

SERVICE MANUAL

DAIHATSU **ROCKY**

FOREWORD

This service manual describes the maintenance and servicing procedures for the 1992 Daihatsu Rocky.

Applicable Model: F300

In this service manual, the entire portion is divided into 23 sections and four supplements. Each section has an index along with a table of contents in the beginning. For easier reference, the upper part of each page bears the section title concerned.

All information used in this service manual was in effect at the time when the manual was approved for printing. However, the specifications and procedures may be revised due to the continuing improvements in the design without advance notice and without incurring any obligation to us.

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IMPORTANT SAFETY NOTICE

The vehicle is a machine comprising a great number of parts. Basically speaking, the vehicle is potentially hazard. However, one can handle it safely if he has the required knowledge.

Correct service methods and repair procedures are very vital for assuring not only the safety and reliability of a vehicle, but also the safety of service personnel concerned.

The methods and procedures contained in this manual describe in a general way the techniques which the manufacturer has recommended. Thus, they will contribute to ensuring the reliability of the products. The contents of the servicing operations come in a wide variety of ways. Moreover, techniques, tools and parts necessary for each operation are different widely from each other.

This manual does not cover all details of techniques, procedures, parts, tools and handling instructions which are necessary for these operations, for such coverage is impossible. Hence, any one who obtains this manual is expected first to make his responsible selection as to techniques, tools and parts which are necessary for servicing the vehicle concerned properly. Furthermore, he must assume responsibility for his actions in connection with his own safety.

Therefore, one should not perform any service if he is not capable of making responsible selection and/or if he can not understand the contents herein described, for this manual has been prepared for experienced service personnel.

WRU90-00003

The following list describes general WARNINGS:

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires you to be under the vehicle.
- Be sure that the ignition switch is always in the OFF position, unless otherwise required by the procedure.
- Set the parking brake when working on the vehicle.
- Operate the engine only in a well-ventilated area to avoid the danger of carbon monoxide.
- Keep yourself and your clothing away moving parts, when the engine is running, especially from the fan and belts.
- To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe, catalytic converter and muffler.
- Do not smoke while working on a vehicle.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on a vehicle.
- Keep hands and other objects clear of radiator fan blades! The electric cooling fan is mounted on the radiator and can start to operate at any time by an increase in underhood temperature. The electric cooling fan is also mounted on the condenser for air conditioner and start to operate in anytime during air conditioner switch "ON". For this reason care should be taken to ensure that the electric cooling fan motor is completely disconnected when working under the hood.

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DAIHATSU

Rocky

GI

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WRU92-GI039

HOW TO USE THIS MANUAL

In this service manual, the entire portion is divided into 21 sections and three supplements. Each section has a table of contents in the beginning. For easier reference, a thumb index is provided. Also, the upper part of each page bears the section title concerned so that you may use this manual readily and fully.

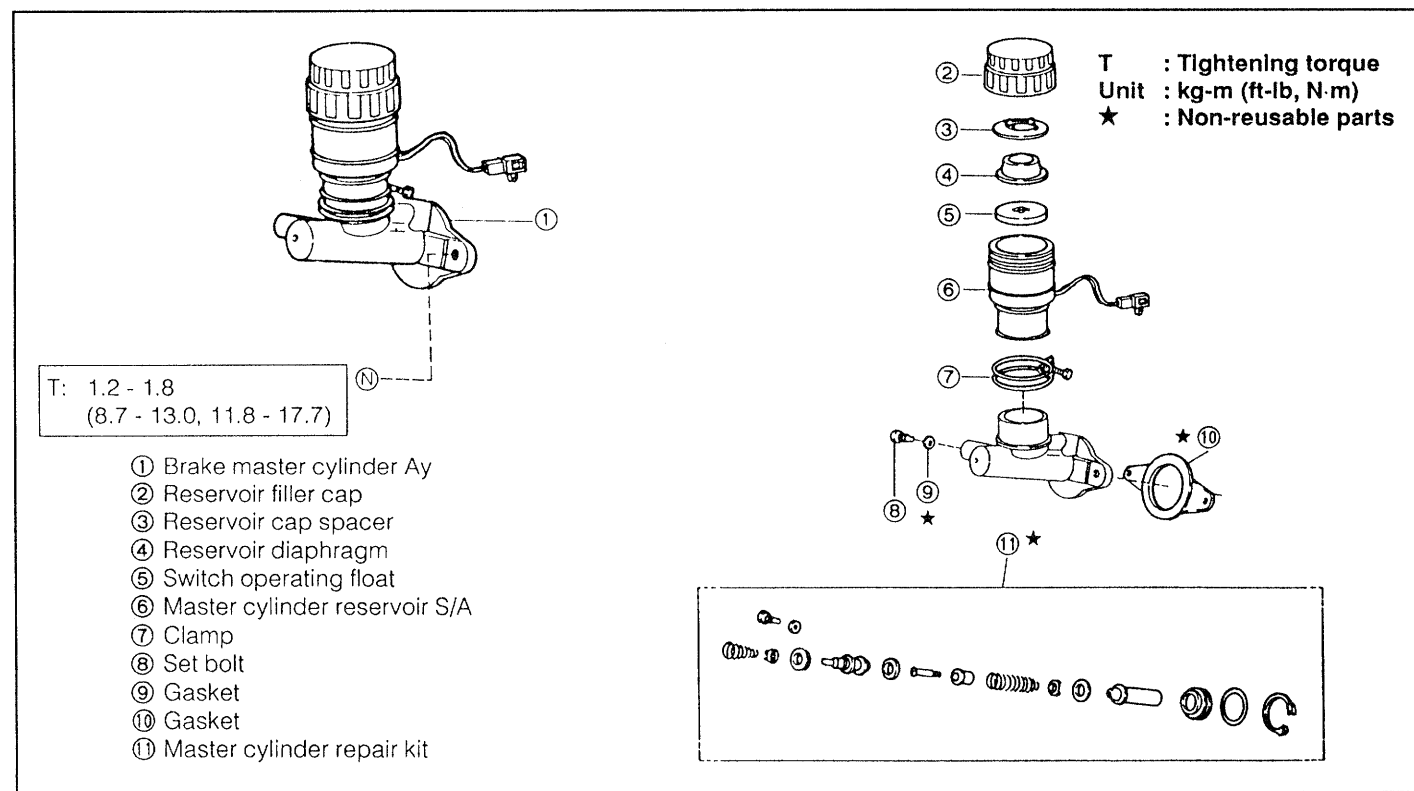
WRU90-GI002

CONTENTS OF EXPLANATION

1. Schematic Diagram of Components

- (1) The schematic diagram of components that appears at the beginning of each section describes the nomenclature and installed conditions of each component. Also, the tightening torque is posted in the figure.
- (2) Those parts whose reuse is not permitted bear a "★" mark for an identification purpose. Be certain to replace these parts with new ones during the assembly.

(Example)



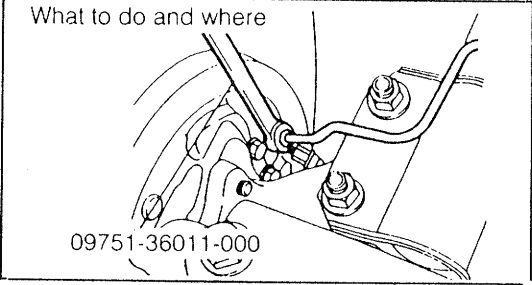
WRU90-GI003

2. Servicing Procedure

- (1) In principle, the servicing procedure is described in the following sequence given below:
Removal → Inspection → Installation, and Disassembly → Inspection → Assembly.
- (2) The explanation covers detailed servicing methods, specifications and notes.
- (3) The main point of each item explains the servicing section and servicing procedure, using illustrations.

WRU90-GI004

(Example)

What to do	How to do it	What to do and where
3. Brake tube installation (1) Install the brake tube to the wheel cylinder temporarily by hands. (2) Tighten the brake tube to the wheel cylinder, using the following SST. SST: 09751-36011-000		

(4) The inspection section in this manual describes only checking operation. Therefore, if you find any malfunction, replace the defective parts with new ones.

WRU90-GI005

3. SST

For those operations which require the use of any SST, the SST numbers concerned are given in bold letters.

Also, a table of all SSTs is collectively posted in the Appendix Data A.

4. Service Specifications

Service specifications are indicated in bold letters or enclosed by heavy lines. Be certain to confirm the specifications concerned.

Service specifications are collectively posted in the Appendix Data B.

5. Tightening Torque

For those operations which require the control of tightening torque, the relevant tightening torque is given in bold letters. Be certain to confirm the tightening torque concerned. Tightening torque specifications are collectively posted in the Appendix Data C.

6. Definitions of Terms

Specified Value A value which represents the allowable range during the inspection and adjustment.

Limit A maximum or a minimum limit which the value should not exceed or fall below.

7. WARNING, CAUTION & NOTE:

All these symbols are indicated in bold letters.

WARNING:

This symbol means that there is a possibility of personal injury of the operator himself or the nearby workers if the operator fails to follow the operating procedure prescribed in this manual.

CAUTION:

This symbol means there is a possibility of damage to the component being repaired if the operator fails to follow the operating procedure prescribed in this manual.

NOTE:

To accomplish the operation in an efficient manner, additional instructions concerning the operation are given in this section.

WRU90-GI006

IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is on the left top of the instrument panel and on the cossmember of the vehicle front section.

J D 2 B F 3 1 0 X N 6 3 0 0 0 2 0

Serial
Number

Factory Code
6: Ikeda No.2
Factory

Model Year
N: 1992

Check digit

Engine
0: HD EFI

Series, GVWR
1: SE, B class
2: SX, B class

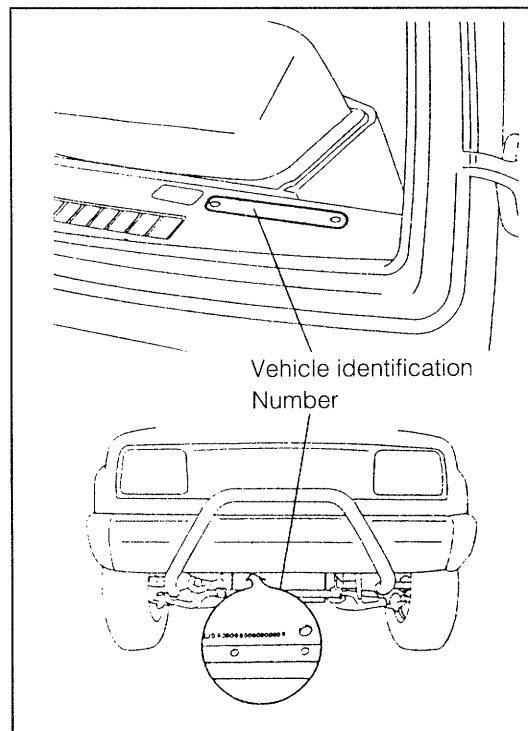
Model
3: F300

Car line
F: ROCKY

Body type
B: RESIN TOP (HARD TOP)
F: SOFT TOP

Vehicle type
2: MULTIPURPOSE CAR

Manufacturer Code
JD: Japan, Daihatsu

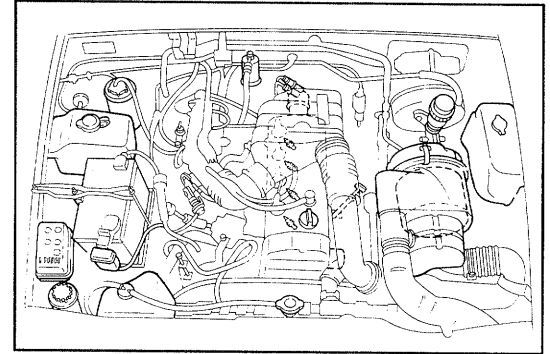


WRU92-G1033

MANUFACTURER'S PLATE

1. Position of Manufacturer's Plate

The manufacturer's plate is affixed on the cowl panel inside the engine compartment.



WRU90-GI008

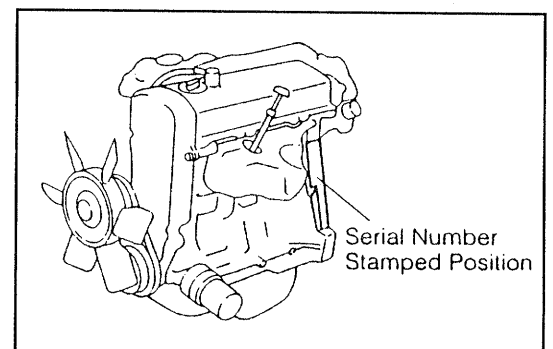
2. Contents of Manufacturer's Plate

(1)	DAIHATSU MOTOR CO.LTD.JAPAN									
(2)	TYPE									
(3)	CHASSIS NO									
(4)	ENGINE									
(5)	COLOR				TRIM					
	ENGINE NO									
	ダイハツ工業株式会社									

- (1) Manufacturer's name, Country
- (2) Vehicle model
- (3) Chassis No. (This column is not used currently.)
- (4) Engine type (This column is not used currently.)
- (5) Body colors code
- (6) Trim code
- (7) Engine No. (This column is not used currently.)
- (8) Manufacturer's name in Japanese.

ENGINE SERIAL NUMBER

The engine serial number is stamped on the side wall of the cylinder block at the transmission side.



WRU90-GI009

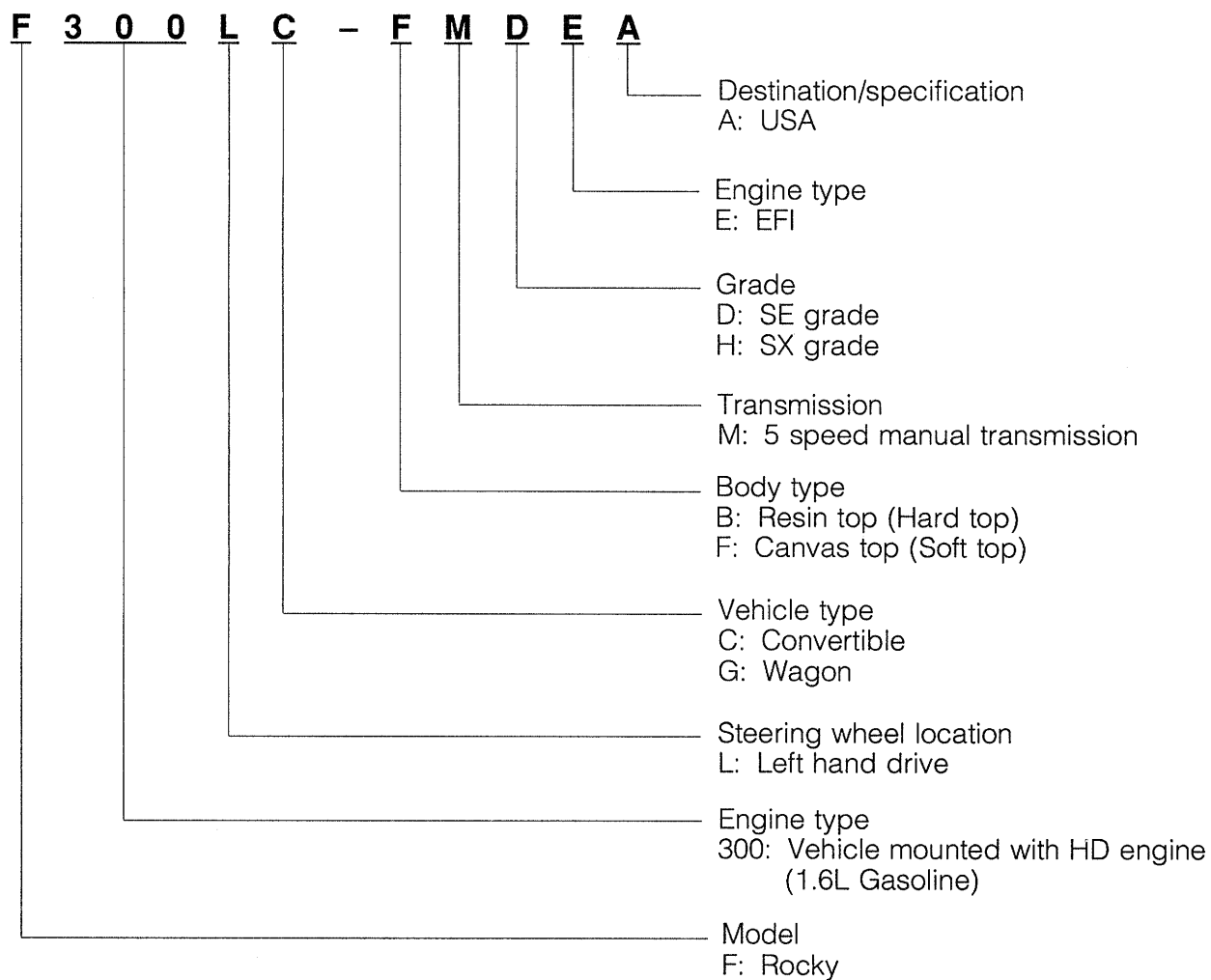
GENERAL INFORMATION

VEHICLE MODELS

Model code	Engine	Transmission	Transfer	Brakes
F300LG – BMDEA F300LG – BMHEA F300LC – FMDEA F300LC – FMHEA	HD	5 M/T	Part time	Front Disc Brake

WRU92-GI036

Explanation of vehicle model code



WRU90-GI011

BODY COLOR INFORMATION

Color code	Color	Color code	Color
045	White	25L (3HI/168)	Red Mica/Gray Metallic
3HI	Red Mica	NA5 (6A5/168)	Black Metallic/Gray Metallic
168	Gray Metallic	NB1 (G09/168)	Green/Gray Metallic
6A5	Black Metallic	NB3 (G12/168)	Trad Green Metallic/Grey Metallic
		NB4 (B22/168)	Marine Blue Metallic/Grey Metallic

WRU92-GI034

COLOR CODE OF THE WORLD

Color	CODE					
	DAIHATSU	AKZO	DUPONT	ICI	SPIES HECKER	STANDOX
WHITE	045	DAH045	L8997	NW-80	16067	045
RED MICA	3HI	DAH3HI	G8730	PC86B	97805	3HI
GRAY. M	168	DAH168	N8832	B936B	97728	168
BLACK. M	6A5	DAH6A5	G8742	A403B	97806	6A5
TWO TONE	25L	DAH25L	G8730/N8832	PC86B/B936B	48226	25L
TWO TONE	NA5	DAHNA5	G8742/N8832	B929B/B936B	48233	NA5
TWO TONE	NB1	DAHNB1	N9305/N8832	XW13/B936B	48480	NB1
TWO TONE	NB3	DAHNB3	L9652/N8832	D575B/B936B	48715	NB3
TWO TONE	NB4	DAHNB4	L9651/N8832	D576B/B936B	48716	NB4

Trim informations

F D S1

Trim color code
S1: Gray

Serial code
A code that has been set in alphabetical order.

Seat main material
F, Y: Fabric
L: Printed leatherette

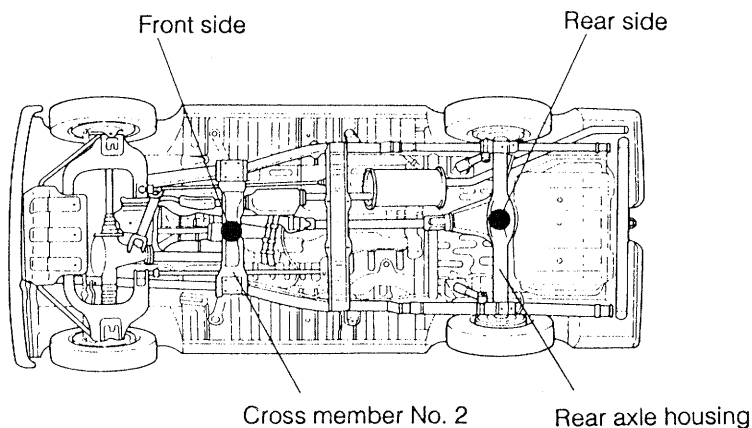
WRU92-GI035

JACKING POINTS AND SUPPORTING POINTS OF SAFETY STANDS

- **Jacking point**

Front side Cross member No.2

Rear side Rear axle housing



WRU90-GI014

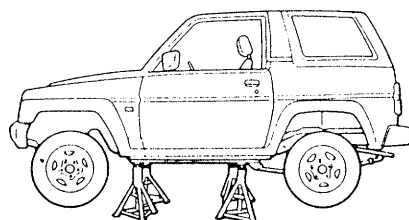
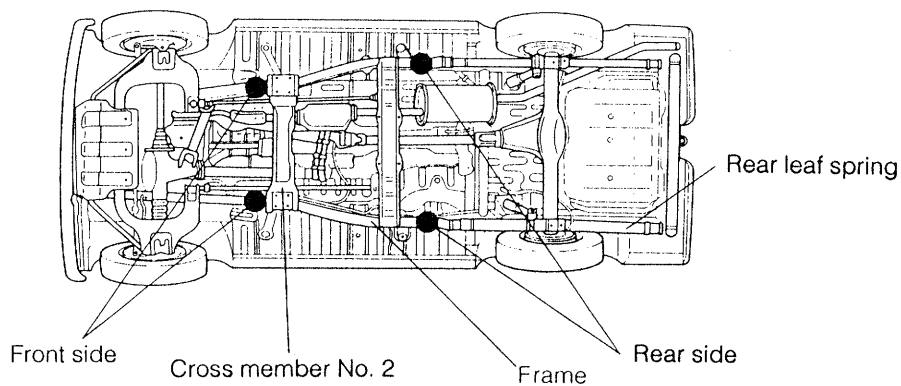
SUPPORTING POINTS OF TWO-POST LIFT

Align the supporting pads of a two-post lift with the supporting points of safety stands, as indicated in the figure below.

- **Supporting points**

Front side Frame (In front of the crossmember No.2)

Rear side..... Frame (In front of the rear leaf spring)



WRU90-GI015

TOWING INFORMATION

We recommend using a towing dolly.
If the wheels or axles are damaged, must be used a towing dolly.

WARNING

Under no circumstance should a person be allowed to ride in a vehicle being towed when the front or rear wheels on the ground.

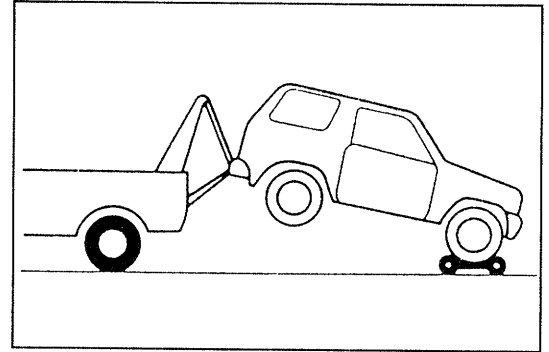
1. Towing with four wheels on ground

The following steps must be performed.

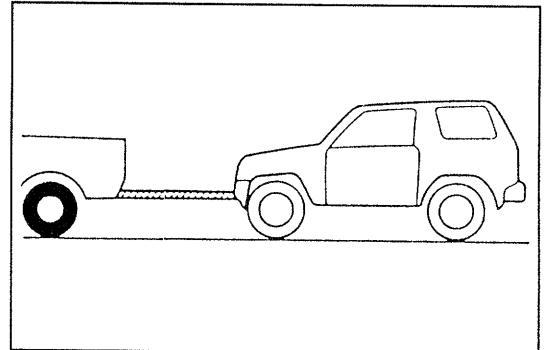
- (1) Parking brake must be released.
- (2) Transmission must be placed in the "NEUTRAL" position.
- (3) Transfer shift lever must be placed in "2H" on Part-time 4WD vehicle.
- (4) Ignition key must be placed in the "ACC" position.
The locking hubs must be placed in the "FREE" position.
- (5) Free wheeling hubs or automatic
- (6) Wheels, axles, drive train and steering must be in good condition.
- (7) Towing speed does not exceed 30 mph (50 km/h).
- (8) Maximum towing distance must be 200 miles (300 km).

CAUTION

- (1) The vehicle can be towed in this manner only when wheels, axles, drive train, steering or brakes are in good condition. Otherwise never try to tow in this manner.
- (2) A driver must ride in the vehicle to maneuver it and operate the brakes.
- (3) When the engine is not running, the brake booster and power steering do not operate. Therefore braking and steering will require much more effort than usual.



WRU90-GI016



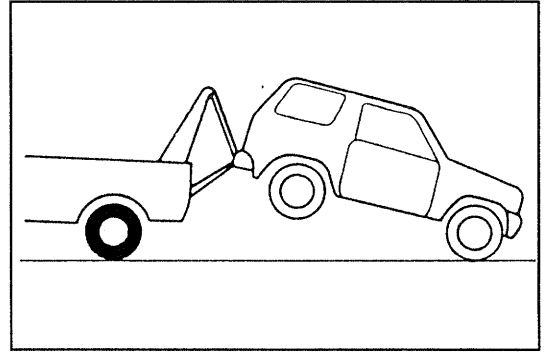
WRU92-GI037

GENERAL INFORMATION

2. Towing with front wheels on ground.

The following steps must be performed.

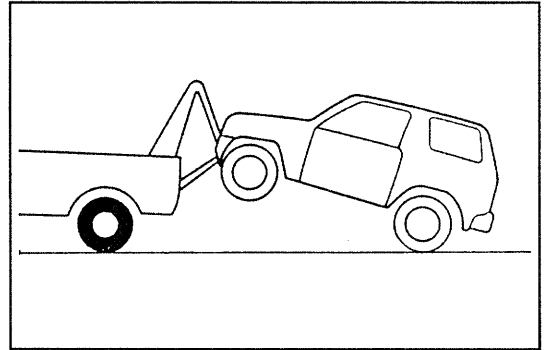
- (1) Transmission must be placed in the "NEUTRAL" position.
- (2) Transfer shift lever must be placed in "2H" on part-time 4WD vehicle.



WRU90-GI018

3. Towing with rear wheels on ground.

- (1) Release the parking brake.
- (2) Same as above 2-(2) to 2-(5) procedure must be performed.



WRU90-GI022

GENERAL SERVICE INSTRUCTIONS

1. Use fender covers, seat covers or floor sheets so that the vehicle may not get dirty or be scratched.
2. Jacking up
 - (1) When only the front section or rear section of the vehicle is jacked up, be sure to place chocks at the wheels so as to insure safe operations.
 - (2) When the vehicle has been jacked up, be sure to support the vehicle at the specified section using safety stands. (See page GI-14)
3. Handling instructions related to battery
 - (1) Before you start performing the electrical works, make certain to disconnect the battery cable from the negative (-) terminal of the battery.
 - (2) When it becomes necessary to disconnect the battery cables for the purpose of carrying out, checks or repairs, always start at the negative (-) battery terminal which is grounded to the body.
 - (3) To avoid damaging the battery plates, after the terminal nut has been loosened, pull out the battery cable straight upward, rather than turning or prying the terminal.
 - (4) Clean the battery terminal posts or cable terminals, using a cloth. Never use a file or other adhesive agents.
 - (5) When connecting the cable terminal to the battery, first the cable terminal should be fitted onto the battery post with the attaching nut in a loose state. Then, tighten the nut. Never tap the terminal onto the battery post, using a hammer.
 - (6) As for the cover at the positive (+) terminal side, be sure to install it at the correct position.
 - (7) When charging the battery, be certain to disconnect the ground cable terminal from the battery negative terminal.
4. Repairing of fuel system
 On the EFI engine, a fairly high pressure is applied to the fuel of the fuel system.
 Therefore, the following notes given below should be observed:
 - (1) When the union bolt is removed take a measure to prevent the fuel from splashing on a clothes or the like. Slacken the union bolt gradually.
 - (2) Tighten each connecting section to the specified torque.
 - (3) Attach the specified clip to each connecting section.
5. For increased work efficiency and improved accuracy, be sure to utilize the SSTs effectively.
6. Removal and disassembly
 - (1) When disassembling complicated components, put stamped marks or mating marks on those sections where such marks do not affect their functions so that the assembling operation may be performed easily.
 - (2) Each time a part is removed, check the part for the assembled condition, deformation, breakage, roughness and scratches.
 - (3) Arrange the disassembled parts in the disassembling order. In addition, separate and arrange those parts to be replaced and those parts to be reused.
 - (4) Thoroughly clean and wash those parts to be reused.
 - (5) Inspection and measurement of parts
 Perform thorough inspection and measurement on those parts to be reused, as required.
7. Installation and assembly
 - (1) Assemble satisfactory parts, following the proper procedure and specified standards. (adjusting values and tightening torque, etc.)
 - (2) Ensure that seal packings and grease are applied to those sections where such application is needed.
 - (3) Be sure to use new packings, gaskets, cotter pins and so forth.
 - (4) Ensure that only the specified bolts and nuts should be used. Moreover, where specified, make sure to employ a torque wrench to tighten bolts and nuts to the specified torque.
 Make sure to use only genuine parts for every replacement.

GENERAL INFORMATION

8. Adjustment and operation check

Adjust the reassembled or replaced components to the servicing specifications, using gauges and testers, as required.

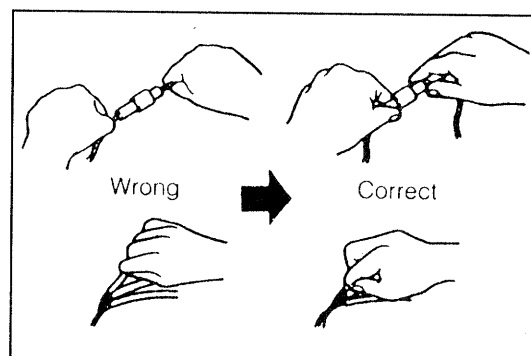
9. Handling of hoses, etc.

- (1) Connect fuel hoses and water hoses, etc. securely so that they exhibit no leakage.
- (2) When disconnecting fuel hoses, make sure that no fuel is splashed around the hose. (Special care must be exercised to the engine mounting rubber, etc., for there is the possibility that the rubber is deteriorated by the gasoline-based liquid.)

WRU90-GI027

10. Observe the following precautions to avoid damage to the parts.

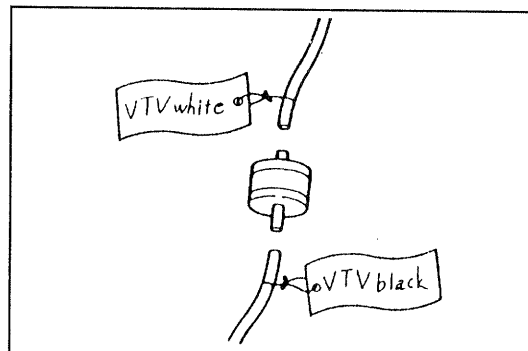
- (1) When pulling out vacuum hoses, be sure to hold the hose end, not the middle part of the hose.
- (2) When disconnecting connectors, be sure to hold the connector itself, not the wire portion.
- (3) Be very careful not to drop electrical components, such as sensors or relays, to the floor. If they are dropped, they must be replaced. Never reuse them.
- (4) When steam cleaning the engine, take precautionary measures so that no water is applied to the air filter, EFI components, distributor, ignition coil and so forth.
- (5) Never use an impact wrench to remove or install thermo switches or thermo sensors.
- (6) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
- (7) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter instead. Once the hose has been stretched, it may leak.



WRU90-GI028

11. Tag hoses before disconnecting them:

- (1) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.
- (2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.



WRU90-GI029

12. The dimensions and specified values that appear in this manual are those values at 20°C (68°F), unless otherwise specified.

13. Handling of clamps

Be certain to reassemble securely in the respective original positions.

14. Touch-up painting

If the bolts, etc. have been removed for the body alignment work and so forth, touch up any scratch on the paint finish of the body and bolts, using the same vehicle body color.

WRU90-GI030

HANDLING INSTRUCTIONS ON CATALYTIC CONVERTER-EQUIPPED VEHICLES

WARNING:

When a great amount of unburnt gas is admitted into the catalytic converter, overheating is prone to occur, resulting in a fire hazard.

To avoid such trouble in advance, be certain to observe the following precautions. Also, be sure to explain such precautions to your customers.

1. Use only unleaded gasoline in your vehicle.
2. Avoid idling the engine for a prolonged periods of time.
Do not run the engine continuously at fast idle speed for more than 10 minutes; at the idle speed for more than 20 minutes.
3. Never perform spark jump tests.
 - (1) The spark jump test must be limited to cases where such test is absolutely necessary. Also, be sure to finish the test in the shortest possible time.
 - (2) Never race the engine during the test.
4. Do not run the engine when the fuel tank becomes nearly empty.
Failure to observe this caution will cause misfiring. Also, it will apply excessive load to the converter, even leading to catalyst damage.
5. Do not dispose the waste catalyst in conjunction with parts contaminated with gasoline or oil.

WRU90-GI031

GENERAL INFORMATION

ABBREVIATION CODES

The abbreviation codes that appear in this Service manual stand for the following.

A/C, AC	Air Conditioner
ACV	Air Control Valve
Ay	Assembly
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BVSV	Bimetal Vacuum Switching Valve
ECU	Electronic Control Unit
EFI	Electronic Fuel Injection
EGR	Exhaust Gas Recirculation
EVSV, EGR VSV	EGR Vacuum Switching Valve
EX	Exhaust (Manifold, Valve)
FC	Fuel pump Control
FL, F/L	Fusible Link
IN	Intake (Manifold, Valve)
ISC	Idle Speed Control
LH	Left Hand
LHD	Left Hand Drive
LLC	Long Life Coolant
M/T, MT	Manual Transmission
MP	Multipurpose
N·m	Newton meter
O ₂ S	Oxygen Sensor
PCV	Positive Crankcase Ventilation
PVSV	Pressure Vacuum Switching Valve
RH	Right Hand
SST	Special Service Tool
STD	Standard
T/F, TF	Transfer
TDC	Top Dead Center
TP	Throttle Positioner
TWC	Three-way Catalyst
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
W/	With
W/O	Without
2WD	Two-wheel Drive Vehicle
4WD	Four-wheel Drive Vehicle

The abbreviation codes that appear in the figure stand for the following.

Ⓑ	Bolt	Ⓢ	Screw
Ⓝ	Nut	Ⓦ	Washer

WRU92-GI038

DAIHATSU

ROCKY

MA

MAINTENANCE

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WRU90-MA001

MAINTENANCE SCHEDULE

GENERAL NOTES

Every service item in the periodic maintenance list must be performed otherwise failure to perform even one item can cause poor engine running and increased exhaust emissions.

WRU90-MA002

NORMAL CONDITION SCHEDULE

Maintenance operations:

A=Check and adjust as necessary; I=Inspection and correct or replace as necessary; R=Replace, change or lubricate.

Service interval:		× 1000 miles		7.5	15	22.5	30	37.5	45	52.5	60	67.5	70	75	80	82.5	90	97.5	100	105	110	112.5	120	See page
[Use odometer reading or months whichever comes first.]		or Months		9	18	27	36	45	54	63	72	81	84	90	96	99	108	117	120	126	132	135	144	
ENGINE COMPONENTS AND EMISSION CONTROL SYSTEMS																								
1	Timing belt										R												R	MA- 7
2	Valve clearance*		A		A		A		A		A			A			A			A			A	MA-13
3	Drive belts ["V" belts]				I					I		I		I			I		I		I		I	MA- 7
4	Engine oil and oil filter*	R	R	R	R	R	R	R	R	R	R		R		R	R	R		R		R	R		MA-10
5	Engine coolant				R					R							R						R	MA-10
6	Catalytic converter																		I					MA-11
7	Exhaust pipes and mountings				I					I							I						I	MA-12
8	Idle speed	A			A					A							A						A	MA-14
9	Air filter*				R					R							R						R	MA- 9
10	Fuel filter				R					R							R						R	MA-12
11	Fuel lines and connections				I					I							I						I	MA-12
12	Fuel tank cap gasket				I					R							I						R	MA-12
13	Spark plug wires and distributor									I													I	MA- 9
14	Spark plugs*				R					R							R						R	MA- 7
15	Positive crankcase ventilation (PCV) system				I					I							I						I	MA-11
16	EGR system									I													I	MA-13
17	Charcoal canister																		I					MA-11
18	Oxygen sensor**	Replace at initial 80,000 miles																					MA-13	
CHASSIS AND BODY																								
19	Clutch pedal		I		I		I		I		I			I			I		I			I		MA-16
20	Brake linings and drums		I		I		I		I		I			I			I		I			I		MA-16
21	Brake pads and discs		I		I		I		I		I			I			I		I			I		MA-17
22	Brake lines and hoses		I		I		I		I		I			I			I		I			I		MA-17
23	Steering linkage		I		I		I		I		I			I			I		I			I		MA-18
24	Steering gear box		I		I		I		I		I			I			I		I			I		MA-19
25	Transmission, transfer and differential oil		I		R		I		R		I			I			R		I			R		MA-19
26	Wheel bearing		I		I		I		I		I			I			I		I			I		MA-20
27	Wheel bearing grease				R				R								R						R	MA-20
28	Steering knuckle & linkage chassis grease		R		R		R		R				R				R			R			R	MA-20
29	Propeller shafts grease		R		R		R		R				R				R			R			R	MA-21
30	Bolts and nuts on chassis and body		I		I		I		I		I			I			I		I			I		MA-22

Performance of the maintenance services indicated by * is a condition of the Emission Control System Warranty.

See Warranty Information Book for complete warranty information.

★...Recommended in California

(NOTE)

After 120,000 miles, the maintenance services should be performed at the same intervals.

SEVERE CONDITION SCHEDULE (1)

Follow the severe condition schedule if vehicle is operated mainly under one or more of the following severe conditions:

- Towing a trailer
- Operating when outside temperature remains below freezing
- Repeated short trips less than 5 miles
- Idling for extended periods and/or low speed operation for long distance such as police, taxi, door-to-door delivery or daily rental service
- Operating in dusty, rough, muddy or salt sprayed roads
- Operating daily for a maximum of 15 miles or less, or continuously for 30 minutes or less

Maintenance operations:

A=Check and adjust as necessary; I=Inspection and correct or replace as necessary; R=Replace, change or lubricate.

Service interval: [Use odometer reading or (months) whichever comes first.]	× 1000 miles	3.75	5	7.5	10	11.25	15	18.75	20	22.5	25	26.25	30
	or Months	4.5	6	9	12	13.5	18	22.5	24	27	30	31.5	36
ENGINE COMPONENTS AND EMISSION CONTROL SYSTEMS													
1. Timing belt													
2. Valve clearance*							A						A
3. Drive belts ("V" belts)													I
4. Engine oil and oil filter (see NOTE 1)	R		R			R	R	R		R		R	R
5. Engine coolant													R
6. Catalytic converter													
7. Exhaust pipes and mountings (see NOTE 1)							I						I
8. Idle speed	A												A
9. Air filter (see NOTE 2)*			I		I		I		I		I		R
10. Fuel filter													R
11. Fuel lines and connections													I
12. Fuel tank cap gasket													I
13. Spark plug wires and distributor													
14. Spark plugs*													R
15. Positive crankcase ventilation (PCV) system													I
16. EGR system													
17. Charcoal canister													
18. Oxygen sensor**		Replace at initial 80,000 miles											
CHASSIS AND BODY													
19. Clutch pedal				I			I			I			I
20. Brake linings and drums				I			I			I			I
21. Brake pads and discs				I			I			I			I
22. Brake lines and hoses							I						I
23. Steering linkage				I			I			I			I
24. Steering gear box							I						I
25. Transmission, transfer and differential oil			R				R			R			R
26. Wheel bearing							I						I
27. Wheel bearing grease													R
28. Steering knuckle & linkage chassis grease				R			R			R			R
29. Propeller shafts grease				R			R			R			R
30. Bolts and nuts on chassis and body (see NOTE 2)				I			I			I			I

MAINTENANCE

Maintenance operations:

A=Check and adjust as necessary; I=Inspection and correct or replace as necessary; R=Replace, change or lubricate.

Service interval: [Use odometer reading or (months) whichever comes first.]	× 1000 miles	33.75	35	37.5	40	41.25	45	48.75	50	52.5	55	56.25	60
	or Months	40.5	42	45	48	49.5	54	58.5	60	63	66	67.5	72
ENGINE COMPONENTS AND EMISSION CONTROL SYSTEMS													
1. Timing belt													
2. Valve clearance*							A						A
3. Drive belts ("V" belts)													I
4. Engine oil and oil filter (see NOTE 1)	R			R		R	R	R		R		R	R
5. Engine coolant													R
6. Catalytic converter													
7. Exhaust pipes and mountings (see NOTE 1)							I						I
8. Idle speed	A												A
9. Air filter (see NOTE 2)*			I		I		I		I		I		R
10. Fuel filter													R
11. Fuel lines and connections													I
12. Fuel tank cap gasket													I
13. Spark plug wires and distributor													
14. Spark plugs*													R
15. Positive crankcase ventilation (PCV) system													I
16. EGR system													
17. Charcoal canister													
18. Oxygen sensor**	Replace at initial 80,000 miles												
CHASSIS AND BODY													
19. Clutch pedal				I			I			I			I
20. Brake linings and drums				I			I			I			I
21. Brake pads and discs				I			I			I			I
22. Brake lines and hoses							I						I
23. Steering linkage				I			I			I			I
24. Steering gear box							I						I
25. Transmission, transfer and differential oil				R			R			R			R
26. Wheel bearing							I						I
27. Wheel bearing grease													R
28. Steering knuckle & linkage chassis grease				R			R			R			R
29. Propeller shafts grease				R			R			R			R
30. Bolts and nuts on chassis and body (see NOTE 2)				I			I			I			I

Performance of the maintenance services indicated by * is a condition of the Emission control system Warranty.

See Warranty Information Book for complete warranty information.

★...Recommended in California

(NOTE)

1. Applicable when you mainly operate your vehicle on rough and/or muddy road. If not, apply the schedule for NORMAL driving.
2. Applicable when you mainly operate your vehicle on dusty roads. If not, apply the schedule for NORMAL driving.
3. After 120,000 miles, the maintenance services should be performed at the same intervals.

SEVERE CONDITION SCHEDULE (2)

Maintenance operations:

A=Check and adjust as necessary; I=Inspection and correct or replace as necessary; R=Replace, change or lubricate.

Service interval: [Use odometer reading or (months) whichever comes first.]	× 1000 miles	63.75	65	67.5	70	71.25	75	78.75	80	82.5	85	86.25	90
	or Months	76.5	78	81	84	85.5	90	94.5	96	99	102	103.5	108
ENGINE COMPONENTS AND EMISSION CONTROL SYSTEMS													
1. Timing belt													
2. Valve clearance*							A						A
3. Drive belts ("V" belts)													I
4. Engine oil and oil filter (see NOTE 1)	R			R		R	R	R		R		R	R
5. Engine coolant													R
6. Catalytic converter													
7. Exhaust pipes and mountings (see NOTE 1)							I						I
8. Idle speed	A												A
9. Air filter (see NOTE 2)*			I		I		I		I		I		R
10. Fuel filter													R
11. Fuel lines and connections													I
12. Fuel tank cap gasket													I
13. Spark plug wires and distributor													
14. Spark plugs*													R
15. Positive crankcase ventilation (PCV) system													I
16. EGR system													
17. Charcoal canister													
18. Oxygen sensor**		Replace at initial 80,000 miles											
CHASSIS AND BODY													
19. Clutch pedal				I			I			I			I
20. Brake linings and drums				I			I			I			I
21. Brake pads and discs				I			I			I			I
22. Brake lines and hoses							I						I
23. Steering linkage				I			I			I			I
24. Steering gear box							I						I
25. Transmission, transfer and differential oil				R			R			R			R
26. Wheel bearing							I						I
27. Wheel bearing grease													R
28. Steering knuckle & linkage chassis grease				R			R			R			R
29. Propeller shafts grease				R			R			R			R
30. Bolts and nuts on chassis and body (see NOTE 2)				I			I			I			I

WRU92-MA073

MAINTENANCE

Maintenance operations:

A=Check and adjust as necessary; I=Inspection and correct or replace as necessary; R=Replace, change or lubricate.

Service interval: [Use odometer reading or (months) whichever comes first.]	× 1000 miles	93.75	95	97.5	100	101.25	105	108.75	110	112.5	115	116.25	120
	or Months	112.5	114	117	120	121.5	126	130.5	132	135	138	139.5	144
ENGINE COMPONENTS AND EMISSION CONTROL SYSTEMS													
1. Timing belt													
2. Valve clearance*							A						A
3. Drive belts ("V" belts)													I
4. Engine oil and oil filter (see NOTE 1)	R			R		R	R	R		R		R	R
5. Engine coolant													R
6. Catalytic converter													
7. Exhaust pipes and mountings (see NOTE 1)							I						I
8. Idle speed	A												A
9. Air filter (see NOTE 2)*			I		I		I		I		I		R
10. Fuel filter													R
11. Fuel lines and connections													I
12. Fuel tank cap gasket													I
13. Spark plug wires and distributor													
14. Spark plugs*													R
15. Positive crankcase ventilation (PCV) system													I
16. EGR system													
17. Charcoal canister													
18. Oxygen sensor**	Replace at initial 80,000 miles												
CHASSIS AND BODY													
19. Clutch pedal				I			I			I			I
20. Brake linings and drums				I			I			I			I
21. Brake pads and discs				I			I			I			I
22. Brake lines and hoses							I						I
23. Steering linkage				I			I			I			I
24. Steering gear box							I						I
25. Transmission, transfer and differential oil				R			R			R			R
26. Wheel bearing							I						I
27. Wheel bearing grease													R
28. Steering knuckle & linkage chassis grease				R			R			R			R
29. Propeller shafts grease				R			R			R			R
30. Bolts and nuts on chassis and body (see NOTE 2)				I			I			I			I

Performance of the maintenance services indicated by * is a condition of the Emission control system Warranty.

See Warranty Information Book for complete warranty information.

★...Recommended in California

(NOTE)

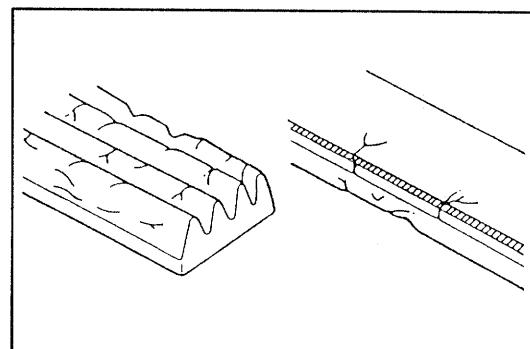
1. Applicable when you mainly operate your vehicle on rough and/or muddy road. If not, apply the schedule for NORMAL driving.
2. Applicable when you mainly operate your vehicle on dusty roads. If not, apply the schedule for NORMAL driving.
3. After 120,000 miles, the maintenance services should be performed at the same intervals.

MAINTENANCE OPERATIONS

COLD ENGINE OPERATIONS

1. Replacement of timing belt
 - (1) Remove the timing belt.
(See section EM)
 - (2) Install the timing belt.
(See section EM)
2. Inspection of drive belt (V-ribbed belt)
 - (1) Visually check the belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed core, separation of the rib from the adhesive rubber, cracks or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs. If necessary, replace the drive belt.

WRU90-MA008



WRU90-MA009

- (2) Measure the amount of the drive belt deflection when the midpoint of the drive belt between the alternator and the water pump pulley is pushed with a force of 22 lb (10 kg).

Specified Belt Deflection

New belt:

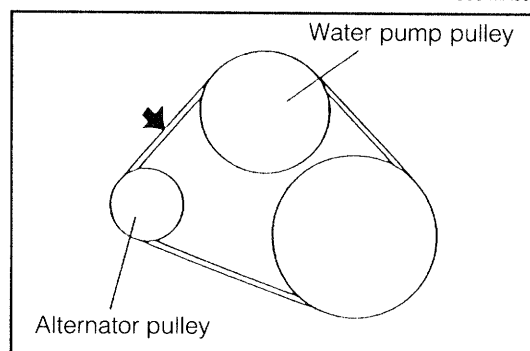
4 - 5 mm (0.16 - 0.20 inch)

[with a force of 10 kg (22 lb) applied at the point shown in the figure.]

Used belt:

5 - 6 mm (0.20 - 0.24 inch)

[with a force of 10 kg (22 lb) applied at the point shown in the figure.]



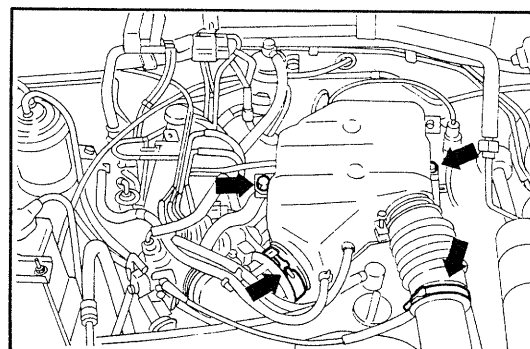
WRU90-MA010

If necessary, adjust the drive belt tension.

NOTE:

- "New belt" refers to a belt which has been used on a running engine for less than five minutes.
- "Used belt" refers to a belt which has been used on a running engine for five minutes or more.
- After replacing the drive belt, check that it fits properly in the ribbed grooves, especially in the places difficult to see.
- After installing a new belt, run the engine for about five minutes and then recheck the tension.

3. Replacement of spark plugs
 - (1) Remove the air chamber.
 - ① Unlock the clamps.
 - ② Remove the bolts.



WRU90-MA011

MAINTENANCE

- (2) Disconnect the spark plug wire at the spark plug side.
- (3) Remove the spark plug, using the following SST.
SST: 09268-87703-000

WARNING:

Since the spark plugs are hot care must be exercised to avoid getting scalded.

- (4) Using a plug gap gauge, check the air gap on the new spark plugs.

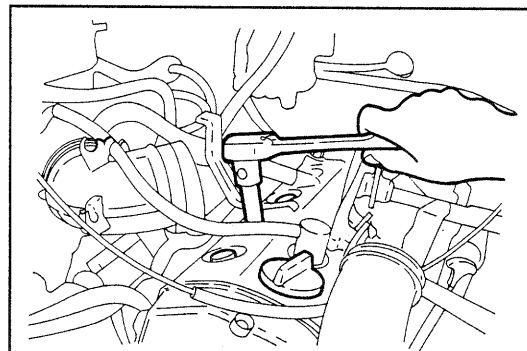
Specified Air Gap:

CHAMPION:	RC9YC4	1.0 - 1.1 mm (0.039 - 0.043 inch)
NIPPONDENSO:	K20PR-U11	
NGK:	BKR6E-11	

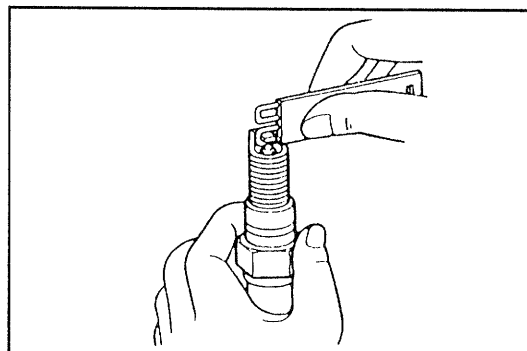
NOTE:

When adjusting the gap of a new plug, bend only the base of the ground electrode. Do not touch the tip. Never attempt to adjust the gap on a used spark plug.

Make sure that all four spark plugs are of the same manufacturer and have the same heating range.



WRU90-MA012



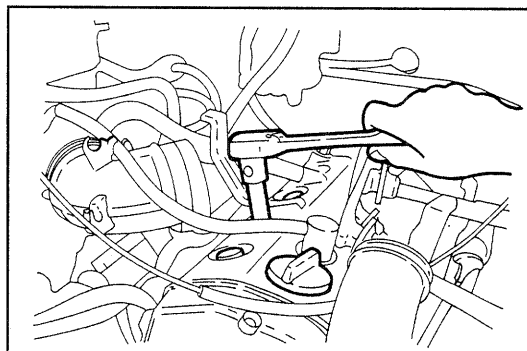
WRU90-MA013

- (5) Install the spark plug, using the following SST.
SST: 09268-87703-000
Specified Tightening Torque:
1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

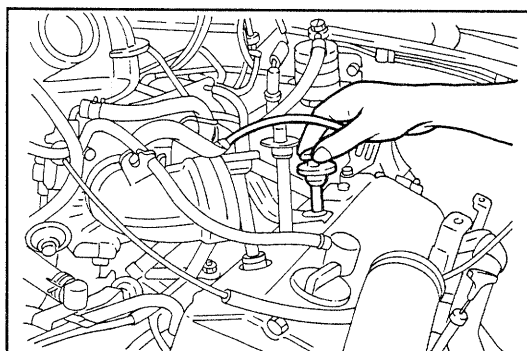
NOTE:

Since the insulator strength of a small spark plug is comparatively smaller than that of regular spark plugs, when tightening, be sure to use the tool exclusively used for this application. Also, when tightening, never use the wrench in a crooked way.

- (6) Connect the spark plug wire to the spark plug.

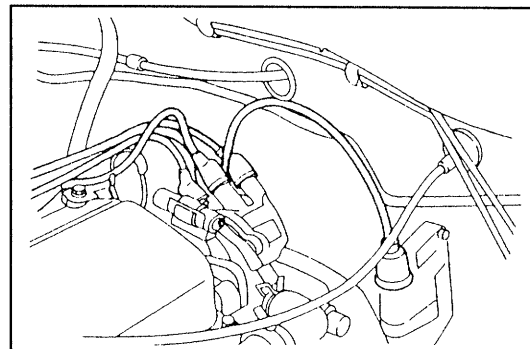


WRU90-MA014



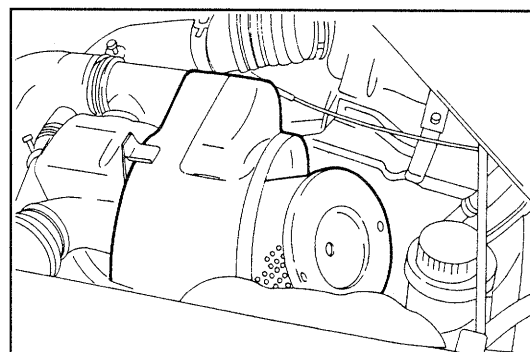
WRU90-MA015

4. Inspection of spark plug wires and distributor
 - (1) Visually inspect spark plug wires for loose connections, deterioration, cracks or other damage. Also visually inspect distributor cap for cracks. Securely connect or replace parts as necessary.
 - (2) Installed the air chamber.



WRU90-MA016

5. Inspection of air filter
 - (1) Removal of the air filter element from the air cleaner case
 - 1) Unlock the air cleaner cap at the three points.
 - 2) Remove the air filter element installing nut, then remove the air filter element.
 - (2) Visually check that the air cleaner element is not excessively dirty, damaged or oil. Replace the air filter element, if necessary.



WRU90-MA017

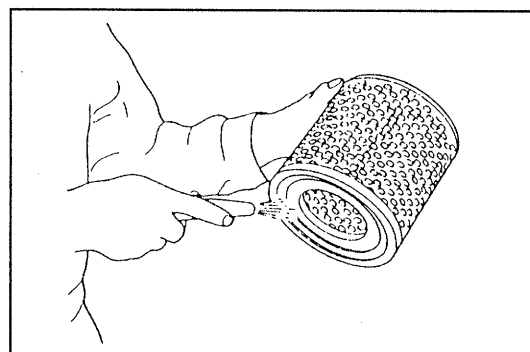
- (3) Clean the element with compressed air.

First blow compressed air from the inside thoroughly. Then, blow off the outside of the element.

CAUTION:

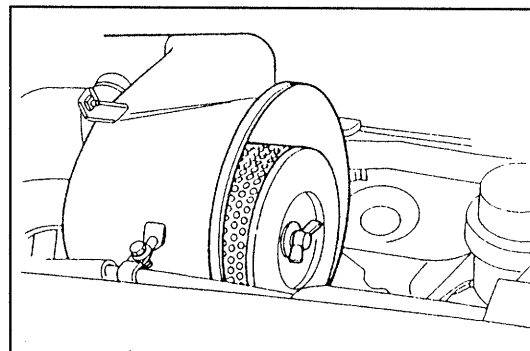
The air pressure to be used for this cleaning operation should not exceed 4.0 kg/cm² (56.9 psi).

Replace the air filter element, if necessary.



WRU90-MA018

- (4) Install the air cleaner filter element in the air cleaner case using the installing nut.

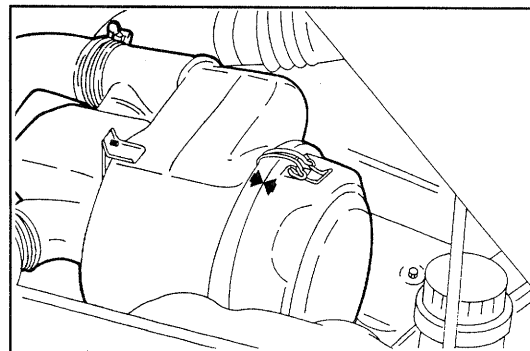


WRU90-MA019

- (5) Lock the air cleaner cap at the three points.

NOTE:

Align the matching marks provided on the air cleaner case and cap.



WRU90-MA020

MAINTENANCE

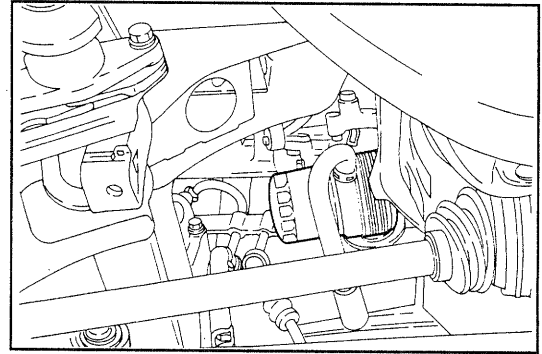
6. Engine oil change and oil filter replacement
(See section LU)

Oil grade: API grade SG or SF, multigrade viscosity
and fuel-efficient oil

Engine oil capacity

Drain and refill: 3.3 liters (3.5 U.S. qts.)

Drain and refill with oil filter replacement:
3.5 liters (3.7 U.S. qts.)



WRU90-MA021

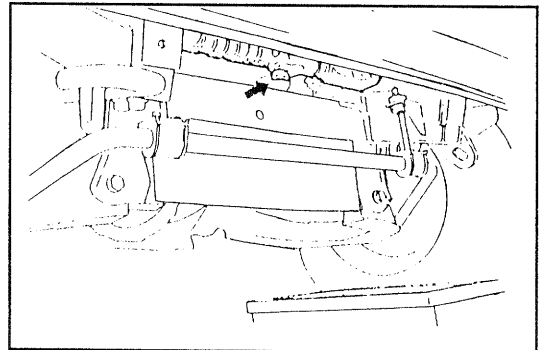
7. Engine coolant change

WARNING:

To avoid the risk of burn or injuries, never remove the radiator cap or the drain plug if the engine is still hot.

CAUTION

As regards water to be used as cooling water, use soft water which does not contain salt or minerals, calcium, magnesium and so forth.



WRU90-MA022

- (1) Remove the radiator cap.
- (2) Drain the coolant from the radiator drain plug.
- (3) Close the drain plug.
- (4) Fill the radiator with water.
- (5) Repeat the steps (2) to (4).
- (6) Drain the coolant of the reserve tank.

- (7) Pour the radiator and reserve tank with ethylene-glycol base antifreeze of a good brand. The mixing ratio should be decided according to the manufacturer's instructions of manufacturer of antifreeze solution.

Reference:

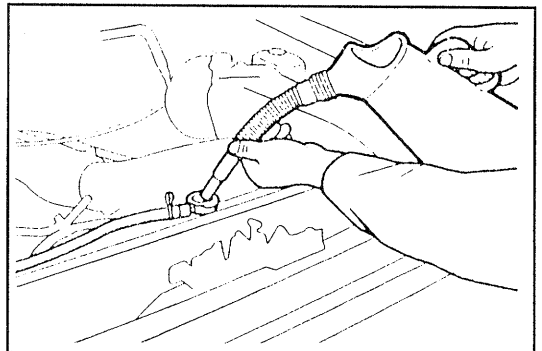
Coolant Capacity

5.5 liters (5.8 U.S. qts)

[excluding 1.0 liter (1.1 U.S. qts.) for reserve tank]

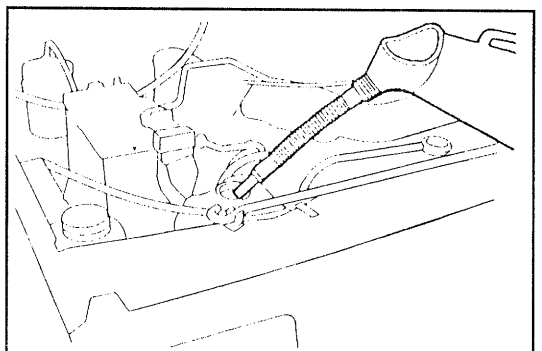
CAUTION

Use a good brand of ethylene-glycol base antifreeze solution.



WRU90-MA023

- (8) Fill the radiator with water.
- (9) Fill the reserve tank with water up to the full level.
- (10) Start the engine. Check to see if the coolant level in the radiator drops.
If the coolant level drops, replenish the water.
- (11) Install the radiator cap and reserve tank cap.



WRU90-MA024

- (12) Warm up the engine thoroughly. Afterwards, allow the coolant to cool down to the atmospheric temperature.
 Recheck the coolant level at the reserve tank. Add coolant to the full level, as required.
 If no coolant remains at all in the reserve tank, recheck the coolant level in the radiator. Replenish the radiator with water, as required.
 Replenish the reserve tank with coolant up to the full level.

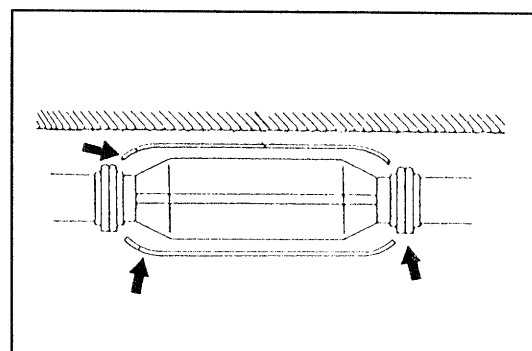
NOTE:

Here, the coolant refers to the mixture of water and antifreeze that has been mixed in accordance with the instructions of the antifreeze manufacturer.

8. Catalytic converter inspection

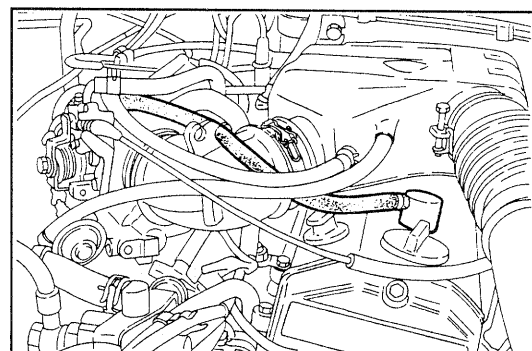
- (1) Check catalytic converter for dents or damage.
- (2) Check heat insulator for damage.
- (3) Check for adequate clearance between catalytic converter and heat insulator.

WRU90-MA025



9. Inspection of the positive crankcase ventilation (PCV) system.
 Inspect the PVC hoses for collapse, cracks, damage or bulge.
 Replace any faulty parts, as required.

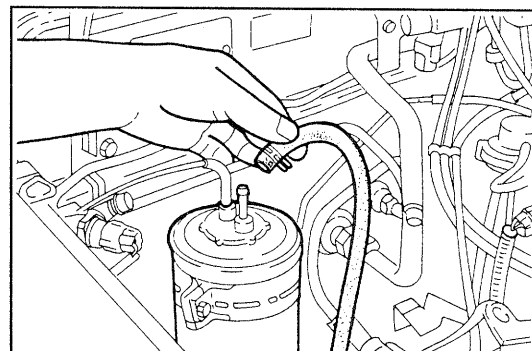
WRU90-MA026



10. Inspection of charcoal canister

- (1) Put a label on each hose connected to the charcoal canister so that each hose may be installed to the correct original position.
- (2) Disconnect the hoses connected to the charcoal canister.
- (3) Unlock the charcoal canister by raising it.

WRU90-MA027

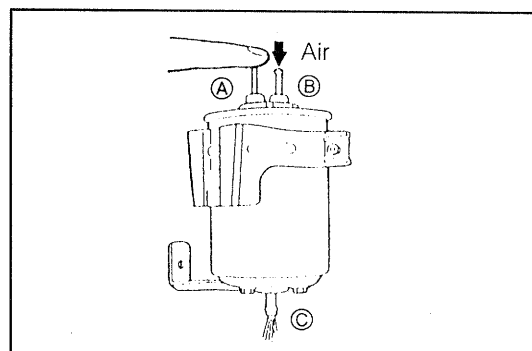


WRU90-MA028

- (4) Plug the pipe ① with your finger and blow compressed air 3kg/cm² (43 psi) through the pipe ② (fuel tank side).
 - Check that air comes out of the bottom pipe ③ without resistance.
 - Check that no activated charcoal comes out.
 If necessary, replace the charcoal canister.

NOTE:

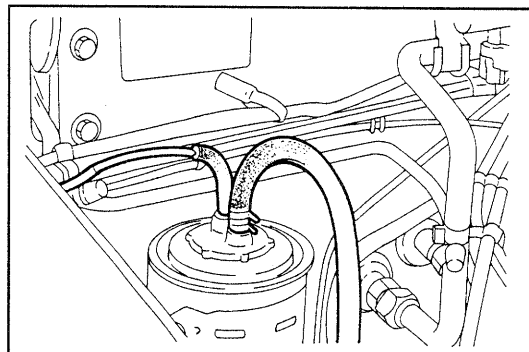
Do not attempt to wash the charcoal.



WRU90-MA029

MAINTENANCE

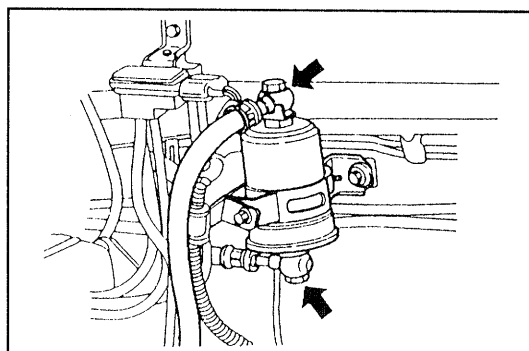
- (5) Install the charcoal canister.
- (6) Install the disconnected hoses according to the respective label.
- (7) Remove the labels attached to the hoses.



WRU90-MA030

11. Fuel filter replacement

Replace the fuel filter when schedules.
(See section EF)



WRU90-MA031

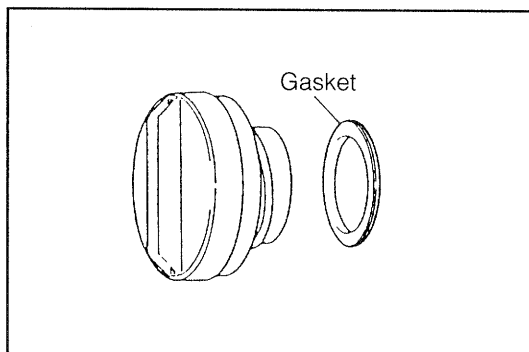
12. Replacement of gasket in fuel tank cap

- (1) Remove the fuel tank cap.
- (2) Remove the old gasket ("O" ring) from the fuel tank cap.

NOTE:

Do not damage the cap.

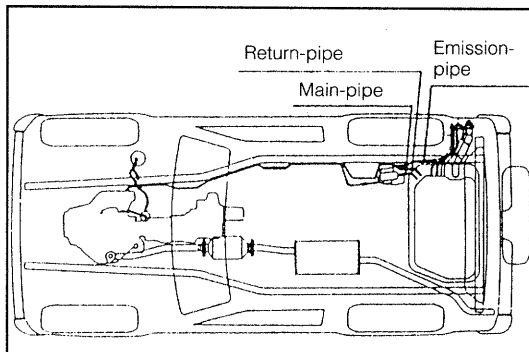
- (3) Inspect the cap for damage or cracks.
If necessary, replace the cap.
- (4) Install the new gasket by hand.
- (5) Install the cap and check the torque limiter.
If necessary, replace the cap.



WRU90-MA032

13. Inspection of fuel lines and connections

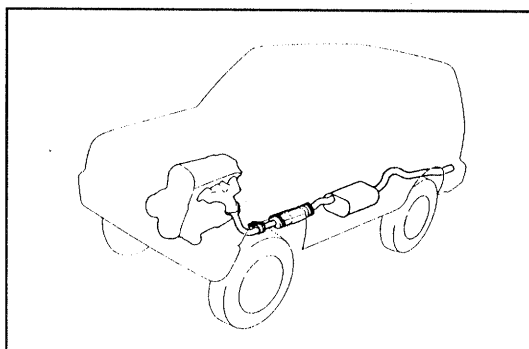
Visually inspect the fuel lines for cracks, leakage, loose connections, or deformation.



WRU90-MA033

14. Inspection of exhaust pipe and mountings

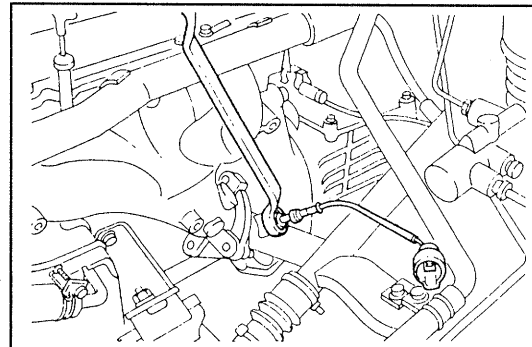
Visually inspect the pipes, hangers, and connections for severe corrosion, leaks or damage.



WRU90-MA034

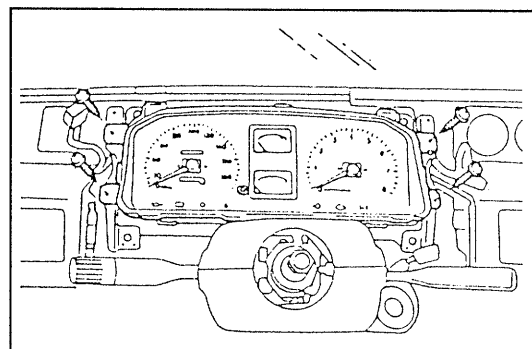
15. Oxygen sensor replacement

- (1) Replace the oxygen sensor at 128,000 km (80,000 miles)



WRU90-MA035

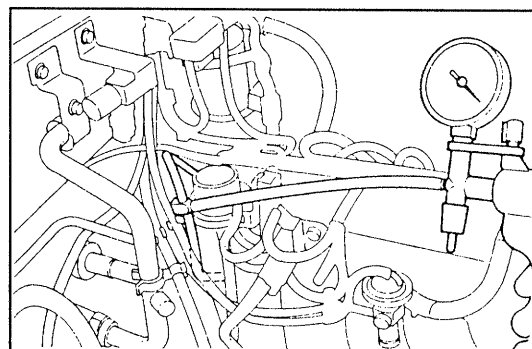
- (2) Remove the warning bulb for oxygen sensor indicator light.
(See section BE)



WRU90-MA036

16. Inspection of EGR system

- Check EGR system for proper operation.
(See section EC)



WRU90-MA037

HOT ENGINE OPERATIONS

1. Valve clearance adjustment
(See section EM)

NOTE:

Check and adjust the valve clearance while the engine is hot*.

*: Here, "hot" denotes engine conditions where the cooling water temperature is above 80°C (176°F), and the lubrication oil temperature is above 60°C (110°F).

Valve clearance (Hot)

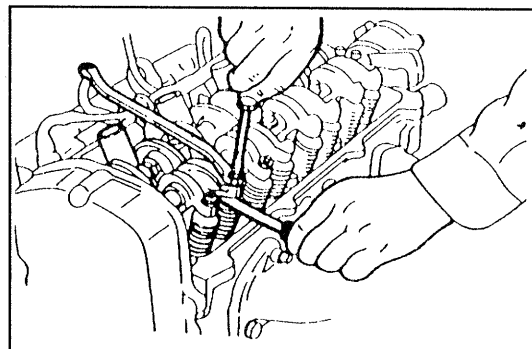
Intake: 0.20 - 0.30 mm (0.008 - 0.012 inch)

Exhaust: 0.28 - 0.38 mm (0.011 - 0.015 inch)

(Reference: cold)

Intake: 0.18 mm (0.007 inch)

Exhaust: 0.25 mm (0.010 inch)



WRU90-MA038

2. Idle speed adjustment

(1) Perform the preparatory operations given below.

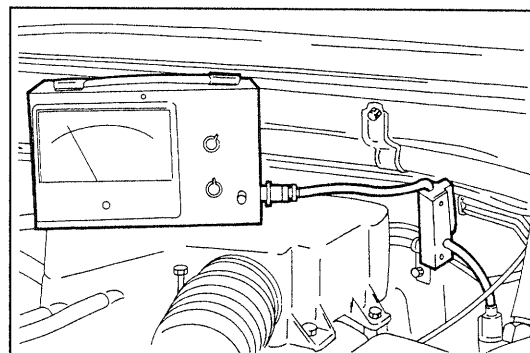
- Securely apply the parking brake.
- Ensure that no diagnosis code has been memorized in the ECU. (Except normal code.)
- The air cleaner filter element installed.
- All pipes and hoses of the air intake system connected.
- All vacuum lines connected (i.e. PCV system, etc.)
- All accessories switched OFF.
- Ensure that the exhaust and intake systems exhibit no gas leakage.
- The EFI system wiring connectors fully plugged.
- The transmission in the "Neutral" position.
- The steering wheel in the straight ahead condition. (Power steering equipped vehicle only)
- Warm up the engine thoroughly.

NOTE:

If the idle speed adjustment can not be performed, check the systems described in step (1).

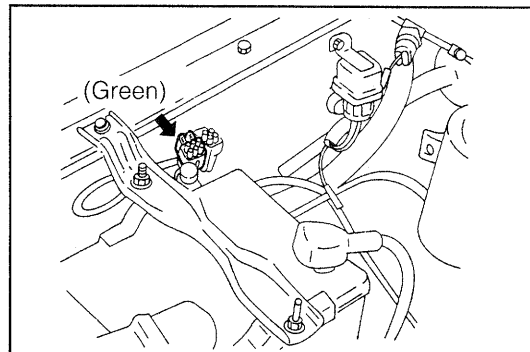
WRU90-MA039

(2) Connect the measuring terminal of a tachometer to the engine.



WRU90-MA040

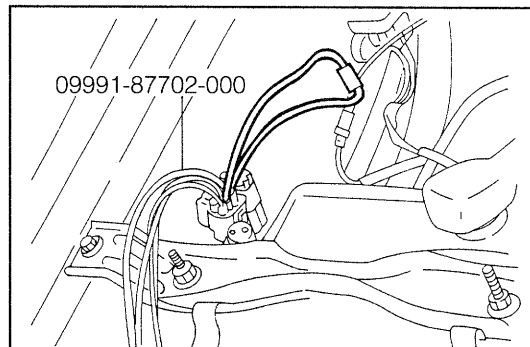
(3) Remove the engine check terminal cap (Green).



WRU90-MA041

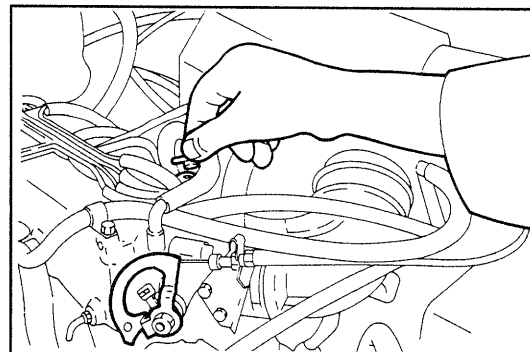
(4) Connect the following SST to the check terminal and connect the test terminal (Brown) with Ground terminal (Black).

SST: 09991-87702-000



WRU90-MA042

- (5) Remove the idle adjusting screw cap from the throttle body.
- (6) Race the engine to 2000 rpm (do not exceed the 4000 rpm) for 2 - 3 times.

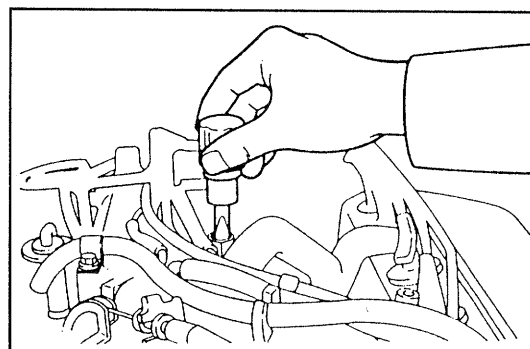


WRU90-MA043

- (7) Adjust the idle speed to specified rpm by turning the idle adjusting screw.
Idle rpm (T terminal short): 800 ± 50 rpm

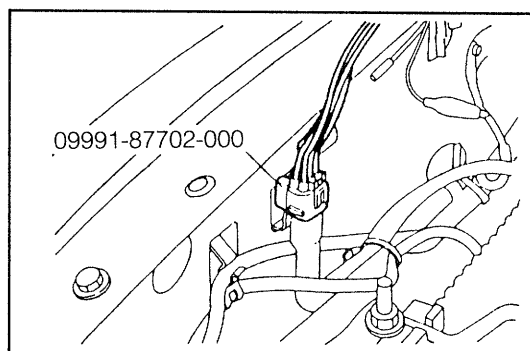
NOTE:

This adjustment should be encountered while the engine is warmed up thoroughly.



WRU90-MA044

- (8) Remove the SST from the engine check connector.
- (9) Race the engine to 2000 rpm (do not exceed the 4000 rpm) for 2 - 3 times.



WRU90-MA045

- (10) Ensure that the engine idle rpm is within the specification.
Idle rpm: 850 ± 50 rpm

- (11) Turn off the ignition switch.
- (12) Install the engine check terminal cap to the engine check terminal.
- (13) Install the idle adjusting screw cap to the throttle body.
- (14) Remove the tachometer.
- (15) Remove the SST from the distributor wire connectors.
- (16) Connect the distributor wire connector.

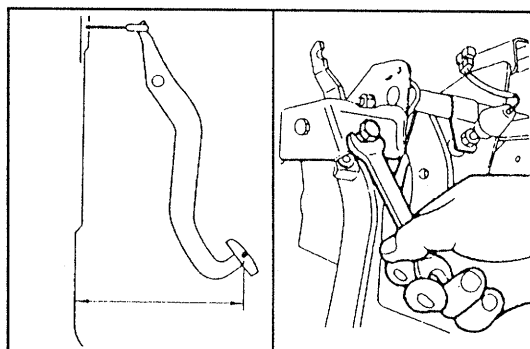
WRU90-MA046

CLUTCH PEDAL

1. Check of clutch
 - (1) Adjust the clutch pedal height by means of the set bolt.
Clutch Pedal Installation Height:
 $219 - 227$ mm (8.62 - 8.94 inch)

NOTE:

The clutch pedal height should be measured from the body metal section by rolling up the carpet and floor mat.



WRU90-MA047

MAINTENANCE

- (2) Connect the clutch cable to the clutch pedal. Adjust the clutch free travel.

Adjust the clutch pedal free travel by moving the clip of the clutch cable.

Clutch Pedal Free Travel:

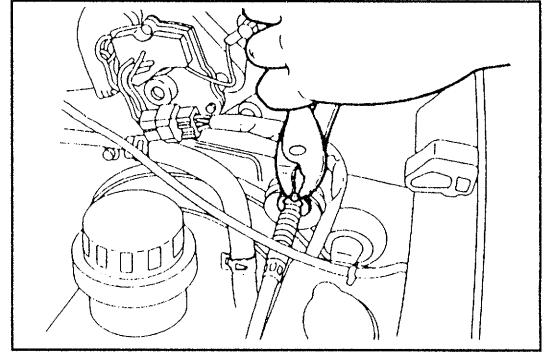
18 - 27 mm (0.071 - 1.06 inch)

NOTE:

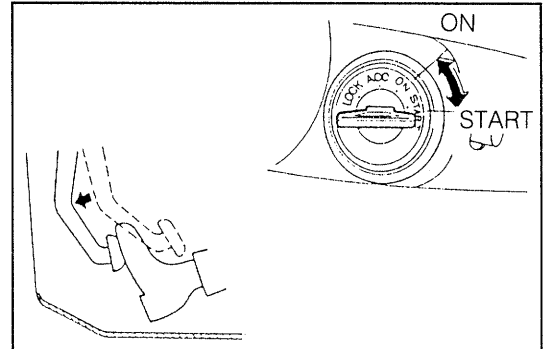
Apply grease to the clutch cable and the installation section of the pedal.

2. Check of clutch switch

- (1) Ensure that the engine will not start when the clutch pedal is not fully depressed.
- (2) Ensure that the engine can start when the clutch pedal is fully depressed.



WRU90-MA048



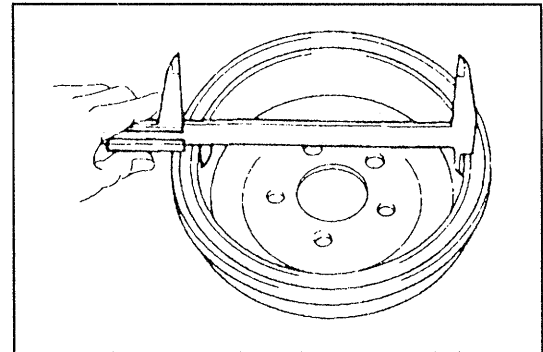
WRU90-MA049

BRAKE LININGS AND DRUMS

1. Inspect the brake drum for damage, inner surface wear, scores, or uneven wear.

Specified Diameter: 254.0 mm (10.00 inch)

Allowable Limit: 256.0 mm (10.08 inch)

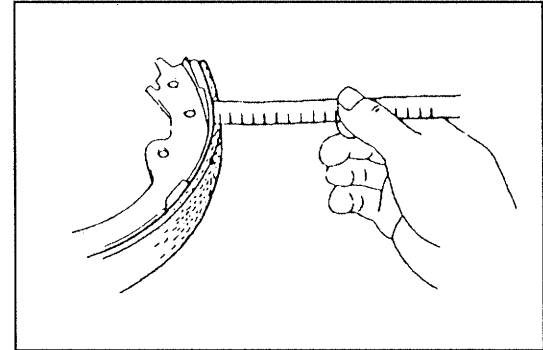


WRU90-MA050

2. Inspect the brake linings for wear.

Specified Value: 5.0 mm (0.197 inch)

Allowable Limit: 1.0 mm (0.0393 inch)



WRU90-MA051

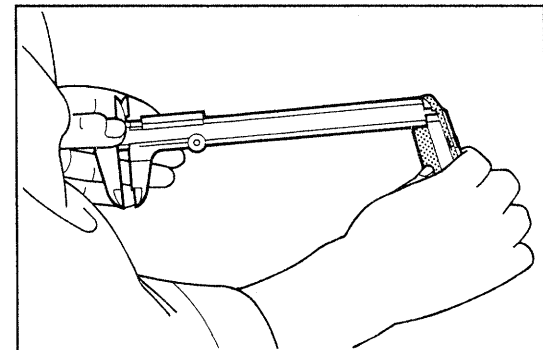
BRAKE PADS AND DISCS

1. Check of brake disc pad for thickness, wear and damage
If the pads thickness is less than 1.0 mm (0.04 inch), replace the pad.

- (1) Measure brake pad thickness.

If the pads thickness is less than 1.0 mm (0.04 inch), replace the pad.

- (2) Inspect uneven wear and damage.



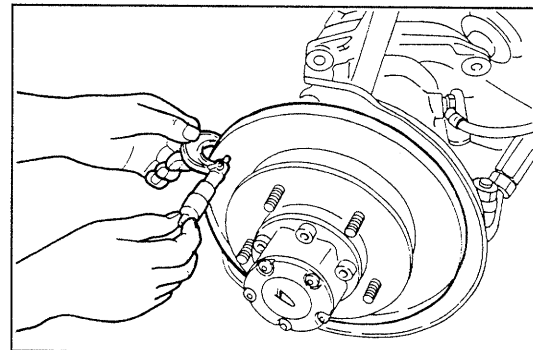
WRU90-MA052

2. Check of brake disc for wear, damage
 - (1) Clean the brake disc surface and measure the disc thickness.

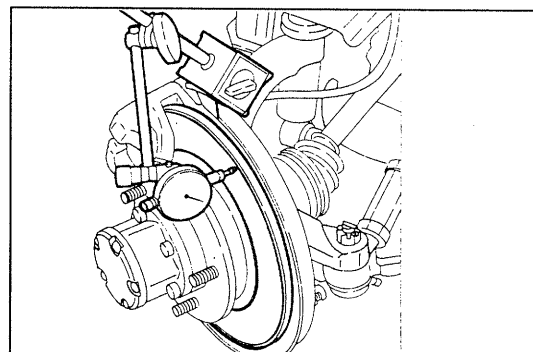
	mm (inch)
Specified thickness	12.5 (0.49)
Minimum limit	11.5 (0.45)

Difference in stock thickness of the same

- (2) Measure the disc circumference.
Specified Value: Not to exceed 0.15 mm (0.006 inch)



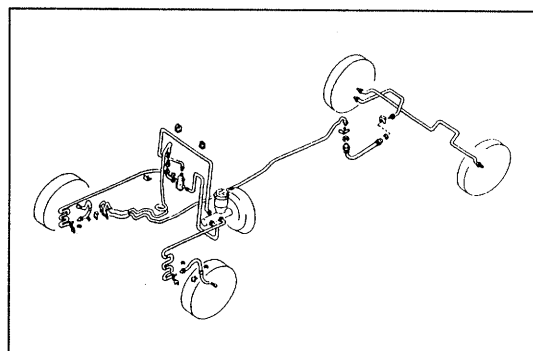
WRU92-MA077



WRU90-MA054

BRAKE LINES AND HOSES

1. Checking of following parts
 - (1) Hoses and tubes for damage, cracks
 - (2) Hoses for deformation or swelling
 - (3) Tubes for corrosion or rust
 - (4) Connection of fluid leakage
 - (5) Tube clamps for tightness
 - (6) Hoses for extreme bending, twisting or pulling



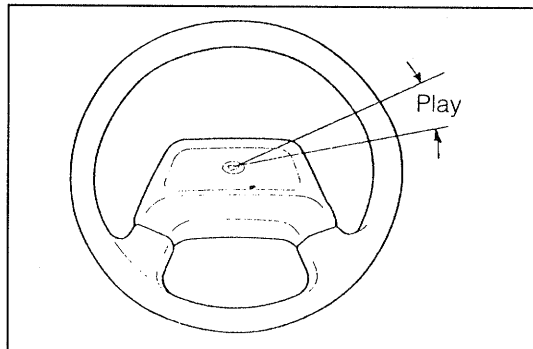
WRU90-MA055

STEERING LINKAGE

1. Check of steering wheel play

Set the vehicle in a straight-ahead condition. Check the steering wheel play by turning it lightly with your fingers.

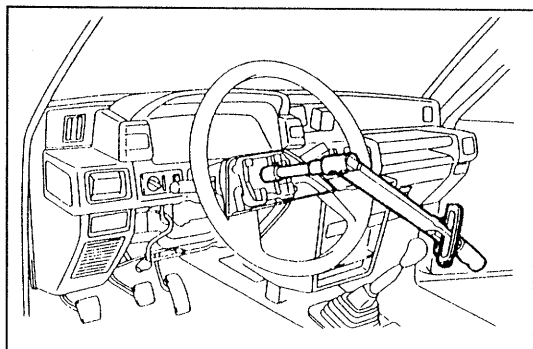
Specified Value: 10 - 30 mm (0.4 - 1.18 inch)



WRU90-MA056

2. Check of steering wheel tightness

Tightening Torque:
3.0 - 5.0 kg-m (21.7 - 36.1 ft-lb, 29.4 - 49.0 N-m)

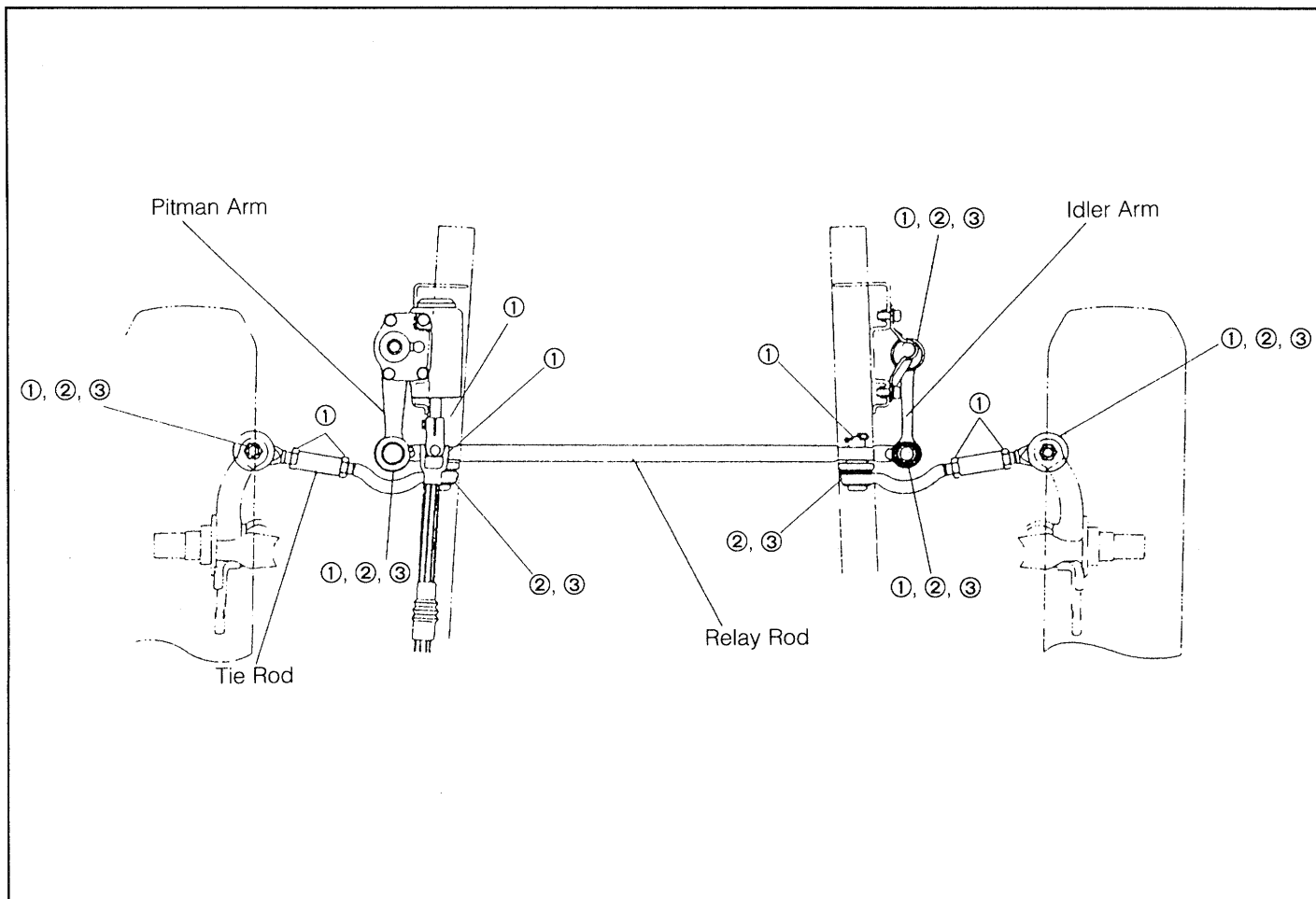


WRU90-MA057

MAINTENANCE

3. Check of steering linkage and dust cover.

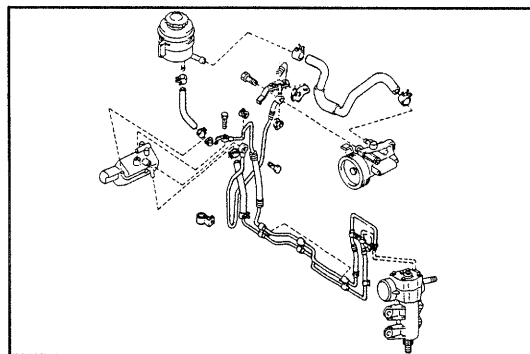
- ① Tightness
- ② Rattle
- ③ Damage



WRU90-MA058

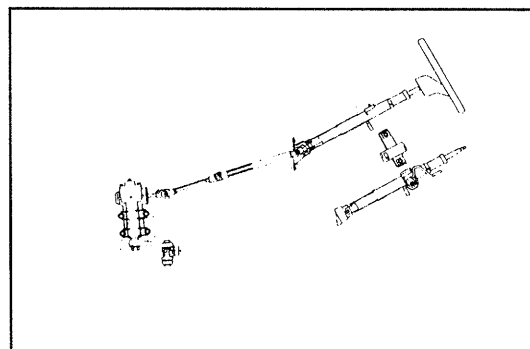
STEERING GEAR BOX

1. Check of steering gear box for oil leakage
 - (1) On the power steering-equipped vehicle, check that the steering gear box, vane pump and so forth exhibit no oil leakage.



WRU90-MA059

- (2) On the vehicle equipped with no power steering, check that the steering gear box exhibits no oil leakage.

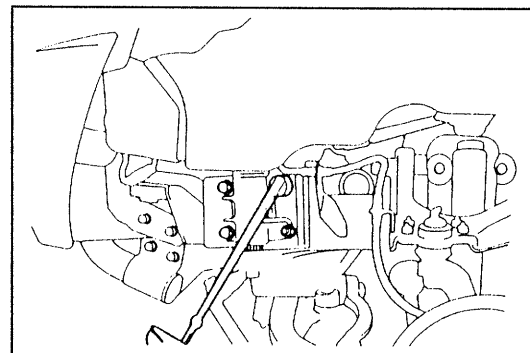


WRU90-MA060

2. Check of steering gear box tightness

Tightening Torque:

7.5 - 10.5 kg-m (54.2 - 75.9 ft-lb, 73.5 - 103 N-m)



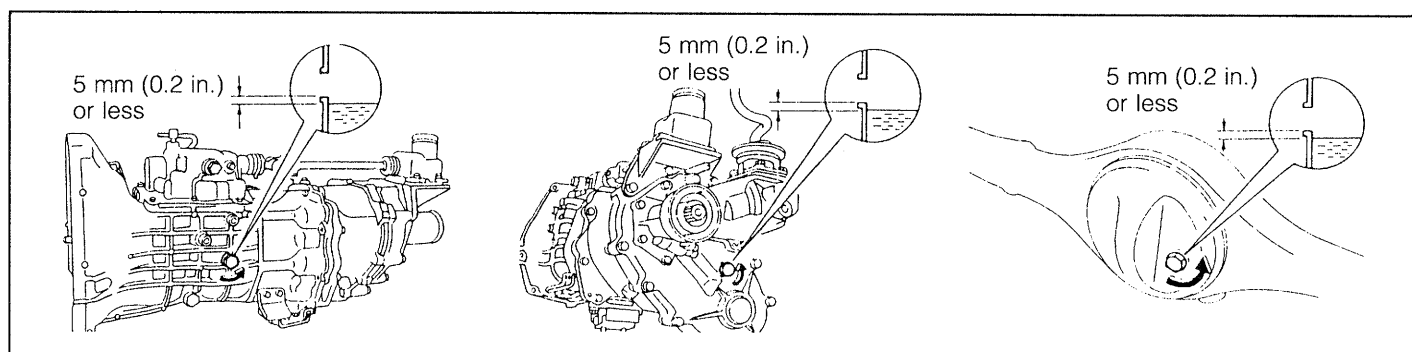
WRU90-MA061

TRANSMISSION, TRANSFER AND DIFFERENTIAL OIL

1. Check of transmission, transfer and differential
 - (1) Check of oil level and leakage
The oil should be filled up to the filler plug hole.
Add oil if the oil level is too low. Inspect for oil leakage.
 - (2) Oil change

Specified oil

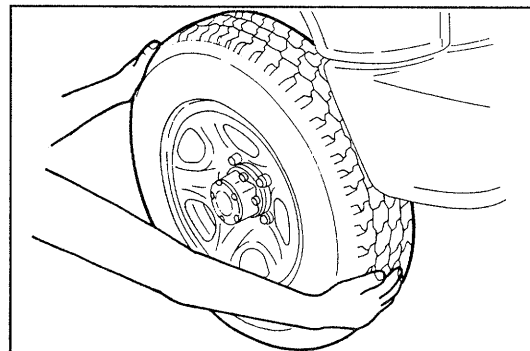
Transmission	API GL - 3 or GL - 4 Viscosity SAE 75 W - 85 or 75 W - 90
Transfer	API GL - 3 or GL - 4 Viscosity SAE 75 W - 85 or 75 W - 90
Front/Rear differential	API GL - 5 Viscosity SAE 90 or 80 W - 90
Limited slip differential	L.S.D. oil



WRU90-MA062

WHEEL BEARING

1. Check of front and rear wheel bearing rattle.



WRU90-MA063

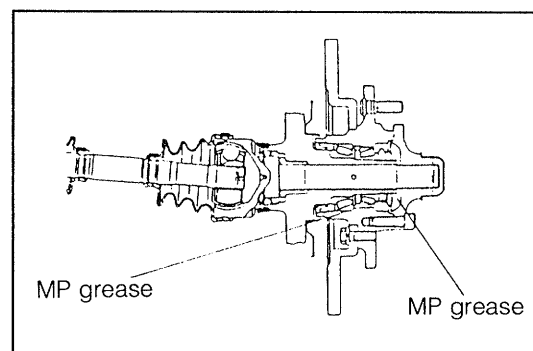
2. Grease change of front wheel bearing

Specified grease:

Lithium base multipurpose grease
25 - 30 grams (0.9 - 1.06 ounces)

NOTE:

Pack the bearing with grease. Also, fill 25 to 30 grams of grease into the hub.



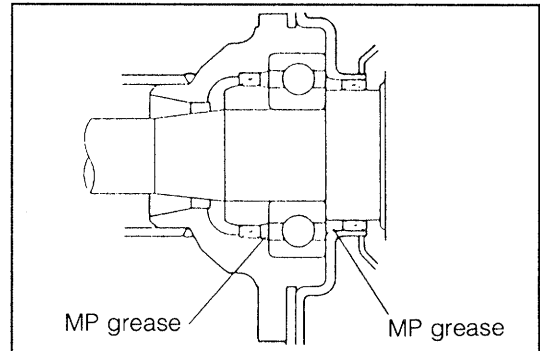
WRU92-MA075

MAINTENANCE

- Grease change of rear wheel bearing
Apply 5 grams (0.18 ounces) of MP grease to both the front section and rear section of the wheel bearing.
Specified grease: Lithium base multipurpose grease
5 grams (0.18 ounces)

NOTE:

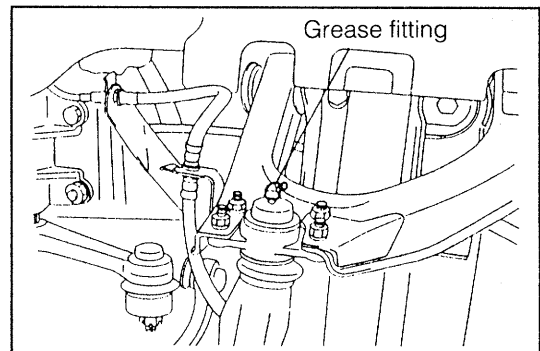
Pack the bearing with grease. Also, fill 5 grams of grease into the hub.



WRU90-MA065

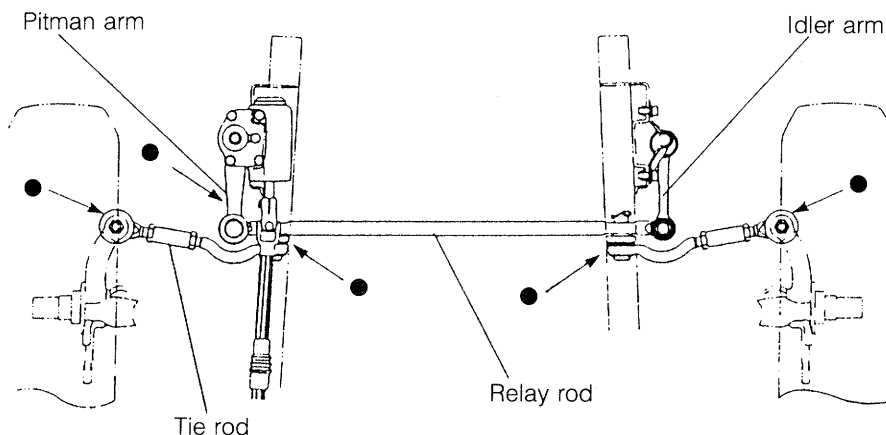
STEERING KNUCKLE & LINKAGE CHASSIS GREASE

- Grease apply of suspension ball joints.
Apply grease to the upper arm ball joint and lower arm ball joint.
Specified grease: Lithium base multipurpose grease
- Grease apply of steering ball joint



WRU90-MA066

Apply chassis grease to the points bearing a "●" mark, as shown in the illustration.
Specified grease: Lithium base multipurpose grease.

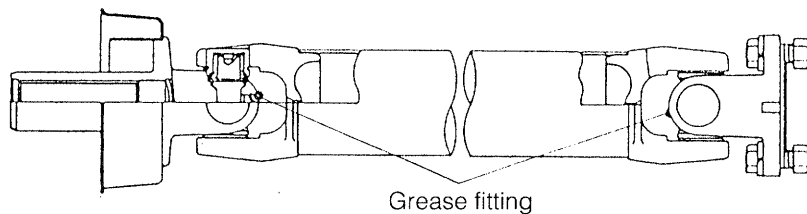


WRU92-MA076

PROPELLER SHAFTS GREASE

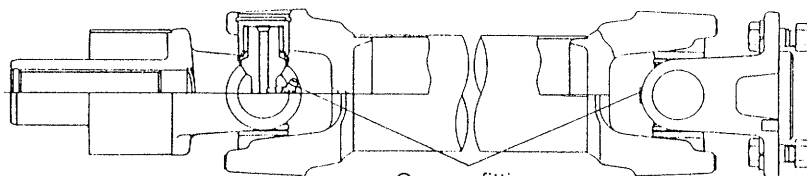
1. Check the grease fitting of propeller shaft for grease condition.
2. Apply lithium base multipurpose grease to the fittings given below.

Front propeller shaft



Grease fitting

Rear propeller shaft



Grease fitting

WRU90-MA068

BOLTS AND NUTS ON CHASSIS AND BODY

Retightening of bolts and nuts on chassis and body

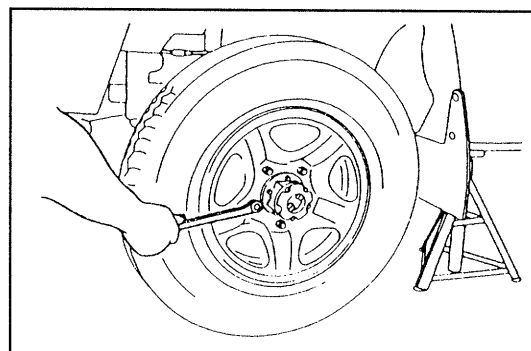
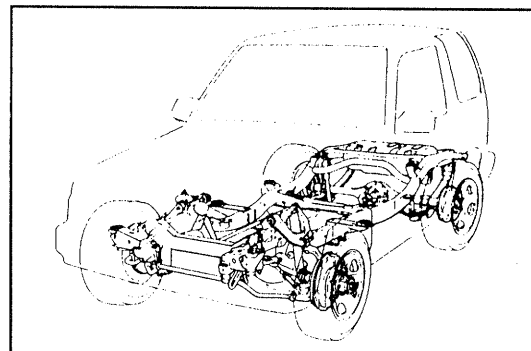
- (1) Front suspension parts
- (2) Power train parts
- (3) Rear suspension parts
- (4) Steering system parts

Check of wheel hub nuts.

- (1) Retighten the hub nuts.

Tightening torque:

9.0 - 12.0 kg-m (65.1 - 86.7 ft-lb, 88.3 - 118 N-m)



WRU90-MA069

DAIHATSU

Rocky

EM

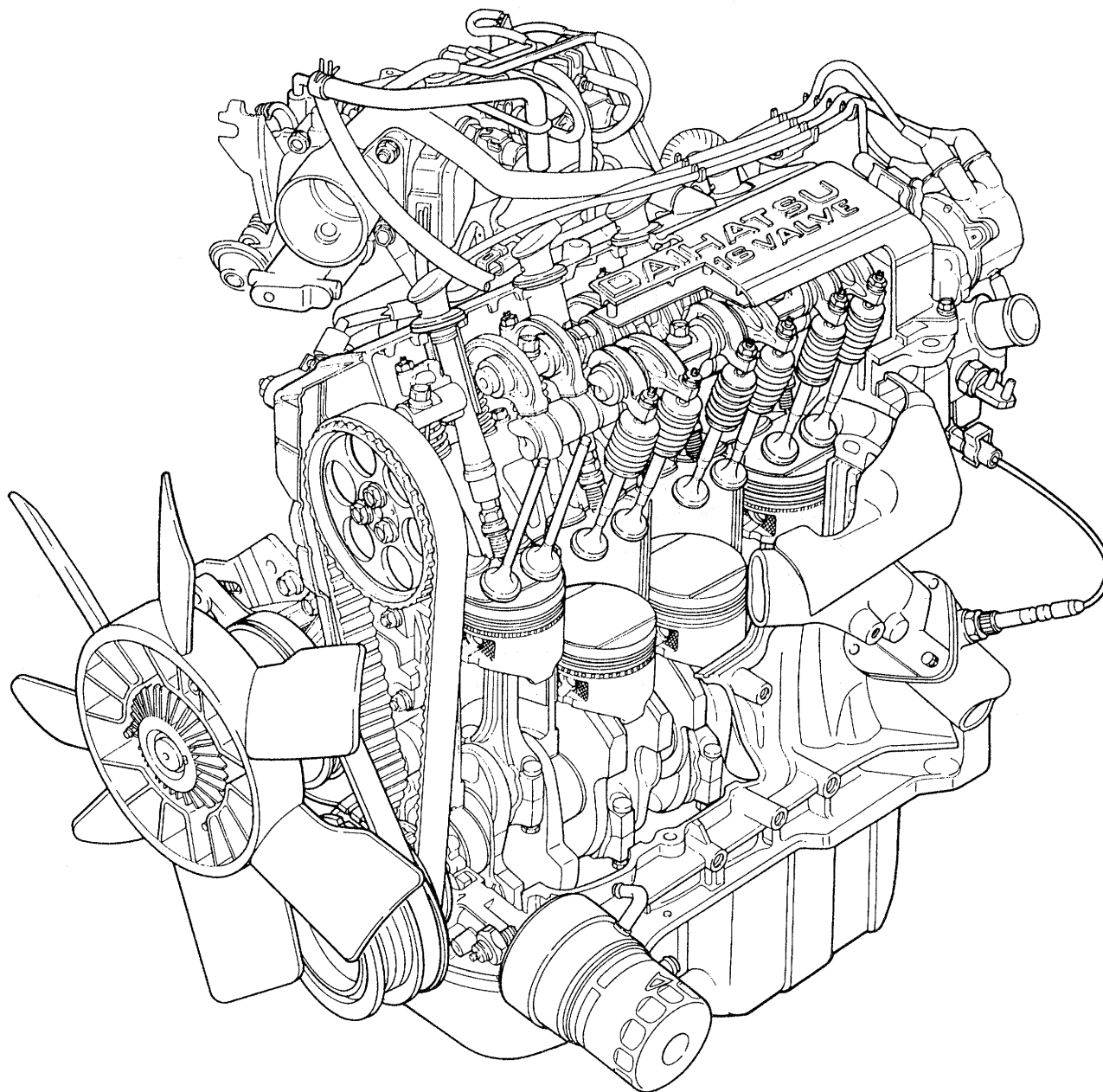
ENGINE MECHANICALS

INTRODUCTION	EM- 2
TROUBLE SHOOTING	EM- 6
ENGINE TUNE-UP	EM- 9
CHECK METHOD OF IDLE HC/CO CONCENTRATIONS	EM-16
COMPRESSION CHECK	EM-18
TIMING BELT	EM-21
CYLINDER HEAD	EM-36
CYLINDER BLOCK	EM-82

WRU90-EM001

INTRODUCTION

Type HD engine is a water-cooled, 4-cycle, 4-cylinder-in-line, SOHC 16-valve EFI gasoline engine. The cylinders are arranged in a sequence of 1-2-3-4 from the timing belt side.



FEATURES

Type HD engine is mounted in the engine compartment longitudinally relative to the vehicle forward direction. The firing order is 1-3-4-2.

CYLINDER HEAD COVER

The cylinder head cover is made of aluminum alloy. A ventilation baffle plate and an oil separator are integrated inside the cylinder head cover so that the oil contained in the blow-by gas may be separated. Moreover, to prevent the leakage of oil and blow-by gas, a grommet is press-fitted at the contact section with each spark plug tube.

CYLINDER HEAD

In this aluminum alloy cylinder head, its combustion chamber adopts a pent roof type. The spark plug is located at the central position in the combustion chamber.

For improved flame propagation characteristics, the squash area is provided at the combustion chamber in order that a turbulence may be generated in the mixture during the compressed stroke.

CYLINDER HEAD GASKET

The cylinder head gasket employs a carbon gasket which features remarkable durability.

CYLINDER BLOCK

The cylinder block is made of aluminum alloy. The cylinder liner made of cast iron is cast at the cylinder block.

For assured rigidity, the crankshaft journal bearing caps are made of cast iron. Moreover, the bores have been machined integral with the cylinder block so as to improve the roundness accuracy.

OIL PAN

In this oil pan made of pressed a steel sheets, ribbed sections are provided in order to increase its strength. Moreover, the oil pan is provided with a baffle plate so as to prevent excessive movements of the oil while the vehicle is cornering, moving off or stopping quickly. Also, the baffle plate prevents the generation of resonating noises.

PISTON

The piston is made of aluminum alloy.

A triangle front mark is stamped on the piston's top.

The piston pin hole is offset 0.5 mm (0.02 inch) in relation to the center of the piston in order to reduce thrust pressure toward the piston cylinder wall.

In addition, slit type oil holes are provided in the oil ring groove in order that the lubricating performance may be further improved.

PISTON PIN

The piston pin is made of chrome molybdenum steel which features adequate strength and light weight. This piston pin adopts a semi-floating type.

CONNECTING ROD

The connecting rod employs a vanadium steel as the material in order to assure sufficient strength and reduce its weight for decreased stress of inertia. Also, a front mark is provided on each of the connecting rod and connecting rod cap.

Moreover, the adoption of serration type connecting rod bolts has improved the roundness of the connecting rod at its big end.

PISTON RINGS

The piston ring No. 1 is made of steel iron, whereas the piston ring No. 2 is made of cast iron.

The oil ring made of stainless steel employs a three-piece type.

ENGINE MECHANICALS

CAMSHAFT

The camshaft made of cast iron employs a hollow type so as to achieve the reduction in weight. This single camshaft actuates a total of 16 valves; two intake valves and two exhaust valves of each cylinder.

VALVE SPRING

For improved anti-surfing characteristics, the valve spring adopts an unequal pitch type.

The valve springs are assembled in such a direction that the side having a painted mark (the side with a greater pitch) may come at the valve rocker arm side.

VALVE ROCKER ARM & VALVE ROCKER SHAFT

The valve rocker shaft made of carbon steel has undergone nitriding treatment.

The valve rocker shaft is bolt-attached to the cylinder head together with the camshaft caps of the cylinder head.

Furthermore, the valve rocker shaft at the intake side is provided with recessed portions so as to accommodate the spark plug tubes.

When installing the valve rocker shaft, care must be exercised as to its correct installing direction. The chamfer dimension at the timing belt side is greater than that at the distributor side.

The valve rocker arm employs aluminum alloy. Moreover, high chrome cast iron is provided at its contact surface with the camshaft so that the durability may be enhanced.

The valve rocker arm comes in four different shapes.

CAMSHAFT TIMING BELT PULLEY & CRANKSHAFT TIMING BELT PULLEY

Both the camshaft timing belt pulley and crankshaft timing belt pulley are made of sintered alloy.

The camshaft timing belt pulley is driven by the crankshaft timing belt pulley through an RU type cogged belt. The tension of this timing belt is maintained by means of a belt tensioner.

CRANKSHAFT

The crankshaft employs spheroidal graphite cast iron as the material.

The crankshaft is supported via crankshaft bearings by the five main journals provided in the cylinder block.

For reduced weight, the crankshaft is a hollow type.

Furthermore, four balance weights prevents the occurrence of vibrations.

CRANKSHAFT PULLEY

To reduce torsional vibrations, the crankshaft pulley adopts a damper.

The crankshaft pulley is attached to the crankshaft timing belt pulley by means of four bolts.

FLYWHEEL

A flywheel made of cast iron is employed.

The flywheel adopts a thin contour which features excellent heat radiating properties. To provide an adequate inertia weight, the outer diameter of the flywheel has been made larger.

An oil catch is provided so that the engine oil may flow to the cylinder block. This design prevents the oil from reaching the clutch disc surface in the event that oil leaks out from the crankshaft side through the flywheel attaching bolts.

The ring gear is shrinkage-fitted onto the outer periphery of the flywheel.

FLYWHEEL/ATTACHING BOLT

The bolt employs a 12 point type. To prevent these bolts from becoming loose, special care has been exercised to achieve the torque stability when tightening them.

In addition, the attaching holes at the crankshaft are of pass-through type. Therefore, the bolts are sealed by applying sealer to them.

WNU89-EM004

TIMING BELT COVER

The timing belt cover is divided into two parts; the upper cover and lower cover. The ignition timing indicator is mounted on the lower cover.

INTAKE MANIFOLD

Intake manifold is made of aluminum alloy. Design has been made so that the length from the throttle body attaching section to the intake manifold installation section on the cylinder head may become equal in all cylinders. Consequently, the air charging rate for each cylinder has been made uniformed.

In addition, the intake tube portion from the surge tank to the intake manifold adopts a diffuser type so as to improve the air charging efficiency.

WNU89-EM005

TROUBLE SHOOTING

Problem	Possible causes	Remedies	Page
Engine overheats.	Cooling system faulty.	Troubleshoot cooling system.	CO- 3
	Incorrect ignition timing.	Reset timing.	IG- 22
	Excessive engine load <ul style="list-style-type: none"> • Clutch faulty • Brake drag 	Troubleshoot clutch. Troubleshoot brake.	CL- 5
Engine will not crank or cranks slowly.	Starting system faulty.	Troubleshoot starting system.	ST- 2
	Charging system faulty	Troubleshoot charging system.	CH- 2
Engine will not start/Hard to start (Only cases where cranking by starter motor is normal).	Ignition problem <ul style="list-style-type: none"> • Ignition coil • Igniter • Distributor • Ignition wiring 	Inspect ignition coil. Inspect igniter. Inspect distributor. Inspect ignition wiring.	IG- 8 IG- 4 IG- 10 IG- 3
	Spark plugs faulty	Inspect plugs.	IG- 6
	Spark plug wire disconnected or faulty.	Inspect wires.	IG- 5
	Low compression.	Check compression.	EM- 18
	Vacuum leaks <ul style="list-style-type: none"> • EGR valve • Throttle body • PCV line • Intake manifold 	Check EGR system. Check throttle body. Check PCV line. Check intake manifold.	EC- 10 EF-119 EC- 4
	No fuel supply to injector <ul style="list-style-type: none"> • No fuel in tank • Fuel pump not working • Fuel filter clogged • Fuel line clogged or leaking 	Repair, as necessary.	EF-115
	EFI system malfunctioning	Troubleshoot EFI system.	EF- 13
	Spark plugs faulty.	Inspect plugs.	IG- 6
	Spark plug wires faulty.	Inspect wires.	IG- 5
	Ignition problem. <ul style="list-style-type: none"> • Ignition coil • Igniter • Distributor • Ignition wiring 	Inspect ignition coil. Inspect igniter. Inspect distributor. Inspect ignition wiring.	IG- 8 IG- 4 IG- 10
Rough idle/Engine stalls or misses.	Incorrect ignition timing	Reset timing.	IG- 22
	Incorrect valve clearance	Adjust valve clearance	EM- 11
	Low compression	Check compression.	EM- 18
	Incorrect idle speed	Adjust idle speed.	MA- 14
	Vacuum leaks. <ul style="list-style-type: none"> • EGR valve • Throttle body • PCV line • Intake manifold 	Check EGR system. Check throttle body. Check PCV line. Check Intake manifold.	EC- 10 EF-119 EC- 4
	EFI system malfunctioning	Repair, as necessary.	EF- 11
	Spark plugs faulty.	Inspect plugs.	IG- 6
	Spark plug wires faulty.	Inspect wires.	IG- 5
	Ignition problem. <ul style="list-style-type: none"> • Ignition coil • Igniter • Distributor • Ignition wiring 	Inspect ignition coil. Inspect igniter. Inspect distributor. Inspect ignition wiring.	IG- 8 IG- 4 IG- 10
	Incorrect ignition timing	Reset timing.	IG- 22

Problem	Possible causes	Remedies	Page
Idle speed is too high.	Fuel line clogged	Check fuel line.	EF-102
	Air suction <ul style="list-style-type: none"> • Intake manifold • Vacuum hose disconnected • Throttle body 	Check intake manifold. Check vacuum hose for proper piping. Check throttle body.	EF-119
	EFI system malfunctioning	Troubleshoot EFI system.	EF- 11
	Incorrect idle speed.	Adjust idle speed.	MA- 14
Engine hesitates/Poor acceleration	Spark plugs faulty	Inspect plugs.	IG- 6
	Spark plug wires faulty.	Inspect wires.	IG- 5
	Incorrect ignition timing.	Reset timing.	IG- 22
	Ignition wiring failure	Inspect wiring.	IG- 3
	Incorrect valve clearances.	Adjust valve clearances.	EM- 11
	Low compression.	Check compression.	EM- 18
	Fuel system clogged.	Check fuel system.	EF- 93
	Air cleaner clogged.	Check air cleaner.	MA- 9
	Engine overheats.	Check cooling system.	CO- 3
	Vacuum leakage <ul style="list-style-type: none"> • EGR valve • Throttle body • PCV line • Intake manifold 	Check EGR system. Check throttle body. Check PCV line. Check intake manifold.	EC- 10 EF-119 EC- 4
	Emission control system malfunctioning (cold engine)	Repair as necessary.	
	EGR system always on	Repair EGR system.	EC- 10
	EFI system malfunctioning	Repair, as necessary.	EF- 11
Engine dieseling (Runs after ignition switch is turned off.)	EFI system malfunctioning	Repair, as necessary.	EF- 11
	Incorrect ignition timing.	Reset timing.	IG- 22
Muffler explosion (after fire) during deceleration only	Incorrect ignition timing.	Reset timing.	IG- 22
	Incorrect valve clearance.	Adjust valve clearance.	EM- 11
	Air cleaner clogged.	Check air cleaner.	MA- 9
	EFI system malfunctioning	Repair, as necessary.	EF- 11
Engine backfires.	Incorrect ignition timing.	Reset timing.	IG- 22
	Incorrect valve clearances.	Adjust valve clearances.	EM- 11
	EFI system malfunctioning	Repair, as necessary.	EF- 11
	Vacuum leakage <ul style="list-style-type: none"> • EGR valve • Throttle body • PCV line • Intake manifold 	Check EGR system. Check throttle body. Check PCV line. Check Intake manifold.	EC- 10 EF-119 EC- 4

WRU90-EM003

ENGINE MECHANICALS

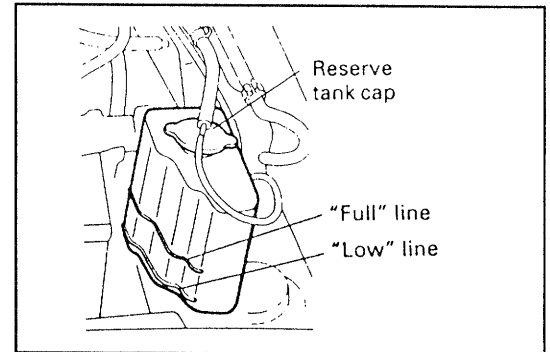
Problem	Possible causes	Remedies	Page
Excessive oil consumption	Oil leak.	Repair, as necessary.	
	PCV line clogged.	Check PCV hose.	EC- 4
	Piston rings worn or damaged.	Check rings.	EM- 99
	Valve stems worn.	Check valves and guides.	EM- 48
	Valve stem oil seals worn or damaged.	Replace oil seal.	EM-45, 60
Poor fuel mileage	Spark plugs faulty.	Inspect plugs.	IG- 6
	Incorrect ignition timing.	Reset timing.	IG- 22
	Ignition wiring failure	Check ignition wiring.	IG- 3
	Low compression.	Check compression.	EM- 18
	Air cleaner clogged.	Check air cleaner.	MA- 9
	Fuel leak.	Repair as necessary.	EF- 93
	EGR system always on	Check EGR system.	EC- 10
	Tires improperly inflated	Inflate tires to specified pressure.	
	Clutch slips.	Troubleshoot clutch.	CL- 5
	Brakes drag.	Troubleshoot brakes.	
	EFI system malfunctioning	Repair, as necessary.	EF- 11
	Idle speed too high	Reset idle speed.	MA- 14
	Distributor advance failure	Check distributor.	IG- 10
Engine detonation (knocking)	Incorrect ignition timing	Reset timing.	IG- 22
	Spark plugs faulty	Inspect plugs.	IG- 6
	Distributor advance failure	Check distributor.	IG- 10
	EFI system malfunctioning	Repair, as necessary.	EF- 11
Unpleasant odor	Incorrect idle speed.	Adjust idle speed.	MA- 14
	Incorrect ignition timing	Reset timing.	IG- 22
	Vacuum leaks	Check PCV system.	EC- 4
	• PCV line	Check EGR system.	EC- 10
	• EGR line	Check intake manifold.	
	• Intake manifold		
	EFI system malfunctioning	Repair, as necessary.	EF- 13

WRU90-EM004

ENGINE TUNE-UP

1. Inspection of engine coolant level

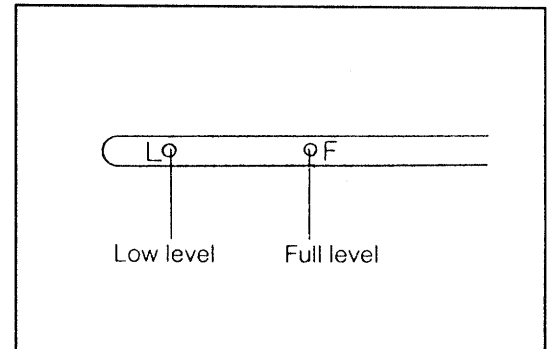
(See page CO-3.)



WRU90-EM005

2. Inspection of engine oil level

(See page LU-2.)

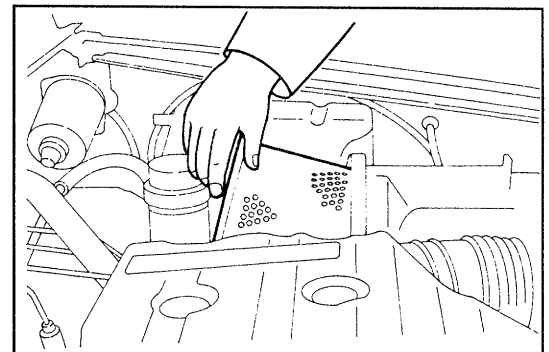


WRU90-EM006

3. Inspection of air cleaner filter element

(See page MA-9.)

Clean or replace the air cleaner filter element.

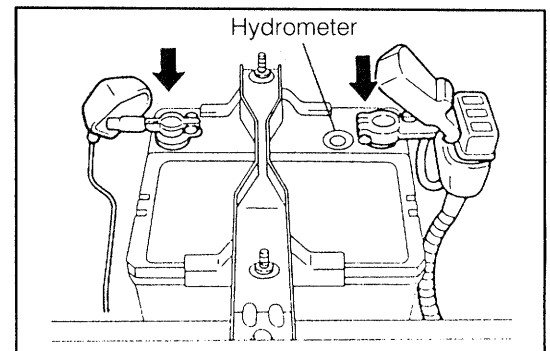


WRU90-EM007

4. Inspection of battery

Maintenance free battery

(See page CH-4.)



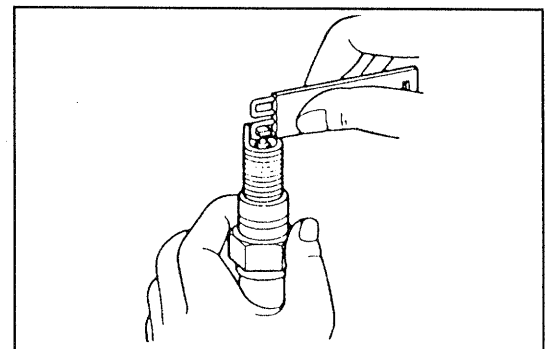
WRU90-EM008

5. Inspection of spark plugs

(See page IG-6.)

Recommended spark plugs:

CHAMPION	NIPPONDENSO	NGK
RC9YC4	K20PR-U11	BKR6E-11



WRU90-EM009

6. Inspection and adjustment of valve clearances

The measurement and adjustment of valve clearances are carried out when each of the pistons of the No. 1 and No. 4 cylinders is set to the top dead center at the end of the compression stroke.

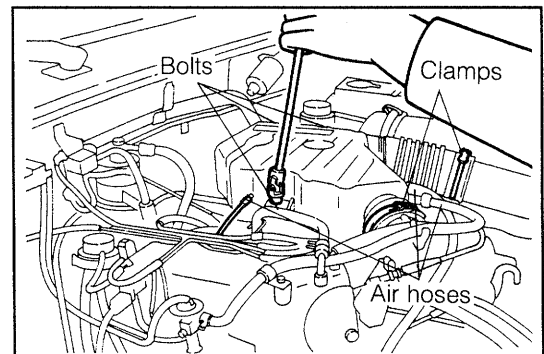
NOTE:

- The valve clearance adjustment is performed normally when the engine is in a hot condition.
- "Hot engine condition" denotes a condition in which the cooling water temperature is 75 - 85°C (167 - 185°F) and the engine oil temperature is above 65°C (149°F).
- However, when the engine has been overhauled, it is necessary to adjust the valve clearances while the engine is cold and to readjust the valve clearances in a hot condition after warming up the engine.

WRU90-EM010

(1) Removal of air chamber

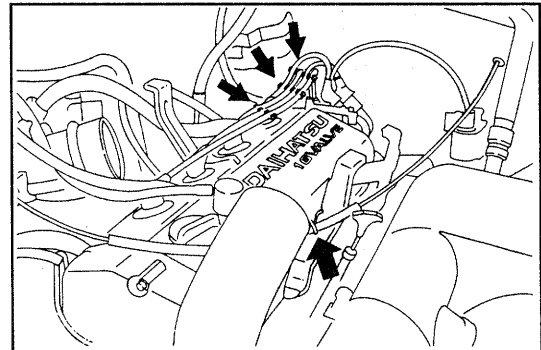
- ① Disconnect the air hoses from the air chamber.
- ② Detach the air chamber by removing the three attaching bolts.
- ③ Unlock the two clamps with your hand. Then remove the air chamber.



WRU90-EM011

(2) Removal of cylinder head cover

- ① Disconnect the accelerator cable from the clamp.
- ② Detach the spark plug wires from the clamps.

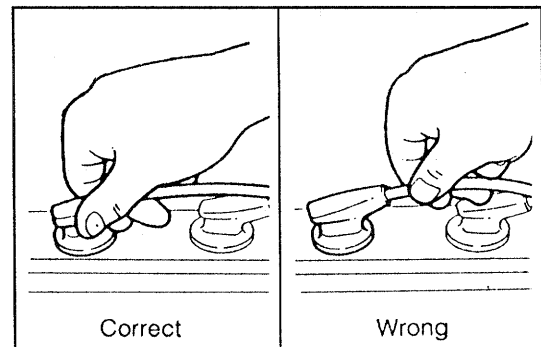


WRU90-EM012

- ③ Detach the spark plug wires at the cylinder head side.

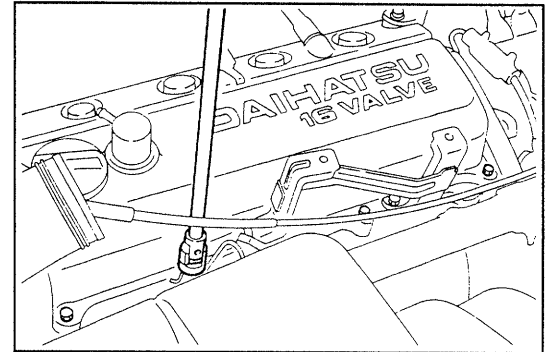
NOTE:

- Be sure to hold the rubber boot during the spark plug wire disconnection. Never remove the spark plug wire, holding the cord portion.



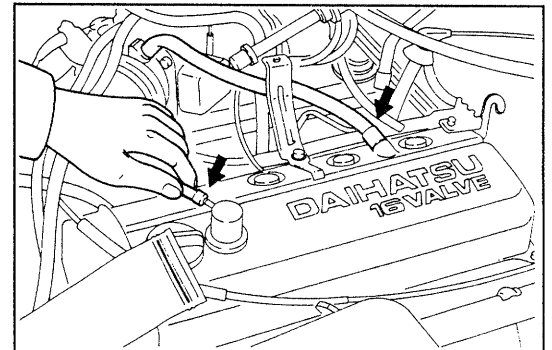
WRU90-EM013

- ④ Detach the air chamber bracket and accelerator cable clamp by removing two screws.
(If the radio equipped vehicle, remove the bond cable from the air chamber bracket.)



WRU90-EM014

- ⑤ Disconnect the PCV hoses from the cylinder head cover.

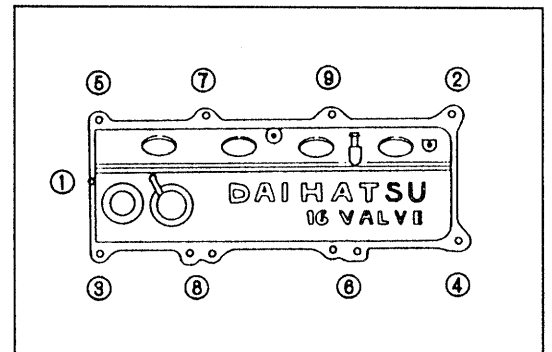


WRU90-EM015

- ⑥ Loosen the nine bolts (10 mm) over two or three stages in the sequence shown in the right figure. After removing the bolts, proceed to remove the cylinder head cover.

NOTE:

- Be sure to loosen the bolts progressively and uniformly over two or three stages.
- The timing belt cover attaching bolt ① should be pulled out fully.
- Be very careful not to damage the grommets of the spark plug tubes.



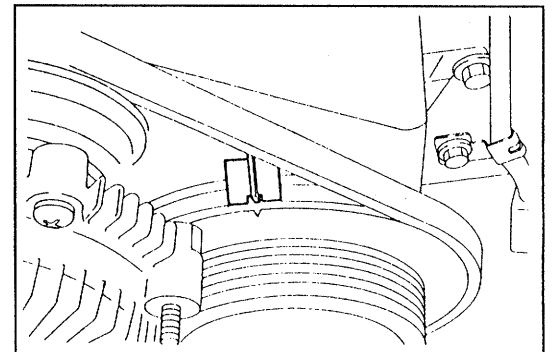
WRU90-EM016

(3) Inspection and adjustment of valve clearances

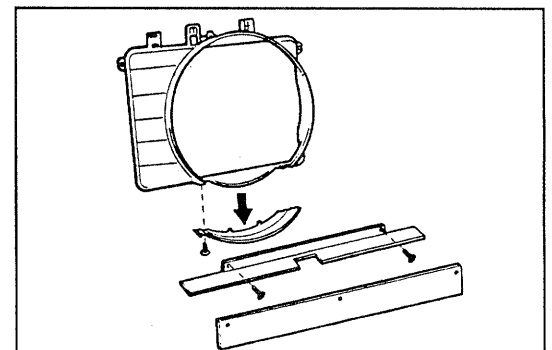
- ① Turn the crankshaft until the recessed mark on the crankshaft pulley is aligned with the indicator mark on the timing belt cover.

NOTE:

- If the vehicles equipped with the power steering and the air-conditioner or only the power steering is equipped, turn the power steering pump pulley while pushing the drive belt.
- If the vehicles equipped with only the air conditioner, remove the engine under cover, rubber plate, engine under cover No. 3 and the lower fan shroud. Then turn the crankshaft pulley from the vehicle lower side.



WRU90-EM017



WRU90-EM018

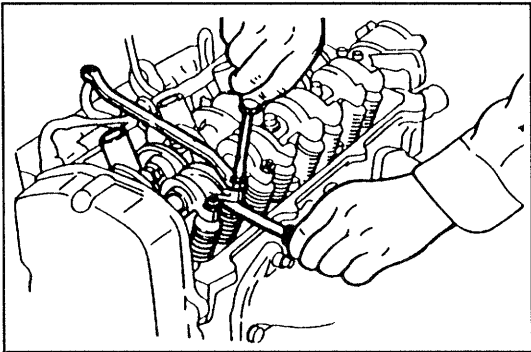
- ② Check to see if the valve rocker arms of the No. 1 cylinder are free or are being pushed up. According to the following table, check and/or adjust the valve clearances, using a thickness gauge.

Valve clearances (Hot condition)

Intake: 0.20 - 0.30 mm (0.008 - 0.012 inch)
Exhaust: 0.28 - 0.38 mm (0.011 - 0.015 inch)

(Reference: Cold)

Intake: 0.18 mm (0.007 inch)
Exhaust: 0.25 mm (0.010 inch)



WRU90-EM019

NOTE:

- Before the adjusting bolts are tightened, apply engine oil to the lock nuts and rocker arm adjusting bolts.

The “O” marks denote those valves that can be adjusted under that setting.

Cylinder No.		1	2	3	4
Rocker arm condition					
When valve rocker arms of No. 1 cylinder are free: (Piston of No. 1 cylinder is at top dead center under compression stroke)	IN	○	○		
	EX	○		○	
When valve rocker arms of No. 4 cylinder are free: (Piston of No. 4 cylinder is at top dead center under compression stroke)	EX			○	○
	IN		○		○

WRU90-EM020

- ③ Turn the crankshaft 360 degrees. Proceed to check and/or adjust the remaining valve clearances.

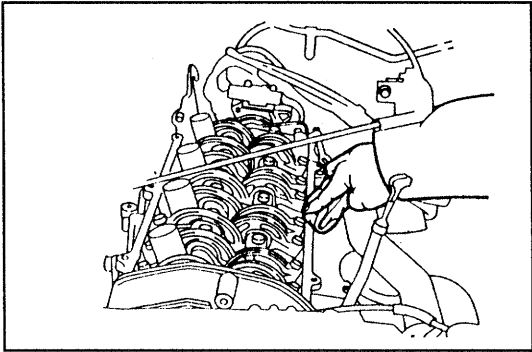
WRU90-EM021

(4) Installation of cylinder head cover

- ① Wipe off the oil or dirt from the gasket surface of the cylinder head cover.

CAUTION:

- Be sure not to drop the dirt or gasket tips into the timing belt cover.

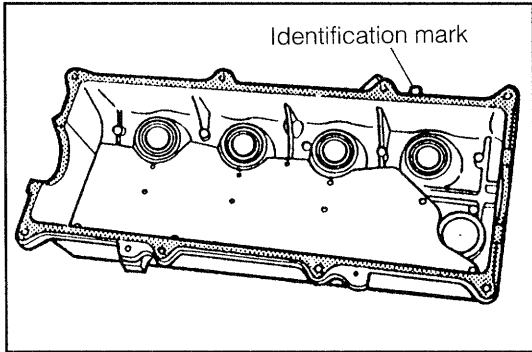


WRU90-EM022

- ② Check the cylinder head cover gasket for evidence of damage.
Replace the gasket, as required.

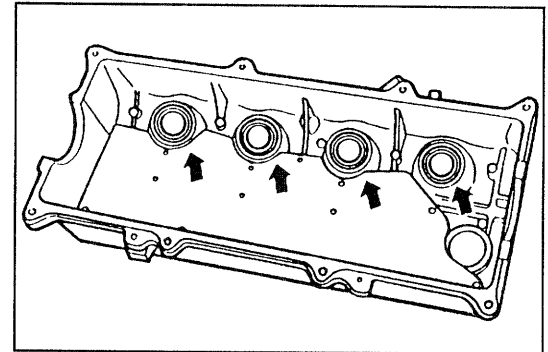
NOTE:

- Install the cylinder head cover gasket in such a direction that the identification mark may come at the intake side.



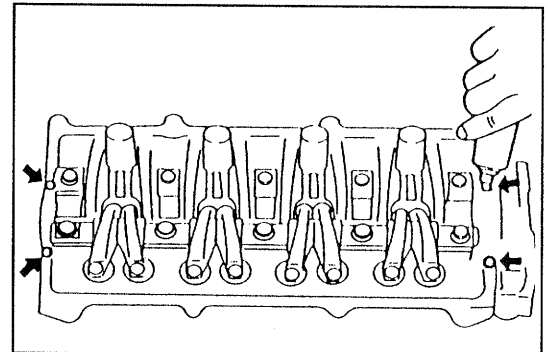
WRU90-EM023

- ③ Check the rubber grommets of the spark plug tubes for evidence of damage.
Replace the rubber grommets, as required.
(See page EM-73.)



WRU90-EM024

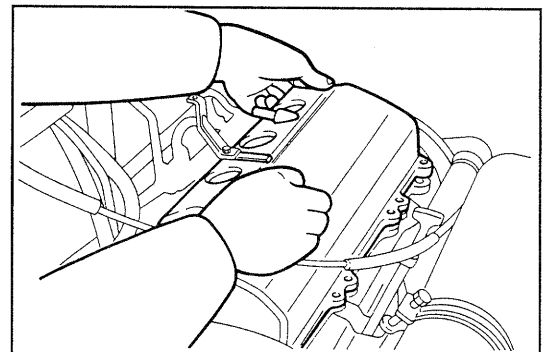
- ④ Install the cylinder head cover gasket on the cylinder head. Apply the Three Bond 1104 to the four points on the cylinder head, as indicated in the figure.



WRU90-EM025

- ⑤ Install the cylinder head cover on the cylinder head.
NOTE:

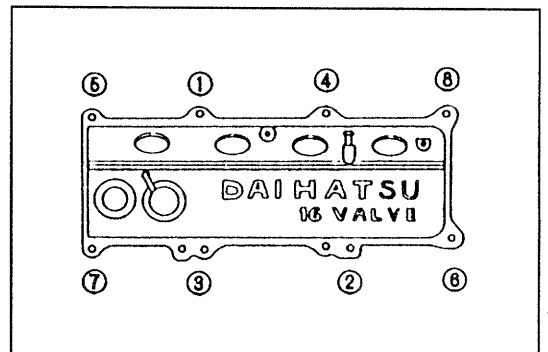
- Be very careful not to damage the rubber grommets for spark plugs during the cover installation.
- Make sure that the rubber grommet is fitted properly to the spark plug tube.



WRU90-EM026

- ⑥ Tighten the cylinder head cover bolts over two or three stages in the sequence shown in the right figure, until they are tightened to the specified torque.

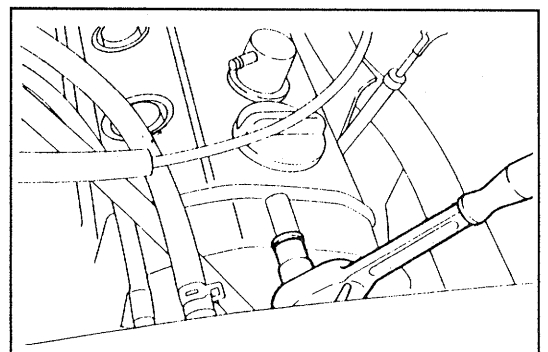
Tightening Torque: 0.3 - 0.5 kg-m
(2.2 - 3.6 ft-lb, 3.0 - 4.9 N-m)



WRU90-EM027

- ⑦ Tighten the timing belt cover attaching bolt.

Tightening Torque: 0.2 - 0.4 kg-m
(1.4 - 2.9 ft-lb, 2.0 - 3.9 N-m)



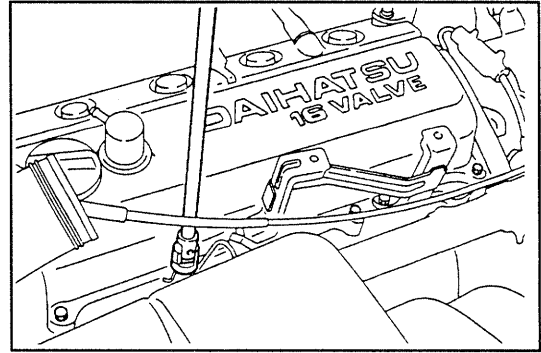
WRU90-EM028

- ⑧ Tighten the air chamber bracket tightening bolts and clamp bolt. Then clamp the accelerator cable.

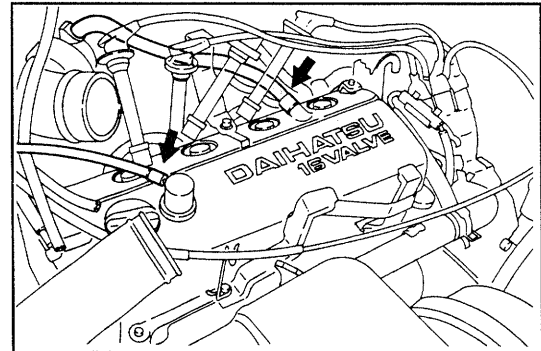
Tightening Torque: 0.3 - 0.5 kg-m
(2.2 - 3.6 ft-lb, 3.0 - 4.9 N·m)

- ⑨ Connect the bond cable to the air chamber bracket, and tighten the attaching bolt.
(Only for the radio equipped vehicle)

- ⑩ Connect the PCV hoses to the cylinder head cover.



WRU90-EM029

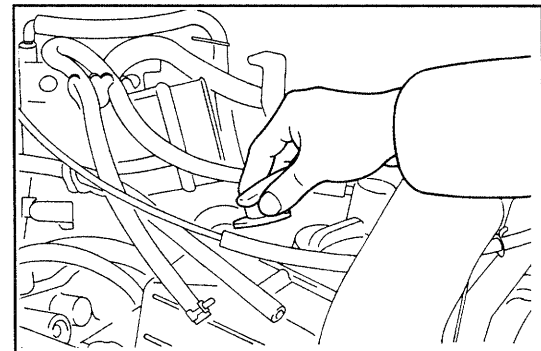


WRU90-EM030

- ⑪ Install the spark plug wires to the spark plugs.

NOTE:

- Be sure that the spark plug wire is connected securely to each spark plug.
- Care should be exercised not to damage the spark plug wire rubber grommet with the spark plug tube.

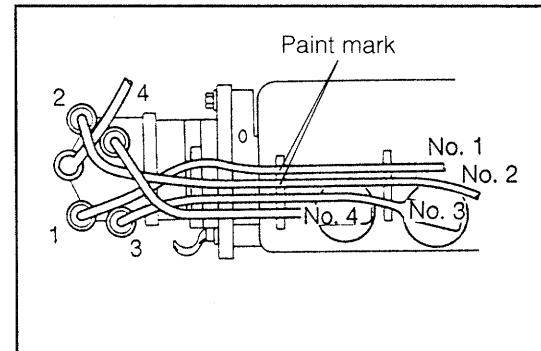


WRU90-EM031

- ⑫ Install the spark plug wires to clamps.

NOTE:

- Align the pink paint marks provided on the No. 1 and No. 2 spark plug wires with clamping position indicated in the right figure.



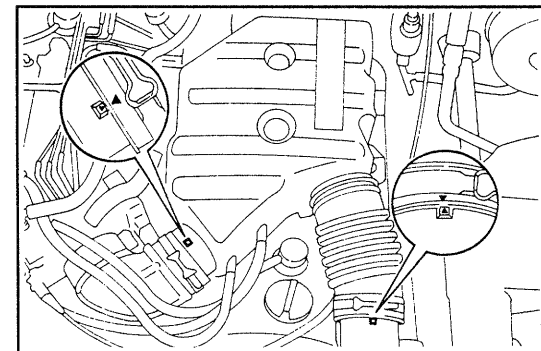
WRU90-EM160

(5) Installation of intake air chamber

- ① Connect the air hoses to the intake air chamber.

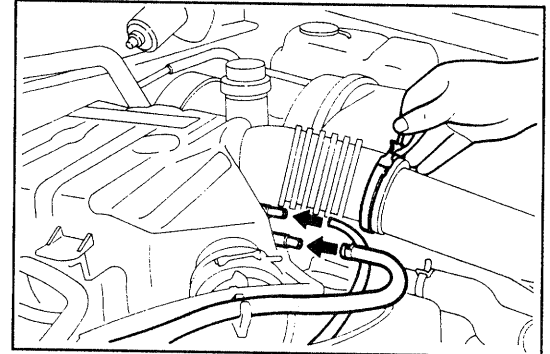
NOTE:

- At this time, make sure that the mating mark at the hose side is aligned with the mating mark at the intake air chamber side.



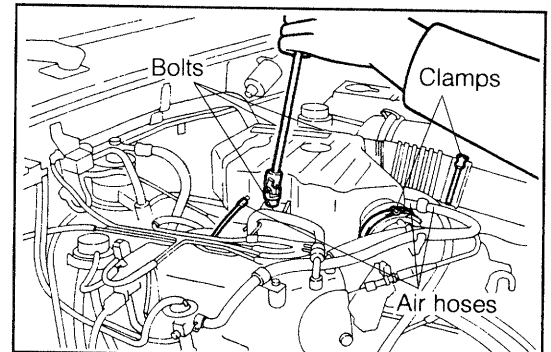
WRU90-EM033

- ② Install the clamps of the intake air chamber hoses.
- ③ Connect the air hoses of the air conditioner and power steering.



WRU90-EM034

- ④ Install the intake air chamber to the bracket with three bolts.
- (6) Start the engine. Ensure that the engine exhibits no trouble, such as oil leakage.



WRU90-EM035

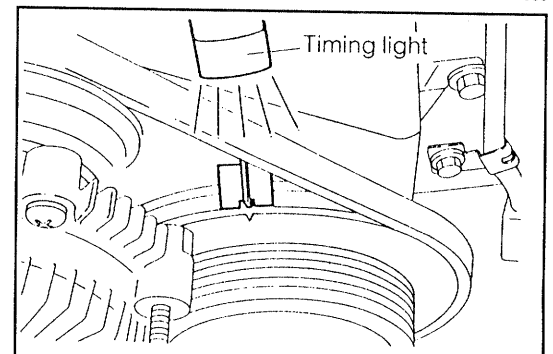
7. Inspection of ignition timing

(See page IG-22.)

Check to see if the ignition timing mark of the crankshaft pulley is aligned with the indicator of the timing belt cover.

NOTE:

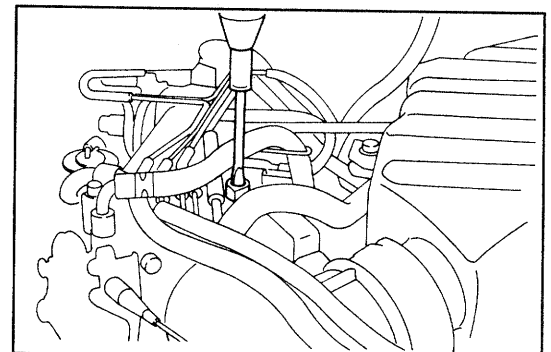
- This does not include the sub-ignition timing advance of the distributor.



WRU90-EM036

8. Adjustment of idle speed

(See page MA-14.)



WRU90-EM037

CHECK METHOD OF IDLE HC/CO CONCENTRATIONS

NOTE:

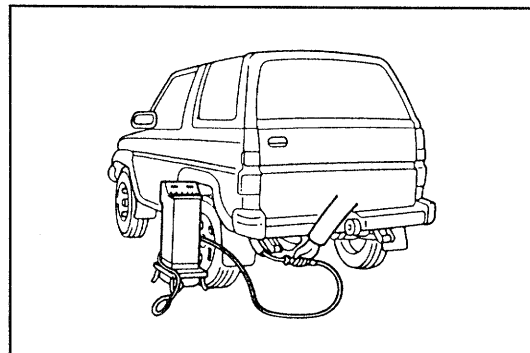
- This check is used only to determine whether or not the idle HC/CO emissions comply with the regulations.

1. Initial Conditions

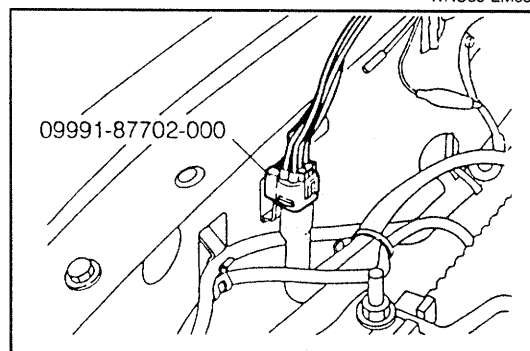
- (1) Air cleaner filter element installed.
- (2) All accessories switched OFF.
- (3) All vacuum lines connected.
(e.g. EGR system)
- (4) All pipes and hose of air intake system connected.
- (5) Ignition timing set correctly.
- (6) Transmission in "Neutral" Position.
- (7) Warm up the engine thoroughly.
- (8) Ensure that the exhaust system exhibits no gas leakage.
- (9) Ensure that the intake system exhibits no air leakage.
- (10) Tachometer and HC/CO meter at hand and calibrated.

2. System inspection of oxygen sensor

- (1) Remove the cap of the check connector. Connect the following SST to the check connector.
SST: 09991-87702-000



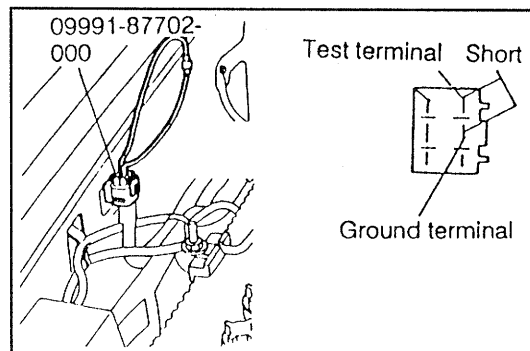
WNU89-EM037



WNU89-EM038

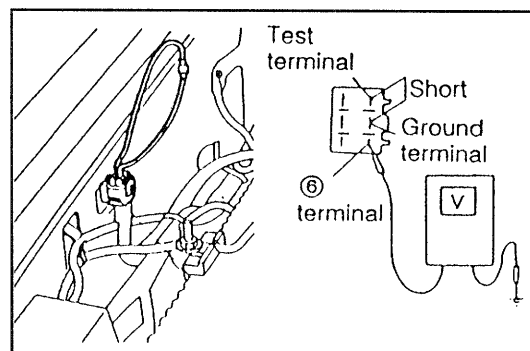
WNU89-EF190

- (2) Start and warm up the engine completely.
- (3) Connect the test terminal (brown) of the SST to the ground terminal (black).



WNU89-EF191

- (4) Connect a voltmeter to the output terminal (green) of the SST.



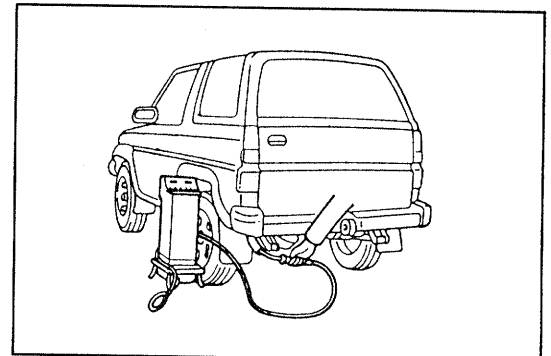
WNU89-EF092

- (5) Hold the engine speed at 3000 rpm.
- (6) After a lapse of 2 minutes, ensure that the reading of the voltmeter connected in the step (4) changes eight times or more for 10 seconds.
If the change in voltage fails to occur eight times or more, check the diagnosis code. Replace the oxygen sensor if no malfunction code is memorized.

WNU89-EF093

3. Measurement

- (1) Insert the HC/CO meter testing probe into the tail pipe at least 400 mm (15.7 inch).



WNU89-EM039

- (2) Measurement of HC/CO concentrations at idle.
Wait at least one minute before the measurement so as to allow concentrations to stabilize.
Complete the measurement within three minutes.
If the HC/CO concentrations dose not conform to the regulations, see the following table for possible causes.

WNU89-EF040

Trouble shooting

HC	CO	Problems	Possible causes
High	Normal	Rough idle	<ol style="list-style-type: none"> 1. Faulty ignition <ul style="list-style-type: none"> • Incorrect timing • Fouled, shorted or improperly gapped spark plugs • Open or crossed high tension cords • Cracked distributor cap
			<ol style="list-style-type: none"> 2. Incorrect valve clearance 3. Leaky EGR valve 4. Leaky exhaust valves 5. Leaky cylinder
High	Low	Rough idle (Fluctuating HC reading)	<ol style="list-style-type: none"> 1. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	<ol style="list-style-type: none"> 1. Restricted air filter 2. Faulty EFI system <ul style="list-style-type: none"> • Faulty pressure regulator • Clogged fuel return line • Defective water temp. sensor • Defective air temp. sensor • Faulty throttle position sensor • Faulty pressure sensor • Faulty injector • Faulty ECU 3. Insufficient warmed up three way catalyst

WNU89-EM041

COMPRESSION CHECK

NOTE:

- After completion of the engine tune-up, if the engine exhibits lack of power, excessive oil consumption or poor fuel economy, measure the cylinder compression pressure.

- Warm up the engine thoroughly. Then turn OFF the ignition key.
- Remove the intake air chamber. (See page EM-10.)
- Removal of spark plugs
 - Remove the spark plug wires from the clamp.
 - Disconnect the spark plug wire at spark plug side.

NOTE

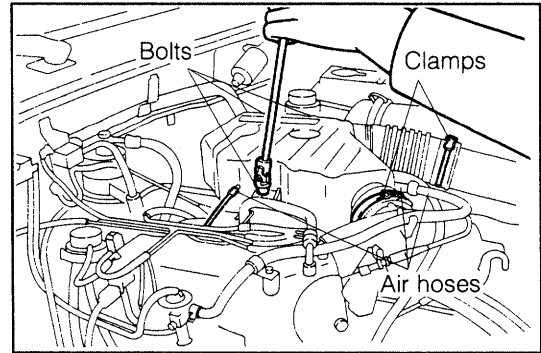
- Be sure to hold the rubber boot during the spark plug wire disconnection. Never remove the spark plug wire, holding the cord portion.

- Remove the all spark plugs, using the following SST {Plug wrench (16 mm)}.
SST: 09268-87703-000

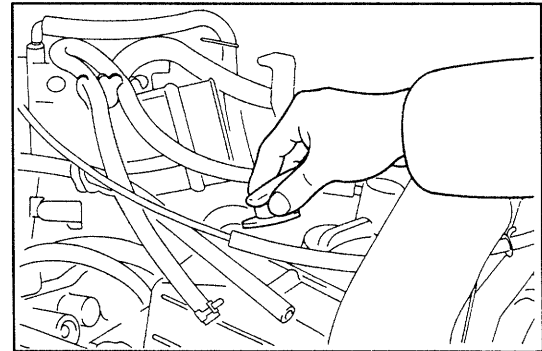
WARNING:

Be very careful not to burn yourself.

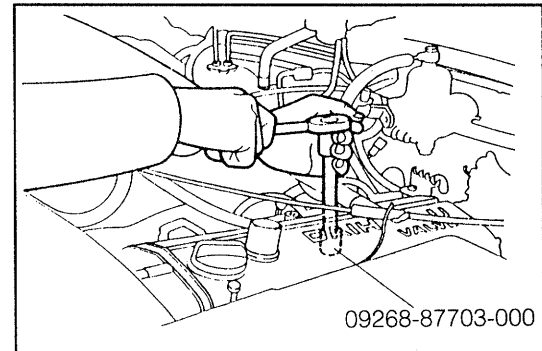
- Disconnect the distributor connector.
- Pull out the injector relay and fuel pump relay from the relay block.



WRU90-EM038

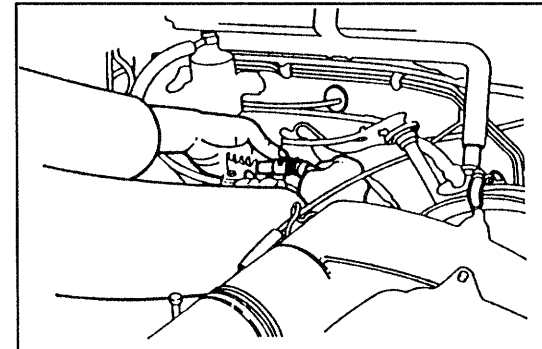


WRU90-EM039

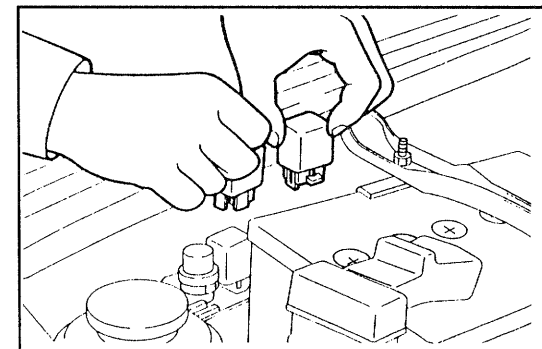


09268-87703-000

WNU89-EM044



WNU89-EM045



WNU89-EM046

6. Measurement of cylinder compression pressure
 - (1) Insert a compression gauge into the spark plug hole.
 - (2) Depress the accelerator pedal fully.
 - (3) While cranking the engine, measure the compression pressure.

NOTE:

- Always use a fully charged battery so that at least a revolution speed of 300 rpm is attained.

- (4) Repeat the steps (1) through (3) for each cylinder.

NOTE:

- Perform the measurement in the shortest possible time.
- Crank the engine for the same duration for each cylinder.

Compression pressure:

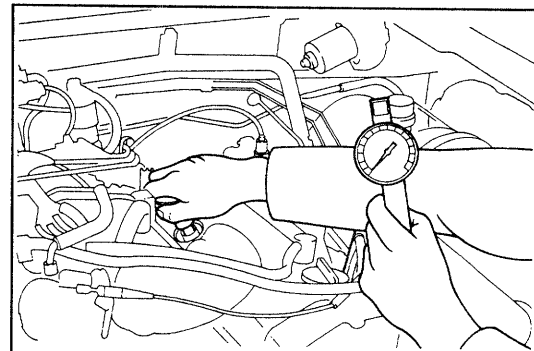
14 kg/cm²/at 300 rpm (199.1 psi/at 300 rpm)

Minimum pressure:

10.5 kg/cm²/at 300 rpm (149.4 psi/at 300 rpm)

Difference between cylinders:

1.5 kg/cm²/at 300 rpm (21.3 psi/at 300 rpm)

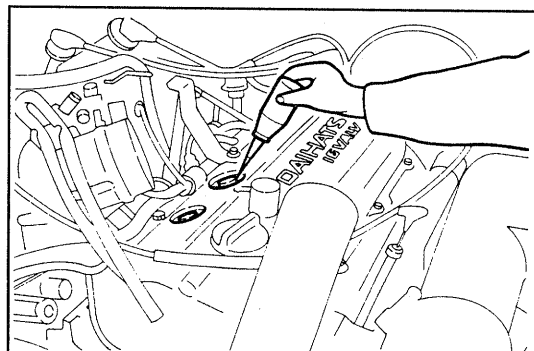


WRU90-EM040

- (5) If the compression of one or more cylinders is low, pour a small amount of engine oil into that cylinder through the spark plug hole and repeat the steps (1) through (4) for the cylinder with low compression.

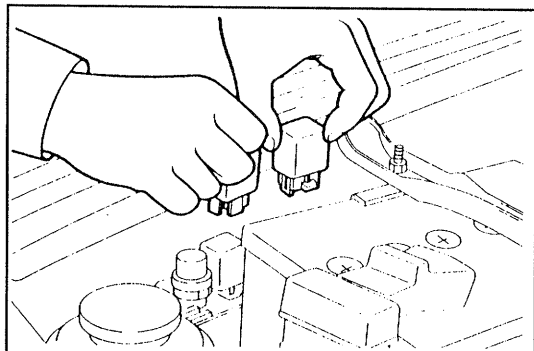
- If adding oil helps the compression to improve, chances are that the piston rings and/or cylinder bores are worn or damaged.
- If the pressure remains low after the operation described in the step (5) has been performed, the valve may be sticking or seated improperly, or there may be leakage past the gasket.

7. Install the injector relay and fuel pump relay to the relay block.



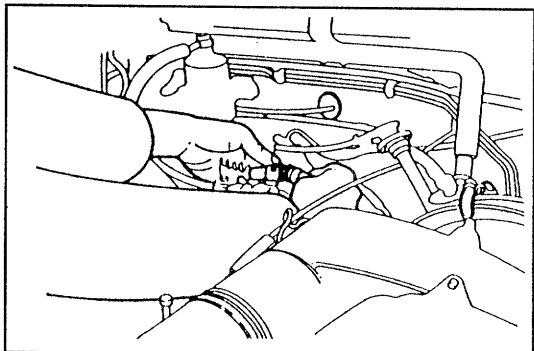
WNU89-EM047

WRU90-EM041



WNU89-EM049

8. Connect the distributor connector. Install it to the clamp.

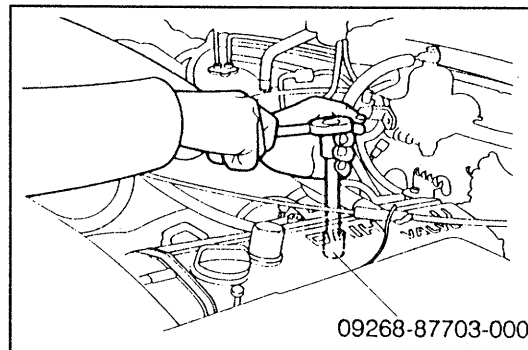


WNU89-EM050

(9) Install the spark plugs using the following SST.

SST: 09268-87703-000

Tightening Torque: 1.5 - 2.2 kg-m
(10.9 - 15.9 ft-lb, 14.7 - 21.6 N·m)

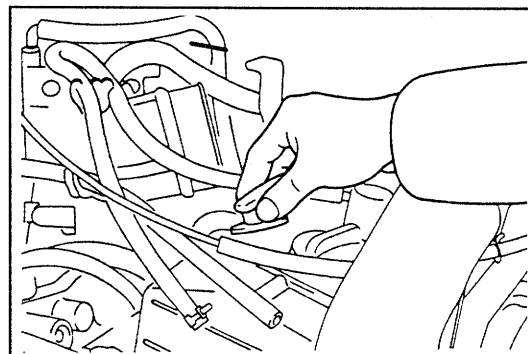


WNU89-EM051

(10) Connect the spark plug wire.

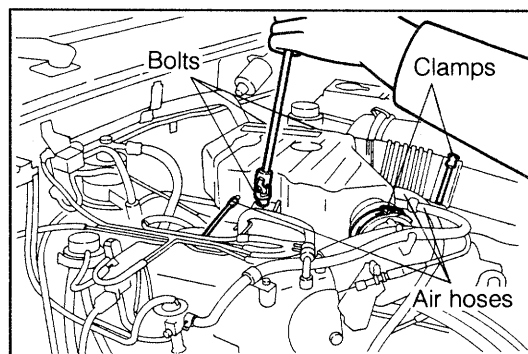
NOTE:

- Be sure that the spark plug wire is connected securely to each spark plug.
- Care should be exercised not to damage the spark plug wire with the spark plug tube.

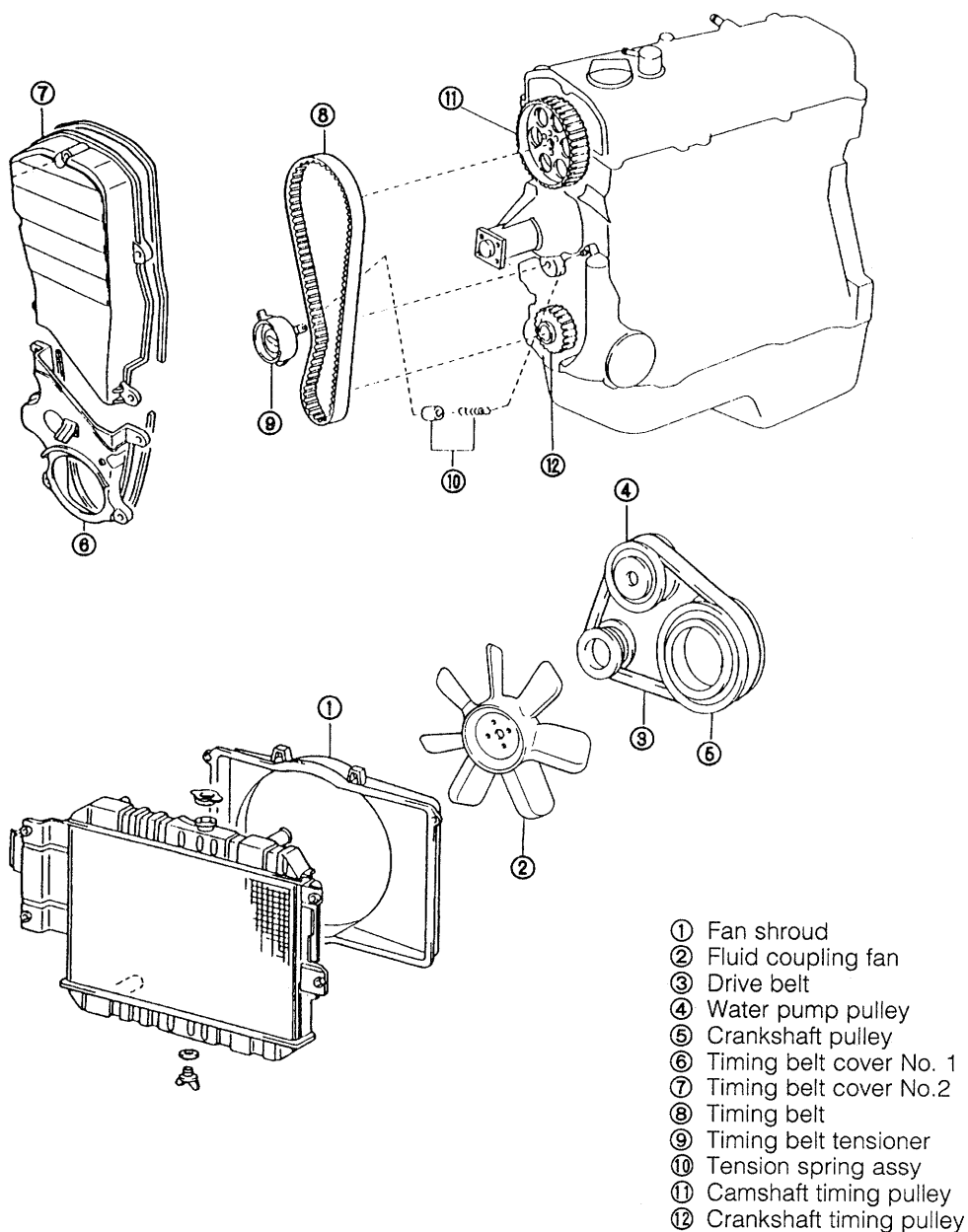


(11) Attach the spark plug wire to the clamp.

(12) Install the intake air chamber.
(See page EM-14.)



TIMING BELT COMPONENTS



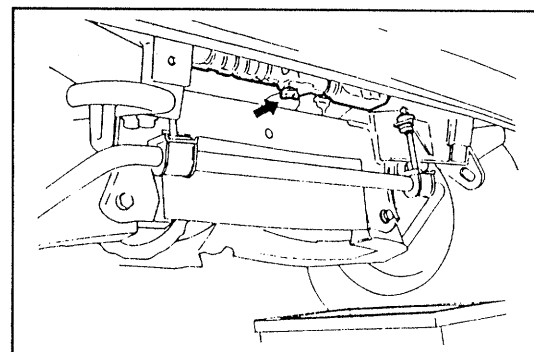
WRU90-EM044

REMOVAL OF TIMING BELT

1. Disconnect the battery ground cable from the negative (-) terminal of the battery.
2. Remove the engine under cover. Drain the engine coolant about 1 liter from drain plug of the radiator.

WARNING:

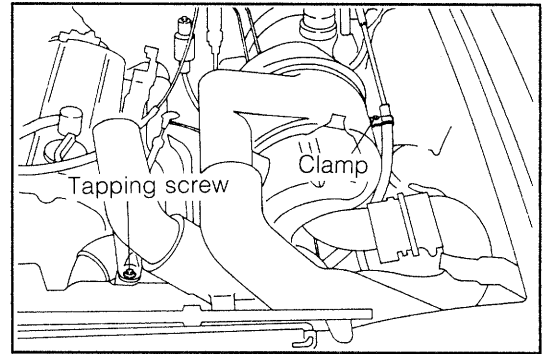
The engine coolant may be very hot. Care must be exercised to avoid getting scalded.



WRU90-EM045

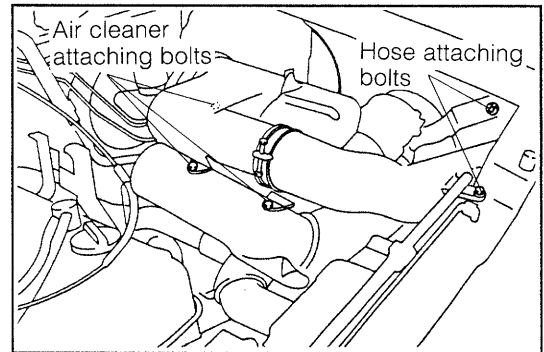
ENGINE MECHANICALS

3. Removal of air cleaner and air cleaner hose subassembly
 - (1) Remove the tapping screw from the radiator fan shroud upper side.
 - (2) Remove the clutch cable clamp provided at the air cleaner.



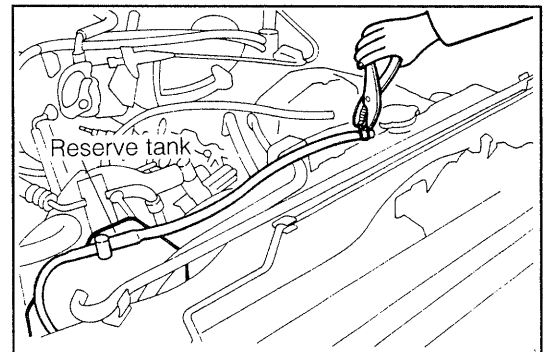
WRU90-EM047

- (3) Remove the air cleaner hose attaching bolts provided at the left fender panel and radiator center support. Remove the three air cleaner attaching bolts. Then remove the air cleaner and air cleaner hose subassembly.



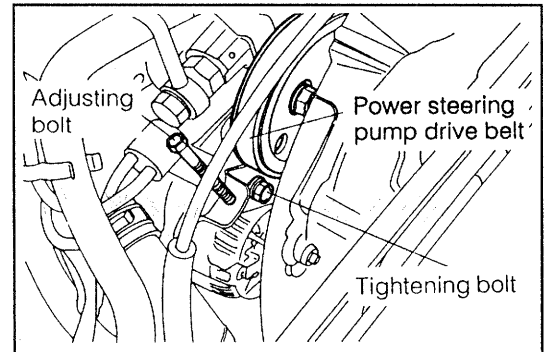
WRU90-EM048

4. Removal of the radiator reserve tank
 - (1) Disconnect the radiator reserve tank hose from the radiator.
 - (2) Pull up the radiator reserve tank together with hose.



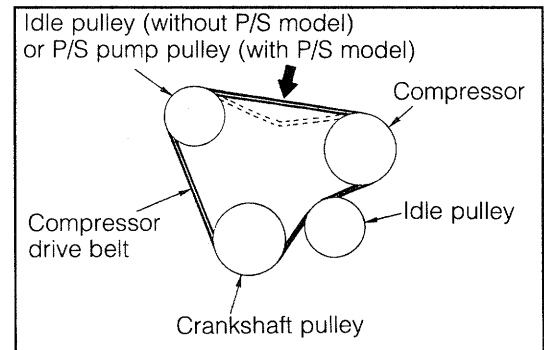
WRU90-EM049

5. Removal of the power steering pump drive belt. (power steering equipped vehicle only)
 - (1) Loosen the adjusting bolt and two tightening bolts. Then push down the pump.
 - (2) Remove the drive belt.



WRU90-EM050

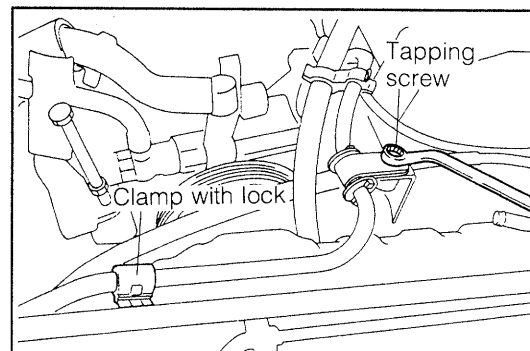
6. Remove the air conditioner drive belt by loosening the adjusting bolt. (air conditioner equipped vehicle)



WRU90-EM051

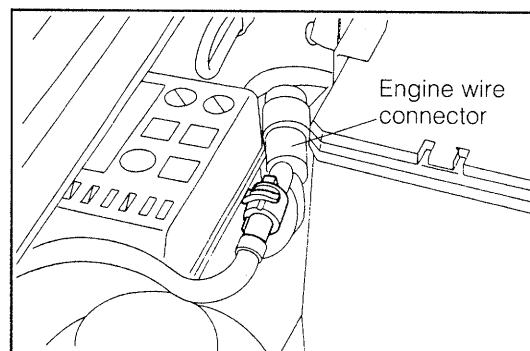
7. Disconnection of engine wire

- (1) Remove the tapping screw and detach the clamp with lock.



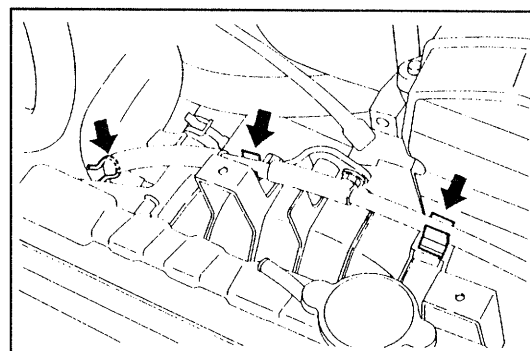
WRU90-EM052

- (2) Disconnect the engine wire connector at the relay box side.



WRU90-EM053

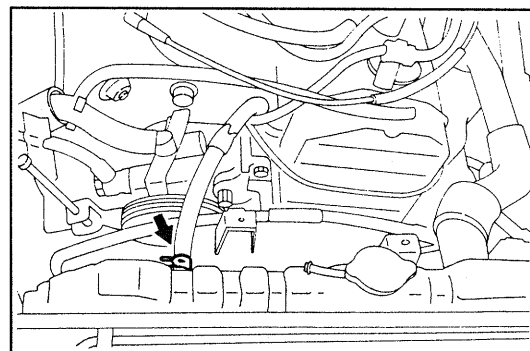
8. Remove the three clamps for clutch cable provide on the fan shroud.



WRU90-EM054

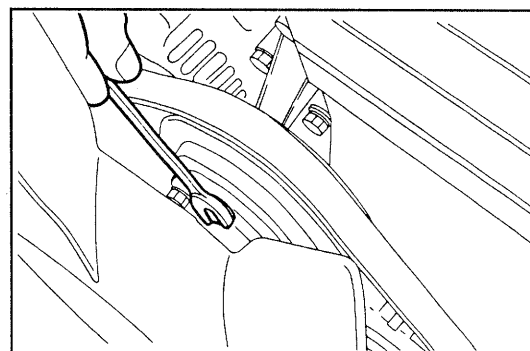
9. Removal of fluid coupling with fan and fan shroud

- (1) Disconnect the water hose from the radiator upper tank.



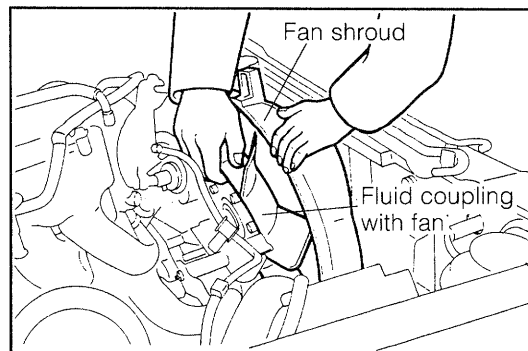
WRU90-EM055

- (2) Remove the four water pump pulley attaching nuts. Then detach the fluid coupling with fan from the water pump pulley temporarily.
- (3) Remove the drive belt by loosening the alternator pulley adjusting bolt.
- (4) Remove the water pump pulley.



WRU90-EM056

- (5) Remove the two fan shroud attaching bolts from the radiator.
- (6) Unlock the lock section of the fan shroud lower part from the radiator by pulling up the fan shroud.
- (7) Remove the fan shroud together with fluid coupling with fan from the engine compartment.

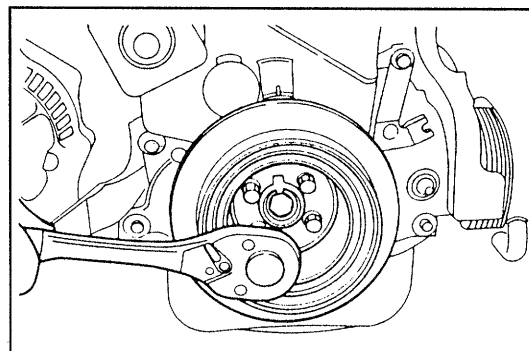


WRU90-EM057

10. Remove the crankshaft pulley by removing the four attaching bolts.

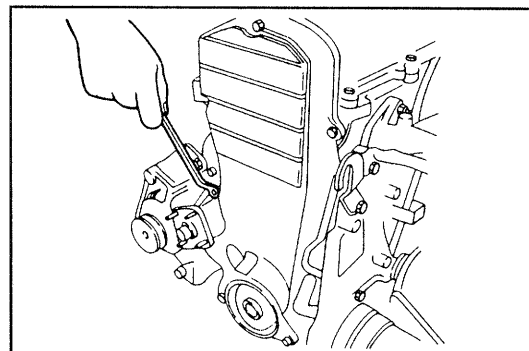
NOTE:

- Place the gear shift lever in the 5th gear position so as to prevent the rotation of the crankshaft.



WRU90-EM058

11. Remove the timing belt cover No. 1 and No. 2 by removing the eight bolts.



WRU90-EM059

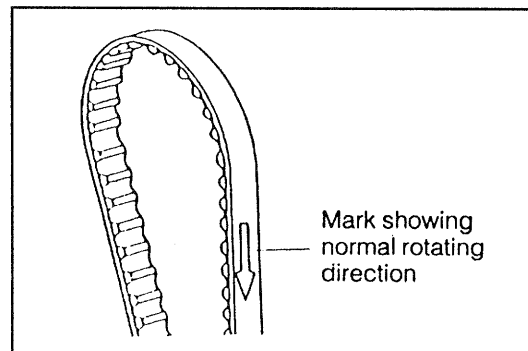
12. Removal of timing belt

NOTE:

- Prior to removal of the timing belt, put an arrow mark indicating the normal rotating direction on the belt, using a chalk or the like.

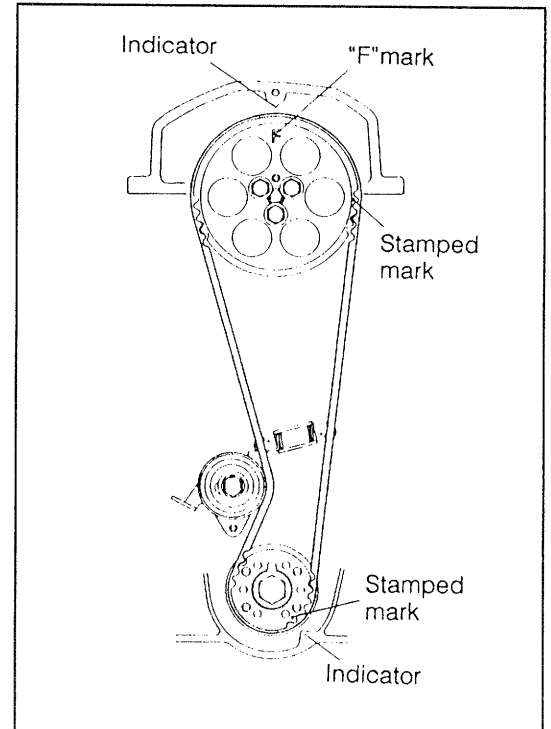
CAUTION:

- Do not try to pry the timing belt with a screwdriver or the like during the removal or installation.
- Do not allow the belt to come into contact with oil, water or dust.
- Do not bend the belt at a sharp angle or turn the belt inside out, for it is very vulnerable to bending.
- Do not utilize the tension of the timing belt pulley when loosening the set bolt of the camshaft timing belt pulley.



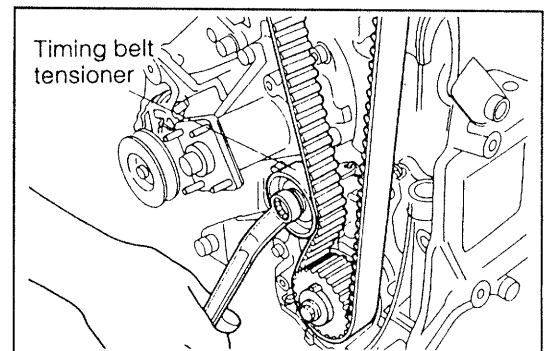
WRU90-EM060

- (1) Rotate the crankshaft until the "F" mark of the camshaft timing belt pulley is aligned with the indicator of the cylinder head cover.



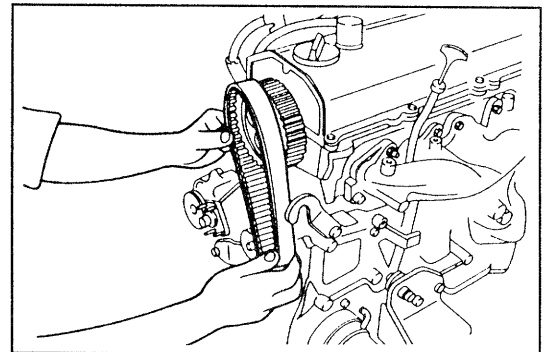
WNU89-EM066

- (2) Loosen the attaching bolt of the timing belt tensioner. Move the tensioner to the left as far as it will go and tighten the bolt temporarily.



WNU89-EM067

- (3) Remove the timing belt.



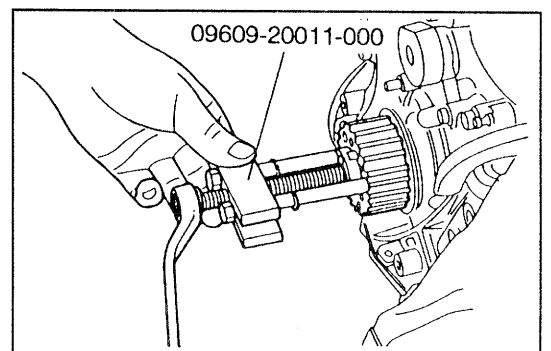
WNU89-EM068

13. Remove the crankshaft timing belt pulley and pulley flange by removing pulley bolt. (If required.)

NOTE:

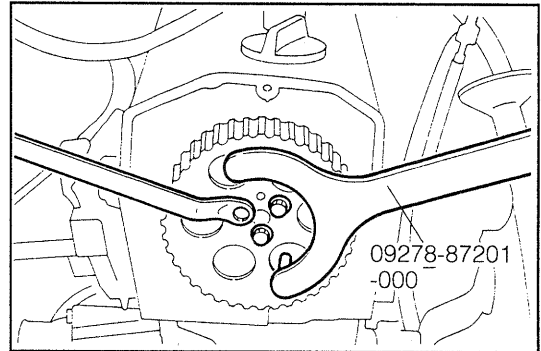
- Prevent the crankshaft from being rotated by placing the gear shift lever in the 5th gear position.
- If any difficulty is encountered in removing the crankshaft timing belt pulley, lightly screw in the set bolt of the crankshaft timing belt pulley. Then, remove the pulley, using the following SST.

SST: 09609-20011-000



WRU90-EM061

14. Removal of camshaft timing belt pulley (If required.)
 - (1) Loosen the attaching bolt of the camshaft timing belt pulley by using the following SST.
SST: 09278-87201-000
 - (2) Remove the camshaft timing belt pulley.
15. Remove the timing belt tensioner and tension spring.



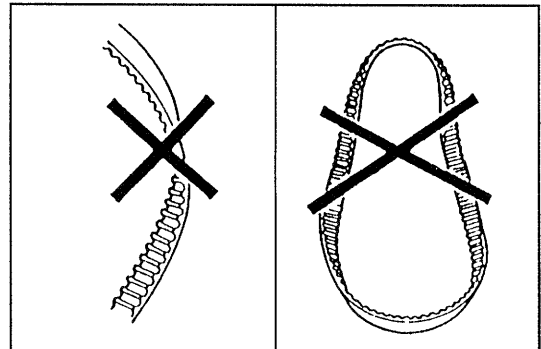
WRU90-EM062

INSPECTION OF COMPONENTS

1. Timing belt inspection

CAUTION:

- Do not bend, twist or turn the belt inside out.
- Do not allow the belt to come into contact with oil, water or steam.
- Keep the belt clean.

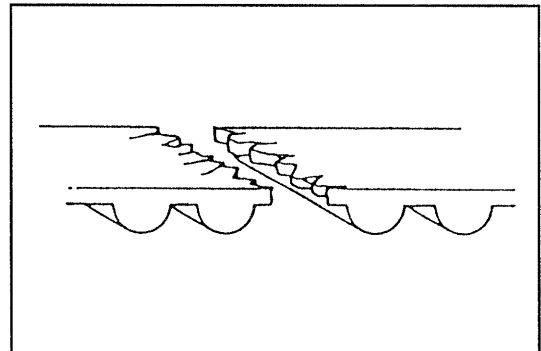


WNU89-EM071

If there are defects, as shown in the figures, check the following points and replace the timing belt, if necessary.

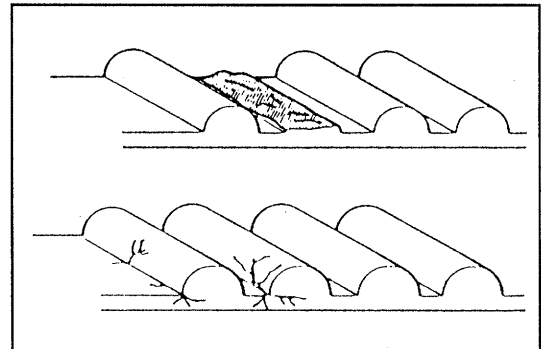
- (1) Premature separation

- Check for proper installation.
- Check the timing gear cover gaskets for damage and check for correct installation.



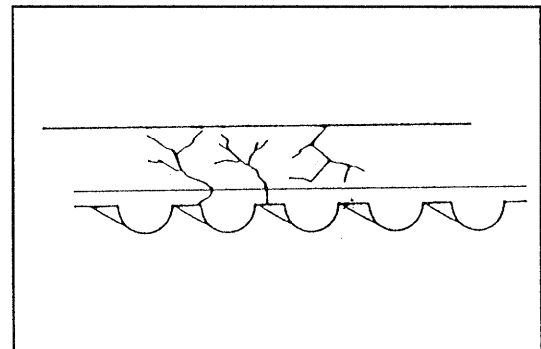
WNU89-EM072

- (2) If the belt teeth are cracked or damaged, check to see if the camshaft is seized.



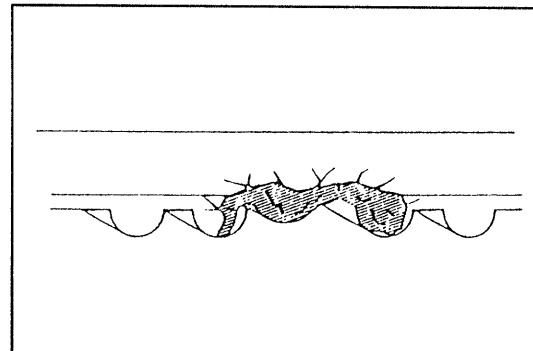
WNU89-EM073

- (3) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on one side of the idler pulley lock.



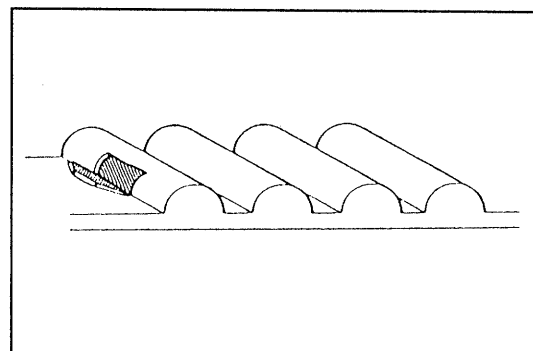
WNU89-EM074

- (4) If there is wear or damage on only one side of the belt, check the pulley flange.



WNU89-EM075

- (5) If there is noticeable wear on the belt teeth, check the timing cover gasket for damage and check for correct gasket installation. Check for foreign material on the pulley teeth.

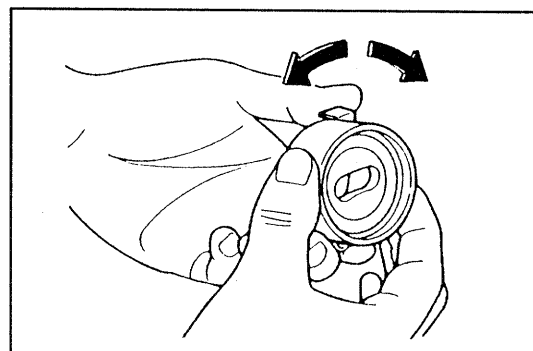


WNU89-EM076

2. Timing belt tensioner inspection
- Check the timing belt tensioner for smooth turning.
 - Check the belt contact surface for damage.
- If necessary, replace the timing belt tensioner.

CAUTION:

- Never wash the timing belt tensioner.



WNU89-EM077

3. Inspection of tension spring

- (1) Check the free length of the spring
Free length: 46.5 mm (1.83 inch)

- (2) Check the tension of the spring at the specified installation length.

Tension as installed: 3.0 kg at 50.9 mm
(6.6 lb at 2.0 inch)

If the tension does not conform to the specification, replace the spring.

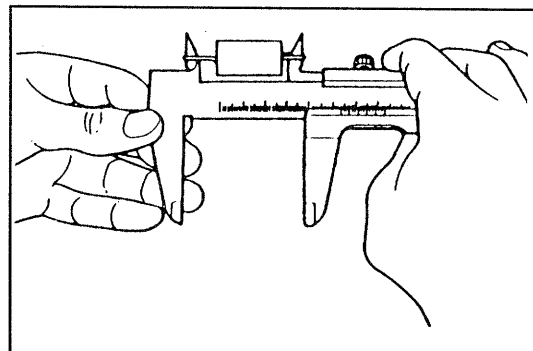
4. Inspection of timing belt pulley

- (1) Measure the maximum diameter of the timing belt pulley, using vernier calipers.

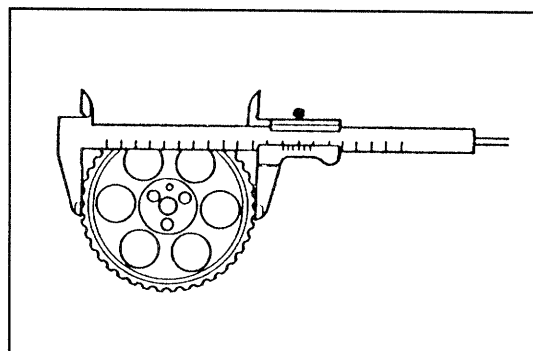
Reference:

Camshaft timing belt pulley: 119.90 mm (4.720 inch)

Crankshaft timing belt pulley: 59.37 mm (2.335 inch)

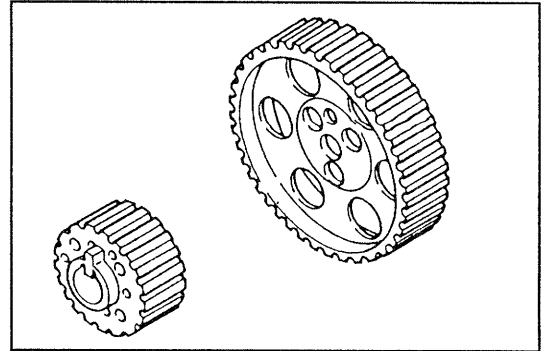


WRU90-EM400



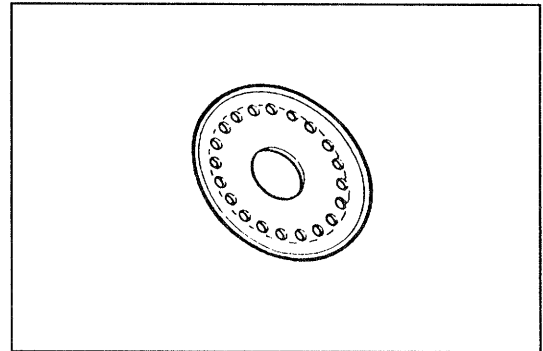
WRU90-EM063

(2) Visually inspect the timing belt pulley for damage.



WNU89-EM080

5. Inspection of crankshaft timing belt pulley flange
Check the crankshaft timing belt pulley flange for bend, damage and wear.
If necessary, replace the crankshaft timing belt pulley flange.



WNU89-EM081

INSTALLATION OF TIMING BELT

(See page EM-21.)

NOTE:

- Check the water pump for water leakage and the oil seal for oil leakage.

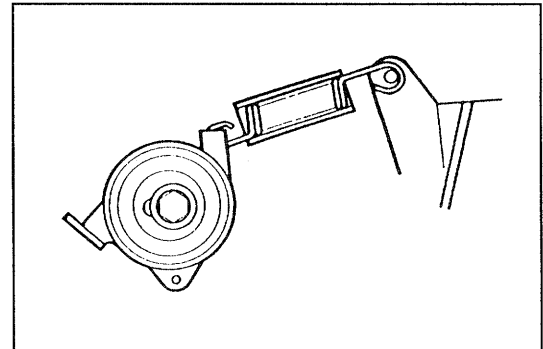
Repair any water leakage or oil leakage, if necessary.

WRU90-EM064

1. Attach the tension spring to the timing belt tensioner. Hang the tension spring hook on the pin. Assemble the timing belt tensioner in place and install the bolt.

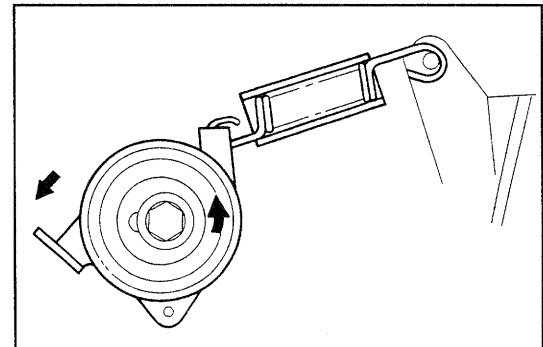
CAUTION:

- Hang the spring hook securely on the pin groove.
- Ensure that the pin at the oil pump is fitted into the pin hole of the timing belt tensioner.



WNU89-EM083

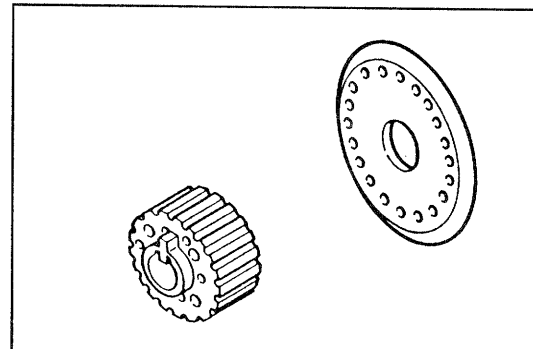
2. While pulling the timing belt tensioner fully toward the water pump side, temporarily tighten the attaching bolt of the timing belt tensioner.



WRU90-EM065

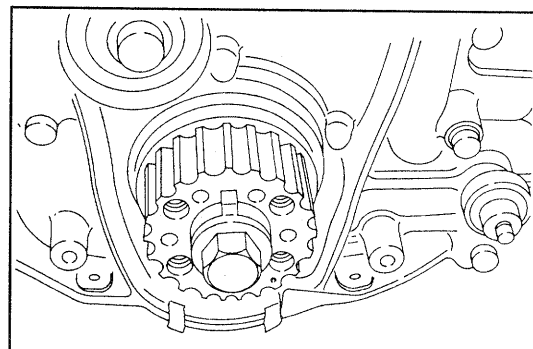
3. Installation of crankshaft timing belt pulley

- (1) Install the crankshaft timing belt pulley flange with its recessed side facing toward the oil pump side.



WNU89-EM085

- (2) Install the crankshaft timing belt pulley on the crankshaft by aligning it with the key groove. Install the setting bolt of the crankshaft timing belt pulley. Align the drilled mark of the crankshaft timing belt pulley with the indicator.

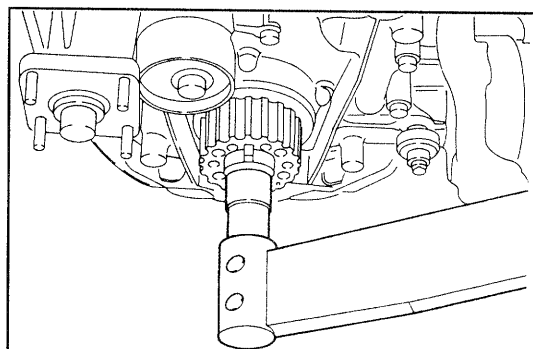


WRU90-EM066

- (3) Tighten the crankshaft timing belt pulley bolt.
Tightening Torque: 9.0 - 10.0 kg-m
(65.1 - 72.0 ft-lb, 88.3 - 98.0 N-m)

NOTE:

- Prevent the crankshaft from being rotated by placing the gear shift lever in the 5 gear.



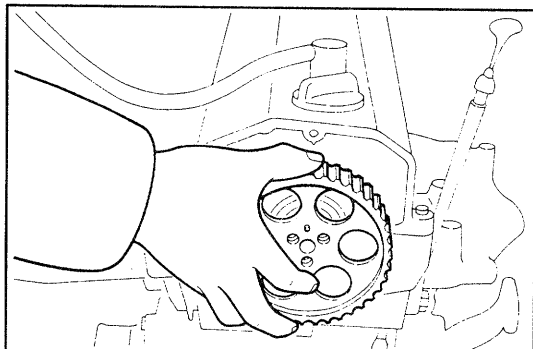
WRU90-EM067

4. Installation of camshaft timing belt pulley

- (1) Install the camshaft timing belt pulley on the camshaft in such a way that the "F" mark can be seen and the locating pin hole is aligned.

NOTE:

- Remove any oil or water from the camshaft timing belt pulley. Keep the pulley clean.

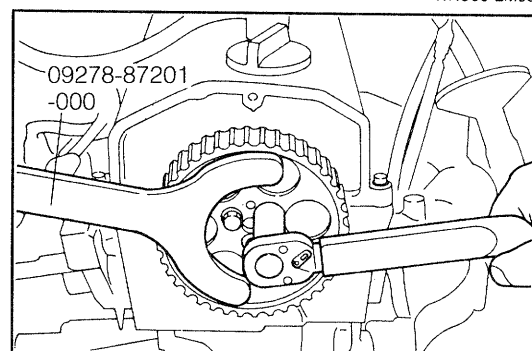


WRU90-EM068

- (2) Install the three attaching bolts of the camshaft timing belt pulley, while preventing the pulley from turning by using the following SST.

SST: 09278-87201-000

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.8 - 21.5 N-m)



WRU90-EM069

CAUTION:

- Never allow the camshaft to turn.

5. Installation of timing belt

CAUTION:

- Do not try to pry the timing belt with a screwdriver or the like.
- Do not allow the belt to come into contact with oil, water or dust.
- Do not bend the belt at a sharp angle or turn the belt inside out.
- Perform the engine turning operation at the crankshaft side.
- Do not utilize the tension of the timing belt when tightening the set bolt of the timing belt pulley.
- When the timing belt is reused, install the timing belt in such a way that the direction of the arrow put during the removal may match with the engine rotation direction.
- The adjustment of belt tension should be made when the cylinder block and its ambient temperatures are in between 5 - 50°C (41 - 122°F).

WRU90-EM070

- (1) Align the "F" mark of the camshaft timing belt pulley with the indicator on the cylinder head cover.

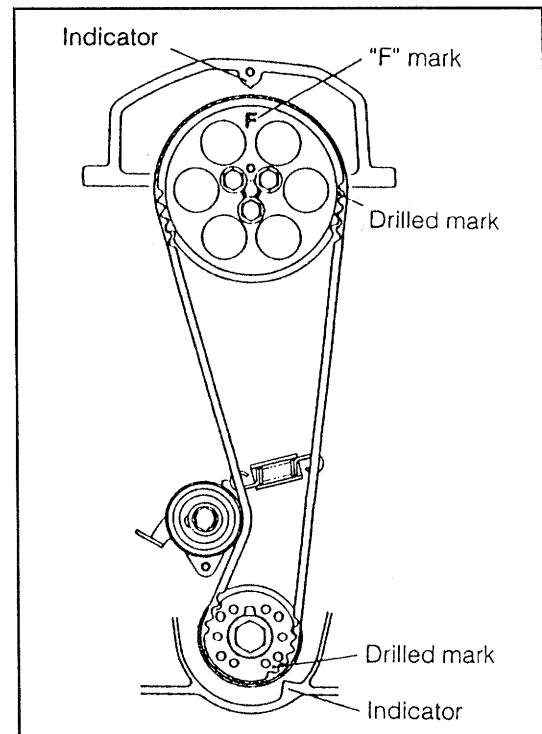
CAUTION:

- It should be noted that the piston may interfere with the valves if the camshaft is turned independently.

- (2) Align the drilled mark of the crankshaft timing belt pulley with the indicator with the indicator.

CAUTION:

- It should be noted that the piston may interfere with the valves if the crankshaft is turned independently.

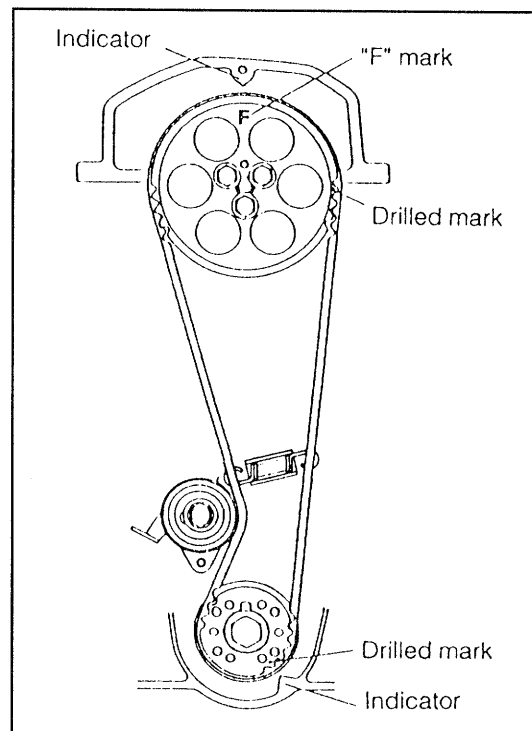


WNU89-EM099

- (3) Assemble the timing belt in such a way that the two mating marks on the timing belt may be aligned with the corresponding drilled marks on the crankshaft timing belt pulley and camshaft timing belt pulley.

NOTE:

- When the timing belt is reused, install the timing belt in such a way that there exist 35 teeth of the belt between the drilled marks of the crankshaft timing belt pulley and camshaft timing belt pulley.
- When the timing belt is reused, install the timing belt in such a way that the arrowhead which was put on during disassembly points in the direction of engine rotation.

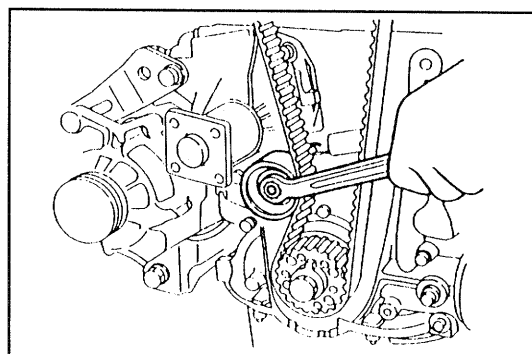


WRU90-EM401

- (4) Loosen the attaching bolt of the timing belt tensioner. Apply tension to the timing belt. Temporarily tighten the attaching bolt.

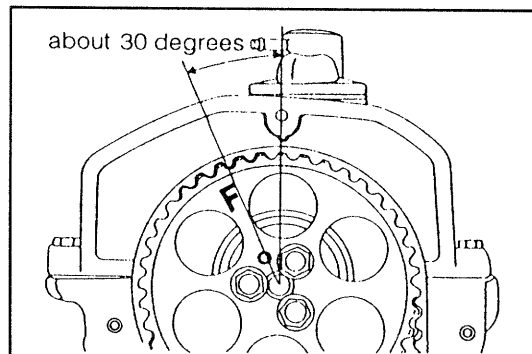
NOTE:

- Ensure that the belt exhibits no slack at the tension side of the belt (the side opposite to the tensioner).



WRU90-EM071

- (5) Rotate the crankshaft 1.9 turns in the normal direction (to the right as viewed from the engine cylinder No. 1) so that the "F" mark of the camshaft timing belt pulley comes at a point three teeth in the camshaft timing belt pulley before the indicator of the cylinder head cover.

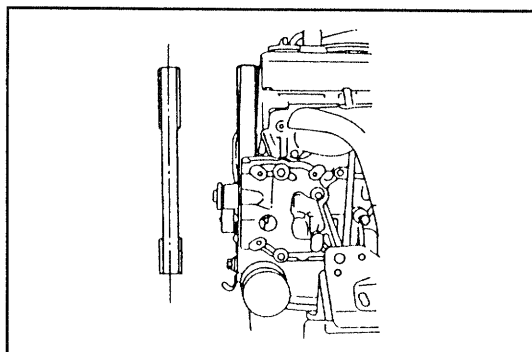


WNU89-EM102

CAUTION:

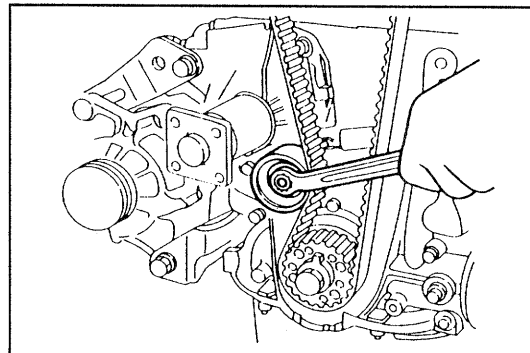
- At this time, never turn the crankshaft reversely.
- Make sure that the belt is not tilted between the crankshaft timing belt pulley and the camshaft timing belt pulley.

If the crankshaft should be reversed or the timing belt should be tilted, turn the crankshaft two more turns.



WNU89-EM103

- (6) Make the tensioner free by loosening the attaching bolt of the timing belt tensioner.

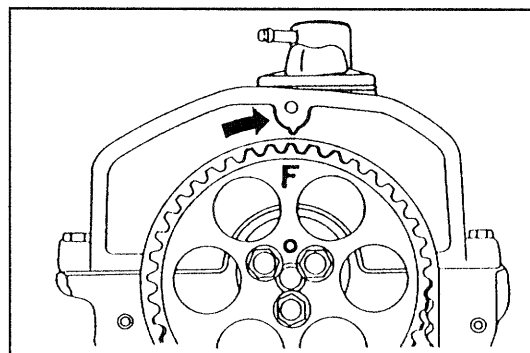


WNU89-EM104

- (7) Turn the crankshaft further in the normal direction until the "F" mark of the camshaft timing belt pulley is aligned with the indicator of the cylinder head cover.

CAUTION:

- Never turn the crankshaft reversely.
- Never turn the crankshaft beyond the point where the "F" mark of the camshaft timing belt pulley is aligned with the indicator.

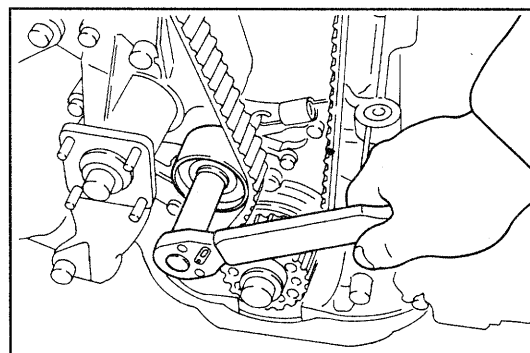


WNU89-EM105

If the crankshaft should be reversed or turned beyond that point, temporarily tighten the tensioner attaching bolt and repeat the operations from the step (5) onward.

- (8) Tighten the attaching bolt of the timing belt tensioner to the specified torque.

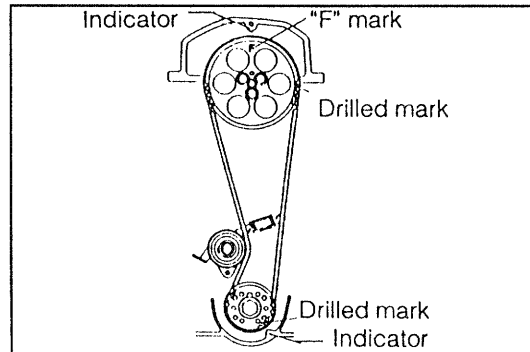
Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N-m)



WRU90-EM072

- (9) Ensure that the drilled marks of the crankshaft timing belt pulley and camshaft timing belt pulley are aligned with the corresponding indicators.

If the drilled mark is not aligned with the indicator, repeat the operations from the step (1) onward.



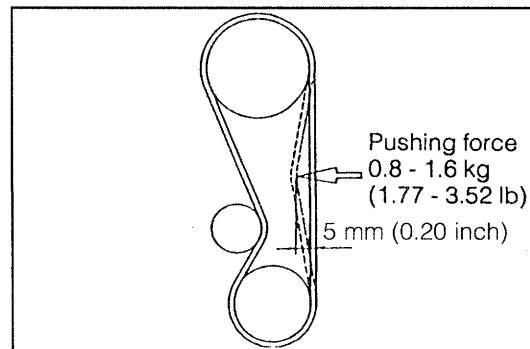
WNU89-EM107

6. Check of timing belt tension

When the midpoint of the belt at the tension side is pushed 5.0 mm (0.20 inch), ensure that the pushing force is 0.8 - 1.6 kg (1.77 - 3.52 lb).

Specified Pushing Force: 0.8 - 1.6 kg (1.77 - 3.52 lb)
When belt is deflected 5.0 mm (0.20 inch)

If the belt does not conform to the specification, repeat the operations from the step 5 (4) onward.



WRU90-EM073

7. Installation of timing belt cover

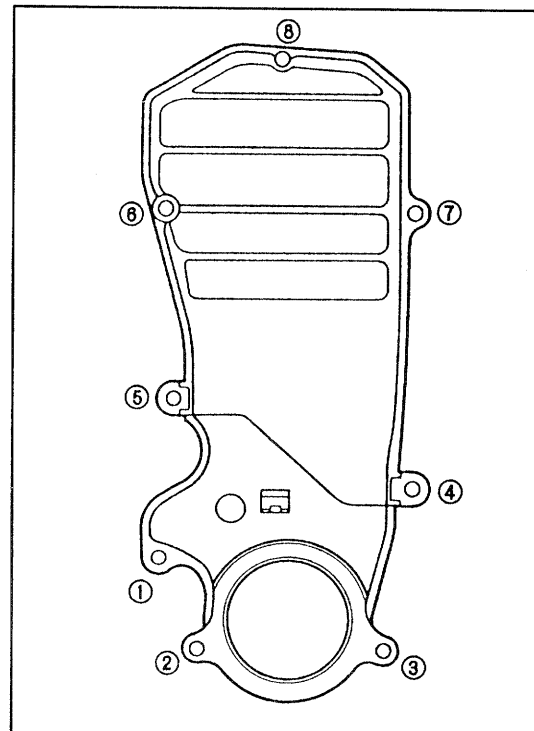
- (1) Install the timing belt cover No. 1 (lower side) with three bolts.

NOTE:

- First, attaching bolts ① and ④ should be installed.
- Attaching bolts ④ and ⑤ in the figure are tightened both upper and lower side cover.

- (2) Install the timing belt cover No. 2 (upper side) with five bolts.

Tightening Torque: 0.2 - 0.4 kg-m
(1.4 - 2.9 ft-lb, 2.0 - 3.9 N·m)
(For both upper and lower cover)

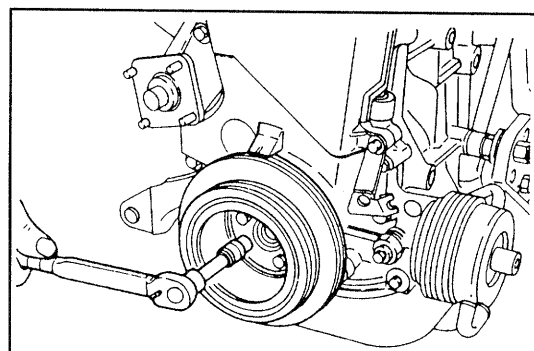


WRU90-EM074

8. Installation of crankshaft pulley

- (1) Prevent the crankshaft from turning by placing the gear shift lever in the 5th gear position, and pull the parking break lever.
- (2) Install the crankshaft pulley on the crankshaft timing belt pulley with four bolts.

Tightening Torque: 2.0 - 3.0 kg-m
(14.5 - 21.6 ft-lb, 19.6 - 29.4 N·m)



WRU90-EM075

9. Installation of fluid coupling with fan and fan shroud

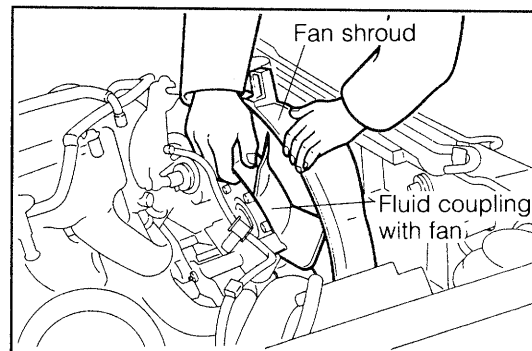
- (1) Temporarily install the water pump pulley.
- (2) Insert the radiator fan shroud together with the fluid coupling with fan between radiator and the engine.

NOTE:

- Be sure that water pump pulley is seated properly to the water pump.

- (3) Install the fluid coupling with fan to the water pump by means of four bolts through water pump pulley.

Tightening Torque: 1.0 - 1.8 kg-m
(7.2 - 13.0 ft-lb, 9.8 - 17.7 N·m)



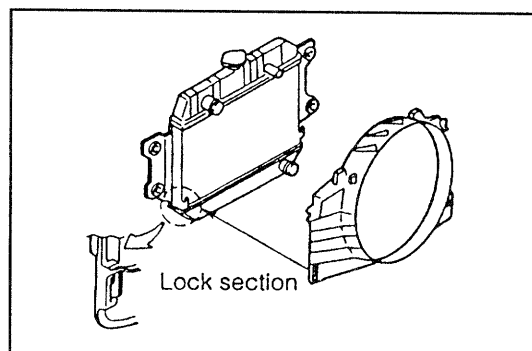
WRU90-EM076

REFERENCE:

Tightening torque of fluid coupling and fan is as follows.

0.44 - 0.66 kg-m (3.2 - 4.8 ft-lb, 4.3 - 6.5 N·m)

- (4) Insert the lock section of fan shroud to the radiator. Then, tighten the two attaching bolts of the radiator upper side.
- (5) Connect the water hose to the radiator upper tank. Securely clamp the water hose clamp.



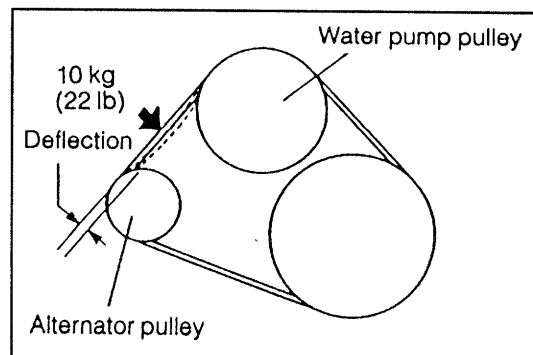
WRU90-EM077

10. Installation of V ribbed belt

- (1) Install the V ribbed belt.
- (2) Perform the adjustment in such a way that the deflection at the midpoint between the water pump pulley and the alternator may become the specified value when a force of 10 kg (22 lb) is applied to the midpoint.

Specified Belt Deflection:

- New Belt:** 4.0 - 5.0 mm (0.157 - 0.197 inch)
With a force of 10 kg (22 lb) applied to point indicated in figure
- Used Belt:** 5.0 - 6.0 mm (0.197 - 0.236 inch)
With a force of 10 kg (22 lb) applied to point indicated in figure



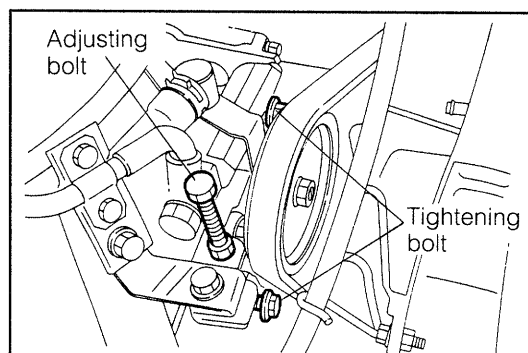
WRU90-EM078

NOTE

- The term "used belt" denotes a belt which has been used for more than five minutes after it was put into use.

11. Installation of power steering drive belt (power steering equipped vehicle only)

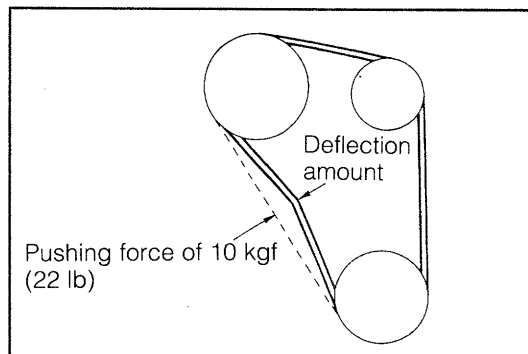
- (1) Install the power steering drive belt.



WRU90-EM079

- (2) Set the drive belt tension to the specified value by tightening the adjusting bolt.

Specified Deflection: 9 - 11 mm (0.35 - 0.43 inch)
[When a force of 10 kg (22 lb) is applied]

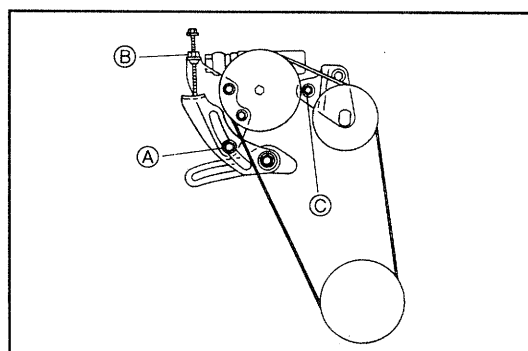


WRU90-EM080

- (3) Tighten the bolts and nut to the specified value.

Tightening Torque:

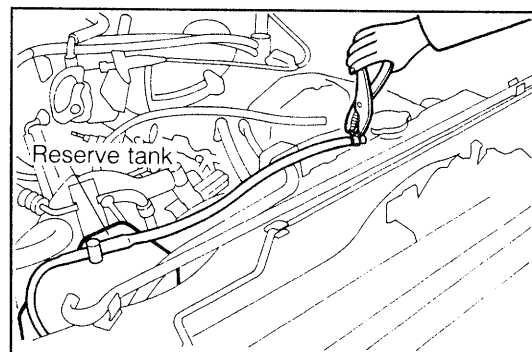
- Ⓐ 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N·m)
- Ⓑ 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)
- Ⓒ 5.0 - 7.0 kg-m
(36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)



WRU90-EM081

12. Installation of reserve tank

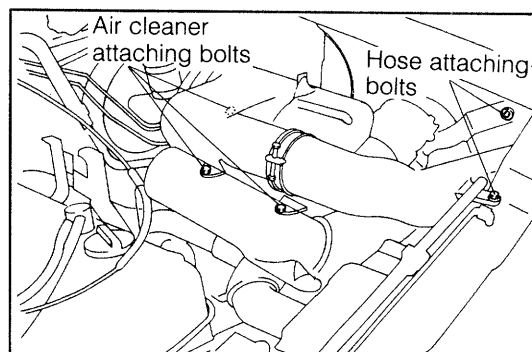
- (1) Install the reserve tank to the radiator assy bracket.
- (2) Insert the reserve tank hose to the radiator with clip.



WRU90-EM082

13. Installation of air cleaner and air cleaner hose

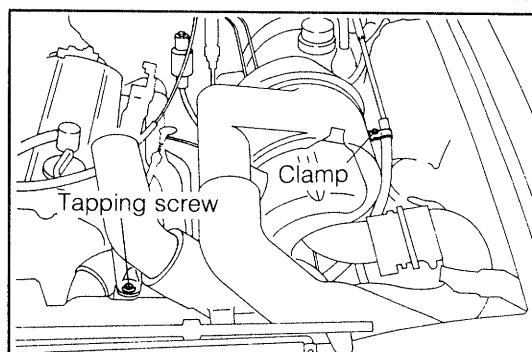
- (1) Put the air cleaner and air cleaner hose into position.
- (2) Tighten the three air cleaner attaching bolts.
- (3) Tighten the air cleaner hose attaching bolts provided at the left fender panel and the radiator center support.



WRU90-EM083

14. Install the clutch cable clamp provided at the air cleaner.

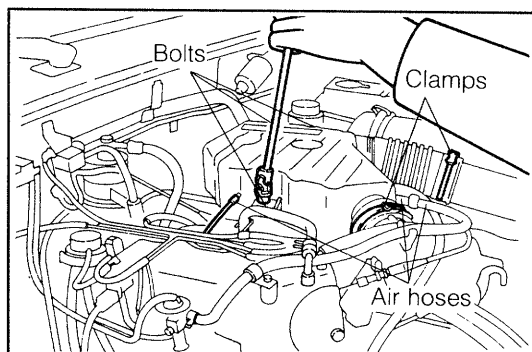
15. Install the tapping screw onto the radiator fan shroud upper side.



WRU90-EM084

16. Install the intake air chamber.

(See page EM-14)



WRU90-EM085

17. Pour the engine coolant about 1 liter into the radiator.

NOTE:

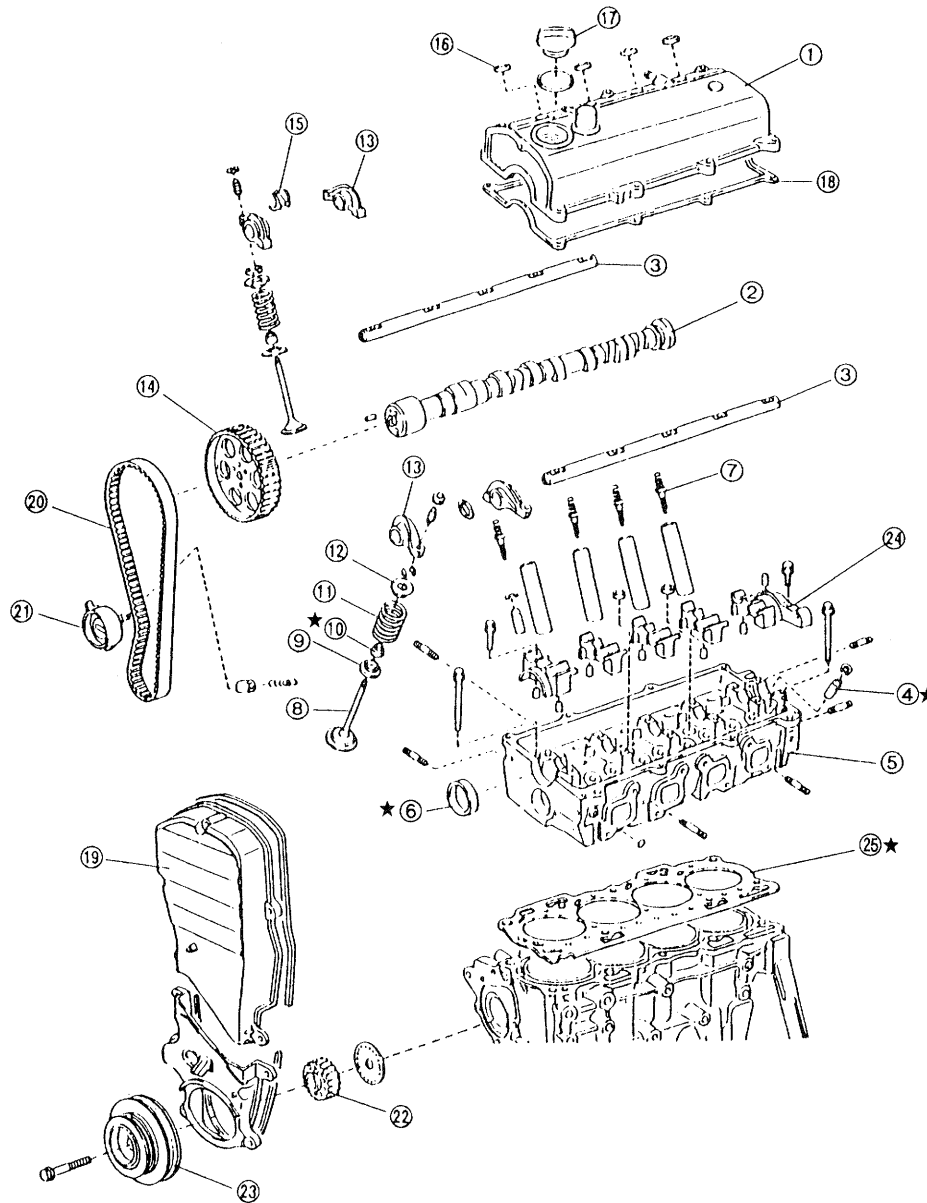
- Use the engine coolant which is drained from radiator in the step 2 of removal of timing belt.

18. Connect the battery ground cable to the negative (-) terminal of the battery.

WRU90-EM086

CYLINDER HEAD COMPONENTS

★: Non-reusable parts

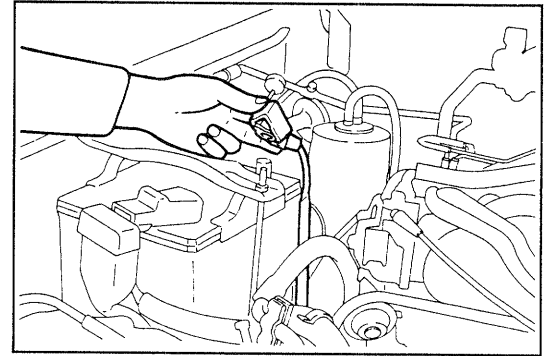


- ① Cylinder head cover
- ② Camshaft
- ③ Valve rocker shaft
- ④ Valve guide
- ⑤ Cylinder head
- ⑥ Oil seal
- ⑦ Spark plug
- ⑧ Valve
- ⑨ Spring seat
- ⑩ Valve stem oil seal
- ⑪ Valve spring
- ⑫ Valve spring retainer
- ⑬ Valve rocker arm

- ⑭ Camshaft timing belt pulley
- ⑮ Spacer
- ⑯ Grommet
- ⑰ Oil filler cap
- ⑱ Gasket
- ⑲ Timing belt upper cover
- ⑳ Timing belt
- ㉑ Timing belt tensioner
- ㉒ Crankshaft timing belt pulley
- ㉓ Crankshaft pulley
- ㉔ Camshaft cap
- ㉕ Cylinder head gasket

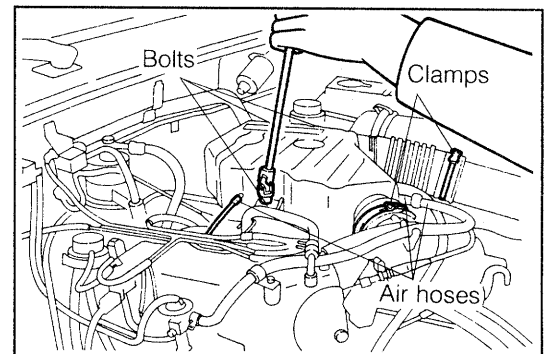
REMOVAL OF CYLINDER HEAD WITH MANIFOLDS

1. Removal of battery
 - (1) Disconnect the battery ground cable from the negative (–) terminal of the battery. Then disconnect the positive cable from the positive (+) terminal.
 - (2) Remove the battery from the engine compartment by removing the battery holding clamp.
2. Drain the coolant. (See page CO–3.)
3. Drain the engine oil. (See page LU–4.)
4. Removal of engine hood
 - (1) Disconnect the window shield washer hose.
 - (2) Remove the engine hood by removing four bolts.



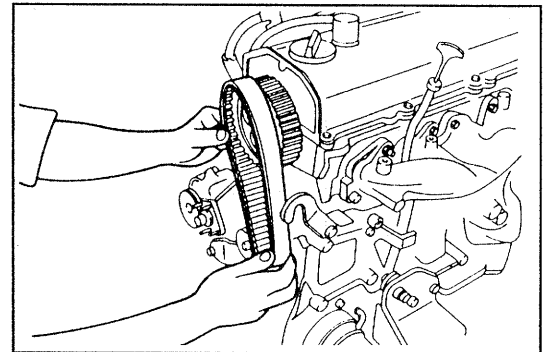
WRU90-EM088

5. Remove the intake air chamber. (See page EM–10.)



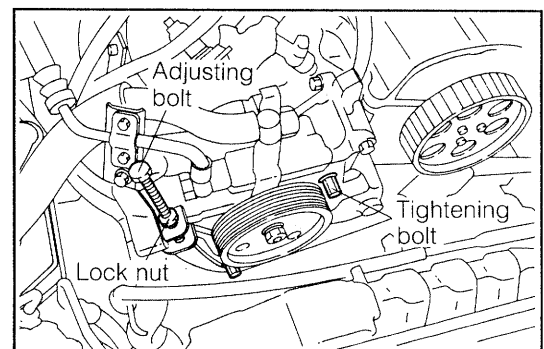
WRU90-EM090

6. Remove the timing belt. (See page EM–21 to EM–25.)



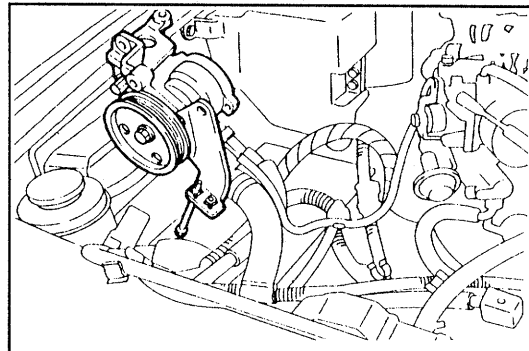
WRU90-EM091

7. Removal of the power steering pump (power steering equipped vehicle)
 - (1) Loosen the lock nut, adjusting bolt and two tightening bolts. Then push down the pump.



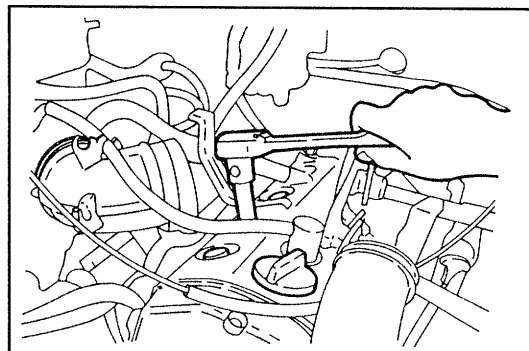
WRU90-EM092

- (2) Remove the power steering pump assembly from the engine by removing three bolts. Then temporarily put the pump assembly onto the battery mounting location.



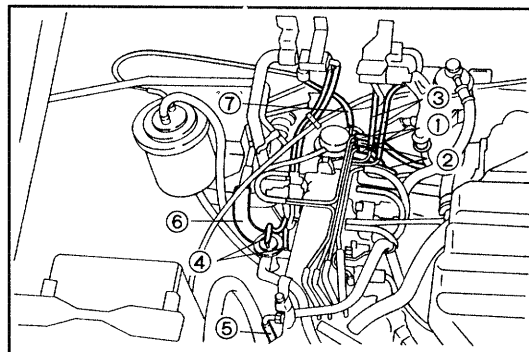
WRU90-EM093

8. Removal of spark plug
 - (1) Remove the spark plug wires.
 - (2) Remove the spark plugs, using the plug wrench (16 mm) or the following SST.
SST: 09268-87703-000



WRU90-EM094

9. Removal of following vacuum hoses at surge tank side
 - (1) Distributor diaphragm ①
 - (2) BVSV ②
 - (3) Pressure VSV ③
 - (4) Air conditioner idle up VSV ④
 - (5) Power steering ACV ⑤
 - (6) Brake booster ⑥
 - (7) Charcoal canister ⑦

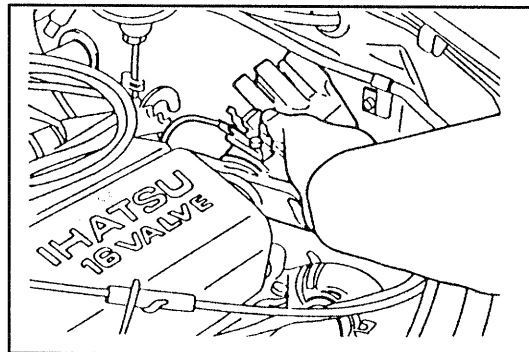


WRU90-EM095

10. Removal of distributor
 - (1) Disconnect the distributor wire connector.
 - (2) Remove the distributor from the cylinder head by removing the two attaching bolts.

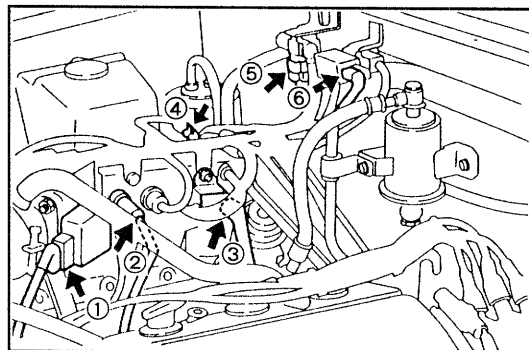
NOTE:

- Since the remaining engine oil will flow out, be certain to place a cloth etc..



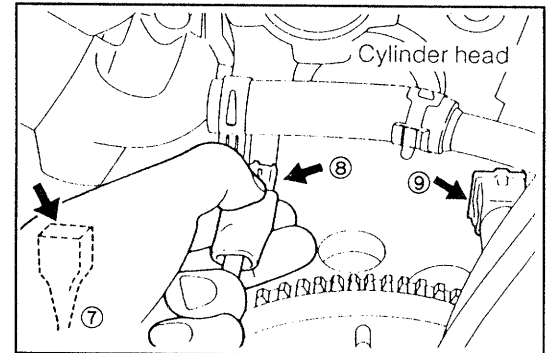
WRU90-EM096

11. Removal of engine wire harness
 - (1) Disconnect the following connectors.
 - ① Throttle position sensor ①
 - ② Intake air temperature sensor ②
 - ③ Idle speed control VSV ③
 - ④ EGR VSV and harness clamp ④
 - ⑤ Air-conditioner idle up VSV ⑤
 - ⑥ Pressure sensor, pressure VSV and clamp ⑥



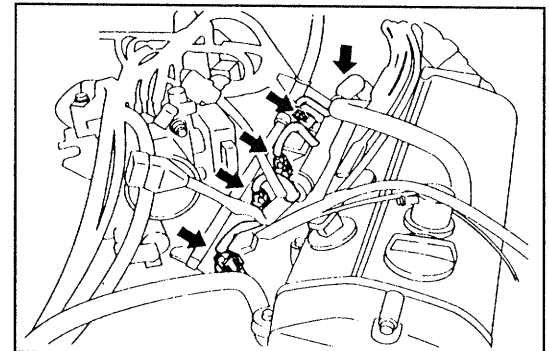
WRU90-EM097

- ⑦ Air conditioner water temperature switch ⑦
- ⑧ Water temperature sender gauge ⑧
- ⑨ Water temperature sensor ⑨
- ⑩ Oxygen sensor



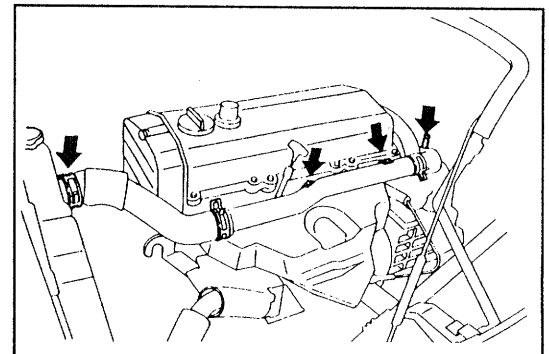
WRU90-EM098

- (2) Disconnect the four injector connectors.
- (3) Remove the engine wire clamps and engine ground cables.



WRU90-EM099

- 12. Remove the radiator hose No. 1 from the radiator upper tank by loosening the two clamps and two attaching bolts.



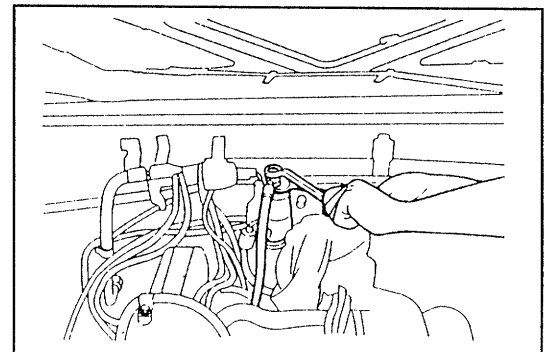
WRU90-EM100

- 13. Disconnect the hose No. 1 from the fuel filter.

CAUTION:

- Release the inner pressure of the fuel tank by removing the fuel filler cap in advance.
- The fuel pressure inside the fuel line is set to a pressure 2.55 kg/cm² (36.3 psi) higher than the atmospheric pressure.

Hence, gradually loosen the connection while preventing the fuel from splashing with a cloth or the like.

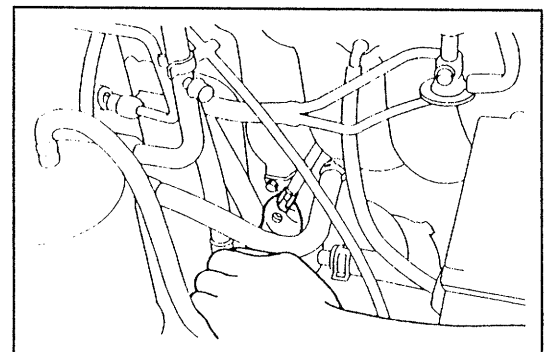


WRU90-EM101

- 14. Disconnect the fuel return hose from the fuel pipe No. 2.

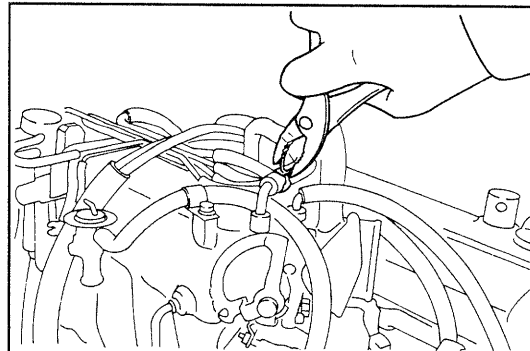
CAUTION:

- When disconnecting the fuel hose, take precautionary measures to prevent any dirt from entering into the fuel line.
- Place a suitable container or rags under the disconnecting portion because the fuel flows out.



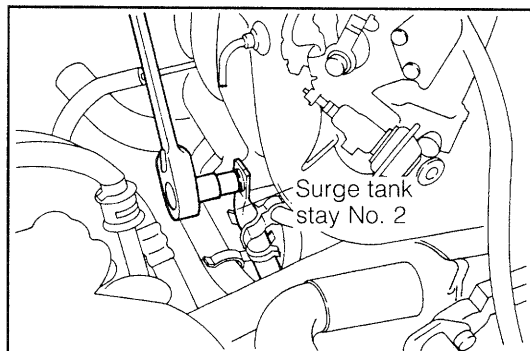
WRU90-EM102

15. Disconnect the water hose from the throttle body upper side.



WRU90-EM103

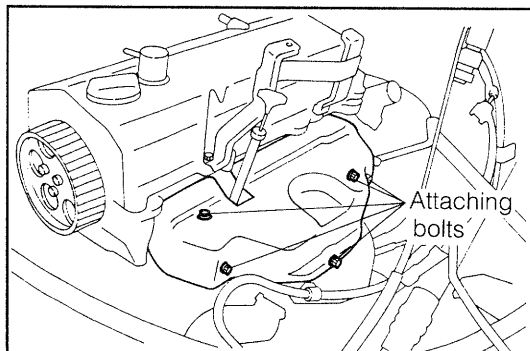
16. Remove the surge tank stay No. 2 from the surge tank.



WRU90-EM104

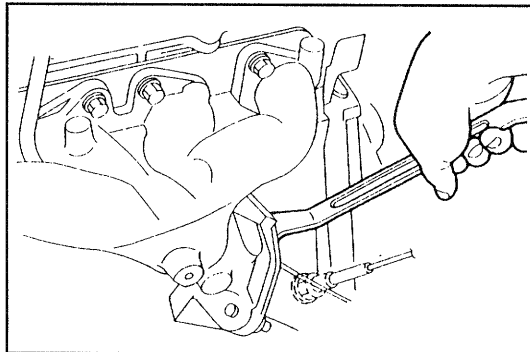
17. Remove the exhaust manifold cover by removing the five bolts.

18. Remove the oil level gauge support by removing the clamping bolt.



WRU90-EM105

19. Disconnect the exhaust pipe from the exhaust manifold by removing the three attaching nuts.



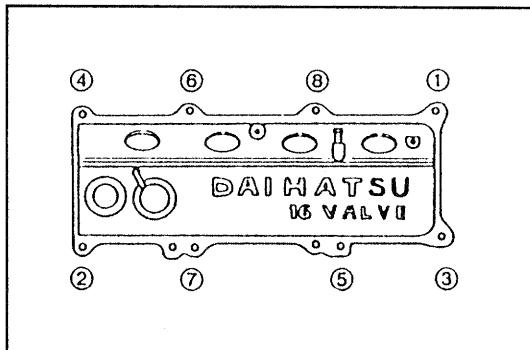
WRU90-EM106

20. Removal of cylinder head cover

- (1) Remove the air chamber bracket and the accelerator cable clamp from the cylinder head cover.

- (2) Loosen the cylinder head cover attaching bolts evenly over two or three stages in the sequence indicated in the figure.

Remove the cylinder head cover attaching bolts.



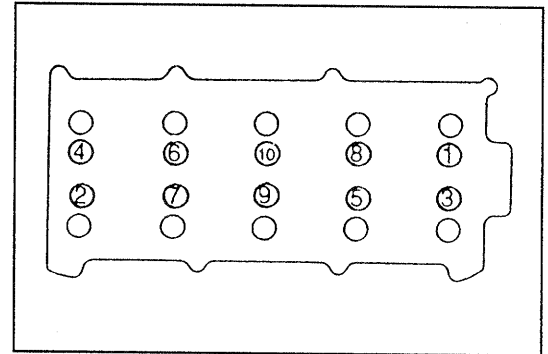
WRU90-EM107

21. Removal of cylinder head

- (1) Loosen the cylinder head bolts, using a hexagon wrench.

CAUTION:

- Loosen the cylinder head bolts evenly over two or three stages in the sequence indicated in the figure.

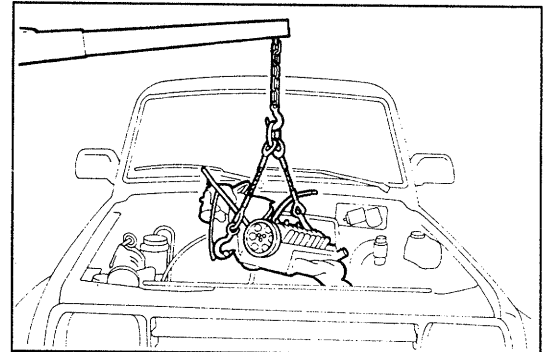


WRU90-EM108

- (2) Remove the cylinder head with intake and exhaust manifold by using the chain block.

CAUTION:

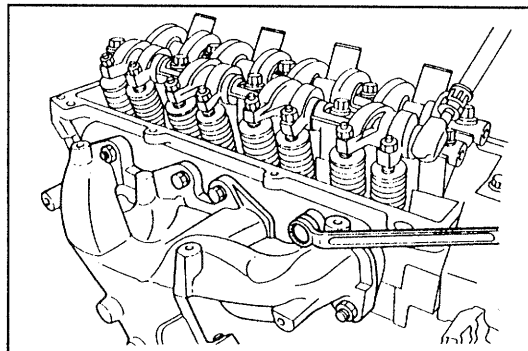
- Be careful not to allow the cylinder head to hit to the vehicle body and/or other parts.
- Place the removed cylinder head on suitable two wooden blocks in order that the cylinder head surface and valve may not be damaged.



WRU90-EM109

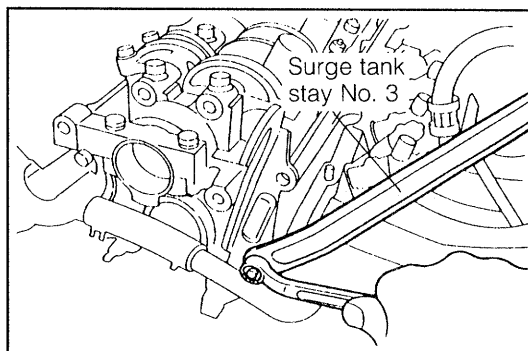
SEPARATION OF INTAKE AND EXHAUST MANIFOLDS

1. Remove the exhaust manifold by removing the six bolts and two nuts.
2. Remove the exhaust manifold gasket.



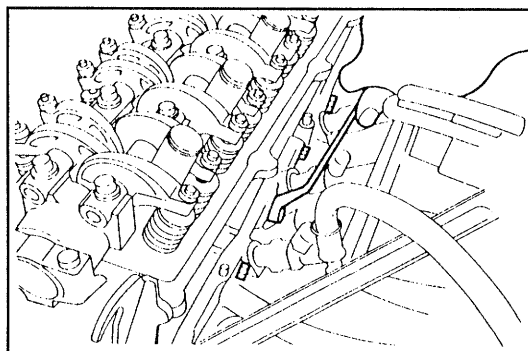
WRU90-EM110

3. Removal of intake manifold assembly
 - (1) Remove the surge tank stay No. 3.



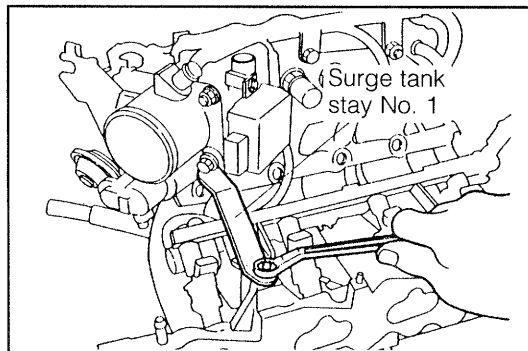
WRU90-EM111

- (2) Remove the intake manifold assembly by removing the eight bolts and four nuts.
 - (3) Remove the intake manifold gasket.



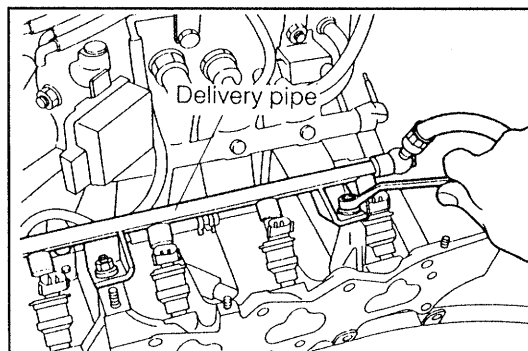
WNU89-EM149

4. Remove the surge tank stay No. 1 by removing the bolt and nut.



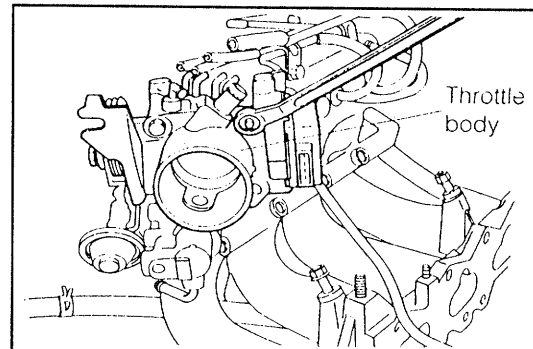
WRU90-EM112

5. Remove the fuel delivery pipe by removing the two attaching bolts.



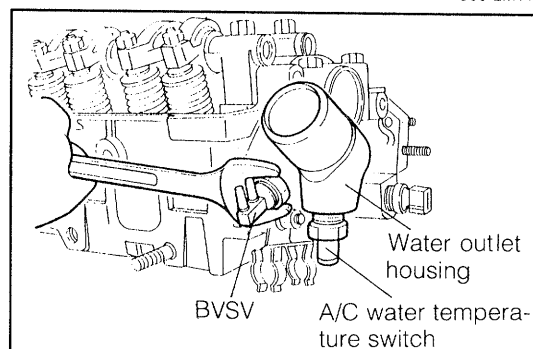
WRU90-EM113

6. Remove the throttle body by removing the two bolts and nut.



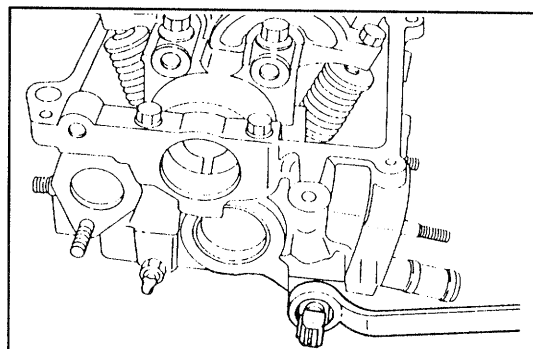
WRU90-EM114

7. Removal of water outlet housing from the cylinder head
 - (1) Remove the BVSV.
 - (2) Remove the A/C water temperature switch.
 - (3) Remove the water outlet housing by removing the attaching bolt and nut.



WRU90-EM115

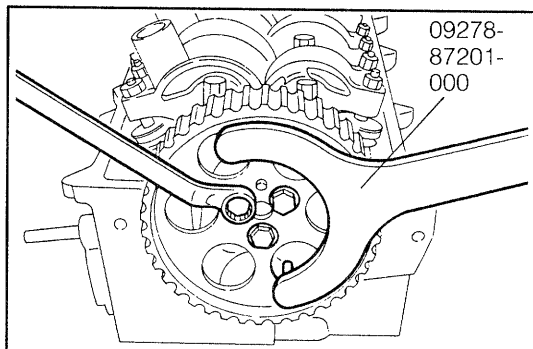
8. Remove the water temperature sensor and water temperature sender gauge.



WRU90-EM116

DISASSEMBLY OF CYLINDER HEAD

1. Removal of camshaft timing belt pulley
 - (1) Remove the attaching bolts of the camshaft timing belt pulley, using the following SST.
SST: 09278-87201-000
 - (2) Remove the camshaft timing belt pulley.

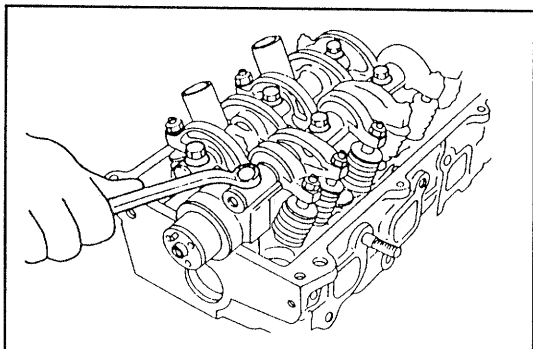


WRU90-EM117

2. Remove the valve rocker shaft sub assembly No. 1 (intake side) and No. 2 (exhaust side) by removing the ten attaching bolts.

NOTE:

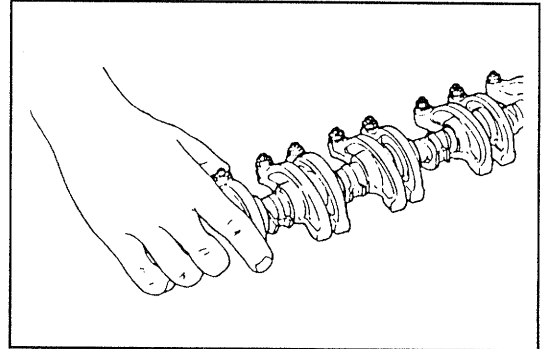
- Remove the attaching bolts by loosening them evenly over two or three stages.



WNU89-EM156

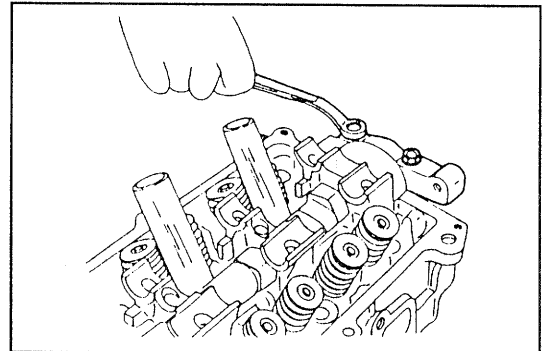
ENGINE MECHANICALS

3. Remove the valve rocker shaft together with the rocker arms from the cylinder head.
4. Remove the valve rocker arm, spacer and wave washer from valve rocker shaft.



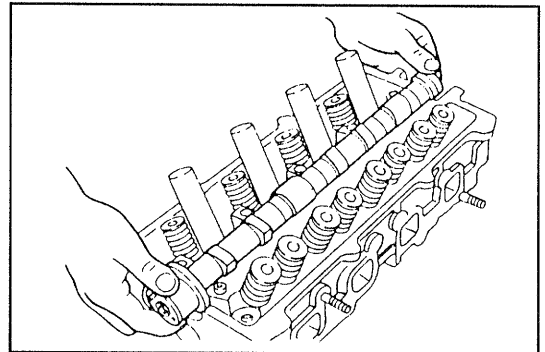
WNU89-EM157

5. Removal of camshaft
 - (1) Remove the camshaft bearing cap No. 5 by removing the two attaching bolts.
 - (2) Remove the camshaft bearing cap No. 1 to No. 4.



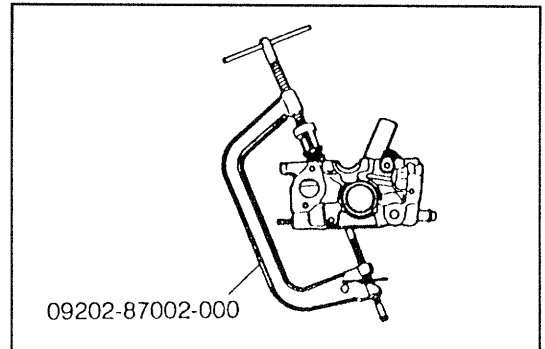
WNU89-EM158

- (3) Remove the camshaft.
 - (4) Remove the oil seal from the camshaft.



WNU89-EM159

6. Removal of intake and exhaust valve
 - (1) Remove the valve spring retainer locks, using the following SST.
SST: 09202-87002-000

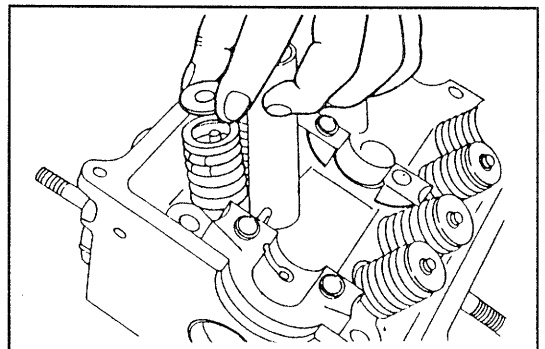


WNU89-EM160

- (2) Remove the valve spring retainers, compression springs, valves, valve stem oil seals and valve spring seats.

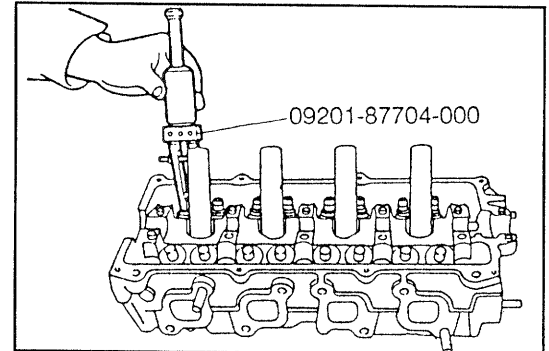
NOTE:

- Arrange the removal parts in order so that their installing positions may be known easily.



WNU89-EM161

- If any difficulty is encountered in removing the valve stem oil seal, pull the oil stem, using the following SST.
SST: 09201-87704-000

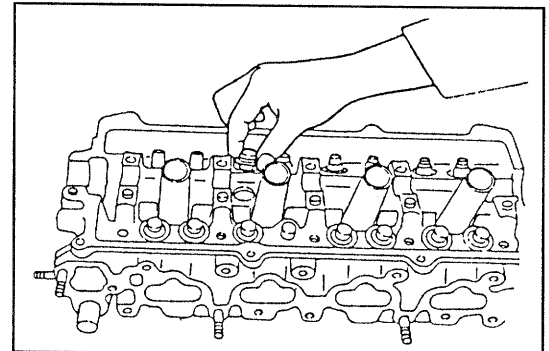


WNU89-EM162

7. Remove the valve spring seats.

NOTE:

- Arrange the removed parts in order so that their installing positions may be known easily.



WRU90-EM118

8. Wash the disassembled parts except for electrical parts, plastic parts and grease sealed bearings. Dry them by blowing compressed air.

WRU90-EM119

INSPECTION, CLEANING AND REPAIRS OF CYLINDER HEAD COMPONENTS

1. Cleaning of top of each piston and cylinder block
 - (1) Turn the crankshaft until each piston is brought to the top dead center.
Using a gasket scraper, remove all carbon deposits from the piston tops.
 - (2) Using a gasket scraper, remove any remaining gasket material from the top of the cylinder block.
Blow carbon deposits and oil from the bolt holes.

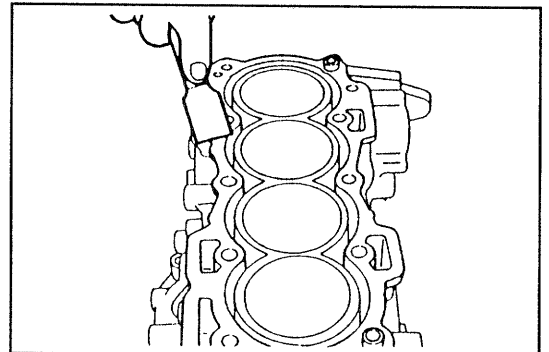
WARNING:

Protect your eyes during the cleaning operation when using compressed air.

CAUTION:

- Do not scratch the gasket surfaces of the piston and cylinder block.

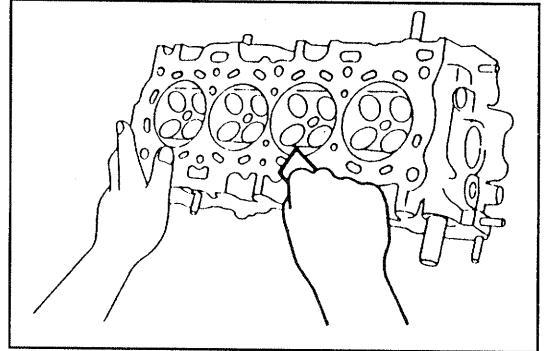
- (3) Set the piston No. 1 to the top dead center.



WRU90-EM402

2. Removal of gasket material

Using a gasket scraper, remove any remaining gasket material from the cylinder head and manifold surfaces.



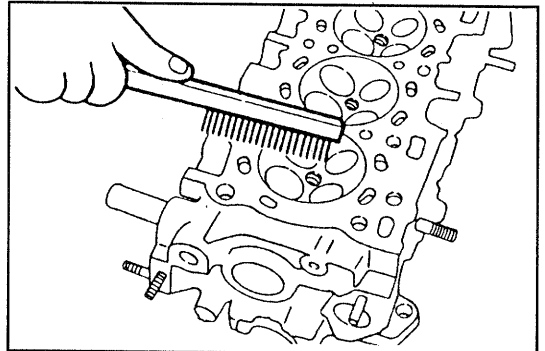
WNU89-EM167

3. Cleaning of combustion chamber

Using a wire brush, remove all carbon deposits from the combustion chambers.

CAUTION:

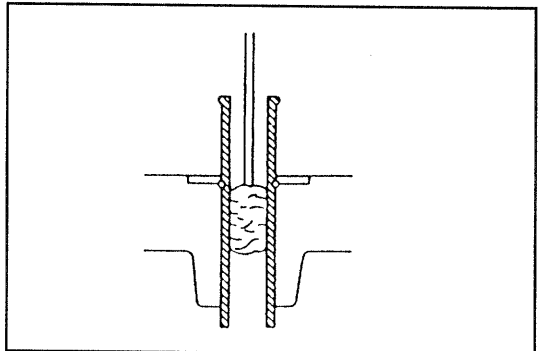
- Be careful not to scratch the cylinder head gasket contact surfaces.



WNU89-EM168

4. Cleaning of valve guide bushings

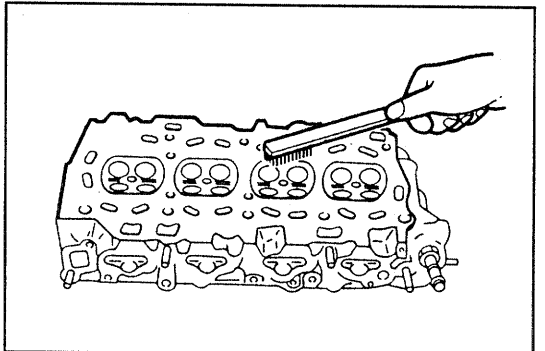
Using a valve guide brush and solvent, clean all the valve guide bushings.



WNU89-EM169

5. Cleaning of cylinder head

Using a soft brush and solvent, thoroughly clean the cylinder head.



WNU89-EM170

6. Inspection of cylinder head for flatness

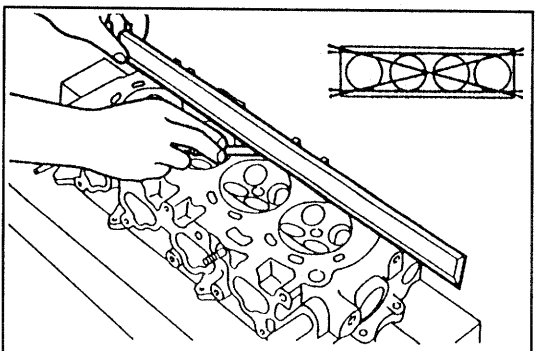
Using a precision straight edge and a feeler gauge, check the gasket surfaces contacting the cylinder block and manifolds for warpage.

Maximum surface warpage:

Cylinder block side: 0.10 mm (0.0039 inch)

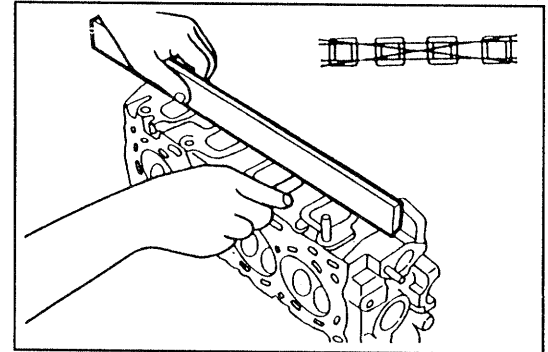
Intake manifold side: 0.10 mm (0.0039 inch)

Exhaust manifold side: 0.10 mm (0.0039 inch)



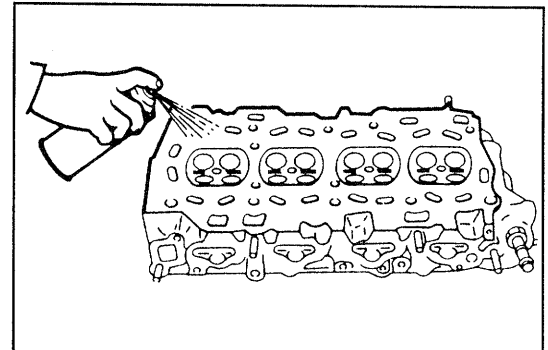
WNU89-EM171

If surface warpage of the cylinder block side exceeds the maximum limit replace the cylinder head.



WNU89-EM172

7. Inspection of cylinder head for cracks
Using a dye penetrant, check the combustion chamber, intake and exhaust ports, head surface and top of the head for cracks.
If a crack is found, replace the cylinder head.



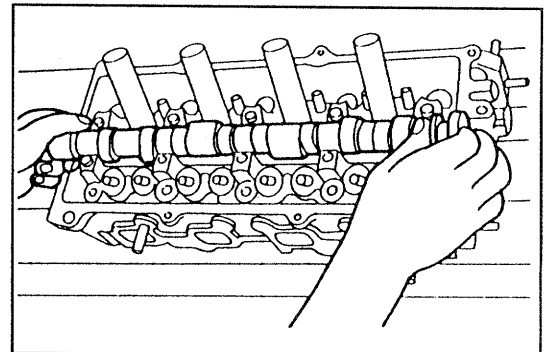
WNU89-EM173

8. Inspection of camshaft oil clearance

NOTE:

- Prior to this oil clearance check, the camshaft should be checked for runout in advance. (See page EM-57).

- (1) Clean the bearing and camshaft journals with cloth.
- (2) Install the camshaft to the cylinder head.
- (3) Place plastigage on each bearing.



WRU90-EM120

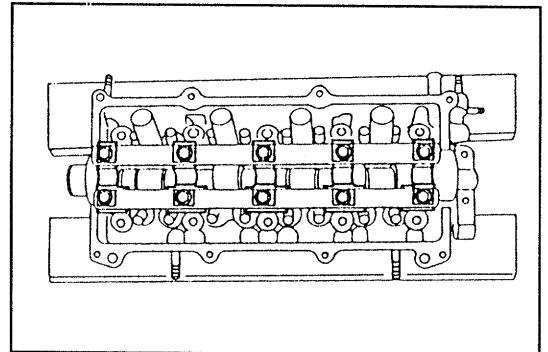
- (4) Install the bearing caps and valve rocker shaft. Tighten them to the specified torque.

Tightening Torque:

M10 bolt	2.9 - 3.7 kg-m/Dry (21.0 - 26.8 ft-lb)
M8 bolt	1.3 - 1.7 kg-m/Dry (9.4 - 12.3 ft-lb)

NOTE:

- Ensure that the bolt holes and bolts are dry when tightening the bolts.

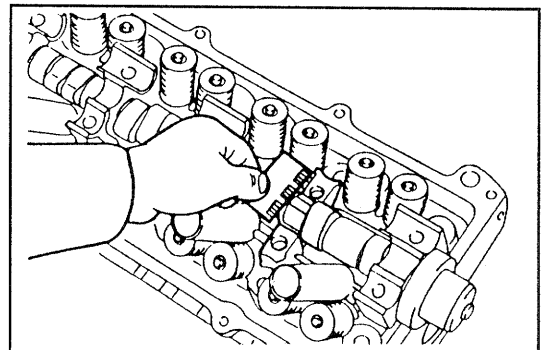


WRU90-EM121

- (5) Remove the bearing caps and measure the oil clearance.

Clearance:

Specified Value:	0.035 - 0.076 mm (0.0014 - 0.0029 inch)
Allowable Limit:	0.17 mm (0.0067 inch)



WNU89-EM176

If the oil clearance exceeds the allowable limit, replace the cylinder head and camshaft as a set.

NOTE:

- After completion of the check, remove the plastigages. Wash the camshaft and bearing caps in cleaning solvent.

WNU89-EM177

9. Inspection of camshaft thrust clearance

- (1) Apply engine oil to the camshaft journals.
- (2) Install the camshaft to the cylinder head. Install the bearing caps and rocker shafts and tighten them to the specified torque.

Tightening Torque:

M10 bolt	2.9 - 3.7 kg-m/Dry (21.0 - 26.8 ft-lb, 28.4 - 36.3 N·m)
M8 bolt	1.3 - 1.7 kg-m/Dry (9.4 - 12.3 ft-lb, 12.7 - 16.7 N·m)

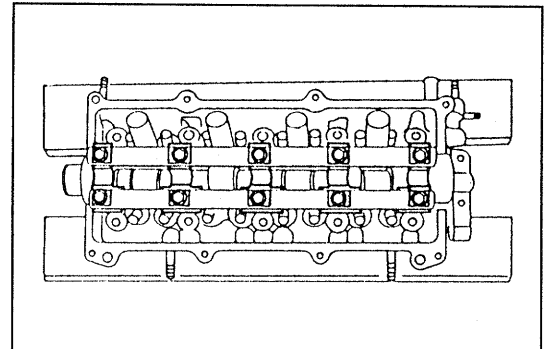
NOTE:

- Ensure that the bolt holes and bolts are dry when tightening the bolts.

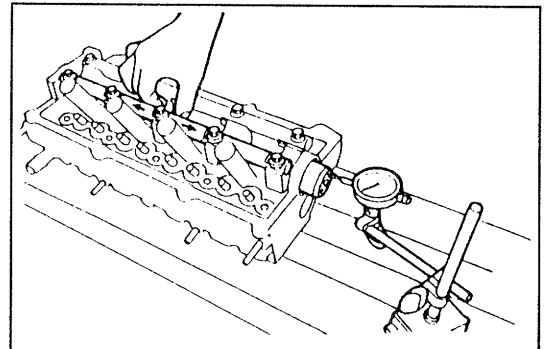
- (3) With a dial gauge attached to the camshaft, measure the thrust clearance.

Thrust Clearance:

Specified Value:	0.1 - 0.25 mm (0.0039 - 0.0098 inch)
Allowable Limit:	0.45 mm (0.018 inch)



WRU92-EM422



WNU89-EM179

10. Inspection and grinding of valves

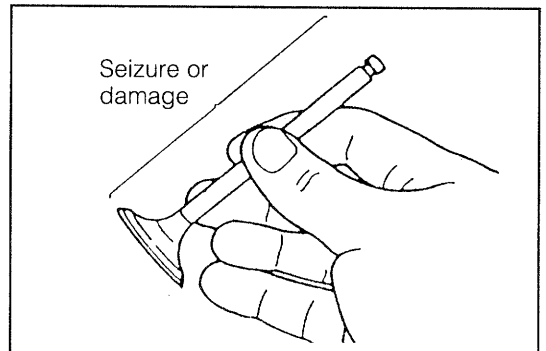
- (1) Visually inspect the valve stem for seizure or damage.

NOTE:

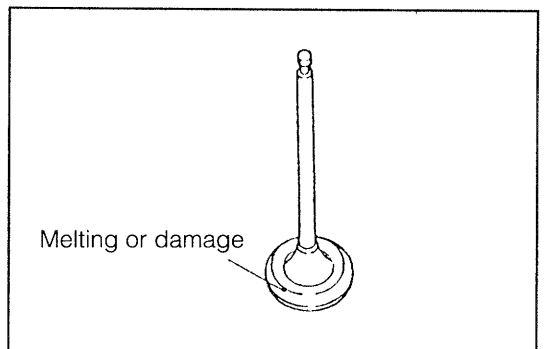
- If seizure or damage is found, replace the valve and valve guide bush as a set. However, this replacement should be performed only after the checks for the cylinder head have been finished.
- The valve guide bush hole must be used for refacing the valve seat. Hence, if the valve guide bush hole exhibits any roughness due to seizure, etc., clean the valve guide bush with an adjustable reamer.

- (2) Visually inspect the valve head for melting or damage. If the valve head exhibits any melting or damage, replace the valve.

If the roughness on the contact surface can be corrected, grind the valve seat contact surface with a valve refacer.



WRU90-EM403



WNU89-EM181

- (3) Grind the valves only enough to obtain a smooth contact surface with the valve seat.

Valve Face Angle: 45.5°

NOTE:

- Make sure the valves are ground to the correct valve face angle.

- (4) Visually inspect the valve stem end for abnormal wear.

If the valve stem end exhibits abnormal wear, correct the stem end with a valve refacer. However, this correction should be made within a limit of 0.8 mm (0.0315 inch) from that of standard length.

[Reference]

Valve Length (STD):

Intake Valve: 112.8 mm (4.441 inch)

Exhaust Valve: 114.5 mm (4.508 inch)

- (5) Inspect the valve head for its stock thickness.

Minimum Stock Thickness

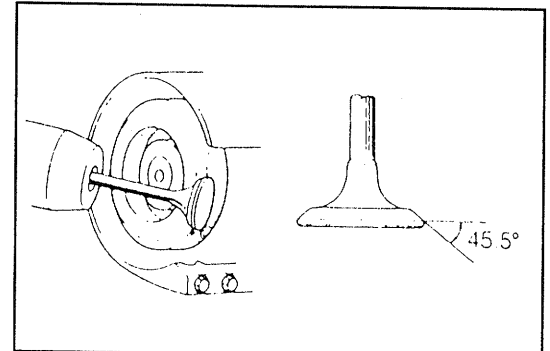
Intake Valve: 0.8 mm (0.032 inch)

Exhaust Valve: 1.0 mm (0.039 inch)

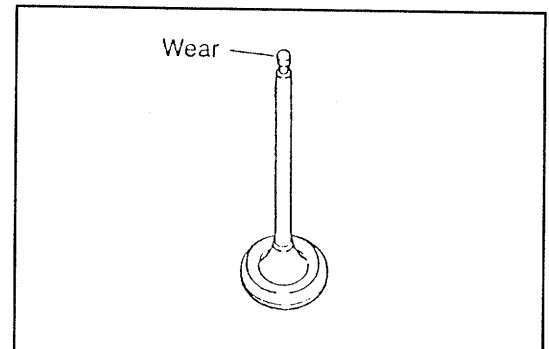
If the stock thickness of the valve head is less than the minimum stock thickness, replace it with a new one.

11. Inspection and cleaning of valve seats

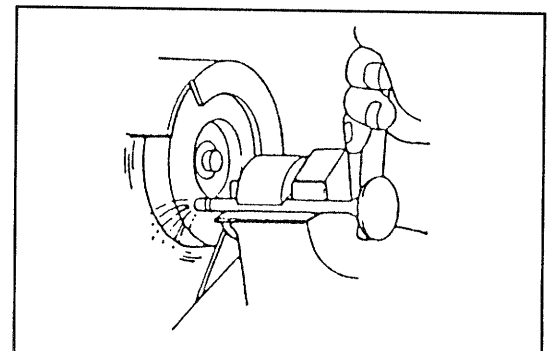
- (1) Using a 45-degree valve seat cutter, reface the valve seats. Remove only enough metal stock to clean the seats.
- (2) Apply a thin film of red lead (or white lead) to the valve seat.
- (3) Let the valve drop by its own weight onto the valve seat two or three times.
- (4) Take out the valve.



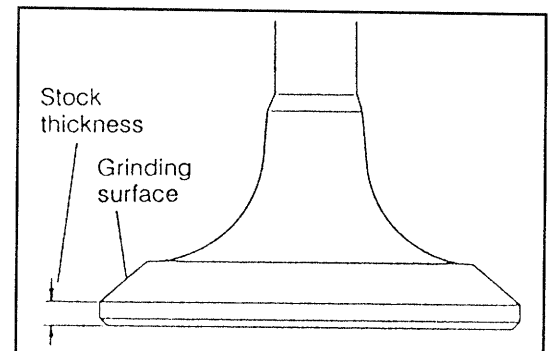
WNU89-EM182



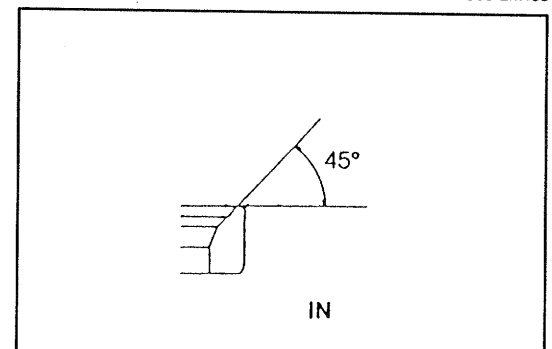
WNU89-EM183



WNU89-EM184



WNU89-EM185



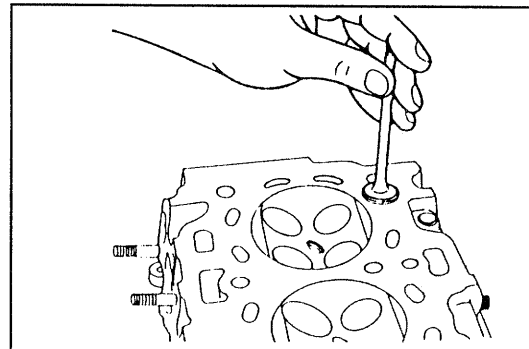
WNU89-EM186

- (5) Inspect the valve face and seat for the following items.
- ① Ensure that the valve seat contact surface of the valve is continuous over the whole circumference. If not, replace the valve.
 - ② Ensure that the valve contact surface of the valve seat is continuous over the whole circumference. If not, reface the valve seat.

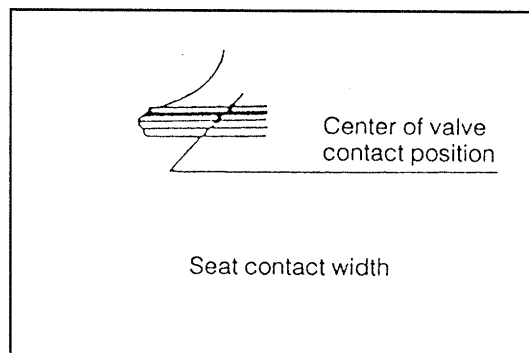
- ③ Measure the width of the contact surface of valve seat.

Contact surface of valve seat: 1.2 - 1.6 mm
(0.048 - 0.062 inch)

If not, reface the valve seat.



WNU89-EM187

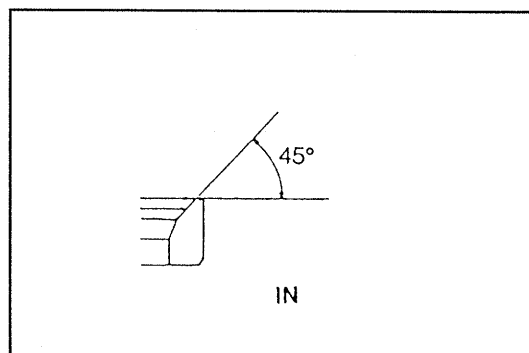


WNU89-EM188

12. Refacing of valve seat

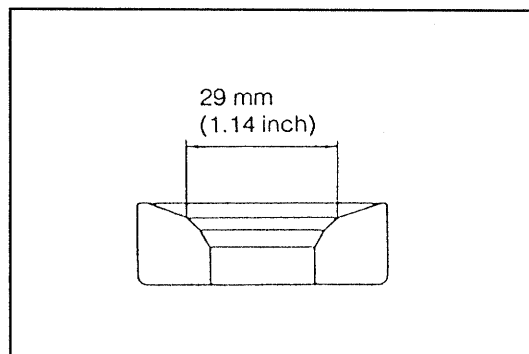
(1) Refacing procedure for intake valve seats

- ① Using a 45-degree cutter, recondition the roughness on the valve-to-valve seat contact surface, only enough to obtain a smooth surface.



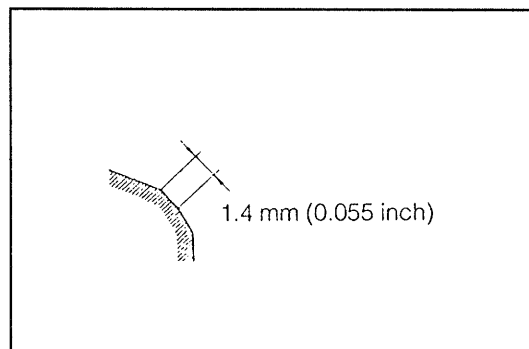
WNU89-EM189

- ② Using a 30-degree cutter, cut the valve seat in such way that the circumference of the surface refaced by the 45-degree cutter may become 29 ± 0.1 mm (1.142 ± 0.004 inch)



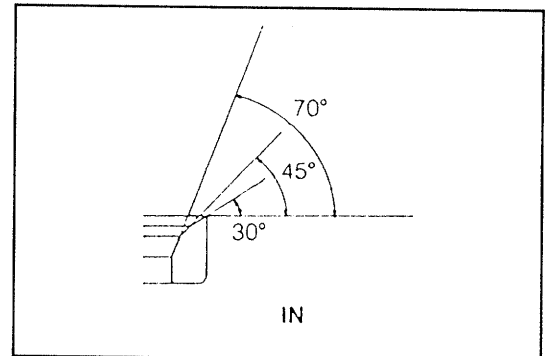
WNU89-EM190

- ③ Using a 70-degree cutter, cut the seat in such way that the width, of the surface refaced by the 45-degree cutter may became 1.4 mm (0.055 inch).



WNU89-EM191

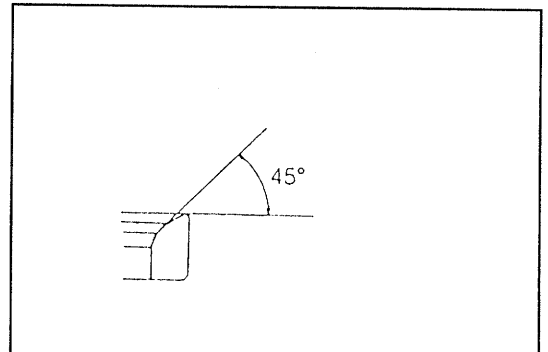
- ④ Using the 45-degree cutter, remove burrs produced during the refacing by the 30-degree and 70-degree cutters.



WNU89-EM192

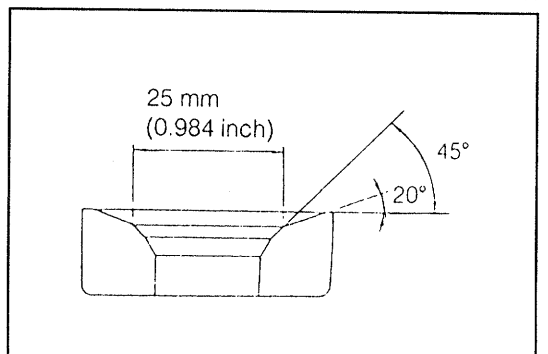
(2) Refacing procedure for exhaust valve seats

- ① Using a 45-degree cutter, recondition the roughness on the valve-to-valve seat contact surface, only enough to obtain a smooth surface.



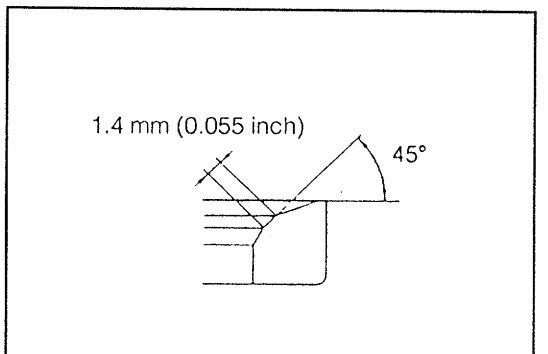
WNU89-EM193

- ② Using a 20-degree cutter, cut the valve seat in such a way that the circumference of the surface refaced by the 45-degree cutter may become 25 mm (0.984 inch).



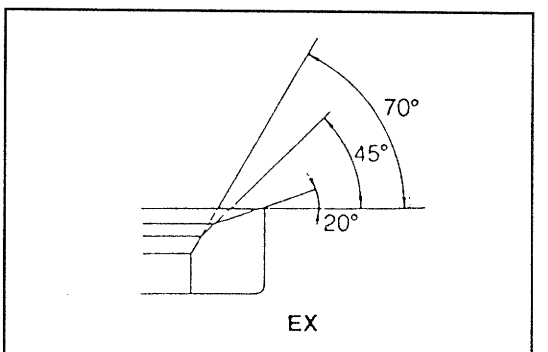
WNU89-EM194

- ③ Using a 70-degree cutter, cut the valve seat in such a way that the width of the surface refaced by the 45-degree cutter may become 1.4 mm (0.055 inch).



WNU89-EM195

- ④ Using the 45-degree cutter, remove burrs produced during the refacing by the 20-degree and 70-degree cutters.



WNU89-EM196

13. Hand lapping of valves

- (1) Perform hand lapping of the valves and valve seats, using an abrasive compound.
- (2) Clean the valves and valve seats after the hand lapping of the valves.

WNU89-EM197

14. Inspection of valve recession

After the valve seat has been refaced, install the new valve. Measure the distance between the cylinder attaching surface of the cylinder head (attaching surface of the cylinder head gasket) and the upper most section of the valve. Ensure that the distance does not exceed the following maximum limit.

Maximum limit

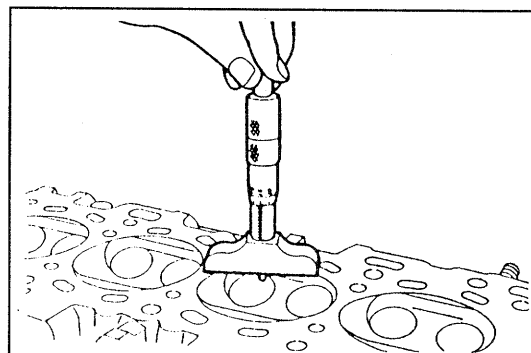
Intake valve 2.775 mm (0.1092 inch)

Exhaust valve 6.026 mm (0.2372 inch)

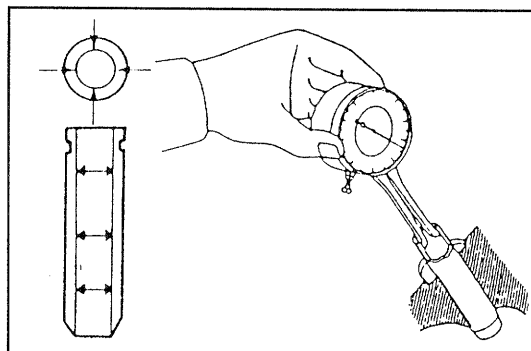
If the recession exceeds the maximum limit, replace the cylinder head.

15. Inspection of valve stem-to-guide bushing oil clearance

- (1) Using a caliper gauge, measure the inner diameter of the valve guide at six points. Record the measured values.

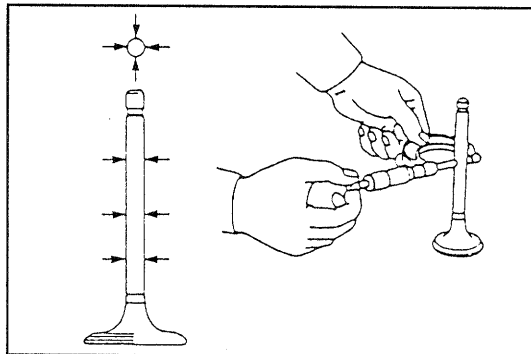


WNU89-EM198



WNU89-EM199

- (2) Using a micrometer, measure the diameter of the valve stem at six points. Record the measured values.



WRU90-EM123

(3) Calculation of oil clearance

Calculate the oil clearance of each valve according to the following formula.

$$\text{Oil clearance} = \frac{\text{Inner diameter of valve stem guide} - \text{Outer diameter of valve stem}}{\text{Specified Oil Clearance}}$$

Specified Oil Clearance

Intake valve side: 0.020 - 0.060 mm
(0.0008 - 0.0024 inch)

Exhaust valve side: 0.025 - 0.065 mm
(0.0010 - 0.0026 inch)

Allowable Limit

Intake valve side: 0.080 mm (0.0031 inch)

Exhaust valve side: 0.090 mm (0.0035 inch)

If the calculated oil clearance exceeds the allowable limit, replace the valve guide bush and valve as a set.

WRU90-EM124

16. Replacement of valve guide bush

NOTE:

- Removal and installation of the valve guide bush should be carried out while the cylinder head temperature is 80°C - 100°C (170°F - 212°F) after heating it gradually.

(1) Intake valve guide bush

NOTE:

- If the intake valve guide bush has been already installed with a locating ring, replace the cylinder head.

- Drive out the valve guide bush from the combustion chamber side, using the following SST.

SST: 09201-87705-000

NOTE:

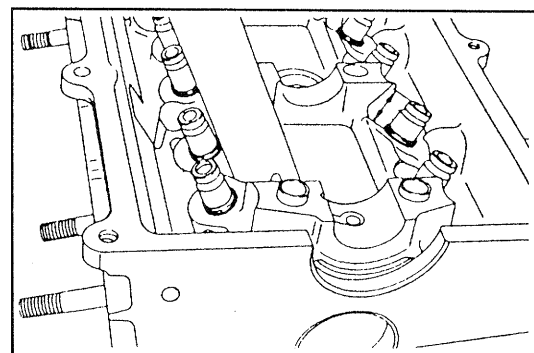
- Be careful not to tap the cylinder head.

- Drive a new valve guide bush into position, until the snap ring contacts the cylinder head, using the following SST.

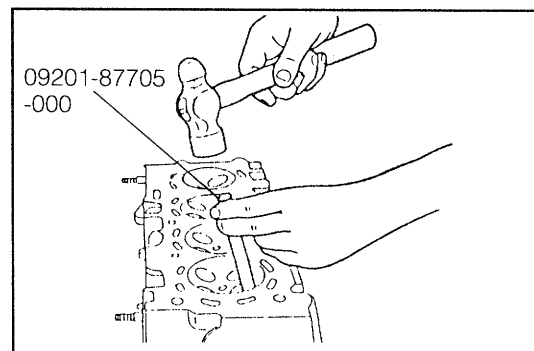
SST: 09201-87705-000

CAUTION:

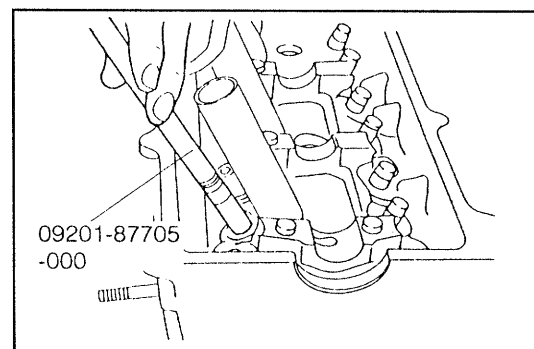
- Be very careful not to give an excessive impact during the installation. Failure to observe this caution will result in a cracked valve guide bush.
- Care should be exercised not to detach the snap ring due to driving the valve guide bush excessively.



WRU90-EM125



WRU90-EM126

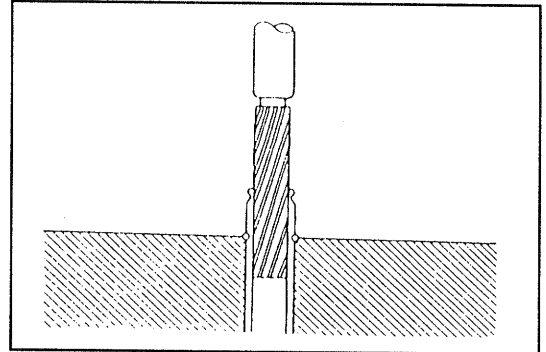


WRU90-EM404

- ③ Using an adjustable reamer, ream the valve guide bush to remove any burr or the like.

NOTE:

- This reaming should be done only enough to remove the burr or the like.



WRU90-EM405

- ④ Inspection of oil clearance
Ensure that the oil clearance meets the specifications.

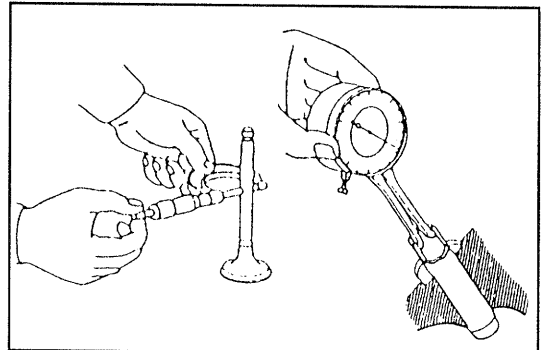
Oil Clearance:

Specified Value:

Intake 0.020 - 0.060 mm
(0.0008 - 0.0024 inch)

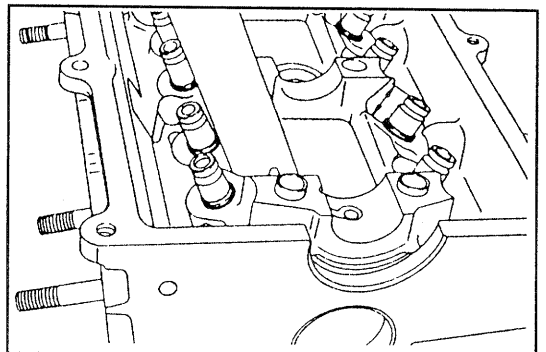
Allowable Limit:

Intake 0.08 mm (0.0031 inch)



WNU89-EM202

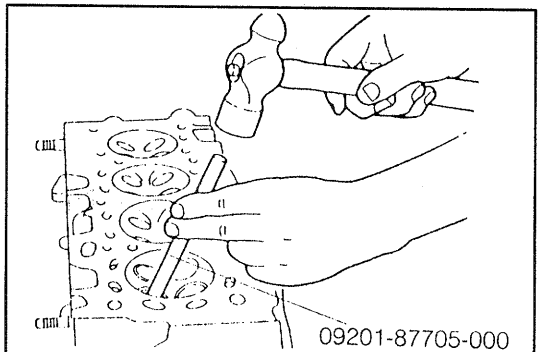
(2) Exhaust valve guide bush



WRU90-EM127

- ① Drive out the valve guide bush from the combustion chamber side, using the following SST.

SST: 09201-87705-000



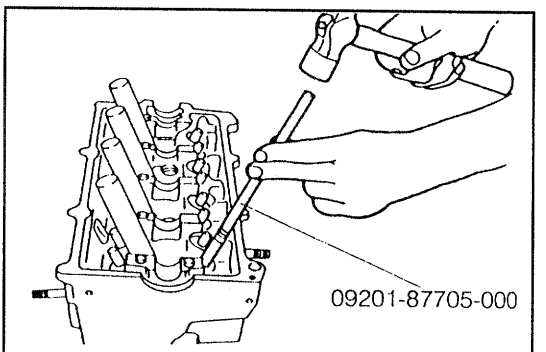
WNU89-EM204

- ② Drive a new valve guide bush into position, until the snap ring contacts the cylinder head, using the following SST.

SST: 09201-87705-000

CAUTION:

- Be very careful not to give an excessive impact during the installation. Failure to observe this caution will result in a cracked valve guide bush.
- Care should be exercised not to detach the snap ring due to driving the valve guide bush excessively.

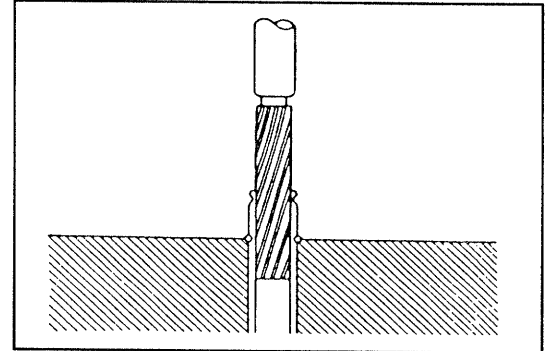


WRU90-EM406

- ③ Using an adjustable reamer, ream the valve guide bush to remove any burr or the like.

NOTE:

- This reaming should be done only enough to remove the burr or the like.



WRU90-EM407

- ④ Inspection of oil clearance
Ensure that the oil clearance meets the specifications.

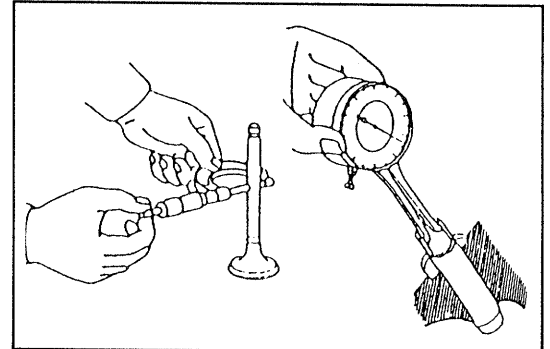
Oil Clearance:

Specified Value:

Exhaust 0.025 - 0.065 mm
(0.0010 - 0.0025 inch)

Allowable Limit:

Exhaust 0.09 mm (0.0035 inch)



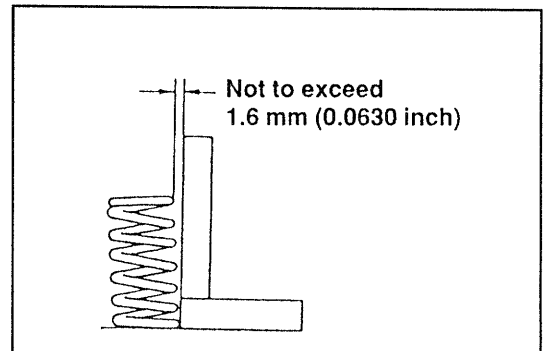
WNU89-EM206

17. Inspection of valve springs

- (1) Check the valve spring for squareness, using a steel square.

Maximum squareness: 1.6 mm (0.0630 inch)

If the squareness exceeds the maximum limit, replace the valve spring.



WNU89-EM207

- (2) Measure the valve spring for free length and spring tension, using a spring tester.

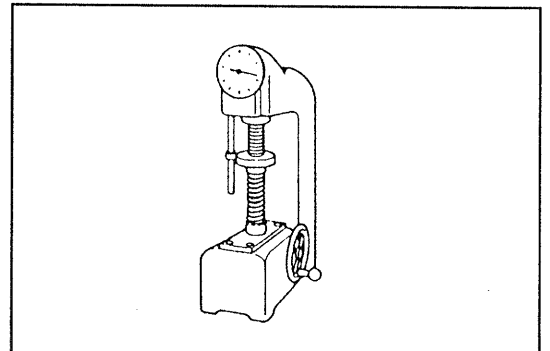
Minimum free length: 44.3 mm (1.74 inch)

Minimum tension/installation height:
26.4 kg/38.0 mm (58.2 lb/1.5 inch)

If the minimum free length and/or minimum tension is less than the minimum limit, replace the valve spring.

Reference

Standard free length: 45.2 - 46.0 mm
(1.78 - 1.81 inch)

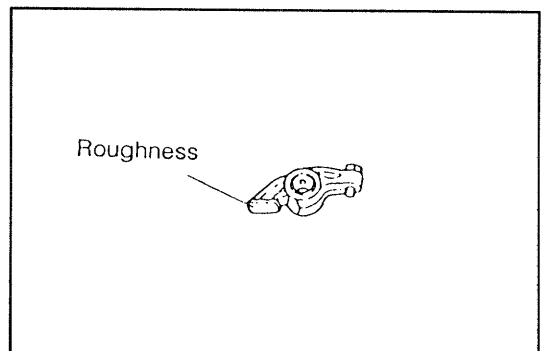


WNU89-EM208

18. Inspection of valve rocker arms and valve rocker shaft

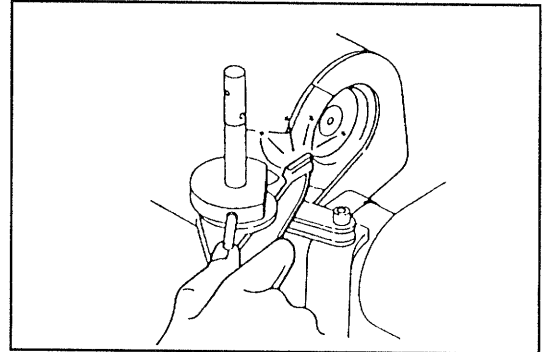
- (1) Visually inspect the valve rocker arm for cracks, seizure or wear.

Replace the valve rocker arm, if necessary.



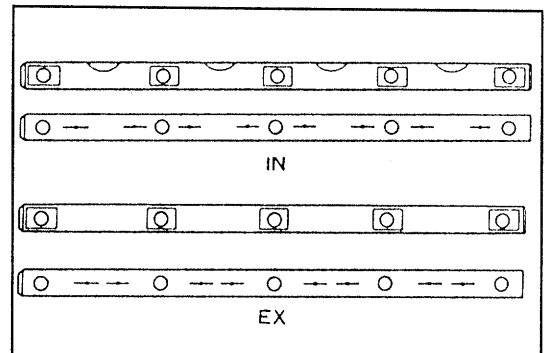
WNU89-EM209

- (2) If the valve rocker arm-to-cam contact surface is worn excessively, grind or replace the rocker arm.



WNU89-EM210

- (3) Visually inspect the valve rocker shaft for cracks, seizure or wear.
Replace the valve rocker shaft, if necessary.



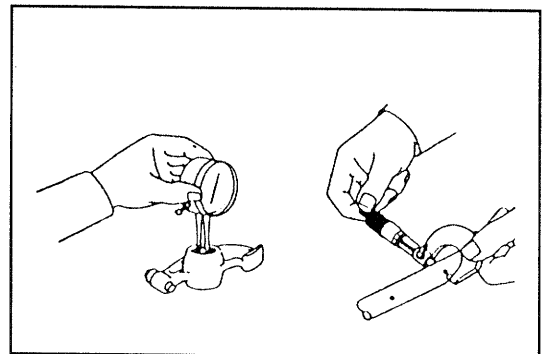
WNU89-EM211

- (4) Valve rocker shaft-to-valve rocker arm
- Using a dial gauge, measure the inner diameter of the valve rocker arm in two directions, 90 degrees apart from each other.
 - Using a micrometer, measure the outer diameter of the valve rocker arm attaching position of the camshaft in two directions, 90 degrees apart from each other.
 - Calculate the oil clearance by subtracting the rocker shaft diameter from the rocker arm diameter.

Oil Clearance

Specified Value: 0.012 - 0.053 mm
(0.0005 - 0.0020 inch)

Allowable Limit: 0.08 mm (0.0031 inch)



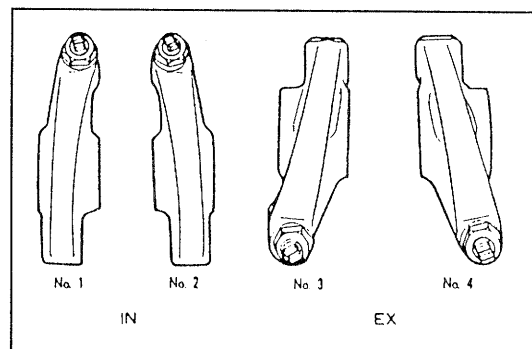
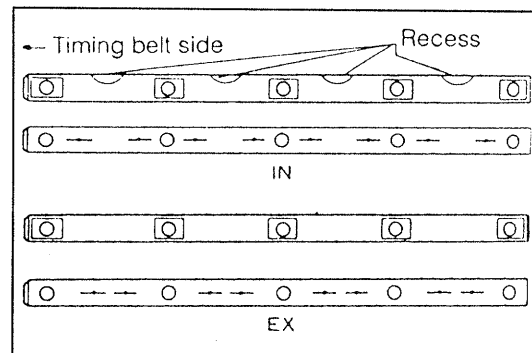
WNU89-EM212

NOTE:

- The measurement of the rocker shaft outer diameter must be performed at the assembling position of each rocker shaft.

Reference

- Identification of valve rocker shafts
On the intake valve rocker shaft, recesses for the spark plug tube are provided.
Also, the oil grooves are provided very closely to the bolt holes.
On the exhaust valve rocker shaft, the oil grooves are located near the midpoint of the bolt holes.
- Installing direction of valve rocker shaft
The valve rocker shaft should be installed in such a way that the side having a wider chamfer comes at the timing belt side.
- Identification of valve rocker arm
The valve rocker arm comes in four kinds; two kinds each for the intake side and exhaust side, as shown in the right figure.
- Specified dimensions of valve rocker shaft and valve rocker arm
Outer diameter of valve rocker shaft:
19.468 - 19.488 mm (0.7665 - 0.7672 inch)
Bore diameter of valve rocker arm:
19.500 - 19.521 mm (0.7678 - 0.7685 inch)



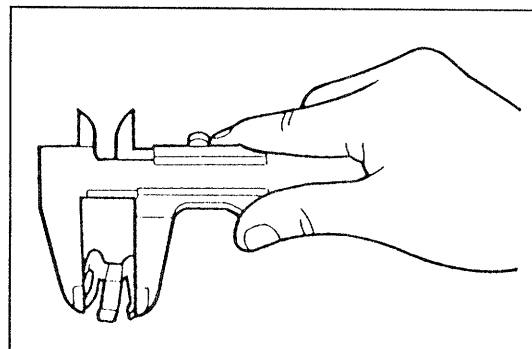
WRU90-EM128

19. Inspection of valve rocker arm, spacer and wave washer

- (1) Measure the free width of the spacer, using vernier calipers.

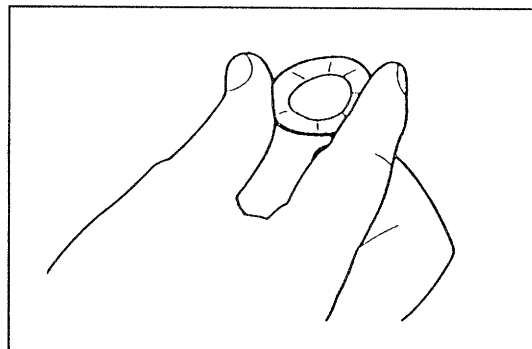
Minimum Free Width: 22.0 mm (0.866 inch)

Replace the spacer whose free length is less than the minimum free width.



WNU89-EM214

- (2) Visually inspect the wave washer for flattened condition or damage.
Replace the wave washer, if necessary.



WNU89-EM215

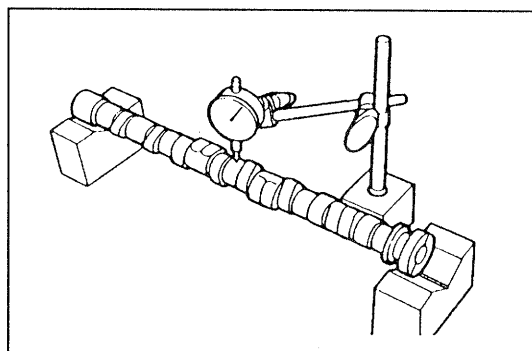
20. Inspection of camshaft

- (1) Checking camshaft for runout

Support the camshaft at its both ends with V-shaped blocks. Set a dial gauge to the mid-point of the center journal section of the camshaft. Turn the camshaft one turn, making sure that the camshaft will not move back and forth. Take a reading on the dial gauge during the turning. Calculate the maximum runout, i.e. the difference between the maximum and minimum readings.

Maximum runout: 0.03 mm (0.0012 inch)

If the runout exceeds the maximum limit, replace the camshaft.



WRU90-EM408

(2) Checking of cam lobe height

Measure the cam lobe height, using a micrometer.

Specified Cam Lobe Height:

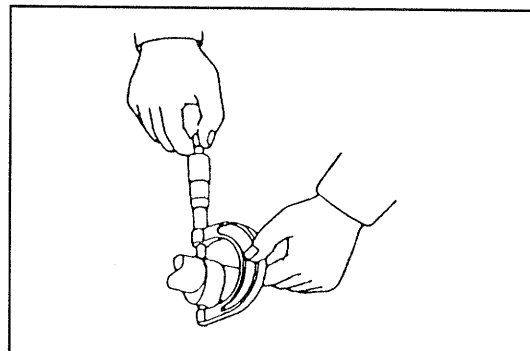
Intake: 33.08 - 33.28 mm (1.302 - 1.310 inch)

Exhaust: 33.00 - 33.20 mm (1.299 - 1.307 inch)

Minimum Limit:

Intake: 32.9 mm (1.295 inch)

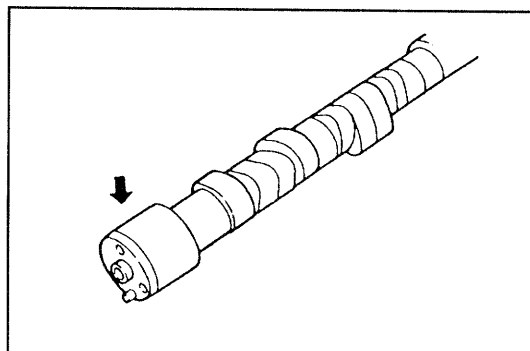
Exhaust: 32.85 mm (1.293 inch)



WNU89-EM217

(3) Inspection of oil seal contact surface

Inspect the oil seal contact surface for abnormal wear.
Replace the camshaft if the contact surface exhibits any abnormal wear.



WRU89-EM218

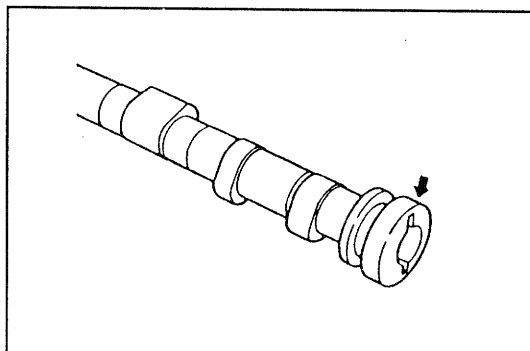
(4) Inspection of groove for driving distributor

Visually inspect to see if any damage is present at the groove for driving the distributor.

Replace the camshaft if the groove exhibits any damage.

NOTE:

- If any damage is present, check the distributor side, too.
(See page IG-15.)

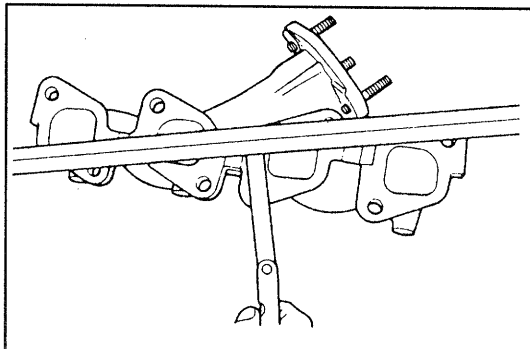


WRU90-EM129

21. Inspection of exhaust manifold and intake manifold

- (1) Check the cylinder head attaching surface of the exhaust manifold for warpage, using a straight edge and a thickness gauge.

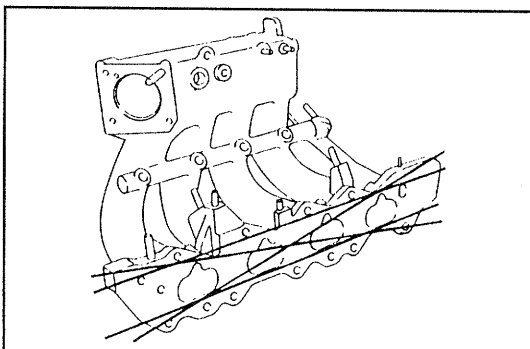
Maximum warpage: 0.1 mm (0.0039 inch)



WRU90-EM409

- (2) Check the contact surface of the intake manifold with the cylinder head.

Maximum warpage: 0.1 mm (0.0039 inch)



WNU89-EM221

22. Check the valve spring seats, valve spring retainers and valve retainer locks for damage and cracks.
If any damage is present, replace such faulty parts.

ASSEMBLY OF CYLINDER HEAD

(See page EM-36.)

NOTE:

- (1) Thoroughly clean all parts to be assembled.
- (2) Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- (3) Replace all gaskets and oil seals with new ones.

1. Assembly of cylinder head (When new cylinder head is installed:)

When new cylinder head is installed, spark plug tubes and a heater outlet tube have been furnished separately. Assemble these parts, following the procedure given below.

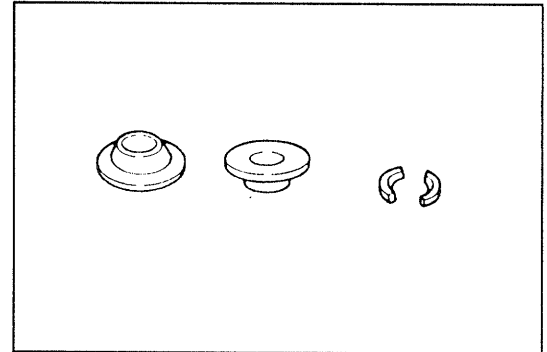
- (1) Wash the cylinder head in cleaning solvent and dry it with compressed air.
- (2) Apply a thin film of the Three Bond 1377B to the cylinder head attaching surfaces for the spark plug tubes.

- (3) With a wooden piece or the like placed on the upper end of the spark plug tube, drive the spark plug tube to the cylinder head in such an extent that the distance between the spark plug tightening surface and the upper end of the spark plug tube becomes 139 mm (5.47 inch).

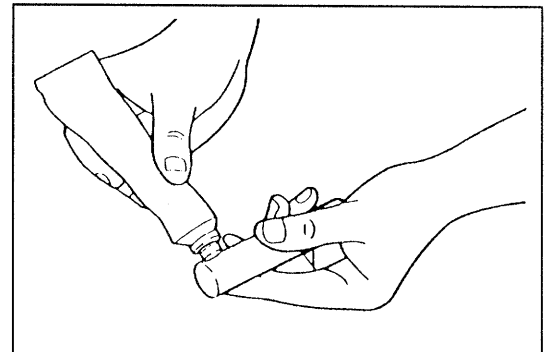
NOTE:

- Be very careful not to drive the spark plug tube too deeply.
- Be very careful not to damage the upper end of the spark plug tube.
- When driving the spark plug tube into position, make sure that the tube will not tilt in relation to the cylinder head tube hole.

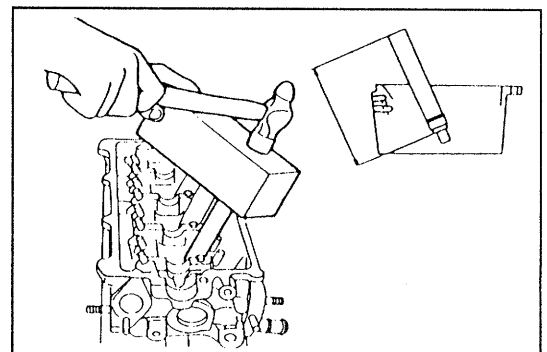
- (4) Put mark at a point 45.0 ± 1.0 mm (1.77 ± 0.04 inch) from the forward end of the heater outlet tube.



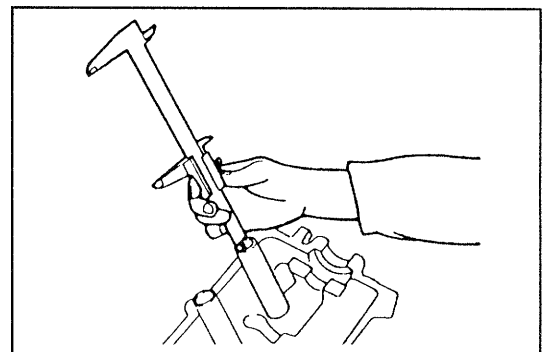
WNU89-EM222



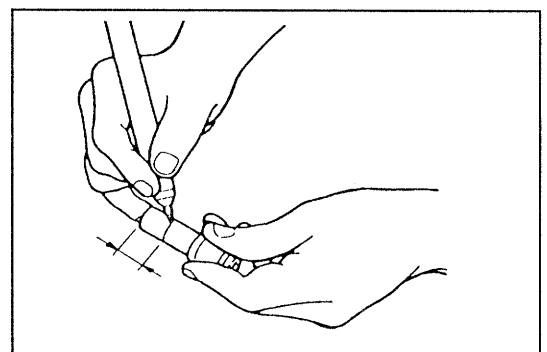
WRU90-EM130



WNU89-224

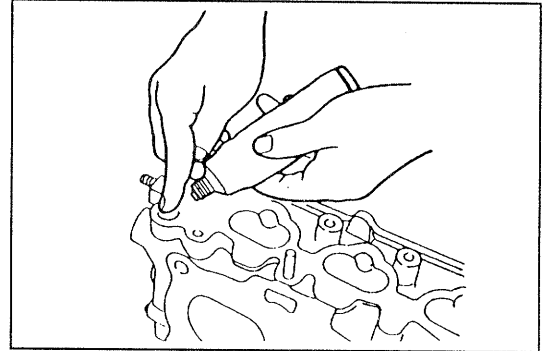


WNU89-EM225



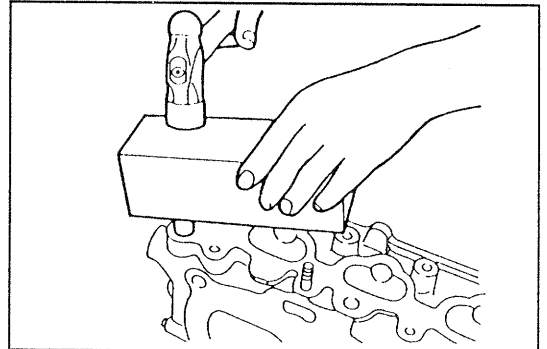
WNU89-EM226

- (5) Apply a thin film of the Three Bond 1377B to the attaching section for the heater outlet tube on the cylinder head.



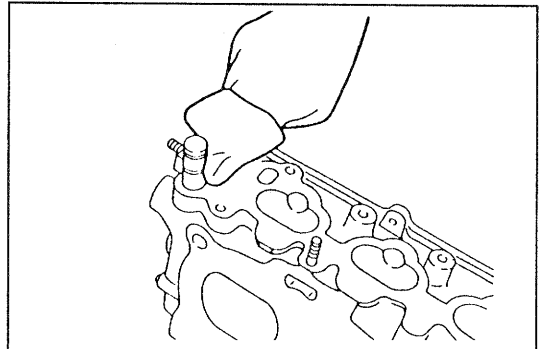
WNU89-EM227

- (6) With a wooden piece interposed, drive the heater outlet tube to the point marked in Step (4).



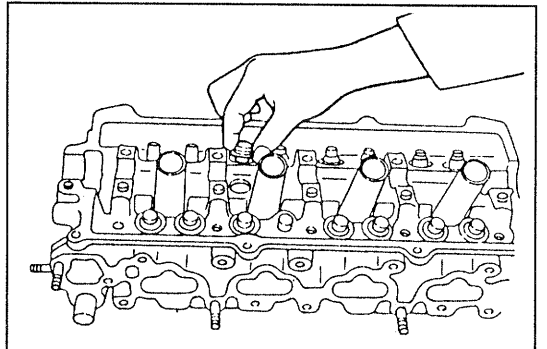
WNU89-EM228

- (7) After completion of the operation, remove any oozed bond, wooden chips and so forth.



WNU89-EM229

2. Install the valve spring seats to the cylinder head.



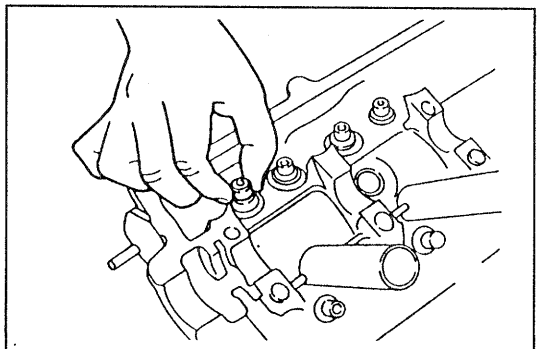
WNU89-EM230

3. Installation of valve stem oil seal

- (1) Apply engine oil to the bore of the valve stem oil seal.
(2) Drive the valve stem oil seal into the valve stem guide bush by hand.

NOTE:

- When driving the oil seal, make sure that the oil seal is not tilted.
- Do not reuse any oil seal which was tilted or driven diagonally.
- Hold the frame of the oil seal. Do not touch the rubber lip section of the oil seal.

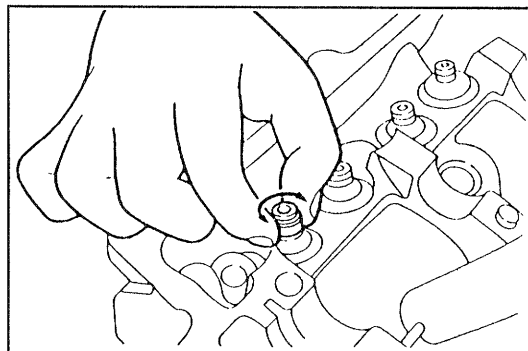


WNU89-EM231

- (3) Turn the oil seal slightly by hand to see if it can be turned.

NOTE:

- Never rotate the oil seal more than one turn, because excessive turning may cause scratches on the oil seal.
- If the oil seal can not be turned by hand, it means that the oil seal has been tilted, driven diagonally or press-fitted improperly.
- Do not reuse any oil seal which was tilted or driven diagonally.

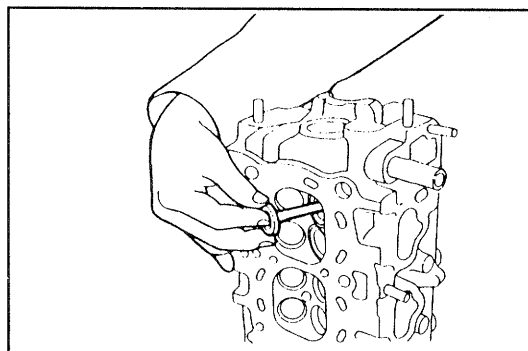


WNU89-EM232

4. Apply oil to the valve stem. Install the valve to the cylinder head.

NOTE:

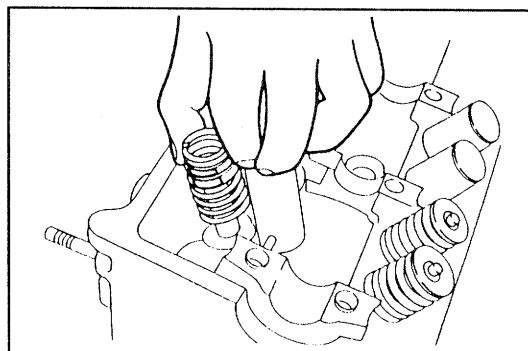
- Care must be exercised as to the installing position. Do not pull out the valve once it has been inserted.
- If the inserted valve should be pulled out, replace the valve stem oil seal.



WNU89-EM233

5. Assembly of valve springs, valve spring retainers and valve spring retainer locks

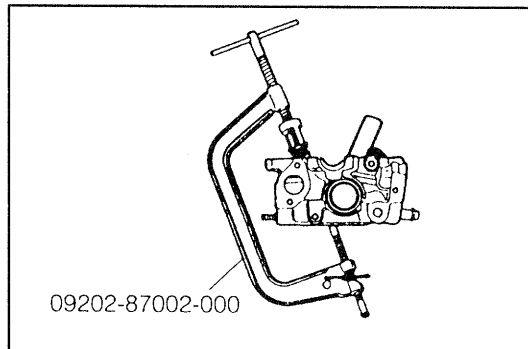
- (1) Assemble the valve spring in such a way that the painted side (the side having a larger pitch) comes at the valve spring retainer.



WNU89-EM234

- (2) Install the valve spring retainer to the valve spring. Install the valve spring retainer locks while compressing the valve spring retainer, using the following SST.

SST: 09202-87002-000

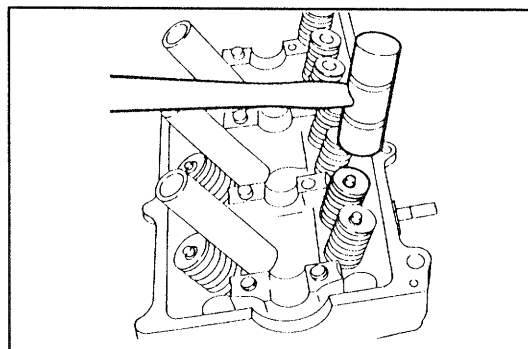


WNU89-EM235

- (3) After installing the valve spring retainer lock, lightly tap the valve spring retainer with a hammer or the like so as to ensure that the valve spring retainer locks are installed securely.

WARNING

- During this operation, care must be exercised to ensure that the valve spring retainer or retainer locks may not be jumped out.
- Protect your eyes with safety goggles during this operation.



WNU89-EM236

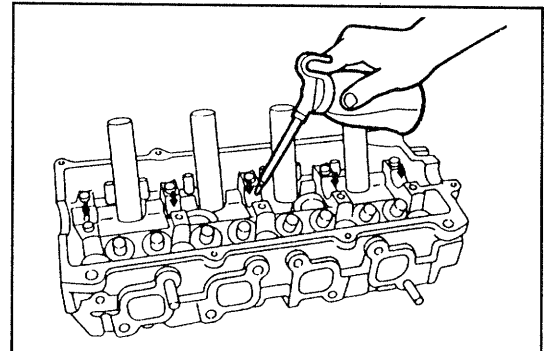
6. Installation of camshaft and rocker shafts
- (1) Wash and dry the holes for the camshaft cap attaching bolts.

WARNING:

When using compressed air, protect your eyes with safety goggles.

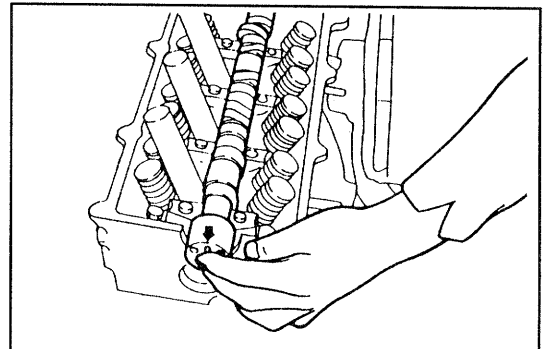
WNU89-EM237

- (2) Liberally apply engine oil to the journal sections and thrust bearing sections.



WNU89-EM238

- (3) Assemble the camshaft on the cylinder head in such a way that the locating pin for the camshaft timing belt pulley comes exactly at the top position.
Apply engine oil to the camshaft journal section.

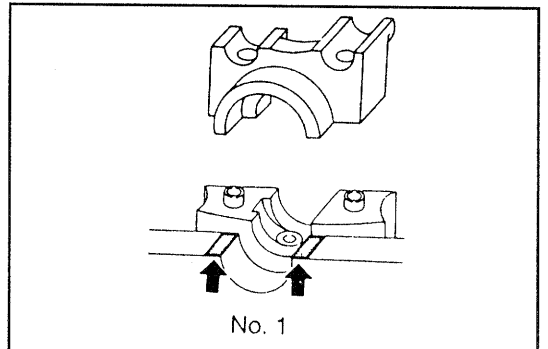


WNU89-EM239

- (4) Apply the Three Bond 1104 to the camshaft cap No. 1 attaching section of the cylinder head at those points shown in the right figure.

NOTE:

- Be careful not to allow any oil to flow into the bearing cap attaching holes.

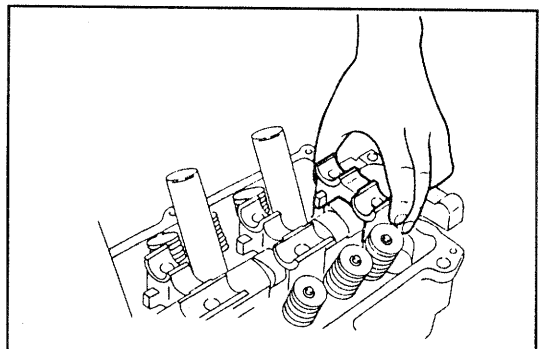


WNU89-EM240

- (5) Install the camshaft bearing caps in the sequence of embossed figures on the caps.

NOTE:

- Before the camshaft bearing caps are installed, wipe off any bond oozed from the camshaft cap No. 1.

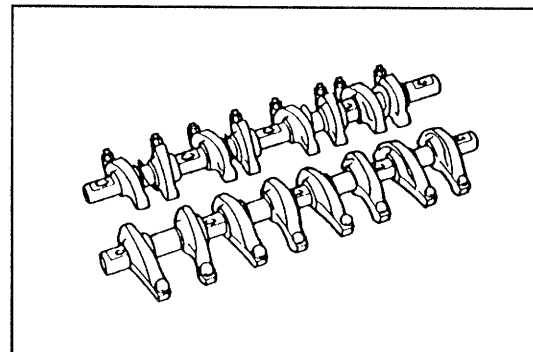


WNU89-EM241

- (6) Assemble the valve rocker arms and wave washers onto the valve rocker shaft, while applying engine oil liberally as shown in the right figure.

NOTE:

- The intake valve rocker shaft can be identified by the recessed sections.

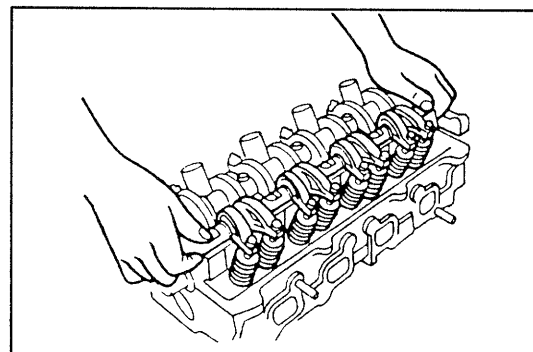


WNU89-EM242

- (7) Install the valve rocker shaft on the camshaft caps.

NOTE:

- For easier installation, it is advisable to insert the rocker arm first to the camshaft cap side.

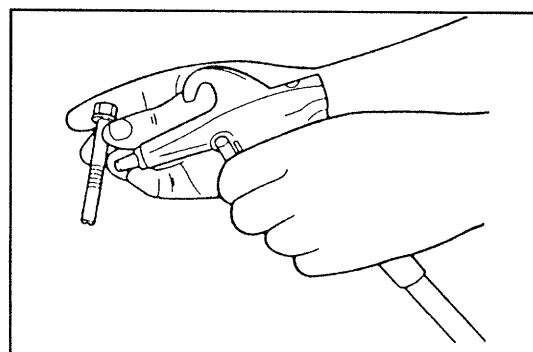


WNU89-EM243

- (8) Clean the attaching bolts and dry them with compressed air. Install them to the cylinder head through the rocker shafts and camshaft caps. Tighten the bolts evenly over two or three stages to the specified torque.

Tightening Torque:

M10 bolt	2.9 - 3.7 kg-m/Dry (21.0 - 26.8 ft-lb, 28.4 - 36.3 N·m)
M8 bolt	1.3 - 1.7 kg-m/Dry (9.4 - 12.3 ft-lb, 12.8 - 16.7 N·m)



WRU90-EM131

WARNING:

- When using compressed air, protect your eyes with safety goggles.

CAUTION:

- Never exceed the specified tightening torque.
- The bolts and bolt holes should be dry when tightening the bolts.

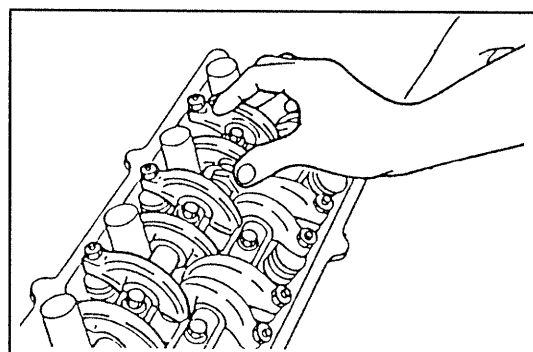
7. Install the spacers into between the intake valve rocker arms on the rocker shaft.

8. Clean the threaded portion of the water temperature sensor. Wind seal tape around the threaded portion and install the sensor to the cylinder head.

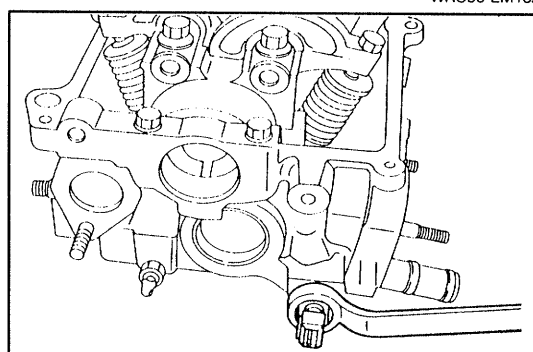
Tightening Torque: 2.5 - 3.5 kg-m
(18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)

NOTE:

- When using a new water temperature sensor, seal tape is unnecessary since seal material is coated on the water temperature sensor.
- Ensure that the water temperature sensor is installed horizontally.



WRU90-EM132



WRU90-EM133

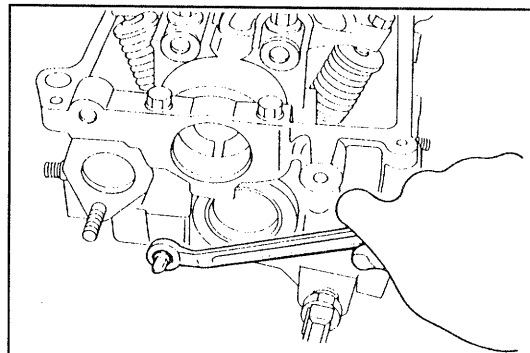
9. Clean the threaded portion of the water temperature sender gauge. Wind seal-tape around the threaded portion. Tighten the gauge to the cylinder head, using the long box wrench.

Tightening Torque: 1.2 - 2.0 kg-m
(8.7 - 14.5 ft-lb, 11.8 - 19.6 N·m)

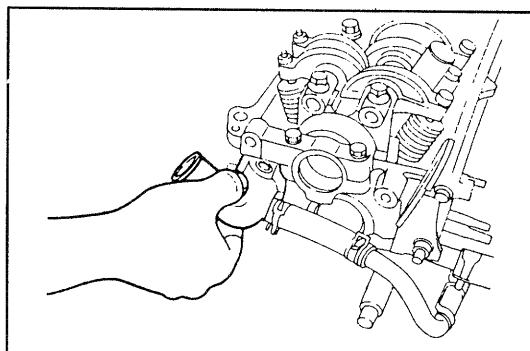
NOTE:

- When using a new sender gauge, seal-tape is unnecessary since seal material is coated on the sender gauge.

10. Install the water outlet to the cylinder head with a new gasket interposed.
11. Connect the by-pass hoses and by-pass pipe to the water outlet.



WNU89-EM247



WNU89-EM248

12. Clean the threaded portion of the BVSV. Wind seal tape around the threaded portion and install the BVSV to the cylinder head.

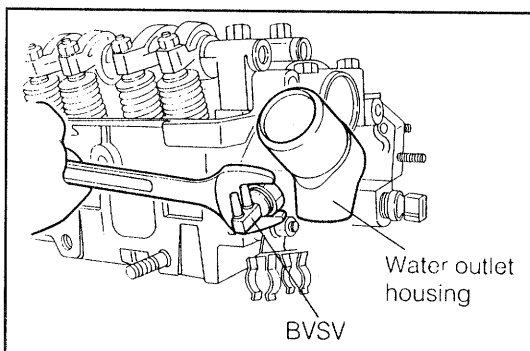
Tightening Torque: 2.5 - 3.5 kg-m
(18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)

NOTE:

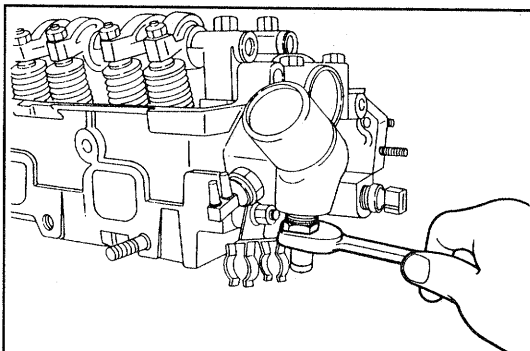
- When using a new BVSV, seal-tape is unnecessary since seal material is coated on the BVSV.

Clean the threaded portion of the A/C water temperature switch. Wind seal tape around the threaded portion and install the A/C water temperature switch to the water outlet (Air conditioner-equipped model only)

Tightening Torque: 2.5 - 3.5 kg-m
(18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)



WNU89-EM249



WRU90-EM134

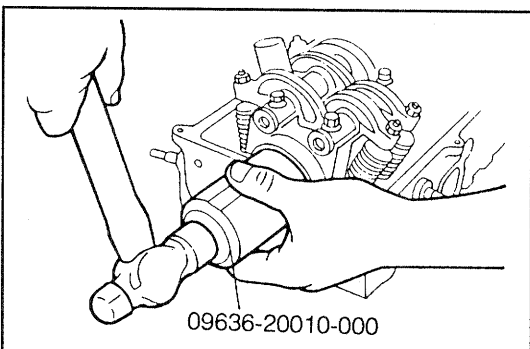
13. Apply engine oil to the bore of the type T oil seal for the camshaft.

Drive the oil seal into position, using the following SST.

SST: 09636-20010-000

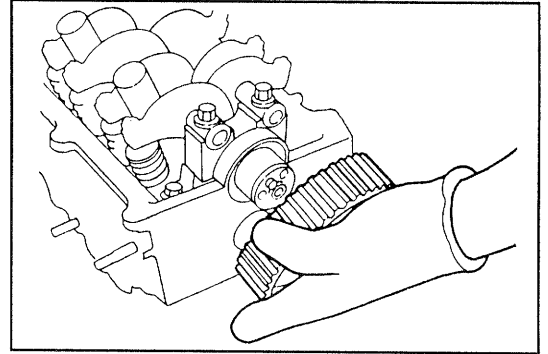
NOTE:

- Be very careful not to slant the T oil seal during the installation.



WRU90-EM135

14. Install the camshaft timing belt pulley in such a way that it is aligned with the locating pin of the camshaft and the "F" mark can be seen from the timing belt side.



WNU89-EM252

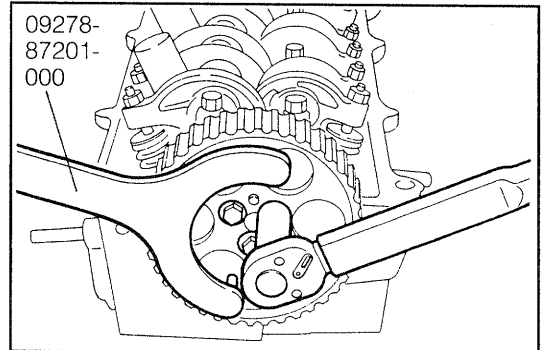
15. Attach the attaching bolts of the camshaft timing belt pulley. Tighten the attaching bolt while preventing the camshaft timing belt pulley from turning, using the following SST.

SST: 09278-87201-000

Tightening Torque: 1.5 - 2.2 kg-m
(10.9 - 15.9 ft-lb, 14.7 - 21.5 N·m)

NOTE:

- Do not turn the camshaft independently.
- The bolts and bolt holes should be dry during the tightening.



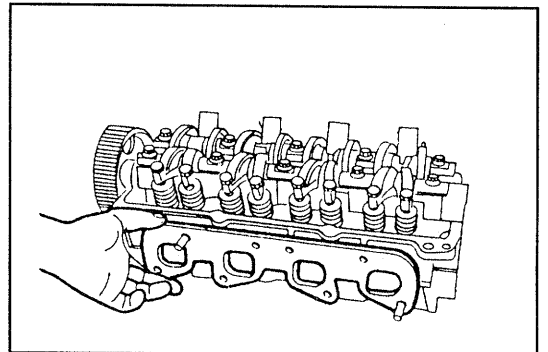
WRU90-EM136

INSTALLATION OF EXHAUST MANIFOLD SIDE PARTS

1. Install the exhaust manifold gasket on the cylinder head.

NOTE:

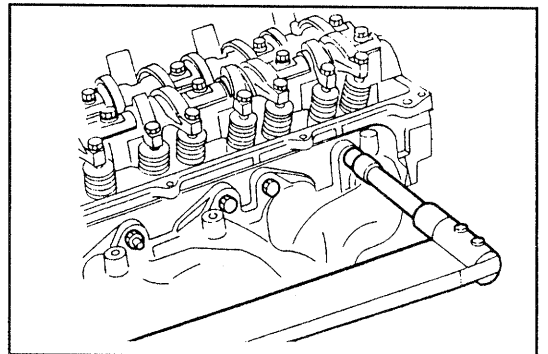
- The exhaust manifold gasket should be installed in such a direction that the side where the grommet turned-out section is bulged may come at the exhaust manifold.



WNU89-EM254

2. Install the exhaust manifold to the cylinder head. Tighten the attaching bolts and nuts evenly over two or three stages.

Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)



WRU90-EM137

INSTALLATION OF THE INTAKE MANIFOLD SIDE PARTS

1. Clean the intake manifold.

WARNING:

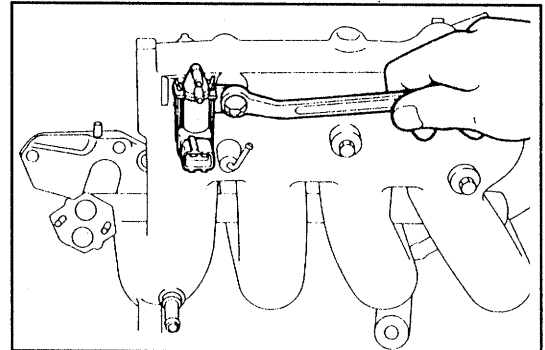
When using compressed air, protect your eyes with safety goggles.

WNU89-EM256

2. Install the EGR VSV to the surge tank.

NOTE:

- Apply thin film of the Three Bond 1104 to the threaded portion of the bolt.

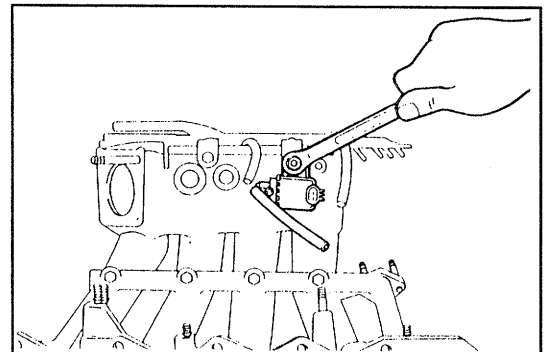


WNU89-EM257

3. Install the vacuum hose sub assembly onto the surge tank.

NOTE:

- Apply the thin film of the Three Bond 1104 to the threaded portion of the bolt.



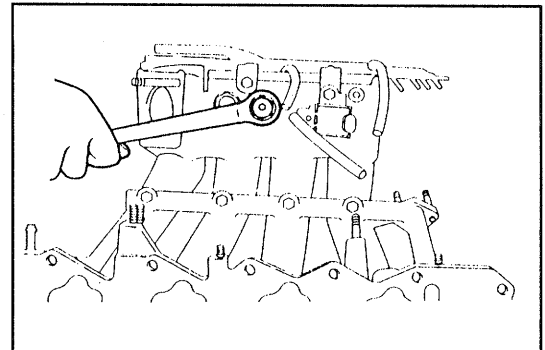
WNU89-EM258

5. Clean the threaded portion of the gas filter.
Wind seal tape around the threaded portion and install it to the surge tank.

Tightening Torque: 1.2 - 2.0 kg-m
(8.7 - 14.4 ft-lb, 11.8 - 19.6 N-m)

NOTE:

- This operation is required only when the gas filter has been removed.
- Use a hexagonal long box wrench for tightening.



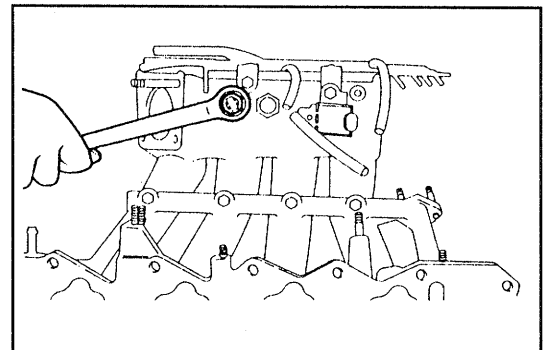
WRU90-EM410

6. Install the intake air temperature sensor to the surge tank with a new washer interposed.

Tightening Torque: 3.0 - 4.0 kg-m
(21.7 - 28.9 ft-lb, 29.4 - 39.2 N-m)

NOTE:

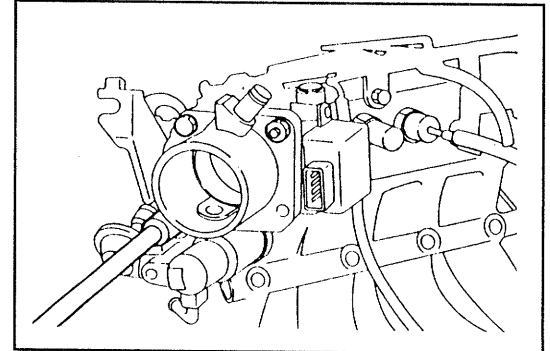
- This operation is required only when the intake air temperature sensor has been removed.



WNU89-EM260

7. Install the throttle body to the surge tank with a new gasket interposed.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

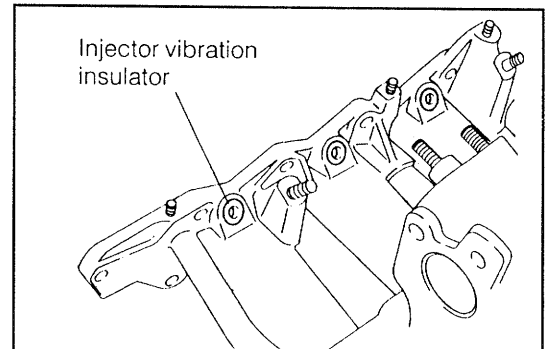


WRU90-EM138

8. Install the injector vibration insulator to the intake manifold section.

CAUTION:

- Prior to installation, check the insulator for damage and cracks. Replace any faulty insulator with a new part.

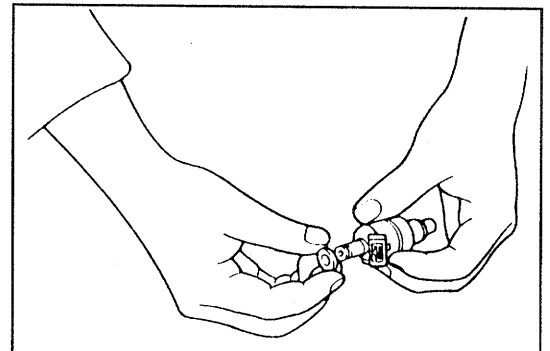


WNU89-EM262

9. Remove the "O" ring of the injector. Remove the grommet and check it for damage or cracks.

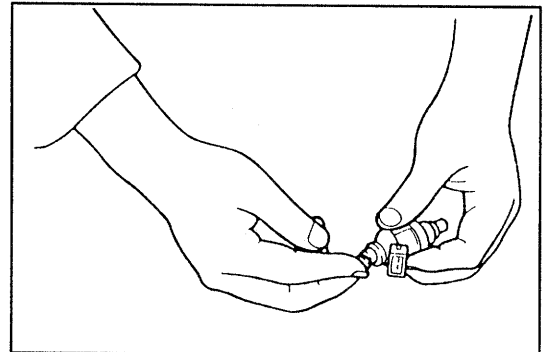
NOTE:

- If the grommet exhibits any fault, replace it with a new one.



WNU89-EM263

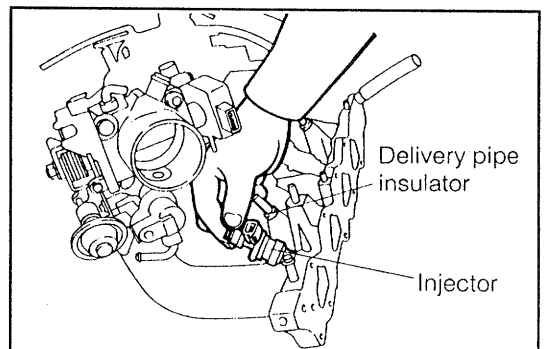
10. Install the grommet and new "O" ring to the injectors.



WNU89-EM264

11. Insert the injector to the vibration insulator hole of the intake manifold.

12. Install the delivery pipe insulator to the stud bolt of the intake manifold.



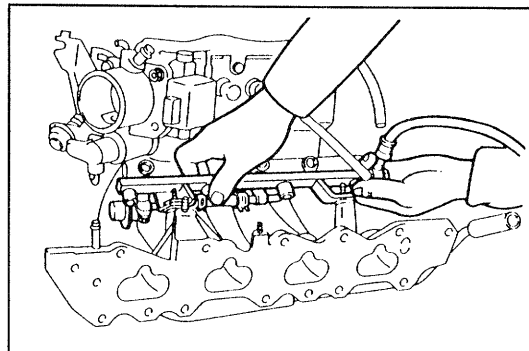
WRU90-EM411

ENGINE MECHANICALS

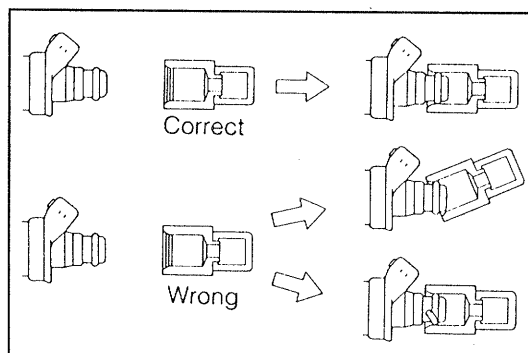
13. Apply silicon oil to the "O" ring of the injector.
Then, install the delivery pipe.

CAUTION:

- Be very careful not to damage the "O" ring of the injector during the delivery pipe installation.
- Do not install the delivery pipe diagonally to the injector.



WRU90-EM139

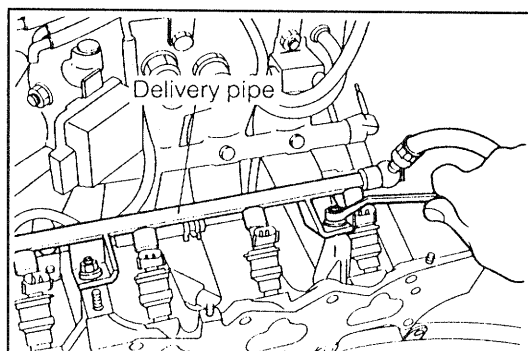


WNU89-EM267

14. Tighten the attaching nuts of the delivery pipe.
Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

NOTE:

- After tightening the delivery pipe, make sure that the injector can be turned by hand. If the injector can not be turned, it indicates probably a damaged injection "O" ring. Hence, replace the injector "O" ring with a new part.



WNU89-EM268

15. Install the surge tank stay No. 1 to the throttle body and intake manifold, using bolt and nut.

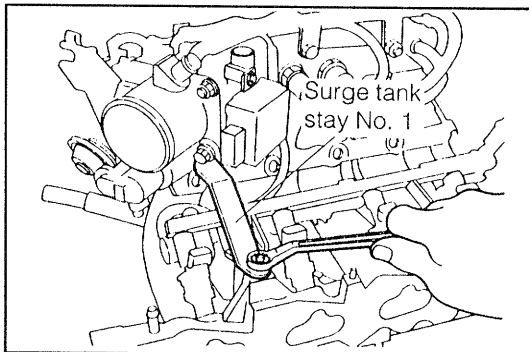
Tightening Torque:

Bolt : 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.5 N·m)

Nut: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.5 N·m)

16. Install the intake manifold to the cylinder head. Tighten the attaching bolts and nuts evenly over two or three stage.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.5 N·m)



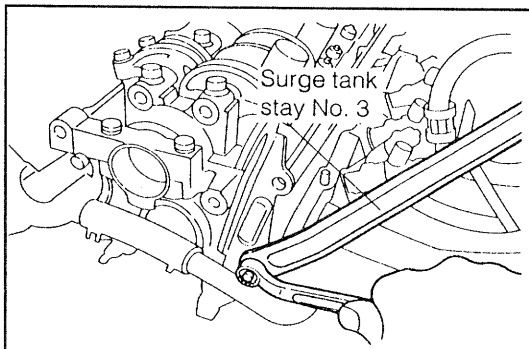
WRU90-EM412

17. Install the engine hanger No. 2 and surge tank stay No. 3 to the stud bolt at the cylinder head. Install the surge tank stay No. 3 to the surge tank side.

Tightening Torque:

Bolt: 1.9 - 3.1 kg-m
(13.8 - 22.4 ft-lb, 18.6 - 30.3 N·m)

Nut: 1.9 - 3.1 kg-m
(13.8 - 22.4 ft-lb, 18.6 - 30.3 N·m)



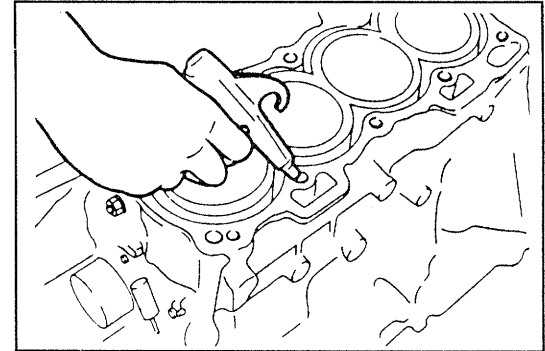
WRU90-EM413

INSTALLATION OF CYLINDER HEAD WITH MANIFOLDS

1. Clean the cylinder block head bolt holes.

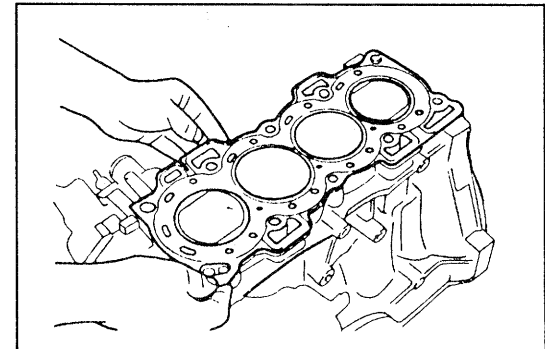
WARNING:

Protect your eyes with goggles when using compressed air.



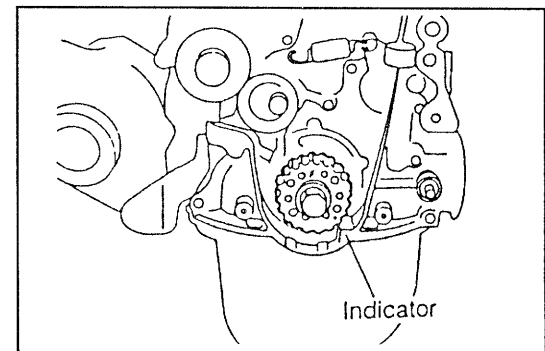
WNU89-EM271

2. Clean the cylinder block upper gasket surface. Install the cylinder head gasket, while aligning it with the pin ring for locating use.



WNU89-EM272

3. Turn the crankshaft so that the crankshaft key groove may come at the top position.

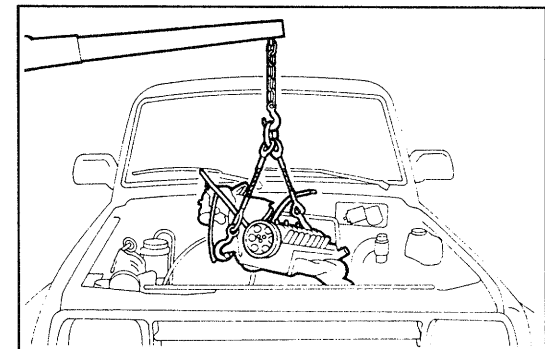


WNU89-EM273

4. Install the cylinder head onto the cylinder block, using chain block.

CAUTION:

- Be careful not to allow the cylinder head to hit to the vehicle body and/or other parts.



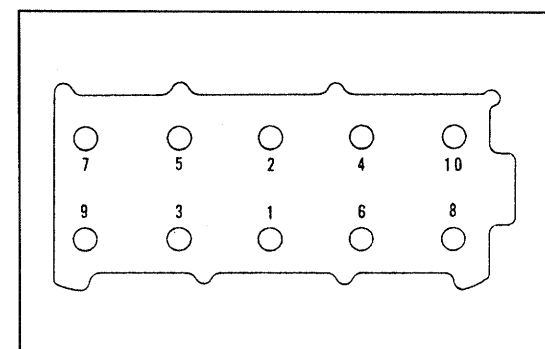
WRU90-EM140

5. Coat each cylinder head bolt with a thin film of engine oil. Using these bolts, install the cylinder head to the cylinder block. Tighten the bolts evenly over two or three stages, following the sequence shown in the right figure.

Tightening Torque: 6.0 - 6.8 kg-m
(43.4 - 49.2 ft-lb, 58.8 - 66.7 N·m)

NOTE:

- Make sure that all the bolts are torqued uniformly to a constant level, not just torqued within the specified range.

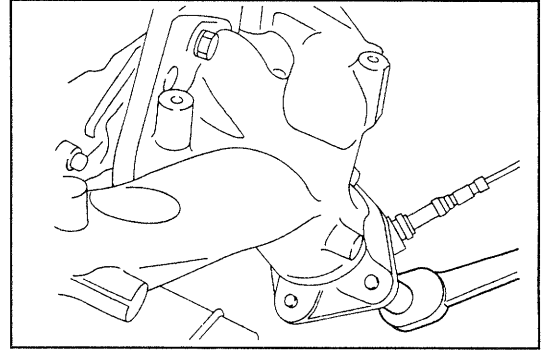


WRU90-EM414

ENGINE MECHANICALS

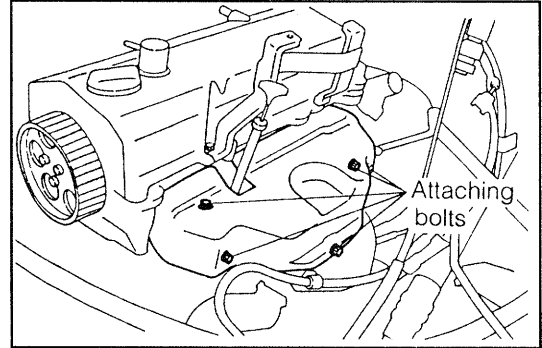
6. Connect the exhaust pipe to the exhaust manifold with a new gasket interposed.
Then, tighten the attaching nuts.

Tightening Torque: 4.5 - 5.5 kg-m
(32.5 - 39.8 ft-lb, 44.1 - 53.9 N·m)



WRU92-EM425

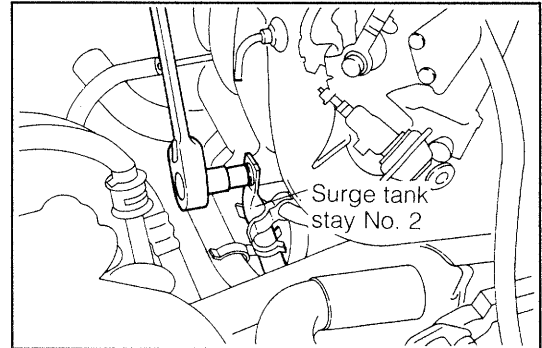
7. Install the oil level gauge support.
Tighten the clamping bolt.
8. Install the exhaust manifold cover.
Tighten the five attaching bolts.



WRU90-EM142

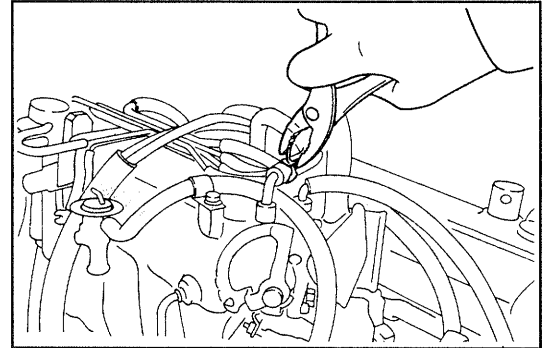
9. Fit the surge tank stay No. 2 to the surge tank. Tighten the attaching bolt and nut.

Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)



WRU90-EM143

10. Connect the cooling water hoses to the air valve on the throttle body.

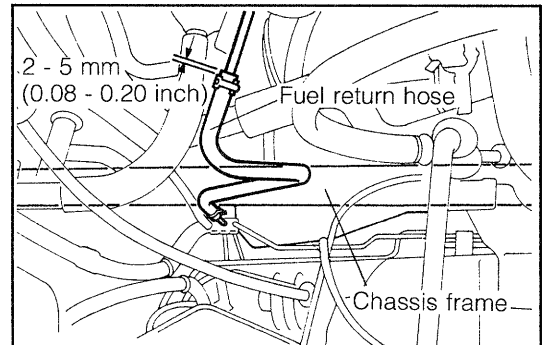


WRU90-EM144

11. Connection of fuel return hose to fuel pipe No. 2.
(1) Insert the fuel return hose onto the fuel pipe No. 2 until second spool of fuel pipe.
(2) Securely clamp the fuel hose at 2 - 5 mm (0.08 - 0.20 inch) from fuel return hose end.

NOTE:

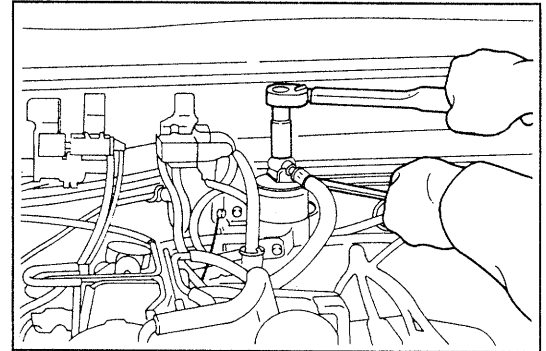
- Install the fuel return hose in parallel with chassis frame.



WRU90-EM145

12. Install the fuel hose No. 1 to the fuel filter with a new gasket interposed.

Tightening Torque: 3.5 - 4.5 kg-m
(25.4 - 32.5 ft-lb, 34.3 - 44.1 N·m)

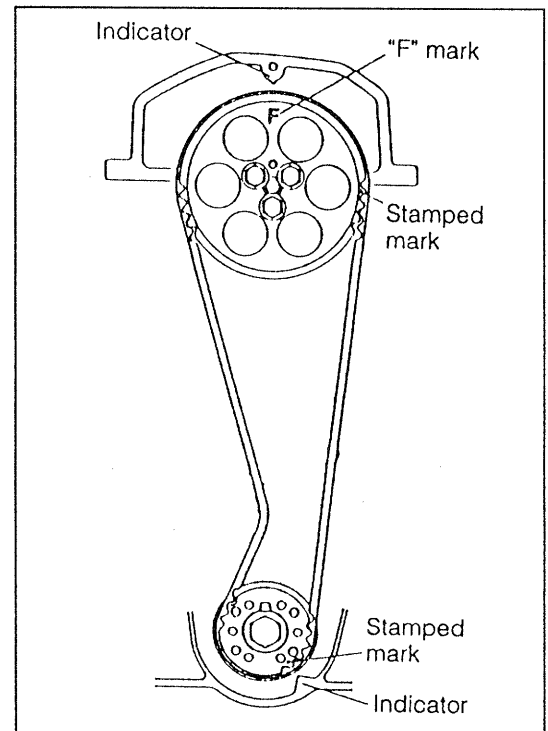


WRU90-EM146

INSTALLATION OF TIMING BELT

(See page EM-30)

1. Install the cylinder head cover temporarily.
2. Install the timing belt tensioner and tensioner spring. Temporarily tighten them, while they are being pushed toward the alternator side.
3. Align the mating marks of the crankshaft timing belt pulley and camshaft timing belt pulley with the corresponding mating marks.
4. Install the timing belt.
5. Loosen the tensioner attaching bolt so that tension may be given to the belt.
Then, temporarily tighten the attaching bolt again.
6. Turn the crankshaft 2 turns in the normal direction.
7. Loosen the tensioner attaching bolt.
8. Turn the crankshaft until the "F" mark of the camshaft is aligned with the indicator on the cylinder head cover.
9. Tighten the tensioner attaching bolt to the specified torque.
10. Remove the cylinder head cover.



WRU90-EM147

ADJUSTMENT AND INSTALLATION OF OTHER PART

1. Adjustment of Valve Clearances

NOTE:

- When tightening the adjusting nuts, apply engine oil to the lock nuts, adjusting bolts and rocker arms.

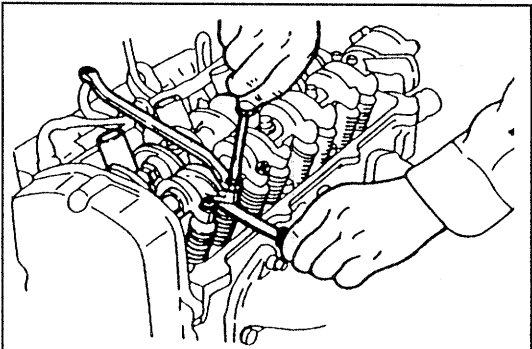
(1) Align the drilled mark of the crankshaft timing belt pulley with the indicator mark of the oil pump.

(2) Check to see if the valve rocker arms of the No. 1 cylinder are in a free state or they are pushed up by the cam.

Adjust the valve clearances in accordance with the table below.

The mark represents a valve which can be adjusted at that time.

WRU90-EM148



WNU89-EM284

Cylinder No.		1	2	3	4
Rocker arm condition					
(1)When valve rocker arms of No. 1 cylinder is free; "O" marks are available to adjust. (2)Turn the crankshaft 360 degrees. (3)When valve rocker arms of No. 4 cylinder is free; "x" marks are available to adjust.	IN	O	O	x	x
	EX	O	x	O	x

Valve Clearances (Cold):

- Intake 0.18 mm (0.0071 inch)
- Exhaust 0.25 mm (0.0098 inch)

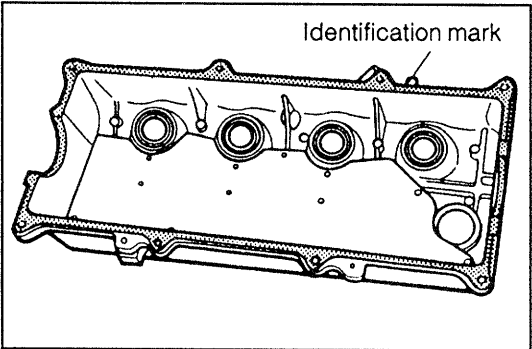
NOTE:

- The valve clearance should be readjusted after the engine has been warmed up thoroughly.

WRU90-EM179

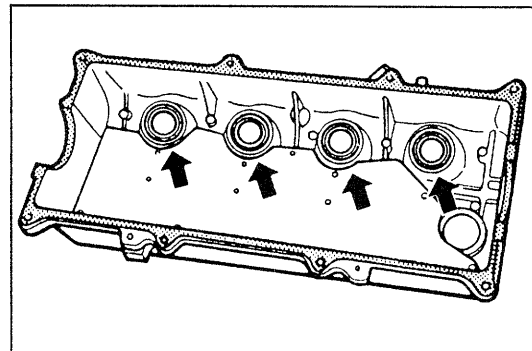
2. Installation of cylinder head cover

- Clean the cylinder head cover gasket surface of the cylinder head.
- Check the cylinder head cover gasket for damage. Replace the cylinder head cover gasket, as required. Assemble the cylinder head cover gasket with the identification mark facing toward the intake side.



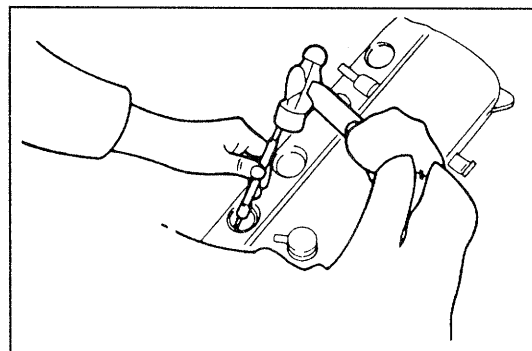
WRU90-EM149

- (3) Check the rubber grommets of the spark plug tubes for damage.
Replace the rubber grommets, as required.



WNU89-EM287

- Replacement of rubber grommets
For removal operation, use a slotted pin puller.



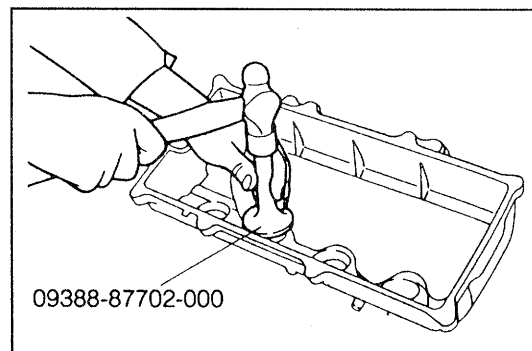
WNU89-EM288

- When installing the grommet, drive it into position, using the following SST.

SST: 09388-87702-000

NOTE:

- Make sure that the grommets is not tilted when it is driven into position.
- Be sure to use a suitable wooden piece so as to prevent the cylinder head cover from damage.
- Be careful not to damage the lip section of the grommet.

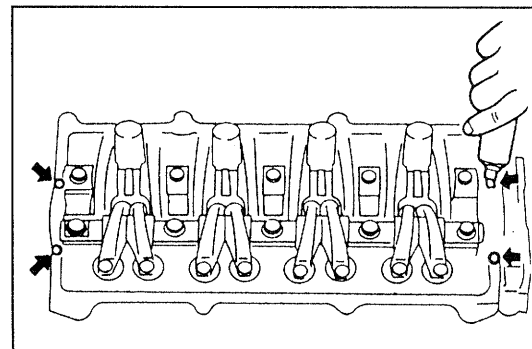


WNU89-EM289

- (4) Apply the Three Bond 1104 to the cylinder head at points indicated in the figure.
(5) Install the cylinder head cover to the cylinder head.

NOTE:

- Be careful not to scratch the rubber grommet for the spark plug tube during the installation.
- Care must be exercised to ensure that the rubber grommet will not ride over the spark plug tube.

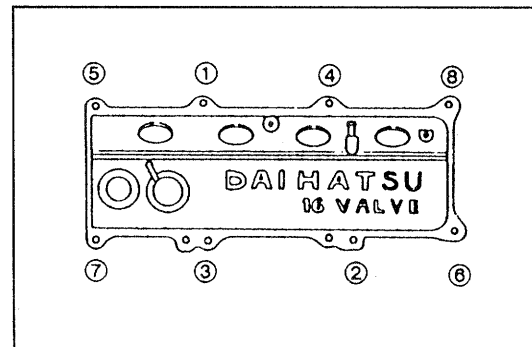


WNU89-EM290

- (6) Tighten the cylinder head cover bolts evenly over two or three stages to the specified torque, following the sequence shown at the figure.

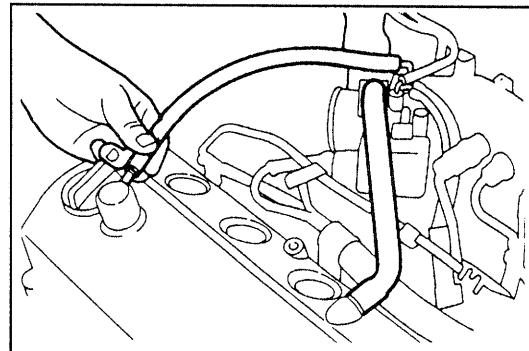
Tightening Torque: 0.3 - 0.5 kg-m
(2.2 - 3.6 ft-lb, 2.9 - 4.9 N-m)

- (7) Install the oxygen sensor harness to the clamp.



WRU90-EM415

- (8) Connect the blow-by gas hoses to the cylinder head and throttle body.



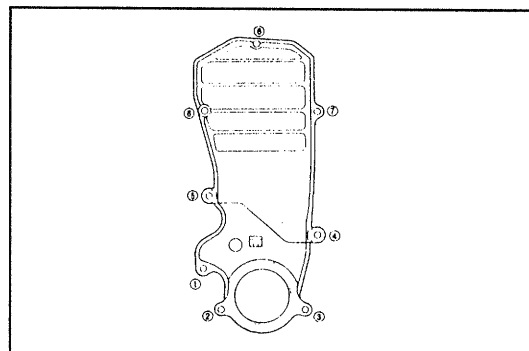
WNU89-EM-292

3. Install the timing belt cover.

Tightening Torque: 0.2 - 0.4 kg-m
(1.4 - 2.9 ft-lb, 2.0 - 3.9 N-m)

NOTE:

- Attaching bolts ① and ④ should be installed first of all.



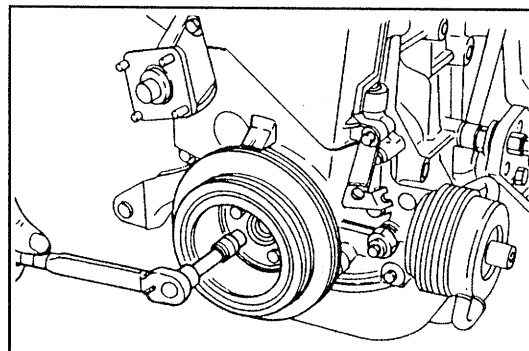
WRU90-EM150

4. Install the crankshaft pulley on the crankshaft timing belt pulley with four bolts.

Tightening Torque: 2.0 - 3.0 kg-m
(14.5 - 21.7 ft-lb, 19.6 - 29.4 N-m)

NOTE:

- Prevent the engine from turning by placing the shift lever in the 5th speed gear position.
- Special care must be exercised to get the specified tightening torque, for the crankshaft may turn slightly, while tightening.



WNU89-EM294

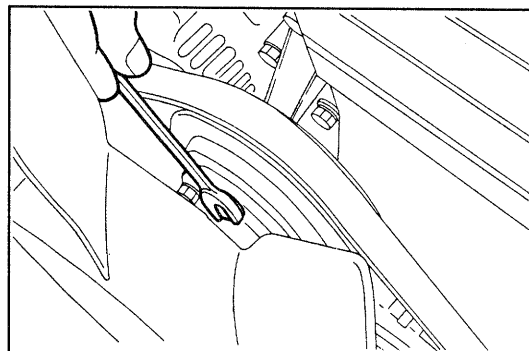
5. Installation of fluid coupling with fan and fan shroud
- (1) Install the water pump pulley to the water pump with temporarily attaching.
 - (2) Insert the radiator fan shroud together with the fluid coupling with fan between radiator and the engine.

NOTE:

- Be sure that the water pump pulley is not ride to the spigot section of the water pump pulley seat.

- (3) Install the fluid coupling with fan to the water pump by means of four bolts through water pump pulley.

Tightening Torque: 1.0 - 1.8 kg-m
(7.2 - 13.0 ft-lb, 9.8 - 17.7 N-m)



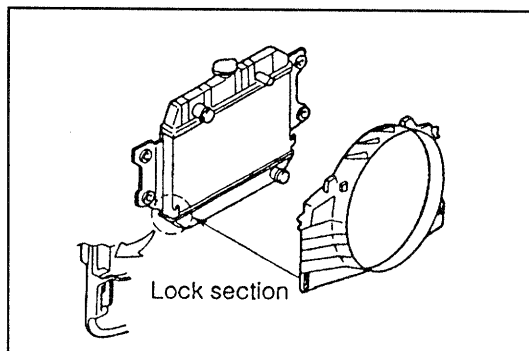
WRU90-EM151

REFERENCE:

Tightening torque of fluid coupling and fan is as follows.

0.44 - 0.66 kg-m (3.2 - 4.8 ft-lb, 4.3 - 6.5 N-m)

- (4) Insert the lock section of fan shroud to the radiator. Then, tighten the two attaching bolts of the radiator upper side.
- (5) Connect the water hose to the radiator upper tank. Securely clamp the water hose clamp.

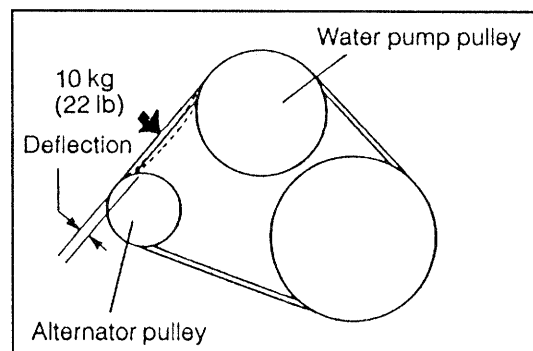


WRU90-EM152

6. Install the V ribbed belt and perform the adjustment in such a way that the deflection at the midpoint between the water pump pulley and the alternator may become the specified value when a force of 10 kg (22 lb) is applied to the midpoint.

Used Belt: 5.0 - 6.0 mm (0.197 - 0.236 inch)

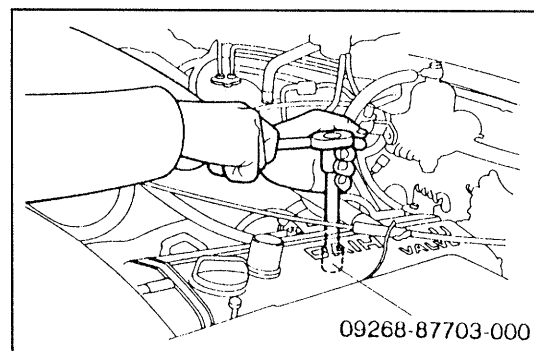
With a force of 10 kg (22 lb) applied to point indicated in figure



WNJ89-EM296

7. Install the reserve tank to the radiator assembly bracket. Insert the over flow hose to the radiator.
8. Install the spark plug, using the following SST.

SST: 09268-87703-000

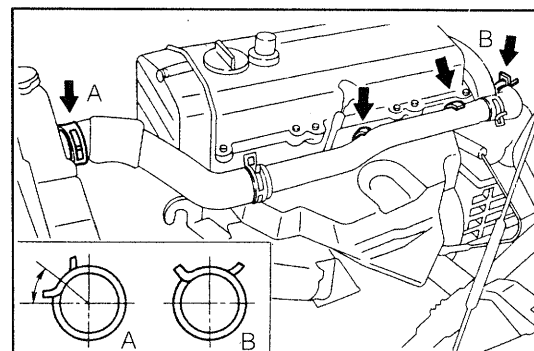


WRU90-EM153

9. Install the radiator hose No. 1 to the radiator upper tank. Tighten the two clamps and two attaching bolts.

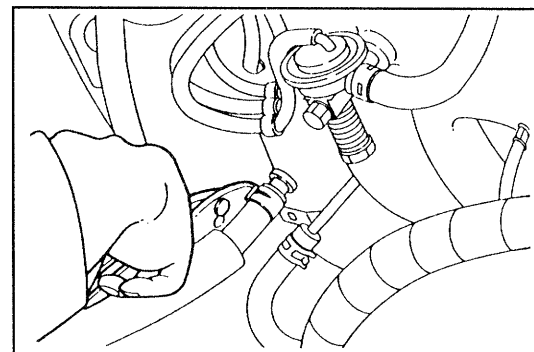
NOTE:

- Ensure that the clamps are installed as illustrated in right figure.



WRU90-EM154

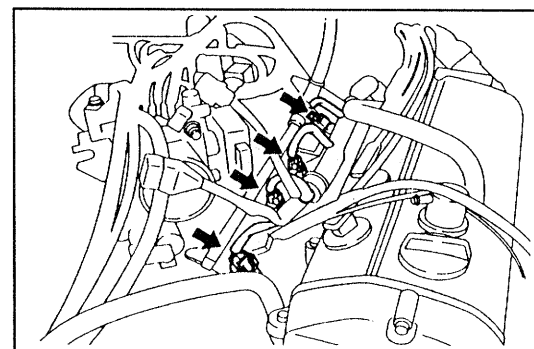
10. Connect the vacuum hose for the brake booster to the intake manifold.



WRU90-EM155

11. Installation of engine wire harness

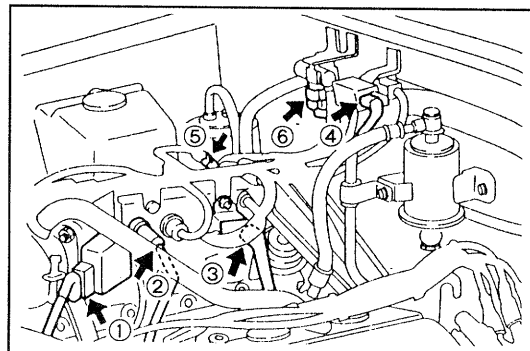
- (1) Install the engine wire clamps and engine ground cables.
- (2) Connect the injector connectors.



WRU90-EM156

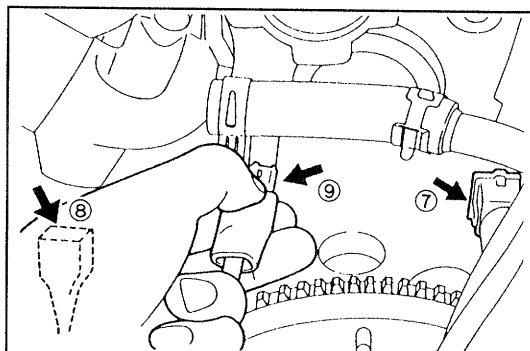
(3) Connect the following connectors.

- ① Throttle position sensor
- ② Intake air temperature sensor
- ③ Idle speed control VSV
- ④ Pressure sensor, pressure VSV and clamp
- ⑤ EGR VSV
- ⑥ A/C idle up VSV



WRU90-EM157

- ⑦ Water temperature sensor
- ⑧ A/C water temperature switch
- ⑨ Water temperature sender gauge
- ⑩ Oxygen sensor



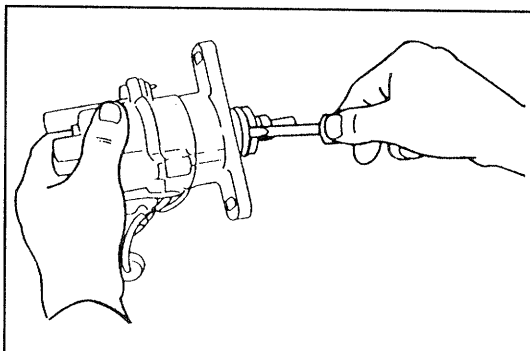
WRU90-EM158

12. Installation of the distributor

- (1) Replace the "O" ring of the distributor body with a new one.

NOTE:

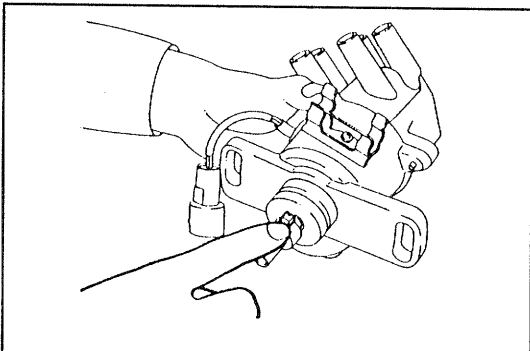
- Care must be exercised to avoid scratching the new "O" ring.



WRU90-EM159

- (2) Align the cutout section of the distributor proper with the cutout groove of the coupling. Assemble the distributor on the cylinder head, lining up the protrusion of the distributor with the camshaft groove.

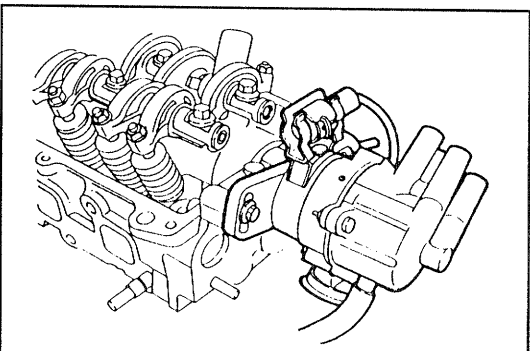
During this installation, the aligned cutout sections must come at the top side of the engine.



WNU89-EM304

- (3) With the center of each elongated hole on the flange section of the distributor proper aligned with the corresponding threaded hole of the cylinder head, tighten the distributor attaching bolts.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

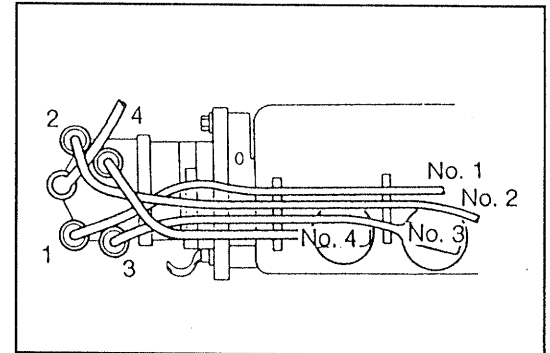


WNU89-EM305

(4) Connect the distributor connector.

NOTE:

- Be sure to install the spark plug wire into the distributor cap as indicated in the right figure.

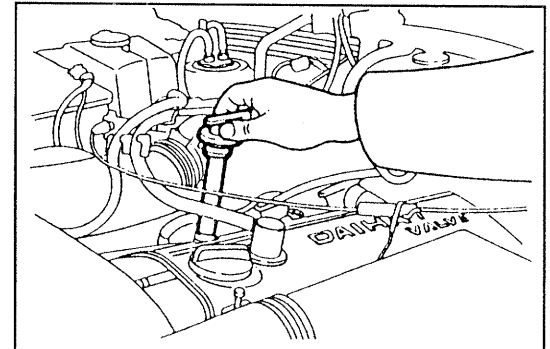


WRU90-EM160

13. Connect the spark plug wire.

CAUTION:

- Hold the rubber boot section of the spark plug wire. Securely connect it to the spark plugs, the distributor cap and the ignition coil.
- Be careful not to damage the spark plug wire with the spark plug tube.

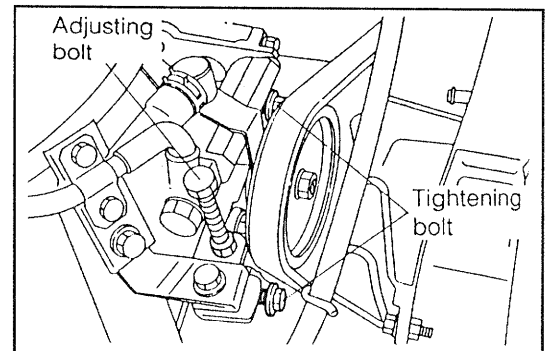


WRU90-EM161

14. Connect the spark plug wire to the cord clamp.

15. Installation of the power steering pump and drive belt (P/S equipped vehicle only)

- (1) Install the power steering pump assembly into the position.
- (2) Install the power steering drive belt.

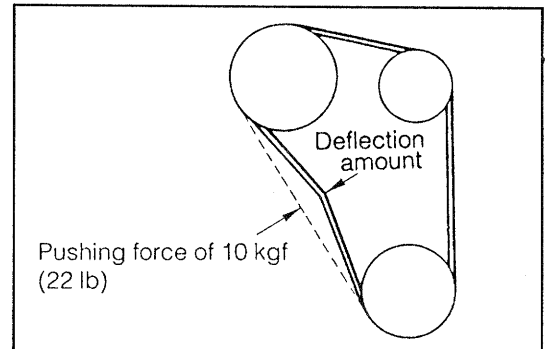


WRU90-EM162

(3) Set the drive belt tension to the specified value by tightening the adjusting bolt.

Specified Deflection: 9 - 11 mm (0.35 - 0.43 inch)

[When a force of 10 kg (22 lb) is applied:]

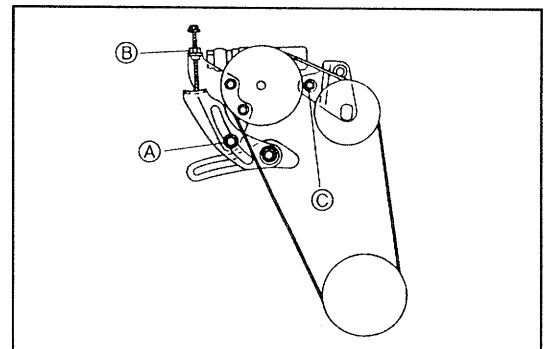


WRU90-EM163

(4) Tighten the bolts to the specified value.

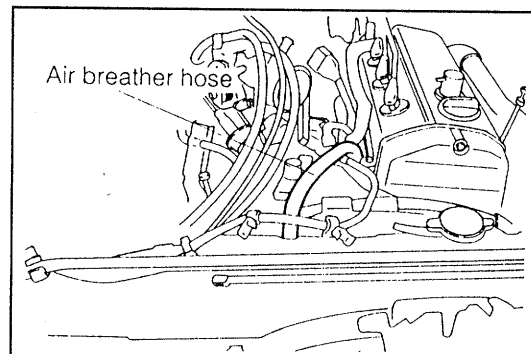
Tightening Torque:

- Ⓐ 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N·m)
- Ⓑ 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)
- Ⓒ 5.0 - 7.0 kg-m
(36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)



WRU90-EM164

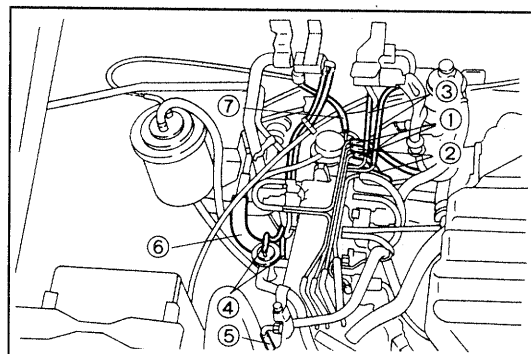
16. Connect the air breather hose to the radiator upper tank.



WRU90-EM165

17. Installation of vacuum hoses at the surge tank

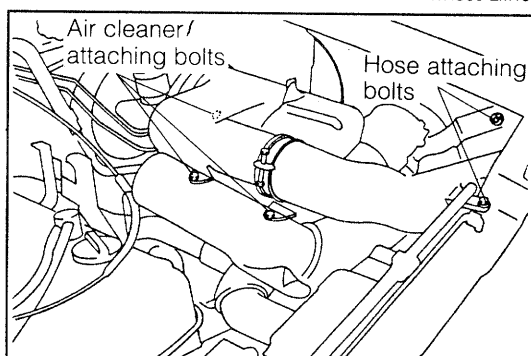
- (1) Distributor diaphragm ①
- (2) BVSV ②
- (3) Pressure VSV ③
- (4) Air-con idle up VSV ④
- (5) Power steering ACV ⑤
- (6) Brake booster ⑥
- (7) Charcoal canister ⑦



WRU90-EM166

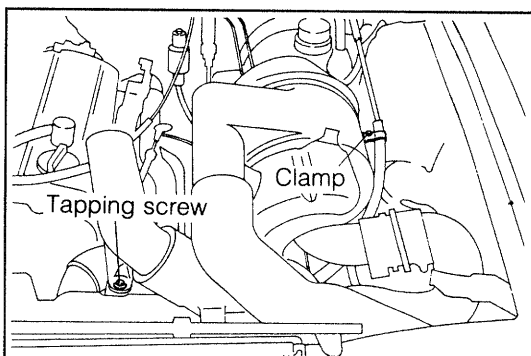
18. Installation of the air cleaner sub assembly

- (1) Install the air cleaner sub assembly into position.
Tighten the three attaching bolts.
- (2) Tighten the attaching bolts to the left fender panel and radiator center support.



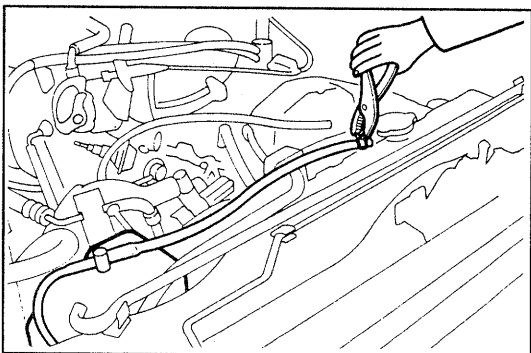
WRU90-EM167

- (3) Tighten the tapping screw at the fan shroud.
- (4) Install the clutch cable clamp to the air cleaner.



WRU90-EM168

19. Install the radiator reserve tank into position.
Clamp the water hose securely.



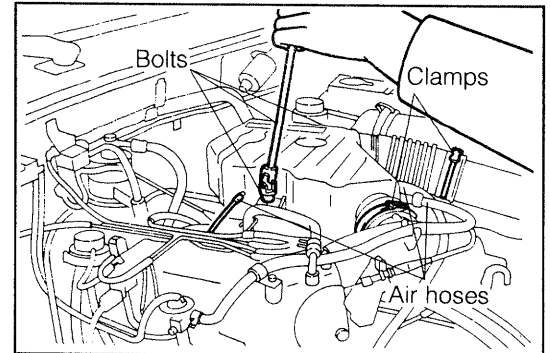
WRU90-EM169

20. Installation of air chamber

- (1) Install the air chamber by attaching the three screws and two clamps.

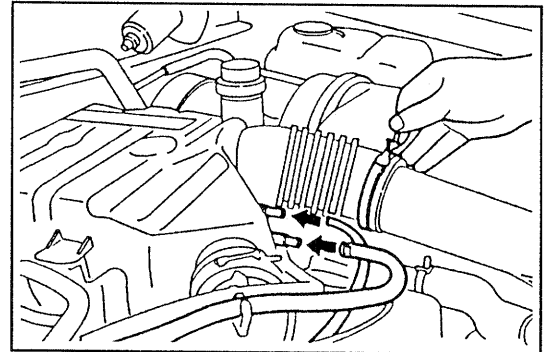
NOTE:

- Align the matching marks provided on the air chamber and air hose.



WRU90-EM170

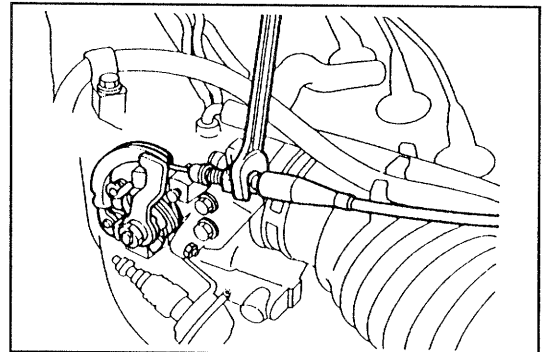
- (2) Install the air hoses for air conditioner and power steering idle up.



WRU90-EM171

21. Connect the accelerator cable to the throttle body.

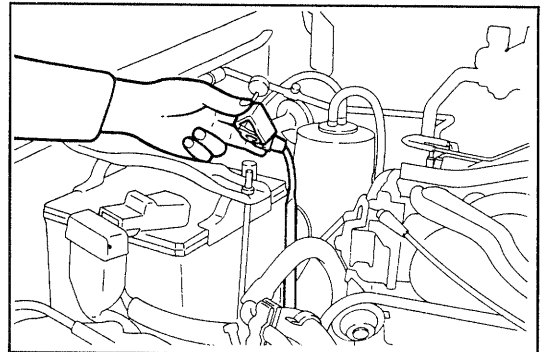
22. Adjust the accelerator cable so that the accelerator pedal free play may become 1 - 5 mm (0.04 - 0.20 inch).



WNU89-EM319

23. Installation of the battery

- (1) Install the battery into position.
- (2) Install the battery holding clamp.
- (3) Connect the positive cable to the positive (+) terminal. Then connect the battery ground cable to the negative (-) terminal of the battery.



WRU90-EM172

FILLING OF ENGINE OIL AND COOLING WATER

1. Filling engine oil

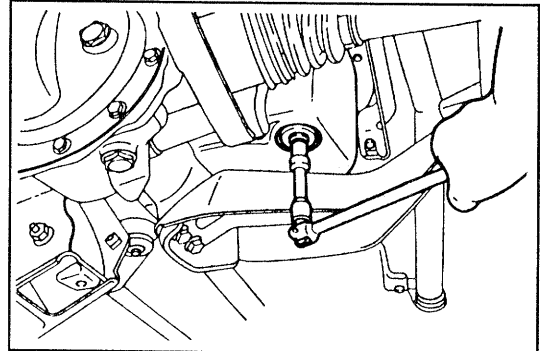
- (1) Clean the oil drain plug. Install it with a new gasket interposed.

NOTE:

- Remove any remaining gasket material from the oil pan, using a gasket scraper.

Tightening Torque:

2.0 - 3.0 kg-m (14.5 - 21.7 ft-lb, 19.6 - 29.4 N-m)



WRU90-EM173

- (2) Fill the engine with engine oil.

The oil should be API grade SG or SF multigrade viscosity, fuel-efficient oil.

Oil capacity

When only engine oil is changed:

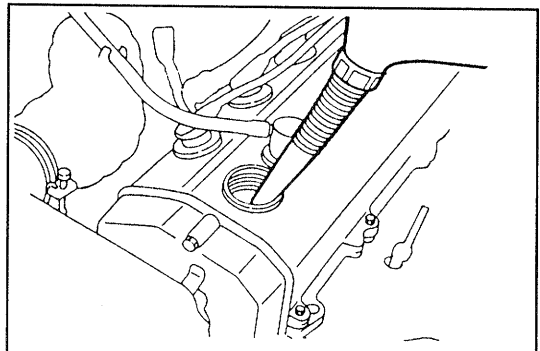
3.3 liter (3.5 US qt.)

When engine oil is changed and oil filter is replaced:

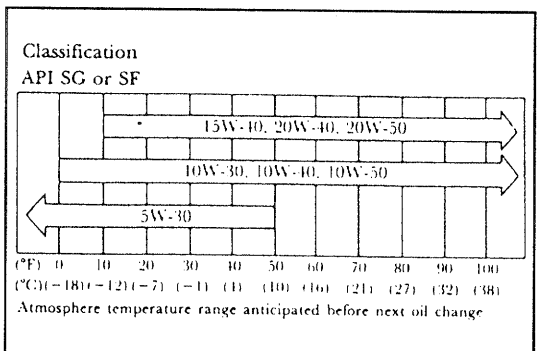
3.5 liter (3.7 US qt.)

After engine has been overhauled or when engine oil has been drained completely from engine:

3.8 liter (4.0 US qt.)



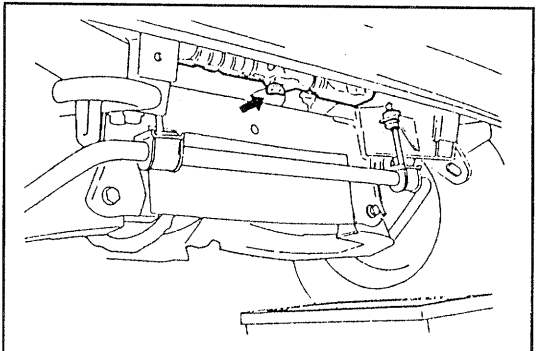
WNU89-LU017



WNU89-LU018

2. Filling cooling water

- (1) Install the cooling water drain plug with new gasket.



WRU90-EM174

- (2) Fill the radiator and reserve tank with antifreeze solution in accordance with the instructions of the manufacturer of the antifreeze solution.

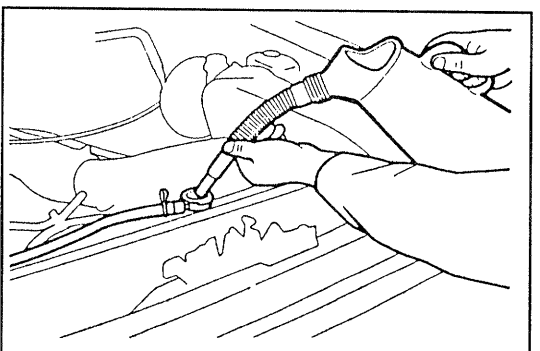
CAUTION:

- Use a Good brand of ethylene-glycol base antifreeze solution.

Coolant capacity (Vehicle with front heater):

5.5 liter (5.8 US qt)

[excluding 1.0 liter (1.1 US qt) for reserve tank]



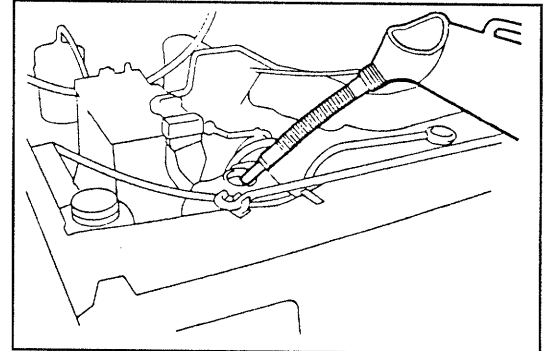
WRU90-EM175

- (3) Fill the system with water.
- (4) Start the engine. Check the coolant level. Add water, as required.
- (5) Tighten the radiator cap.
- (6) Warm the engine. Afterwards, allow the coolant to cool down to the atmospheric temperature. Recheck the coolant level at the reserve tank. Add coolant to the full level, as required.

If no coolant remains at all in the reserve tank, recheck the coolant level in the radiator. Replenish the radiator with water, as required. Replenish the reserve tank with coolant up to the full level.

NOTE:

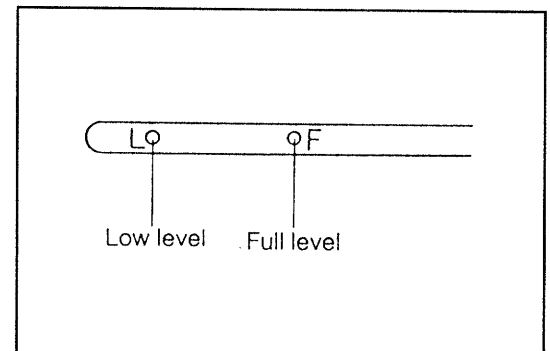
- Here, the coolant refers to the mixture of water and antifreeze that has been mixed in accordance with the instructions of the antifreeze manufacturer.



WRU90-EM176

- (7) A lapse of two or three minutes after the engine stop, check the oil level.

If the oil level is less than the full level, replenish the oil to the full level.



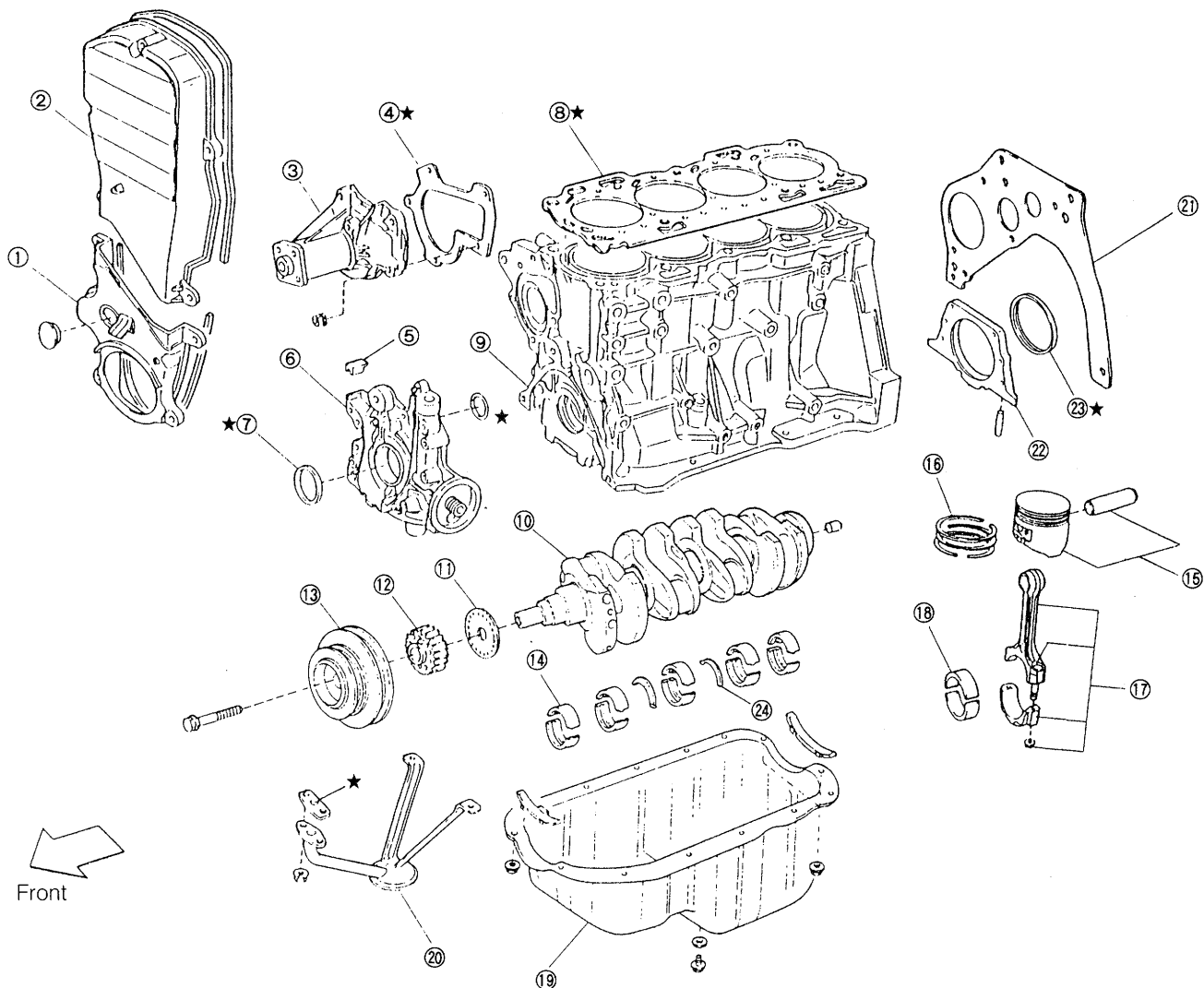
WRU90-EM177

3. Perform the engine tune-up.
(See page EM-9).

WRU90-EM178

CYLINDER BLOCK COMPONENTS

★: Non-reusable parts



- | | |
|--|-----------------------------|
| ① Timing belt cover No. 1 | ⑬ Crankshaft pulley |
| ② Timing belt cover No. 2 | ⑭ Crankshaft bearing |
| ③ Water pump Ay | ⑮ Piston with pin |
| ④ Water pump gasket | ⑯ Piston ring |
| ⑤ Dust seal | ⑰ Connecting rod |
| ⑥ Oil pump Ay | ⑱ Connecting rod bearing |
| ⑦ Oil seal | ⑲ Oil pan |
| ⑧ Cylinder head gasket | ⑳ Oil pump strainer |
| ⑨ Cylinder block | ㉑ Rear end plate |
| ⑩ Crankshaft | ㉒ Oil seal retainer |
| ⑪ Crankshaft timing belt pulley flange | ㉓ Oil seal |
| ⑫ Crankshaft timing belt pulley | ㉔ Crankshaft thrust bearing |

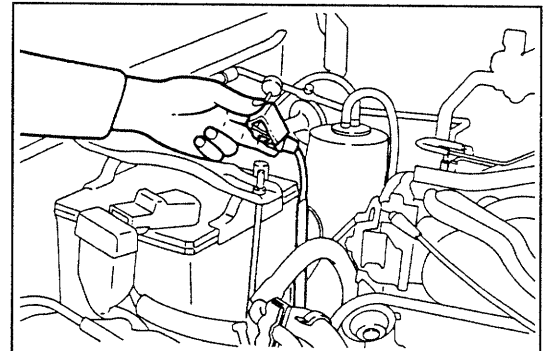
INSTRUCTIONS PRIOR TO OPERATION

Install fender covers to the fenders so that no scratch may be made to the fenders.

WNU89-EM325

ENGINE REMOVAL

1. Removal of battery
 - (1) Disconnect the battery ground cable from the negative (–) terminal of the battery. Then disconnect the wires from the positive (+) terminal of the battery.

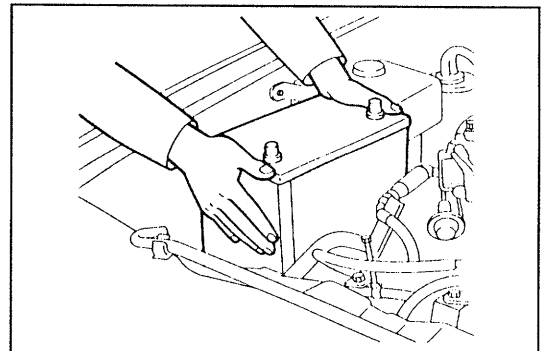


WRU90-EM180

- (2) Remove the battery hold-down clamp and battery clamp bolts.
 - (3) Remove the battery from the engine room.

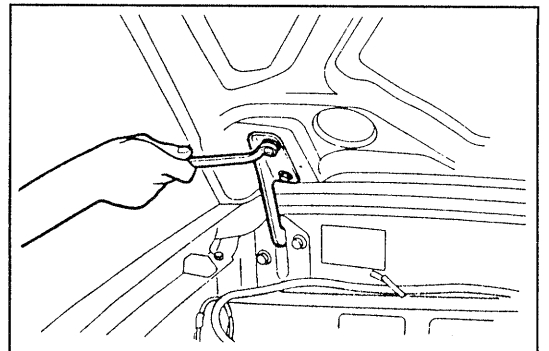
WARNING:

Handle the battery carefully. Never allow any flame to be brought to the battery.



WRU90-EM181

2. Removal of engine hood
 - (1) Disconnect the windshield washer hose from the three-way joint. Remove the hose from the clamp of the engine hood.
 - (2) Remove the hood, being careful not to scratch the body and hood.

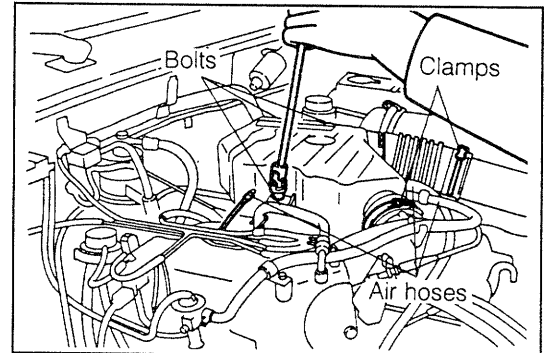


WNU89-EM327A

3. Drain the coolant.
(See page CO-3.)
4. Drain the engine oil.
(See page LU-4.)

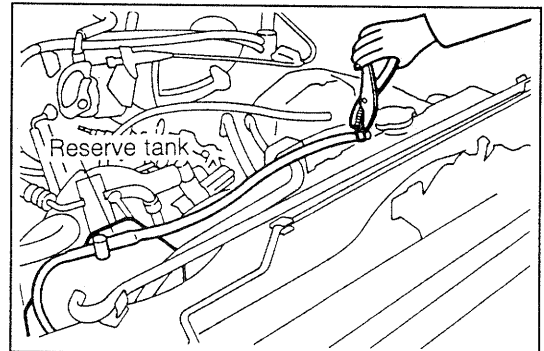
WRU90-EM182

5. Remove the intake air chamber.
(See page EM-10.)



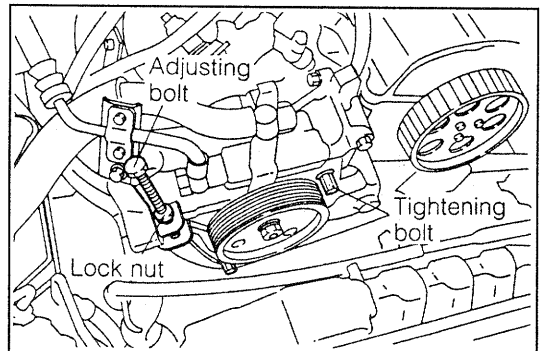
WRU90-EM183

6. Removal of radiator reserve tank
(1) Disconnect the radiator reserve tank hose from the radiator.
(2) Pull up the radiator reserve tank together with hose.



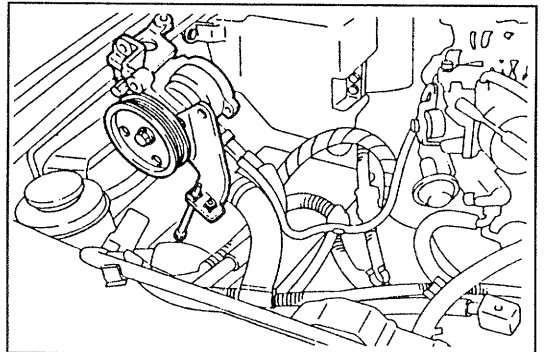
WRU90-EM184

7. Removal of power steering pump and drive belt (Power steering equipped vehicle only)
(1) Loosen the lock nut, adjusting bolt and two tightening bolts. Then push down the power steering pump.



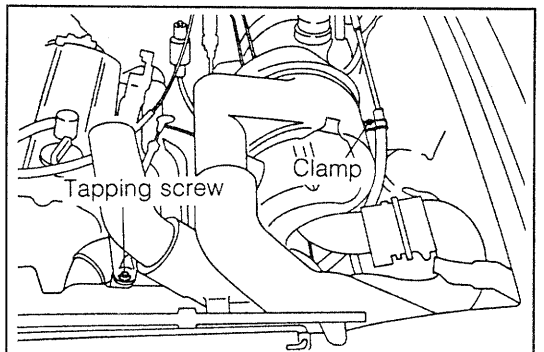
WRU90-EM185

- (2) Remove the power steering pump assembly from the engine by removing three screws. Then temporarily put the pump assembly onto the battery mounting location.



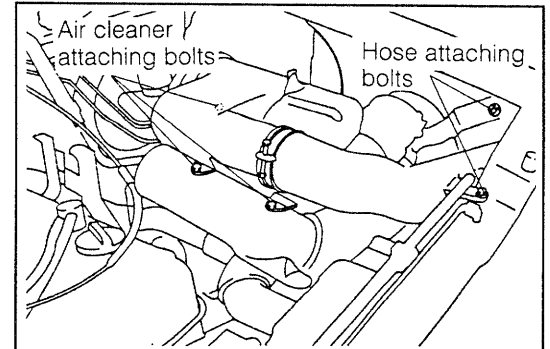
WRU90-EM186

8. Removal of air cleaner and air cleaner hose assembly
(1) Remove the tapping screw from the radiator fan shroud upper side.
(2) Remove the clutch cable clamp provided at the air cleaner.



WRU90-EM187

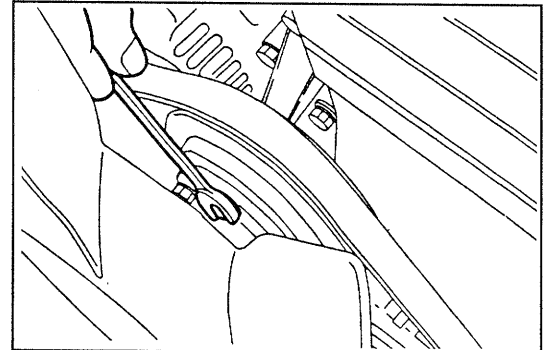
- (3) Remove the air cleaner hose attaching bolts provided at the left fender panel and radiator center support.



WRU90-EM188

9. Removal of radiator

- (1) Disconnect the air breather hose from the radiator upper tank.

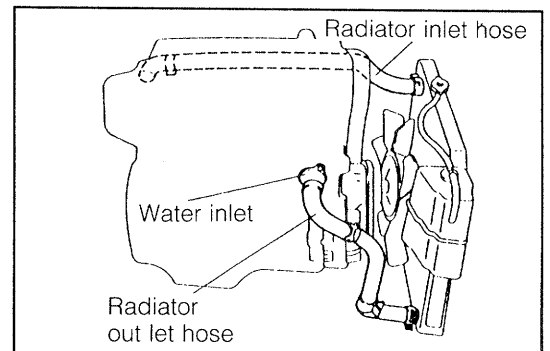


WRU90-EM189

- (2) Remove the radiator inlet hose by disconnecting the radiator and water outlet side clamps.
- (3) Disconnect the radiator outlet hose at the center connection.

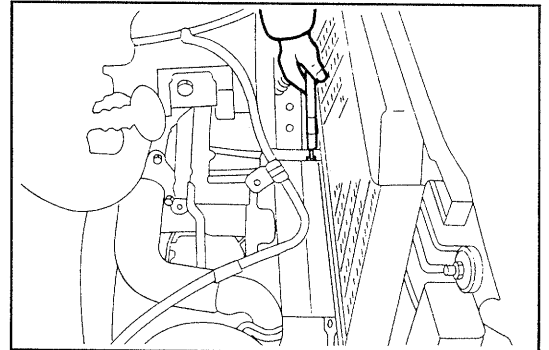
CAUTION:

- When disconnect the radiator outlet hose, be sure to protect the alternator in order to prevent the alternator from entering of coolant.



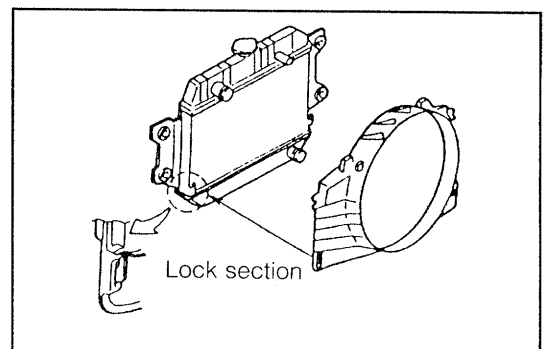
WRU90-EM190

- (4) Disconnect the oil cooler hose from the radiator.



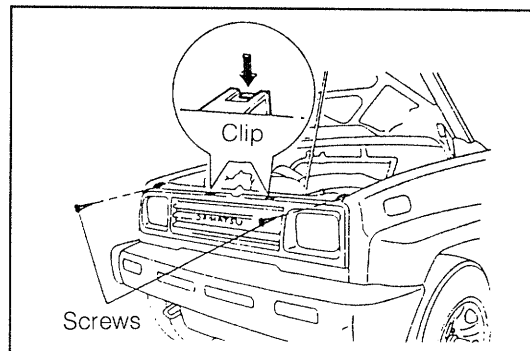
WRU90-EM191

- (5) Remove the two attaching bolts of the fan shroud. Then, disconnect the lock section of the fan shroud from radiator.
- (6) Disconnect the fluid coupling with fan by removing the four attaching bolts. Then remove the fluid coupling with fan together with fan shroud.



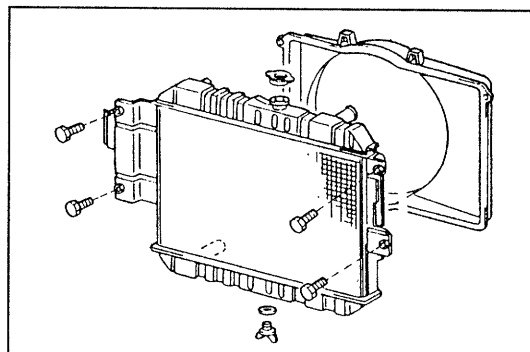
WRU90-EM192

(7) Remove the radiator grille.



WRU90-EM193

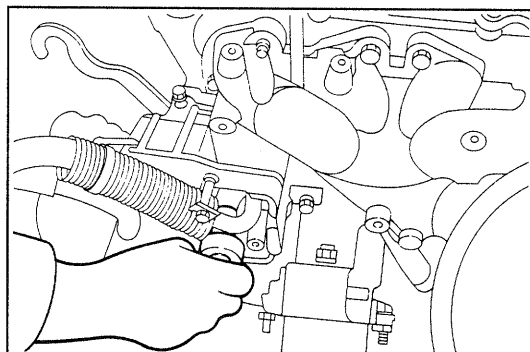
(8) Remove the radiator by removing the four attaching bolts.



WRU90-EM194

10. Removal of air conditioner compressor

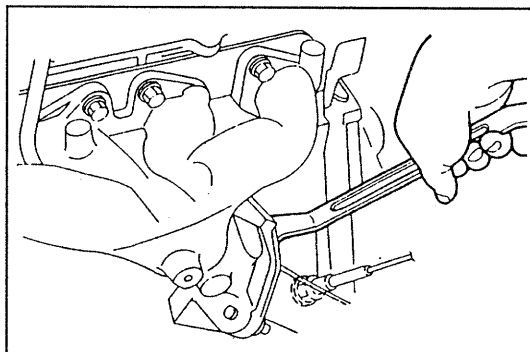
- (1) Remove the compressor cover by removing the attaching bolts.
- (2) Remove the compressor assembly by removing the attaching bolts. Then temporarily put the compressor assembly onto the engine compartment left side.



WRU90-EM195

11. Disconnecting of exhaust pipe

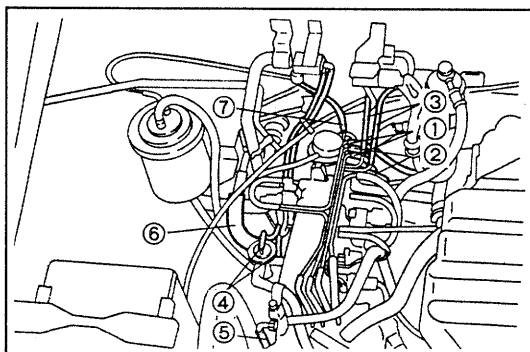
- (1) Remove the exhaust manifold cover.
- (2) Disconnect the exhaust pipe from the exhaust manifold by removing the three attaching nuts.
- (3) Disconnect the exhaust pipe from the bracket provided at the transmission.



WRU90-EM196

12. Removal of following vacuum hoses at surge tank side

- (1) Distributor diaphragm ①
- (2) BVSV ②
- (3) Pressure VSV ③
- (4) Air conditioner idle up VSV ④
- (5) Power steering ACV ⑤
- (6) Brake booster ⑥
- (7) Charcoal canister ⑦



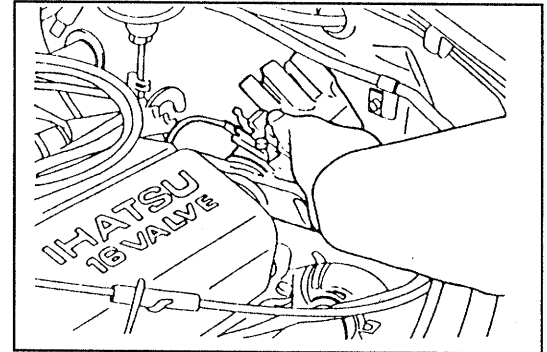
WRU90-EM197

13. Removal of distributor

- (1) Disconnect the distributor wire connector.
- (2) Remove the distributor from the cylinder head by removing the two attaching bolts.

NOTE:

- Since the remaining engine oil will flow out, be certain to place a cloth etc..

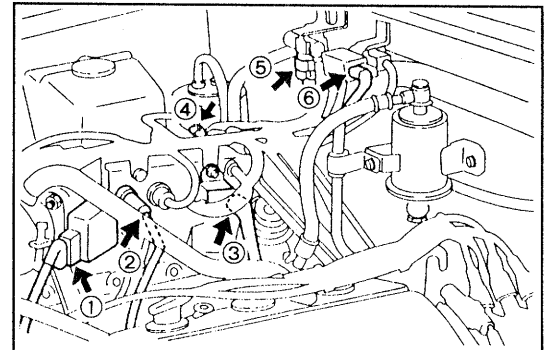


WRU90-EM198

14. Removal of engine wire harness

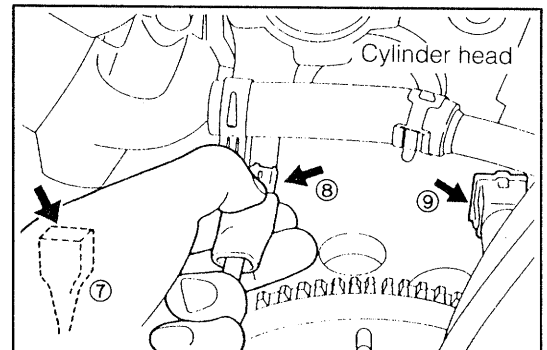
- (1) Disconnect the following connectors.

- ① Throttle position sensor ①
- ② Intake air temperature sensor ②
- ③ Idle speed control VSV ③
- ④ EGR VSV and harness clamp ④
- ⑤ Air-conditioner idle up VSV ⑤
- ⑥ Pressure sensor, Pressure VSV and clamp ⑥



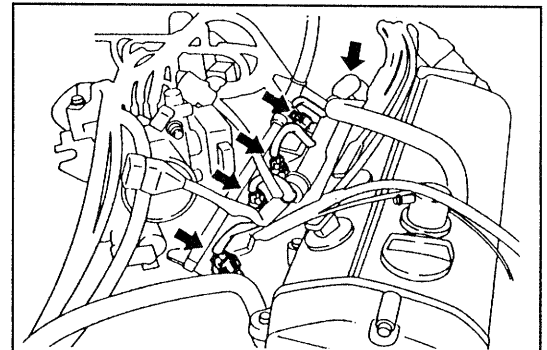
WRU90-EM199

- ⑦ Air conditioner water temperature switch ⑦
- ⑧ Water temperature sender gauge ⑧
- ⑨ Water temperature sensor ⑨
- ⑩ O₂ sensor



WRU90-EM200

- (2) Disconnect the four injector connectors.
- (3) Remove the engine wire clamps and engine ground cables.

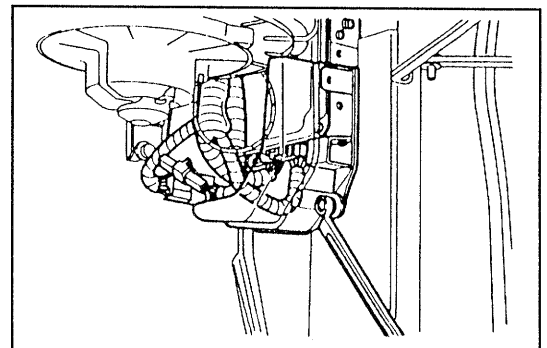


WRU90-EM201

- (4) Removal of engine wire from ECU

- ① Remove the ECU cover at the cowl side panel of passenger seat side.
- ② Disconnect the engine wire connector from the engine control computer assembly (ECU).
- ③ Pull out the engine wire toward the engine compartment.

- (5) Remove the engine wire from the engine compartment.



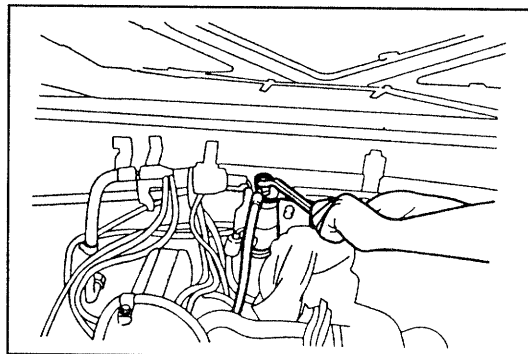
WRU90-EM202

ENGINE MECHANICALS

15. Disconnect the fuel hose at the upper part of fuel filter.

CAUTION:

- Release the inner pressure of the fuel tank by removing the fuel filler cap in advance.
- The pressure in the fuel line is kept 2.55 kg/cm² (36.3 psi) higher than the atmospheric pressure. Hence, when the fuel line is loosened, be sure to prevent the fuel from splashing using an adequate cloth or the like. Furthermore, place a suitable container under the fuel filter because the fuel flows out.

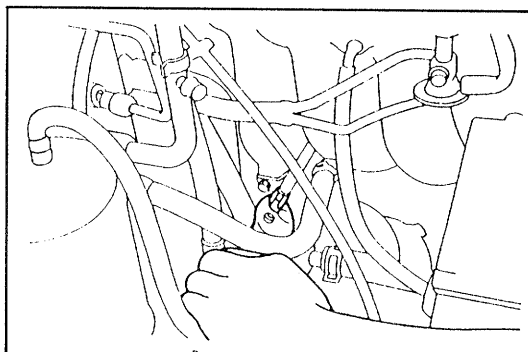


WRU90-EM203

16. Disconnect the fuel return hose from the fuel pipe No.2.

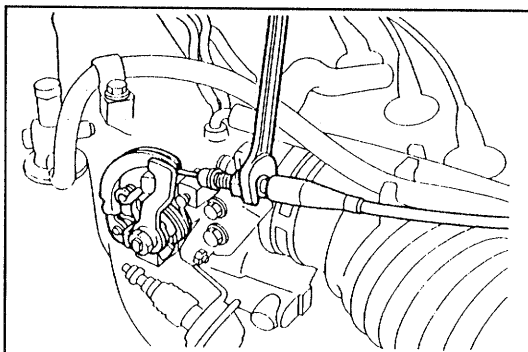
CAUTION:

- When disconnecting the fuel hose, take precautionary measures to prevent any dirt from entering into the fuel line.
- Place a suitable container or rags under the disconnecting portion because the fuel flows out.



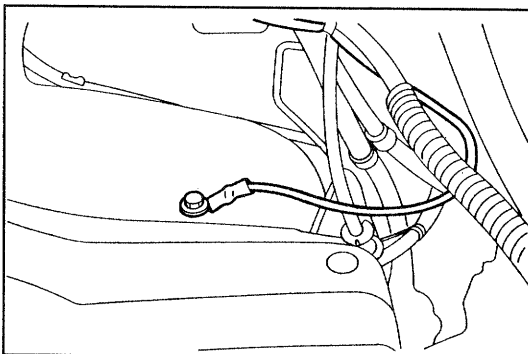
WRU90-EM204

17. Disconnect the accelerator cable.



WRU90-EM205

18. Remove the battery ground cable from the body.

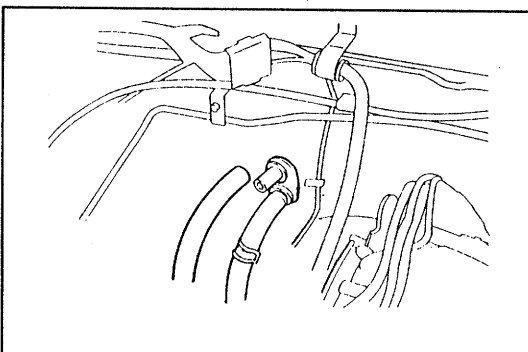


WRU90-EM206

19. Disconnect the inlet and outlet hoses from the heater pipes.

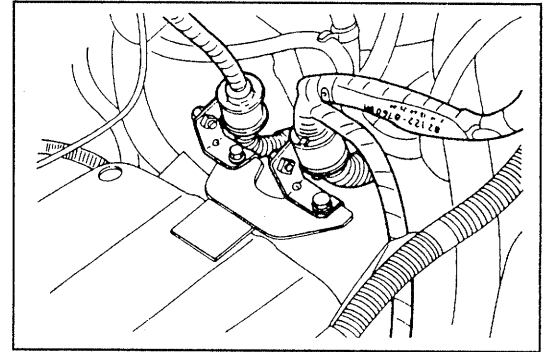
CAUTION:

- Care must be exercised not to damage the heater pipe end.

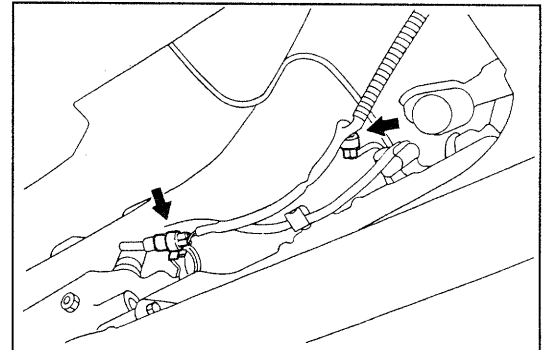


WRU90-EM207

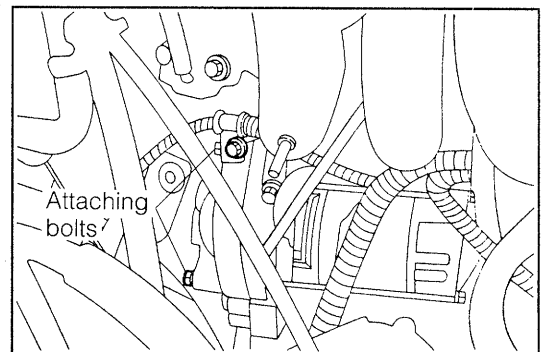
20. Disconnect the following wires and cords.
 - (1) Cowl wire and alternator wire
 - (2) Engine wire and relay block connectors
 - (3) Engine wire clamps at the cylinder block



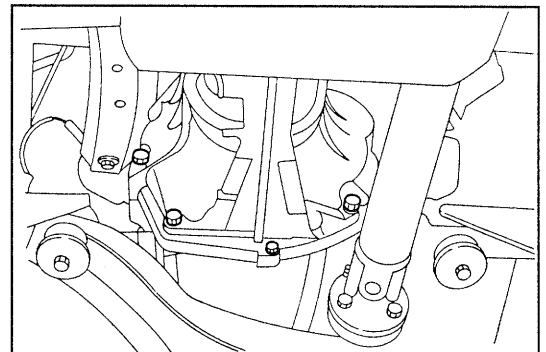
21. Disconnect the connectors from the transmission and transfer by jacking up the vehicle. Disconnect the air breather hose from the transmission.



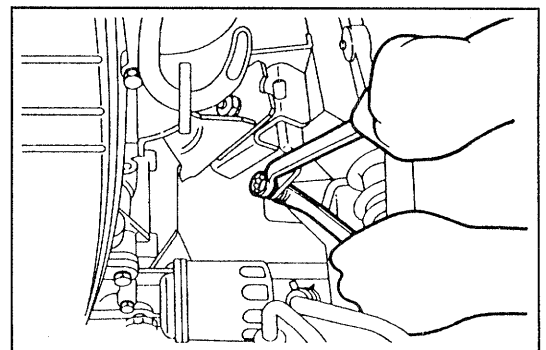
22. Removal of starter
 - (1) Disconnect the connector with lock and remove the harness clamping bolt.
 - (2) Remove the starter by removing the two attaching bolts.



23. Remove the engine-transmission attaching bolts.



24. Remove the attaching bolts of the engine mountings while suspending the engine, using the chain block.

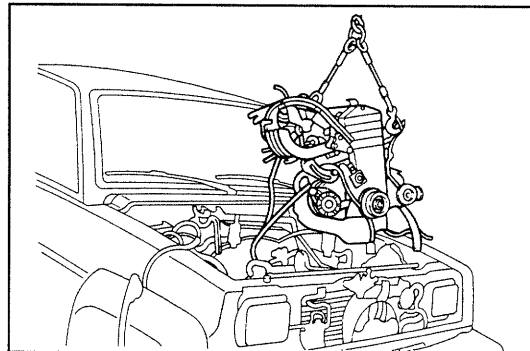


ENGINE MECHANICALS

25. Take out the engine from the body, using chain block.

CAUTION:

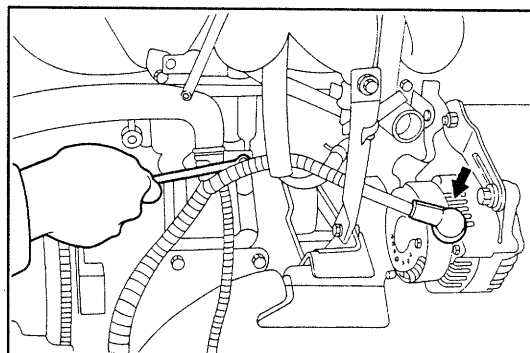
- Be careful not to allow the engine to hit to the vehicle body and/or other parts.
- Make sure that the any hose or wire has been disconnected from the body.



WRU90-EM213

26. Removal of engine harness from engine

- (1) Disconnect the alternator connector and the terminal.
- (2) Remove the engine wire clamp.
- (3) Remove the engine wire from the engine.



WRU90-EM214

27. Remove the engine mountings and surge tank stay No.2.

28. Remove the timing belt.

29. Remove the cylinder head assembly together with intake and exhaust manifold.
(See page EM-37.)

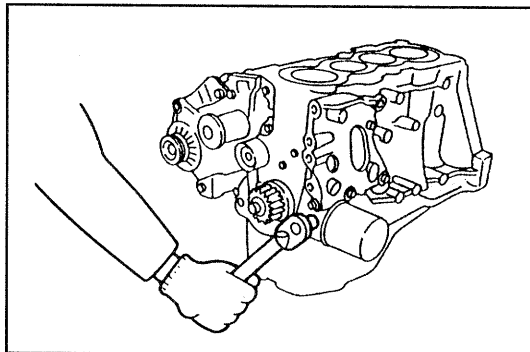
WRU90-EM215

DISASSEMBLY OF CYLINDER BLOCK

1. Remove the oil pressure switch.

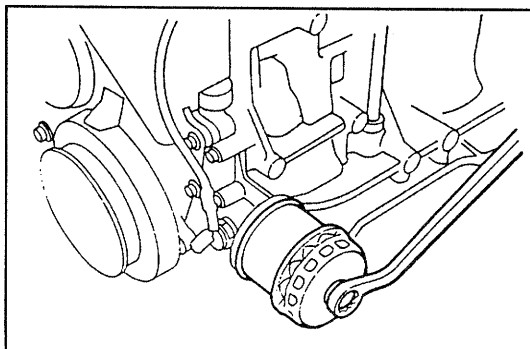
NOTE:

- Use a hexagon box wrench for the removal operation.



WNU89-EM348

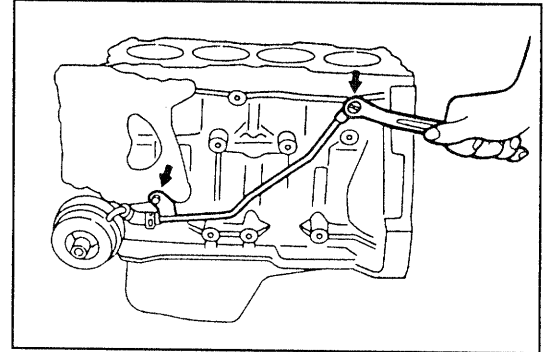
2. Remove the oil filter.



WRU90-EM216

3. Removal of oil cooler

- (1) Remove the oil cooler pipe from the cylinder block.
- (2) Release the hose band and remove the oil cooler pipe.

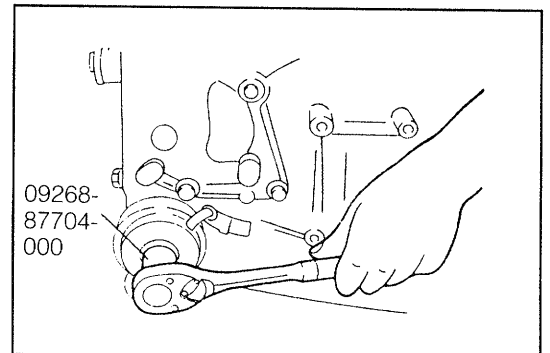


WNU89-EM350

- (3) Remove the oil cooler from cylinder block, using the following SST.

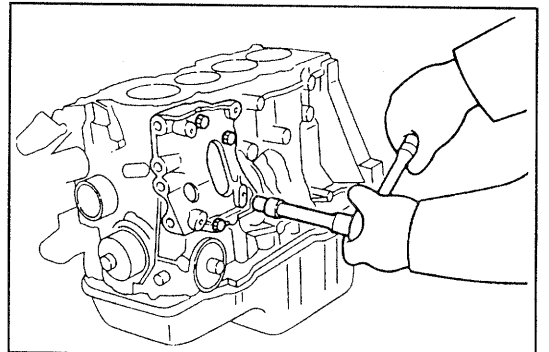
SST: 09268-87704-000

- (4) Remove the water hose from oil cooler.



WNU89-EM351

- ## 4. Remove the compressor bracket, by removing the four attaching bolts.



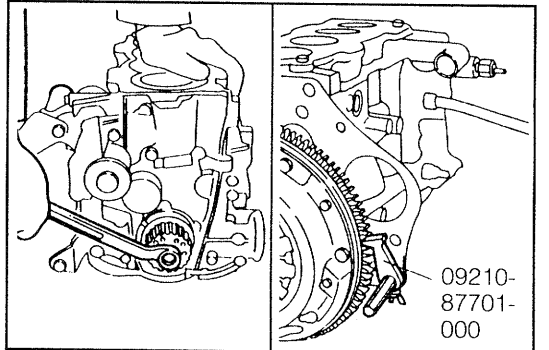
WRU90-EM217

- ## 5. Remove the crankshaft pulley bolt.

NOTE:

- Prevent the ring gear from turning, using the following SST.

SST: 09210-87701-000



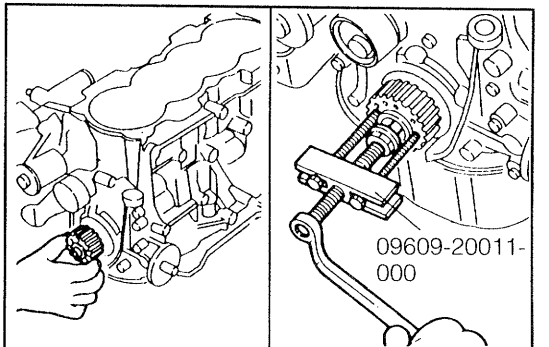
WNU89-EM353

- ## 6. Remove the crankshaft pulley.

NOTE:

- If the crankshaft pulley can not be removed by hand, install the following SST with the crankshaft pulley bolt interposed.

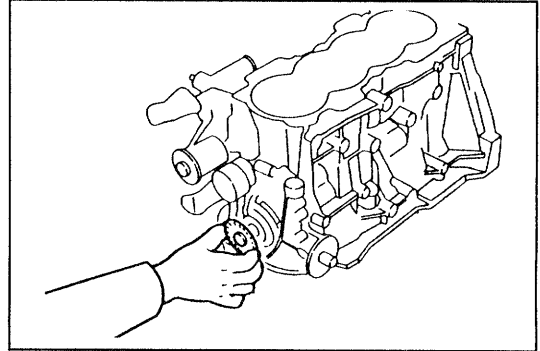
SST: 09609-20011-000



WNU89-EM354

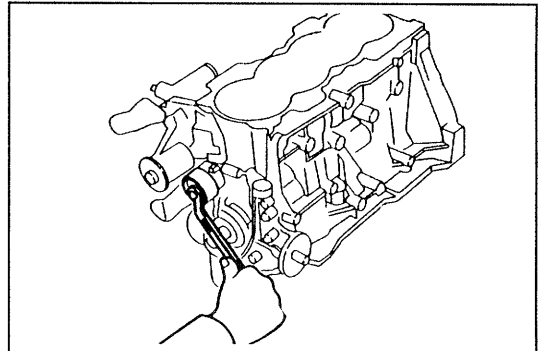
ENGINE MECHANICALS

7. Remove the crankshaft pulley flange.



WNU89-EM355

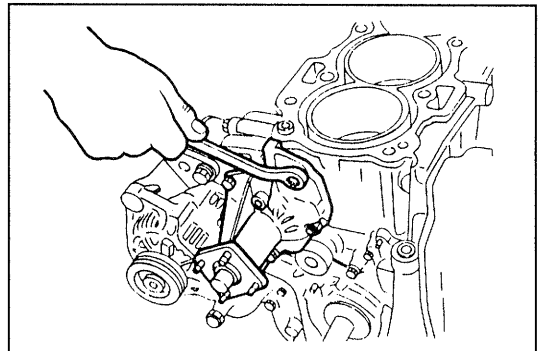
8. Remove the tensioner and tension spring.



WNU89-EM356

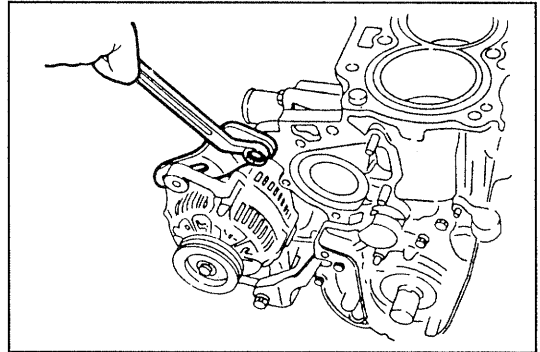
9. Remove the water pump, by removing the three attaching bolts and two nuts.

10. Remove the water pump gasket.



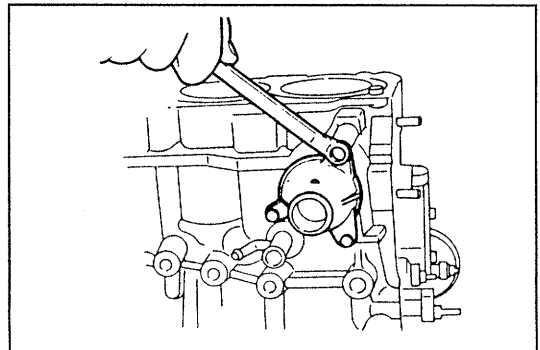
WRU90-EM218

11. Remove the alternator assy with bracket, by removing the two attaching bolts and an adjusting bolt.
Then, remove the alternator bracket by removing a bolt and nut.



WRU90-EM219

12. Remove the water inlet and thermostat by removing the three attaching bolts.

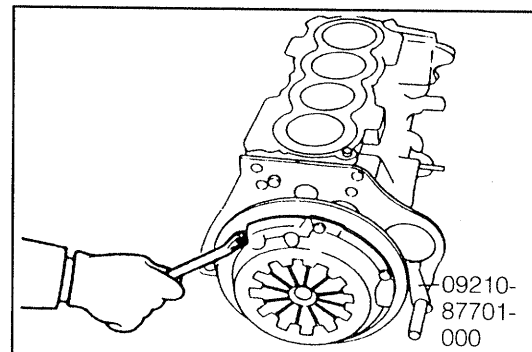


WRU90-EM220

13. Remove the clutch cover and clutch disc, by removing the six attaching bolts.

NOTE:

- Prevent the clutch cover from turning, using the following SST.
- SST: 09210-87701-000

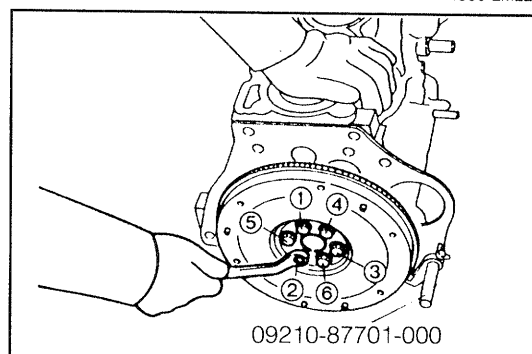


WRU90-EM221

14. Loosen the attaching bolts of the flywheel in the sequence as indicated in the right figure. Remove the flywheel.

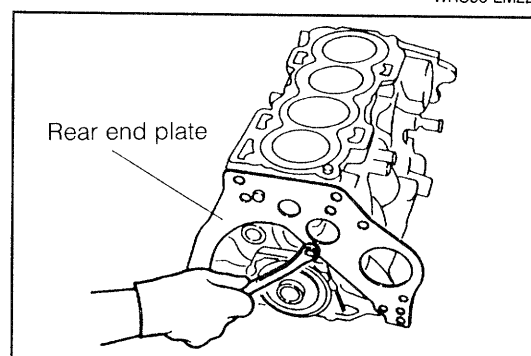
NOTE:

- Prevent the flywheel from turning, using the following SST.
- SST: 09210-87701-000



WRU90-EM222

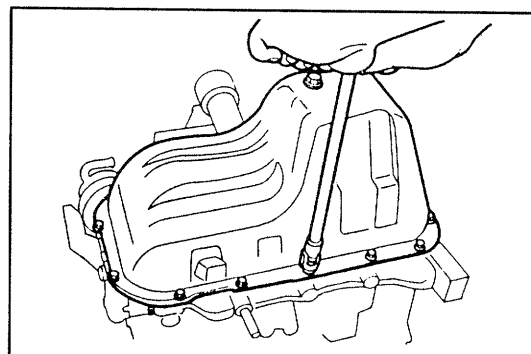
15. Remove the rear end plate, by removing the two attaching bolts.



WRU90-EM223

16. Oil pan removal

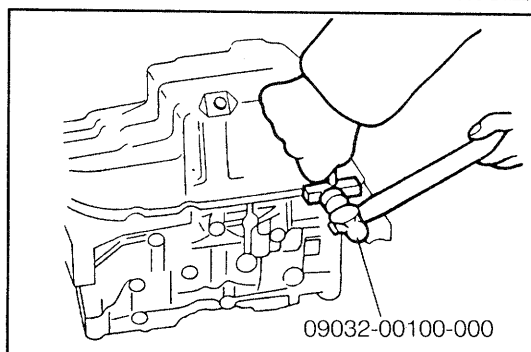
- (1) Loosen the ten attaching bolts and four nuts of the oil pan over two or three stages. Pull out the bolts and nuts.



WRU90-EM224

- (2) Separate the oil pan from the cylinder block by driving the following SST into between the cylinder block and the oil pan.

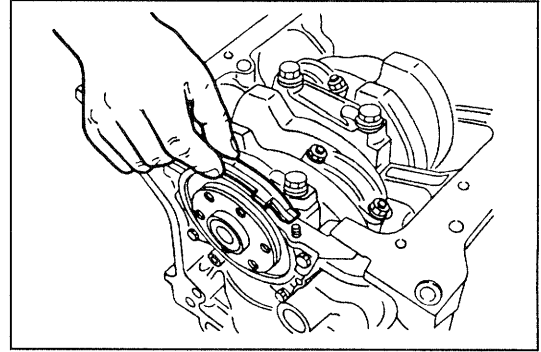
SST: 09032-00100-000



WNU89-EM365

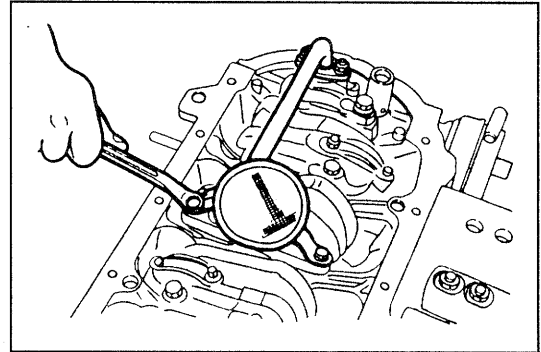
ENGINE MECHANICALS

17. Remove the oil pan gasket front and rear.



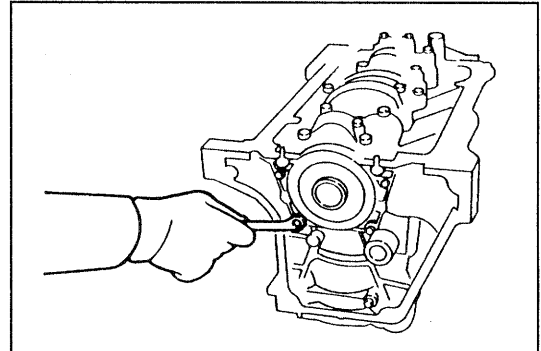
WRU90-EM225

18. Remove the oil pump strainer, by removing the two attaching bolts and two nuts.



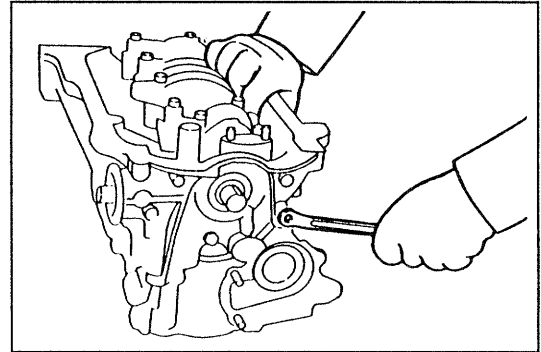
WRU90-EM226

19. Remove the rear oil seal retainer, by removing the four attaching bolts.



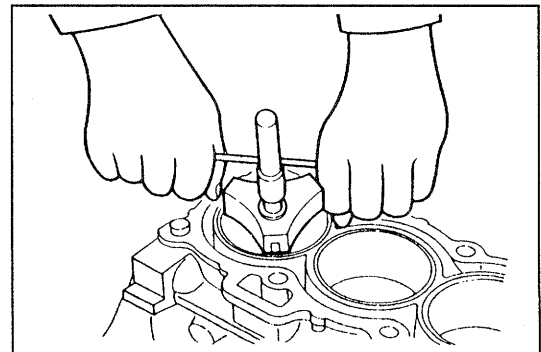
WRU90-EM227

20. Remove the oil pump, by removing the seven attaching bolts.



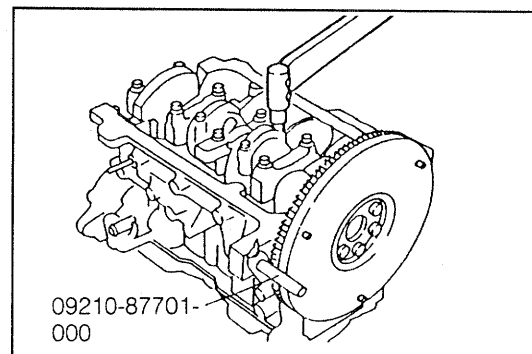
WRU90-EM228

21. Removal of piston
(1) Remove all carbon deposits from the piston ring ridges.



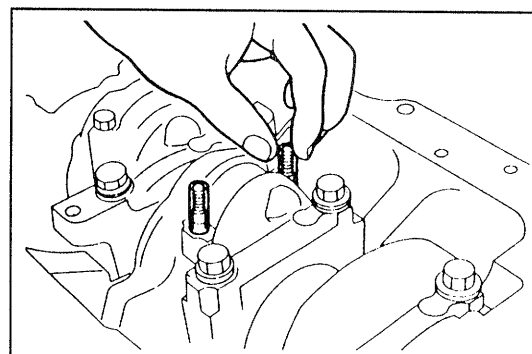
WRU90-EM229

- (2) Remove the connecting rod bearing cap by removing the two attaching nuts.



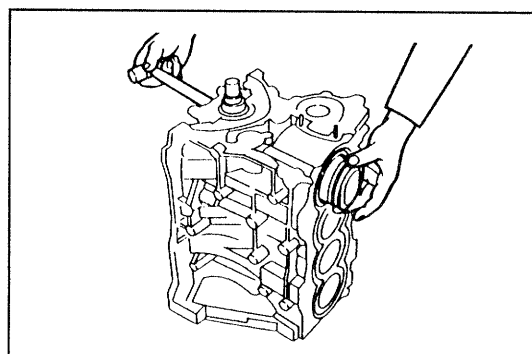
WRU90-EM230

- (3) Cover each connecting rod bolt with a short piece of hose to protect the crankpin journal from damage.



WRU90-EM231

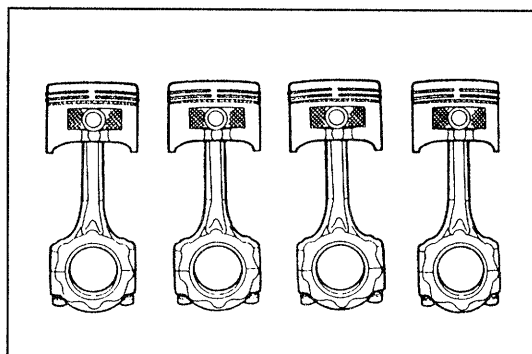
- (4) Push out the piston and connecting rod assembly and the upper bearing through the top of the cylinder block.



WRU90-EM232

NOTE:

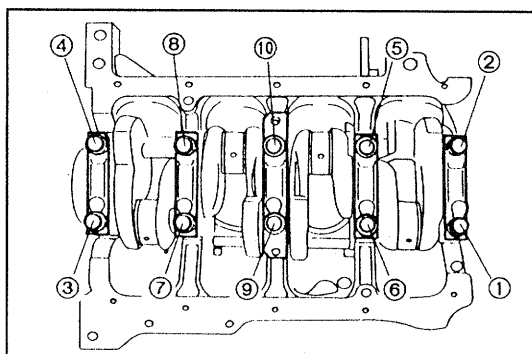
- Arrange the disassembled piston and connecting rods in order that their installation positions may be known readily.
- Care should be exercised so as not to damage the bearings.



WRU90-EM233

22. Removal of crankshaft

- (1) Gradually loosen the main bearing cap bolts over three stages in the numerical sequence shown in the figure. Remove the bearing cap bolts.

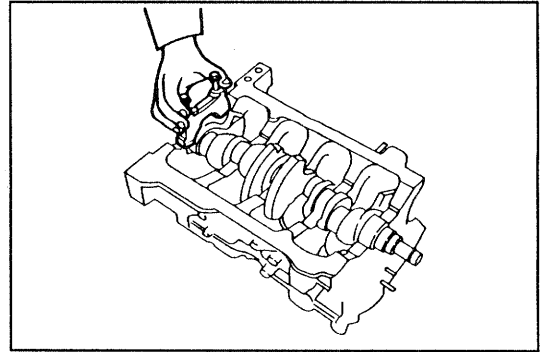


WRU90-EM234

- (2) With the main bearing cap bolts inserted into the bolt holes of the main bearing cap, wiggle the bearing cap back and forth. Remove the bearing cap together with the lower bearing.

NOTE:

- Keep the lower bearing fitted to the main bearing cap. Arrange the removed main bearing caps in order.

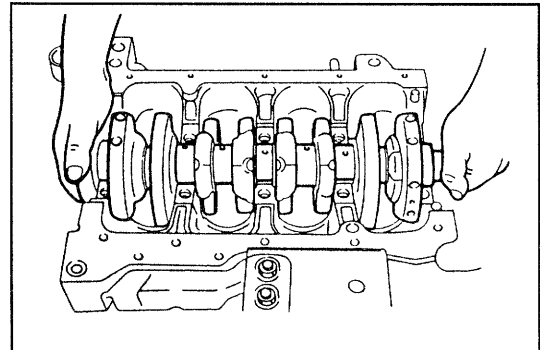


WNU89-EM390

- (3) Lift off the crankshaft.

NOTE:

- Be very careful not to allow the main bearings to be mixed with the bearings of the other cylinders.
- Remove the thrust washer.

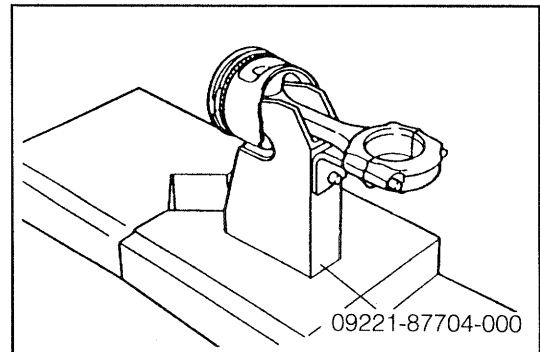


WNU89-EM391

23. Disassembly of piston and connecting rod

- (1) Install the connecting rod in the following SST as shown in the right figure.

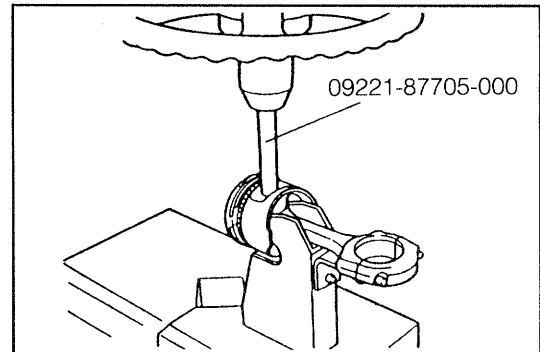
SST: 09221-87704-000



WRU90-EM235

- (2) Insert the longer SST into the piston pin hole. Press off the piston, using a hydraulic press.

SST: 09221-87705-000



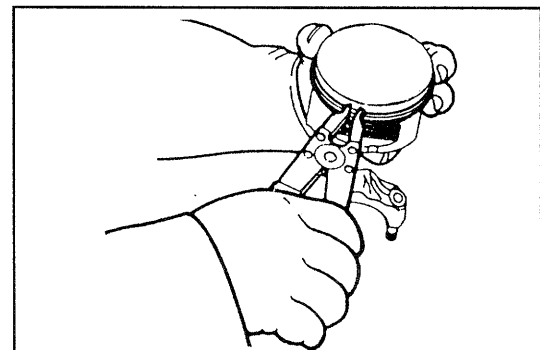
WNU89-EM423

24. Removal of piston rings

NOTE:

- Arrange the removed piston rings in order so that their installation positions may be known readily.
- Do not expand the piston ring unnecessarily beyond the required extent.

- (1) Remove the piston rings No. 1 and No. 2, using a piston ring expander.
- (2) Remove the oil ring side rails by hand.
- (3) Remove the oil ring expander by hand.



WRU90-EM236

25. Cleaning of pistons

- (1) Remove the carbon deposits from the piston top, using a gasket scraper or the like.

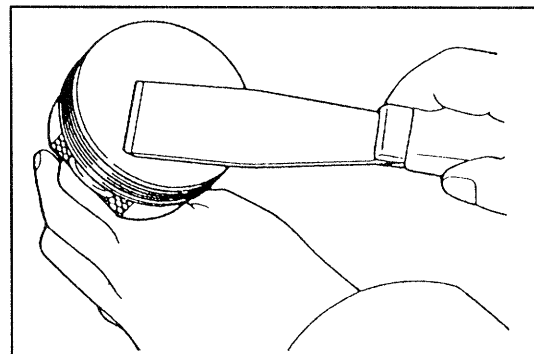
NOTE:

- Be very careful not to scratch the piston.

- (2) Clean the piston grooves with a broken piston ring or a groove cleaning tool.

NOTE:

- Be very careful not to scratch the piston.



WRU90-EM237

26. Clean the disassembled parts using cleaning solvent. Blow them with compressed air.

WARNING:

Protect your eyes with safety goggles during the cleaning operation.

WRU90-EM238

27. Measure the bore diameter of each cylinder at a position shown in the right figure. The measured value is regarded as the cylinder bore diameter.

Specified Bore Diameter:

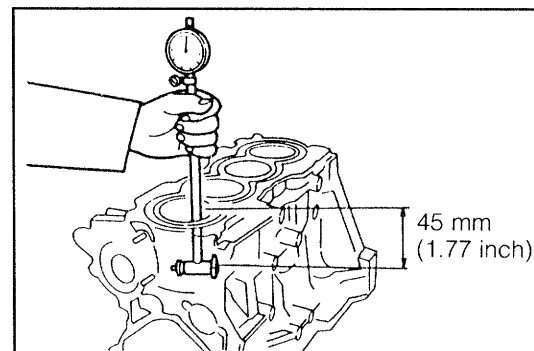
76.000 - 76.030 mm (2.9922 - 2.9933 inch)

Piston-to-Cylinder Bore Clearance:

Specified value: 0.025 - 0.045 mm

(0.0010 - 0.0018 inch)

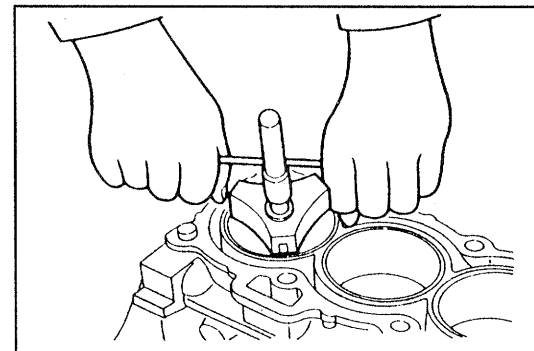
Allowable limit: 0.11 mm (0.0043 inch)



WRU90-EM239

28. Removal of cylinder ridges

If ridges are formed at the upper parts of the cylinder bores, use a ridge reamer to remove the ridges.



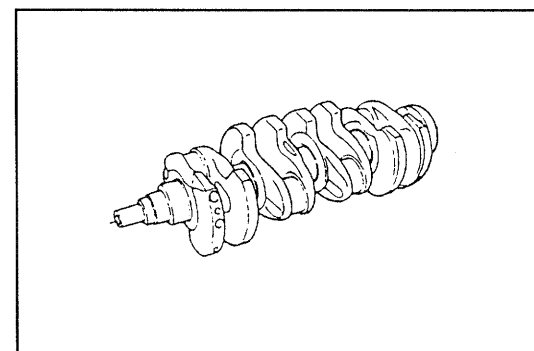
WRU90-EM416

INSPECTION OF EACH PART

Inspection of crankshaft

1. Check the main journals and bearings for pitting or scratches.

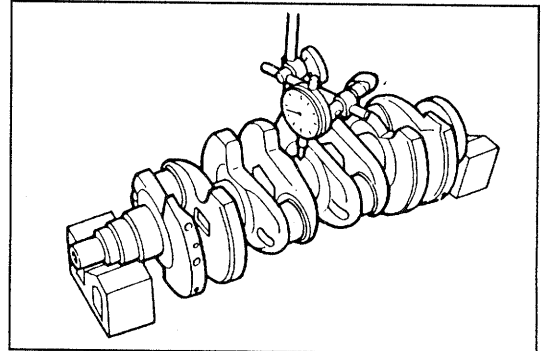
If the main journals are damaged, replace the crankshaft.



WRU90-EM240

2. Support the both ends of the crankshaft with a V-block. Measure the crankshaft runout with a dial gauge.
Allowable limit of runout: 0.06 mm (0.0024 inch)

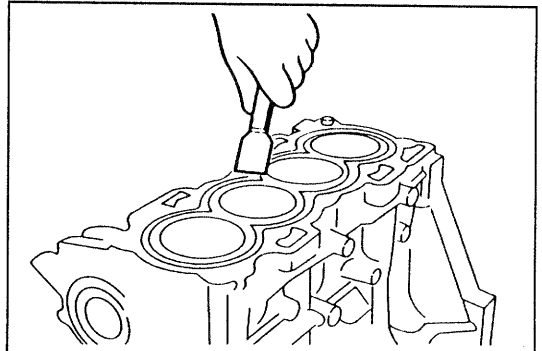
If the runout exceeds the allowable limit, replace the crankshaft.



WRU90-EM241

Inspection of cylinder block

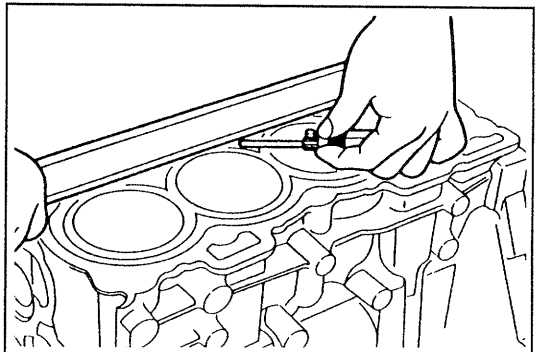
1. Removal of gasket material
Remove all gasket materials from the cylinder block.
2. Cleaning of cylinder block
Clean the cylinder block, using a soft brush and cleaning solvent.



WRU90-EM242

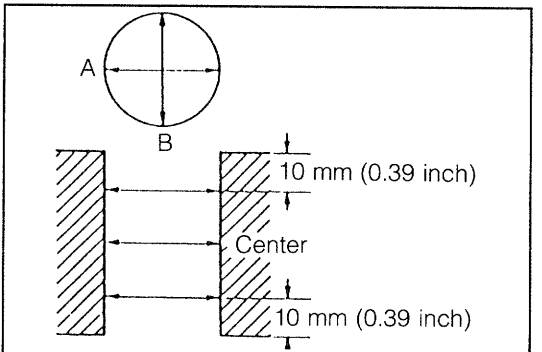
3. Inspection of top surface of cylinder block
Using a precision straightedge and a thickness gauge, check the surface contacting the cylinder head gasket for warpage in the six directions as shown in the figure.
Maximum Warpage: 0.10 mm (0.0039 inch)

If the warpage exceeds the allowable limit, replace the cylinder block.



WNU89-EM405

4. Measurement of cylinder bores
(1) Measure the bore diameter of each cylinder at the four points shown in the right figure. Ensure that the difference between the maximum and minimum bore diameters of each cylinder is within 0.1 mm (0.0039 inch).



WNU89-EM406

If the difference between the maximum and minimum values exceeds 0.1 mm (0.0039 inch), perform boring and/or honing for the cylinder bore in accordance with the oversized piston.

The honing angle is $35^\circ \pm 5^\circ$. The surface coarse degree is 1 - 4Z.

WNU89-EM407

Reference

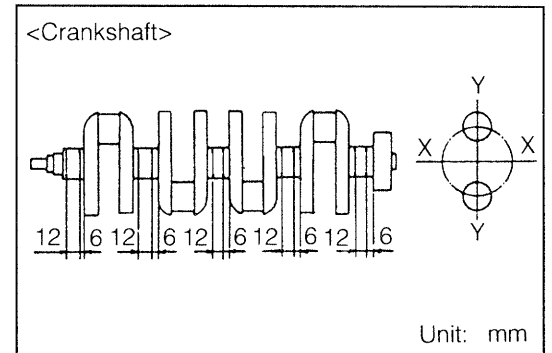
The table below shows the cylinder bore diameter when oversized pistons are used.

However, after the diameter of the replacement piston has been measured, perform the finishing in accordance with the piston diameter.

Standard	O/S 0.25
76.000 - 76.030 mm (2.9922 - 2.9933 inch)	76.250 - 76.280 mm (3.002 - 3.0031 inch)

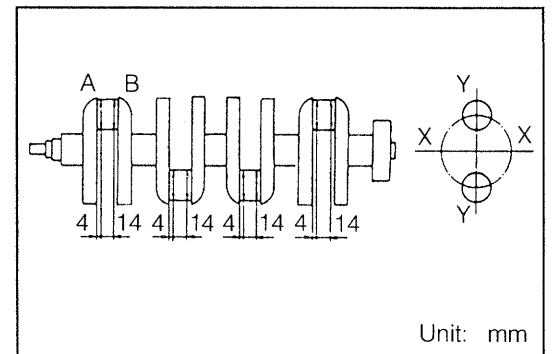
WN089-EM408

- Measure the diameter of the crankshaft main journals.
The measurement should be performed at four points, 90 degrees spaced, for each crankshaft main journal at the points shown in the right figure. The maximum value is regarded as the crankshaft main journal diameter.
However, if the variation in the measured diameters exceeds 0.026 mm (0.0010 inch), replace the crankshaft.



WRU90-EM243

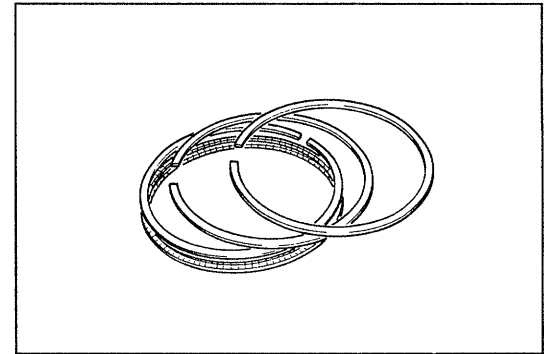
- Measure the diameter of the crankpin journal.
The measurement should be performed at four points, 90 degrees spaced, for each crankpin journal at the points shown in the right figure. The maximum value is regarded as the crankpin journal diameter.
However, if the variation in the measured diameters exceeds 0.044 mm (0.0017 inch), replace the crankshaft.



WRU90-EM244

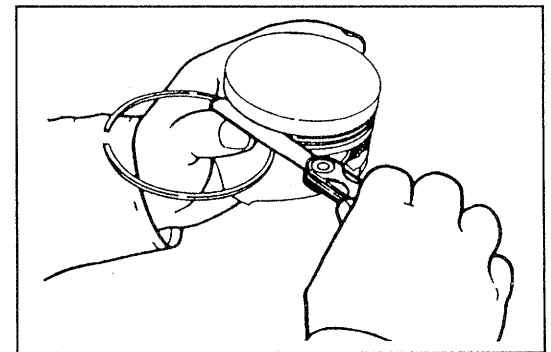
Inspection of piston ring

- Visually inspect the piston ring for extreme wear, seizure or damage.
Replace the piston ring, if necessary.



WRU90-EM245

- Inspection of piston ring groove side clearance
Measure the side clearances of the piston rings No.1 and No.2 over the entire periphery of each groove, using a thickness gauge.
The maximum measured value is regarded as the piston ring side clearance.



WRU90-EM246

Piston ring side clearance

	Specified value mm (inch)	Allowable limit mm (inch)
Compression ring No. 1	0.03 - 0.07 (0.0012 - 0.0027)	0.12 (0.0047)
Compression ring No. 2	0.02 - 0.06 (0.0008 - 0.0023)	0.12 (0.0047)

If the piston side clearance exceeds the allowable limit, measure the piston ring thickness. Referring to the piston ring standard thicknesses given below, replace the piston ring and/or piston so that the piston ring side clearance may become less than the allowable limit.

WNU89-EM416

Piston ring specified thickness

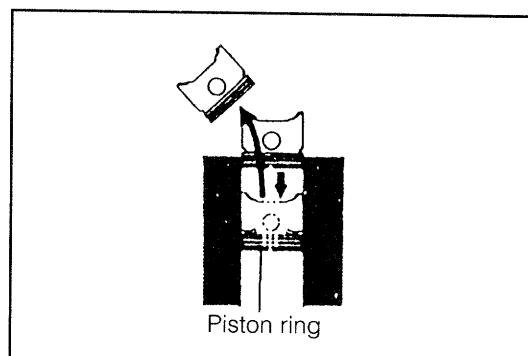
Compression ring No. 1 mm (inch)	1.17 - 1.19 (0.0461 - 0.0468)
Compression ring No. 2 mm (inch)	1.47 - 1.49 (0.0579 - 0.0586)

NOTE:

- When replacing the piston rings, a set of piston rings for one cylinder should be replaced.

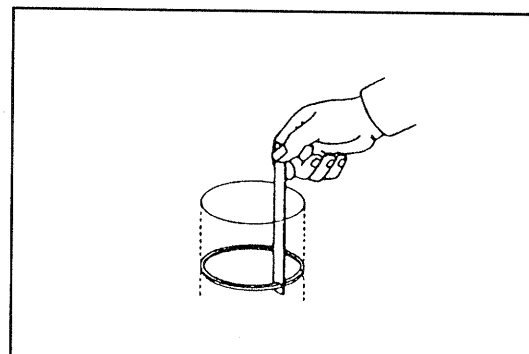
WNU89-EM417

- Inspection of piston ring end gap
 - Apply engine oil to the cylinder walls.
 - Insert the piston rings into the cylinder bore.
 - Using a piston, push down the piston ring to a point 110 mm (4.33 inch) measured from the cylinder block upper surface.



WRU90-EM247

- Measure the piston ring end gap, using a thickness gauge or a feeler gauge.



WNU89-EM419

Piston ring end gap

	Specified value mm (inch)	Allowable limit mm (inch)
Compression ring No. 1	0.27 - 0.42 (0.0107 - 0.0165)	0.7 (0.028)
Compression ring No. 2	0.35 - 0.50 (0.0138 - 0.0196)	0.8 (0.031)
Oil ring	0.20 - 0.70 (0.0079 - 0.0275)	1.0 (0.039)

If the piston ring end gap exceeds the allowable limit, a set of piston rings for one cylinder should be replaced.

WNU89-EM420

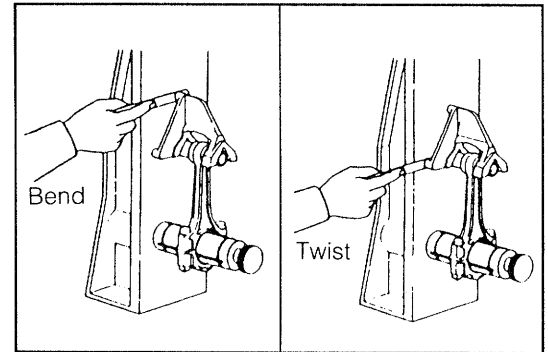
Inspection of connecting rods

1. Visually inspect the connecting rods for damage or cracks.
2. Check the connecting rod for bend and twist, using a connecting rod aligner.

Maximum bend: 0.05 mm (0.0020 inch)

Maximum twist: 0.05 mm (0.0020 inch)

If the bend and/or twist is greater than the maximum limit, replace the connecting rod assembly.
(See page EM-118.)



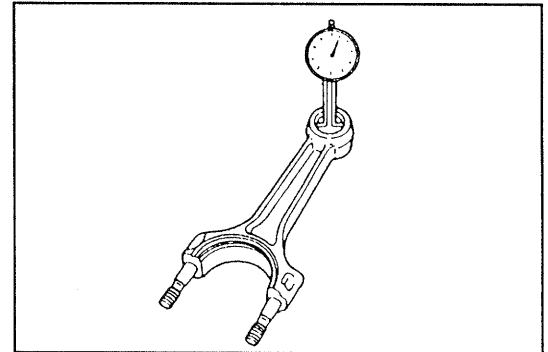
WRU90-EM248

3. Measure the inner diameter of connecting rod small end, using a bore dial gauge.

Specified Value: 18.953 - 18.979 mm
(0.746 - 0.747 inch)

Interference Fit with Piston Pin:

0.012 - 0.044 mm (0.0005 - 0.0017 inch)



WRU90-EM249

4. Measure the width of connecting rod big end, using a micrometer.

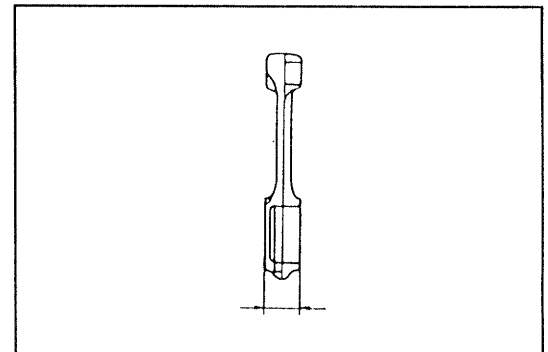
Specified Value:

21.80 - 21.85 mm (0.858 - 0.860 inch)

Allowable Limit:

21.70 mm (0.854 inch)

If the width of connecting rod big end exceeds specified value, replace the connecting rod.



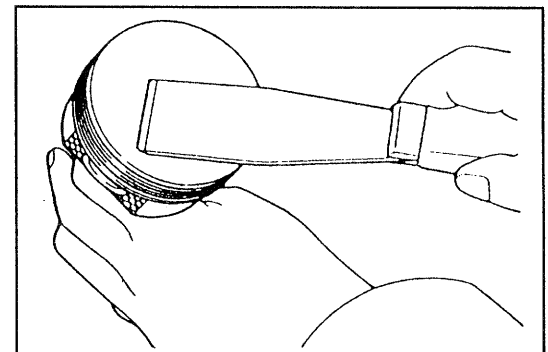
WRU90-EM250

Inspection of pistons

1. Cleaning of pistons
 - (1) Remove the carbon deposits from the piston top, using a gasket scraper or the like.
 - (2) Clean the piston grooves with a broken piston ring or a groove cleaning tool.

NOTE:

- Be very careful not to scratch the piston.



WRU90-EM251

2. Inspection of pistons
Visually inspect the piston for cracks, damage or seizure.
Replace the piston, if necessary.

WRU90-EM252

3. Measurement of piston diameter

- (1) Measure the piston outer diameter horizontally at a point 15 mm (0.59 inch) from the lower end of the piston at right angles to the piston pin.

Specified Value: 75.965 - 75.995 mm
(2.991 - 2.992 inch)

- (2) Calculation of piston-to-cylinder bore clearance

Subtract the measured piston outer diameter from the measured cylinder bore diameter. Ensure that this piston-to-cylinder bore clearance is less than 0.11 mm (0.0043 inch).

Piston-to-Cylinder Bore Clearance:

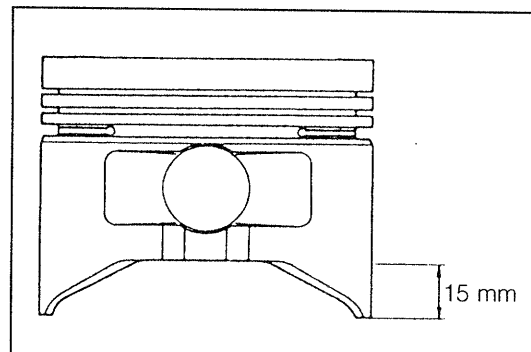
Specified Value 0.025 - 0.045 mm
(0.0010 - 0.0018 inch)

Allowable Limit 0.11 mm
(0.0043 inch)

If the piston-to-cylinder bore clearance exceeds the allowable limit, perform boring and honing the cylinder bores so that the cylinder bore diameter may match with the oversized piston.

(See page EM-112.)

However, when the cylinder bore diameter exceeds 76.28 mm (3.003 inch), replace the cylinder block.



WRU90-EM253

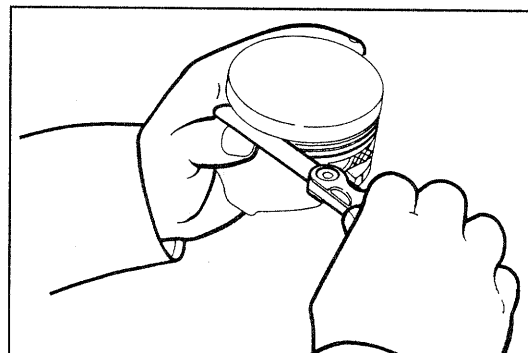
4. Measurement of piston ring grooves

Measure the piston ring grooves for No.1 and No.2 over the entire periphery, using a thickness gauge.

Specified Value:

No.1: 1.202 - 1.204 mm (0.0473 - 0.0474 inch)

No.2: 1.501 - 1.503 mm (0.0591 - 0.0592 inch)



WRU90-EM255

5. Measurement of bore for piston pin

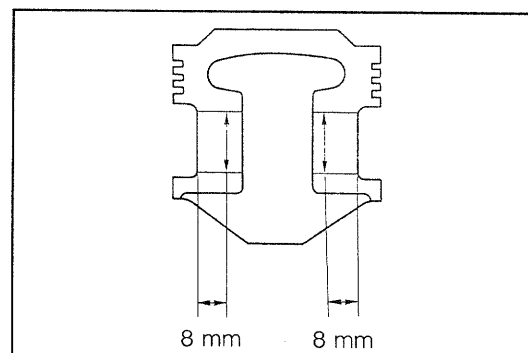
Measure the bore diameter of the piston pin installation positions as shown in the right figure. The minimum value is regarded as the bore diameter for piston pin installation hole.

Specified Value:

18.995 - 19.005 mm (0.7478 - 0.7482 inch)

Piston-to-Piston pin Bore Clearance:

0.005 - 0.011 mm (0.0002 - 0.0004 inch)



WRU90-EM256

Inspection of piston pin

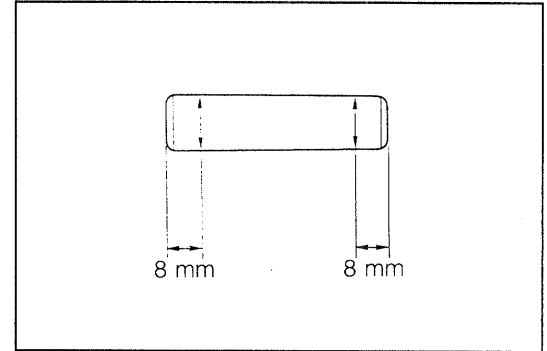
1. Visually inspect the piston pin for a damage or scratch.
Replace the piston with piston pin, if necessary.
2. Measure the piston pin outer diameter at each point as shown in the right figure.
The maximum value is regarded as the outer diameter of piston pin.

Specified Value:

18.991 - 18.997 mm (0.7477 - 0.7479 inch)

Piston-to-Piston pin Bore Clearance:

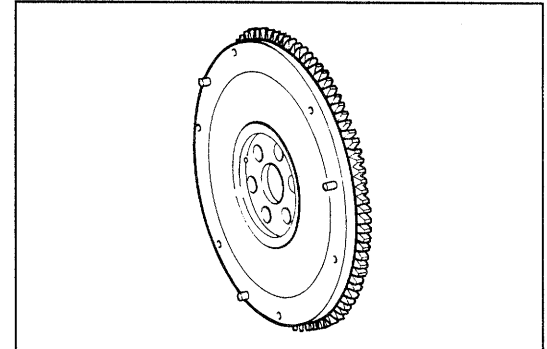
0.005 - 0.011 mm (0.0002 - 0.0004 inch)



WRU90-EM257

Inspection of flywheel

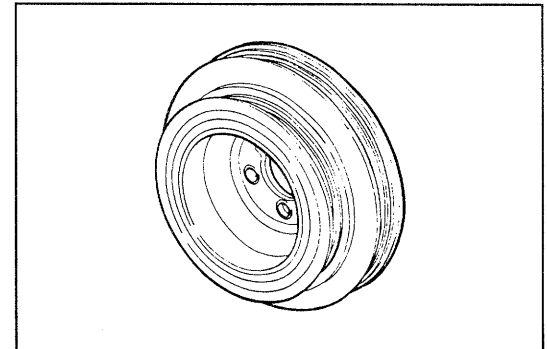
1. Visually inspect the flywheel for damage or cracks.
Replace the flywheel, if necessary.
2. Inspect the ring gear and knock pin for installing condition and/or damage.
Replace the ring gear and/or knock pin, if necessary.



WRU90-EM258

Inspection of crankshaft pulley

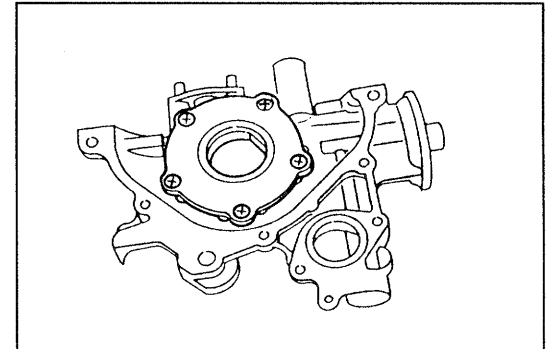
Visually inspect the crankshaft pulley for damage or cracks.
Replace the crankshaft pulley, if necessary.



WRU90-EM259

Inspection of oil pump assembly

1. Visually inspect the rotor surface and oil seal for damage and/or wear.
Replace the rotor and/or oil seal, if necessary.

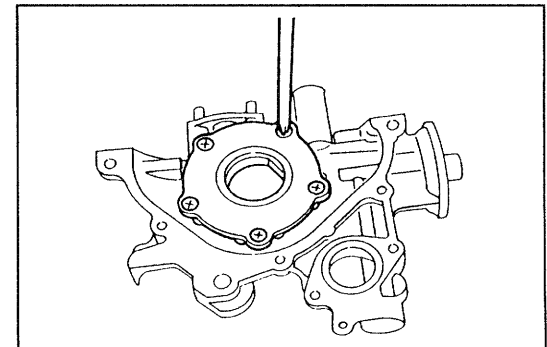


WRU90-EM260

2. Check the oil pump cover installing bolts tightening condition.

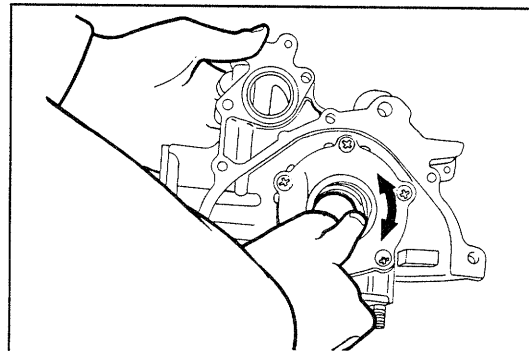
Retighten the bolt if it loosen, using the screw driver.

Tightening Torque: 0.8 - 1.3 kg-m
(5.8 - 9.4 ft-lb, 7.8 - 12.7 N·m)



WRU90-EM261

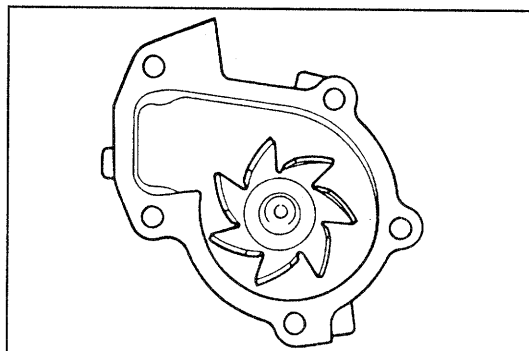
3. Rotate the rotor by applying a force with your finger. Check to see if the rotor rotates smoothly without any sticking. Disassembly and check the oil pump, if necessary. (See page EM-121.)



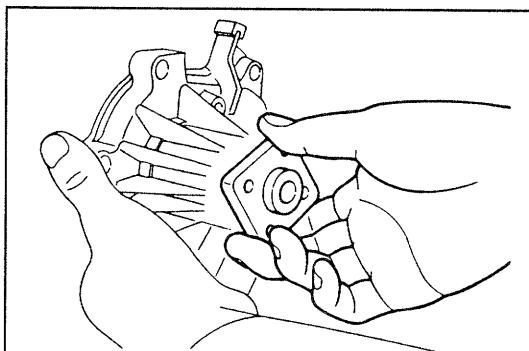
WRU90-EM262

Inspection of water pump

1. Visually inspect the following points.
 - (1) Mechanical seal for water leaked mark
 - (2) Water pump rotary fan for damage, deformation and cracks
 - (3) Installation surface for damageReplace the water pump, if necessary.
2. Check the water pump bearing journal section and the water pump pulley installing section for rattle. Replace the water pump, if necessary.
3. Ensure that the water pump rotates smoothly by hand. Replace the water pump, if necessary.



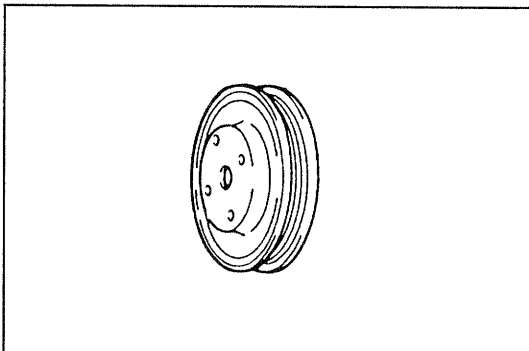
WRU90-EM263



WRU90-EM264

Inspection of water pump

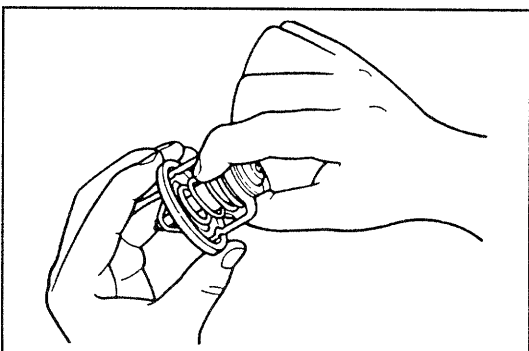
1. Visually inspect the following points.
 - (1) Water pump pulley installing surface for deformation and wear
 - (2) V-ribbed belt install section for deformation and wear



WRU90-EM265

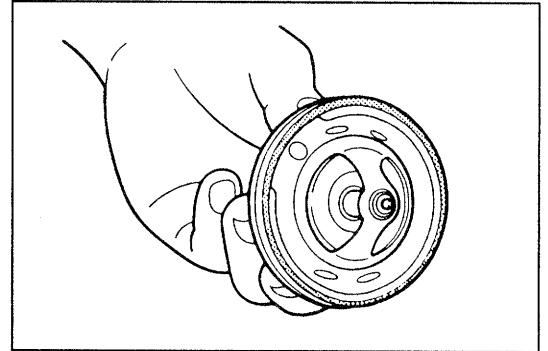
Inspection of thermostat

1. Ensure that the thermostat valve is closed completely at room temperature 20°C (68°F) and the spring has no play. Replace the thermostat if the valve is open or the spring has a play.



WRU90-EM266

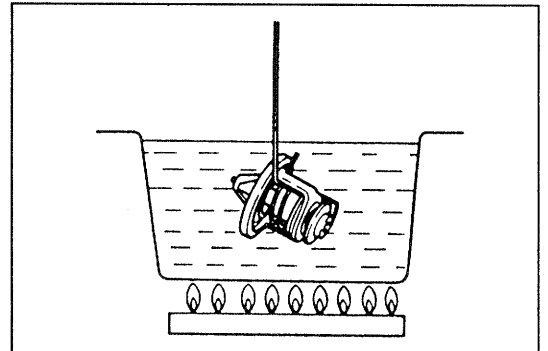
2. Check the rubber grommet of the thermostat for damage or crack.
Replace the thermostat if the rubber grommet exhibits damage or crack.



WNU89-CO028

3. Immerse the thermostat in water, and check the valve opening temperature by heating the water gradually.

Specifications	Valve opening temperature °C (°F)	Valve lift
Standard specifications	76 - 80 (168.8 - 176)	8.5 mm or more at 91°C (0.34 inch or more at 195.8°F)
Cold area specifications	82 - 86 (179.6 - 186.8)	8.5 mm or more at 98°C (0.34 inch or more at 208.4°F)

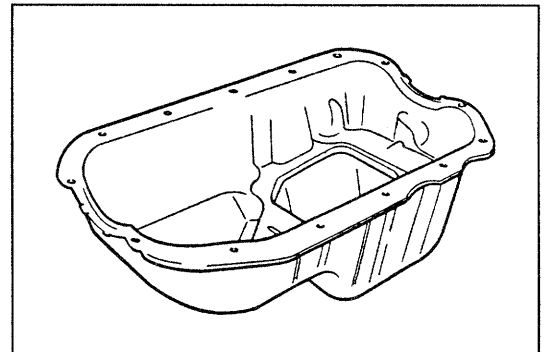


WNU89-CO029

Replace the thermostat if the valve operation fails to conform to the specifications.

Inspection of oil pan

1. Visually inspection the oil pan for damage or cracks.
Replace the oil pan, if necessary.



WRU90-EM267

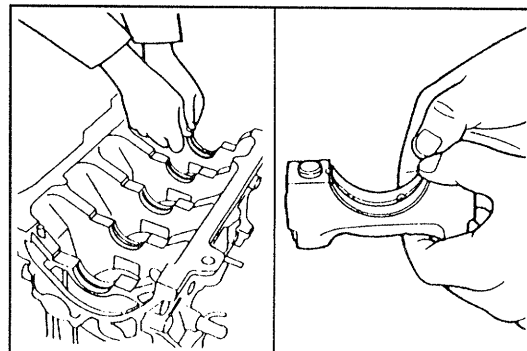
MEASUREMENT OF EACH OIL CLEARANCE

1. Measurement of main journal oil clearance

- (1) Install the main bearings to the cylinder block and crankshaft main bearing cap.

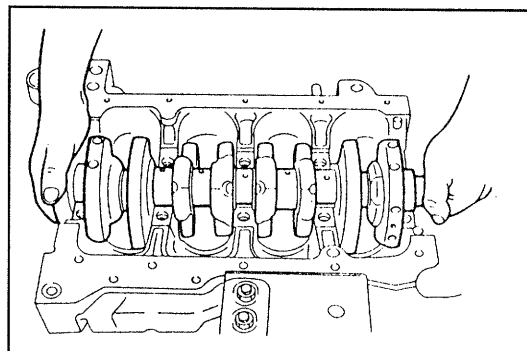
NOTE:

- Do not touch the metal surface of the bearing.



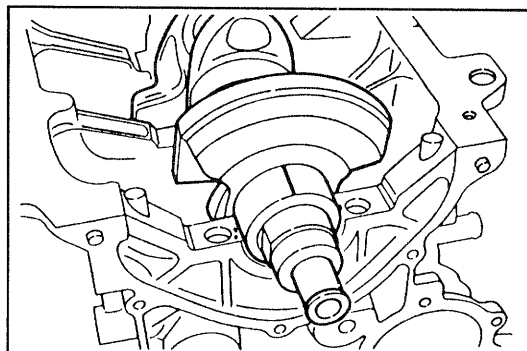
WRU90-EM268

- (2) Place the crankshaft in the cylinder block.



WRU90-EM269

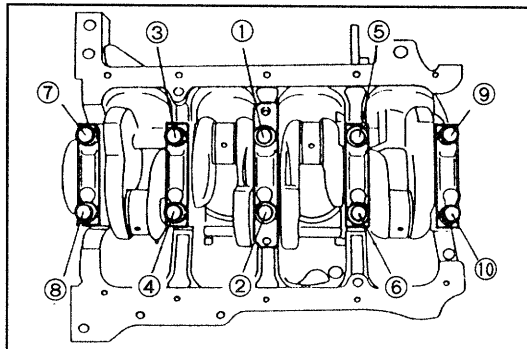
- (3) Lay a strip of plastigage across each crankshaft main journal.



WRU90-EM270

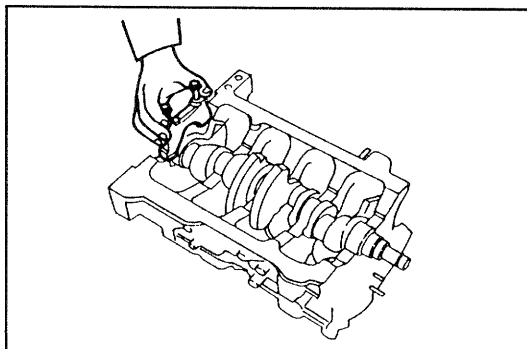
- (4) Install the crankshaft bearing caps. Tighten the crankshaft bearing cap bolts evenly in the sequence indicated in the right figure.

Tightening Torque: 4.5 - 5.5 kg-m
(32.5 - 39.8 ft-lb, 44.1 - 53.9 N·m)



WRU90-EM271

- (5) Remove the main bearing caps with the lower bearings fitted on them.



WRU90-EM272

- (6) Measure the plastigage width at its widest point.

Oil Clearance: 0.024 - 0.042 mm
(0.0010 - 0.0016 inch)

If the oil clearance fails to conform to the specified value, measure the crankshaft main journal diameter and select suitable connecting rod bearings or replace the crankshaft.

(See page EM-116.)

- (7) Remove the plastigage from the crankshaft main journals.

2. Selection of crankshaft bearings

NOTE:

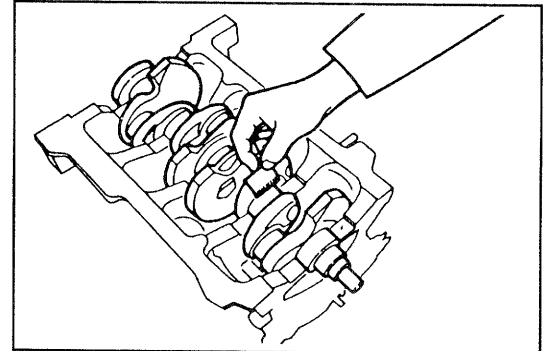
- The replacement of the crankshaft bearings should be performed after all inspections have been finished.

- (1) Read the cylinder block main journal diameter code number.

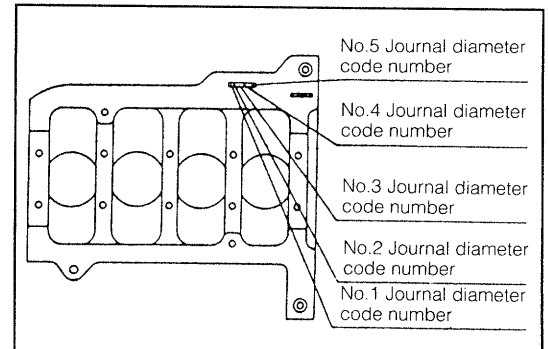
NOTE:

- The main journal diameter code comes in four kinds of 5, 6, 7 and 8.

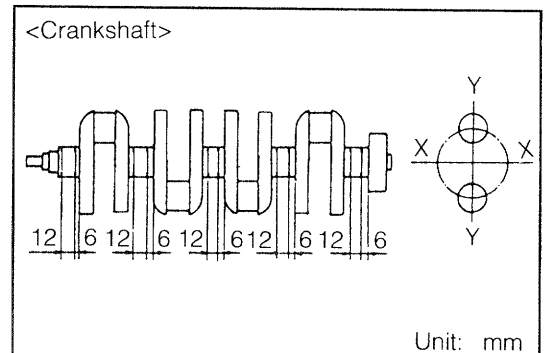
- (2) Measure the diameter of the crankshaft main journals. The measurement should be performed at four points, 90 degrees spaced, for each crankshaft main journal at the points shown in the right figure. The maximum value is regarded as the crankshaft main journal diameter. However, if the variation in the measured diameters exceeds 0.026 mm (0.0010 inch), replace the crankshaft.



WRU90-EM273



WRU90-EM274



Unit: mm

WRU90-EM275

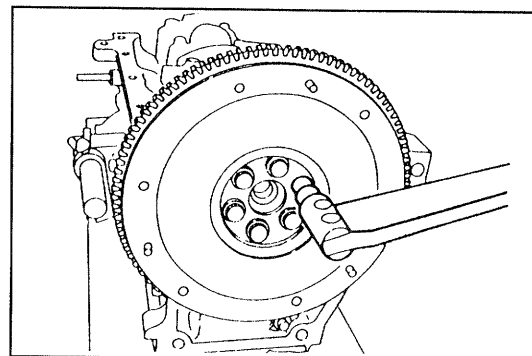
(3) Select the crankshaft bearings or replace the crankshaft, based on the results of (1) and (2).

Main journal diameter code	Crankshaft main journal diameter mm (inch)	Bearing classification number (color)	Remarks
5	49.995 - 50.000 (1.9684 - 1.9685)	1 (Yellow)	—
	49.989 - 49.994 (1.9681 - 1.9683)	2 (Green)	—
	49.983 - 49.988 (1.9679 - 1.9680)	3 (Brown)	—
	49.976 - 49.982 (1.9676 - 1.9678)	4 (Black)	—
	49.975 or less (1.9675)	—	Crankshaft replacement
6	49.995 - 50.000 (1.9684 - 1.9685)	2 (Green)	—
	49.989 - 49.994 (1.9681 - 1.9683)	3 (Brown)	—
	49.983 - 49.988 (1.9679 - 1.9680)	4 (Black)	—
	49.976 - 49.982 (1.9676 - 1.9678)	5 (Blue)	—
	49.975 or less (1.9675)	—	Crankshaft replacement
7	49.995 - 50.000 (1.9684 - 1.9685)	3 (Brown)	—
	49.989 - 49.994 (1.9681 - 1.9683)	4 (Black)	—
	49.983 - 49.988 (1.9679 - 1.9680)	5 (Blue)	—
	49.976 - 49.982 (1.9676 - 1.9678)	6 (White)	—
	49.975 or less (1.9675)	—	Crankshaft replacement
8	49.995 - 50.000 (1.9684 - 1.9685)	4 (Black)	—
	49.989 - 49.994 (1.9681 - 1.9683)	5 (Blue)	—
	49.983 - 49.988 (1.9679 - 1.9680)	6 (White)	—
	49.976 - 49.982 (1.9676 - 1.9678)	7 (Pink)	—
	49.975 or less (1.9675)	—	Crankshaft replacement

WRU90-EM276

3. Measurement of crankpin journal oil clearance

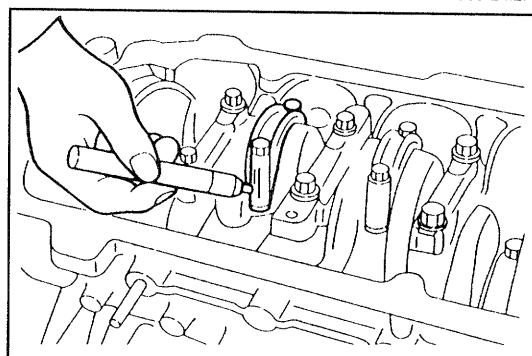
(1) Install the flywheel temporarily.



WRU90-EM277

(2) Wipe off any oil from the side of the mate surface between the connecting rod bearing cap and the connecting rod. Daub a mate mark with an oily paint on the side so that the parts can be assembled correctly in the original combination.
(Also ensure that the cylinder number may be identified)

(3) Turn the crankshaft, until the connecting rod bearing cap to be removed comes at the oil pan side.

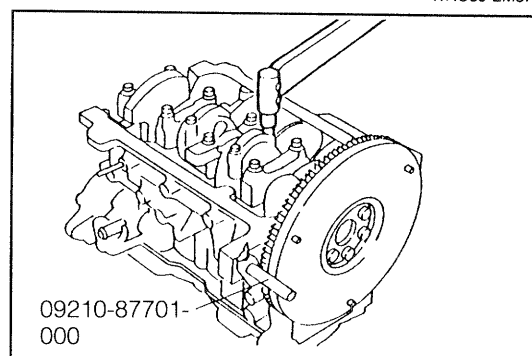


WNU89-EM373

(4) Lock the flywheel to prevent the crankshaft from turning, using the following SST.

SST: 09210-87701-000

(5) Loosen the connecting rod bearing cap nuts evenly over two or three stages. Then, remove the connecting rod bearing cap nuts.

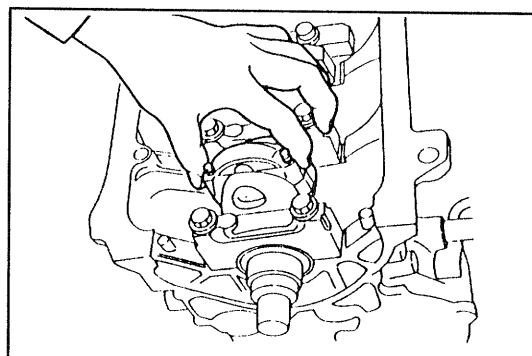


WNU89-EM374

(6) Remove the bearing cap.

NOTE:

- Replace the crankshaft if the crankpin journals exhibit damages, such as seizure.
(See page EM-116.)

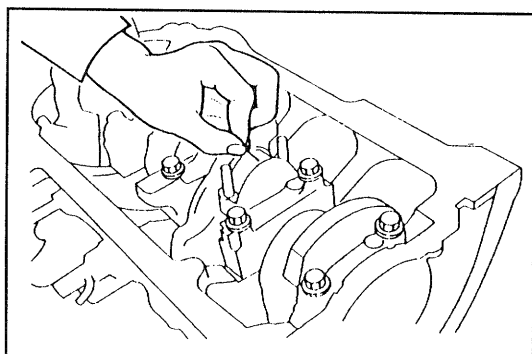


WRU90-EM278

(7) Place a plastigage on the crankpin journal.

NOTE:

- Wipe off any oil from the crankpin journal.



WNU89-EM376

- (8) Install the connecting rod cap, making sure that the mate marks are lined up. Tighten the connecting rod bearing cap nuts evenly over two or three stages to the specified torque.

Tightening Torque: 3.5 - 4.5 kg-m
(25.4 - 32.5 ft-lb, 34.3 - 44.1 N·m)

NOTE:

- When tightening of the bearing cap nuts, apply engine oil to the bearing cap nuts.
- Prevent the crankshaft from turning, using the SST.
SST: 09210-87701-000

- (9) Loosen the connecting rod bearing cap nuts evenly over two or three stages. Then, remove the connecting rod bearing cap.

NOTE:

- Prevent the crankshaft from turning, using the SST.
SST: 09210-87701-000

- (10) Measure the plastigage width at its widest point.

Oil Clearance: 0.020 - 0.044 mm
(0.0008 - 0.0017 inch)

If the oil clearance fails to conform to the specified value, measure the crankpin journal diameter and select a suitable connecting rod bearing or replace the crankshaft.

- (11) Remove the plastigage from the crankpin journal.
(12) Measure the oil clearances of the remaining crankpin journals.

4. Selection of connecting rod bearings

NOTE:

- The replacement of the connecting rod bearings should be performed after all inspections have been finished.

- (1) Read the connecting rod big end bore code number.

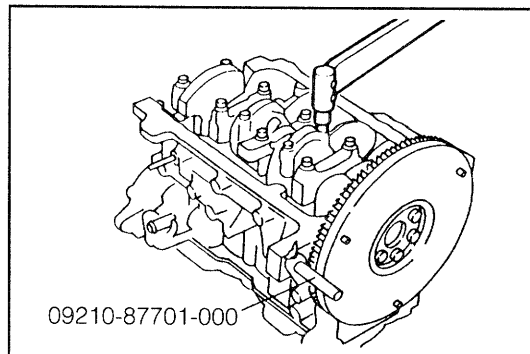
NOTE:

- The connecting rod big end bore code number comes in three kinds of 4, 5 and 6.

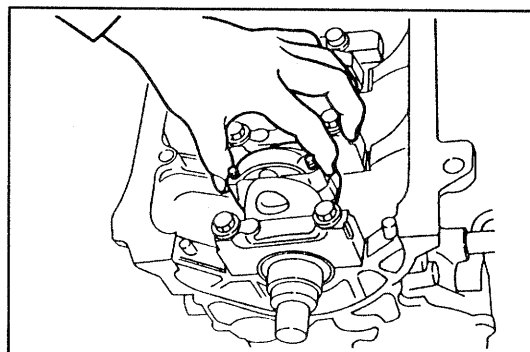
- (2) Measure the diameter of the crankpin journal.

The measurement should be performed at four points, 90 degrees spaced, for each crankpin journal at the points shown in the right figure. The maximum value is regarded as the crankpin journal diameter.

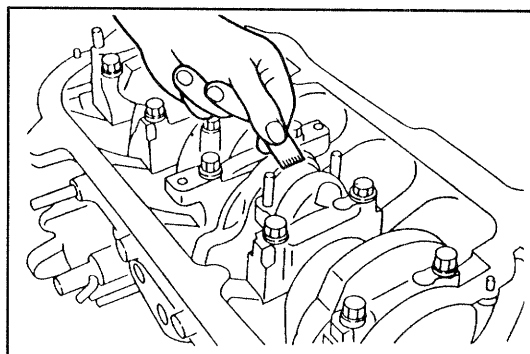
However, if the variation in the measured diameters exceeds 0.044 mm (0.0017 inch), replace the crankshaft.



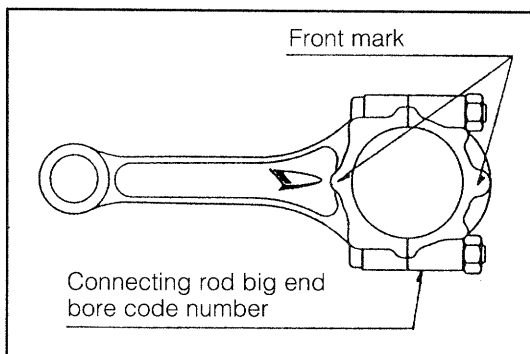
WNU89-EM377



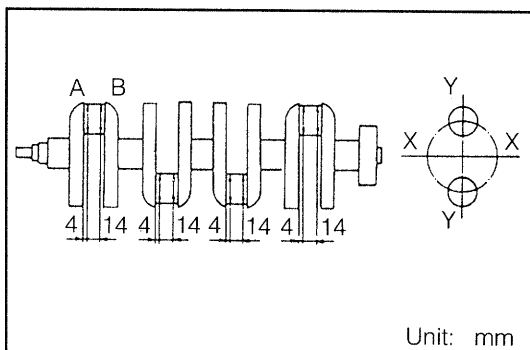
WNU89-EM378



WNU89-EM379



WRU90-EM278A



Unit: mm

WRU90-EM279

(3) Select the connecting rod bearing or replace the crankshaft, based on the results of (1) and (2).

Connecting rod big end bore code number	Crankpin journal diameter mm (inch)	Bearing classification number (color)	Remarks
4	44.993 - 45.000 (1.7714 - 1.7716)	1 (Yellow)	—
	44.985 - 44.992 (1.7711 - 1.7713)	2 (Green)	—
	44.976 - 44.984 (1.7707 - 1.7710)	3 (Brown)	—
	44.975 or less (1.7706)	—	Crankshaft replacement
5	44.993 - 45.000 (1.7714 - 1.7716)	2 (Green)	—
	44.985 - 44.992 (1.7711 - 1.7713)	3 (Brown)	—
	44.976 - 44.984 (1.7707 - 1.7710)	4 (Black)	—
	44.975 or less (1.7706)	—	Crankshaft replacement
6	44.993 - 45.000 (1.7714 - 1.7716)	3 (Brown)	—
	44.985 - 44.992 (1.7710 - 1.7713)	4 (Black)	—
	44.976 - 44.984 (1.7708 - 1.7710)	5 (Blue)	—
	44.975 or less (1.7706)	—	Crankshaft replacement

WNU89-EM382

5. Check of crankshaft thrust clearance

NOTE:

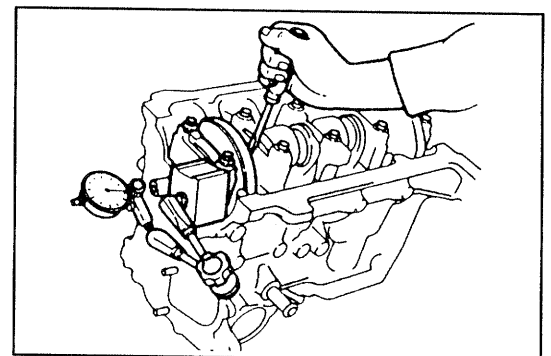
- Measure the thrust clearance, using a dial gauge.

Thrust Clearance:

Specified value: 0.02 - 0.22 mm
(0.0008 - 0.0086 inch)

Allowable limit: 0.30 mm (0.012 inch)

If the thrust clearance exceeds the allowable limit, measure the width of the crankshaft thrust bearing contact surface. If the measured value is less than 39.92 mm (1.57 inch), replace the thrust washer. If the measured value exceeds 39.92 mm (1.57 inch), replace the crankshaft and thrust washer.



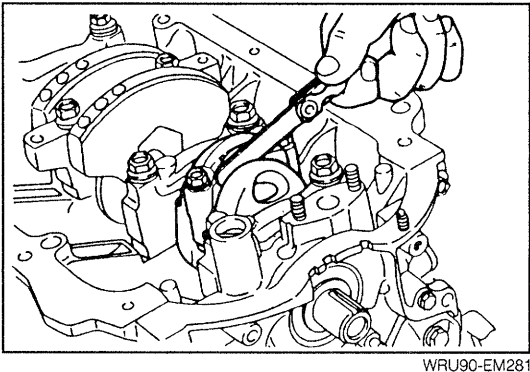
WRU90-EM280

6. Measurement of connecting rod thrust clearance
Measure the thrust clearance between the connecting rod and the crankshaft, using a thickness gauge.

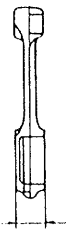
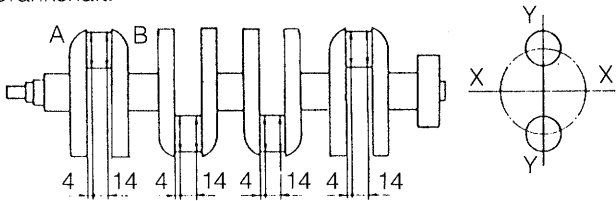
Thrust clearance:
Standard 0.15 - 0.4 mm (0.0060 - 0.015 inch)
Maximum 0.45 mm (0.018 inch)

- NOTE:
- The thrust clearance should be measured while the connecting rod is being pushed against either side of the crankshaft in the axial direction. Measure the thrust clearance at the opposite side.

If the clearance exceeds the specified value, replace the connecting rod or the crankshaft, or both of them, referring to the width of the big end of the connecting rod in the thrust direction and the side width of the crankpin journal.



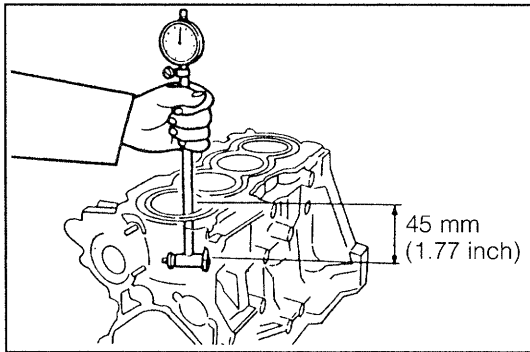
Reference

Width of big end of connecting rod in thrust direction	Side width of crankpin
21.80 - 21.85 mm (0.858 - 0.860 inch)	22.0 - 22.2 mm (0.867 - 0.874 inch)
	<p><Crankshaft></p>  <p>Unit: mm</p>

CYLINDER BORING

- NOTE:
- When the cylinder is bored, all cylinders should be bored at the same time.
 - As for piston rings, use oversized piston rings.

1. Measurement of cylinder bore diameter
Measure the diameter at a point 45 mm (1.77 inch) from the cylinder upper surface in the direction shown in the right figure.
If the measured value exceeds 76.28 mm (3.003 inch), replace the cylinder block.



2. Determining cylinder finishing diameter
 - (1) Measure the diameter of the oversized piston to be used, using a micrometer.

NOTE:

- The measurement should be conducted at the skirt section 15 mm (0.59 inch) from the piston lower end.
- Perform the measurement horizontally, not in a tilted state.

- (2) Calculate the finishing dimension, as follows.

A: Piston diameter

B: Piston-to-cylinder bore clearance

0.025 - 0.045 mm

(0.0010 - 0.0018 inch)

C: Honing allowance

0.02 mm (0.0008 inch)

D: Finishing diameter

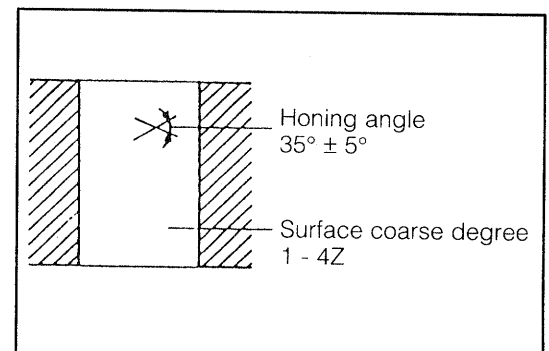
$$D = A + B - C$$

WRU90-EM282

3. Hone the cylinder after the boring.
 - (1) Bore the cylinder, leaving a honing allowance of 0.02 mm (0.0008 inch).
 - (2) Hone the cylinder.

Honing angle: $35^\circ \pm 5^\circ$

Surface coarse degree: 1 - 4Z



WNU89-EM434

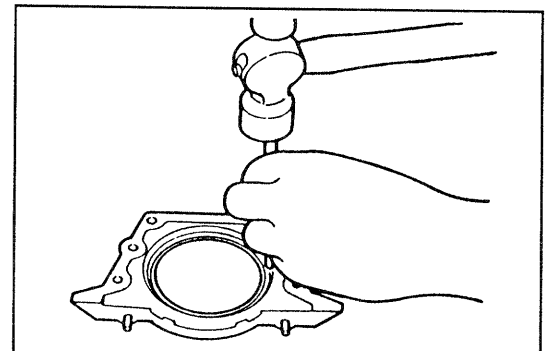
REPLACEMENT OF REAR OIL SEAL

1. Removal of rear oil seal

Remove the rear oil seal from the rear oil seal retainer, using a pin punch.

NOTE:

- Be very careful not to damage the oil seal retainer.



WRU90-EM283

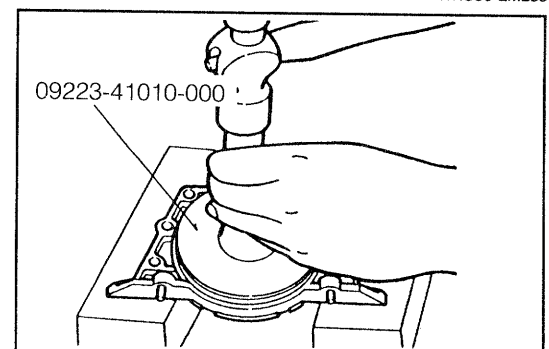
2. Installation of rear oil seal

Drive a new rear oil seal into position, using the following SST.

SST: 09223-41010-000

NOTE:

- Care must be exercised to ensure that the oil seal is not driven in a tilted state.



WRU90-EM284

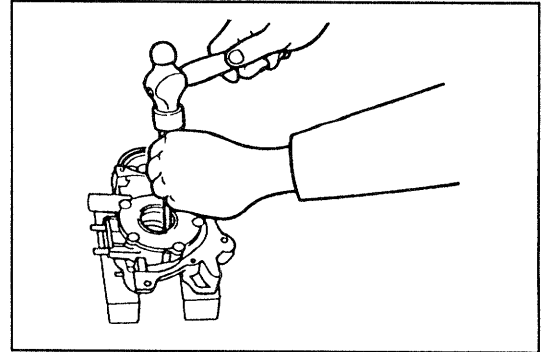
REPLACEMENT OF FRONT OIL SEAL

1. Removal of front oil seal

Remove the front oil seal from the oil pump, using a pin punch.

NOTE:

- Be very careful not to damage the oil pump during the removal.

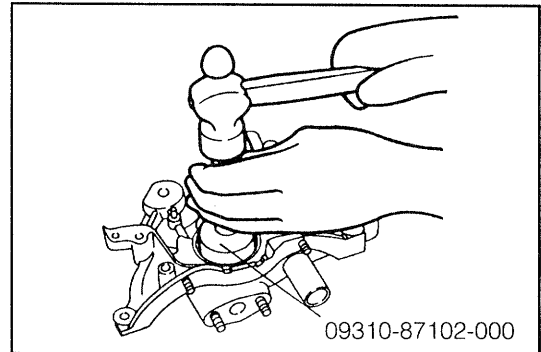


WRU90-EM285

2. Installation of front oil seal

Drive a new front oil seal into position, using the following SST.

SST: 09310-87102-000



09310-87102-000

WRU90-EM286

REPLACEMENT OF CYLINDER BLOCK

NOTE:

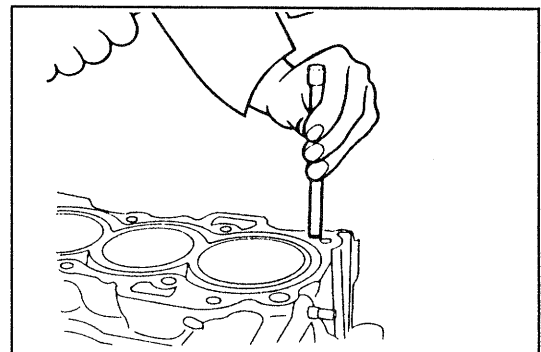
- The cylinder block is furnished along with the pistons as a set. Hence, make sure that each piston is installed in the mated cylinder bore.

1. Wash the cylinder block using cleaning solvent.

2. Drive the oil orifice until it is recessed 3.0 ± 1.0 mm (0.12 ± 0.039 inch) from the cylinder upper surface.

NOTE:

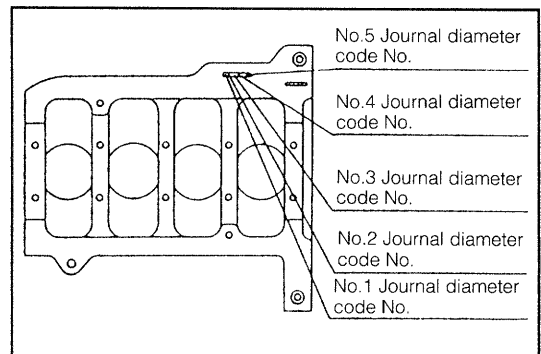
- For driving this oil orifice, use an iron rod having an outer diameter of 10 mm (0.39 inch).



WNU89-EM439

3. Selection of crankshaft bearings

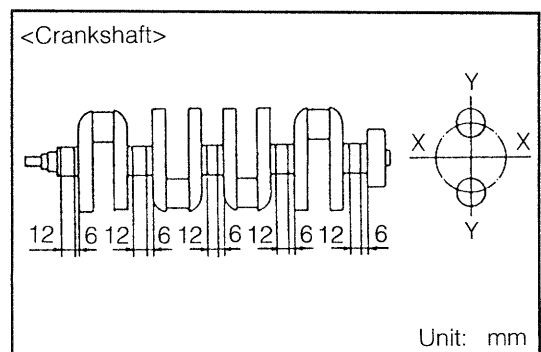
(1) Read the crankshaft journal diameter code number on the cylinder block.



WNU89-EM440

(2) Measure the main journal diameter of the crankshaft at those points indicated in the right figure.

- The measurement should be conducted in four directions for each main journal, 90 degrees spaced, at those points indicated in the right figure.



WNU89-EM440A

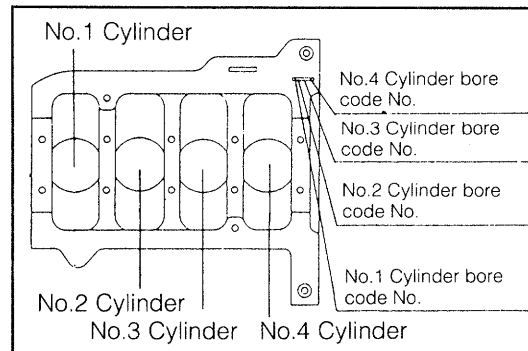
(3) Select the crankshaft bearings in accordance with the table below.

Crankshaft journal hole code	Crankshaft journal diameter mm (inch)	Crankshaft bearing classification No. (color)	Remarks
5	50.000 - 49.995 (1.9685 - 1.9684)	1 (Yellow)	—
	49.994 - 49.989 (1.9683 - 1.9681)	2 (Green)	—
	49.988 - 49.983 (1.9680 - 1.9679)	3 (Brown)	—
	49.982 - 49.976 (1.9678 - 1.9676)	4 (Black)	—
	49.975 or less (1.9675)	—	Crankshaft replacement
6	50.000 - 49.995 (1.9685 - 1.9684)	2 (Green)	—
	49.994 - 49.989 (1.9683 - 1.9681)	3 (Brown)	—
	49.988 - 49.983 (1.9680 - 1.9679)	4 (Black)	—
	49.982 - 49.976 (1.9678 - 1.9676)	5 (Blue)	—
	49.975 or less (1.9675)	—	Crankshaft replacement
7	50.000 - 49.995 (1.9685 - 1.9684)	3 (Brown)	—
	49.994 - 49.989 (1.9683 - 1.9681)	4 (Black)	—
	49.988 - 49.983 (1.9680 - 1.9679)	5 (Blue)	—
	49.982 - 49.976 (1.9678 - 1.9676)	6 (White)	—
	49.975 or less (1.9675)	—	Crankshaft replacement
8	50.000 - 49.995 (1.9685 - 1.9684)	4 (Black)	—
	49.994 - 49.989 (1.9683 - 1.9681)	5 (Blue)	—
	49.988 - 49.983 (1.9680 - 1.9679)	6 (White)	—
	49.982 - 49.976 (1.9678 - 1.9676)	7 (Pink)	—
	49.975 or less (1.9675)	—	Crankshaft replacement

WRU90-EM287

4. Selection of pistons (reference)

(1) Read the cylinder block bore code number.

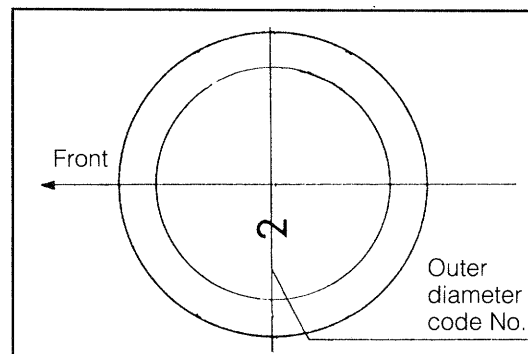


WNU89-EM443

(2) Select a piston having the same classification number as the cylinder block bore code number.

NOTE:

- The piston code number is stamped on the top of each piston.



WNU89-EM444

REPLACEMENT OF CRANKSHAFT

(Replacement of the crankshaft only)

1. Wash the crankshaft using cleaning solvent. Dry it with compressed air.

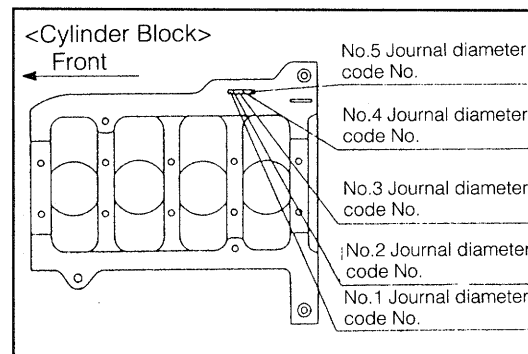
NOTE:

- Make sure that the oil gallery exhibits no restriction due to rust-proof oil.

WNU89-EM445

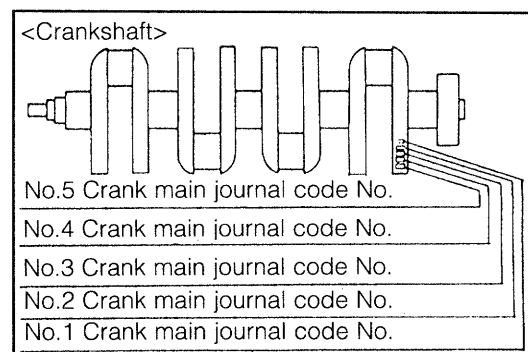
2. Selection of crankshaft bearings

(1) Read the crankshaft journal diameter code number of the cylinder block.



WNU89-EM446

(2) Read the crankshaft main journal diameter code number.



WNU89-EM447

- (3) Establish the crankshaft bearing classification number, using the table below.

Cylinder block		Crankshaft journal			
		1	2	3	4
Crankshaft journal diameter code No.	5	4	3	2	1
	6	5	4	3	2
	7	6	5	4	3
	8	7	6	5	4

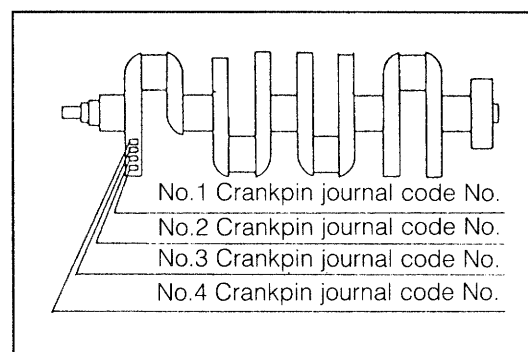
WNU89-EM448

Reference

Bearing classification No.	1	2	3	4	5	6	7
Identification color	Yellow	Green	Brown	Black	Blue	White	Pink

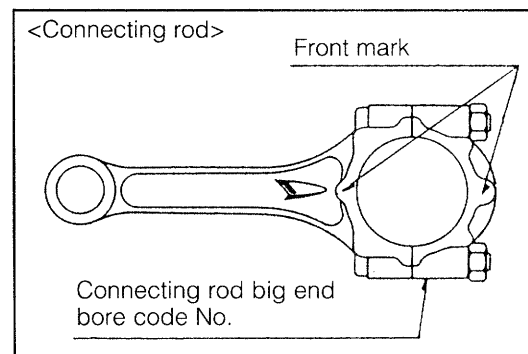
WNU89-EM449

3. Selection of connecting rod bearings
 (1) Read the crankpin journal diameter code number.



WNU89-EM450

- (2) Read the connecting rod big end bore code number.



WNU89-EM451

- (3) Establish the classification number of the connecting rod bearing, using the table below.

Connecting rod		Crankpin journal diameter code No.		
		1	2	3
Connecting rod big end bore code No.	4	3	2	1
	5	4	3	2
	6	5	4	3

WRU90-EM418

Reference

Bearing classification No.	1	2	3	4	5
Identification color	Yellow	Green	Brown	Black	Blue

WNU89-EM453

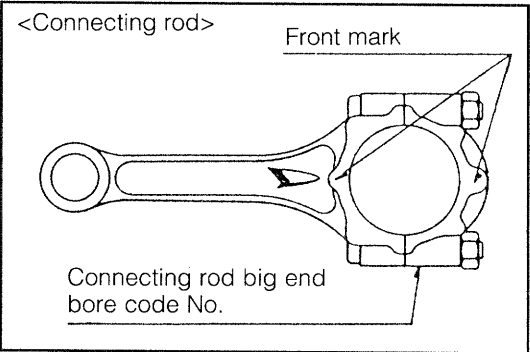
REPLACEMENT OF CONNECTING RODS

1. Wash the connecting rods using cleaning solvent.

WARNING:
Be sure to protect your eyes, wearing goggles.

WNU89-EM454

2. Selection of connecting rod bearings
(1) Read the connecting rod bid end bore code number.

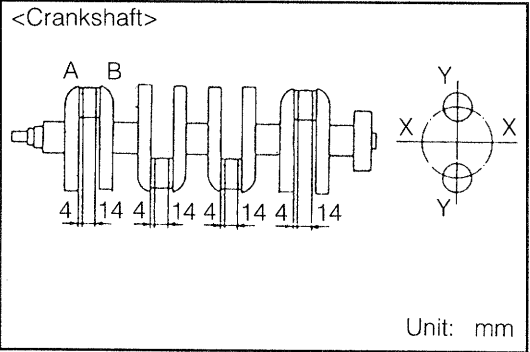


WNU89-EM455

- (2) Measure the crankshaft pin diameter of the crankshaft in four directions for each crankshaft pin, 90 degrees spaced, at those points indicated in the right figure.

NOTE:

- The greatest value among the measured diameters is regarded as the crankpin journal diameter.
- However, if the difference among the measured values exceeds 0.044 mm (0.0017 inch), replace the crankshaft.



WNU89-EM456

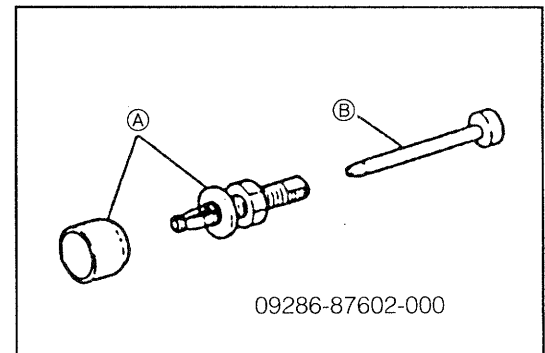
(3) Select the connecting rod bearing in accordance with the table posted in next page.

Connecting rod big end bore code No.	Crankpin journal diameter mm (inch)	Connecting rod bearing classification No. (color)	Remarks
4	45.000 - 44.993 (1.7716 - 1.7714)	1 (Yellow)	—
	44.992 - 44.985 (1.7713 - 1.7711)	2 (Green)	—
	44.984 - 44.976 (1.7710 - 1.7707)	3 (Brown)	—
	44.975 or less (1.7706)	—	Crankshaft replacement
5	45.000 - 44.993 (1.7716 - 1.7714)	2 (Green)	—
	44.992 - 44.985 (1.7713 - 1.7711)	3 (Brown)	—
	44.984 - 44.976 (1.7710 - 1.7707)	4 (Black)	—
	44.975 or less (1.7706)	—	Crankshaft replacement
6	45.000 - 44.993 (1.7716 - 1.7714)	3 (Brown)	—
	44.992 - 44.985 (1.7713 - 1.7711)	4 (Black)	—
	44.984 - 44.976 (1.7710 - 1.7707)	5 (Blue)	—
	44.975 or less (1.7706)	—	Crankshaft replacement

WNU89-EM457

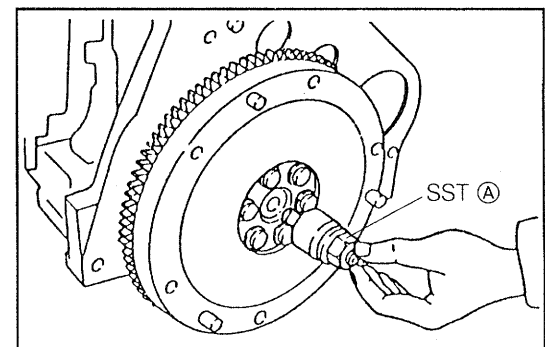
REPLACEMENT CRANKSHAFT REAR END BEARING

- Removal of crankshaft rear end bearing.
SST: 09286-87602-000



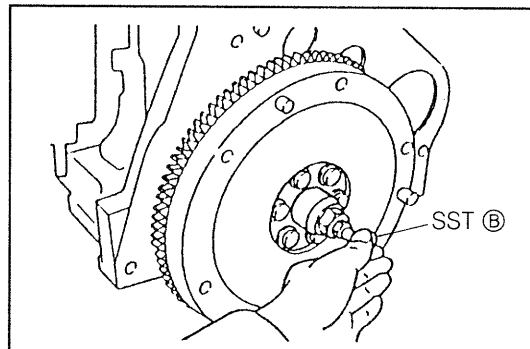
WRU90-EM288

- Insert the SST ① into the crankshaft rear end bearing.



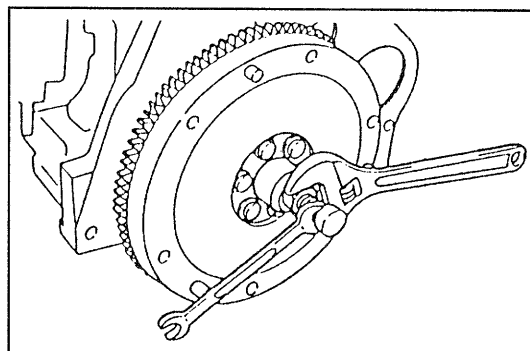
WRU90-EM289

(2) Insert the SST ⑥ into the SST ⑤.



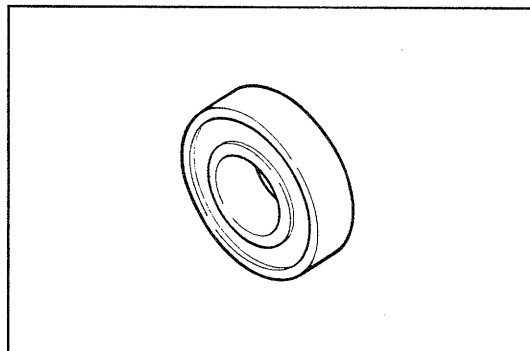
WRU90-EM290

(3) While holding the SST ⑤ by means of a wrench or the like, tighten the nut.
Then, remove the rear end bearing.



WRU90-EM291

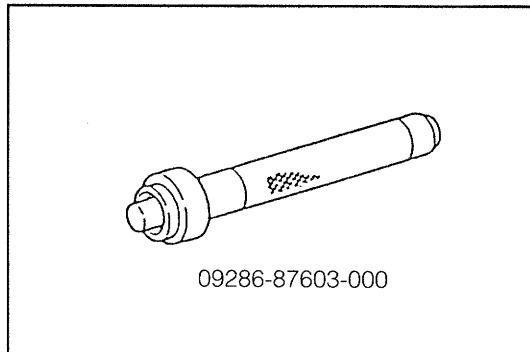
2. Inspect the crankshaft rear end bearing, damage or wear.



WRU90-EM292

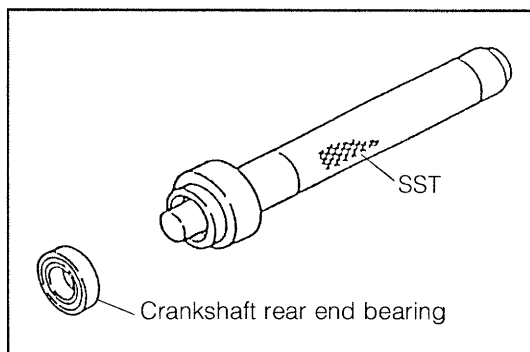
3. Install the crankshaft rear end bearing, using the following SST.

SST: 09286-87603-000



WRU90-EM293

(1) Install the crankshaft rear end bearing to the SST.

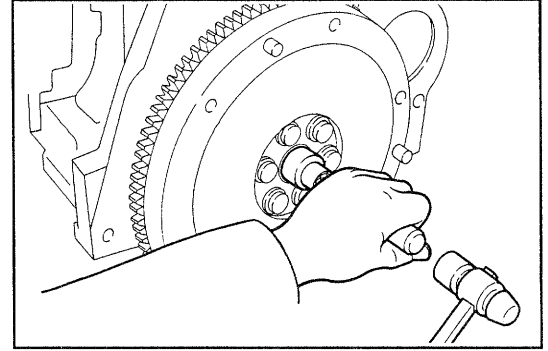


WRU90-EM294

- (2) Press the crankshaft rear end bearing into the crankshaft rear end.

NOTE:

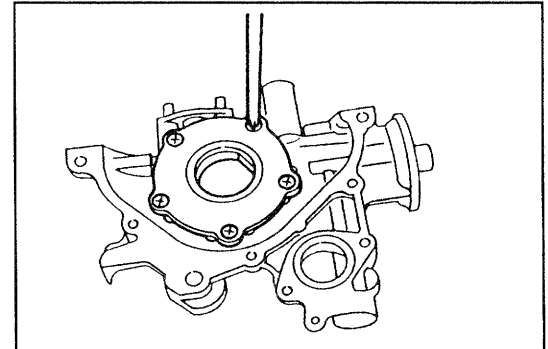
- Be sure to press the bearing, until the end surface of the SST contacts with the crankshaft rear end section.
- When pressing the bearing, be very careful not to allow the bearing to tilt



WRU90-EM295

DISASSEMBLY OF OIL PUMP

1. Detach the oil pump cover, by removing the five attaching bolts.

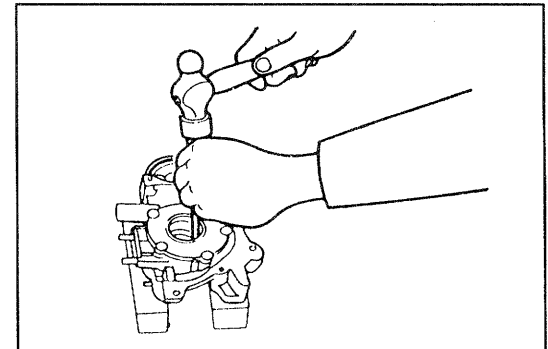


WRU90-EM296

2. Remove the front oil seal from the oil pump, using a pin punch.

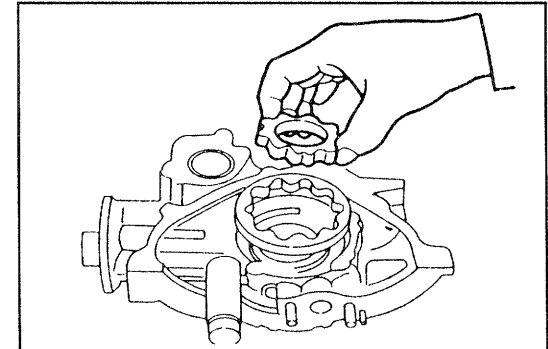
NOTE:

- Be very careful not to damage the oil pump during the removal.



WRU90-EM297

3. Remove the oil pump rotor set.

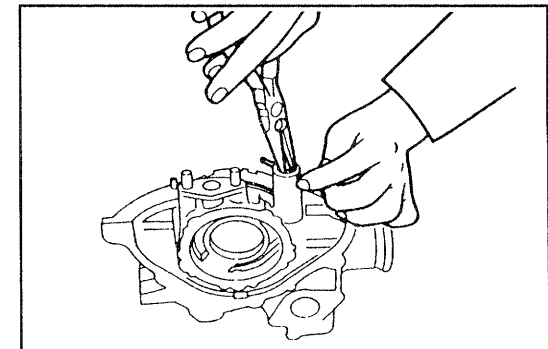


WNU89-EM460

4. Pull out the cotter pin, while pushing the spring retainer with nose pliers or the like.

NOTE:

- Put an appropriate cloth, etc. on the retainer spring so that it may not jump out.

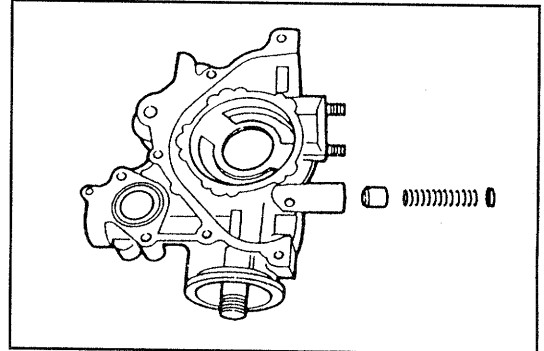


WNU89-EM461

5. Remove the oil pump relief valve spring retainer, compression spring and oil pump relief valve.

NOTE:

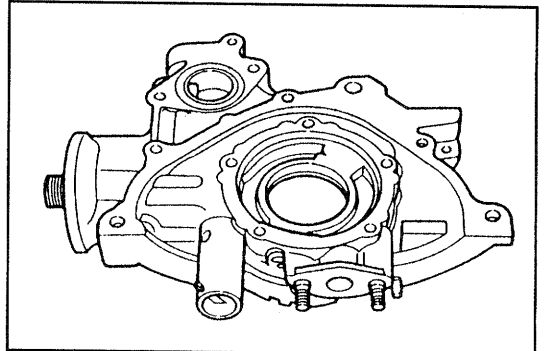
- Wash the disassembled parts in cleaning solvent.



WNU89-EM462

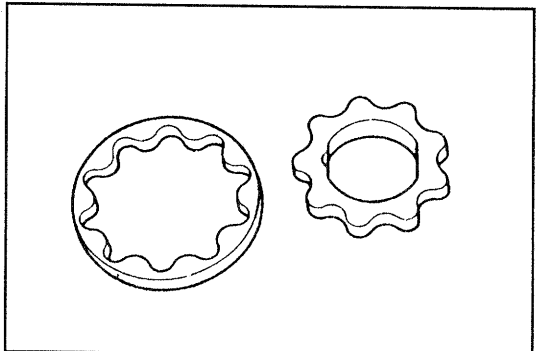
6. Inspection of each part

- (1) Check the pump body for damage.
Replace the pump body if it exhibits damage.



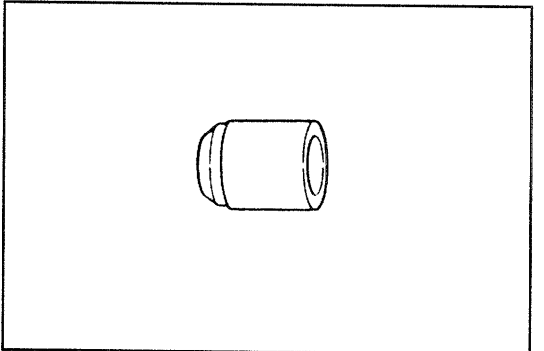
WNU89-EM463

- (2) Check the rotor set for damage.
Replace the rotor set if it exhibits damage.



WNU89-EM464

- (3) Check the oil pump relief valve for damage.
Replace the relief valve if it exhibits damage. Also, check to see if any damage is present at the relief valve installation hole of the oil pump body.

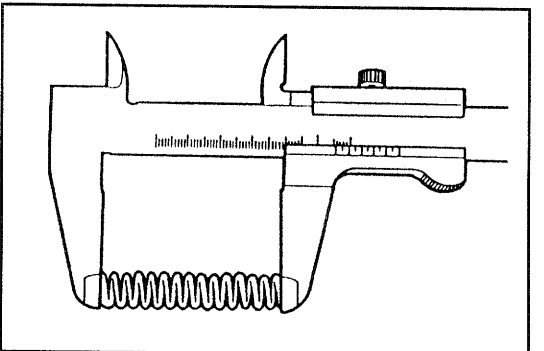


WNU89-EM465

- (4) Check the compression spring for damage. Also, measure its free length.

Specified Free Length: 57 mm (2.244 inch)

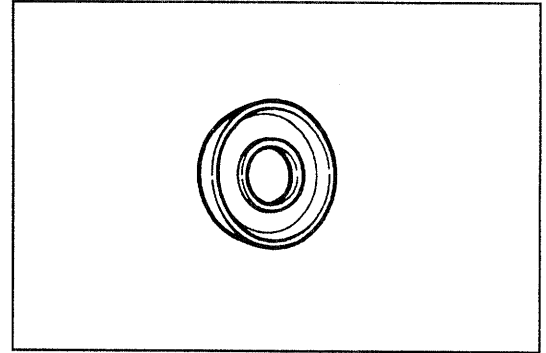
Replace the compression spring if it exhibits damage or the free length is less than the specified valve.



WNU89-EM466

- (5) Check the oil pump relief valve spring retainer for damage.

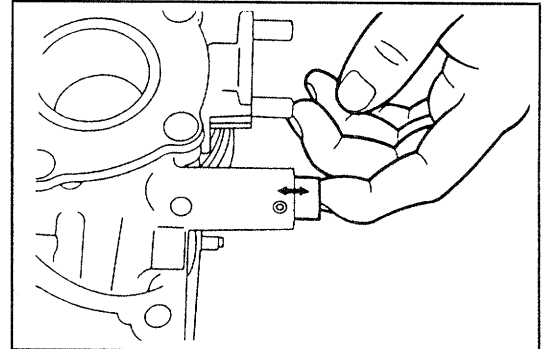
Replace the retainer if it exhibits damage.



WNU89-EM467

- (6) Apply engine oil to the oil pump relief valve. Insert the oil pump relief valve into the oil pump body. Check to see if the valve slides smoothly.

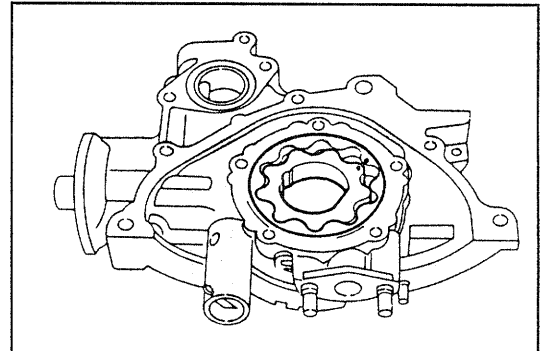
Replace the oil pump body if the valve fails to slide smoothly.



WNU89-EM468

7. Measurement of body clearance, tip clearance and side clearance

- (1) Apply a thin film of engine oil to the rotor mate surface of the oil pump body as well as to the rotor set. Assemble the rotor set in the oil pump body in such a way that the drilled mark may be seen from the outside.

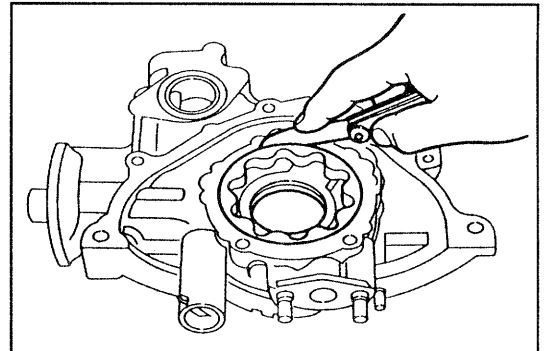


WNU89-EM469

- (2) Measure the body clearance between the oil pump body and the outer rotor, using a thickness gauge.

Body Clearance: 0.20 - 0.28 mm
(0.0079 - 0.011 inch)

Replace the oil pump if the body clearance exceeds the specified value.

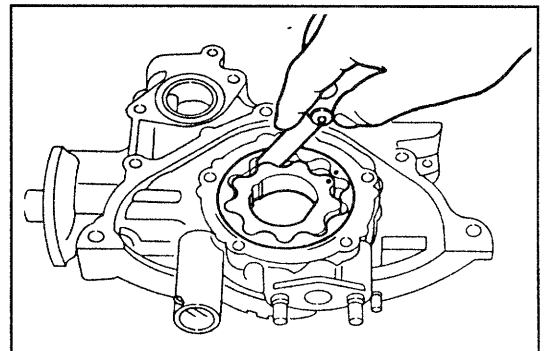


WNU89-EM470

- (3) Measure the tip clearance of the rotor set, using a thickness gauge.

Tip Clearance: 0.16 - 0.24 mm
(0.0063 - 0.0094 inch)

Replace the rotor set if the tip clearance exceeds the specified value.



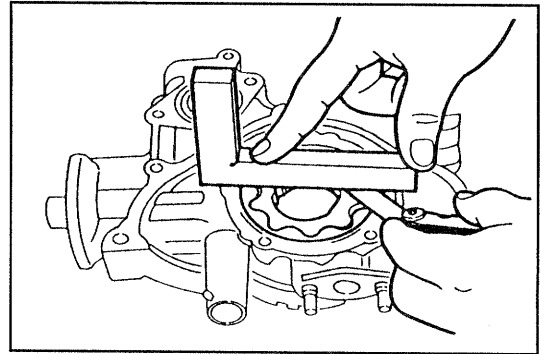
WRU90-EM419

- (4) Measure the side clearance between the oil pump body and the rotor set, using a straightedge and a thickness gauge.

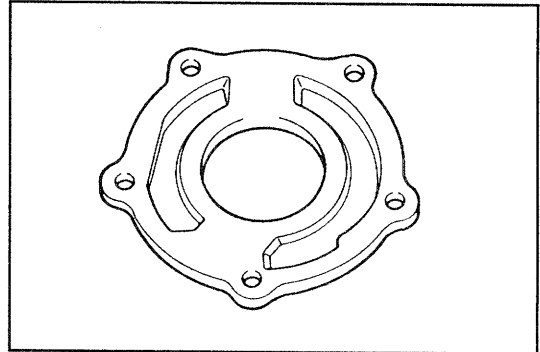
Side Clearance: 0.035 - 0.085 mm
(0.0014 - 0.0033 inch)

Replace the oil pump if the side clearance exceeds the specified value.

8. Check to see if any wear is present at the rotor set mate surface of the pump cover.
Replace the oil pump cover if it exhibits wear.



WRU90-EM420



WNU89-EM473

ASSEMBLY OF OIL PUMP

NOTE:

Wash those parts to be assembled in cleaning solvent. Dry them using compressed air.

WARNING:

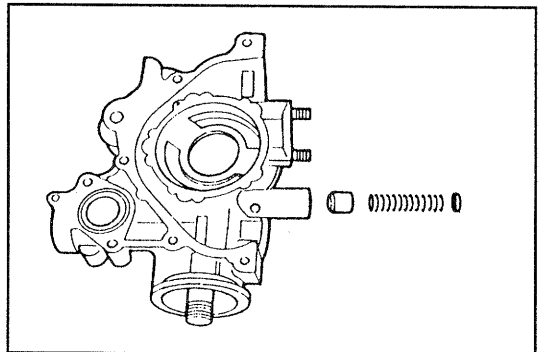
When you use compressed air, be sure to protect your eyes, wearing goggles.

WNU89-EM474

1. Apply engine oil to the relief valve. Then, insert the relief valve into the oil pump body.
2. Insert the compression spring and retainer into the oil pump body.

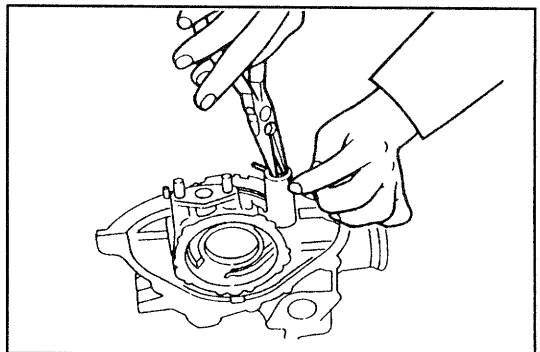
NOTE:

- Install the retainer in such a direction that its projected side may come at the compression spring side.



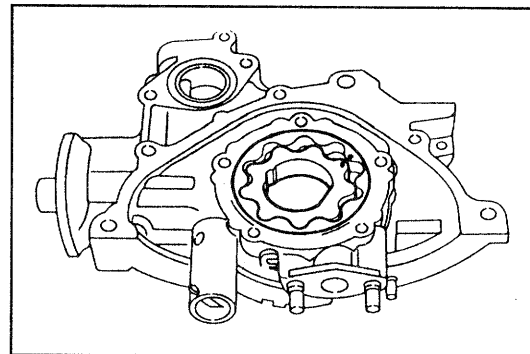
WNU89-EM475

3. Insert a new cotter pin into the retainer while the retainer is being compressed with pliers, etc. Split the end of the cotter pin to form an anchor-like shape.



WNU89-EM476

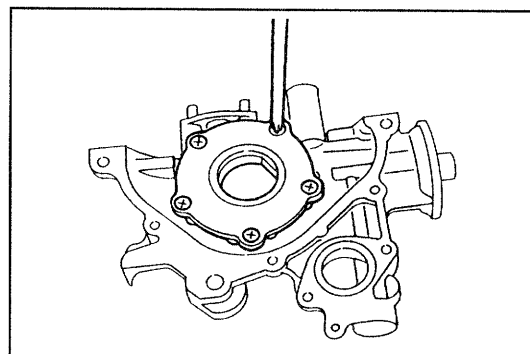
4. Apply engine oil to the rotor set. Assemble the rotor set in the pump body in such a direction that the drilled mark of the rotor may be seen from the outside.



WNU89-EM477

5. Install the oil pump cover. Tighten the cover to the specified torque.

Tightening Torque: 0.8 - 1.3 kg-m
(5.8 - 9.4 ft-lb, 7.8 - 12.7 N·m)

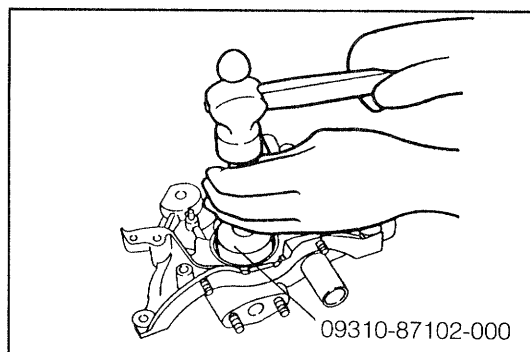


WNU89-EM478

6. Drive a new oil seal into position, using the following SST.
SST: 09310-87102-000

NOTE:

- Be very careful not damage the oil pump during the installation.
- Make sure that the oil seal is not driven into position in a tilted state.

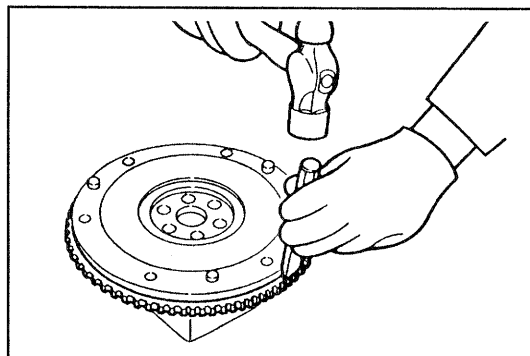


09310-87102-000

WNU89-EM479

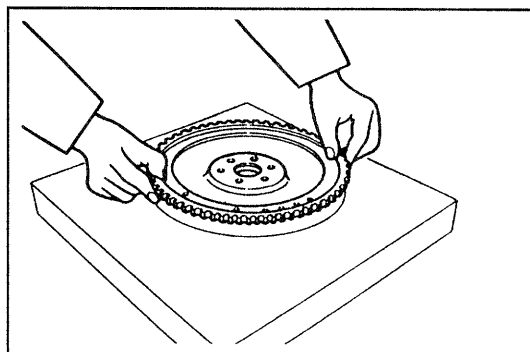
REMOVAL/INSTALLATION OF RING GEAR

1. Place the ring gear on an adequate wooden block. Drive out the ring gear, using a chisel in combination with a hammer.



WNU89-EM481

2. Place a new ring gear horizontally on the flywheel.



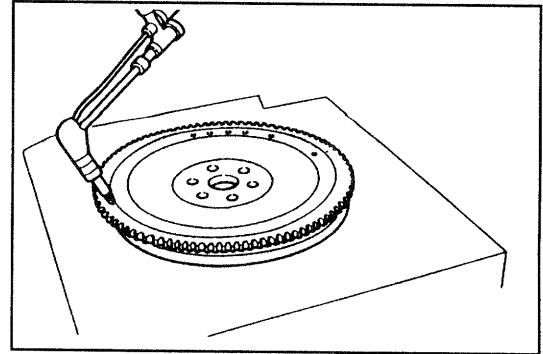
WNU89-EM482

3. Using a gas burner, heat the ring gear evenly, until the ring gear due to its own weight fits onto the flywheel.

NOTE:

- Do not tap the ring gear using a hammer or the like.
- Never cool the ring gear quickly using water or the like.

4. Allow the ring gear to cool naturally.



WRU90-EM421

ASSEMBLY OF CYLINDER BLOCK

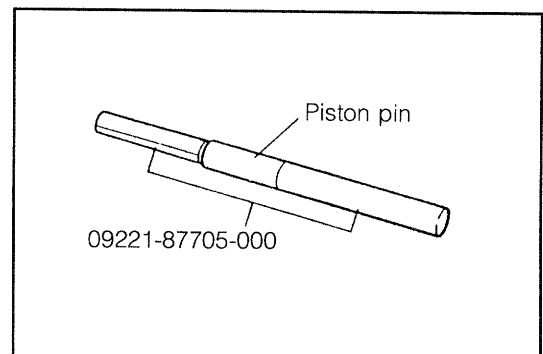
(See page EM-82.)

NOTE:

- As for those parts to be reassembled, wash them in cleaning solvent (excluding those parts, such as grease-sealed type bearings, dust seals and electrical parts). Then, dry them using compressed air.
- Remove any remaining sealer, etc. from the threaded portions of the switches and sensors.

1. Assembly of piston and connecting rod
 - (1) Install the piston pin to the following SST in a way shown in the right figure.

SST: 09221-87705-000

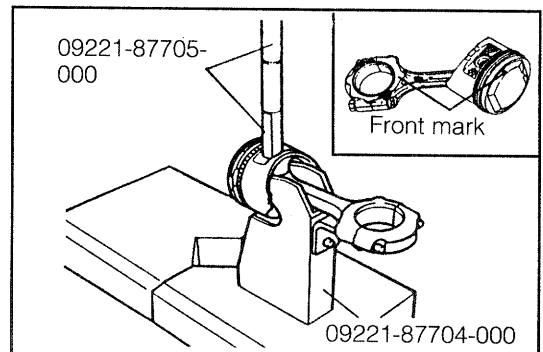


WRU90-EM298

- (2) Install the piston and connecting rod in the SST in a way shown in the right figure. Insert the SST installed with the piston pin into the piston pin hole.

SST: 09221-87704-000

09221-87705-000

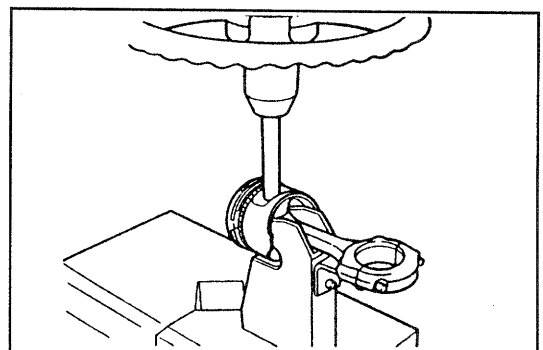


WRU90-EM299

NOTE:

- The piston and connecting rod should be assembled in such a way that the piston front mark and connecting rod front mark come in the same direction.

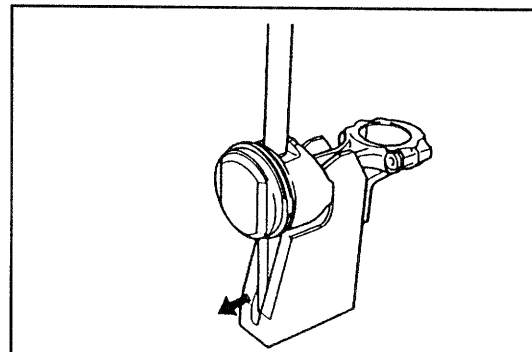
- (3) Press the piston pin into the piston and connecting rod, using a hydraulic press.



WNU89-EM428

WNU89-EM429

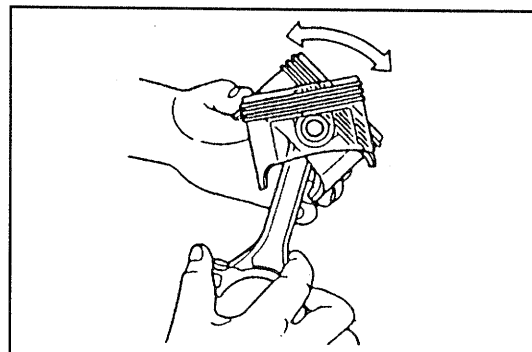
- (4) Remove the piston and connecting rod assembly from the SST. Remove the SST from the piston pin.



WNU89-EM430

NOTE:

- When the piston is moved back and forth on the piston pin, you may encounter hard movement. However, if the piston moves smoothly without any binding, this fitting of the piston is normal.



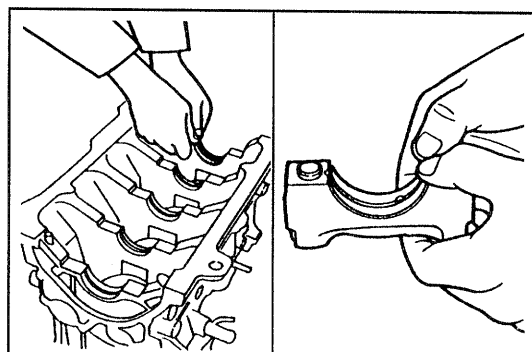
WRU90-EM300

2. Crankshaft installation

- (1) Install the bearings to the cylinder block and crankshaft bearing caps.

NOTE:

- Do not touch with the front and back surfaces of each bearing. Be sure to hold the bearing at its edge surfaces.

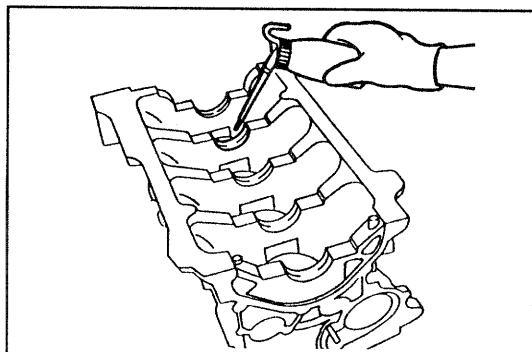


WRU90-EM301

- (2) Lubricate the surface of each bearing with engine oil.

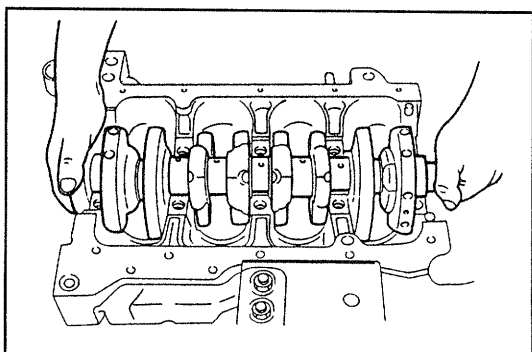
NOTE:

- Do not touch with the front and back surfaces of each bearing.
- Never apply engine oil to the crankshaft bearing caps.



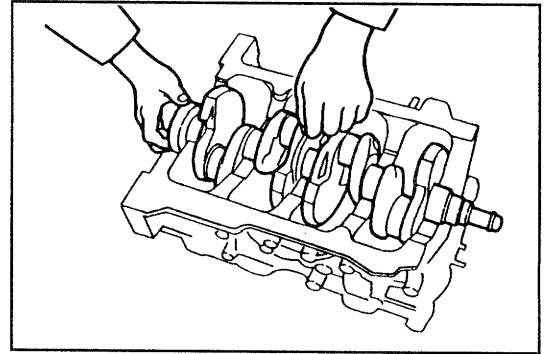
WNU89-EM486

- (3) Install the crankshaft in the cylinder block.



WNU89-EM487

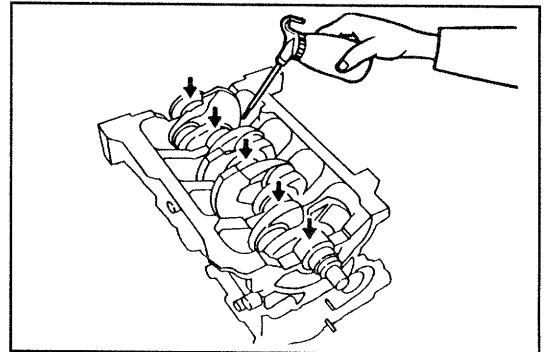
- (4) Apply engine oil to the thrust washers. With the side having the oil groove facing toward the crankshaft side, insert each thrust washer between the crankshaft main journal No. 3 and the cylinder block.



WNU89-EM488

- (5) Apply engine oil to the crankshaft main journal sections.
NOTE:

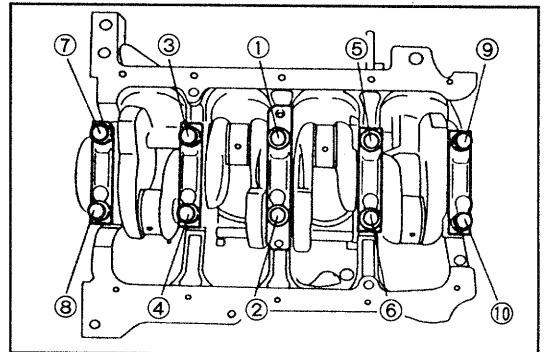
- Care must be exercised to ensure that no oil flows into the bearing cap attaching bolt holes.



WNU89-EM489

- (6) Install the crankshaft bearing caps with the arrow marks facing toward the oil pump side and also in the numerical sequence.
- (7) Thinly apply engine oil to the crankshaft bearing cap bolts. Tighten the bolts to the specified torque over two or three stages in the sequence shown in the right figure.

Tightening Torque: 4.5 - 5.5 kg-m
(32.5 - 39.8 ft-lb, 44.1 - 53.9 N-m)

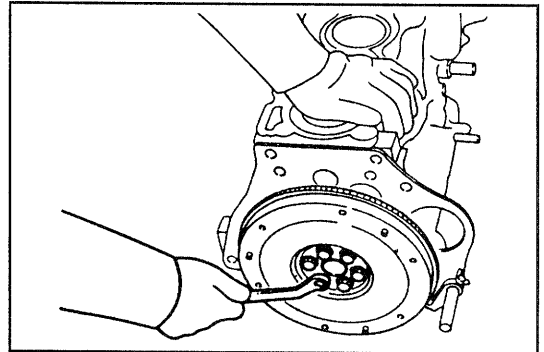


WNU89-EM490

3. Assembly of piston with connecting rod
Install the flywheel on the crankshaft temporarily.

NOTE:

- Care must be exercised to ensure that no oil, etc. gets to the bolts or bolt holes.

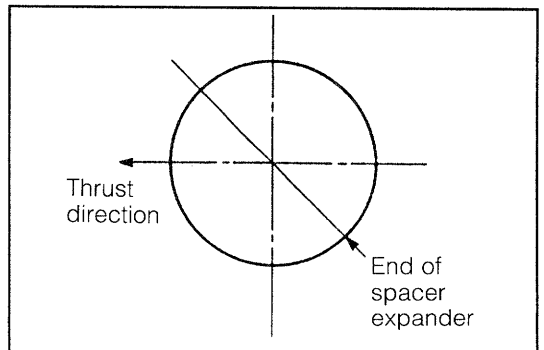


WRU90-EM302

- (1) Install the oil ring spacer expander in the oil ring groove. Ensure that the expander end may not line up with the thrust direction nor with the axial direction.

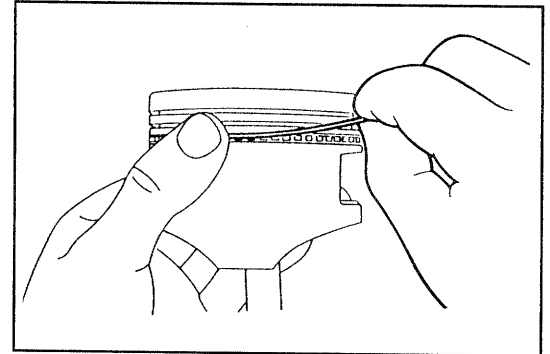
NOTE:

- Do not expand the spacer expander to an extent more than necessary.



WNU89-EM492

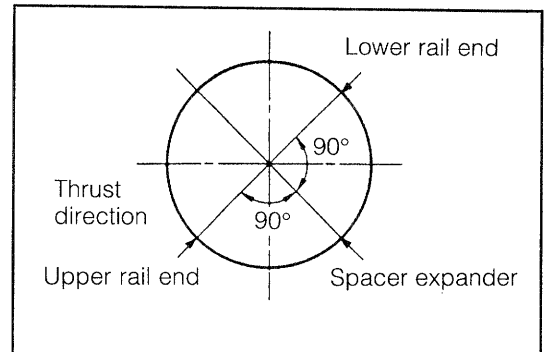
- (2) Fit the upper rail into position in such a manner that it is wound up while pushing the edge section of the oil ring spacer expander with your thumb.



WNU89-EM493

NOTE:

- Ensure that the rail end is deviated 90 degrees to the left from the end of the oil ring spacer expander.
- Do not expand the rail to an extent more than necessary.

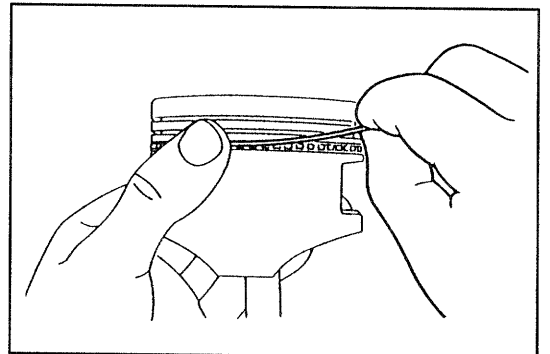


WNU89-EM494

- (3) Fit the lower rail into position in such a manner that it is wound up.

NOTE:

- Ensure that the rail end is deviated 90 degrees to the right from the end of the oil ring spacer expander.
- Do not expand the rail to an extent more than necessary.
- Make sure that the oil ring can be rotated smoothly.

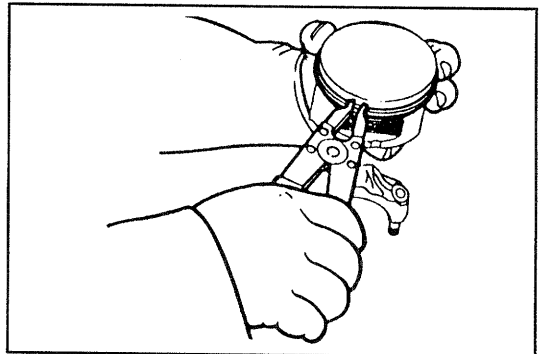


WNU89-EM495

- (4) Install the compression ring No. 2 with the stamped mark of T, 2T, N or 2N facing upward, using a piston ring expander.

NOTE:

- Do not expand the piston ring to an extent more than necessary.



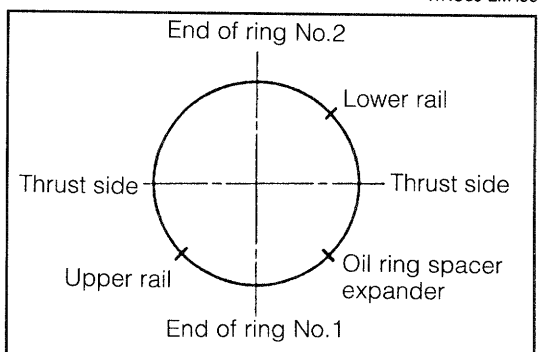
WNU89-EM496

- (5) Install the compression ring No. 1 with the stamped mark of T or N facing upward, using a piston ring expander.

- (6) Position the piston rings so that each ring end may come at the respective points as indicated in the right figure.

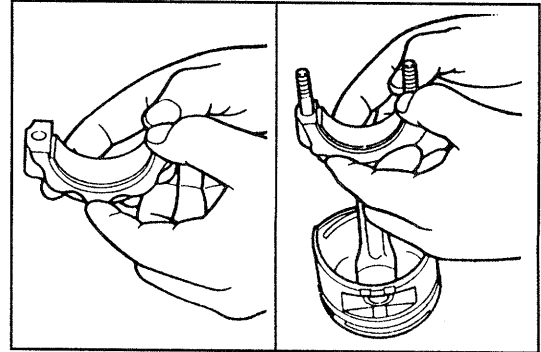
NOTE:

- It is not necessarily required to follow strictly the right figure. However, be sure that the ring end is not lined up with the thrust direction. Also, each ring should be deviated about 120 to 180 degrees from the adjacent ring.



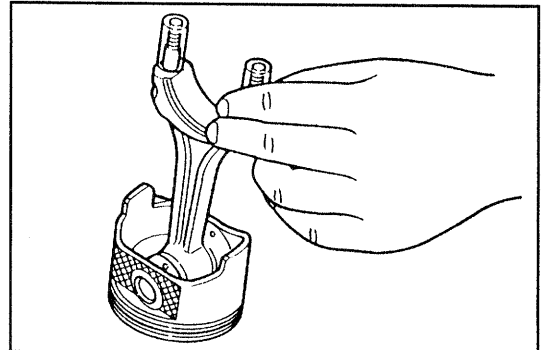
WNU89-EM497

- (7) Install the connecting rod bearings on the connecting rod and connecting rod cap, making sure that your fingers will not touch with the front and back surfaces of the bearings.



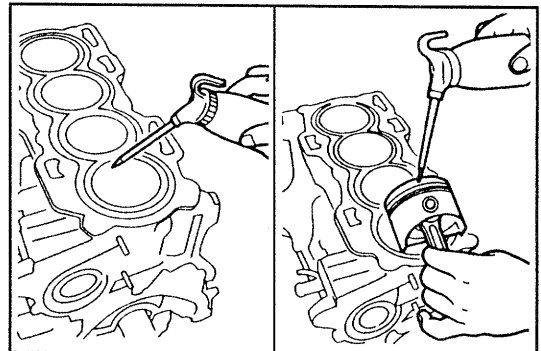
WNU89-EM498

- (8) Cut an appropriate vinyl hose to a suitable length. Fit the vinyl hose to each connecting rod bolt sections.



WNU89-EM499

- (9) Apply engine oil to the piston rings, piston pins, connecting rod bearings, cylinder walls and crankpin journals.



WNU89-EM500

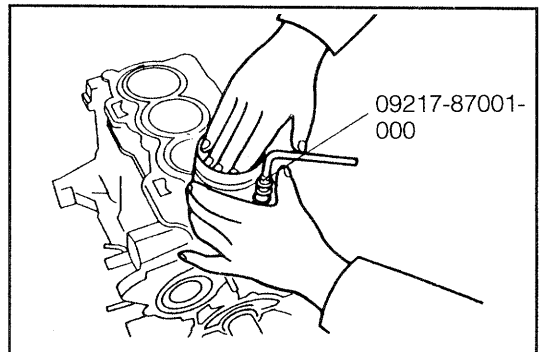
- (10) Compress the piston rings by means of the piston ring compressor SST, making sure that the piston ring ends will not move during the installation.

SST: 09217-87001-000

- (11) Push the piston by hand into the cylinder bore with the front mark facing toward the oil pump side.

NOTE:

- Be very careful to avoid damaging the connecting rod bearings during the installation.
- Care must be exercised to ensure that the crankpin journal is not scratched by the connecting rod.



WNU89-EM501

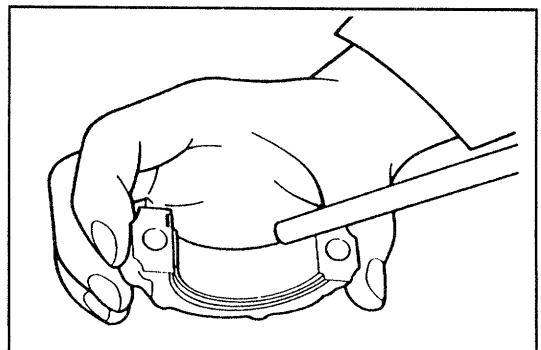
- (12) Push the piston by hand until the connecting rod reaches the crankpin journal.

- (13) Apply engine oil to the bearing surface of each connecting rod bearing.

NOTE:

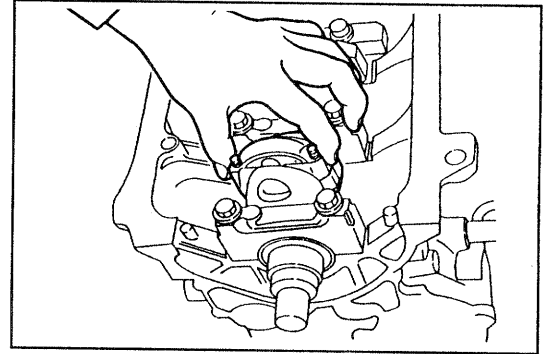
- Do not touch with the bearing front surface.

- (14) Remove the vinyl hoses which were attached to the connecting rod bolt sections.



WNU89-EM502

- (15) Install the connecting rod cap with the front mark facing toward the oil pump side.



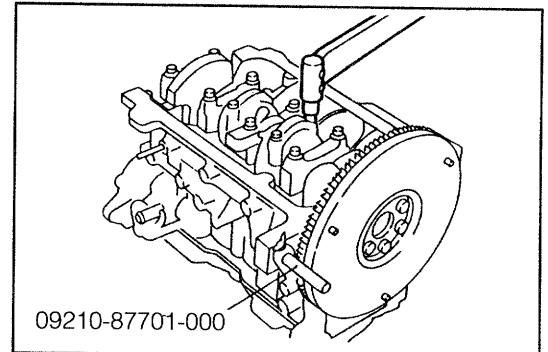
WNU89-EM503

- (16) Prevent the crankshaft from turning, using the following SST.

SST: 09210-87701-000

- (17) Thinly apply engine oil to the connecting rod cap attaching nuts. Tighten the nuts to the specified torque evenly over two or three stages.

Tightening Torque: 3.5 - 4.5 kg-m
(25.4 - 32.5 ft-lb, 34.3 - 44.1 N·m)



09210-87701-000

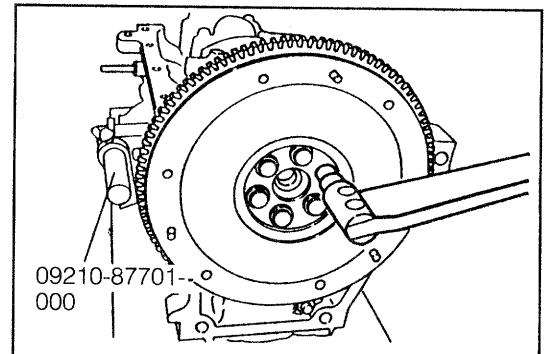
WNU89-EM504

- (18) Perform the operations described in the steps (1) through (18) for each cylinder.

- (19) Remove the flywheel.

- (20) Remove the following SST.

SST: 09210-87701-000



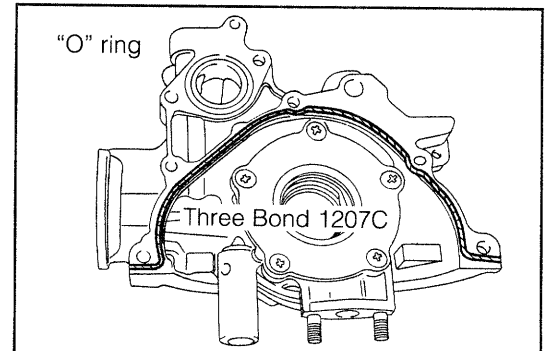
09210-87701-000

WNU89-EM505

3. Installation of oil pump

- (1) Apply the Three Bond 1207C to the oil pump installation surface of the cylinder block, as indicated in the right figure.

- (2) Replace the "O" ring of the oil pump with a new part.



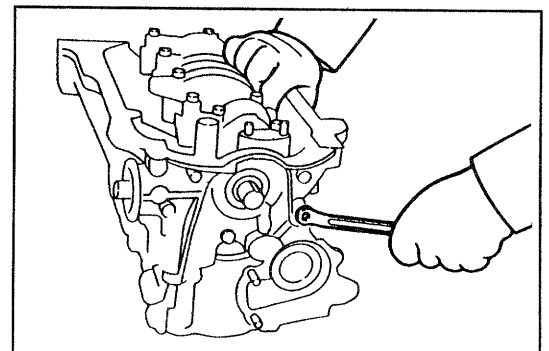
"O" ring

Three Bond 1207C

WRU90-EM303

- (3) Apply engine oil to the inner surface of the oil seal. Install the oil pump to the cylinder block. Perform tightening to the specified torque.

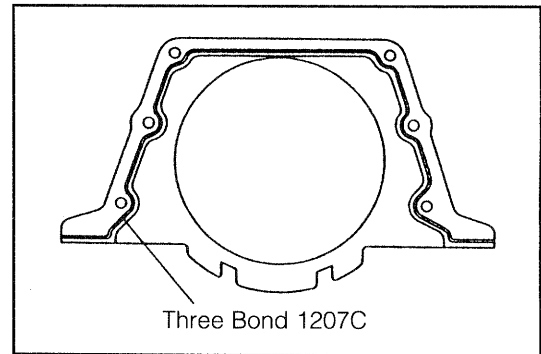
Tightening Torque: 0.6 - 0.9 kg-m
(4.4 - 6.5 ft-lb, 5.9 - 8.8 N·m)



WNU89-EM507

4. Installation of oil seal retainer

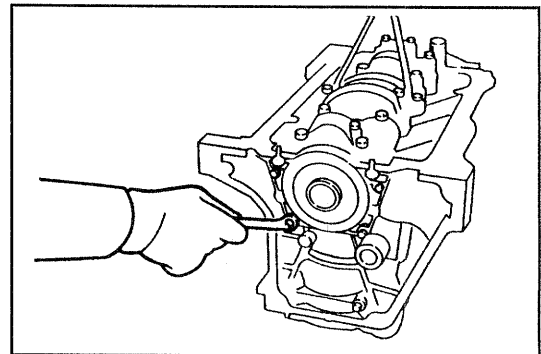
- (1) Apply the Three Bond 1207C to the oil seal retainer installation surface of the cylinder block, as indicated in the right figure.



WNU89-EM508

- (2) Apply engine oil to the inner surface of the oil seal. Install the oil seal retainer to the cylinder block. Perform tightening to the specified torque.

Tightening Torque: 0.6 - 0.9 kg-m
(4.4 - 6.5 ft-lb, 5.9 - 8.8 N·m)

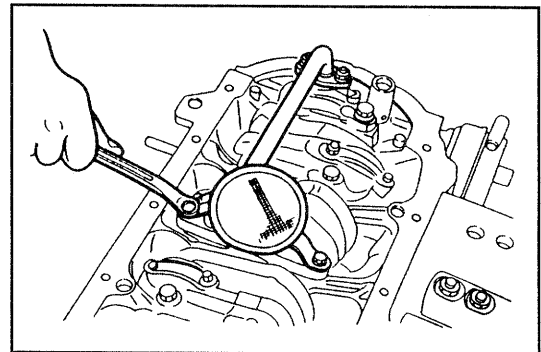


5. Install the oil strainer with a new gasket interposed.

Tightening Torque:

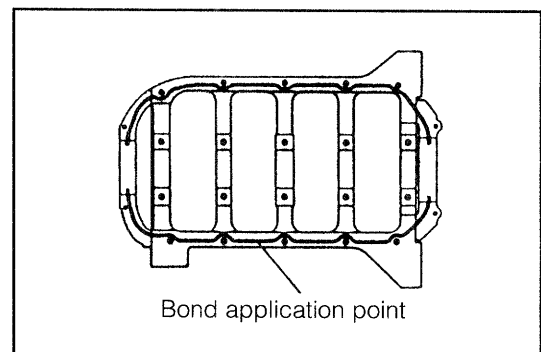
Bolt: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

Nut: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)



6. Installation of oil pan

- (1) Apply the Three Bond 1207C to the oil pan installation surface of the cylinder block, as indicated in the right figure.

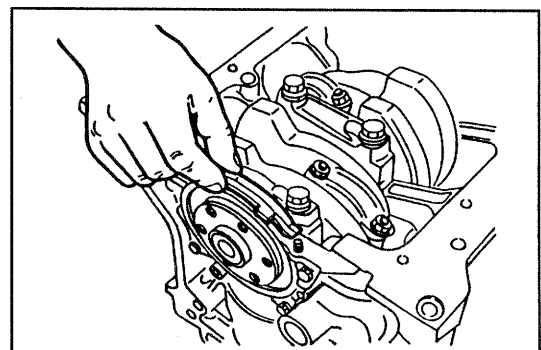


WNU89-EM511

- (2) Place the oil pan gasket.

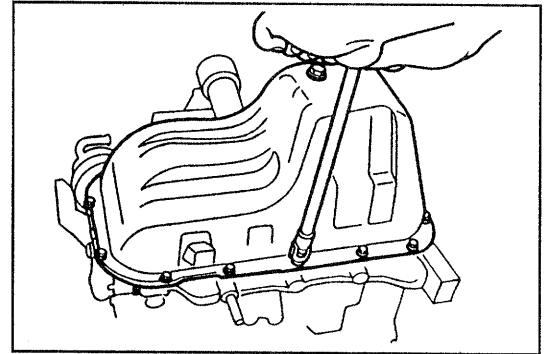
NOTE:

- Ensure that the end section of the oil pan gasket is overlapped at least 10 mm (0.39 inch) with the Three Bond 1207C.



- (3) Install the oil pan. Tighten the oil pan attaching nuts and bolts to the specified torque over two or three stages.

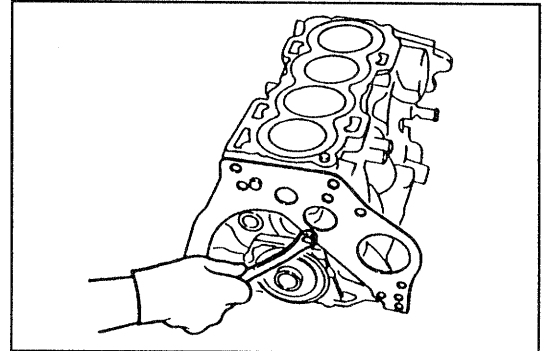
Tightening Torque: 0.7 - 1.2 kg-m
(5.1 - 8.7 ft-lb, 6.9 - 11.8 N·m)



WNU89-EM513

7. Install the rear end plate.

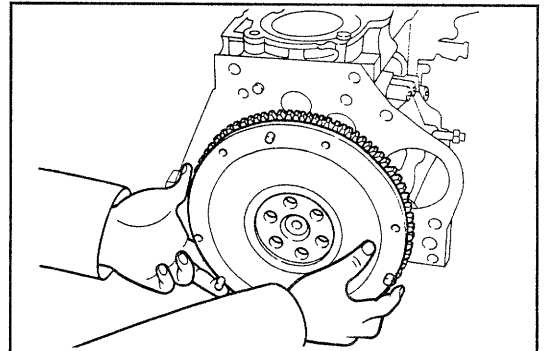
Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)



WRU90-EM305

8. Installation of flywheel

- (1) Install the flywheel on the crankshaft.



WRU90-EM306

(2) Application of flywheel bolt sealing material

- ① Wash the flywheel bolts. Then, degrease and dry them.

NOTE:

- When degreasing the bolts, remove any oil completely, using a solvent such as a degreasing spraying agent or alcohol.

CAUTION:

- Make sure that no bond nor other foreign matter, such as dust, gets to the bolts.
- Even when new bolts are used, be sure to perform this operation.

- ② Check the flywheel bolts for damage. Replace any flywheel bolt which exhibits damage with a new one.

CAUTION:

- Even when a new bolt is used, be sure to perform the operation in the step ①.

- ③ Clean the flywheel bolt threaded holes at the rear end section of the crankshaft. Degrease and dry them.

CAUTION:

- Make sure that no bond nor other foreign matter, such as dust, gets to the bolt threaded holes.
- As for degreasing, wipe off any oil from the threaded portion with a cloth damped with alcohol.
- Never allow alcohol to get to resin or rubber parts, specifically, the rear oil seal.

- ④ Clean the bolt seating surface of the flywheel and degrease it.

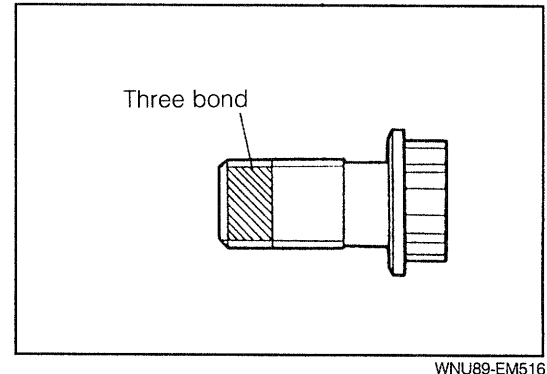
NOTE:

- As for degreasing, wipe the bolt seating surface with a cloth damped with alcohol.
- Never allow alcohol to get to resin or rubber parts.

- ⑤ Apply two to three drops of the Three Bond 1324 to the forward end of the threaded portion of each flywheel bolt.

CAUTION:

- If the Three Bond 1324 is applied excessively beyond the specified amount, the bond sealer will penetrate up to the bolt seating surface. This may cause loosening of the bolts.
- Never use bond sealers other than the designated one.
- Never allow the bond sealer to get to resin or rubber parts.



WNU89-EM516

- (3) Tighten the flywheel attaching bolts temporarily to the specified torque in the sequence indicated in the right figure.

Tightening Torque: 4.5 - 6.5 kg-m
(Temporarily) : (32.5 - 47.0 ft-lb, 44.1 - 63.7 N-m)

NOTE:

- Prevent the crankshaft from turning at the ring gear section, using the following SST.
- SST: 09210-87701-000

CAUTION:

- When tightening the bolt, make sure that no bond is present on the bolt seating surface.
- If the bond oozes out, perform the operations again, starting the step (2).

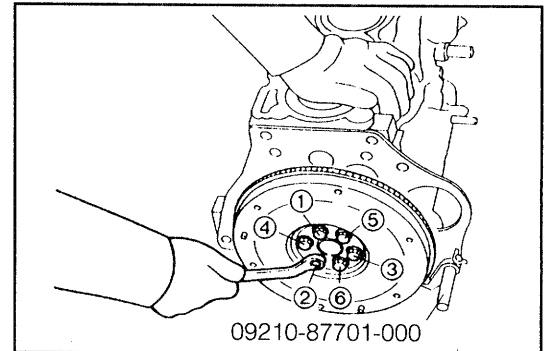
- (4) Tighten the flywheel attaching bolts to the specified torque in the sequence indicated in the right figure.

Tightening Torque: 8.0 - 10.0 kg-m
(57.9 - 72.3 ft-lb, 78.5 - 98.0 N-m)

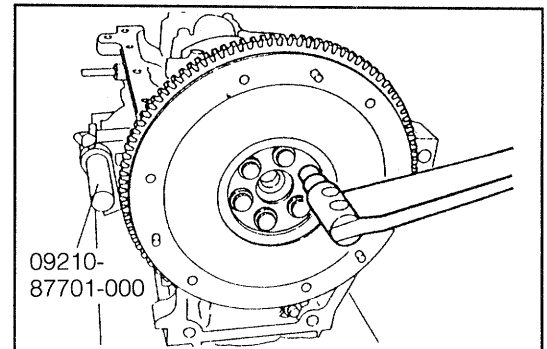
- (5) Measure the flywheel runout, using a dial gauge.
- Allowable Runout Limit: 0.1 mm (0.0039 inch)

NOTE:

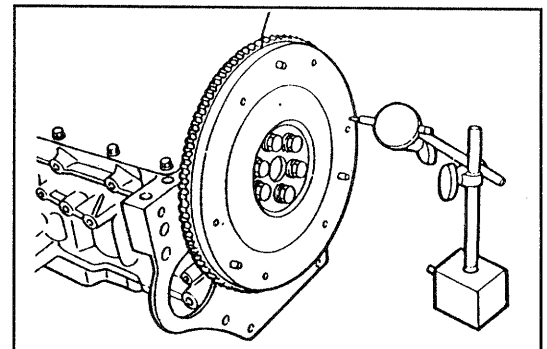
- Replace the flywheel if its runout exceeds the allowable limit.



WRU90-EM307



WRU90-EM308



WNU89-EM518

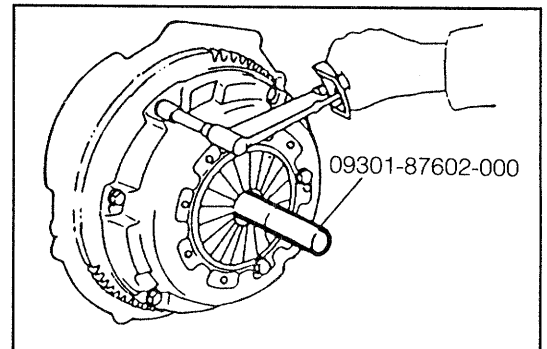
9. Assembly of clutch disc and clutch cover

- (1) Insert the following SST into the crankshaft rear end.
- SST: 09301-87602-000

- (2) Install the clutch disc.

- (3) Install the pressure plate, lining up the locating pin of the pressure plate. Tighten the attaching bolts to the specified torque.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

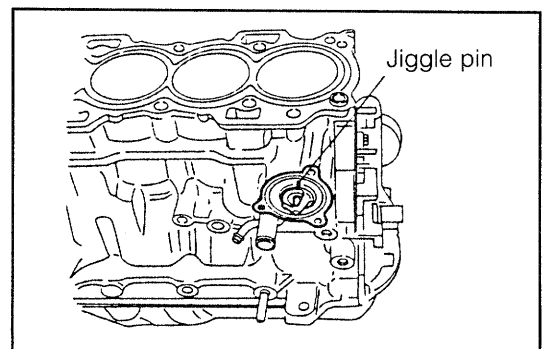


WRU90-EM309

10. Install the thermostat in the cylinder block in such a way that the jiggle pin section may come at the upper side.

CAUTION:

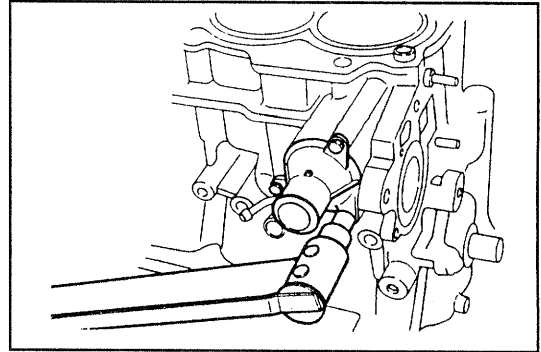
- Make sure to install the jiggle pin of the thermostat in the correct direction. Failure to observe this precaution will be cause of overheating.



WNU89-EM520

11. Install the water inlet.

Tightening Torque: 0.6 - 0.9 kg-m
(4.4 - 6.5 ft-lb, 5.9 - 8.8 N-m)



WNU89-EM521

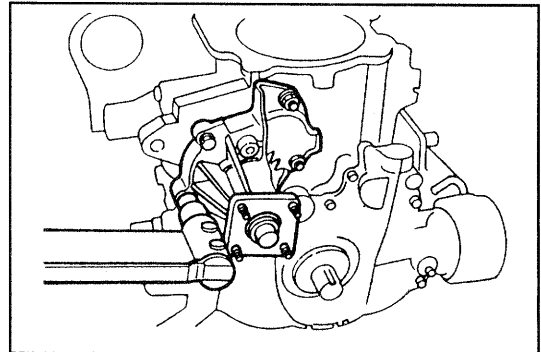
12. Installation of water pump

- (1) Install a new water pump gasket on the cylinder block.
- (2) Install and tighten the water pump to the specified torque.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

NOTE:

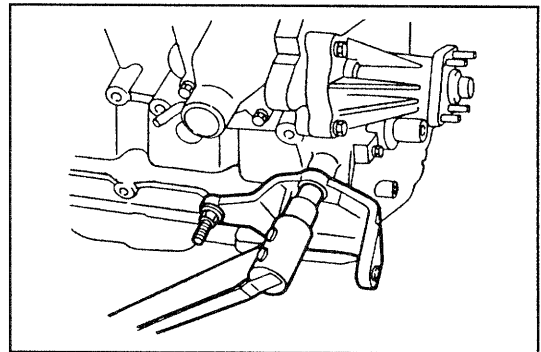
- When the stud bolts have been replaced, apply the Three Bond 1377B to the threaded portion at the cylinder block side.



WNU89-EM522

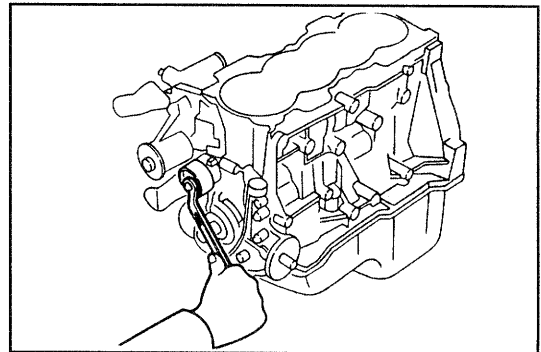
13. Install the alternator bracket.

Tightening Torque: 3.5 - 5.0 kg-m
(25.3 - 36.2 ft-lb, 34.3 - 49.0 N-m)



WNU89-EM523

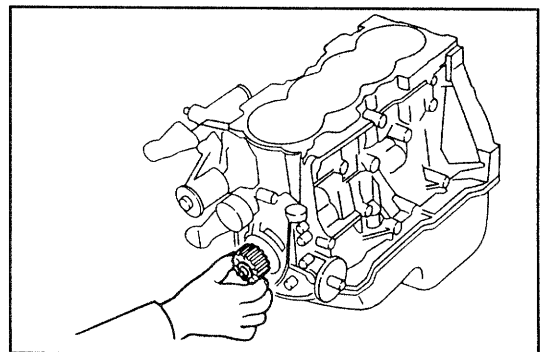
14. Assemble the tensioner tension spring as indicated in the right figure. Push the tensioner to the alternator side as far as it will go. Tighten the tensioner temporarily.



WNU89-EM524

15. Install the crankshaft pulley flange in such a way that its recessed side may come at the cylinder block side.

16. Install the crankshaft timing belt pulley.



WNU89-EM525

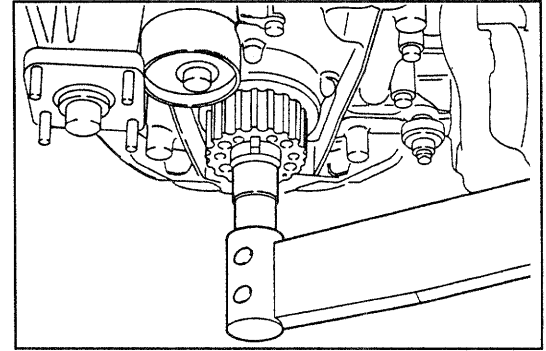
17. Install the crankshaft timing belt attaching bolt. Tighten the bolt to the specified torque.

Tightening Torque: 9.0 - 10.0 kg-m
(65.1 - 72.3 ft-lb, 88.3 - 98.0 N·m)

NOTE:

- Prevent the crankshaft from turning, using the following SST.

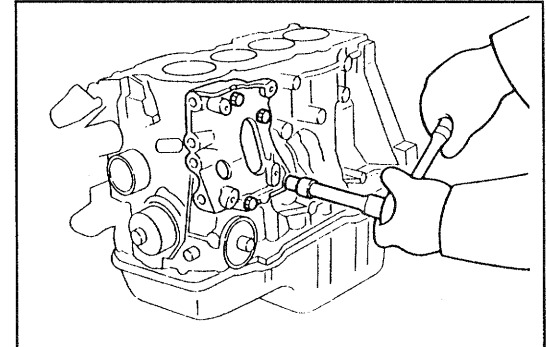
SST: 09210-87701-000



WRU90-EM310

18. Install the compressor mounting bracket.

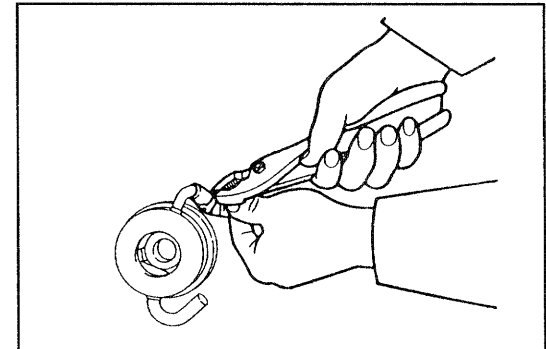
Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)



WNU89-EM527

19. Install the oil cooler.

- Install a new "O" ring.
- Connect the oil cooler hose to the oil cooler.
- Place the rib for locating the oil cooler to the cylinder block. Then install the oil cooler with the set bolts.

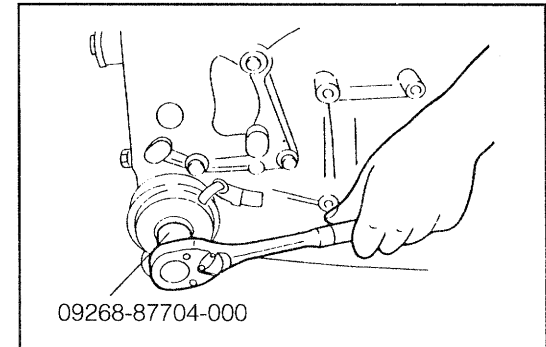


WNU89-EM528

- Tighten the set bolts to the specified torque using the following SST.

SST: 09268-87704-000

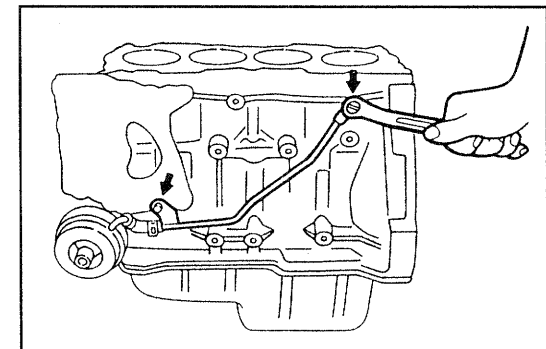
Tightening Torque: 2.5 - 3.5 kg-m
(18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)



09268-87704-000

WNU89-EM529

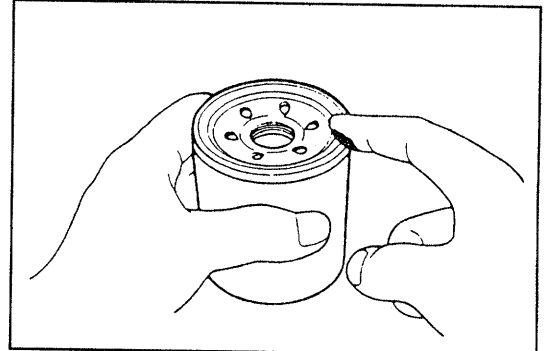
- Connect the oil cooler inlet pipe into the oil cooler hose and install the hose band.
- Install the oil cooler pipe to the cylinder block with a new gasket interposed.



WNU89-EM530

20. Installation of oil filter

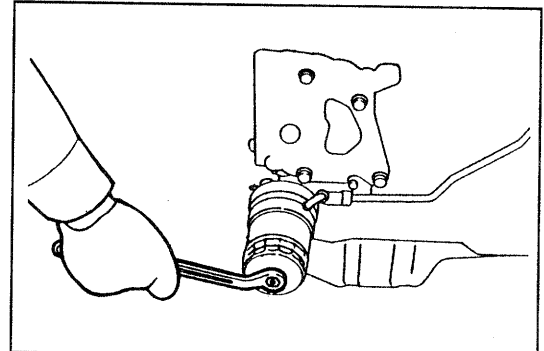
(1) Thinly apply engine oil to the oil seal of the oil filter.



WNU89-EM531

(2) Screw in the oil filter until the oil seal of the oil filter comes in contact with the oil pump or the contact surface of the oil cooler.

(3) Then, rotate the oil filter three fourths to one turn.



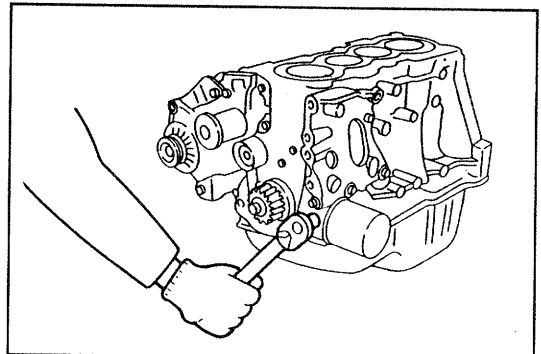
WRU90-EM311

21. Installation of oil pressure switch

(1) Clean the threaded portion of the oil pressure switch. Wind seal tape around the threaded portion.

(2) Tighten the oil pressure switch to the specified torque using a long box wrench having a hexagonal hole.

Tightening Torque: 1.2 - 2.0 kg-m
(8.7 - 14.5 ft-lb, 11.8 - 19.6 N·m)



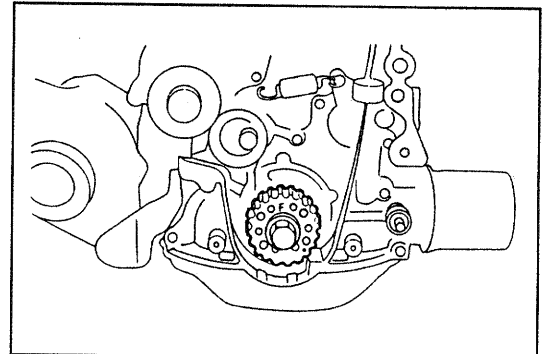
WNU89-EM533

22. Install the alternator.

ASSEMBLY OF CYLINDER HEAD WITH MANIFOLDS

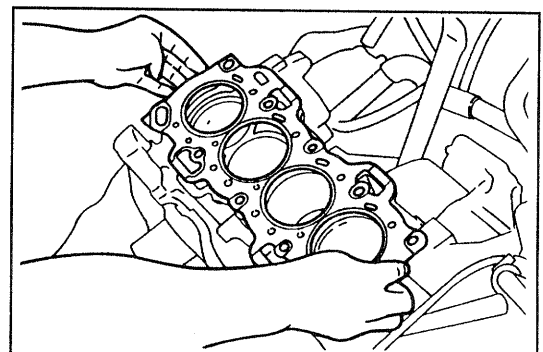
(See page EM-36)

1. Align the drilled mark of the crankshaft timing belt pulley with the indicator of the oil pump.



WRU90-EM312

2. Install the cylinder head gasket on the cylinder block.

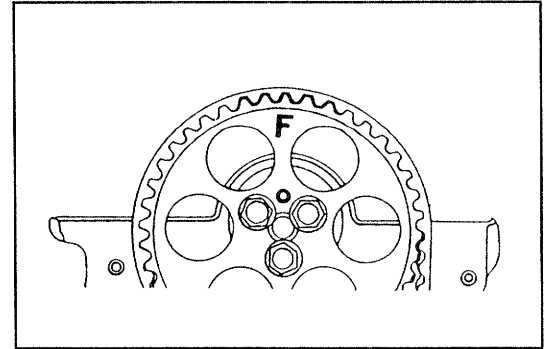


WNU89-EM535

3. Turn the camshaft, until the "F" mark of the camshaft timing belt pulley comes exactly at the top position.
4. Install the cylinder head assembly on the cylinder block.

NOTE:

- Be very careful not to damage the cylinder head gasket and cylinder head gasket surface.



WRU90-EM313

5. Apply engine oil to the threaded portion of each cylinder head bolt. Install the bolts to the cylinder head.

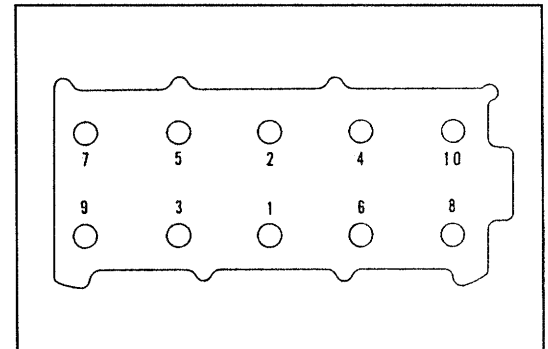
NOTE:

- As for the two bolts at the distributor side, use the bolt whose nominal length is 112 mm (4.41 inch), which is shorter than that of others.
- The cylinder head bolt attaching holes provided on the cylinder block should be dry condition.

WNU89-EM537

6. Tighten the cylinder head bolts evenly over two or three stages to the specified torque, following the sequence shown in the right figure.

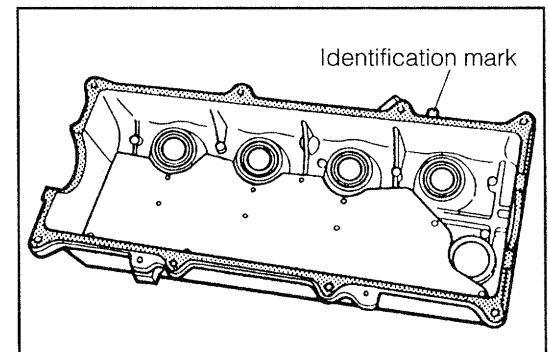
Tightening Torque: 6.0 - 6.8 kg-m
(43.4 - 49.2 ft-lb, 58.8 - 66.7 N-m)



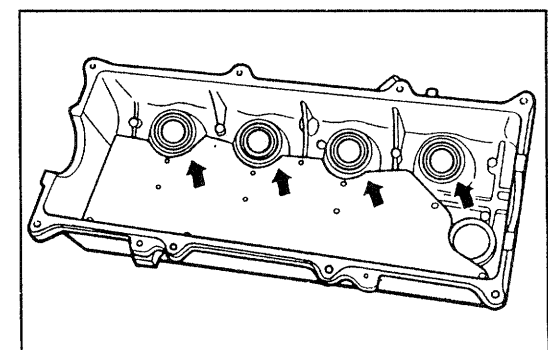
WNU89-EM538

INSTALLATION OF CYLINDER HEAD COVER

1. Check the cylinder head cover gasket for damage. Replace the cylinder head cover gasket if it is damaged.
2. Removal of cylinder head cover gasket
(Only case where such replacement is required:)
Remove the cylinder head cover gasket from the cylinder head cover. Install a new cylinder head cover gasket in such a way that the identification mark comes at the intake side.
3. Check the spark plug tube grommets for damage. Replace any grommet which exhibits damage.
(See page EM-73.)

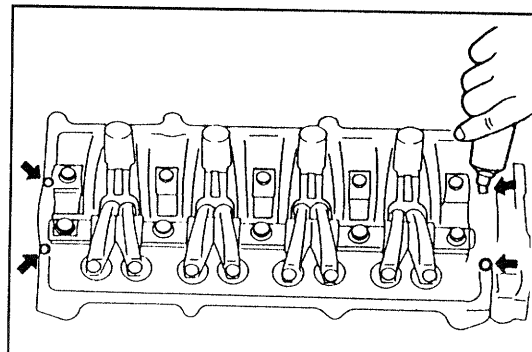


WNU89-EM539



WRU90-EM314

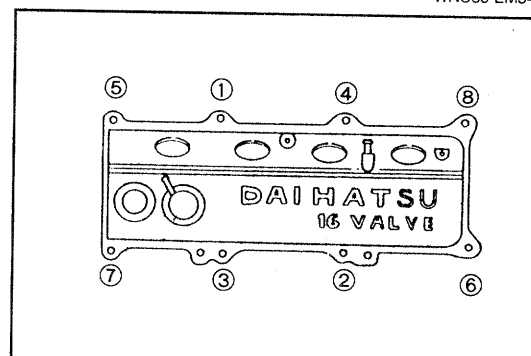
4. Wipe off any oil from the cylinder head cover gasket surface of the cylinder head.
5. Apply the Three Bond 1104 to the mate surface of the cylinder head with the camshaft bearing caps No. 1 and No. 5, but only to those sections which contact the cylinder head gasket.



WNU89-EM541

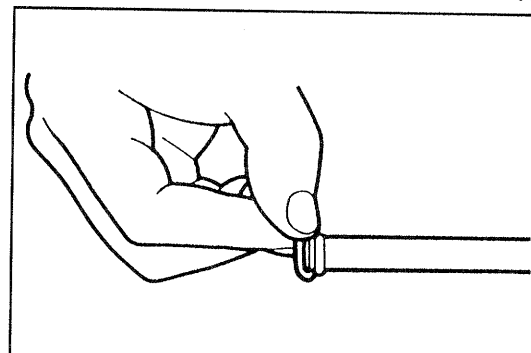
6. Install the cylinder head cover to the cylinder head. Tighten the cylinder head cover attaching bolts to the specified torque, following the sequence in the right figure.

Tightening Torque: 0.3 - 0.5 kg-m
(2.2 - 3.6 ft-lb, 2.9 - 4.9 N-m)



WNU89-EM542

7. Replace the "O" ring of the oil level gauge guide with a new "O" ring.

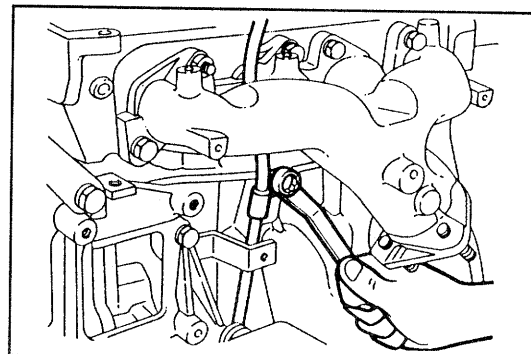


WRU90-EM316

8. Insert the oil level gauge guide into the cylinder block.

9. Install the oil level gauge guide attaching bolts.

Tightening Torque: 1.9 - 3.1 kg-m
(13.7 - 22.4 ft-lb, 18.6 - 30.4 N-m)



WRU90-EM316

10. Install the oil level gauge.

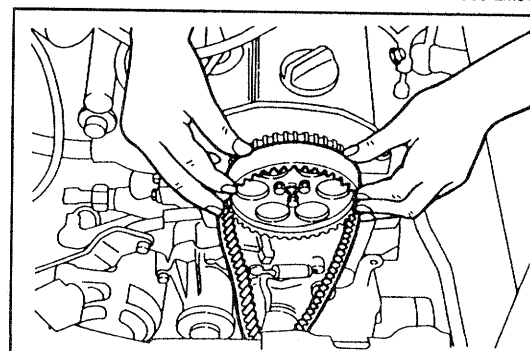
11. Installation of timing belt

- (1) Check the timing belt.

(See page EM-26.)

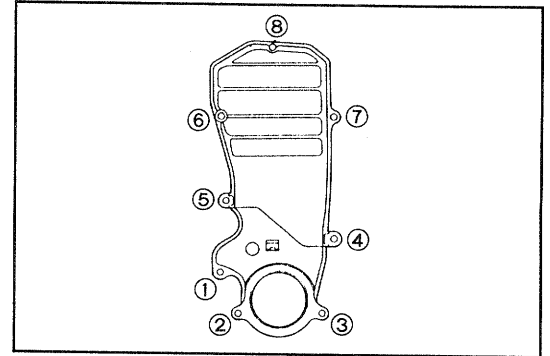
- (2) Install the timing belt.

(See page EM-28.)



WRU90-EM317

12. Install the timing belt cover.
(See page EM-33.)

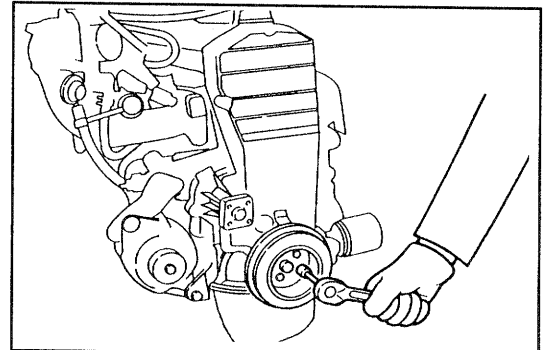


WRU90-EM318

13. Install the crankshaft pulley.
Tightening Torque: 2.0 - 3.0 kg-m
(14.5 - 21.7 ft-lb, 19.6 - 29.4 N·m)

NOTE:

- Prevent the crankshaft from turning, using the following SST.
- SST: 09210-87701-000



WRU90-EM319

INSTALLATION OF ENGINE ASSEMBLY

Operations before installation

- Install the cylinder head assembly onto the cylinder block.
(See page EM-69.)
- Install the engine wire and the engine ground cable onto the cylinder block.
- Install the alternator onto the cylinder block and securely connect the alternator harness clamp.

WARNING:

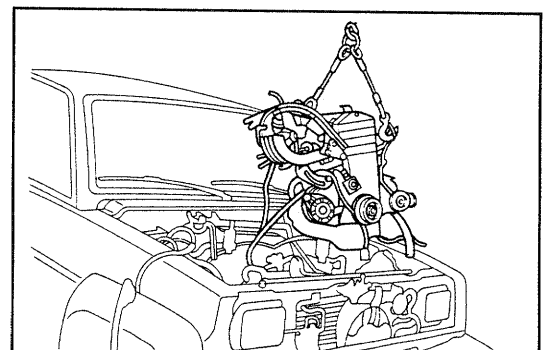
Be very careful not to pinch your fingers or hands while installing the engine assembly into the engine compartment.

CAUTION:

- Be careful not to allow the engine assembly to hit the vehicle body and/or other parts.

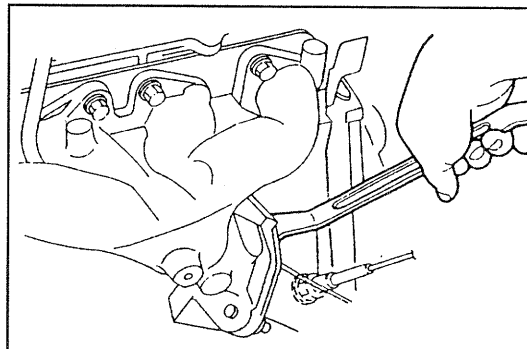
WRU90-EM320

1. Connection of engine and transmission
 - (1) Carefully lower the engine assembly into the engine compartment by using the chain block in order to align the input shaft and the crankshaft rear end bearing.
 - (2) Tighten the engine and transmission attaching bolts temporarily.



WRU90-EM321

- (3) Connect the exhaust pipe to the exhaust manifold with a new gasket interposed with the three attaching bolts temporarily.



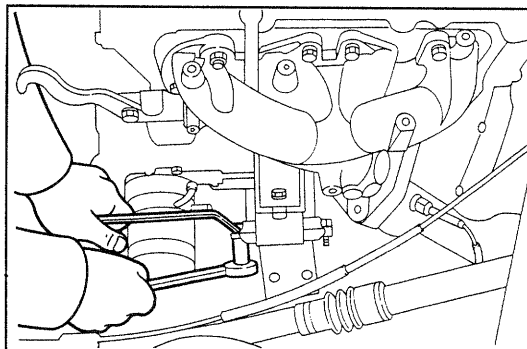
WRU90-EM322

- (4) Connect the engine mounting LH with the engine mounting bracket.

Tightening Torque:

NUT: 3.5 - 5.5 kg-m
(25.3 - 39.8 ft-lb, 34.3 - 53.9 N·m)

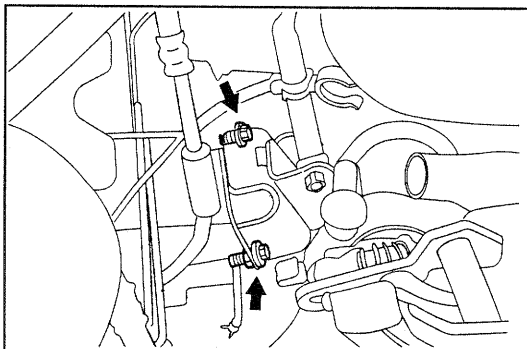
BOLT: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)



WRU90-EM323

- (5) Connect the engine mounting RH with the engine mounting bracket.

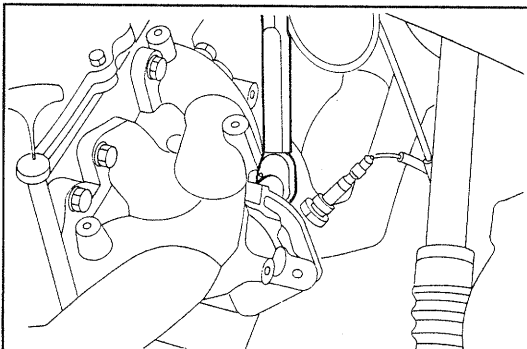
Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)



WRU90-EM324

- (6) Tighten the exhaust manifold with the exhaust pipe.

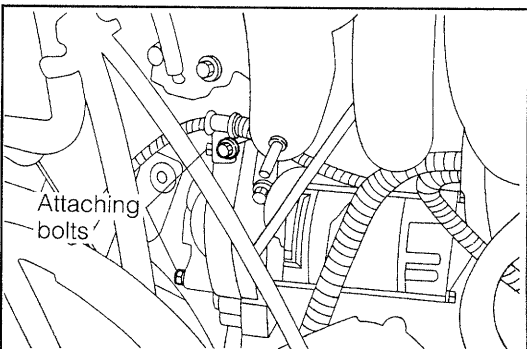
Tightening Torque: 4.5 - 5.5 kg-m
(32.5 - 39.8 ft-lb, 44.1 - 53.9 N·m)



WRU92-EM426

- (7) Install the starter motor onto the cylinder block with two attaching bolts.

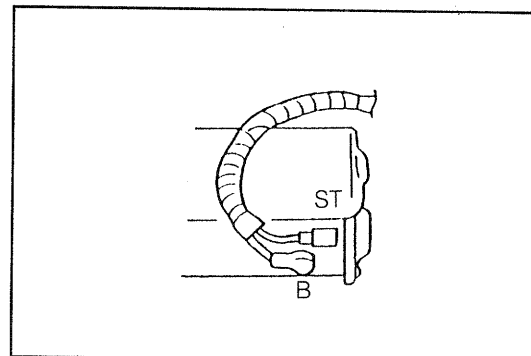
Tightening Torque: 5.0 - 7.0 kg-m
(36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)



WRU90-EM326

(8) Installation of starter motor harness

- ① Insert the ST terminal harness into position until securely locked.
- ② Install the B terminal onto starter motor with attaching bolt.



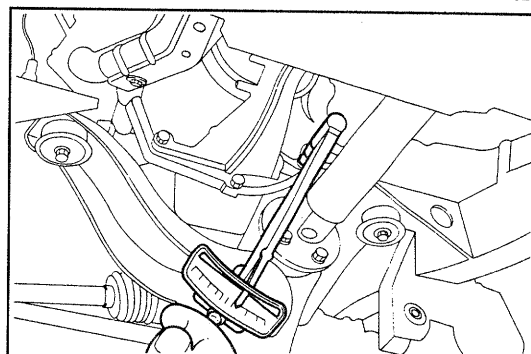
WRU90-EM327

(9) Securely tighten the attaching bolts between engine and transmission.

Tightening Torque: 5.0 - 7.0 kg-m
(36.2 - 50.6 ft-lb, 49.0 - 68.6 N-m)

(10) Tighten the engine end plate with an attaching bolt.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

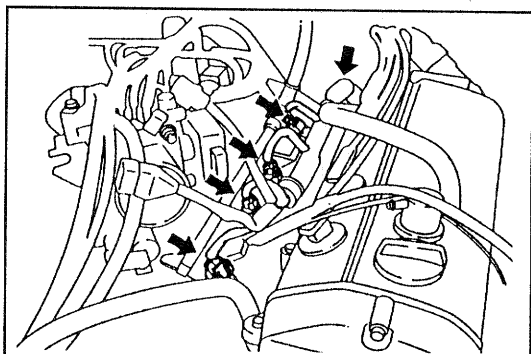


WRU90-EM328

2. Installation of engine wire for ECU

(See page EM-152.)

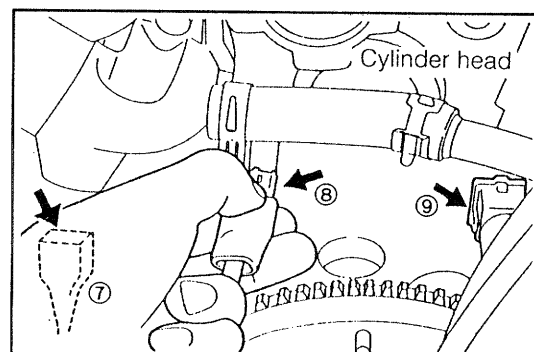
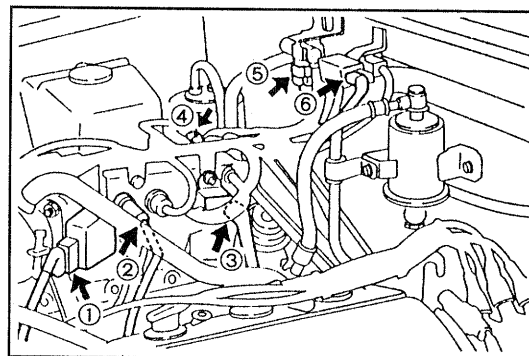
- (1) Pull the engine wire connector for ECU from the cowl side panel of passenger seat side through the dash panel hole.
- (2) Securely connect the engine wire connector to the ECU.
- (3) Install the ECU cover onto the ECU.



WRU90-EM329

(4) Connect the following engine wire connectors with each part securely.

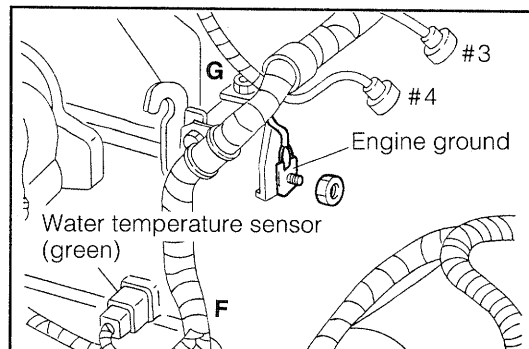
- Water temperature sender gauge
- Water temperature sensor
- Water temperature switch (for A/C)
- O₂ sensor
- Injector
- Oil pressure switch
- Throttle sensor
- Intake air temperature sensor
- ISC VSV
- EGR VSV
- Pressure sensor
- Pressure VSV



WRU90-EM330

- (5) Installation of engine ground cable
- ① Ensure that the engine ground cable is securely tightened onto the cylinder block.
- Tightening Torque:** 5.0 - 7.0 kg-m
(36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)

- ② Install the engine ground cable between the surge tank stay No.3 and the fuel filter bracket.

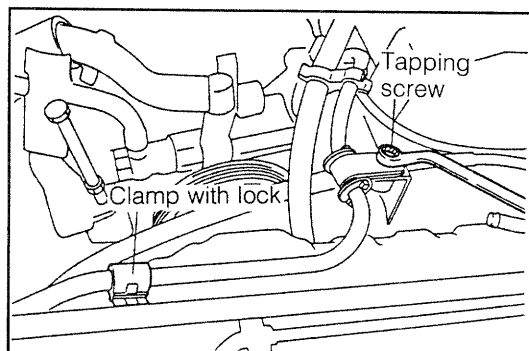


WRU90-EM331

- (6) Connect the engine wire to the relay block side.

NOTE:

- Securely tighten the wire with the two clamps.

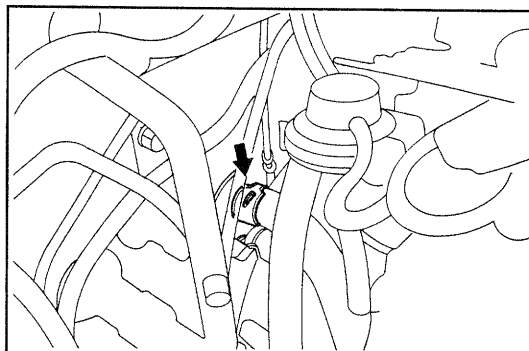


WRU90-EM332

3. Connect the heater inlet and outlet hoses with the heater hose union at the dash panel.

NOTE:

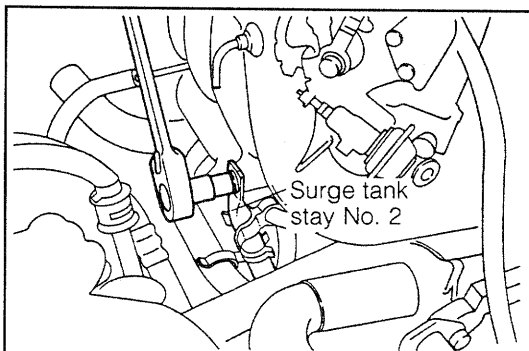
- Be sure not to damage the hose installation position.
- Be sure to clamp the hose with the clip.



WRU90-EM333

4. Install the surge tank stay No.2 between the engine mounting bracket and the intake manifold.

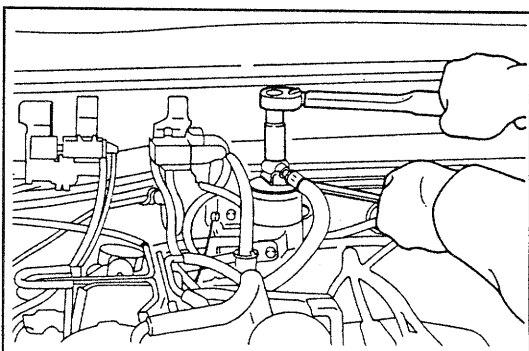
Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)



WRU90-EM334

5. Connect the fuel hose No.1 to the fuel filter.

Tightening Torque: 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N·m)

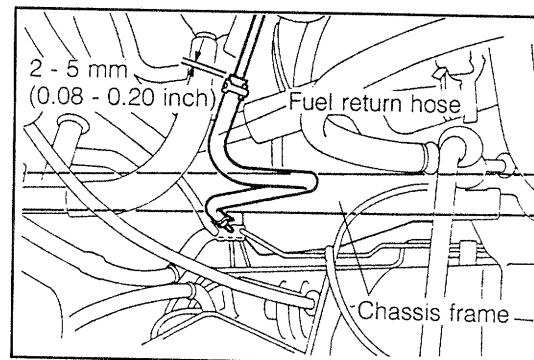


WRU90-EM335

6. Connection of fuel return hose to fuel pipe No.2
 - (1) Insert the fuel return hose onto the fuel pipe No.2 until second spool of fuel pipe.
 - (2) Securely clamp the fuel hose at 2 - 5 mm (0.08 - 0.20 inch) from the fuel return hose end.

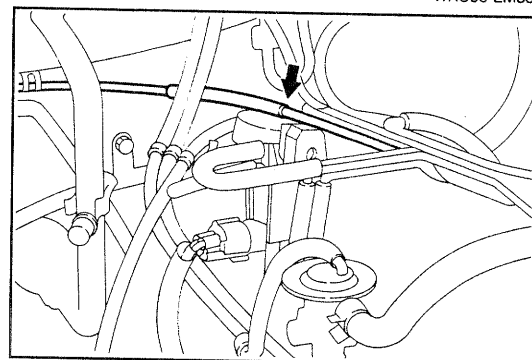
NOTE:

- Install the fuel return hose in parallel with chassis frame.



WRU90-EM336

7. Install the charcoal canister hose to the vacuum pipe provided on the surge tank.

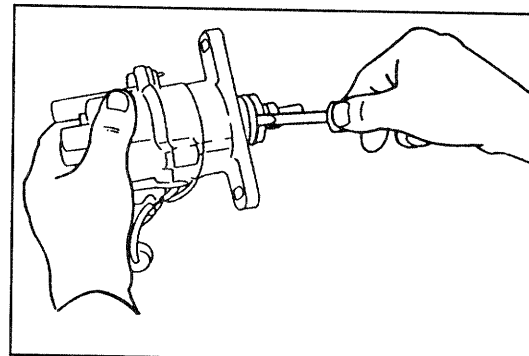


WRU90-EM337

8. Installation of the distributor
 - (1) Replace the "O" ring of the distributor body with a new one.

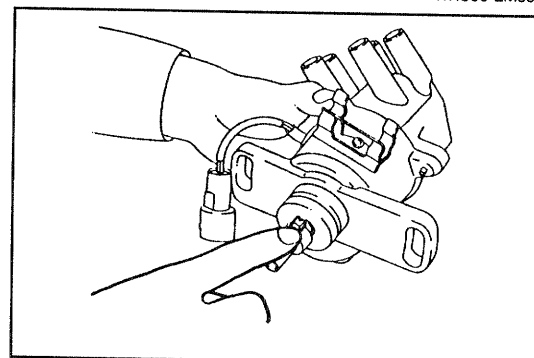
NOTE:

- Care must be exercised to avoid scratching the new "O" ring.



WRU90-EM338

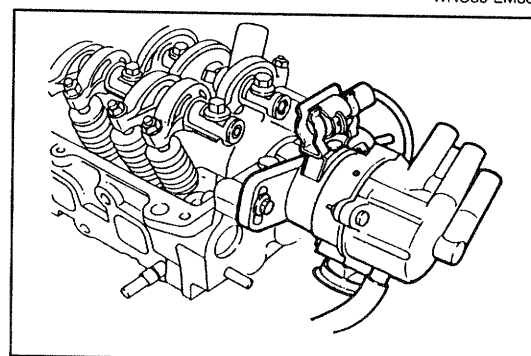
- (2) Align the cutout section of the distributor proper with the cutout groove of the coupling. Assemble the distributor on the cylinder head, lining up the protrusion of the distributor with the camshaft groove. During this installation, the aligned cutout sections must come at the top side of the engine.



WNU89-EM304

- (3) With the center of each elongated hole on the flange section of the distributor proper aligned with the corresponding threaded hole of the cylinder head, tighten the distributor attaching bolts.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

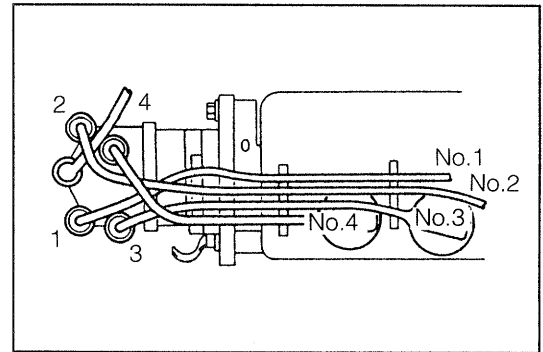


WNU89-EM305

(4) Connect the distributor connector.

NOTE:

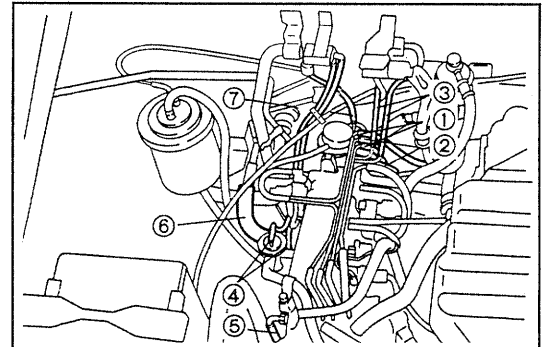
- Be sure to install the spark plug wire into the distributor cap as indicated in the right figure.



WRU90-EM339

9. Connect the following vacuum hoses to each part.

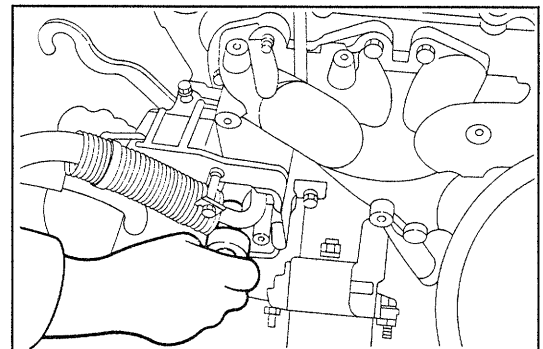
- (1) Distributor main and sub diaphragm ①
- (2) BVSV ②
- (3) Pressure VSV ③
- (4) Air conditioner idle-up VSV ④
- (5) Power steering ACV ⑤
- (6) Brake booster ⑥
- (7) Charcoal canister ⑦



WRU90-EM340

10. Install the air conditioner compressor onto the compressor bracket together with resistance cover with mounting bolts.

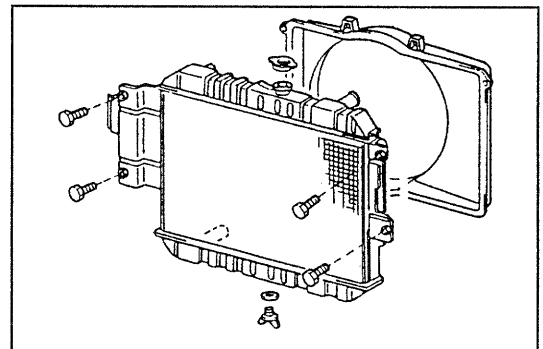
Tightening Torque: 2.5 kg-m (18 ft-lb, 24.5 N-m)



WRU92-EM424

11. Put the radiator onto position with four attaching bolts.

Tightening Torque: 1.0 - 1.6 kg-m
(7.2 - 11.6 ft-lb, 9.8 - 15.7 N-m)

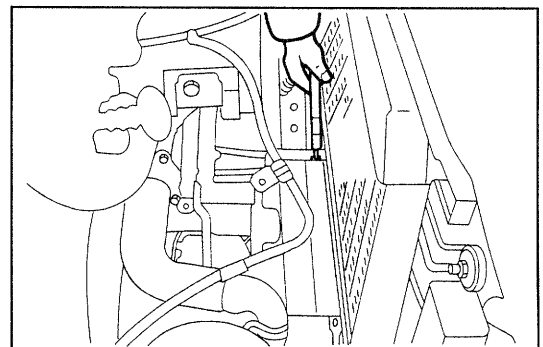


WRU90-EM342

12. Connect the radiator outlet hose and oil cooler hose to the radiator.

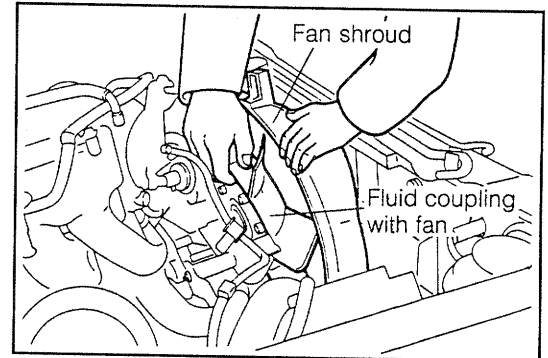
NOTE:

- Make sure that the clamps are securely installed.



WRU90-EM343

13. Put the radiator fan shroud into position together with fluid coupling with fan.



WRU90-EM344

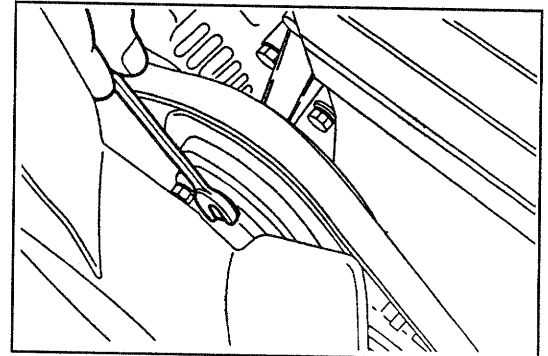
14. Installation of fluid coupling with fan and fan shroud
(1) Temporarily install the water pump pulley.

NOTE:

- Be sure that the water pump pulley is seated properly to the water pump.

- (2) Install the fluid coupling with fan to the water pump by means of four bolts through water pump pulley.

Tightening Torque: 1.0 - 1.8 kg-m
(7.2 - 13.0 ft-lb, 9.8 - 17.7 N-m)

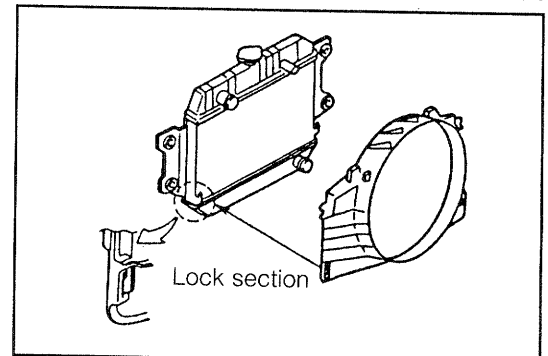


WRU90-EM345

REFERENCE:

Tightening torque of fluid coupling and fan is as follows.
0.44 - 0.66 kg-m (3.2 - 4.8 ft-lb, 4.3 - 6.5 N-m)

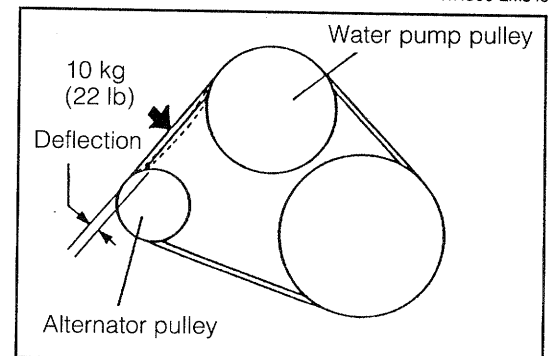
- (3) Insert the lock section of fan shroud to the radiator. Then, tighten the two attaching bolts of the radiator upper side.
(4) Connect the water hose to the radiator upper tank. Securely clamp the water hose clamp.



WRU90-EM346

15. Install the V ribbed belt and perform the adjustment in such a way that the deflection at the midpoint between the water pump pulley and the alternator may become the specified value when a force of 10 kg (22 lb) is applied to the midpoint.

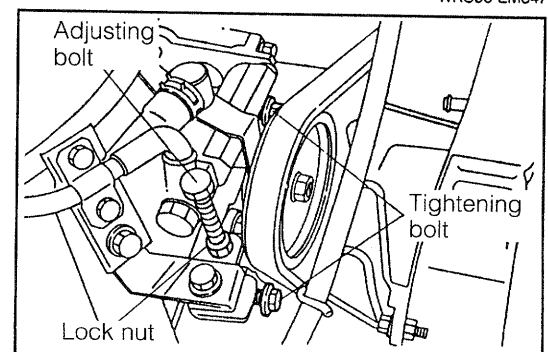
Used Belt: 5.0 - 6.0 mm (0.197 - 0.236 inch)
With a force of 10 kg (22 lb) applied to point indicated in figure



WRU90-EM347

16. Installation of the power steering pump and drive belt (P/S equipped vehicle only)

- (1) Install the power steering pump assembly into the position.
(2) Install the power steering drive belt.

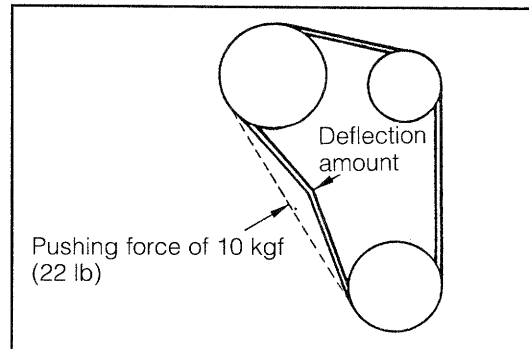


WRU90-EM348

- (3) Set the drive belt tension to the specified value by tightening the adjusting bolt.

Specified Deflection: 9 - 11 mm (0.35 - 0.43 inch)

[When a force of 10 kg (22 lb) is applied:]

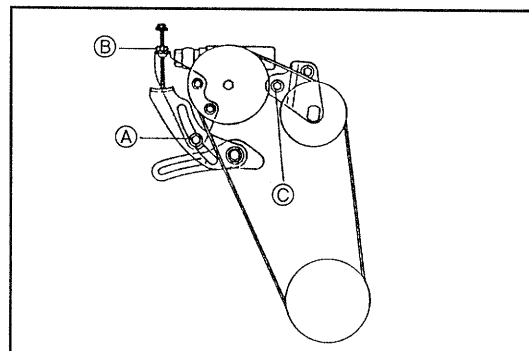


WRU90-EM349

- (4) Tighten the bolts to the specified value.

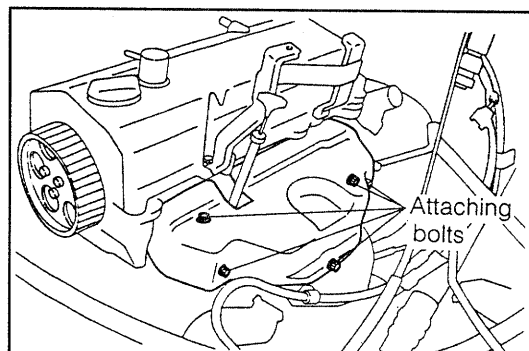
Tightening Torque:

- Ⓐ 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N·m)
- Ⓑ 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)
- Ⓒ 5.0 - 7.0 kg-m
(36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)



WRU90-EM350

17. Tighten the exhaust manifold cover temporarily.

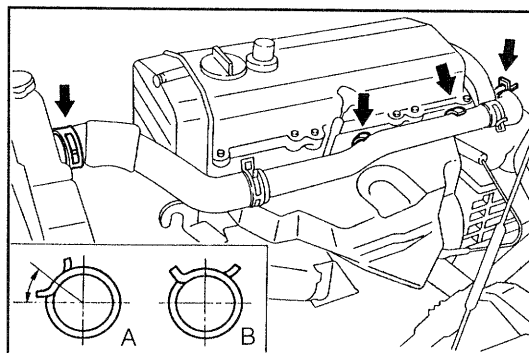


WRU90-EM351

18. Install the radiator hose No. 1 to the radiator upper tank. Tighten the two clamps and two attaching bolts.

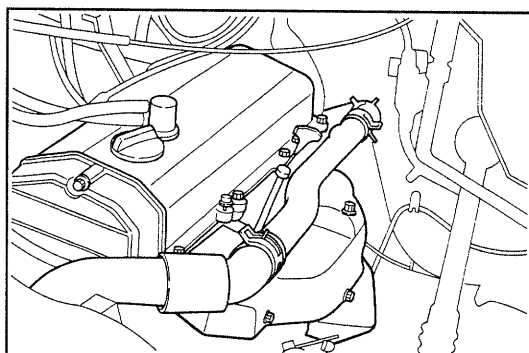
NOTE:

- Ensure that the clamps are installed as illustrated in right figure.



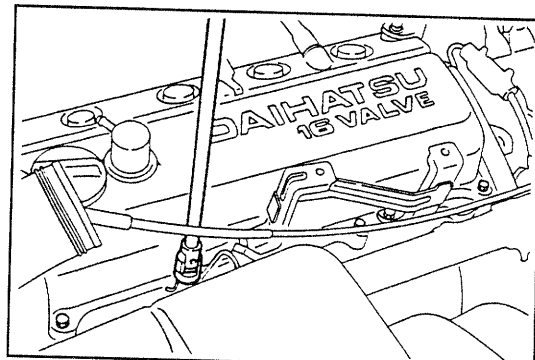
WRU90-EM352

19. Tighten the exhaust manifold cover with five attaching bolts.



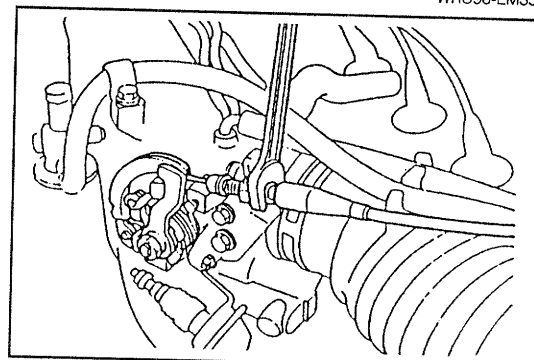
WRU90-EM353

20. Install the air chamber bracket and the accelerator cable clamp onto the cylinder head cover with attaching bolts.



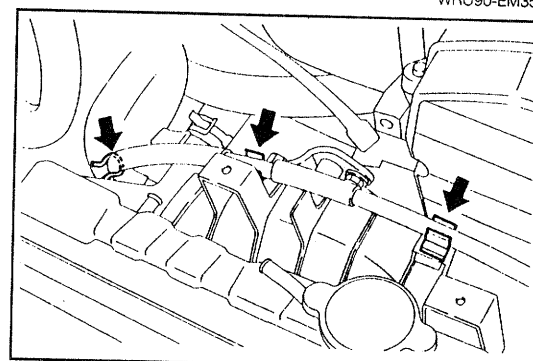
WRU90-EM354

21. Install the accelerator cable to the throttle body.
22. Adjust the accelerator cable so that the accelerator pedal free ply may become 1 - 5 mm (0.04 - 0.20 inch).



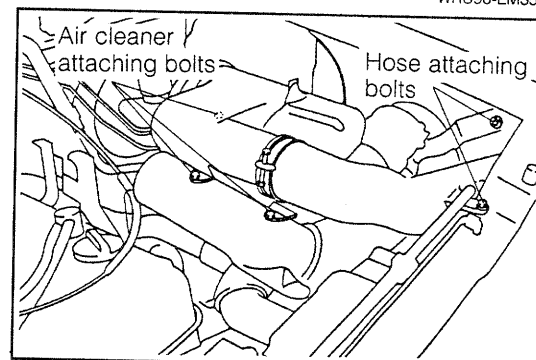
WRU90-EM355

23. Fix the clutch cable with three clamps.



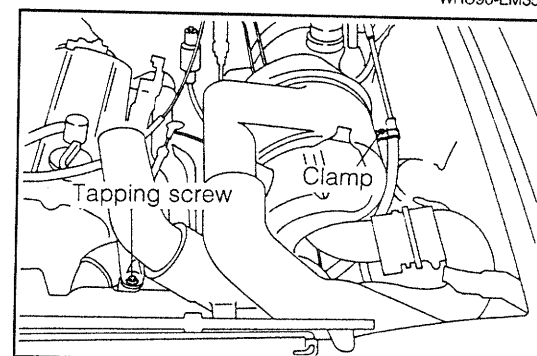
WRU90-EM356

24. Installation of the air cleaner sub assembly
 - (1) Install the air cleaner sub assembly into position. Then tighten the three attaching bolts.
 - (2) Tighten the attaching bolts to the left fender panel and radiator center support.



WRU90-EM357

- (3) Tighten the tapping screw at the fan shroud.
 - (4) Install the clutch cable clamp to the air cleaner.



WRU90-EM358

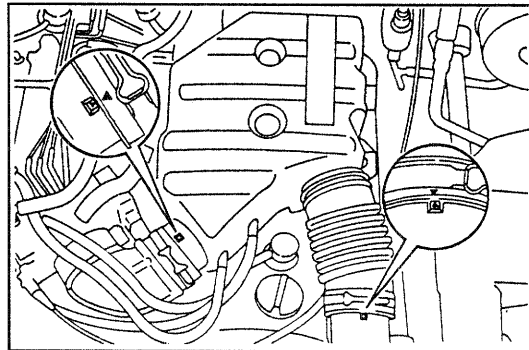
ENGINE MECHANICALS

25. Installation of air chamber

- (1) Install the air chamber with three attaching screws and two clamps.

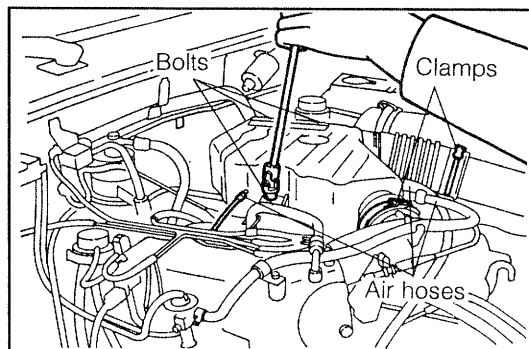
NOTE:

- Align the matching marks provided on the air chamber and air hose.



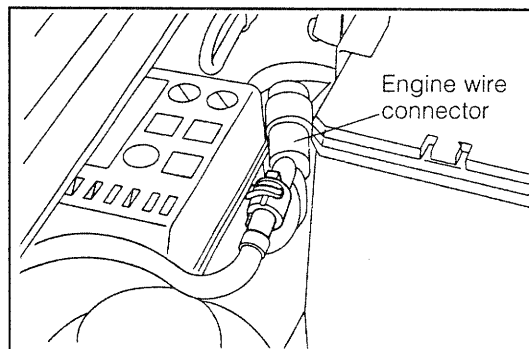
WRU90-EM359

- (2) Install the air hoses for air conditioner and power steering idle-up.



WRU90-EM360

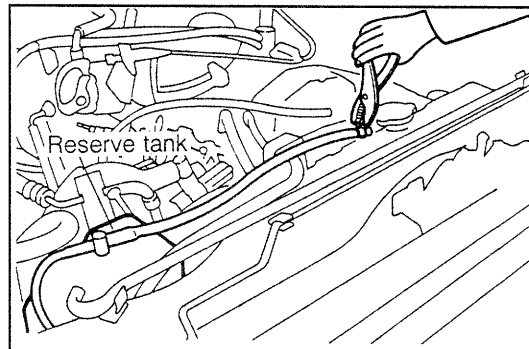
26. Connect the connectors located around the fuse and relay box.



WRU90-EM361

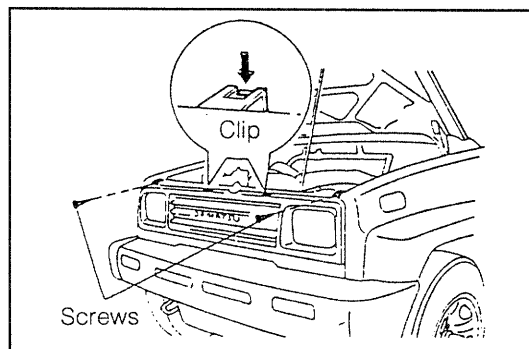
27. Installation of reserve tank

- (1) Securely insert the reserve tank into the bracket.
- (2) Clamp the reserve tank with clip securely.



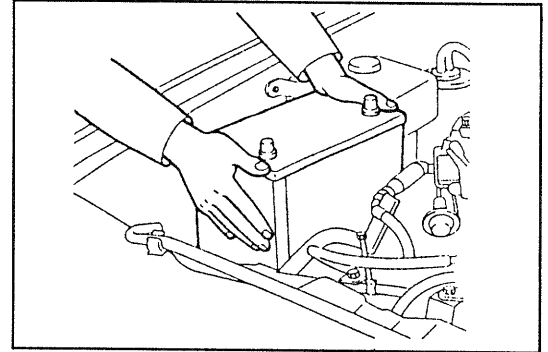
WRU90-EM362

28. Install the front grille.



WRU90-EM363

30. Installation of battery
- (1) Install the battery tray onto position.
 - (2) Put the battery onto position and securely tighten the battery holding clamps.



WRU90-EM364

31. Fill the radiator and reserve tank with coolant.
(See page CO-4.)
32. Fill the engine with oil.
(See page LU-6.)
33. Install the engine hood into position with four bolts.

NOTE:

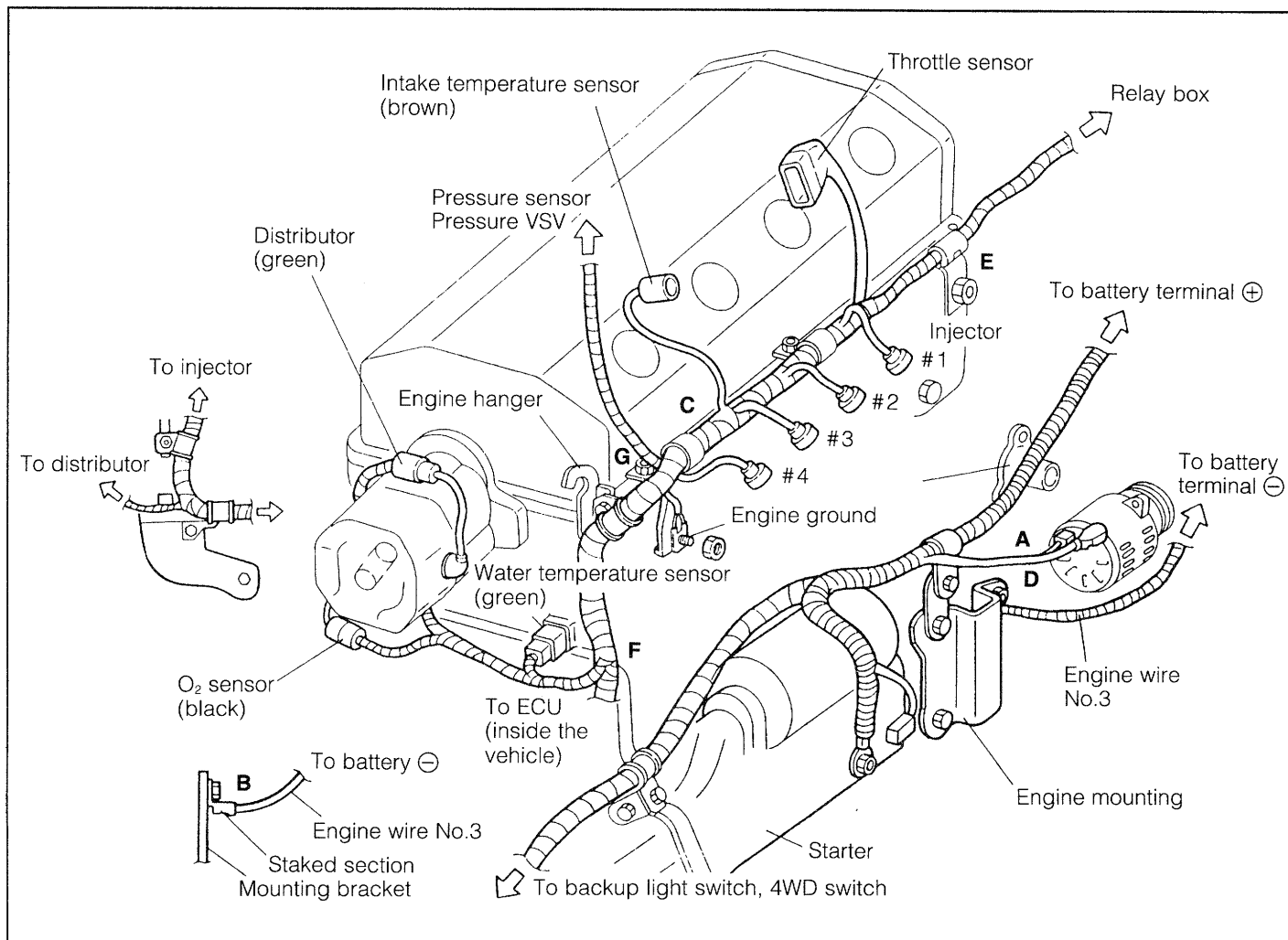
- Be careful not to damage the engine hood.

34. Connect the window washer hose.
35. Connect the wire of the positive terminal to the battery positive \oplus terminal.
36. Connect the battery ground cable to the negative \ominus terminal of the battery.
37. Start the engine. Ensure that the engine exhibits no leakage of cooling water or oil.
38. Perform the engine tune-up.
(See page EM-9.)

WRU90-EM365

Connection of Engine Wire harness

1. Engine Wire Harness (1)

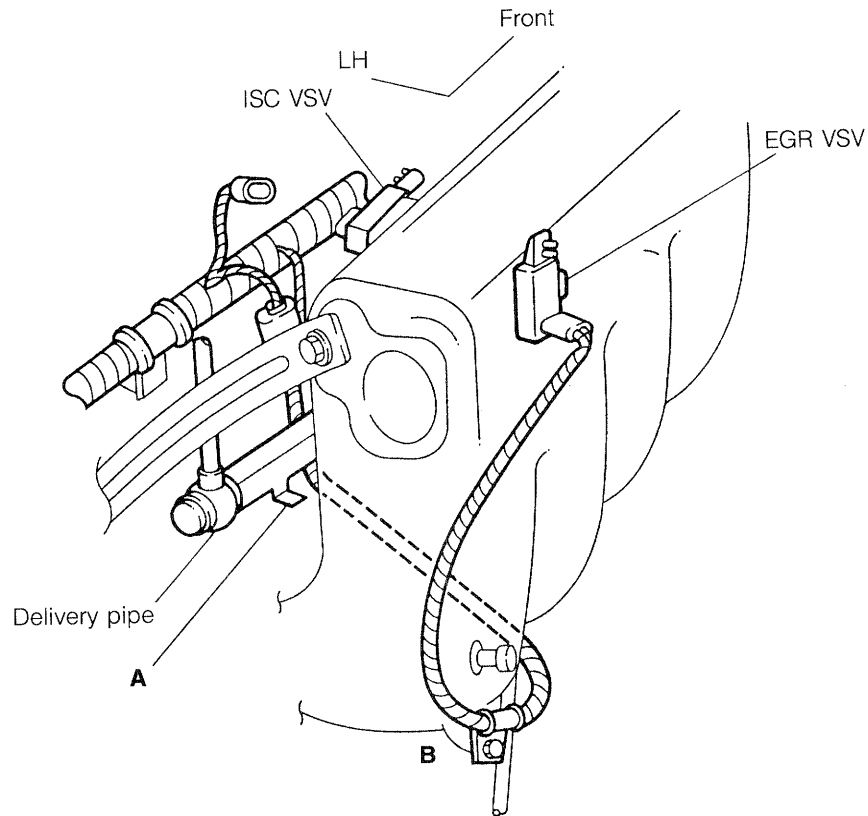


WRU90-EM366

No.	Work procedure	Parts	control item
1	Route the alternator wire under the heater hose and above the engine wire No. 3.	A	Ensure that the alternator wire is routed under the heater hose and above the engine wire No. 3.
2	Install the engine wire No. 3 in such a way that its staked section (B) may come at the lower side in relation with the attaching bolt.	B	Ensure that its staked section (B) comes at the lower side of the attaching bolt.
3	Install the harness at the section C in such a way that the white marking may come at the exact top position.	C	Ensure that the white marking comes at the exact top position. (Ensure that the junction of the injector with the intake air temperature sensor comes at the exactly top position.)
4	Tighten the alternator terminal B in such a direction that the harness points exactly toward the back of the alternator.	D	Ensure that the harness points exactly toward the back of the alternator.
5	As for the clamp provided at the forward edge of the intake manifold, install the clamp in such a way that it may embrace the harness. Also, bend the claw.	E	Ensure that the embraced section is retained positively by the claw.
6	Install the common clamp at the mating section with the transmission in such a direction that the ECU harness may point horizontally.	F	Ensure that the ECU harness points horizontally and toward the outside.
7	Route the junction of the pressure sensor with idle-up VSV harness in such a direction that the junction may point of the top position.	G	Ensure that the junction of the pressure sensor with the idle-up VSV is not routed below the main harness.

WNU89-EM574

1. Engine wire harness (2)

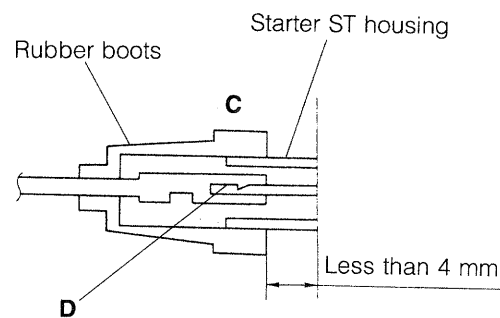
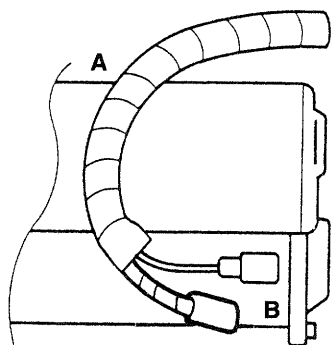


WNU89-EM575

No.	Work procedure	Parts	Control item
1	Route the wire for EGR VSV under the delivery pipe.	A	Ensure that the wire for EGR VSV is routed below the delivery pipe.
2	Install the wire for EGR VSV at level.	B	Ensure that the wire for EGR VSV is tightened at level.

WNU89-EM576

2. Starter Harness



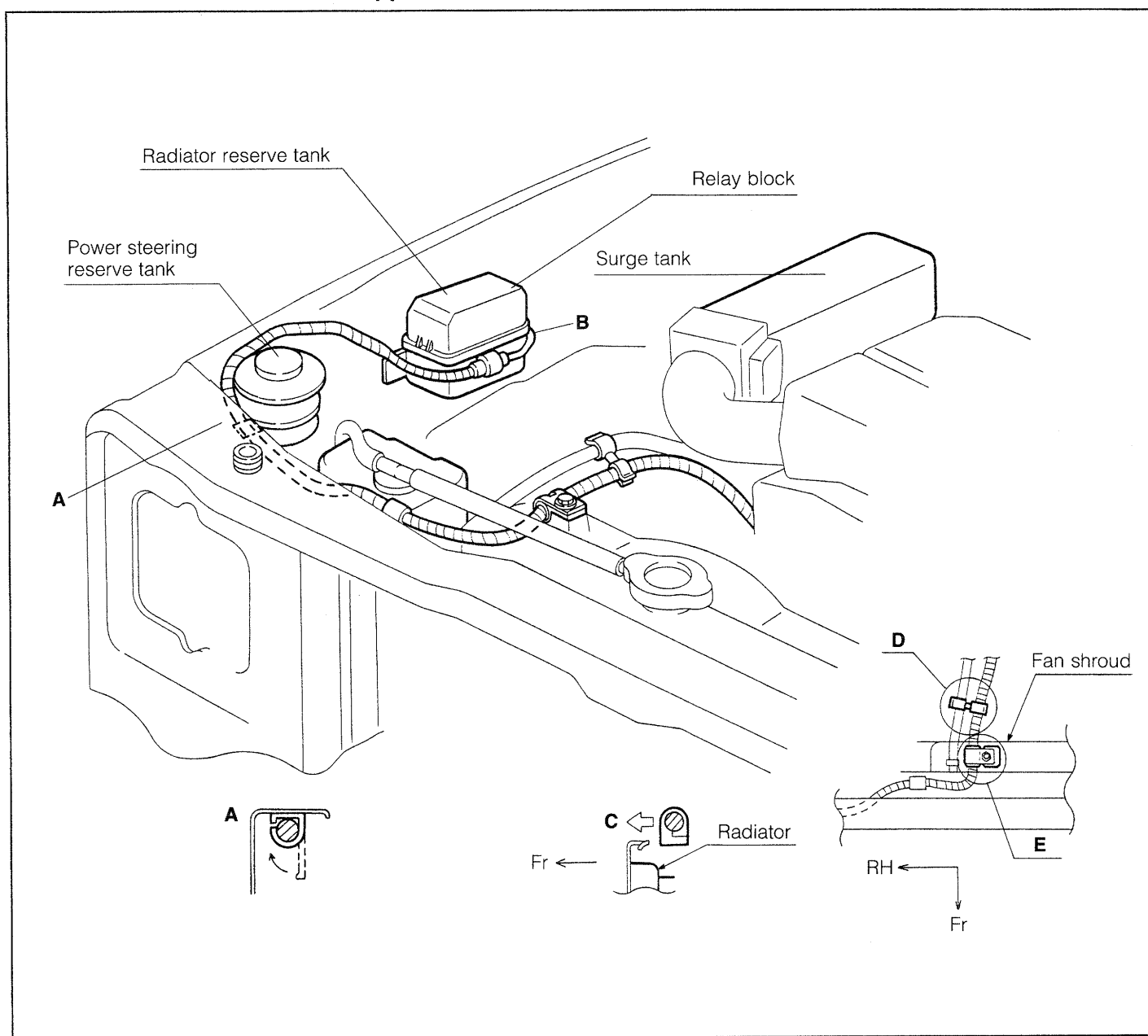
Detail of ST terminal

WRU90-EM367

No.	Work procedure	Parts	Control item
1	Route the harness along with starter.	A	Ensure that the harness is routed along with the starter and it is not floated.
2	After the terminal B has been tightened, cover the terminal with the cap.	B	Ensure that the terminal is covered fully with the cap.
3	Insert the rubber boots of ST terminal completely into the housing.	C	Ensure that the rubber boots is inserted to the position that remaining distance of the housing is less than 4mm. Ensure that the rubber boots is not distortion.
4	Insert the ST terminal until the terminal is locked	D	Ensure that the ST terminal is locked completely.

WNU89-EM578

3. Harness Around Radiator Support

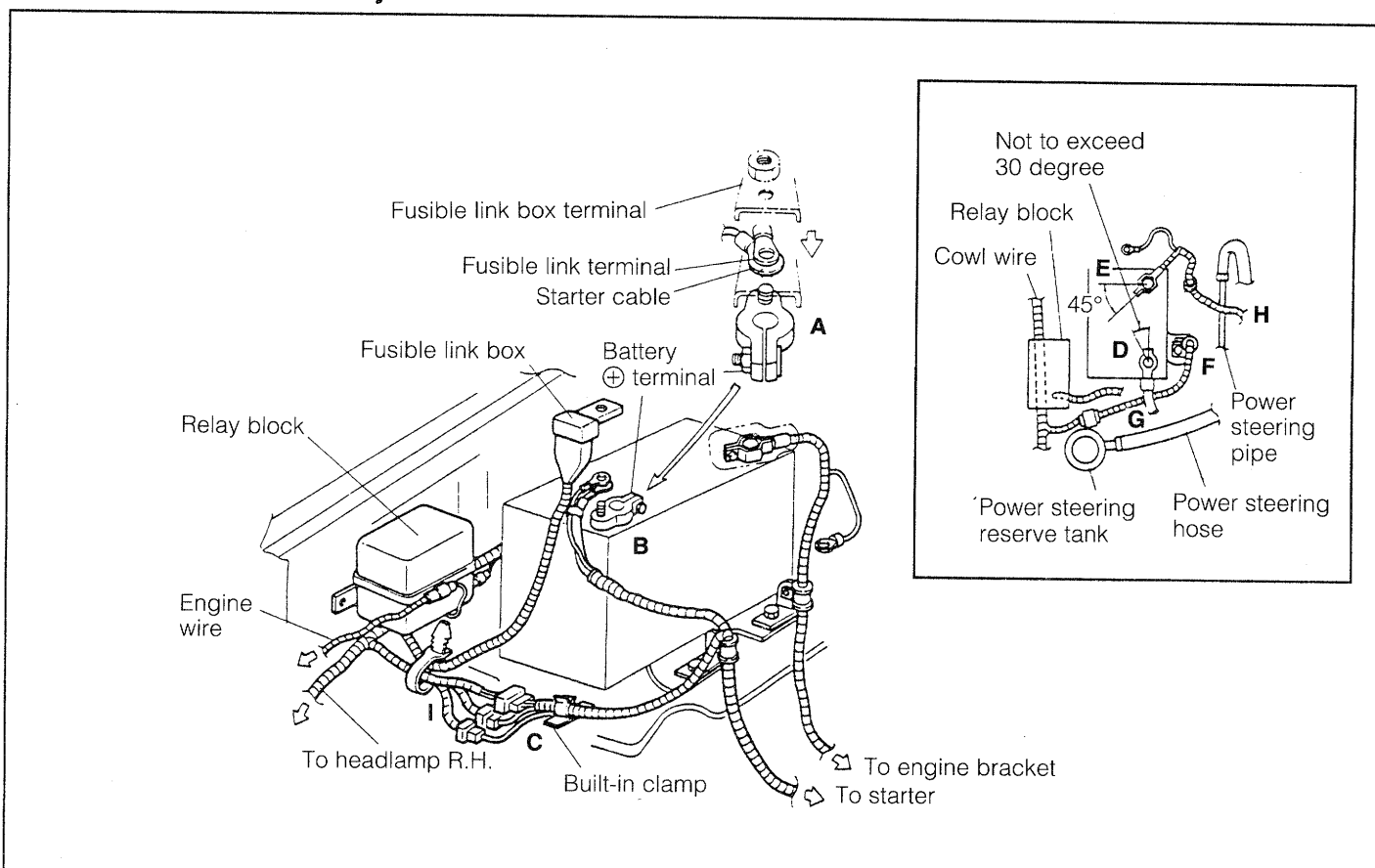


WRU90-EM368

No.	Work procedure	Parts	Control item
1	Route the harness leading to the relay block below the lower surface of the radiator support and through the side of the apron. Clamp the harness by means of the clamp located at the lower surface of the radiator support.	A	Ensure that the harness is routed below the lower surface of the radiator support and through the outside of the power steering reserve tank. Also, ensure that the edges of the clamps are overlapped.
2	Connect the connector (water-proof type, with one pole colored black) to the relay block positively. Secure the harness to the cowl section at the side of the relay block.	B	Ensure that the lock of the connector is fitted properly. Also, ensure that the connector is secured to the claw at the side of the relay block.
3	Insert and secure the built-in clamp of the harness into the bracket of the radiator.	C	Ensure that the clamp is inserted and secured positively in place.
4	Clamp the hose leading to the radiator and the harness to the relay block.	D	Ensure that each of harness and hoses is clamped positively.
5	Clamp the collar of harness leading to the relay block at the outside of the fan shroud boss position.	E	Ensure that the harness collar is clamped at the outside of the fan shroud boss section.

WRU90-EM369

4. Harness Around Battery

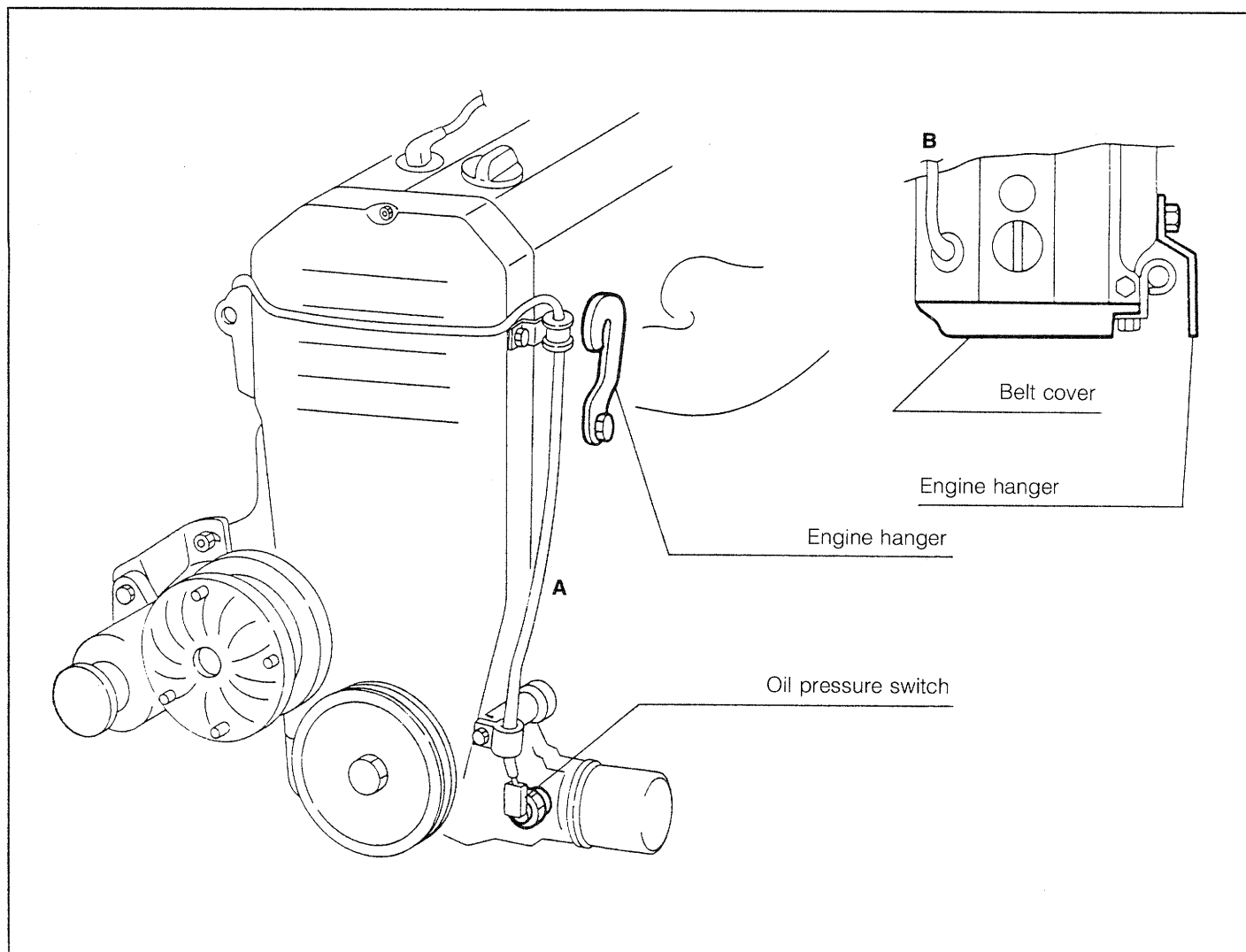


WNU89-EM581

No.	Work procedure	Parts	Control item
1	Perform assembly so that the bent member [] of the fusible link box terminal may not ride on the starter cable and fusible link terminal.	A	Ensure that the terminal does not ride on other parts.
2	Install the following parts to the battery ⊕ terminal in this sequence: (1) starter cable (2) fusible link terminal and (3) fusible link box terminal.	B	Ensure that all parts are assembled as specified.
3	Clamp the battery cable ⊕ leading to the cowl at the side of the carrier.	C	Ensure that the cable is clamped securely to the bracket.
4	Install the battery terminal ⊕ in such a direction that the terminal assumes an angle not to exceed 30 degrees inward as viewed toward the front of the vehicle.	D	Ensure that the terminal assumes an angle of not more than 30 degrees.
5	Install the battery terminal ⊖ at an angle of 45 degrees inward as viewed toward the rear of the vehicle.	E	Ensure that the battery cable is routed above the clutch cable and the terminal assumes an angle of 45 degrees.
6	When the battery cable ⊕ is clamped at the clamp guide section, install the clamp in such a way that the cowl junction may come at the front side of the vehicle.	F	Install the cowl junction comes at the front side of the vehicle.
7	Route the cowl junction and harness leading to fusible link box through between the power steering hose and the battery.	G	Ensure that the cowl junction and harness leading to fusible link box is routed through between the power steering hose and the battery.
8	Route the battery cable ⊖ above the power steering pipe.	H	Ensure that the battery cable ⊖ is routed above the power steering pipe.
9	Secure the relay box-to-fusible link box wire and the cable leading to the battery by means of band clamps.	I	Ensure that the wires are clamped securely.

WNU89-EM582

5. Oil Pressure Switch Harness



WNU89-EM583

No.	Work procedure	Parts	Control item
1	Install the harness between the oil pressure switch and the clamp in such a way that it exhibits no slackness.	A	Ensure that the harness is not interfering with the belt.
2	Install the side clamp of the engine hanger at a point backward from the cover tightening surface. (As viewed from top)	B	Ensure that the clamp is directed as indicated in the view from top above.

WNU89-EM584

DAIHATSU

Rocky

EC

EMISSION CONTROL SYSTEM

INTRODUCTION	EC- 2
PURPOSE OF SYSTEMS	EC- 2
COMPONENT LAYOUT & SCHEMATIC DIAGRAM	EC- 3
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FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM	EC- 5
THROTTLE POSITIONER (TP) SYSTEM	EC- 9
EXHAUST GAS RECIRCULATION (EGR) SYSTEM	EC-10
THREE-WAY CATALYST (TWC) SYSTEM	EC-13

WRU90-EC001

EMISSION CONTROL SYSTEM

INTRODUCTION

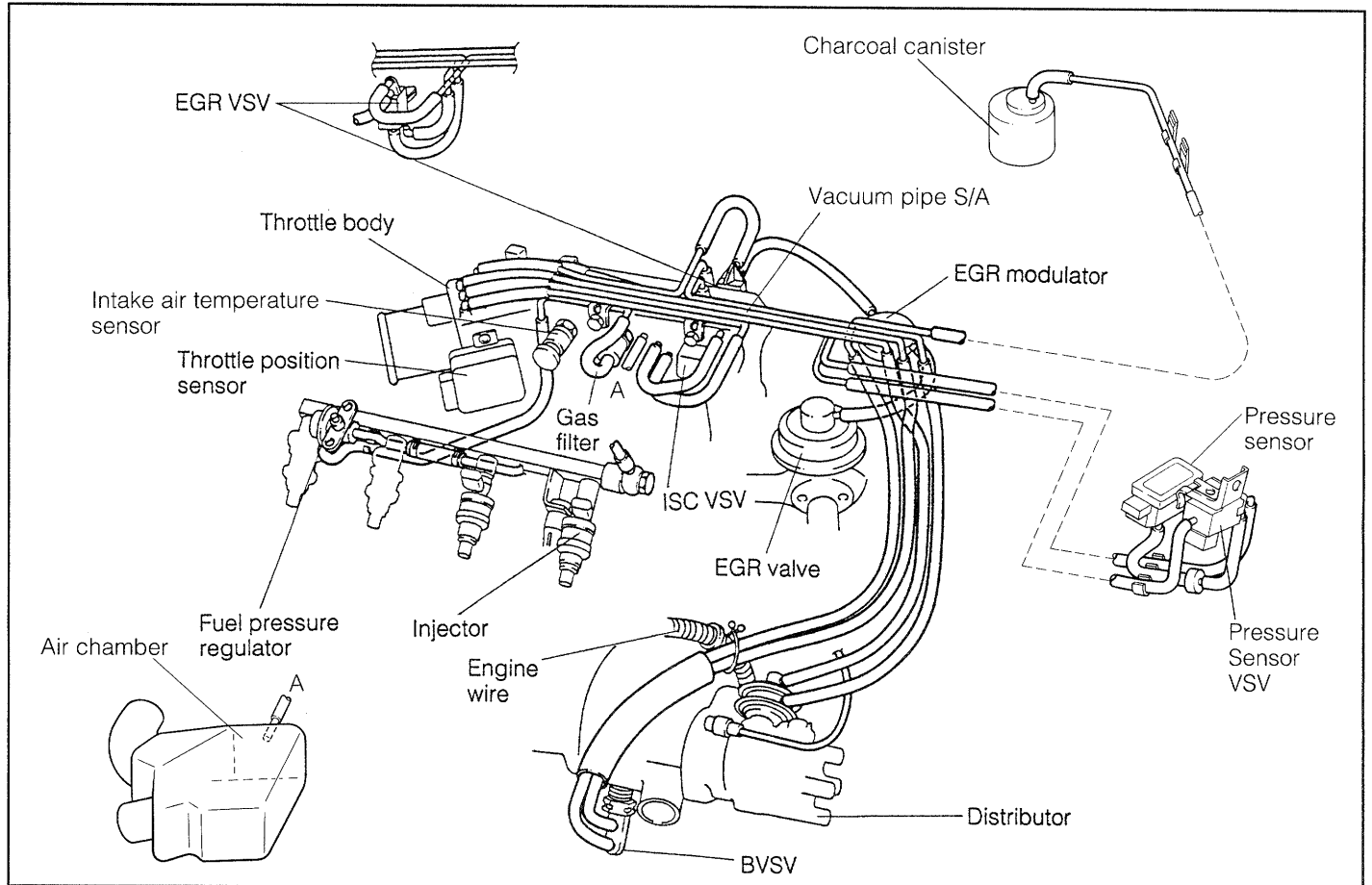
PURPOSE OF SYSTEMS

System	Abbreviation	Purpose
Positive crankcase ventilation	PCV	Reduction of blow-by gas (HC emission)
Fuel evaporative emission control	EVAP	Reduction of evaporative HC emission
Throttle positioner	TP	Reduction of HC and CO emissions
Exhaust gas recirculation	EGR	Reduction of NOx emission
Three-way catalyst (Catalyst provided at under floor.)	TWC	Reduction of HC, CO and NOx emissions
Electronic fuel injection*	EFI	Regulation of all engine conditions for reduction of exhaust emissions

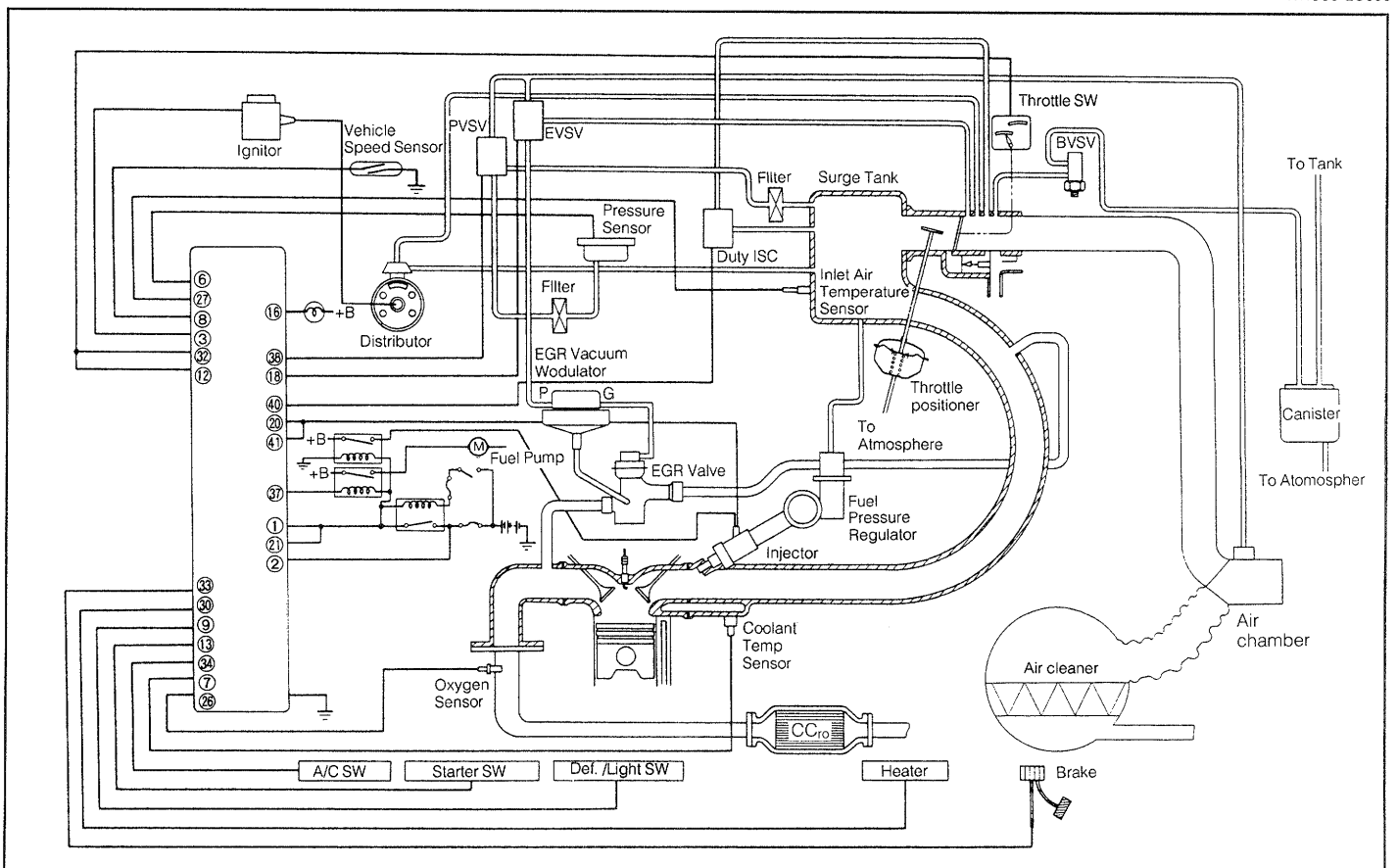
* For inspection and repairs of the EFI system, refer to the EFI section.

WRU90-EC002

COMPONENT LAYOUT & SCHEMATIC DIAGRAM



WRU90-EC003



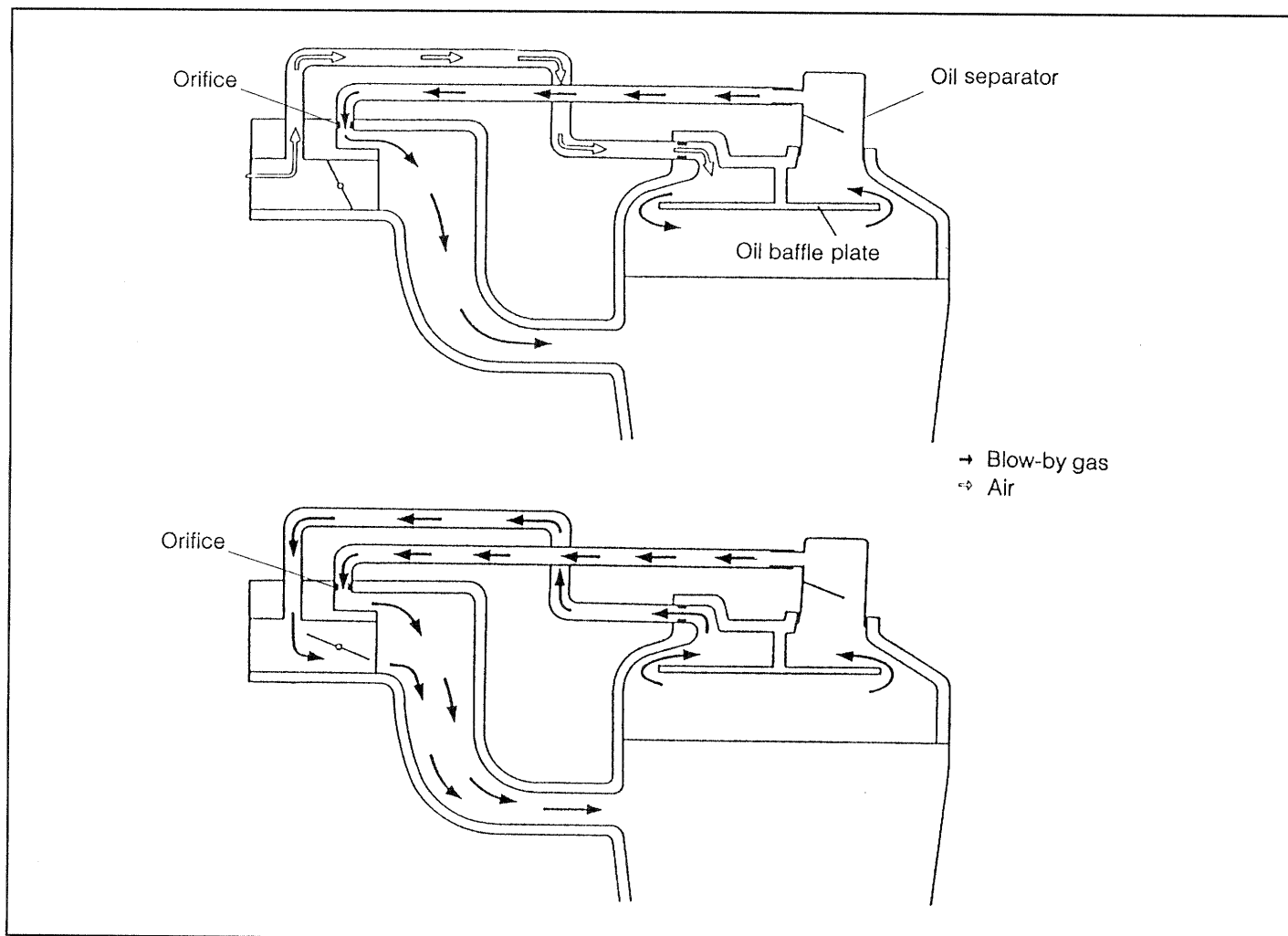
WRU90-EC004

POSITIVE CRANKCASE VENTILATION SYSTEM (PCV)

To combat air-pollution problems, the engine is equipped with a sealed type positive crankcase ventilation system in order to prevent blow-by gases generated inside the crankcase from being released into the atmosphere.

The blow-by gases generated inside the crankcase flow into the cylinder side through the gas path of the cylinder block. When the opening degree of the throttle valve is small, oil in the blow-by gases is separated by the oil separator provided at the cylinder head cover. Then, the blow-by gases are sucked into the cylinders from the throttle body to be burnt again.

Fresh air enters the cylinder head cover from the upstream path of the throttle valve. At this time, the air flow rate is regulated by a jet provided at the cylinder head cover, thus stabilizing the engine idling. When the opening degree of the throttle valve is large and/or when a large amount of blow-by gases are generated, the blow-by gases are sucked into the combustion chambers both through the upstream path and the downstream path of the throttle valve.

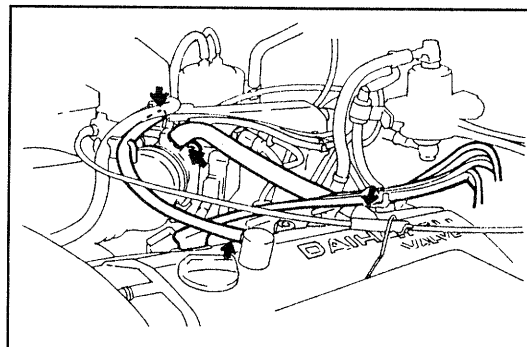


WRU90-EC005

INSPECTION OF PCV HOSE & CONNECTION

Visual inspection of hoses and connections check the hoses and connections for cracks, leakage or damage.

If any parts exhibit fault, replace or repair them, as required.

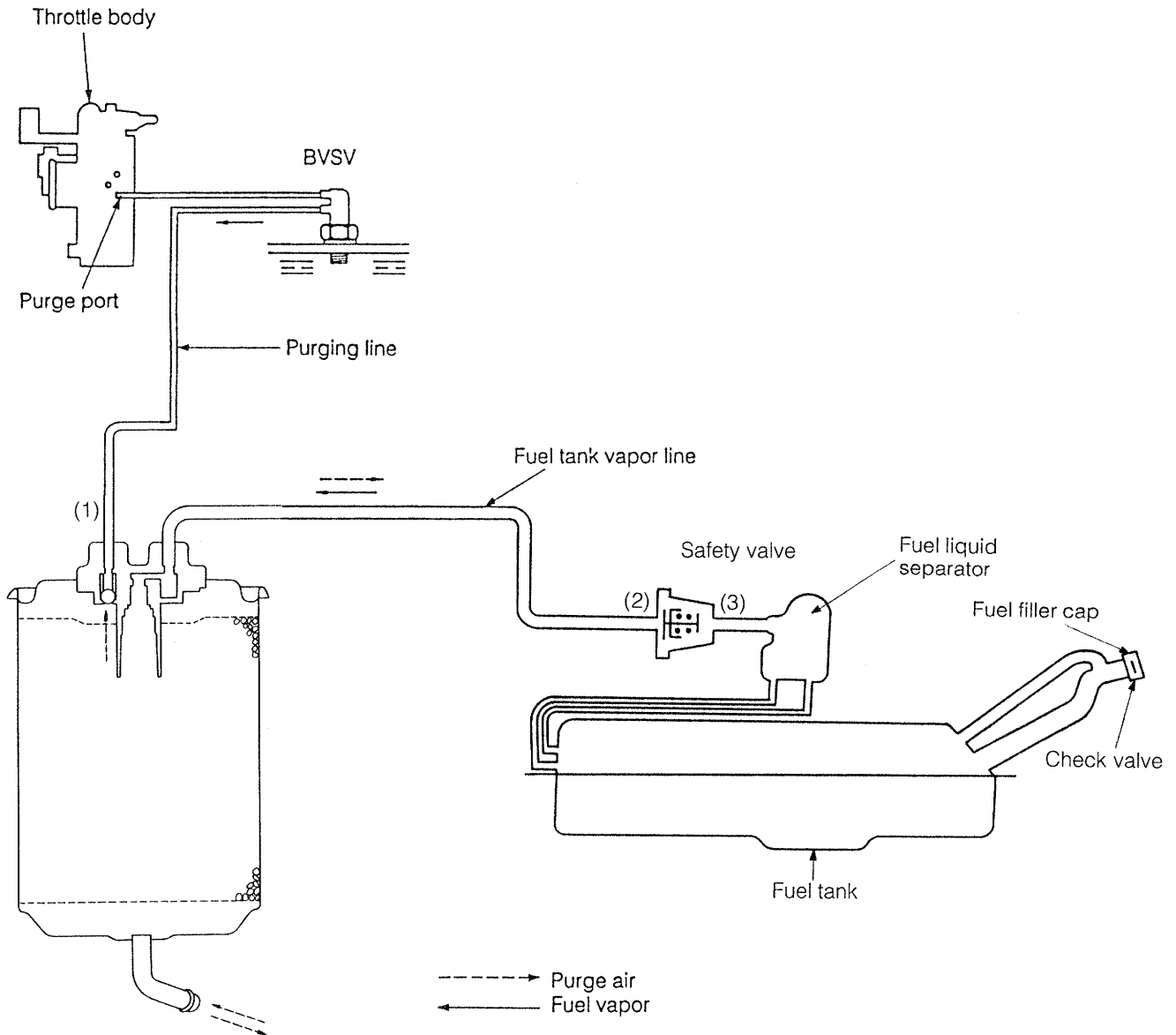


WRU90-EC006

FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM

The fuel evaporative emission control system employs the charcoal canister type. Pressure created by evaporating fuel drives the vapors into the charcoal canister which uses activated carbon to absorb HC emission.

The separated HC emission is drawn into the throttle body to be burnt together with mixture in the combustion chamber when the BVSV opens according to the engine coolant temperature.



EMISSION CONTROL SYSTEM

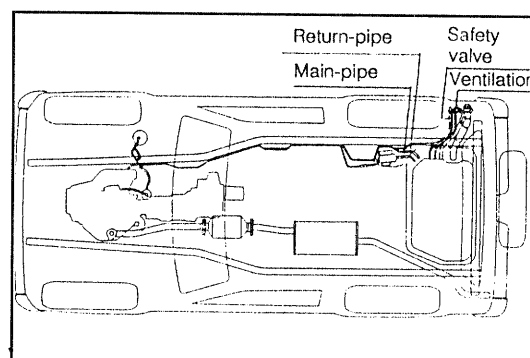
Coolant temp. or tank pressure	BVSV	Throttle valve opening position	* Check valve			Fuel filler cap check valve	Evaporated fuel (HC)
			(1)	(2)	(3)		
Below 45°C (113°F)	CLOSED	—	—	—	—	—	HC from fuel tank is absorbed by canister
Above 66°C (151°F)	OPEN	Positioned below purge port	CLOSED	—	—	—	
		Positioned above purge port	OPEN	—	—	—	HC from canister is sucked into engine
High pressure in fuel tank	—	—	—	OPEN	CLOSED	CLOSED	HC from fuel tank is absorbed by canister
High vacuum in fuel tank	—	—	—	CLOSED	OPEN	CLOSED (OPEN when excessive high vacuum)	(Air is led into fuel tank)

*(1)...Charcoal canister, (2)...Safety valve positive side, (3)...Safety valve negative side

WRU90-EC008

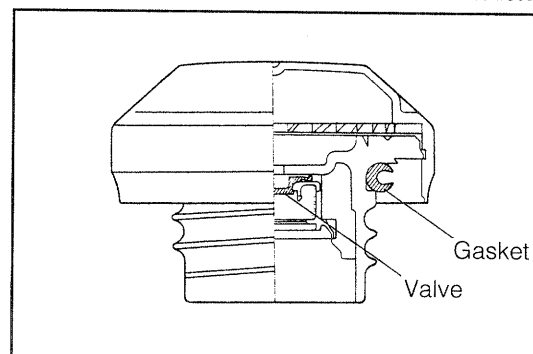
INSPECTION OF FUEL VAPOR LINES, FUEL TANK, FILLER CAP & SAFETY VALVE

1. Visual inspection of fuel vapor lines and connections
Check the lines and connections for loose connections, kinks or damage.
2. Visual inspection of fuel tank
Check the fuel tank for deformation, cracks or fuel leakage.



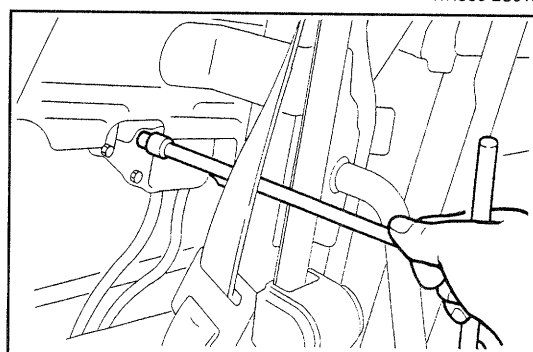
WRU90-EC009

3. Visual inspection of fuel filler cap
Check the cap and gasket for damage or deformation. Repair or replace the gasket and/or cap, if necessary.



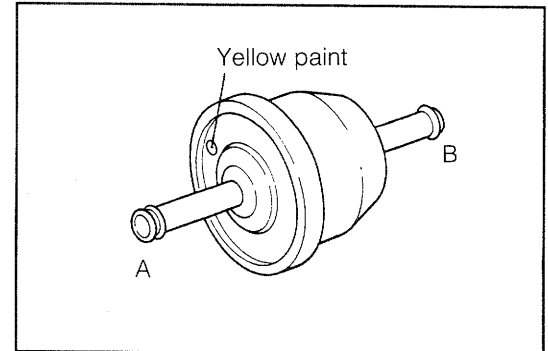
WRU90-EC010

4. Inspection of safety valve
 - (1) Remove the quarter trim RH by detaching the eleven clips.
 - (2) Detach the safety valve together with fuel separator.
 - (3) Disconnect the hoses from the safety valve.



WRU90-EC011

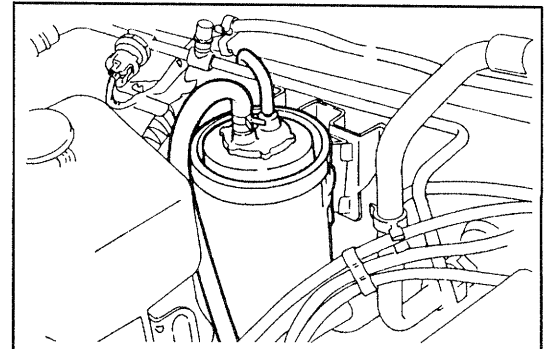
- (4) Ensure that there exists resistance when you blow your breath lightly from the side A. Also, ensure that the resistance no longer exists when you blow your breath strongly.
- (5) Ensure that there exists resistance when you suck air lightly from the side B. Also, ensure that the resistance no longer exists when you suck air strongly.



WRU90-012

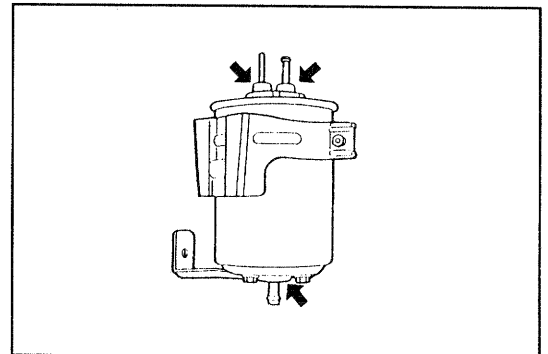
INSPECTION OF CHARCOAL CANISTER

1. Disconnect the rubber hoses and remove the charcoal canister.



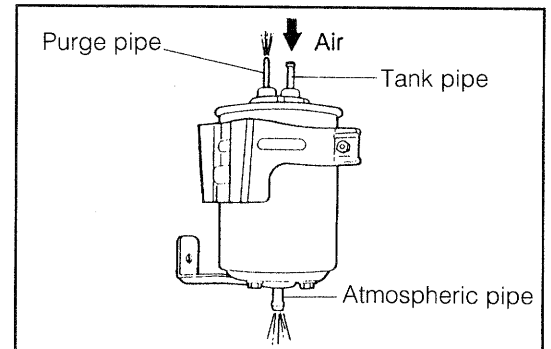
WRU90-EC013

2. Visual inspection of charcoal canister case
Visually inspect the charcoal canister case for cracks or damage.



WRU90-EC014

3. Check of filter for restriction
 - (1) Blow low pressure compressed air into the tank pipe. Ensure that air flows without resistance from the other pipe.
 - (2) Blow air into the purge pipe. Ensure that no air flows from the other pipe.
Replace the charcoal canister, if it exhibits any defect.



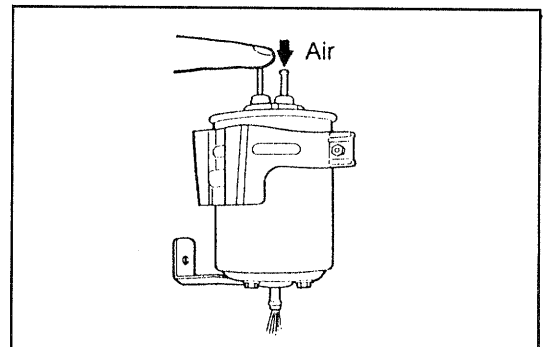
WRU90-EC015

4. Cleaning of filter in canister
Clean the filter by blowing compressed air of 3kg/cm² (43 psi) into the tank pipe while holding the other upper canister pipe closed.

NOTE:

- Do not attempt to wash the canister.
- No activated carbon should come out during the test.

5. Install the charcoal canister and reconnect the rubber hose.

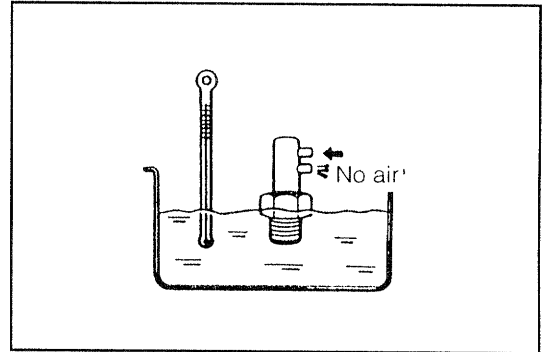


WRU90-EC016

INSPECTION OF BVSV

Checking of BVSV by blowing air into pipe

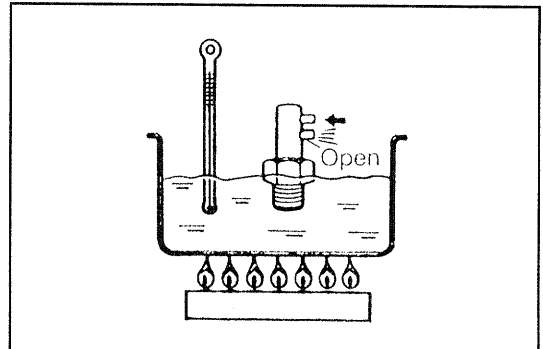
1. Drain the coolant from the radiator into a suitable container.
2. Remove the BVSV.
3. Cool the BVSV to below 45°C (113°F)
4. Ensure that no air continuity exists. If air continuity exists, replace the BVSV.



WRU90-EC017

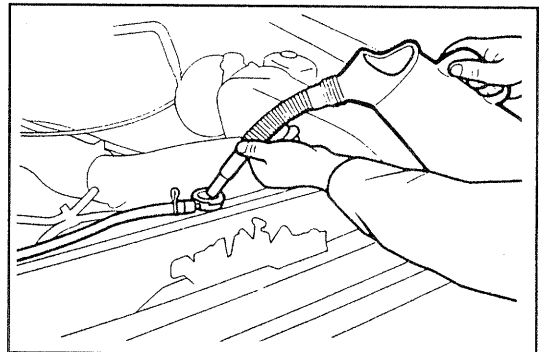
5. Heat the BVSV to above 66°C (151°F), using hot water.
6. Ensure that air continuity exists.
If no air continuity exists, replace the BVSV.
7. Apply liquid sealer to the threaded portion of the BVSV.
Reinstall the BVSV.

Tightening Torque: 2.5 - 3.5 kg-m
(18.1 - 25.3 ft-lb, 24.5 - 34.3 N-m)



WRU90-EC018

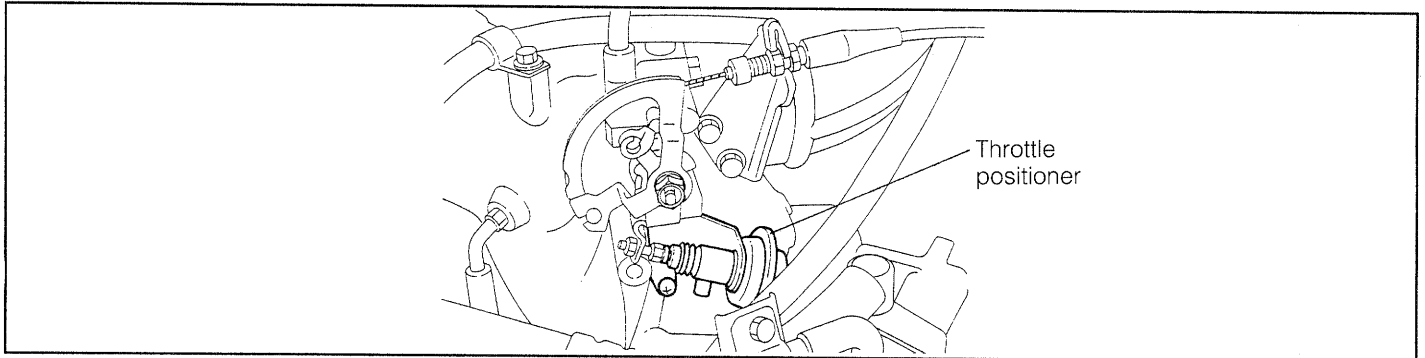
8. Fill the coolant to the radiator.
(See page CO-4.)
9. Start the engine. Check the coolant level.
If the coolant level is low, add the coolant.
10. Check the water leakage and/or air leakage.



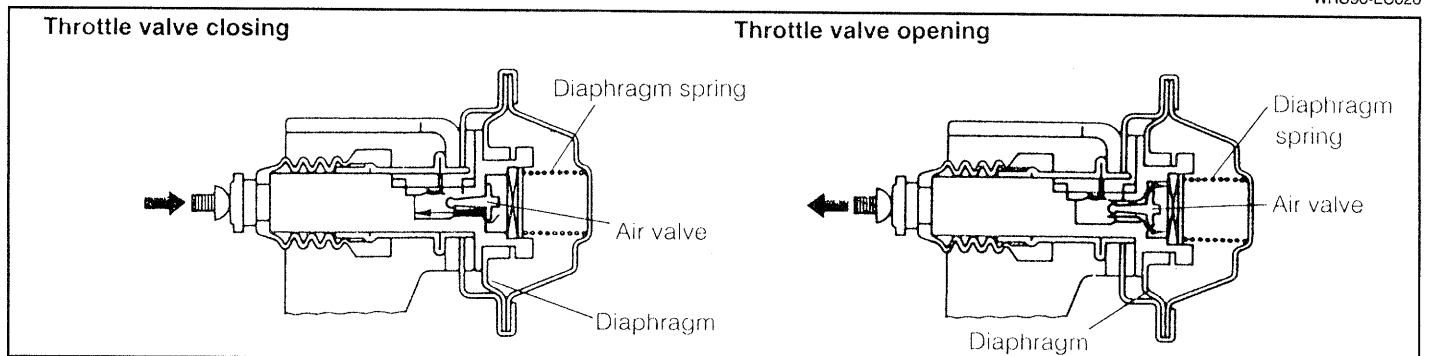
WRU90-EC019

THROTTLE POSITIONER (TP) SYSTEM

This system prevents the throttle valve from suddenly closing, thus reducing the CO and HC emissions.



WRU90-EC020



WRU90-EC021

Conditions	TP diaphragm	Throttle valve
Idling	Pushed in by return force of throttle valve	Idle speed position
Normal driving	Pushed out by diaphragm spring	Opened position
Deceleration	* Pushed in by return force of throttle valve	Slightly opens and then slowly closes to the idle position.

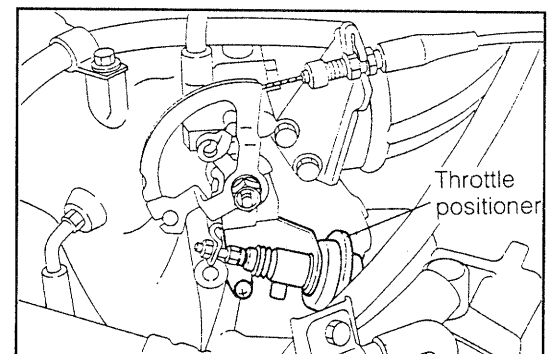
* At this point, the function of the air valve provided inside the throttle positioner diaphragm prevents the throttle valve from being closed suddenly.

WRU90-EC022

INSPECTION OF THROTTLE POSITIONER (TP) SYSTEM

1. Warm up the engine.
2. Check the idle speed. Adjust the speed, if necessary.
3. Check of TP setting speed
 - (1) Raise the engine speed to approximately 3000 rpm.
 - (2) Close the throttle valve slowly.
 - (3) Observe the engine speed at a time when the dashpot lever comes in contact with the throttle lever.

Engine Speed: 1600 ± 100 rpm



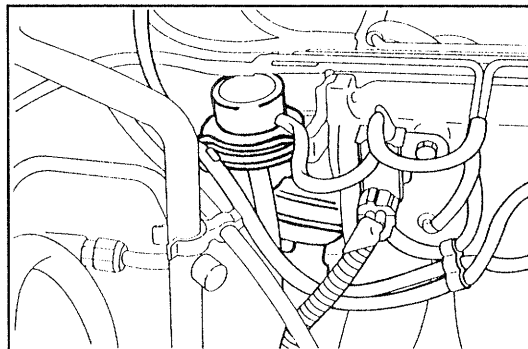
WRU90-EC023

If the engine speed does not conform to the specification, perform adjustment by turning the TP adjusting screw.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

The EGR system recirculates the exhaust gas into the intake manifold in an optimum amount according to driving conditions and coolant temperature.

Thus, this system retards the combustion, resulting in reduced amount of NO_x emission.



WRU90-EC024

Coolant temperature	EVS	Throttle valve opening angle	EGR vacuum modulator	EGR valve	Exhaust gas
Below 39°C (102.2°F)	Closed	—	—	Closed	Not recirculated
Above 40°C (104°F)	Open	Positioned below EGR port	Opens passage to atmosphere	Closed	Not recirculated
		* Positioned between EGR port	Opens passage to atmosphere	Closed	Not recirculated
			Closed passage to atmosphere	Open	Recirculated
		** Positioned above EGR port	Closed passage to atmosphere	Open	Recirculate volume increase

REMARKS:

* At this stage, the EGR valve repeats its opening/closing as described below, depending upon the throttle valve opening and exhaust gas pressure.

Exhaust gas pressure drops. → Modulator opens. → EGR valve closes.
 ↑
 EGR valve opens. ← Modulator closes. ← Exhaust gas pressure increases.

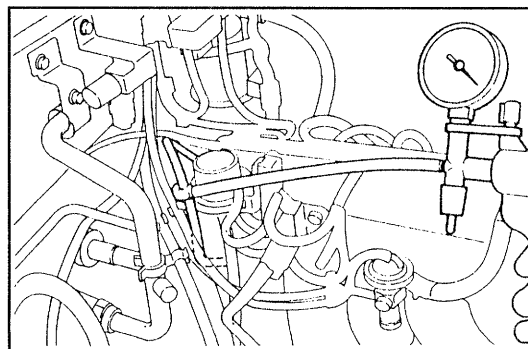
** At this stage, the EGR valve remains open because of a negative pressure being applied to the EGR port, even when the modulator opens to the atmosphere.

WRU90-EC025

INSPECTION OF EGR SYSTEM

1. Preparation

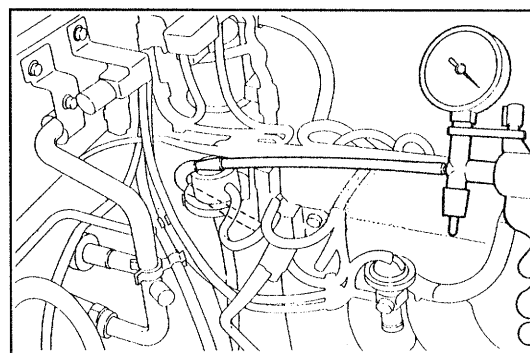
Using a three-way connector, connect a vacuum gauge to the hose between the EGR valve and the EGR vacuum modulator.



WRU90-EC026

2. Check of EGR valve seating
Start the engine. Ensure that the engine starts and runs smoothly at the idle speed.
If the engine will not idle smoothly, perform the unit inspection of the EGR valve.
3. Check of EGR VSV with engine in cold state
Ensure that no vacuum is applied to the vacuum gauge even if the engine is raced when the coolant temperature is below 39°C (102.2°F)
If a negative pressure is applied to the vacuum gauge, check the EGR VSV and/or the water temperature sensor.
4. Check of EGR VSV with engine in hot state
 - (1) Warm up the engine.
 - (2) Run the engine at a speed of about 3000 rpm. Ensure that a negative pressure is applied to the vacuum gauge.
5. Check of EGR valve
 - (1) Connect a MityVac directly to the EGR valve.
 - (2) Apply a negative pressure to the EGR valve while the engine is idling. Ensure that the engine runs roughly or stalls.
 - (3) Reconnect the vacuum hoses to original location.
If no problem is found during this inspection, the system is functioning properly. If any problem is found, check and remedy the part concerned.

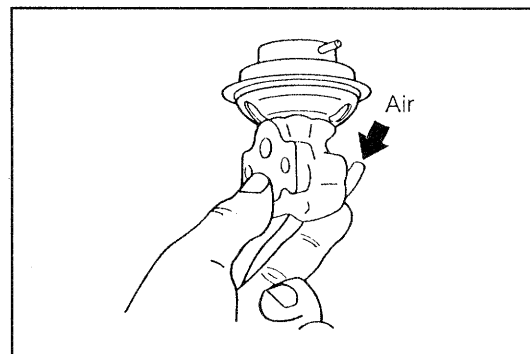
WRU90-EC027



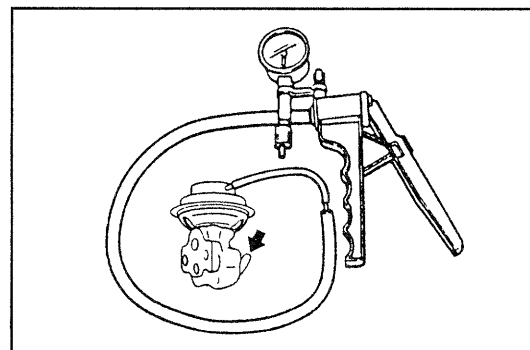
WRU90-EC028

INSPECTION OF EGR VALVE

1. Remove the EGR valve.
2. Check of EGR valve
 - (1) Blow air into the EGR valve through its pipe section with the bypass hole of the EGR valve plugged by your finger, as indicated in the right figure. Under this state, ensure that no air continuity is present.
If air continuity exists, replace the EGR valve.
 - (2) Apply a negative pressure of 150 mmHg (5.9 inchHg) to the EGR valve.
Under this setting, blow air into the EGR valve through its pipe section with the bypass hole of the EGR valve plugged by your finger, as indicated in the right figure.
Ensure that air continuity exists.
If no air continuity exists, replace the EGR valve.
3. Install the EGR valve on the intake manifold with a new gasket interposed. Connect the rubber hose.



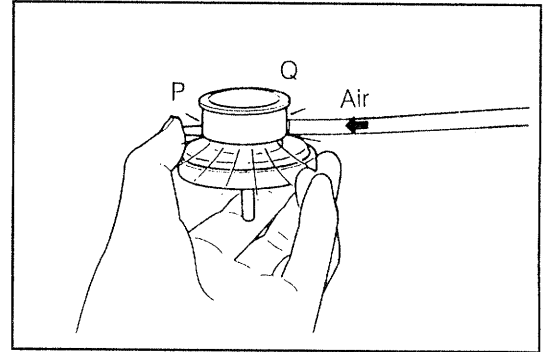
WRU90-EC029



WRU90-EC030

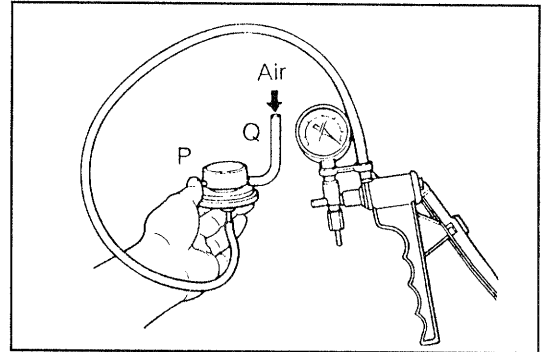
INSPECTION OF EGR VACUUM MODULATOR

1. Remove the EGR vacuum modulator.
2. Plug the port P with your finger. Blow air into the port Q. Ensure that air continuity exists. If no air continuity exists, replace the modulator.



WRU90-EC031

3. Apply a pressure 0.2 kg/cm² (2.8 lb/inch²) to the pressure discharge port of the modulator, using a MityVac. Under this setting, blow air into the modulator through the port Q with the port P plugged by your finger. Ensure that no air continuity exists. If air continuity exists, replace the modulator.



WRU90-EC032

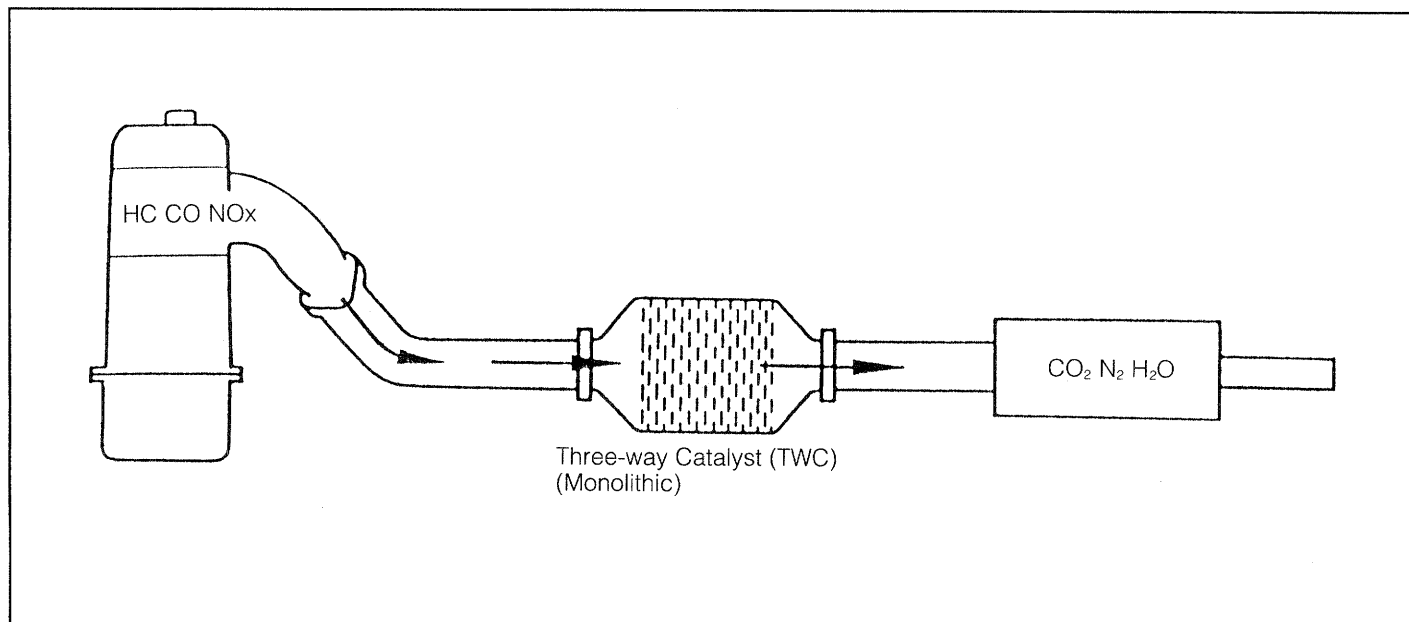
INSPECTION OF EGR VSV

(See page EF-76.)

WRU90-EC033

THREE-WAY CATALYST (TWC) SYSTEM

If this three-way catalyst, the oxidation of carbon monoxide (CO) and the reduction of nitrogen oxides (NO_x) contained in exhaust gas can take place simultaneously. Thus, the three-way catalyst purifies the exhaust gas by converting its harmful components gas into harmless carbon dioxide (CO₂), water vapor (H₂O) and nitrogen (N₂).



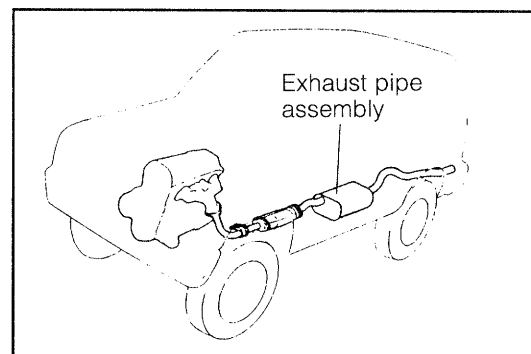
WRU90-EC034

Exhaust gas component	TWC	Exhaust gas
HC, CO and NO _x	Oxidation and reduction	CO ₂ , H ₂ O and N ₂

WRU90-EC035

Inspection of exhaust pipe assembly

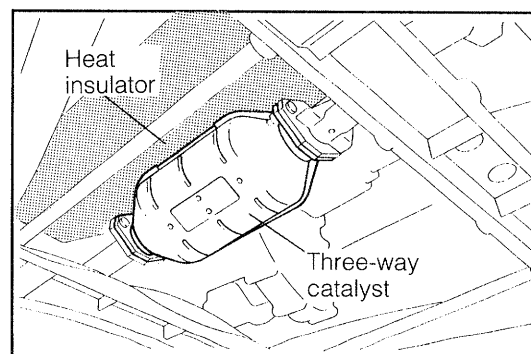
1. Check the connections for looseness or damage.
2. Check the clamps for weakness, bend or damage.



WRU90-EC036

Inspection of heat insulator

1. Check heat insulator for damage.
2. Check for adequate clearance between the three-way catalyst and heat insulator.

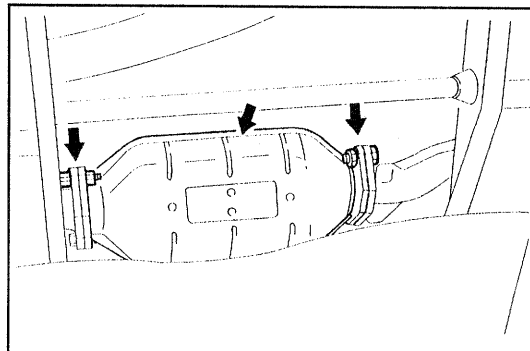


WRU90-EC037

THREE-WAY CATALYST

INSPECTION

1. Check the connections for looseness or damage.
2. Check the three-way catalyst for dents or damage.



WRU90-EC038

REMOVAL

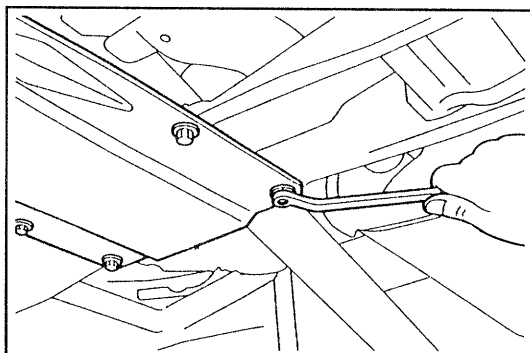
WARNING:

Do not perform any operation while the exhaust pipe is still hot.

1. Jack up the vehicle and support it with safety stands (See page GI-13).

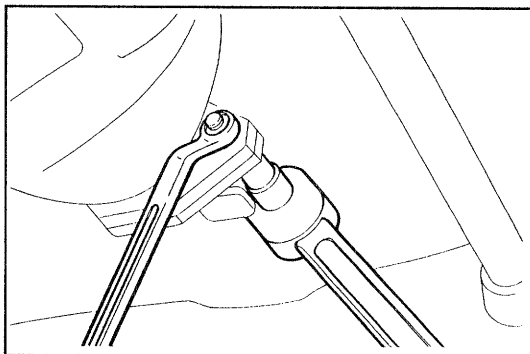
WRU90-EC039

2. Remove the transmission undercover by removing the eight attaching bolts.



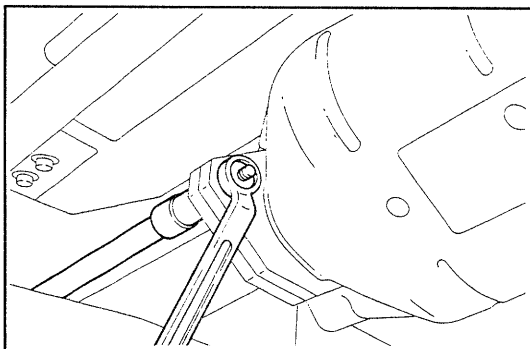
WRU90-EC041

3. Separate the tail pipe assembly from the three-way catalyst assembly by removing the two bolts and nuts.



WRU90-EC042

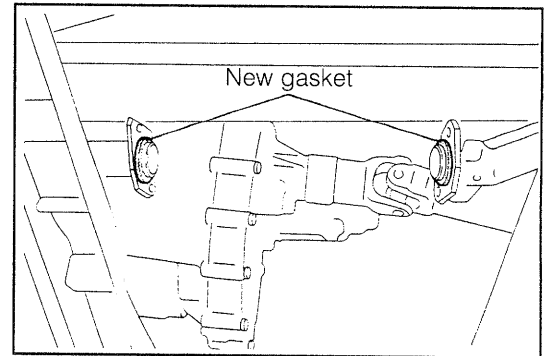
4. Separate the three-way catalyst assembly from the front exhaust pipe assembly by removing the two bolts and nuts.
5. Remove the three-way catalyst while pushing the tail pipe assembly rearward.



WRU90-EC043

INSTALLATION

1. Install a new gasket to the front exhaust pipe and tail pipe.



WRU90-EC044

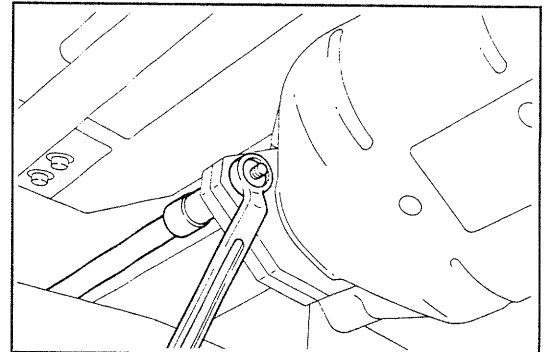
2. Install the three-way catalyst assembly to the front exhaust pipe assembly.

Tightening Torque:

4.5 - 5.5 kg-m (32.5 - 39.8 ft-lb, 44.1 - 53.9 N-m)

NOTE:

Make sure that the front mark is located at front side.

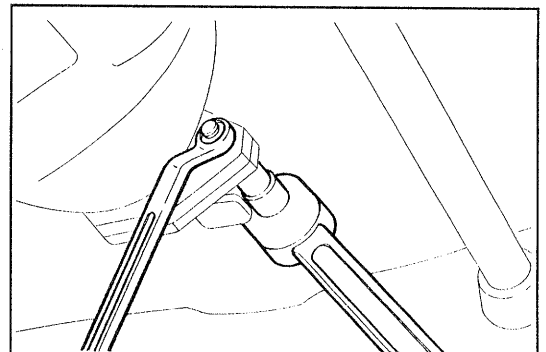


WRU90-EC045

3. Tighten the attaching bolts and nuts for the three-way catalyst at the tail pipe side.

Tightening Torque:

4.5 - 5.5 kg-m (32.5 - 39.8 ft-lb, 44.1 - 53.9 N-m)

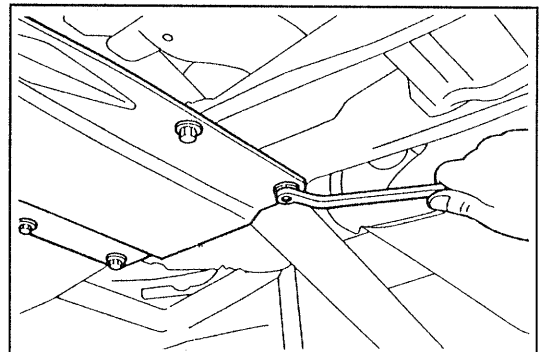


WRU90-EC046

4. Install the transmission under cover by attaching the eight bolts.

Tightening Torque:

1.6 - 2.4 kg-m (11.6 - 17.4 ft-lb, 15.7 - 23.5 N-m)



WRU90-EC047

DAIHATSU

ROCKY

EF

EFI SYSTEM

<p>INTRODUCTION EF- 2</p> <p>PRECAUTION EF- 5</p> <p>INSPECTION PRECAUTIONS EF- 5</p> <p>TROUBLE SHOOTING BY MALFUNCTION</p> <p style="padding-left: 20px;">ITEMS EF-11</p> <p>DIAGNOSIS SYSTEM EF-29</p> <p>TROUBLE SHOOTING BY MALFUNCTION</p> <p style="padding-left: 20px;">CODES EF-35</p> <p>TROUBLE SHOOTING</p> <p style="padding-left: 20px;">EFI ELECTRONIC CIRCUIT WITH</p> <p style="padding-left: 40px;">VOLT/OHMMETER EF-38</p> <p>ELECTRONIC CONTROL SYSTEM EF-55</p> <p style="padding-left: 20px;">MAIN RELAY EF-56</p> <p style="padding-left: 20px;">INJECTOR RELAY EF-57</p> <p style="padding-left: 20px;">FUEL PUMP RELAY EF-58</p> <p style="padding-left: 20px;">WATER TEMPERATURE SENSOR EF-60</p> <p style="padding-left: 20px;">INTAKE AIR TEMPERATURE SENSOR EF-63</p>	<p>THROTTLE POSITION SENSOR EF- 65</p> <p>PRESSURE SENSOR EF- 67</p> <p>IDLE SPEED CONTROL VSV EF- 70</p> <p>EGR VSV EF- 76</p> <p>PRESSURE VSV EF- 79</p> <p>OXYGEN SENSOR EF- 82</p> <p>ELECTRONIC CONTROL UNIT (ECU) EF- 84</p> <p>FUEL CUT RPM EF- 91</p> <p>FUEL SYSTEM EF- 93</p> <p style="padding-left: 20px;">FUEL PUMP EF- 93</p> <p style="padding-left: 20px;">FUEL TANK AND LINE EF-102</p> <p style="padding-left: 20px;">FUEL FILTER ELEMENT EF-104</p> <p style="padding-left: 20px;">PRESSURE REGULATOR EF-108</p> <p style="padding-left: 20px;">INJECTORS EF-115</p> <p>AIR INDUCTION SYSTEM EF-119</p> <p style="padding-left: 20px;">THROTTLE BODY EF-119</p> <p style="padding-left: 20px;">AUXILIARY AIR VALVE EF-124</p>
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WRU90-EF001

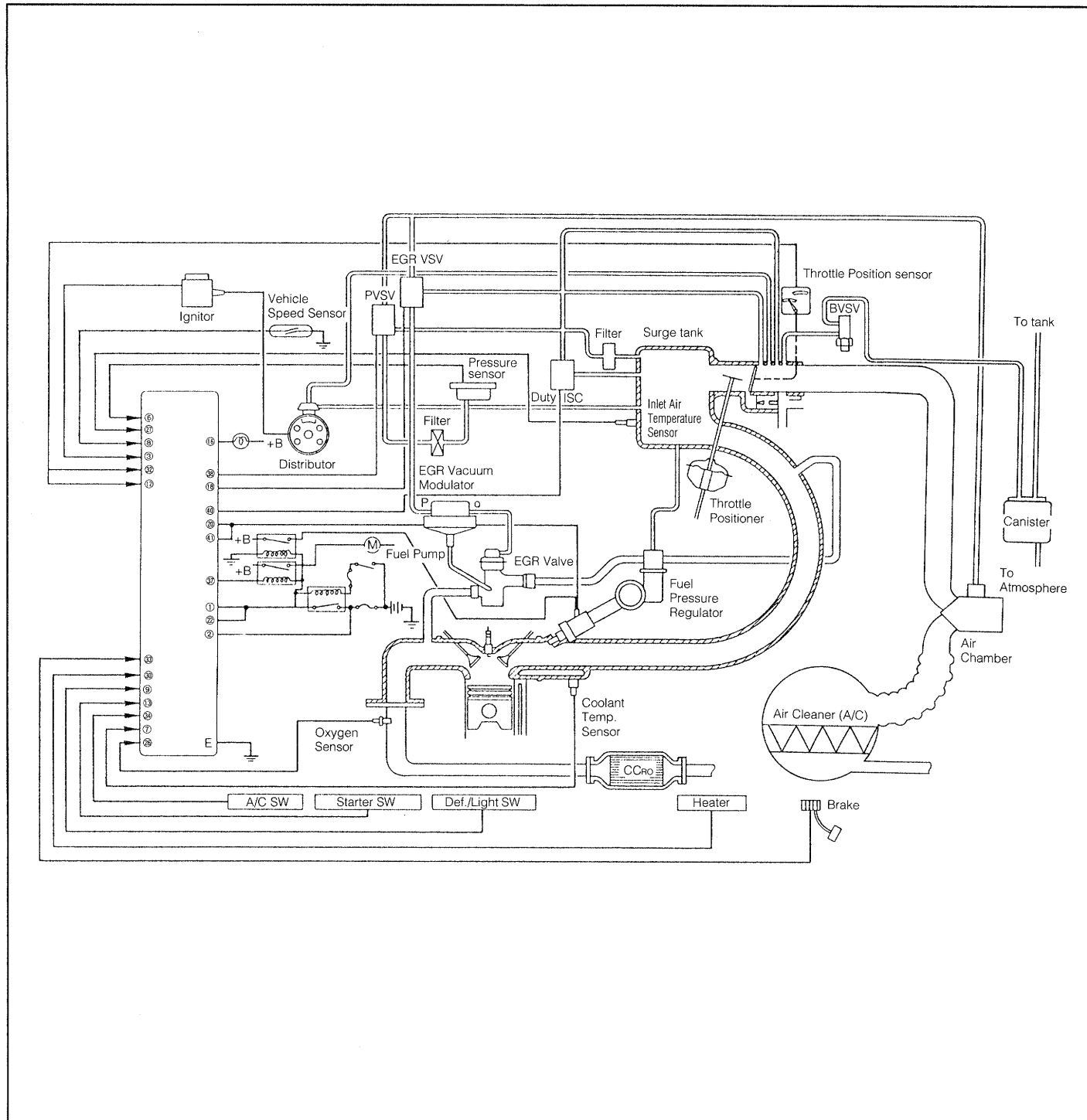
INTRODUCTION

The EFI system consists of the following three systems; fuel system, intake system and control system. The electronic control unit (ECU) incorporating a microcomputer controls the EFI system, based on signals inputted from the various sensors.

Besides this function, the ECU controls various functions such as the fuel pump control, idle speed VSV control (ISC), exhaust gas recirculating (EGR) VSV control, barometric VSV (PVSV) control, self diagnosis function and fail-safe function.

WRU90-EF002

SYSTEMATIC DIAGRAM



WRU90-EF003

FUEL SYSTEM

The fuel system is a system which supplies the injectors with fuel necessary for combustion. This system is composed of the fuel pump, fuel pipes, fuel filter, pressure regulator, fuel delivery pipe and injectors.

Fuel sucked up from the fuel tank by means of the fuel pump is sent under a pressurized condition to the fuel delivery pipe through the fuel filter. The pressure regulator mounted at the delivery pipe keeps the fuel pressure at a value about 2.55 kg/cm^2 (36.3 psi) higher than the intake manifold inner pressure. Such difference between the intake manifold inner pressure and the fuel line inner pressure prevents any variation in the fuel injection rate of each injector.

Any excess fuel returns to the fuel tank through the pressure regulator. This makes it possible for the fuel at a comparatively low temperature in the fuel tank to be supplied into the fuel line, thus preventing percolation. The fuel pump is driven by the ECU.

WRU90-EF004

INTAKE SYSTEM

The intake system is a system which supplies air necessary for combustion with each cylinder.

Air sucked from the cool air intake of a comparatively low temperature is sucked into the surge tank through the air cleaner and air chamber, depending upon the opening degree of the throttle valve.

Then, the air goes through the intake manifold into each cylinder.

WRU90-EF005

CONTROL SYSTEM

The control system is a system which controls the fuel amount, using the ECU, by detecting the engine conditions and vehicle running conditions, based on signals inputted from the various sensors to the ECU.

Fuel pump control (FC)

This system controls the fuel pump operation. This system drives the fuel pump for two seconds when the ignition key switch is turned ON and/or the ignition signal is inputted. It also drives the fuel pump when the starter switch is turned ON.

Idle speed control (ISC)

For stabilized idle speed, this system regulates the air flow rate to the engine in such a way that the idle speed may become the target idle speed that has been memorized in the ECU in advance.

Exhaust gas recirculation (EGR) VSV control

When the cooling water temperature exceeds the specified level, this system makes the EGR in an operable condition by turning ON the EGR VSV.

Barometric VSV (PVSV) control

This system controls the PVSV whereby the pressure being applied to the pressure sensor is switched temporarily from the intake manifold inner pressure to the atmospheric pressure.

WRU90-EF006

SELF DIAGNOSIS FUNCTION

If signals inputted from main sensor systems to the ECU do not conform to the specified values memorized in the ECU, this malfunction is memorized.

(There are some items which are not memorized.)

Since the memorized malfunction code is retained by the back-up power supply from the battery, the code remains memorized when the ignition key switch is turned OFF.

The memorized malfunction code can be reset by cutting off the power supply to the ECU.

When any malfunction concerned with the important items occurs, the check engine lamp provided inside the combination meter is turned ON, thereby warning the driver of such malfunction. The check engine lamp remains illuminated as long as the malfunction concerned with the important item persists. However, if the encountered malfunction takes place temporarily and the normal state is restored, the check engine lamp goes out. In this case, however, the malfunction that has once occurred is memorized to the ECU, using the pertinent code number.

There are thirteen malfunction codes including the item showing the normal state.

To indicate the malfunction code during the inspection, short the test terminal of the check connector located at the fender panel right side of the engine compartment with the ground terminal. The check engine lamp inside the combination meter flashes as many times as the number of the corresponding malfunction code. With the aid of the diagnosis code, the checking operator can perform trouble shooting efficiently.

WRU90-EF007

FAIL-SAFE FUNCTION

In the event that any abnormality takes place in the signals inputted from the important sensors to the ECU and the control can no longer be continued based on the inputted data, an evacuation running is made possible using the data memorized in the ECU in advance. This function is called "fail-safe function."

Moreover, in the event that any abnormality occurs in the microcomputer in the ECU, the backup circuit makes it possible for the vehicle to perform an evacuation running, based on the data memorized in the ECU in advance.

In either case, it is not possible to expect normal running performance under such evacuation running.

WRU90-EF008

PRECAUTION

1. The engine control system has self diagnosis function. The ECU memorizes all malfunction codes which have occurred in the past and/or are occurring at present.
The memorized malfunction codes are erased when the battery ground cable is disconnected from the battery terminal. Hence, prior to starting any repairs, be sure to check to see if any malfunction code has been memorized.
(See page EF-31.)
2. When performing operations on the fuel system or its related operation, never smoke and keep away any fire.
3. Before disconnecting the fuel line, be sure to disconnect the battery ground cable from the negative terminal of the battery.
4. The fuel line is pressurized to a pressure about 2.55 kg/cm^2 (36.3 psi) higher than the pressure inside the surge tank. Therefore, when disconnecting the fuel line, be sure to loose the fuel line slowly and prevent the fuel from splashing with a cloth or the like.
5. Do not allow gasoline to get to any parts made of rubber, leather and resin and/or to the electric parts.
6. When cleaning the engine compartment with water, make sure that no water gets to the electrical system.
7. Ensure that the battery voltage should be 11 volts or more, before performing the inspection.

WRU90-EF009

INSPECTION PRECAUTIONS

Maintenance precautions

1. Ensure that the engine is correctly tuned up.

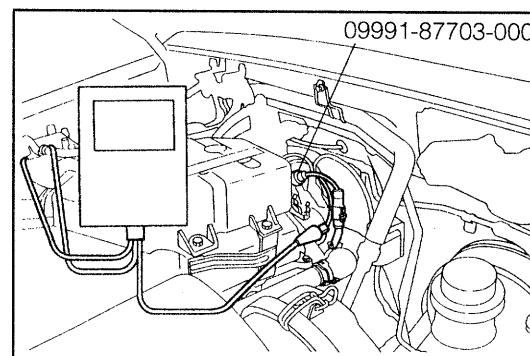
WRU90-EF010

2. Precautions during gauge connection
 - (1) To connect the tachometer, connect the following SST between the distributor connector and the distributor connector of the engine wire.
SST: 09991-87703-000

- (2) Connect the measuring terminal of the tachometer to the measuring terminal of the SST.

NOTE:

This does not apply if your tachometer is a pick-up type.

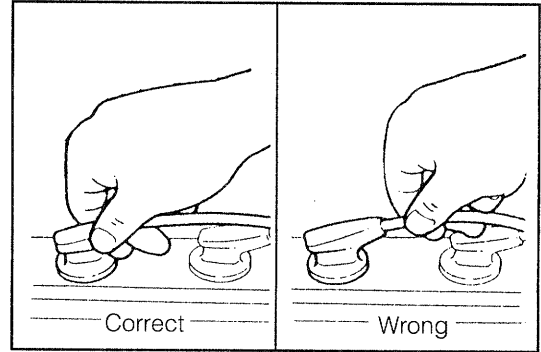


WRU90-EF011

- (3) Use the battery as power source for a timing light, tachometer and so forth.
- (4) Never allow the tachometer terminal to touch the ground, for it could result in damage to the ignitor and/or ignition coil.
- (5) Some kinds of tachometers may not be suited for the ignition system of the vehicle. Therefore, ensure that your tachometer is compatible with the ignition system of the vehicle.

3. If engine misfire takes place, the following measures should be taken.

- (1) Ensure that the battery terminals and so forth are connected properly.
- (2) Ensure that the spark plug wires are connected properly while handle the spark plug wires carefully.
- (3) After completion of repairs, ensure that the ignition coil terminals and other ignition system wire are reconnected securely.



WRU90-EF012

4. Precautions during oxygen sensor handling
- (1) Do not drop the oxygen sensor or allow it to hit other objects.
 - (2) Do not immerse the sensor in water or do not cool it by water.
5. Do not open the cover of the ECU proper.
(Failure to observe this caution could cause ECU malfunction.)
6. Do not touch the screws of the bracket installed on the ECU proper.
(Failure to observe this caution could cause ECU malfunction.)

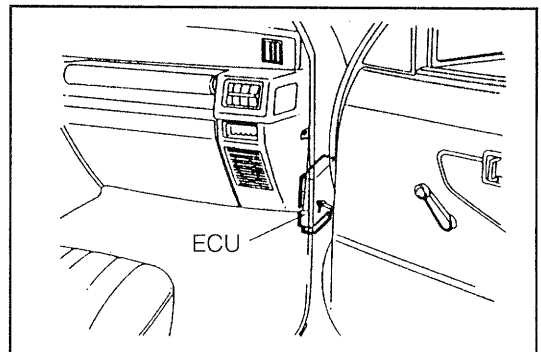
WRU90-EF013

When the vehicle is equipped with wireless installation (HAM, CB, etc.)

The ECU has been so designed that it is resistant to external influence.

However, if a vehicle is equipped with a CB wireless installation and so forth (even if its output is only 10 W), it may affect the ECU adversely. Therefore, observe the following precautions.

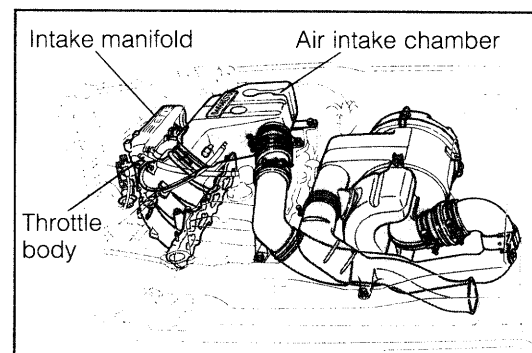
1. Install an antenna at a place as far away as possible from the ECU.
The ECU is installed at the cowl side panel in front of the passenger's seat. Therefore, the antenna should be installed at the rear of the vehicle.
2. The antenna cord should be kept at least 20 cm (7.9 inch) away from the engine wire. Never wind the antenna with the engine wire with tapes.
3. Adjust the antenna output correctly.
4. Never install a wireless installation with a high output on the vehicle.



WRU90-EF014

Air induction system

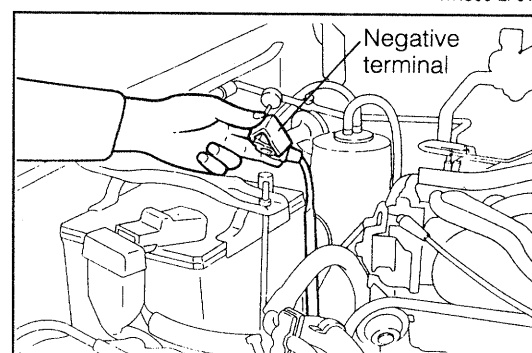
1. Unless all of the oil level gauge, oil filler cap, PCV hose and so forth are installed securely, the engine tune-up can not be performed properly.
2. If air leakage (air admission) is present between the throttle body and the cylinder head, the engine revolution speed can not be adjusted.



WRU90-EF015

Electronic control system

1. Before disconnecting or reconnecting the connector of the sensor system of the EFI system, be sure to turn OFF the ignition switch and all accessory switches. Also, disconnect the battery ground cable from the battery negative terminal. Failure to observe this caution could cause ECU malfunction.



WRU90-EF016

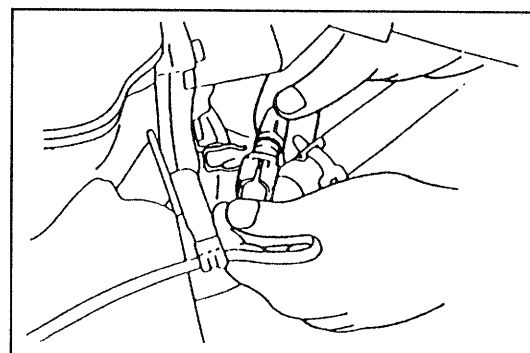
2. Before disconnecting or reconnecting the connector of the ECU proper of the EFI system, be sure to turn OFF the ignition switch and all accessory switches. Also, disconnect the battery ground cable from the battery negative terminal. Failure to observe this caution could cause ECU malfunction.
3. Be sure to keep the number of disconnection/reconnection of the connector of the EFI system at a minimum level.
4. When installing the battery, care must be exercised not to mistake the battery polarity.
5. Never apply strong impacts to the EFI parts. Pay utmost attention during the installation/removal. Especially, special caution must be exercised as to the handling of the ECU.
6. When the voltage or resistance of the ECU is measured during the check, never touch terminals other than the specified terminals. Failure to observe this caution could cause ECU malfunction.
7. Never open the cover of the ECU proper.
8. When the system is checked on a rainy day, be very careful not to allow water to get into connectors and/or terminals.
Also, when the engine compartment is washed, prevent water from being splashed to the EFI-related parts and wiring connectors.
9. EFI parts should be replaced as an assembly.

WRU90-EF017

10. When disconnecting or reconnecting the wiring connector, care must be exercised as to the following points.
 - (1) Carefully observe the shape of the lock prior to the disconnecting/connection.
 - (2) Release the lock. Disconnect the connector.

NOTE:

When disconnecting the connector, be sure to hold the connector body, do not to pull the wire.

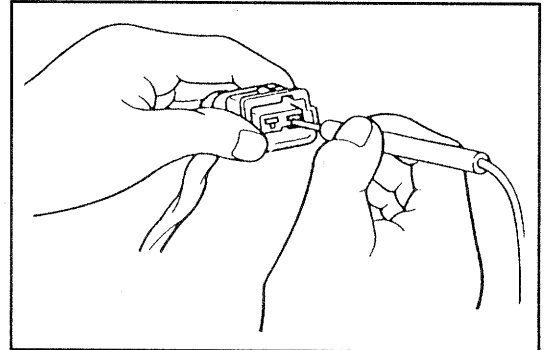


WRU90-EF018

- (3) Insert the connector, until the lock is engaged completely.
- (4) Be sure to keep the number of disconnection/reconnection of the connector at a minimum level.

WRU90-EF019

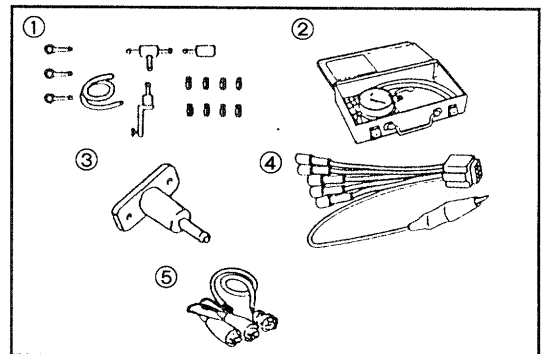
11. When checks are performed at the connector-side terminals, using a circuit tester, care must be exercised as to the following point.
Never apply such a force to the connector terminal that can deform the terminal.



WRU90-EF020

12. When checking the fuel system, such as the injectors, pressure regulator and fuel pressures, use the following SSTs.

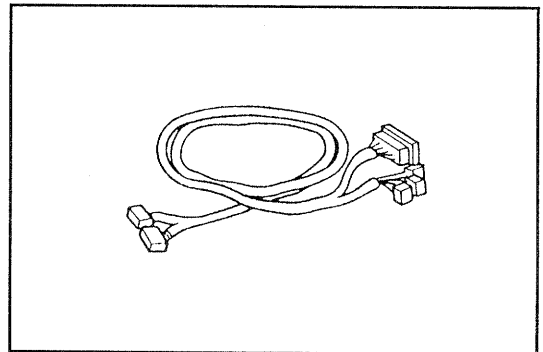
SSTs: 09268-87701-000	①
09268-87702-000	②
09283-87703-000	③
09842-30070-000	④
09991-87702-000	⑤



WRU90-EF021

13. When measuring the voltage or resistance of each system, use the following SST.

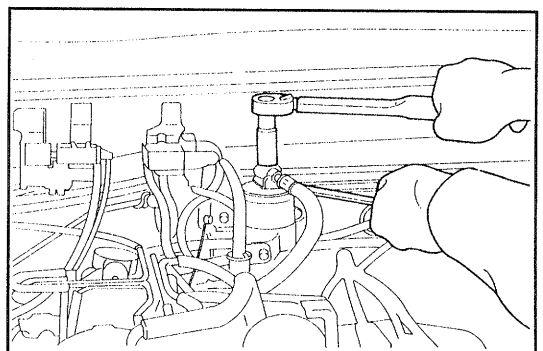
SST: 09842-87704-000



WRU90-EF022

Fuel system

1. The fuel line at the high-pressure side is pressurized to a fuel pressure of about 2.55 kg/cm² (36.3 psi). Therefore, a large amount of gasoline flows out when parts of the fuel line is disconnected. Hence, take the following counter-measures.
 - (1) Release the inner pressure of the fuel tank by removing the fuel filler cap.
 - (2) Place a suitable container, close or the like under the disconnecting connection.
 - (3) Loosen the connection slowly, while preventing the fuel from splashing, using a suitable cloth or the like.
 - (4) Disconnect the connection.
 - (5) Plug the disconnected connection with a rubber plug or the like so that no dust may enter into the fuel line.



WRU90-EF023

2. When connecting the flare nut or union bolt of the high-pressure pipe, observe the following instructions.

[Union bolt type]

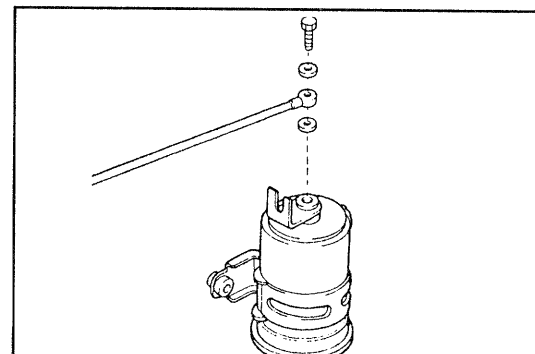
- (1) Always use new gaskets.
- (2) First, tighten the union bolt with your fingers.
- (3) Next, tighten the union bolt to the specified torque.

Tightening Torque: 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N-m)

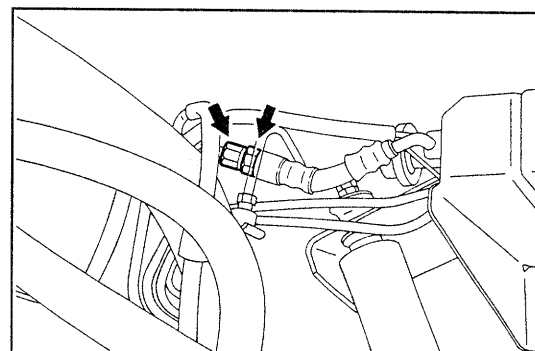
[Flare nut type]

- (1) Coat the flare nut with a thin film of engine oil. Tighten the flare nut fully with your fingers.
- (2) Tighten the flare nut to the specified torque.

Tightening Torque: 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N-m)



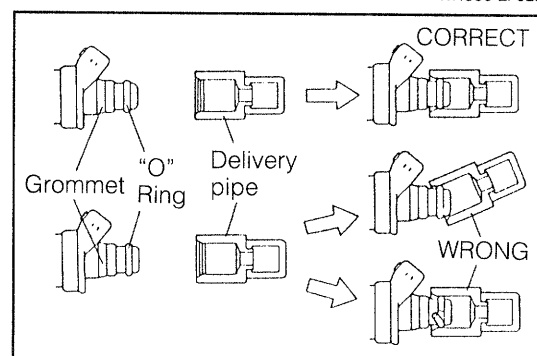
WRU90-EF024



WRU90-EF025

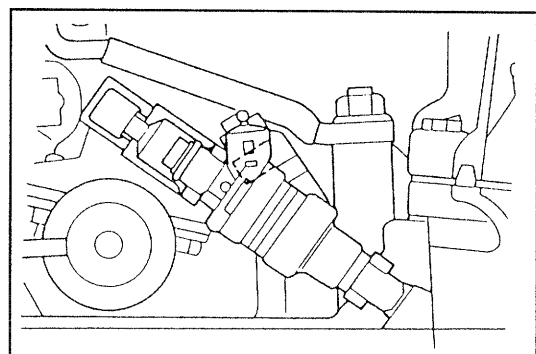
3. When removing/installing the injector, observe the following instructions.

- (1) Do not reuse the "O" ring.
- (2) When installing the "O" ring to the injector, be careful not to damage the "O" ring.
- (3) When connecting the injector to the delivery pipe, apply silicon oil to the "O" ring of the injector in advance. (Never use engine oil, gear oil and so forth.)
- (4) When connecting the injector to the delivery pipe, be very careful not to damage the "O" ring of the injector.



WRU90-EF026

4. Install the injector to the delivery pipe and cylinder head, as shown in the figure.



WRU90-EF027

5. After completion of checks or repairs of the fuel system, be sure that no fuel leakage is present in the fuel system, following the procedure given below.

- (1) Detach the check terminal cap.
- (2) Short the fuel pump terminal (white/black) with the ground terminal (black) of the check connector, using the following SST.

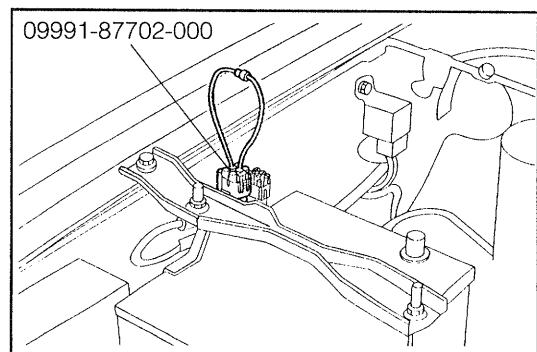
SST: 09991-87702-000

NOTE:

The check connector is located at the right side fender panel of the engine compartment.

CAUTION:

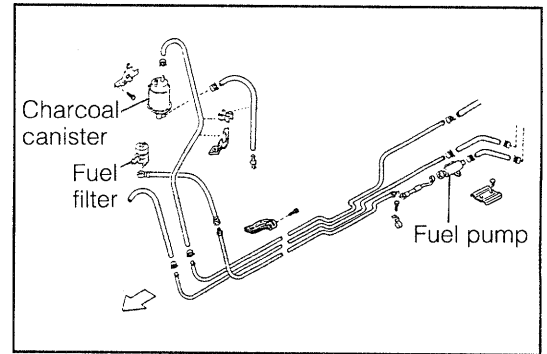
As for the terminals other than those specified, never allow them to be connected or shorted.



WRU90-EF028

EFI SYSTEM

- (3) Turn ON the ignition switch. (with the engine in a stopped state)
At this time, a fuel pressure of 2.55 kg/cm² (36.3 psi) is being applied to the fuel line.
Under this conditions, check the fuel line system for evidence of leakage.
If any leakage is present at the fuel line system, repair leaky points. Recheck the system for leakage.
- (4) Stop the engine.
- (5) Remove the SST from the check terminal.
- (6) Connect the check terminal cap to the check terminal.



WRU90-EF029

TROUBLE SHOOTING BY MALFUNCTION ITEMS

TROUBLE SHOOTING HINTS

1. In most cases, engine troubles are attributable to systems other than the EFI system.
Prior to starting the trouble shooting for the EFI system, check other systems.

- (1) Power supply

- Battery voltage
- Fuse blown
- Fusible link blown

- (2) Body ground

- (3) Fuel supply

- Fuel leakage
- Fuel filter clogged
- Fuel pump malfunctioning

- (4) Ignition system

- Spark plugs faulty
- Spark plug wires faulty
- Distributor and ignitor faulty
- Ignition coil faulty

- (5) Air induction system

- Air leakage

- (6) Others

- Ignition timing adjusted improperly
- Idle speed adjusted improperly
- Idle speed control VSV malfunctioning
- EGR valve malfunctioning
- etc.

WRU90-EF030

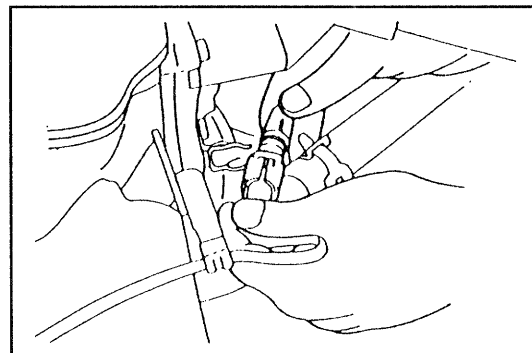
2. Most of troubles related to the EFI system are merely caused by poor wire connections.

Ensure that connectors are connected securely.

Check connectors, being careful as to the following points.

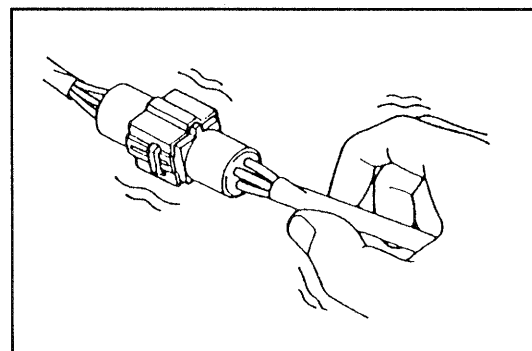
- (1) Visually inspect that terminals are not bent.

- (2) Ensure that connectors are securely connected and locked.



WRU90-EF031

- (3) Check to see if the malfunction phenomenon takes place when applying light vibration to the connector or the wire connected to the connector.

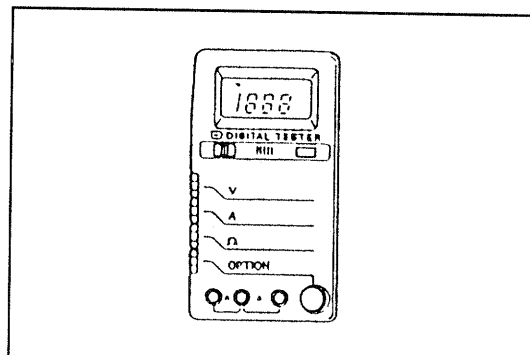


WRU90-EF032

3. Prior to replacing the ECU, thoroughly perform the trouble shooting for possible items other than the ECU. The ECU is a reliable, but an expensive part. Even when the ECU has been replaced according to the check results of the trouble shooting and the relevant malfunction has been remedied, be sure to reinstall the old ECU so as to confirm that the malfunction was obviously caused by the faulty ECU.

WRU90-EF033

4. For the trouble shooting, use a volt/ohmmeter whose internal resistance is $10\text{ k}\Omega/\text{V}$ or more. Use of a volt/ohmmeter whose internal resistance is less than $10\text{ k}\Omega/\text{V}$ may cause an ECU malfunction or wrong diagnosis. Furthermore, be sure to employ a meter whose resolution is 0.1V or more, 0.5Ω or more and whose accuracy is $\pm 2\%$ or more.



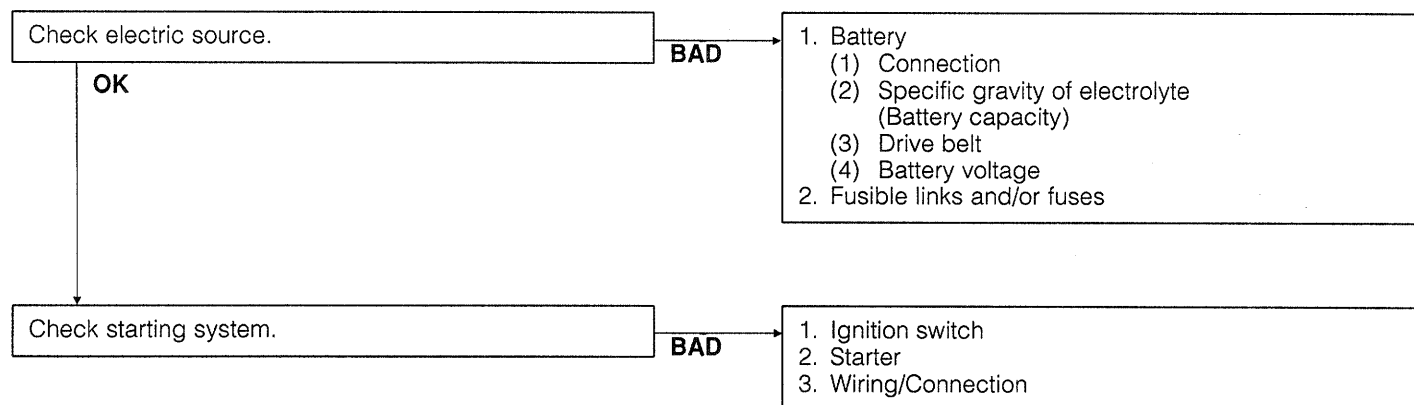
WRU90-EF034

5. In this trouble shooting, no consideration has been made to any displacement of timing belt teeth. Hence, if the trouble persists even after the trouble shooting has been carried out, check to see if the timing belt has skipped a tooth.

WRU90-EF035

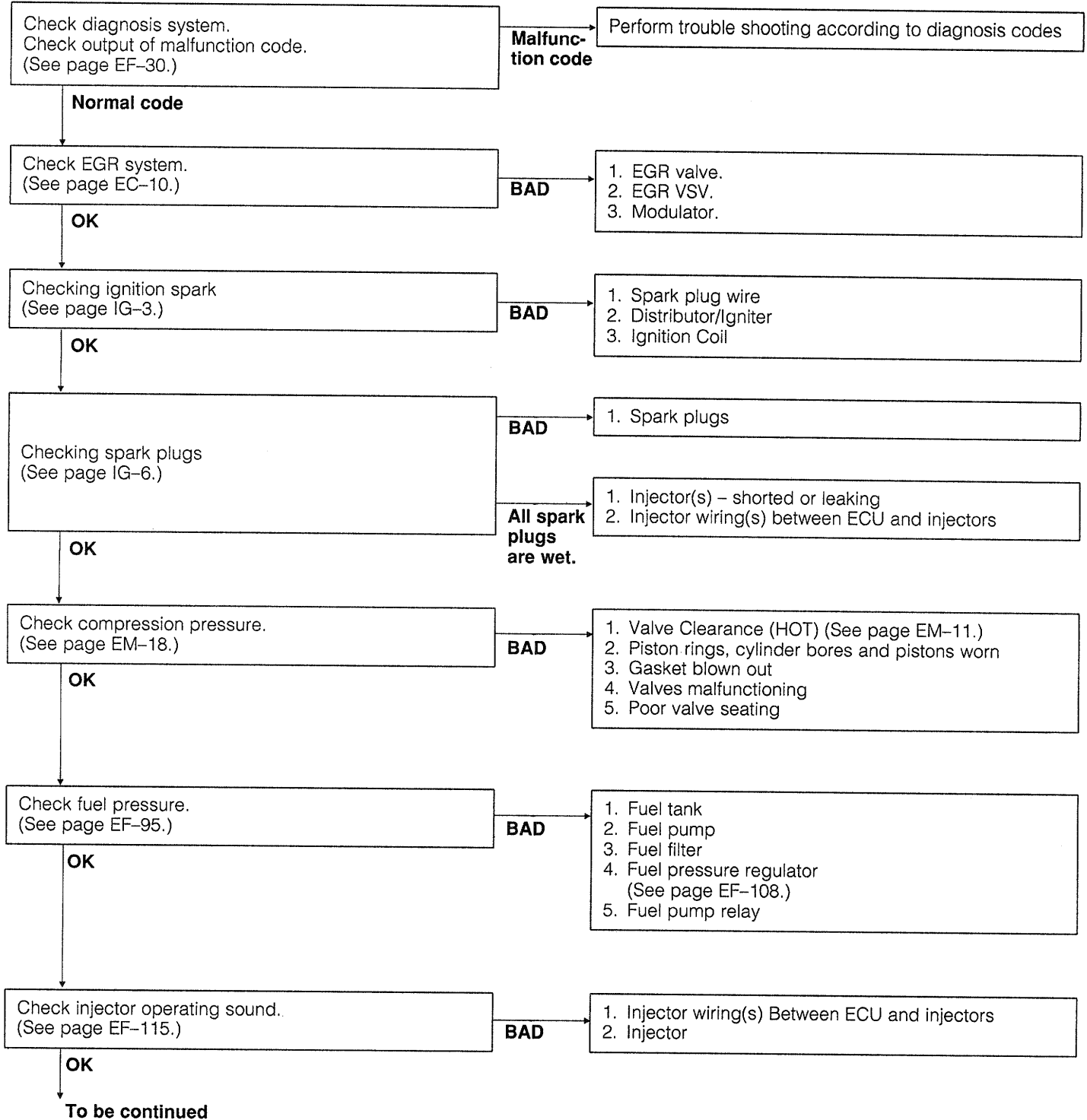
TROUBLE SHOOTING PROCEDURE

**Symptom Engine will not start.
(Engine will not crank or cranks slowly.)**



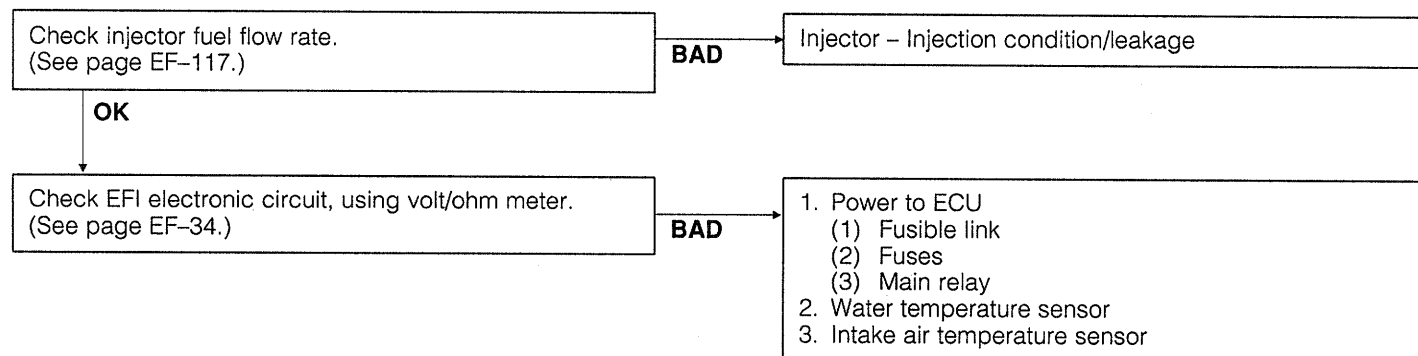
WRU90-EF036

Symptom Engine will not start. (Engine cranks normally.)



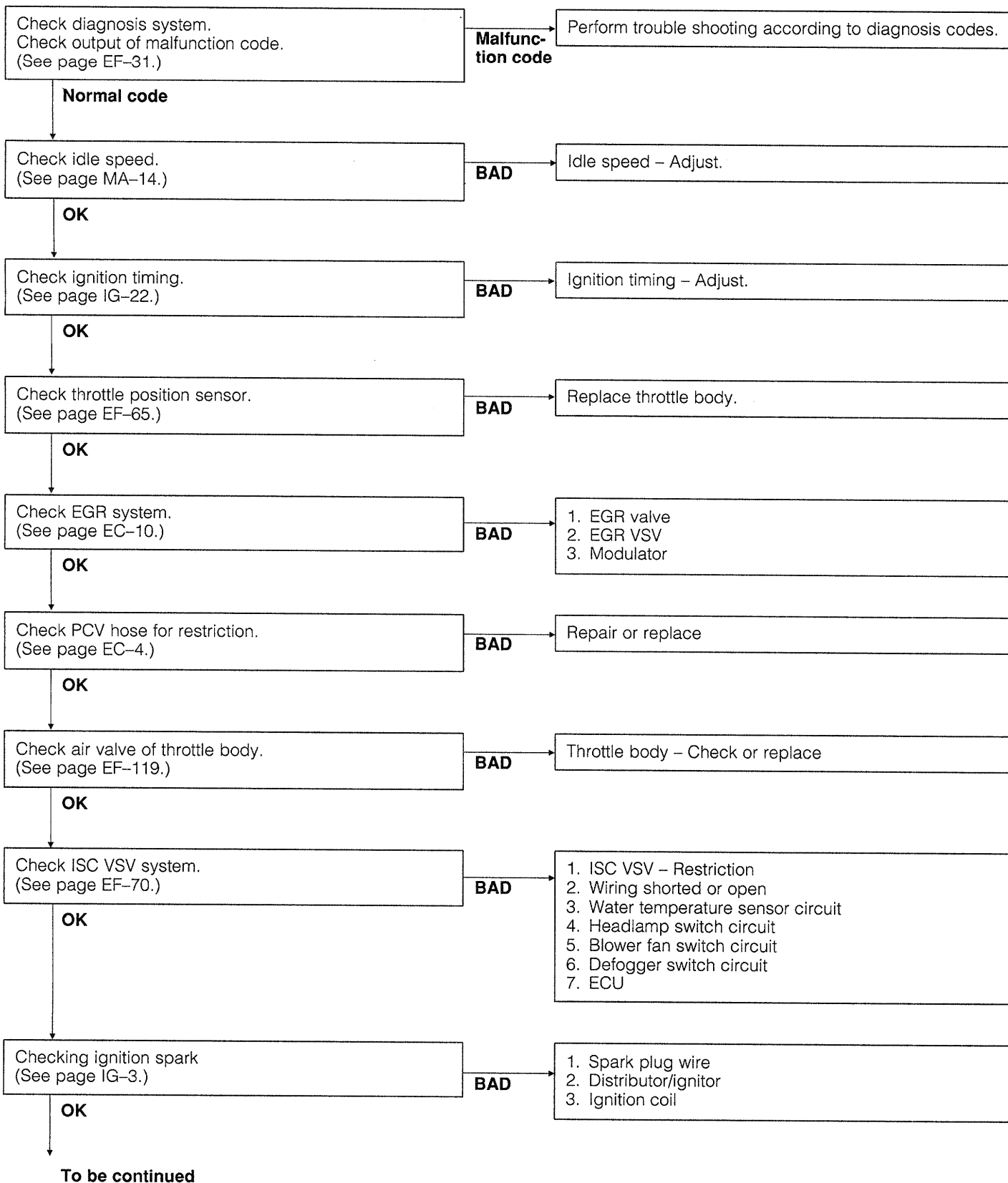
WRU90-EF037

(Cont'd)

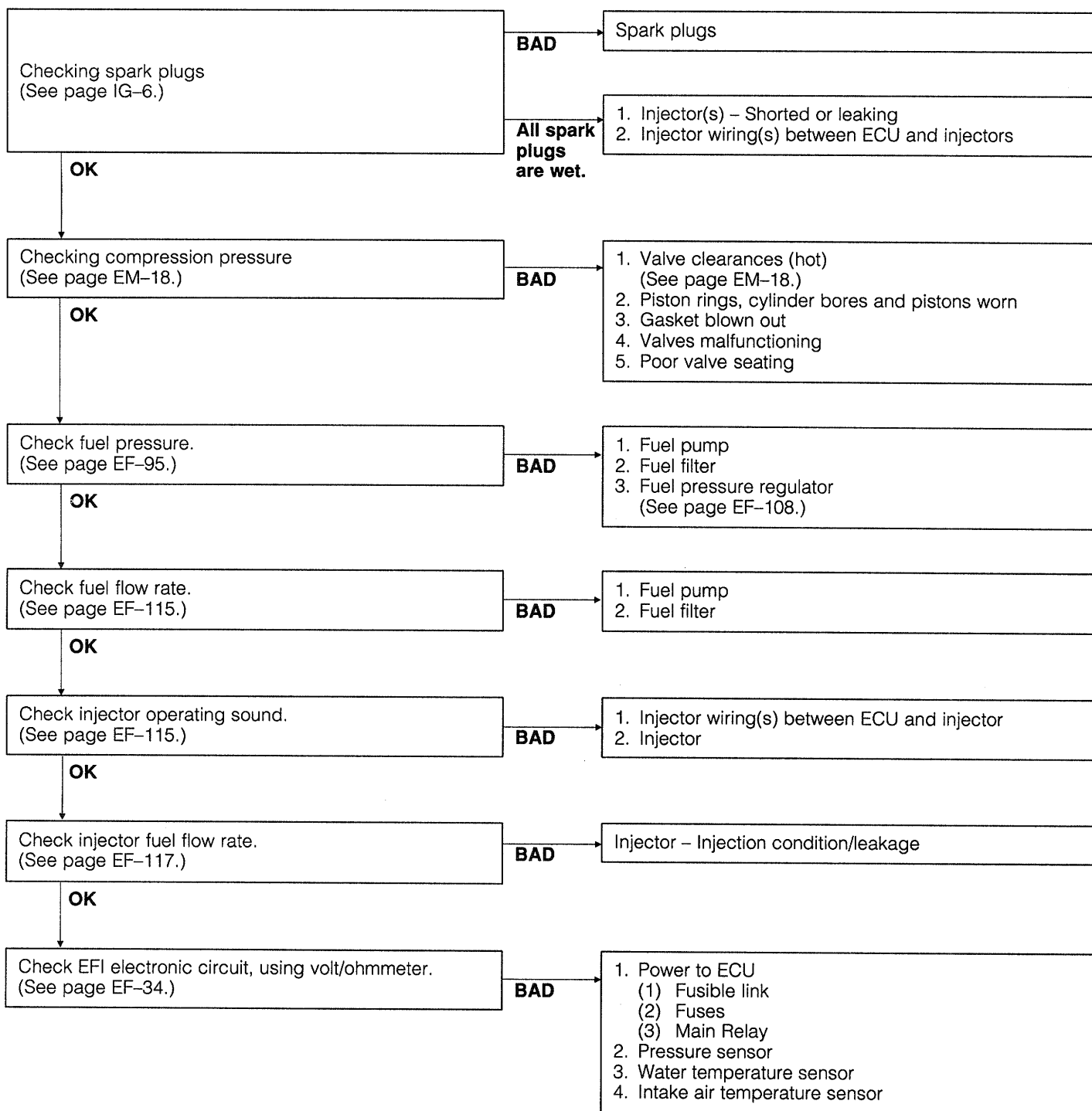


WRU90-EF038

Symptom Engine stalls immediately after starting.

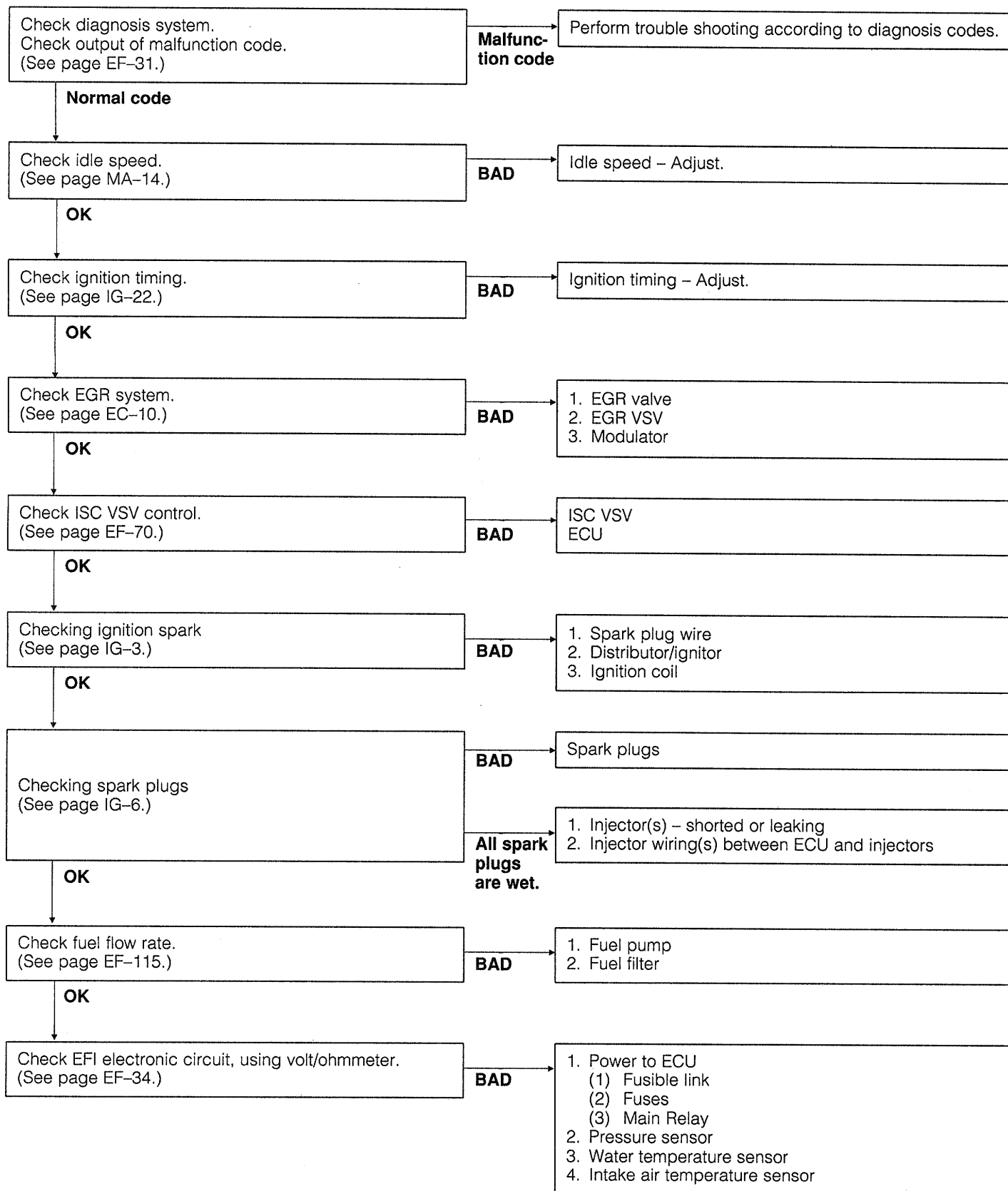


(Cont'd)



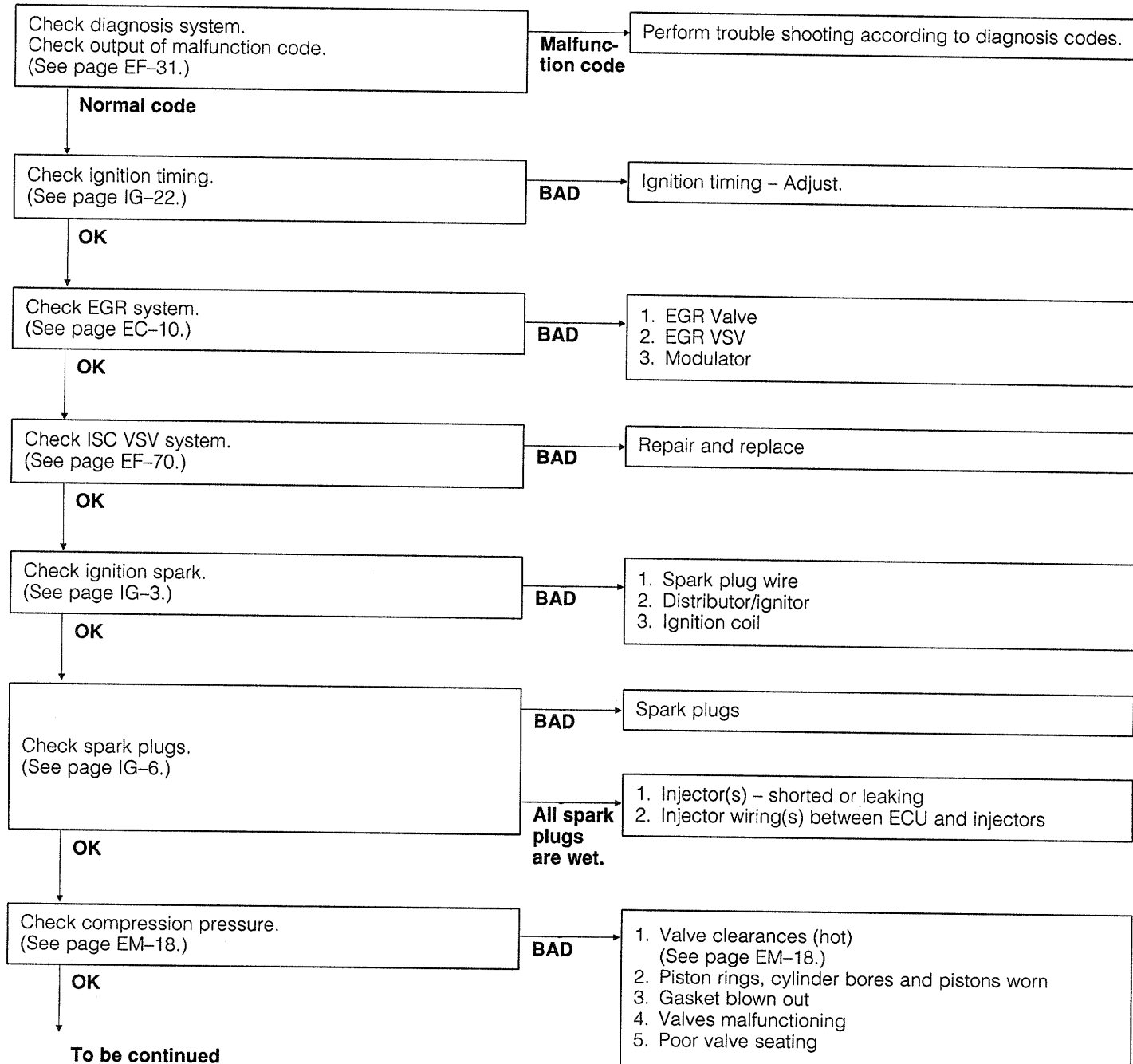
WRU90-EF040

Symptom Engine often stalls.



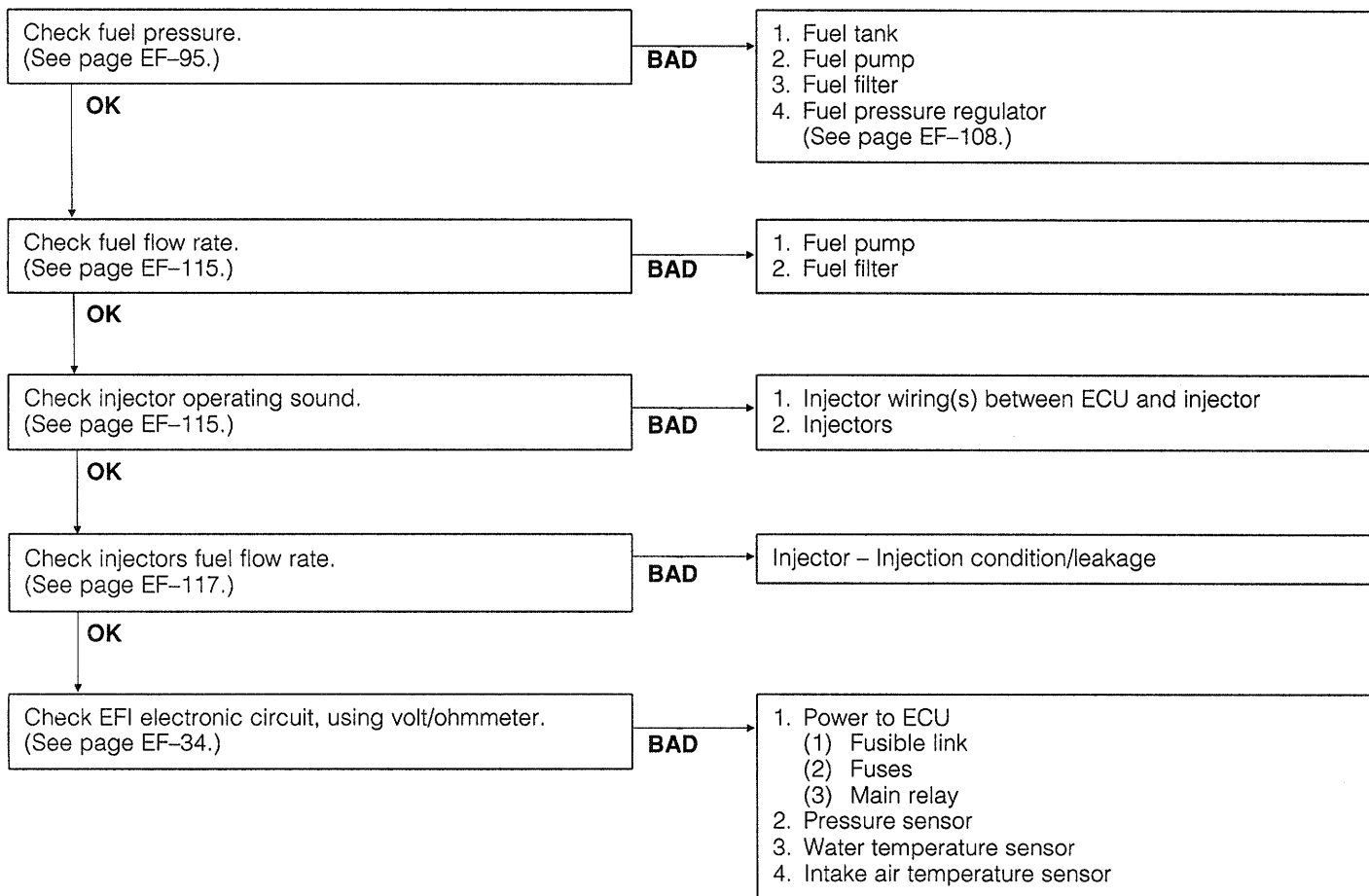
WRU90-EF041

Symptom Hard starting



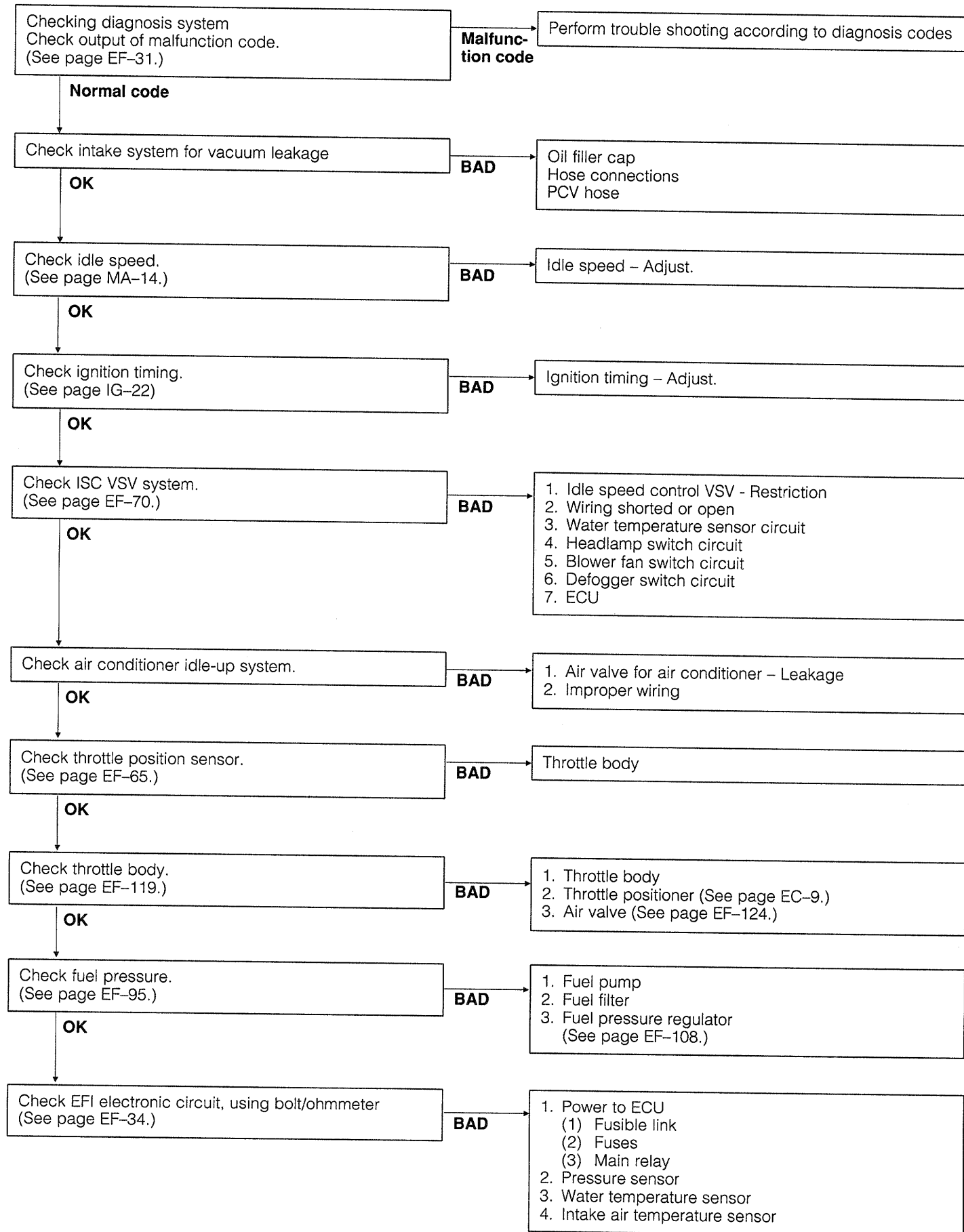
WRU90-EF042

(Cont'd)

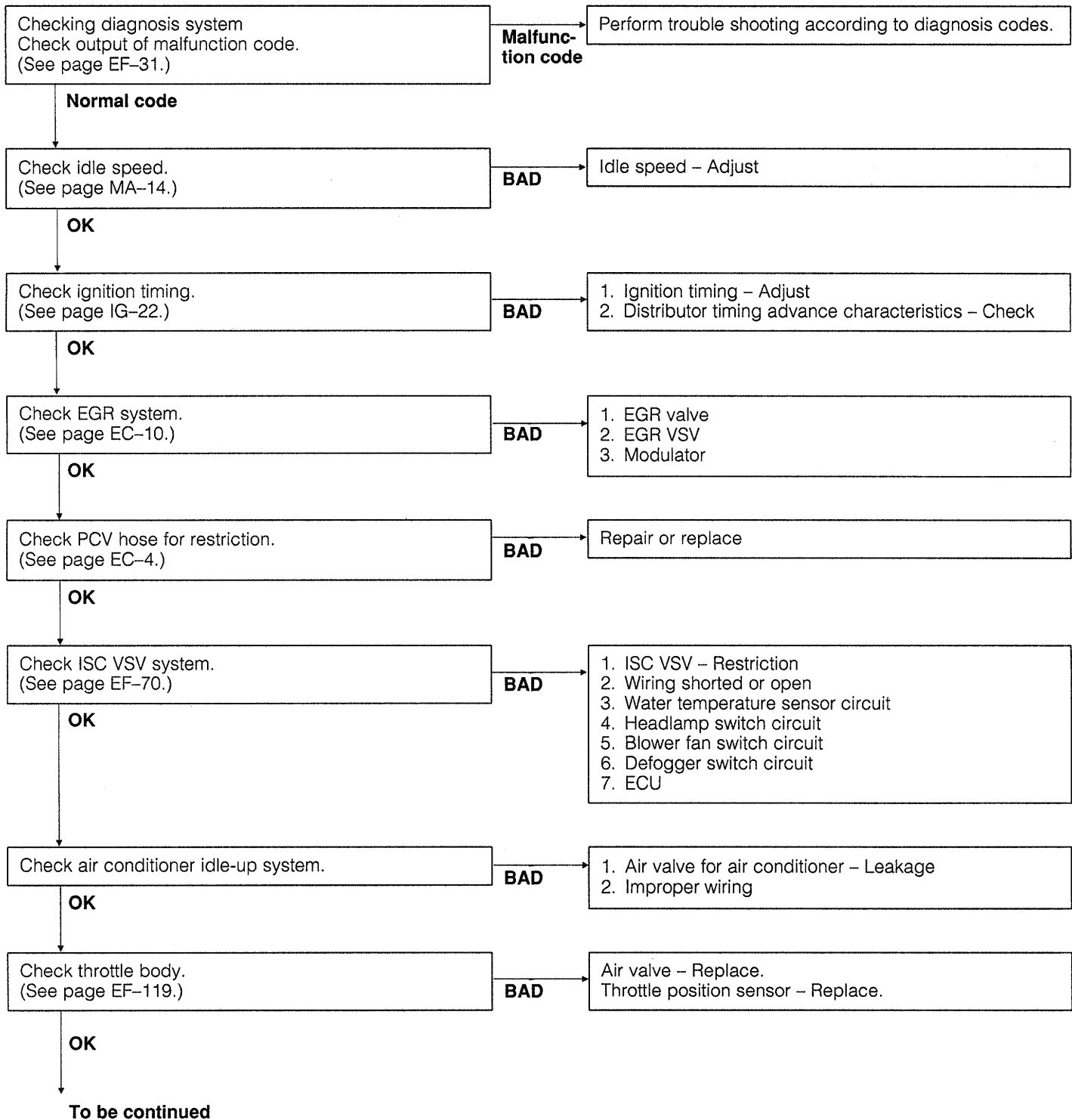


WRU90-EF043

Symptom Engine idle speed too high

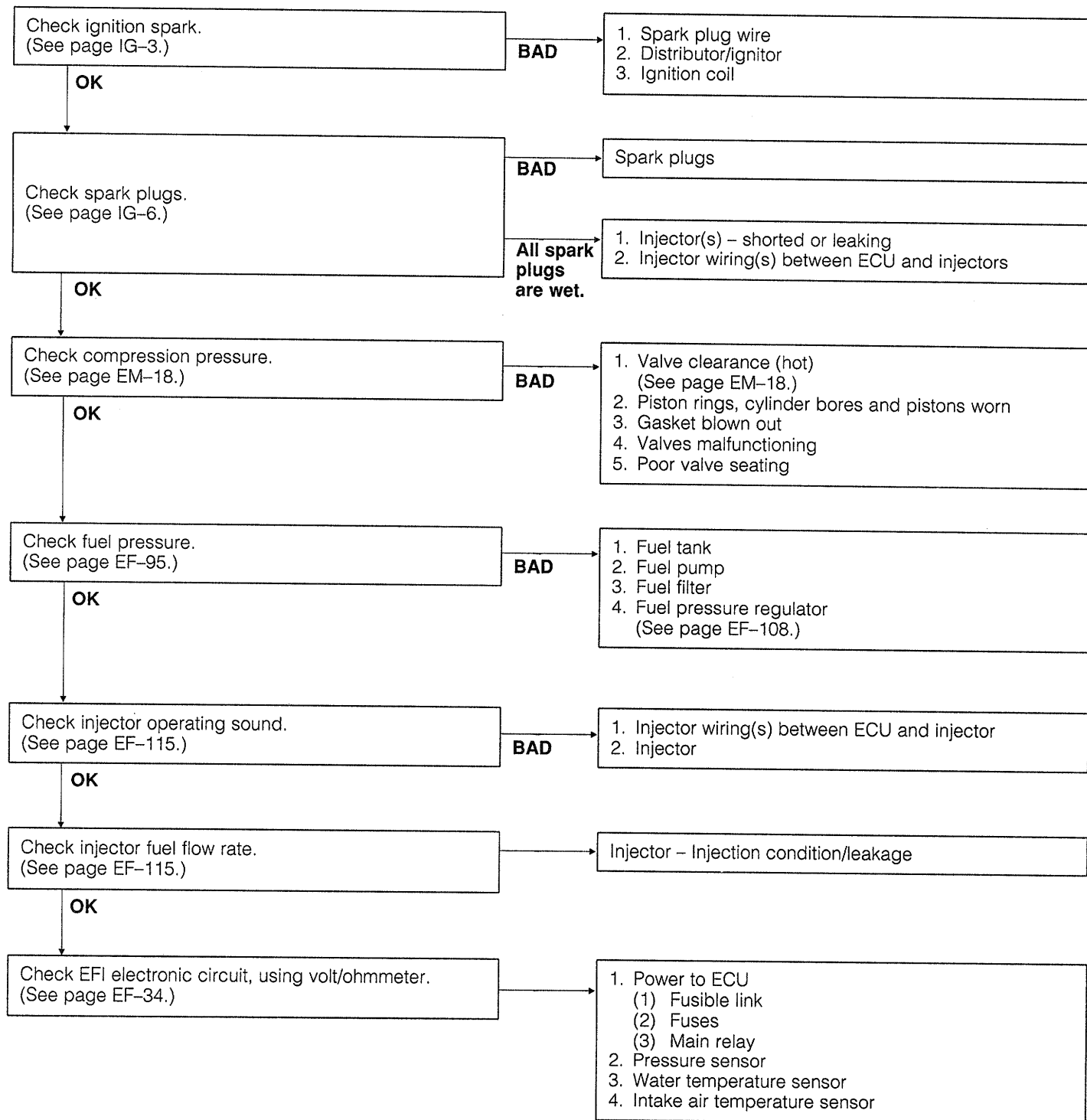


Symptom Engine idle speed too low and/or rough idling



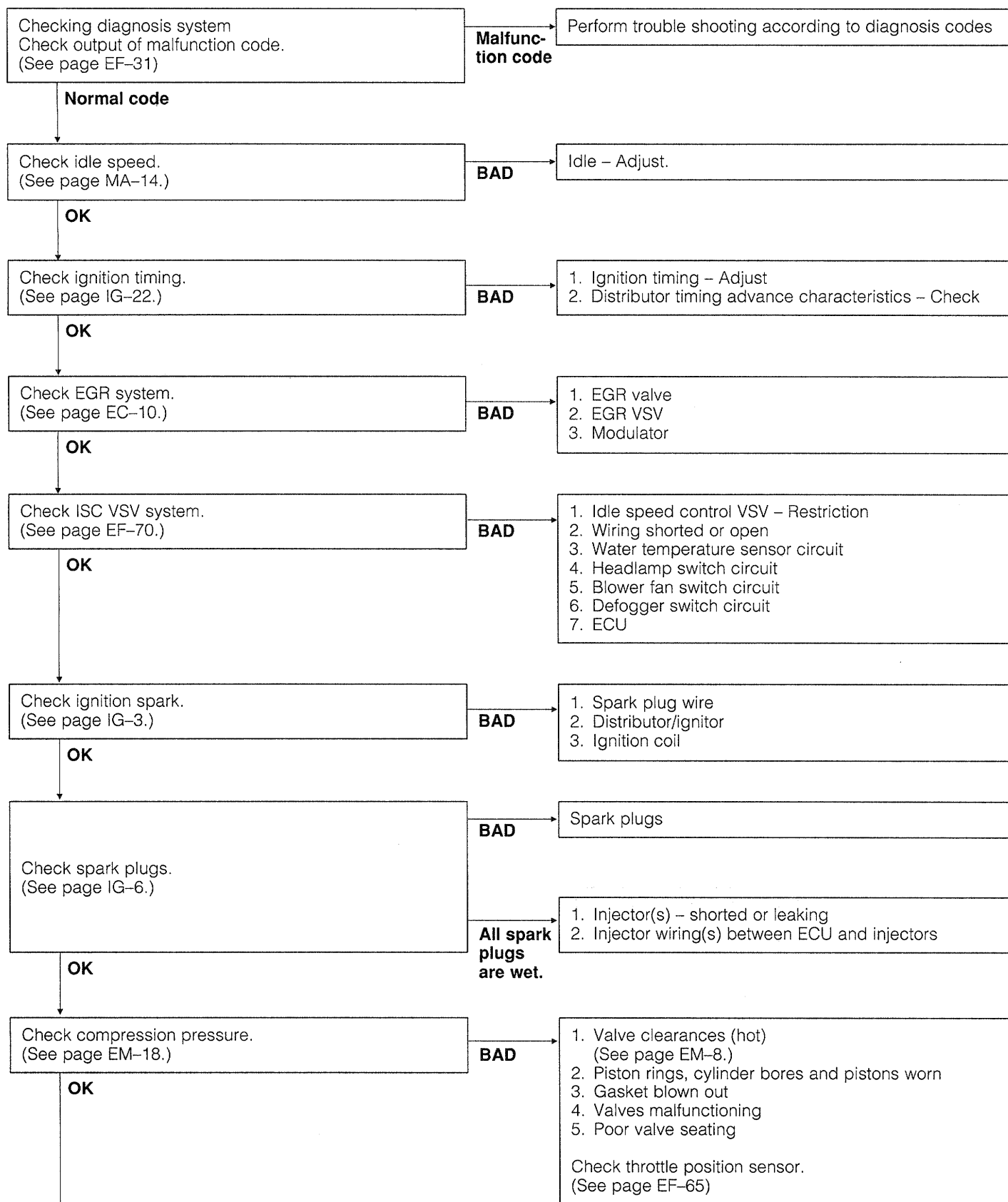
WRU90-EF045

(Cont'd)

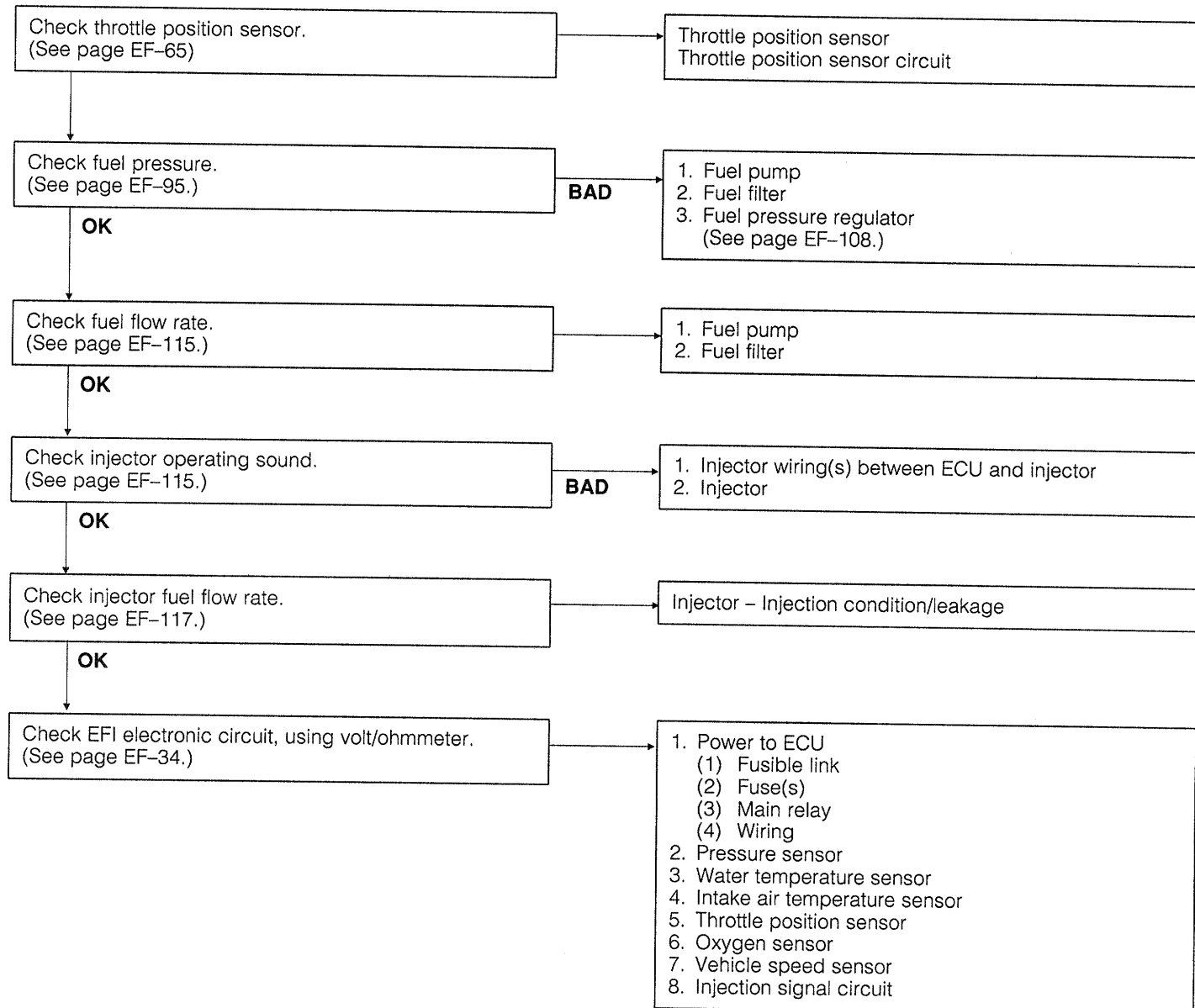


WRU90-EF046

Symptom Poor driveability

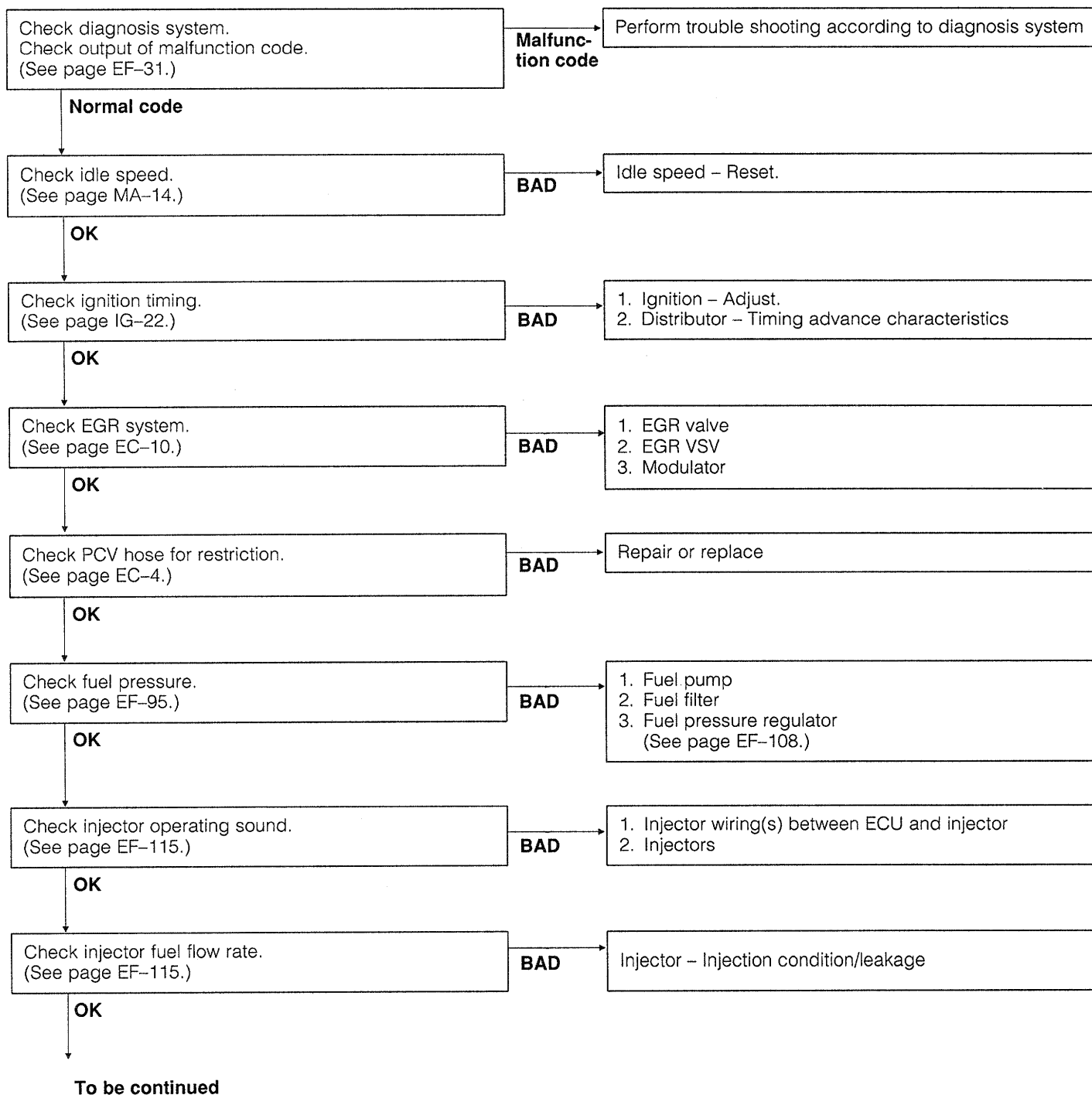


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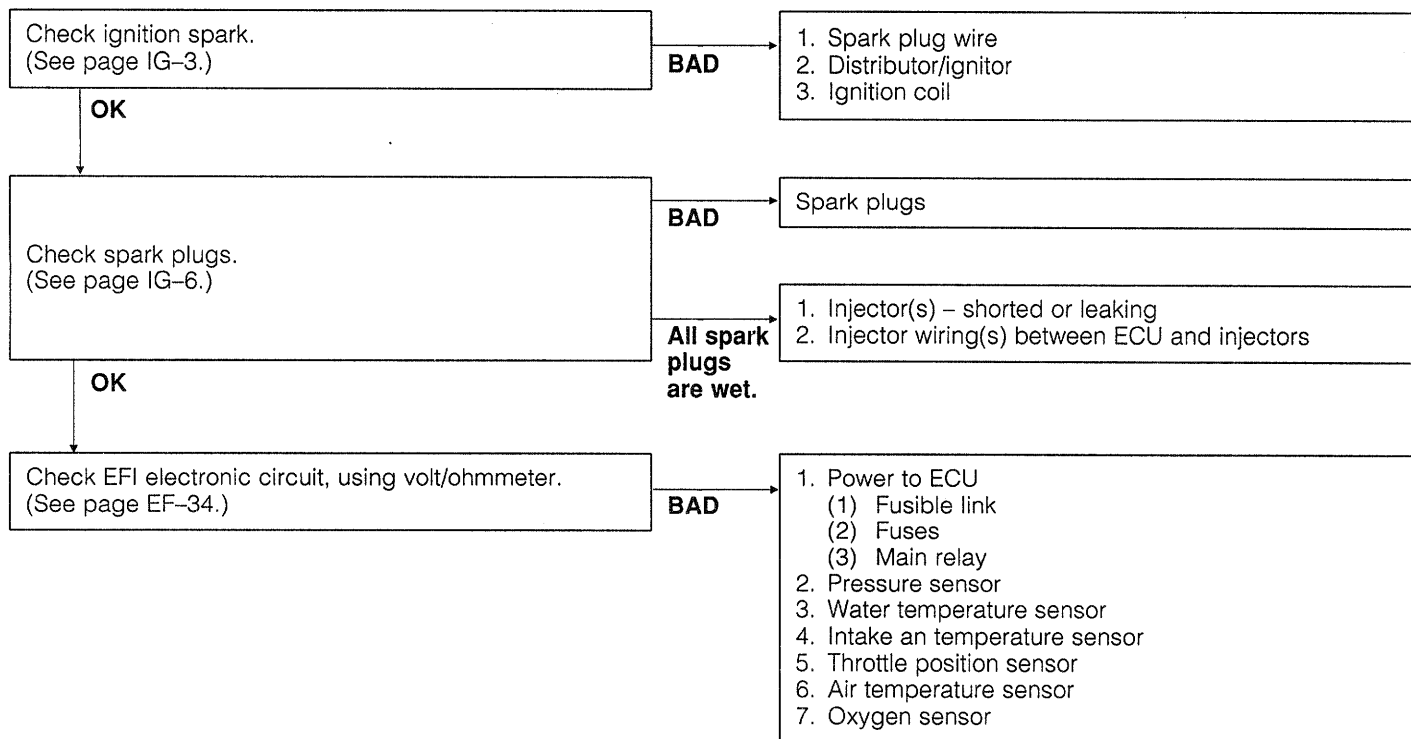


WRU90-EF048

Symptom Backfire (Lean fuel mixture)

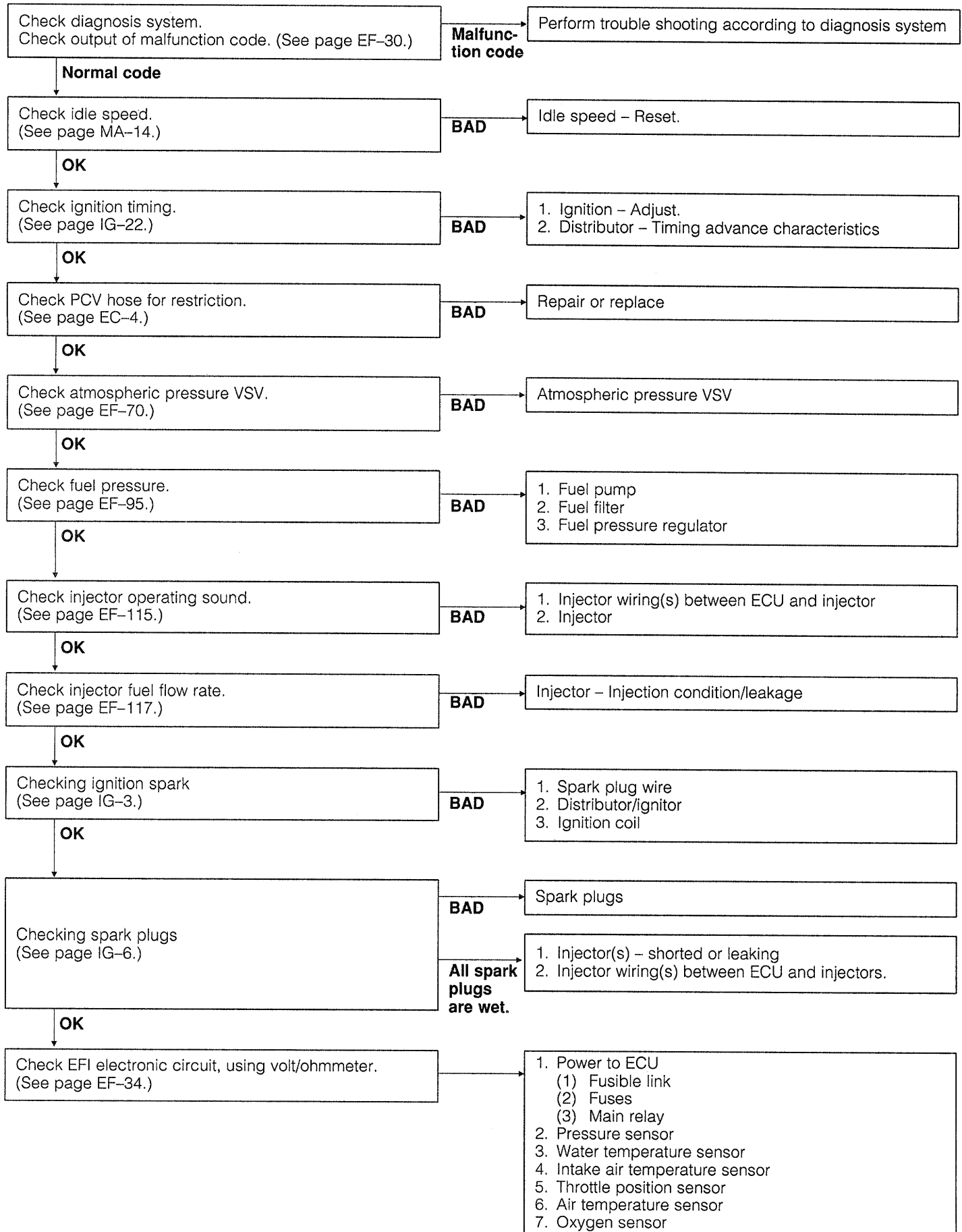


(Cont'd)



WRU90-EF049

Symptom Afterfire (Rich mixture – Misfire)



DIAGNOSIS SYSTEM

DESCRIPTION

A self-diagnosis system is built in the ECU. If any abnormality should occur in the signal systems of various sensors, the self-diagnosis system memorizes the malfunction code number in the ECU. In respect to important abnormalities, the check engine lamp at the instrument panel goes on, thus warning the driver of the abnormality.

When the abnormality is cleared, the check engine lamp goes out.

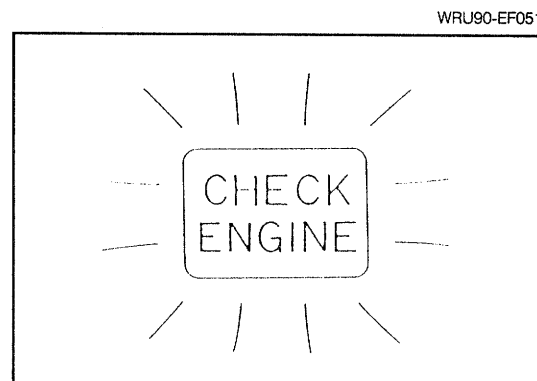
When the Test terminal of the check terminal is shorted with the ground terminal, the malfunction code number that has been memorized in the ECU will be indicated in a form of flashing of the check engine lamp in the instrument panel.

This memorized malfunction code number is erased when the battery ground cable is disconnected from the negative (-) terminal of the battery, or when the back-up fuse in the relay block assembly is disconnected with the ignition key switch turned OFF.

Check of "Check Engine" Warning Light

1. When the ignition switch is turned ON, the check engine lamp goes on.
(Engine is under a stopped state.)
If not, see page EF-33.
2. When the engine starts, the check engine lamp goes off.

If the check engine lamp remains illuminated, it indicates that the diagnosis system has detected system malfunctions.



WRU90-EF051

WRU90-EF052

Output of Diagnosis Codes

1. Initial conditions
 - (1) Battery voltage of 11 volts or more
 - (2) Throttle valve fully closed
 - (3) All accessory switches turned OFF
2. Short the Test terminal of the check terminal with the ground terminal, using the following SST.
SST: 09991-87702-000

NOTE:

The check terminal is located at the right side fender panel of the engine compartment.

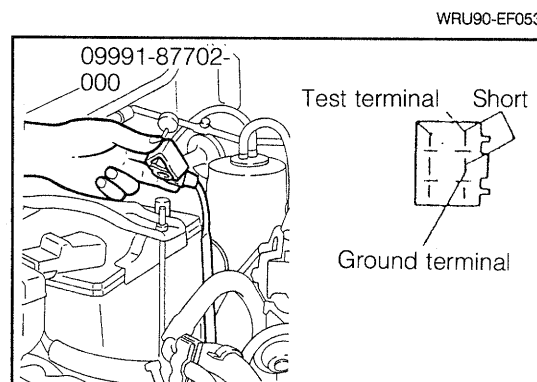
CAUTION:

Care must be exercised to ensure that no connection is made on terminals except for those specified.

3. Set the ignition switch to ON position. At this time, be careful not to start the engine.
4. Read the diagnosis code by observing the flashing number of the check engine lamp.

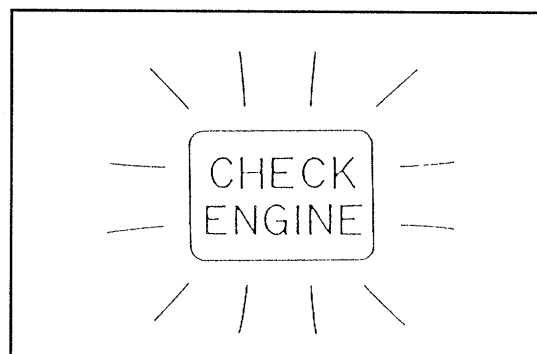
NOTE:

If the check engine lamp fails to flash, it is likely that the ECU is malfunctioning. Hence, proceed to inspection of diagnosis system circuit.



WRU90-EF053

WRU90-EF054



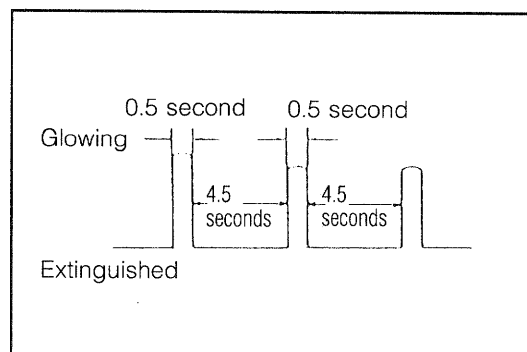
WRU90-EF055

Output form of diagnosis code

(1) Indication of normal code number

(Code number 1 – normal function)

The check engine lamp glows for 0.5 second, 4.5 seconds later after the ignition key switch has been turned ON. After a lapse of 4.5 seconds, the check engine lamp again glows for 0.5 second. Then, this pattern will be repeated.

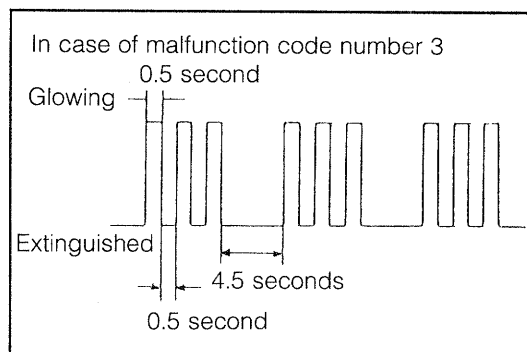


WRU90-EF056

(2) Indication of malfunction code number

- When a single malfunction code is indicated:

The check engine lamp repeats glowing the same times as the number of the malfunction code at intervals of 0.5 second, 4.5 seconds later after the ignition key switch is turned ON. After a lapse of 4.5 seconds, the check engine lamp again repeats glowing the same times as the number of the malfunction code at intervals of 0.5 second. Then, this pattern will be repeated.



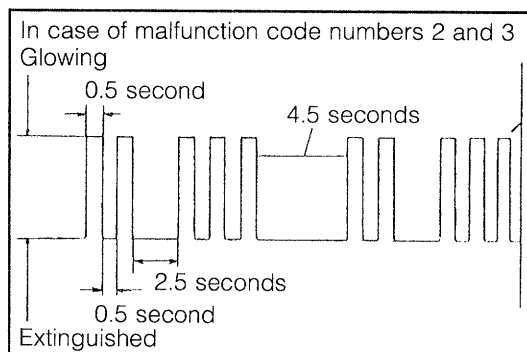
WRU90-EF057

- When plural malfunction code numbers are indicated:

The check engine lamp repeats glowing the same times as the number of the first malfunction code at intervals of 0.5 second, 4.5 seconds later after the ignition key switch is turned ON. After a lapse of 2.5 seconds, the check engine lamp repeats glowing the same times as the number of the next malfunction code at intervals of 0.5 second.

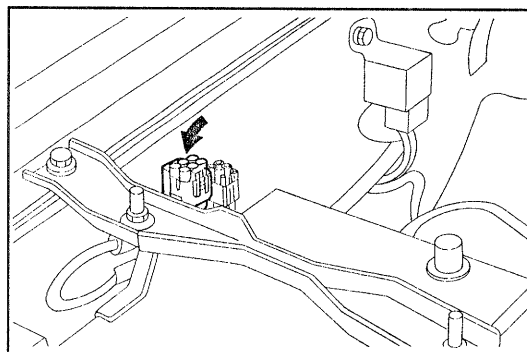
The memorized code numbers are indicated in the sequence of code number, starting from a smaller number.

The indication of the malfunction codes is repeated 4.5 seconds later after the memorized code numbers have been indicated.



WRU90-EF058

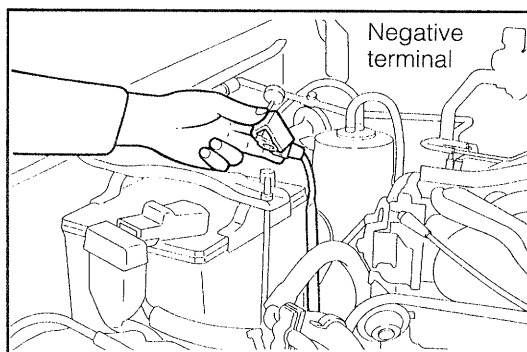
- After the diagnosis codes have been read, remove the SST from the check terminal.
- Install the cap on the check terminal.



WRU90-EF059



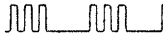








Cancelling Diagnosis Code



To erase the diagnosis codes memorized in the ECU after malfunctions have been repaired, disconnect the battery ground cable from the negative (–) terminal of the battery. For at least 10 seconds with the ignition switch turned OFF. [When ambient temperature is about 20°C (68°F).]



WRU90-EF060

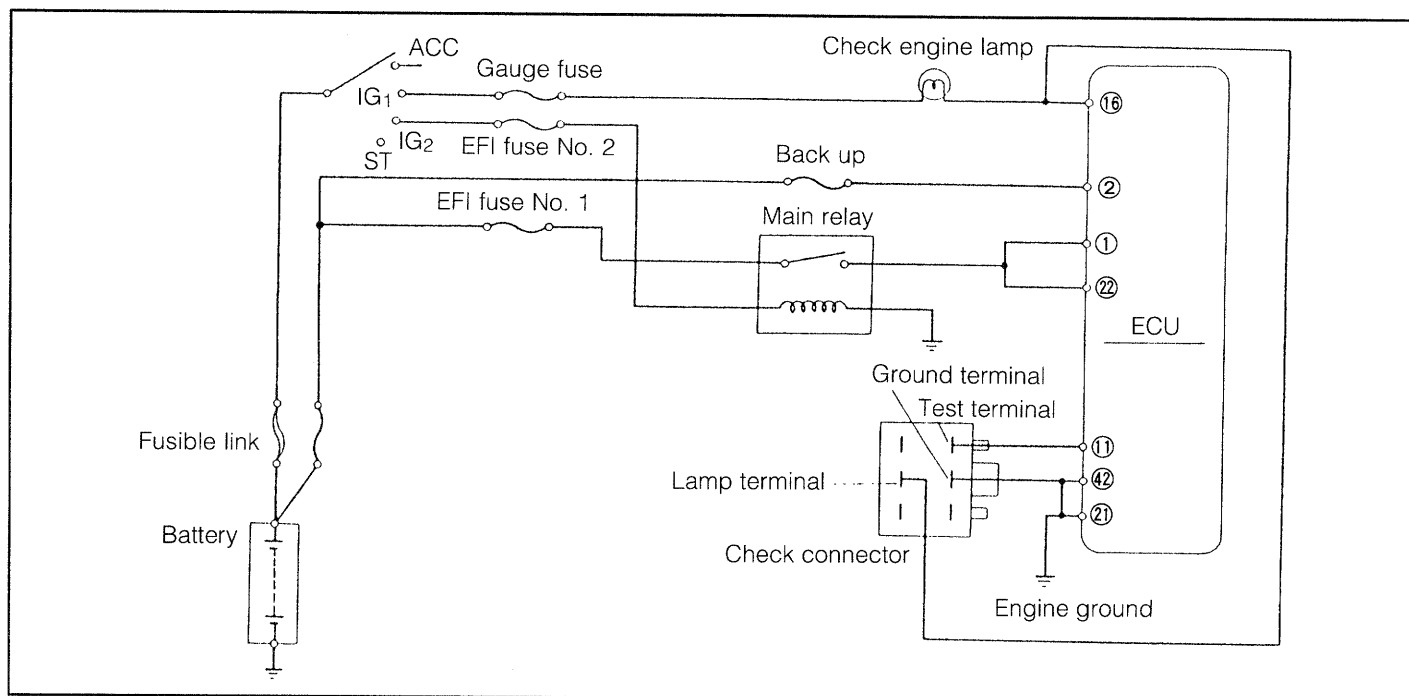
DIAGNOSIS CODE

Code No.	Number of glowing of check engine lamp	Diagnosis item	Diagnosis contents	Trouble area	Reference page
1		Normal	—	—	—
2		Pressure sensor	When the input signal from the pressure sensor deviates from the specified value:	<ul style="list-style-type: none"> • Pressure sensor • Pressure sensor circuit • ECU 	EF-67 EF-42
3		Ignition signal	When the ignition signal fails to be inputted:	<ul style="list-style-type: none"> • Distributor • Ignitor • Ignition coil • Ignition system circuit • ECU 	EF-44 IG- 8
4		Water temperature sensor	When the input signal from the water temperature sensor deviates from the specified value:	<ul style="list-style-type: none"> • Water temperature sensor • Water temperature sensor circuit • ECU 	EF-60 EF-45
5		Oxygen sensor signal	When the input signal from the oxygen sensor fails to be inputted under the certain conditions:	<ul style="list-style-type: none"> • Oxygen sensor • Oxygen sensor circuit • ECU 	EF-82 EF-46
7		Throttle position sensor	When both idle switch and power switch enter "ON" conditions:	<ul style="list-style-type: none"> • Throttle position sensor • Throttle position sensor circuit • ECU 	EF-65 EF-47
8		Intake air temperature sensor	When the input signal from the intake air temperature sensor deviates from the specified value:	<ul style="list-style-type: none"> • Intake air temperature sensor • Intake air temperature sensor circuit • ECU 	EF-63 EF-50
9		Vehicle speed sensor	When the input signal from the vehicle speed sensor fails to be inputted under the certain conditions:	<ul style="list-style-type: none"> • Vehicle speed sensor • Vehicle speed sensor circuit • ECU 	EF-51
10		Starter signal	When the input signal from the starter fails to be inputted, until the certain conditions are satisfied: However, it should be noted that this code may be memorized when vehicle is started by being pushed.	<ul style="list-style-type: none"> • Starter • Starter circuit • ECU 	ST- 3 EF-52
11		Switch signal	When even one of the following conditions is satisfied with the test terminal shorted with the ground terminal: <ul style="list-style-type: none"> • when the air conditioner is functioning. • when idle switch is turned OFF. 	<ul style="list-style-type: none"> • Air conditioner system • Throttle position sensor • Throttle position sensor circuit • ECU 	EF-65 EF-53
12		EGR control system	When it is judged that the EGR control system is not functioning normally under the certain conditions:	<ul style="list-style-type: none"> • EGR valve • Modulator • EGR VSV • Water temperature sensor 	EF-76 EF-60

Code No.	Number of glowing of check engine lamp	Diagnosis item	Diagnosis contents	Trouble area	Reference page
15		Air-to-fuel ratio (rich fail)	When the feedback function performs reduction compensation beyond the specified level:	<ul style="list-style-type: none"> • Injector circuit • Injector • Fuel pressure • Pressure regulator • Pressure sensor • Water temperature sensor • Water temperature sensor circuit • Intake air temperature sensor • Intake air temperature sensor circuit 	EF-115 EF-115 EF-108 EF- 95 EF- 60 EF- 45 EF- 63 EF- 50
16		Air-to-fuel ratio (lean fail)	When the feedback function performs increase compensation below the specified level:	<ul style="list-style-type: none"> • Injector circuit • Injector • ECU • Fuel pressure • Pressure regulator • Pressure sensor • Water temperature sensor • Water temperature sensor circuit • Intake air temperature sensor • Intake air temperature 	EF-115 EF-115 EF- 95 EF-108 EF- 60 EF- 65 EF- 63 EF- 50

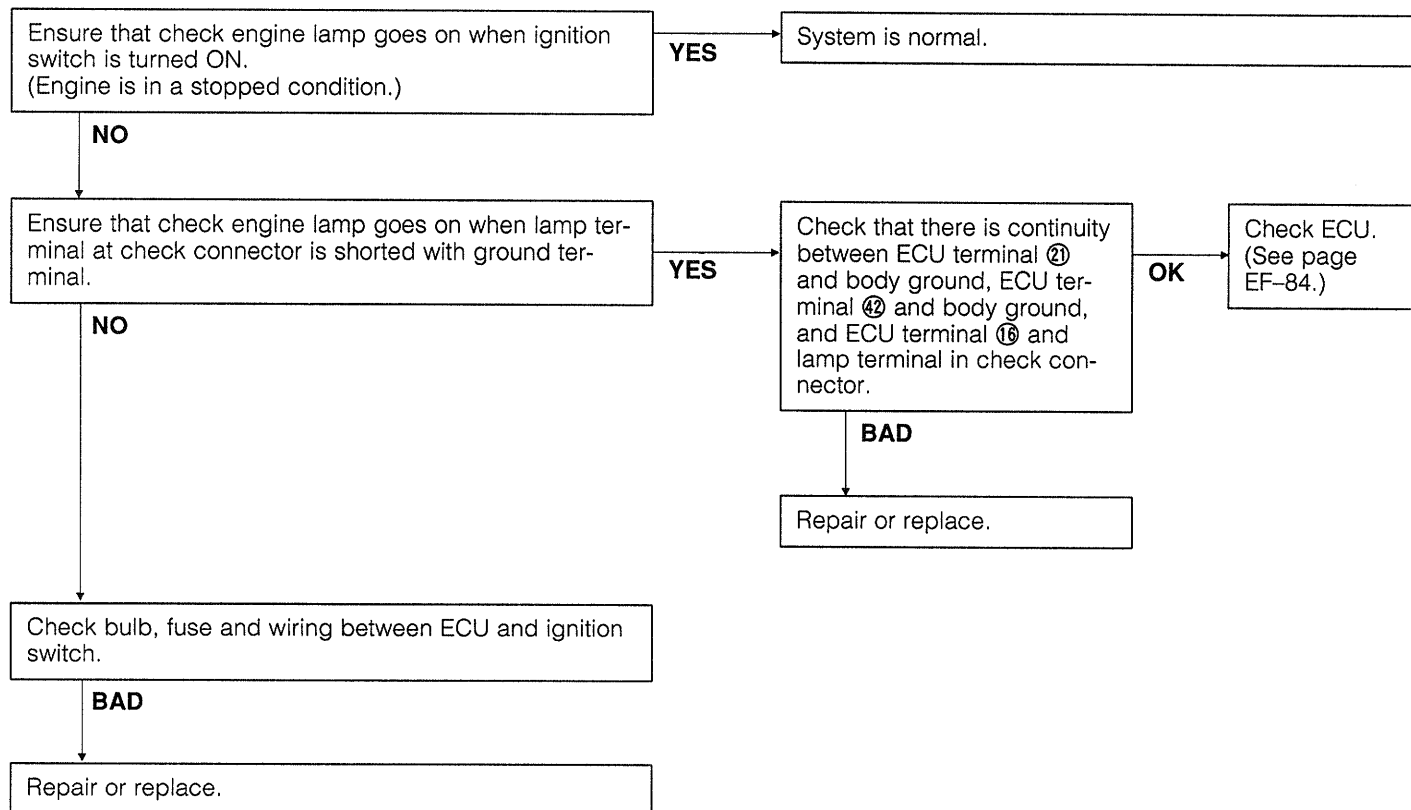
WRU90-EF061

INSPECTION OF DIAGNOSIS SYSTEM CIRCUIT

**NOTE:**

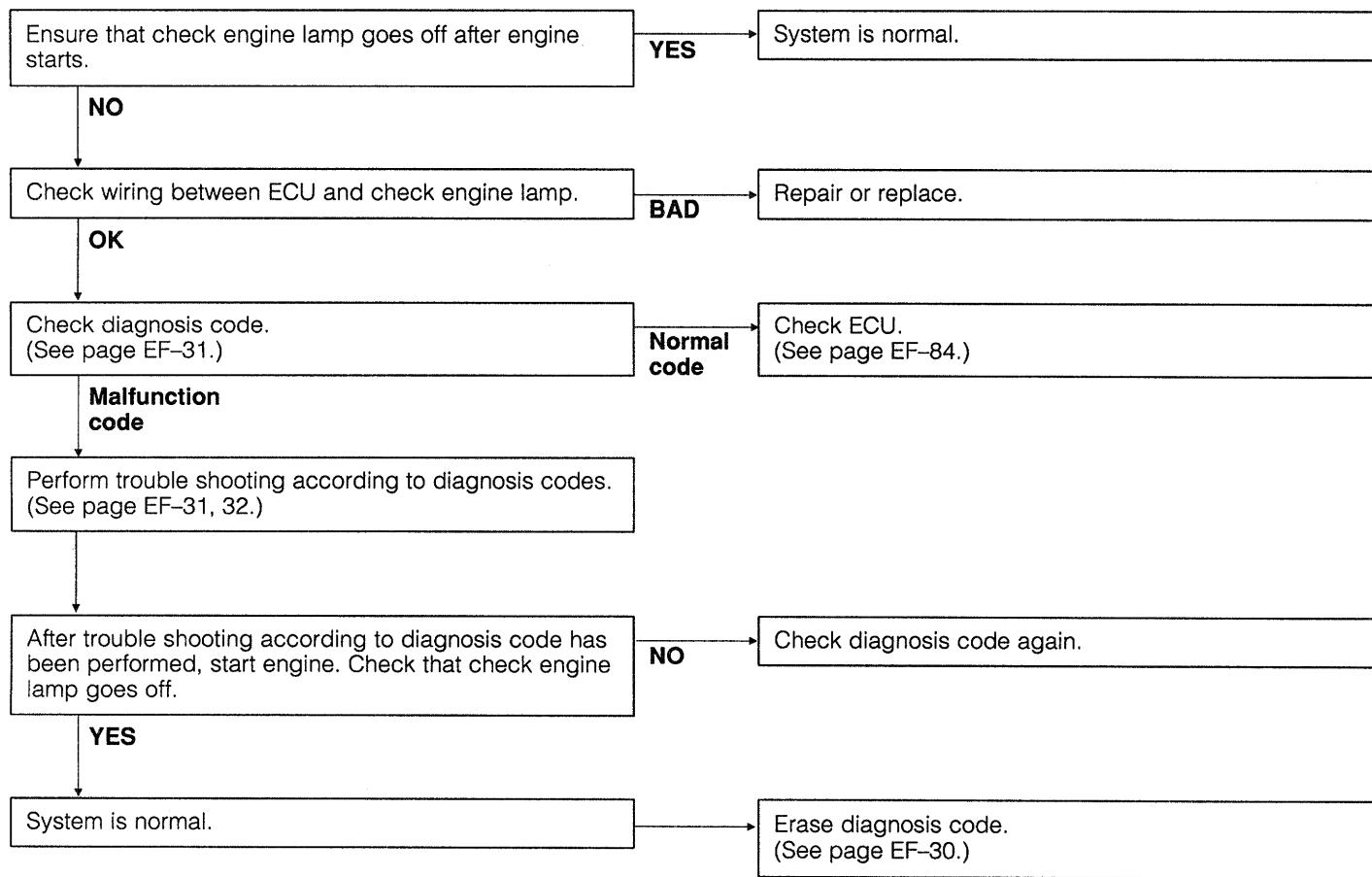
When checking continuity between terminals, first install the SST (09842-87704-000). Then, check continuity between the SST terminals. (See page EF-34)

WRU90-EF062

1st step

WRU90-EF063

2nd step



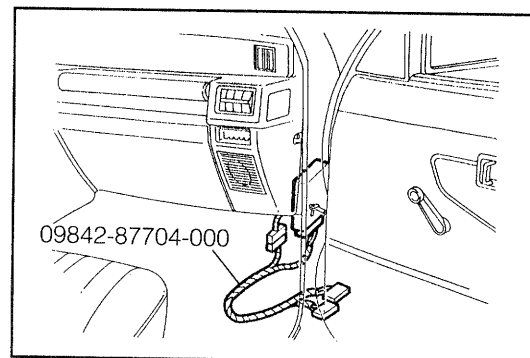
WRU90-EF064

TROUBLE SHOOTING BY MALFUNCTION CODES

PREPARATION OF TROUBLE SHOOTING

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.
2. Remove the ECU cover.
3. Disconnect the engine harness from ECU.
4. Connect the following SST between the engine wire and the ECU.

SST: 09842-87704-000



5. Reconnect the battery ground cable to the negative (–) terminal of the battery.

CAUTION:

- After completion of the inspection, before the SST is removed, be sure to disconnect the battery ground cable from the negative (–) terminal of the battery.
- After the engine harness has been connected to the ECU, reconnect the battery ground cable to the negative (–) terminal of the battery.
- Before using the SST, be sure to check to see if short or open wire exists between the terminals.

WRU90-EF065

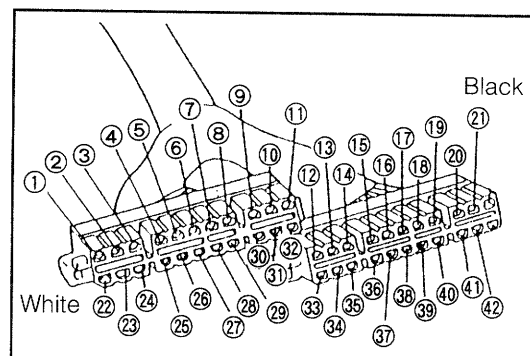
CHECK PROCEDURE FOR EFI SYSTEM

NOTE:

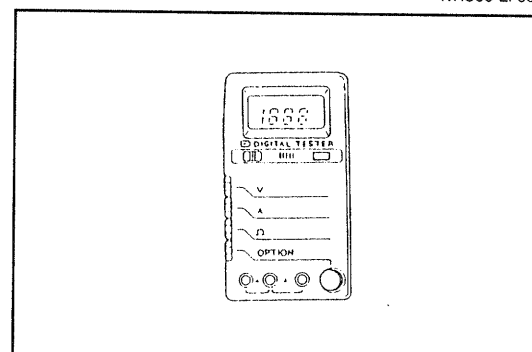
1. The EFI circuit can be checked by measuring the resistance and voltage at the SST terminals.
2. The voltage check should be conducted under a condition where all connectors are connected.
3. Prior to the check, ensure that the battery voltage is 11V or more when the ignition switch is turned ON.
4. If any problem is encountered during this check, see the section under "Trouble Shooting for EFI Electronic Circuit with Volt/Ohmmeter."

CAUTION:

- For the trouble shooting, use a volt/ohmmeter whose internal impedance is more than 10 k Ω /V. Use of a volt/ohmmeter whose internal resistance is 10 k Ω /V or less may cause ECU malfunction and/or misjudgment.
- No terminal except for the specified terminal should be connected. Failure to observe this caution may cause ECU malfunction.



WRU90-EF066

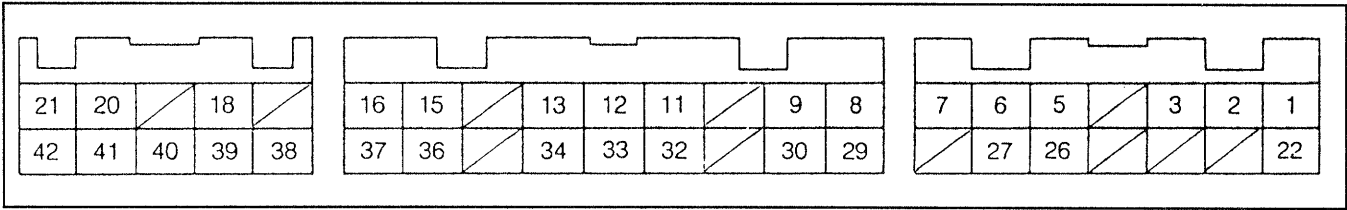


WRU90-EF067

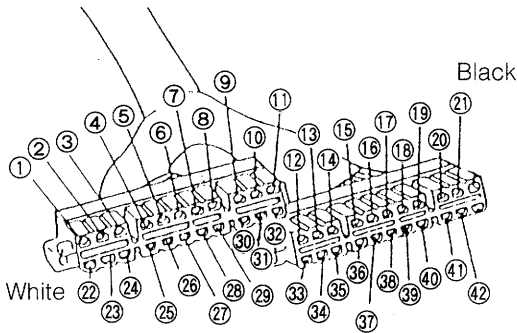
ECU CONNECTORS

The figure below shows the arrangement of the ECU connector terminals.

ECU side



SST side



WRU90-EF068

Table Showing ECU Connections

Terminal code	Contents of connection	Terminal code	Contents of connection
1	Main relay (Power supply)	22	Main relay (Power supply)
2	Battery (Backup power supply)	23	
3	Ignition coil primary voltage	24	
4		25	
5	Pressure sensor power supply	26	Oxygen sensor
6	Pressure sensor	27	Intake air temperature sensor
7	Cooling water temperature sensor	28	
8	Vehicle speed sensor	29	Operation system ground (Engine)
9	Electrical load (Headlamp and defogger)	30	Electrical load (Blower fan)
10		31	
11	Check connector (Test terminal)	32	Throttle position switch (Power switch)
12	Throttle position switch (Idle switch)	33	Stop lamp
13	Starter	34	Air conditioner magnet switch
14		35	
15	Oxygen sensor feedback check terminal	36	Operation system ground
16	Check engine lamp	37	Fuel pump relay
17		38	Pressure VSV
18	EGR VSV	39	System ground
19		40	Idle speed control VSV
20	Injector	41	Injector
21	Actuator drive ground (Engine)	42	Actuator drive ground (Engine)

WRU90-EF069

Voltage at ECU wiring connectors

Measure voltage between SST terminals shown in the table below.

No.	Terminals	STD voltage	Condition		See page
1	① — ③⑨ Ground ②② — ③⑨ Ground	Approx. battery voltage	Ignition switch ON		EF-39
	② — ③⑨ Ground		At all time		
2	⑤ — ③⑥ Ground	4.5 - 5.5 V	Ignition switch ON		EF-42
	⑥ — ③⑨ Ground	3.2 - 4.0 V	Ignition switch ON	Atmospheric pressure 760 mmHg (29.9 inchHg)	
3	③ — ③⑨ Ground	Approx. battery voltage	Ignition switch ON	Engine at stopped state	EF-44
4	⑦ — ③⑨ Ground	0.4 - 0.65 V	Ignition switch ON	When cooling water temperature is 80°C (176°F):	EF-45
5	②⑥ — ③⑨ Ground	Voltage changes more than 8 times within 10 seconds.	Ignition switch ON	When engine speed is held at 3000 rpm for two minutes after engine has been fully warmed up:	EF-46
7	⑫ — ③⑨ Ground	Less than 5V	Ignition switch ON	Throttle valve fully closed	EF-47
		Approx. battery voltage	Ignition switch ON	Throttle valve fully opened	
	③② — ③⑨ Ground	Approx. battery voltage	Ignition switch ON	Throttle valve fully closed	
		Less than 5 V	Ignition switch ON	Throttle valve fully opened	
8	②⑦ — ③⑨ Ground	1.5 - 3.0 V	Ignition switch ON	When air temperature inside intake manifold is 20°C (68°F):	EF-50
9	⑤ — ③⑨ Ground	0 - Approx. battery voltage	Ignition switch ON	Voltages change takes place 4 times when vehicle is moved 1.5 m (4.93 ft).	EF-51
10	⑬ — ③⑨ Ground	More than 6 V	When ignition switch is set to ST position:		EF-52
11	③④ — ③⑨ Ground	Approx. battery voltage	When engine is operating and compressor magnet clutch of air condition is energized:		EF-53
	⑫ — ③⑨ Ground	Less than 5V	Ignition switch ON	Throttle valve fully closed	
		Approx. battery voltage		Throttle valve fully opened	
12	⑮ — ③⑨	Approx. battery voltage	Ignition switch ON	When engine is operating and cooling water temperature is 40°C (104°F) or below:	EF-78
		Less than 3V	Ignition switch ON	When engine is operating and cooling water temperature is 40°C (104°F) or more:	

WRU90-EF070

TROUBLE SHOOTING EFI ELECTRONIC CIRCUIT WITH VOLT/OHMMETER

NOTE:

The trouble shooting procedures described in this section are ones designed for the inspection for each system. Hence, they may differ from actual trouble shooting procedure.

However, it is advisable that the basic approach to trouble shooting is based on the procedure described in this manual.

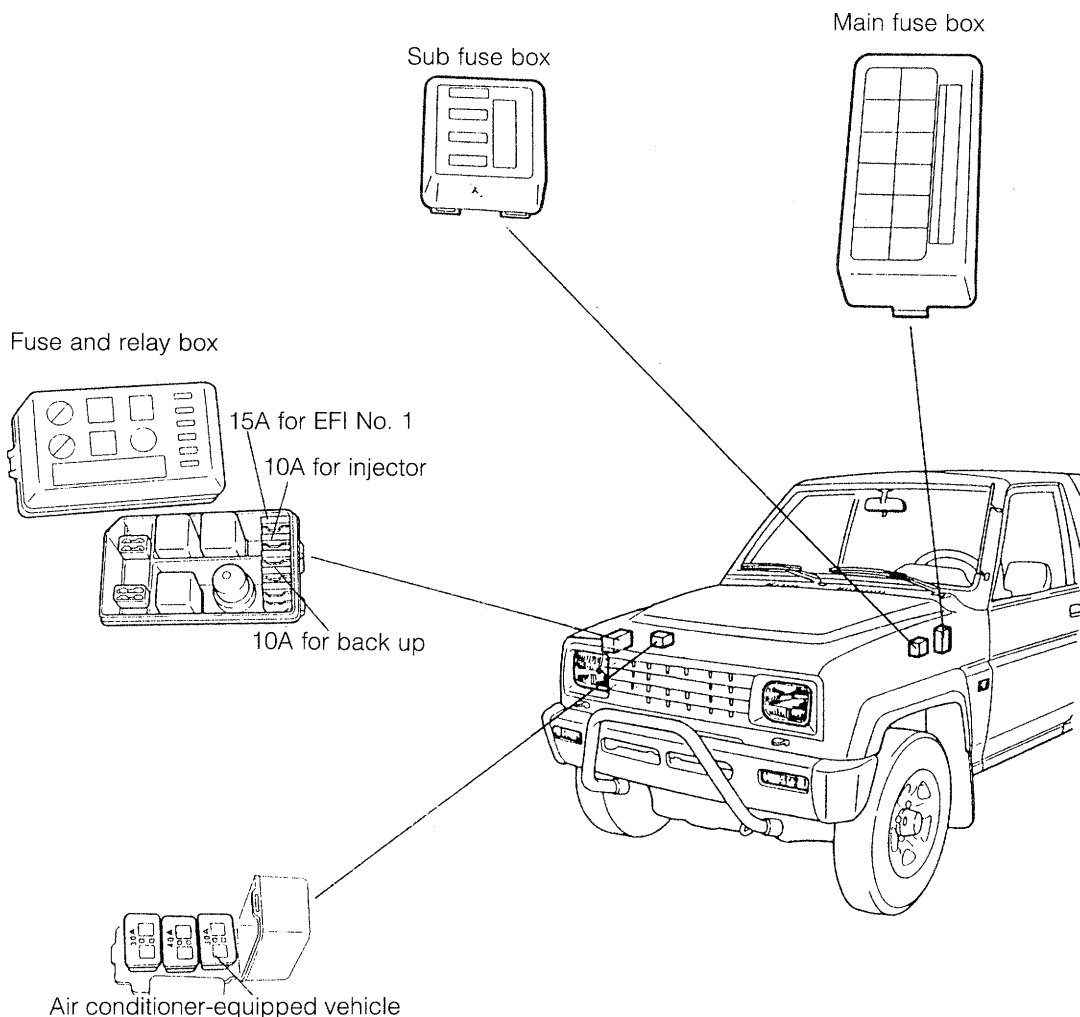
Before you start the inspection, it is a best practice to first make simple checks of the fuses, fusible links and conditions of the connectors.

The following trouble shooting procedure has been prepared on the assumption that troubles are caused by short circuits or open circuits of external components of the computer or short circuits inside the computer.

If engine malfunctions persist even when the terminal voltages of the ECU connectors are normal, the ECU may be faulty. Try the trouble shooting using a new ECU.

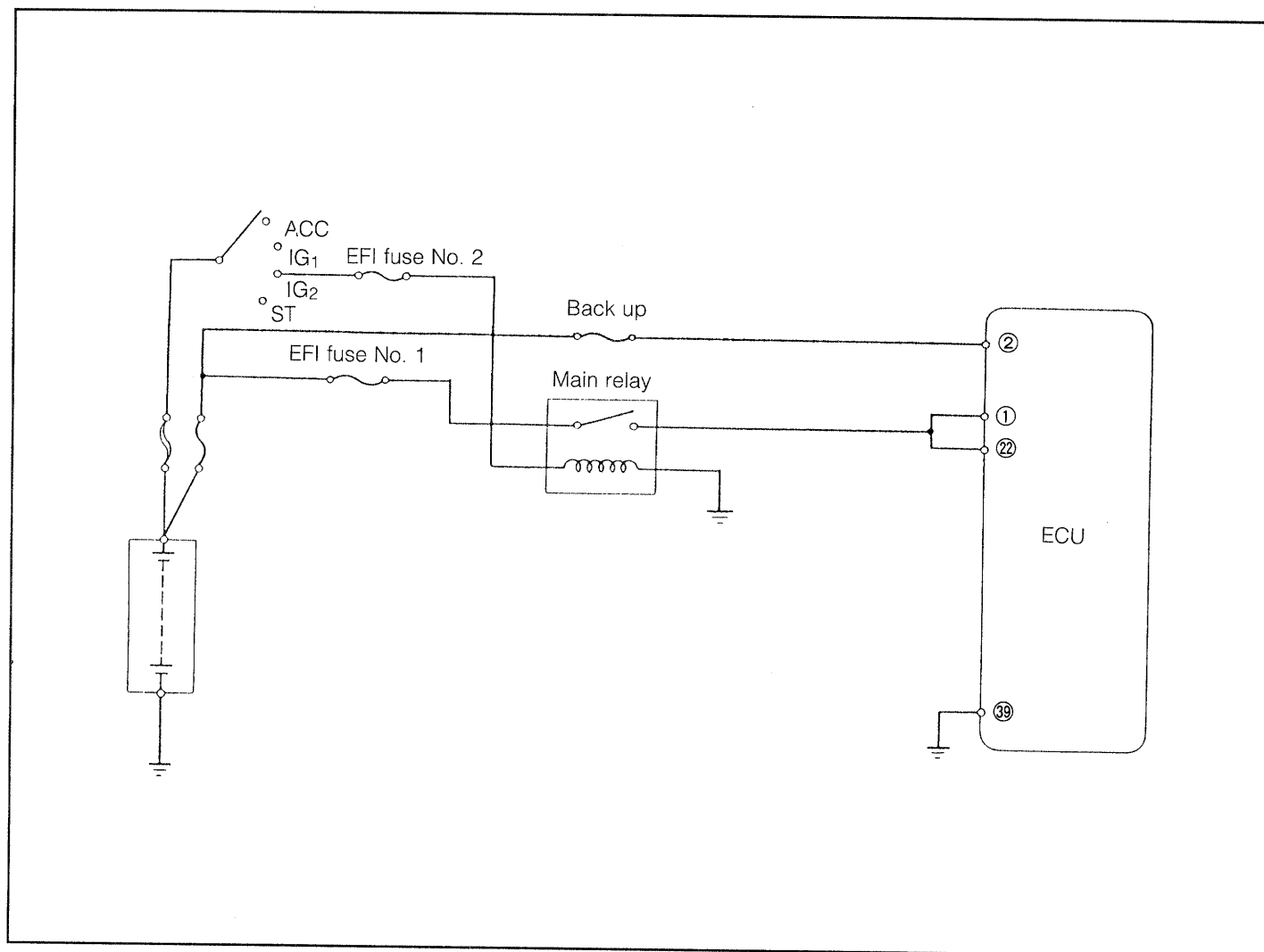
However, even when the trouble is solved after the ECU has been replaced, it is imperative to confirm that the trouble was actually attributed to the old ECU by installing the old ECU again.

When you perform the inspection of wirings, see the section under "Harness & Wiring Diagram."



No.	Terminals	Trouble	Condition	STD voltage
1	① — ③⑨ Ground ②② — ③⑨ Ground	No standard voltage	Ignition switch ON	Approx. battery voltage
	② — ③⑨ Ground		At all time (But, voltage drops during engine starting period)	

WRU90-EF072



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-35.

WRU90-EF073

① or ②② — ③⑨

[1] There is no specified voltage between SST terminals ① or ②② and ③⑨.

[2] Check that there is specified voltage between SST terminal ① or ②② and body ground when ignition switch is turned ON.

NO

YES

Check between ECU terminal ③⑨ and body ground.

BAD

Repair or replace.

Check fuses, fusible link and wiring harness.

OK

BAD

Repair or replace.

Check ignition switch.

OK

BAD

Repair or replace.

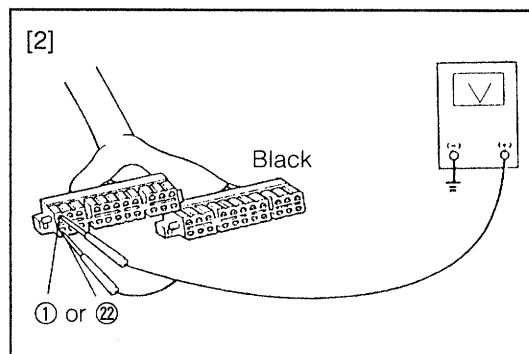
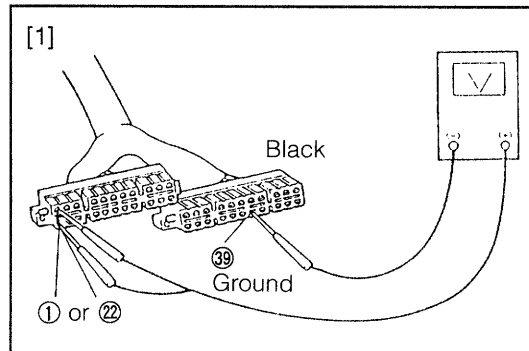
Check EFI main relay. (See page EF-56.)

OK

BAD

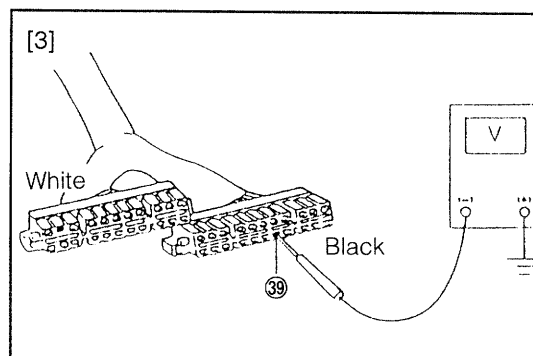
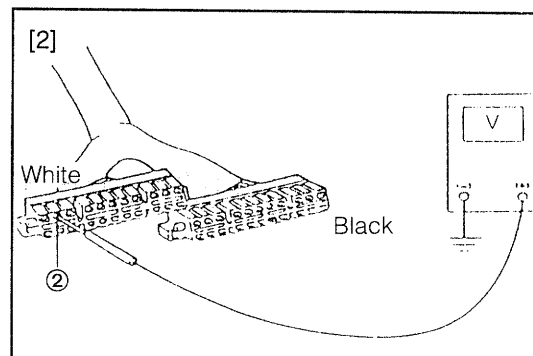
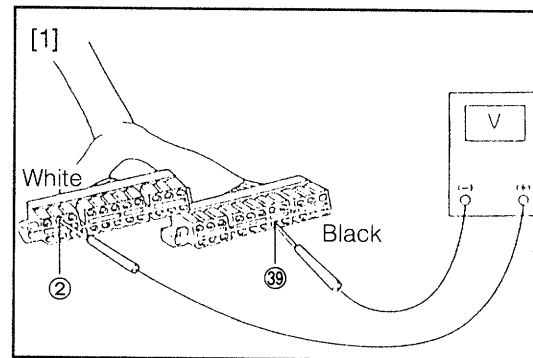
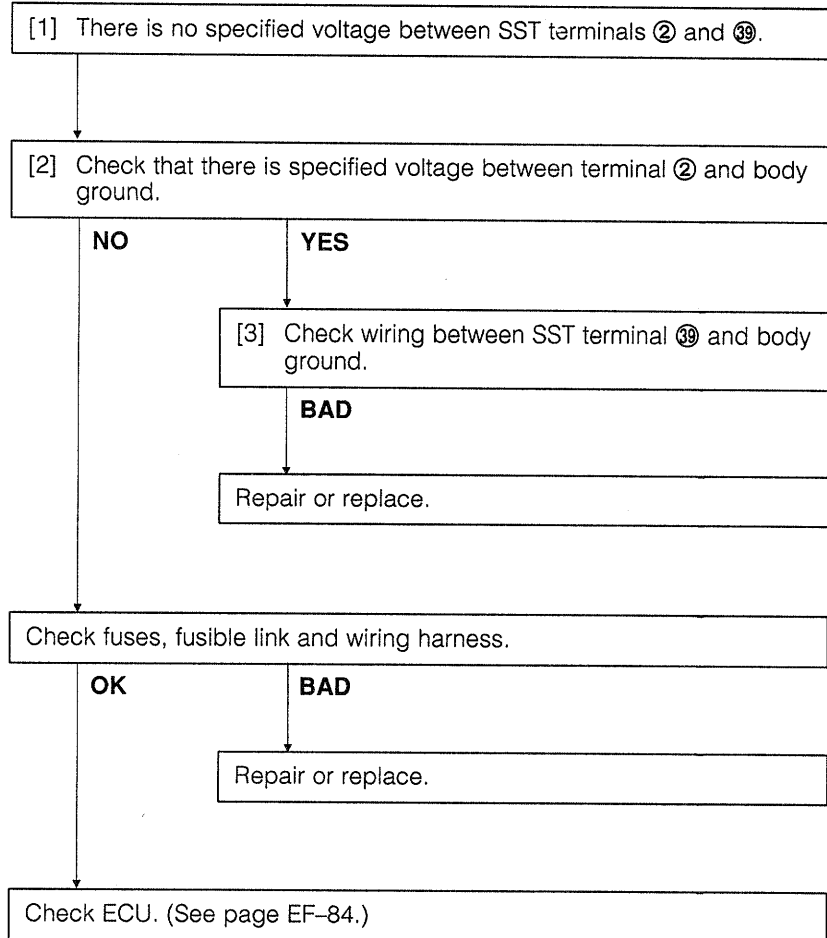
Repair or replace.

Check ECU. (See page EF-84.)



WRU90-EF074

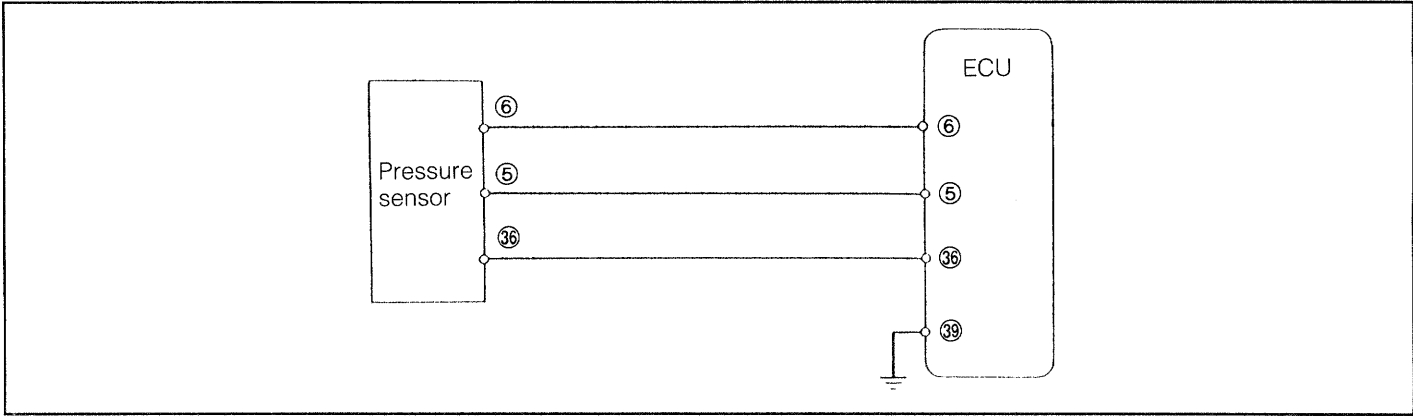
② — ③⑨



WRU90-EF075

No.	Terminals	Trouble	Condition		STD voltage
2	⑤ — ③⑥ Ground	No voltage	Ignition switch ON		4.5 - 5.5 V
	⑥ — ③⑨ Ground	No standard voltage	Ignition switch ON	When atmospheric pressure of 760 mmHg (29.9 inchHg) exists:	3.2 - 4.0 V

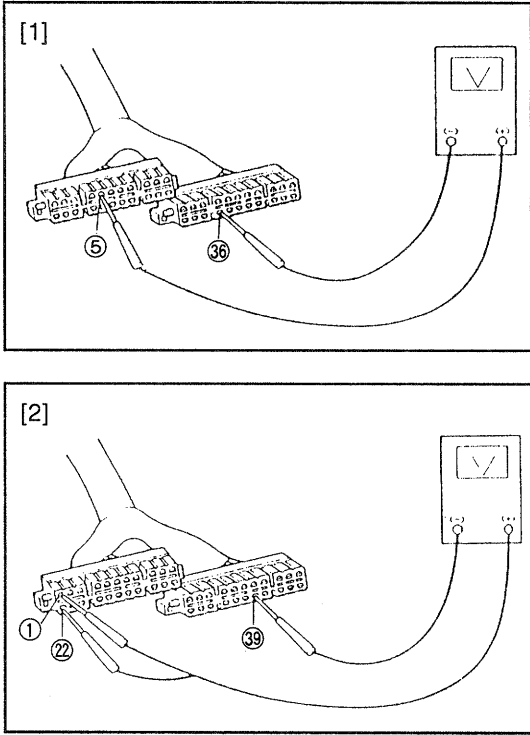
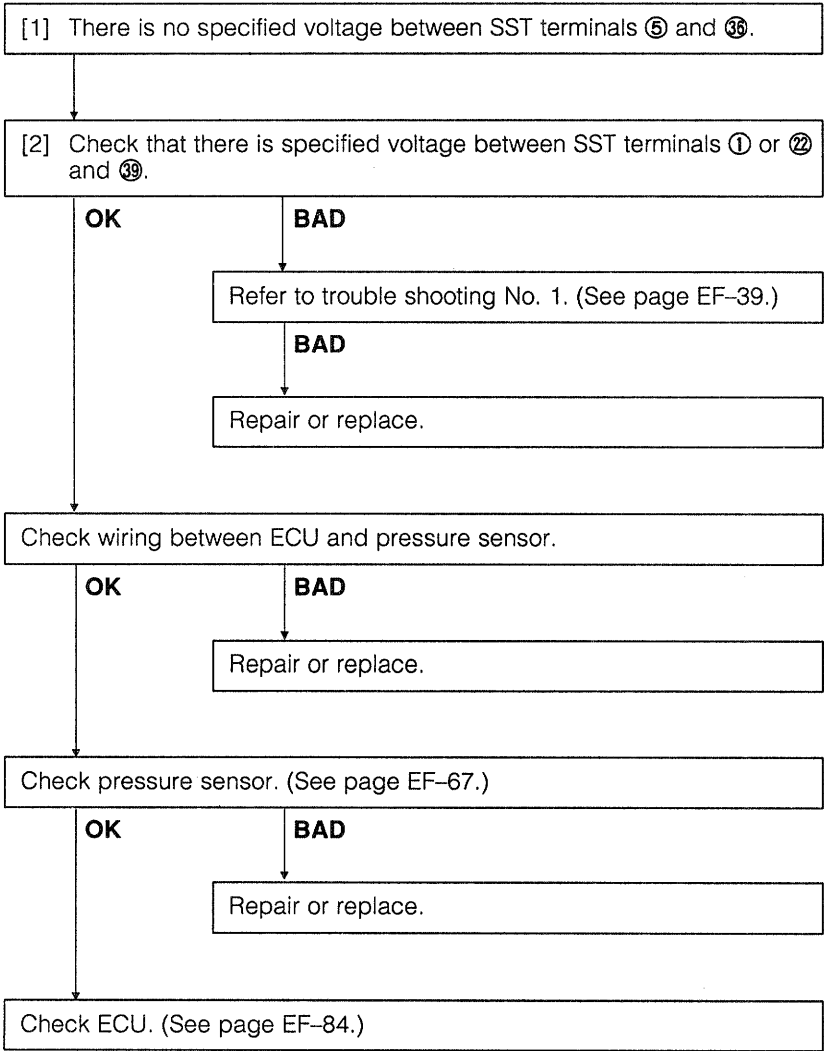
WRU90-EF076



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under “Preparation of Trouble-shooting” at page EF-35.

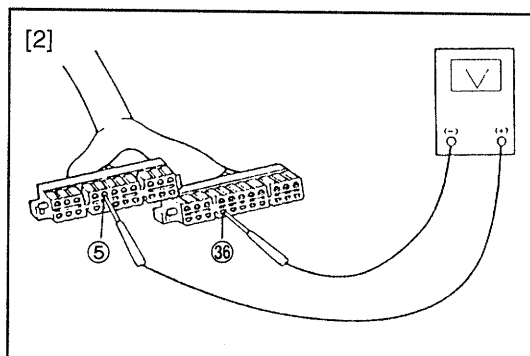
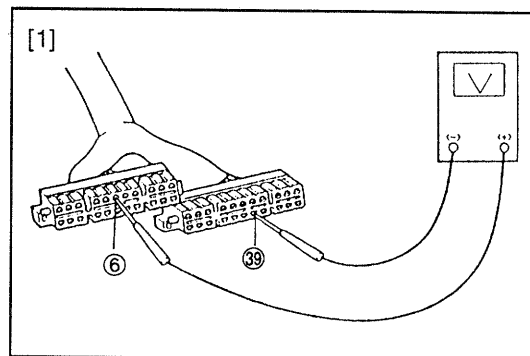
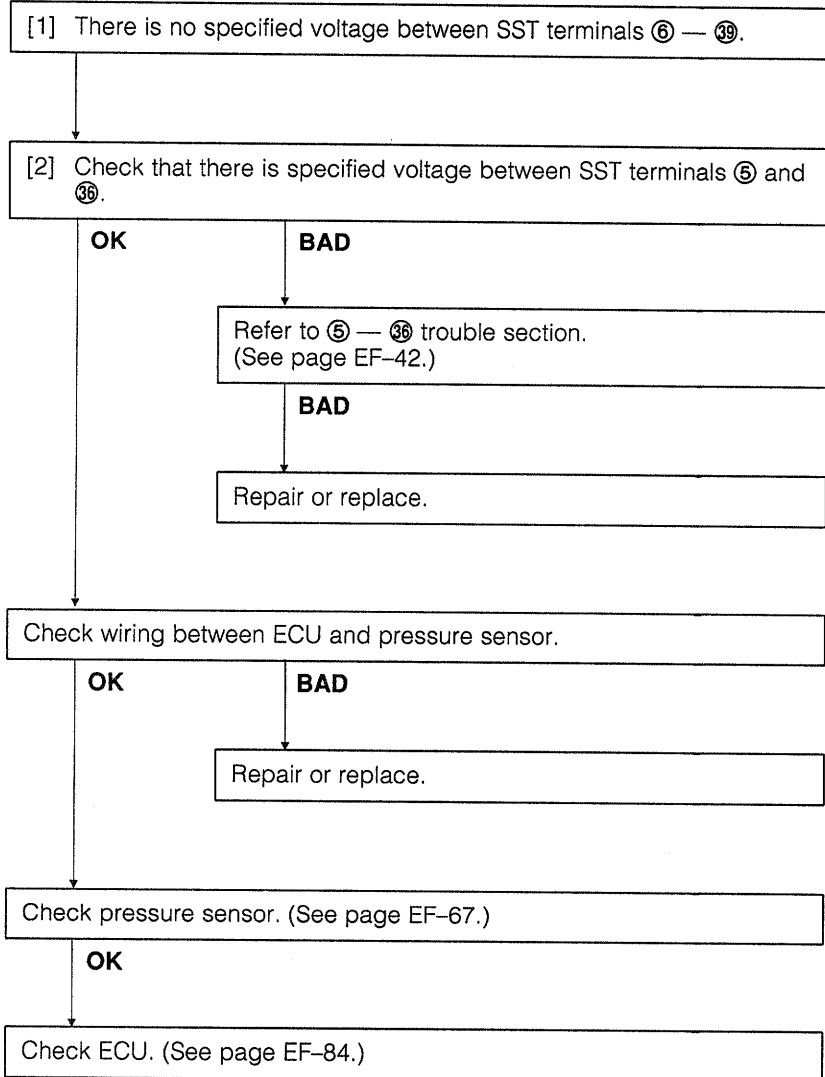
WRU90-EF077

⑤ — ③⑥



WRU90-EF078

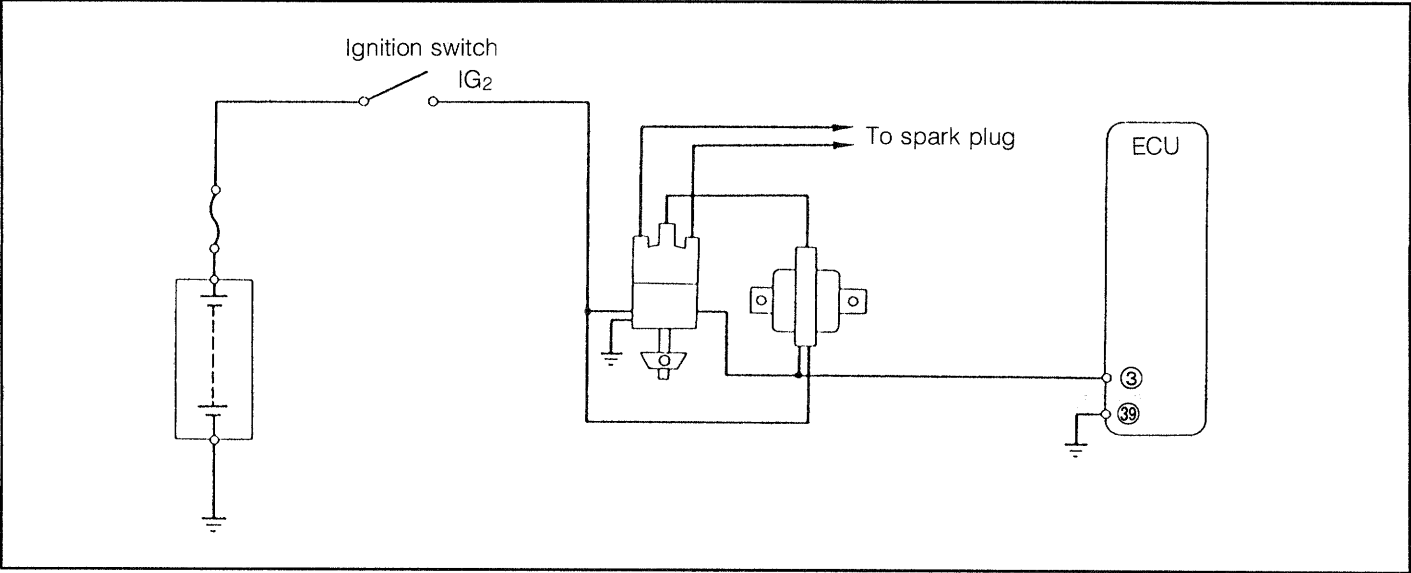
⑥ — ③⑨



WRU90-EF079

No.	Terminals	Trouble	Condition	STD voltage
3	③ — ③⑨	No voltage	Ignition switch ON (Engine stopped state)	Approx. battery voltage

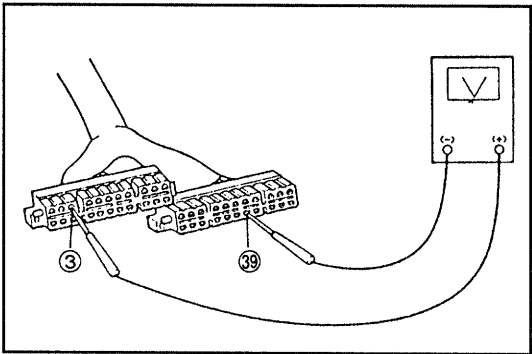
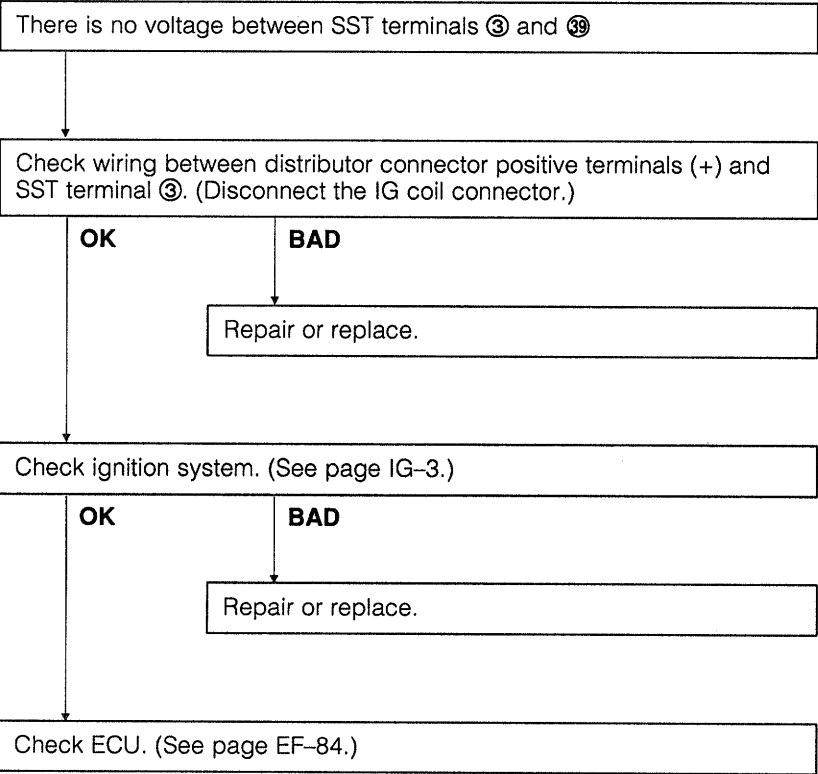
WRU90-EF080



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under “Preparation of Trouble-shooting” at page EF-35.

WRU90-EF081

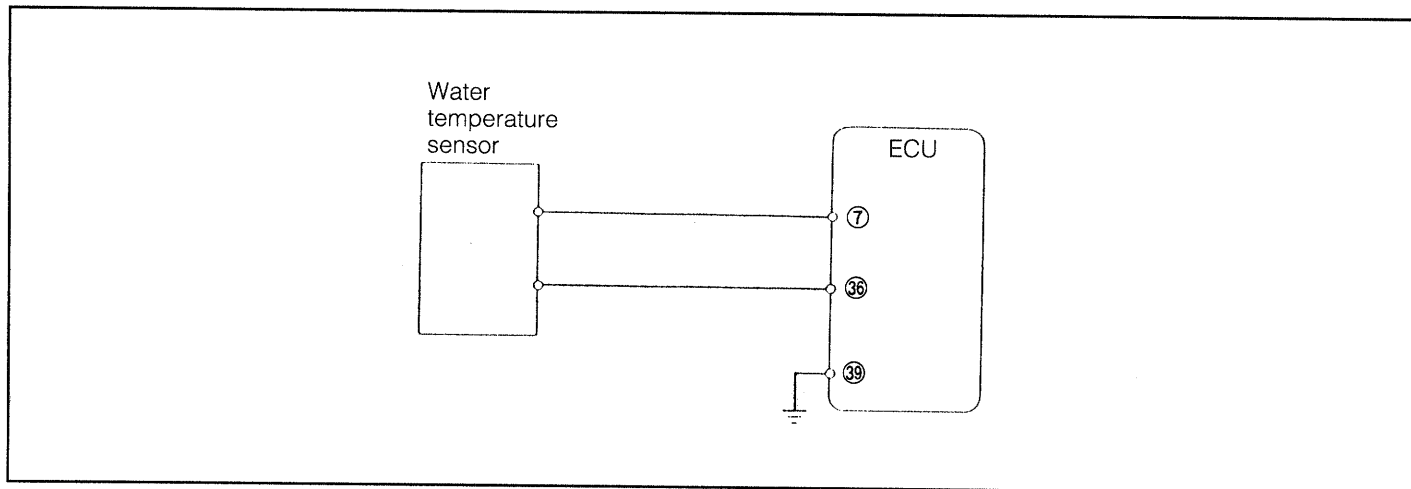
③ — ③⑨



WRU90-EF082

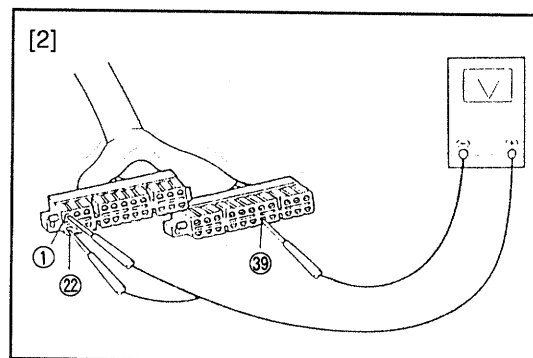
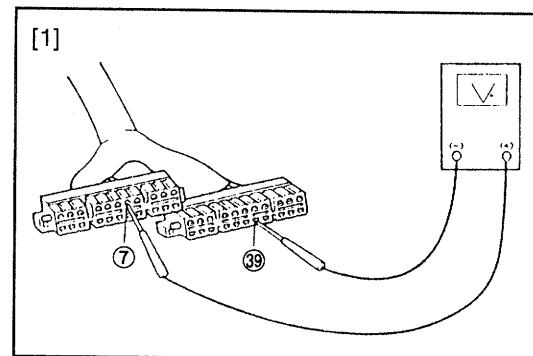
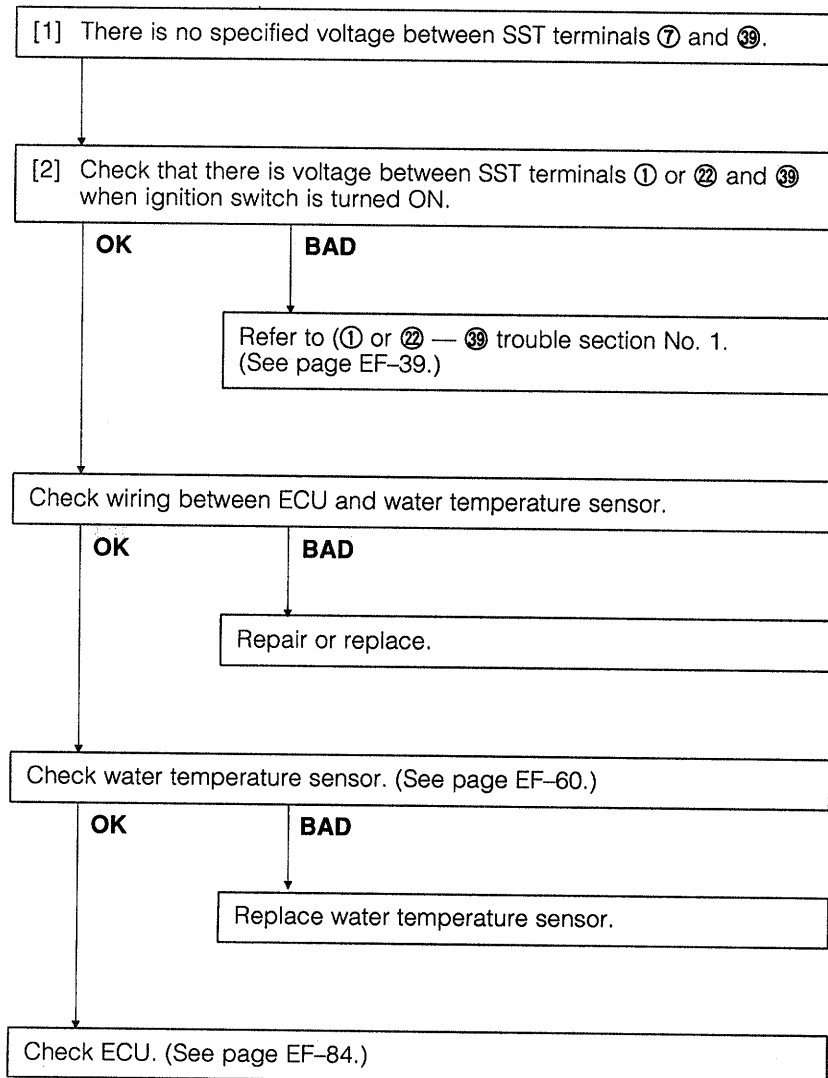
No.	Terminals	Trouble	Condition		STD voltage
4	⑦ — ③⑨ Ground	No specified voltage	Ignition switch ON	When cooling water temperature is 80°C (176°F):	0.4 - 0.65 V

WRU90-EF083



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-35.

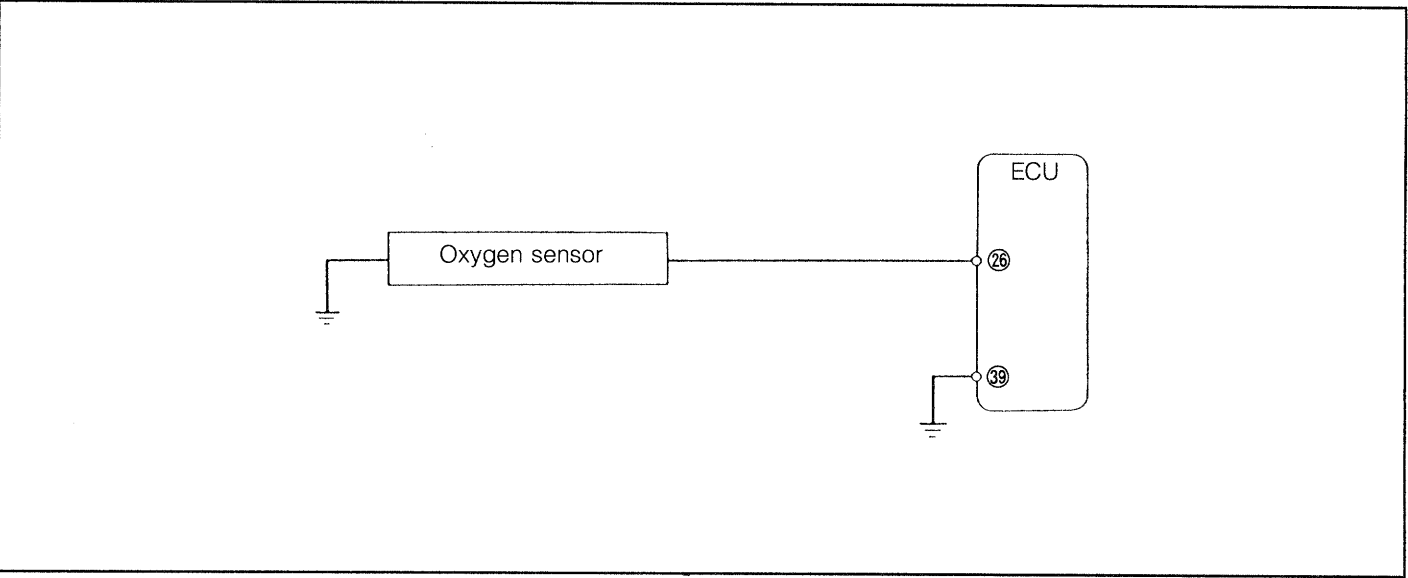
WRU90-EF084



WRU90-EF085

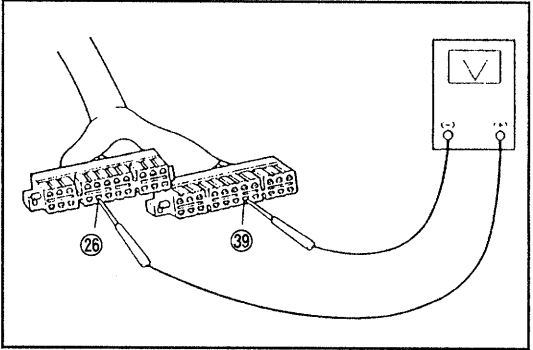
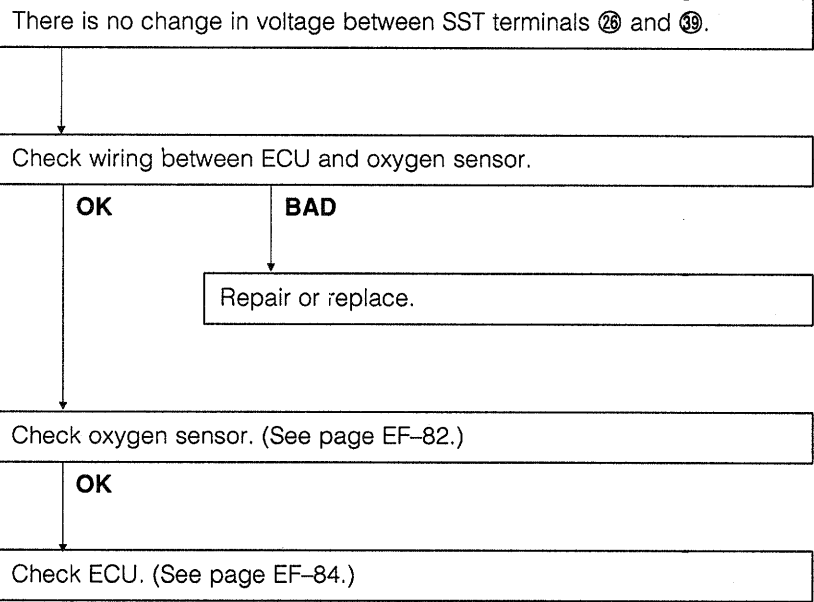
No.	Terminals	Trouble	Condition		STD voltage
5	26 — 39 Ground	No voltage change	Ignition switch ON	When engine revolution speed is held at 3000 rpm after having warmed up engine fully:	Voltage changes more than 8 times within 10 seconds.

WRU90-EF086



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-34.

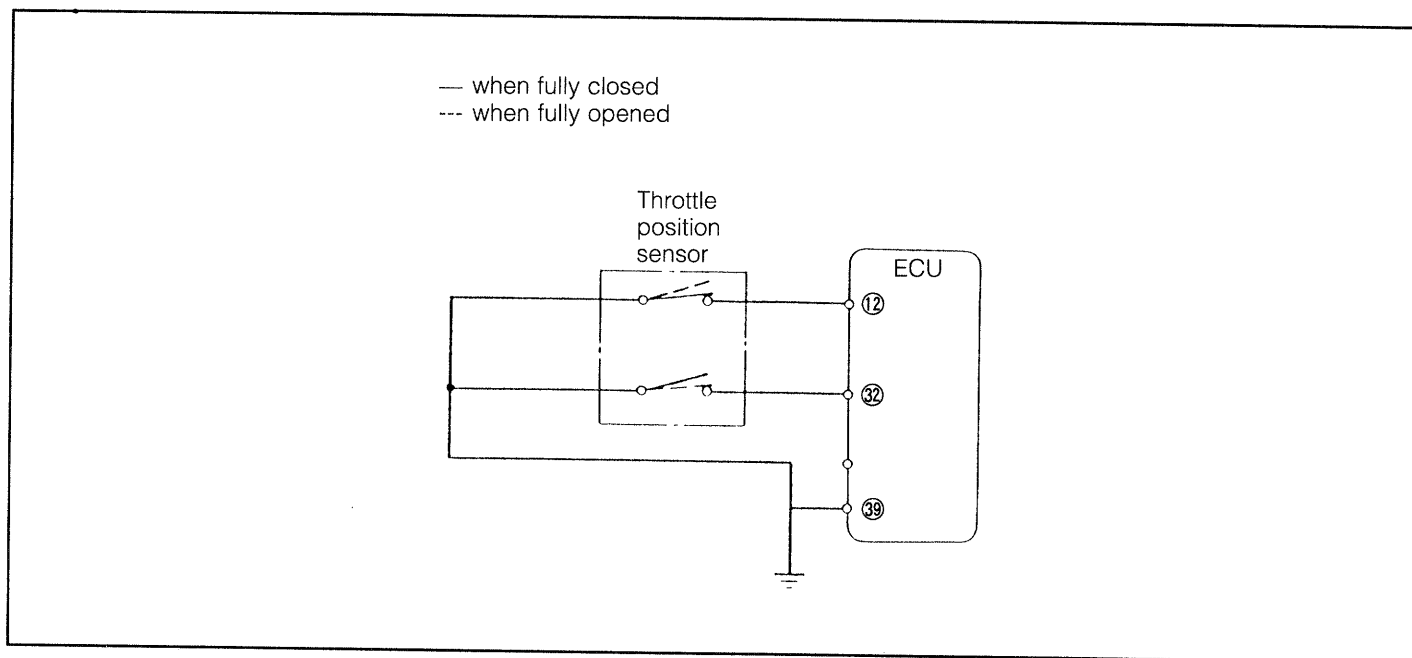
WRU90-EF087



WRU90-EF088

No.	Terminals	Trouble	Condition		STD voltage
7	⑫ — ③⑨ Ground	More than 5 V	Ignition switch ON	Throttle valve fully closed	Less than 5 V
		No voltage	Ignition switch ON	Throttle valve fully opened	Approx. battery voltage
	③② — ③⑨ Ground	No voltage	Ignition switch ON	Throttle valve fully closed	Approx. battery voltage
		More than 5 V	Ignition switch ON	Throttle valve fully opened	Less than 5 V

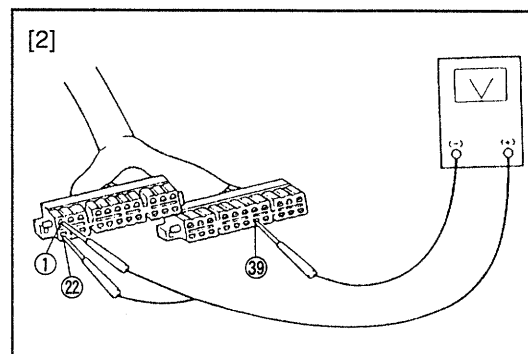
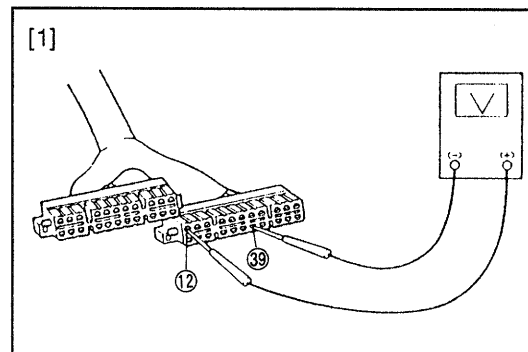
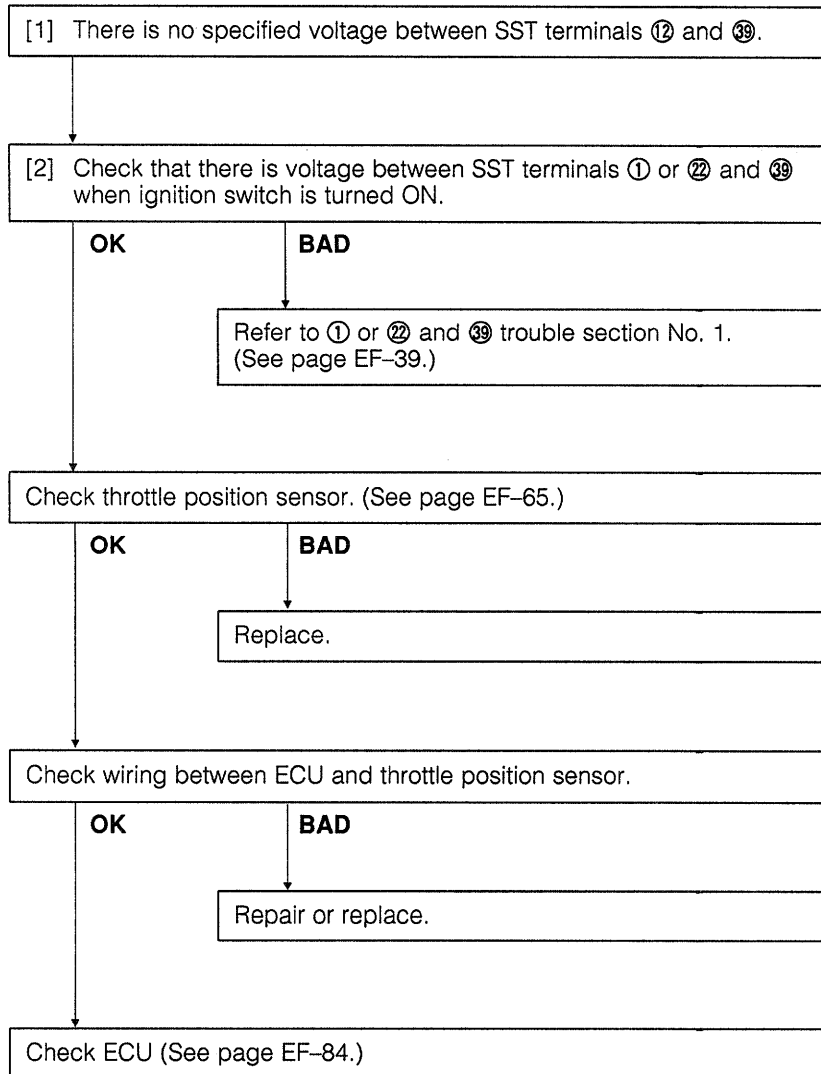
WRU90-EF089



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-35.

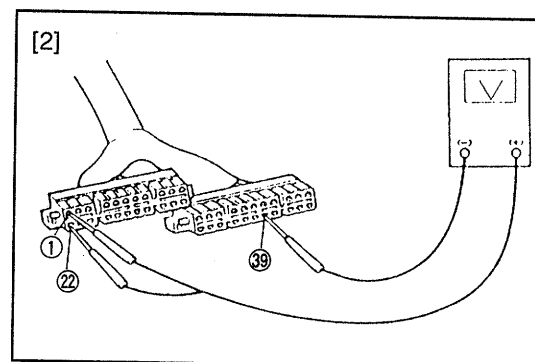
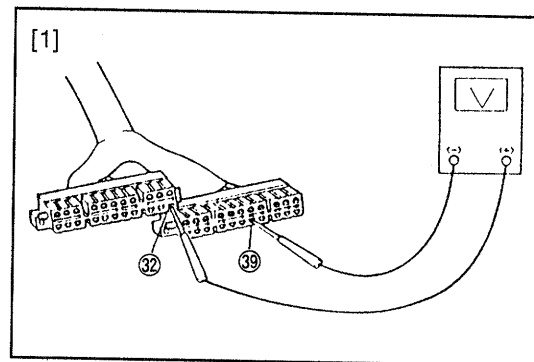
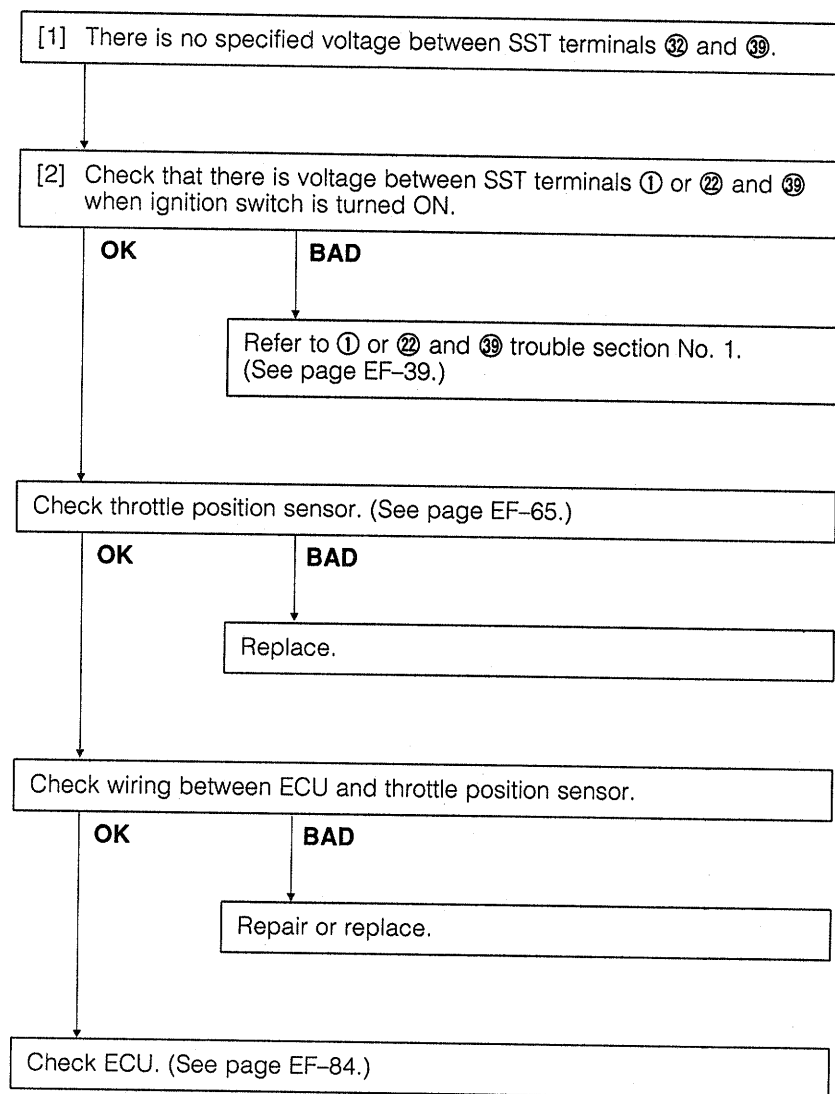
WRU90-EF090

⑫ — ③⑨



WRU90-EF091

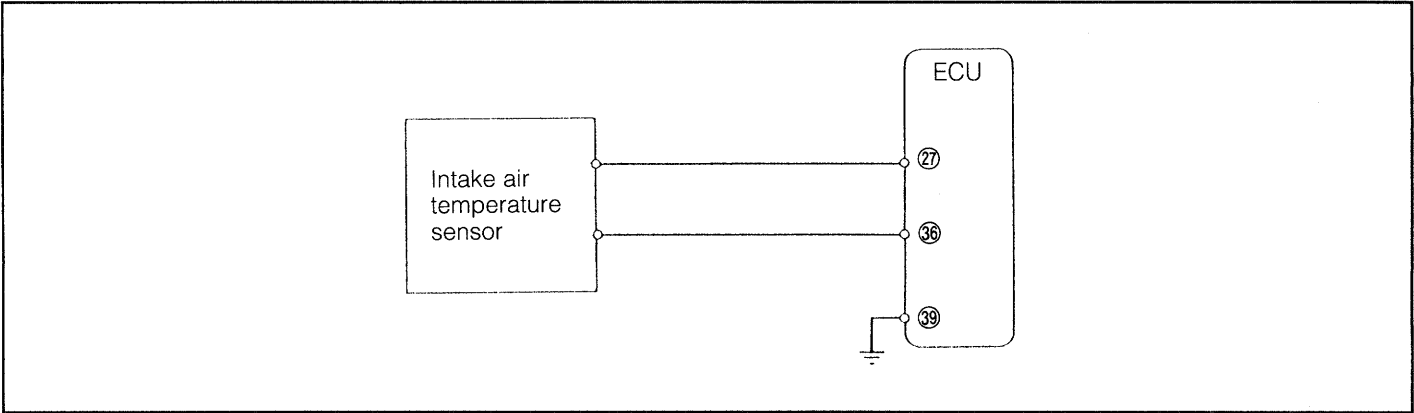
③② — ③⑨



WRU90-EF092

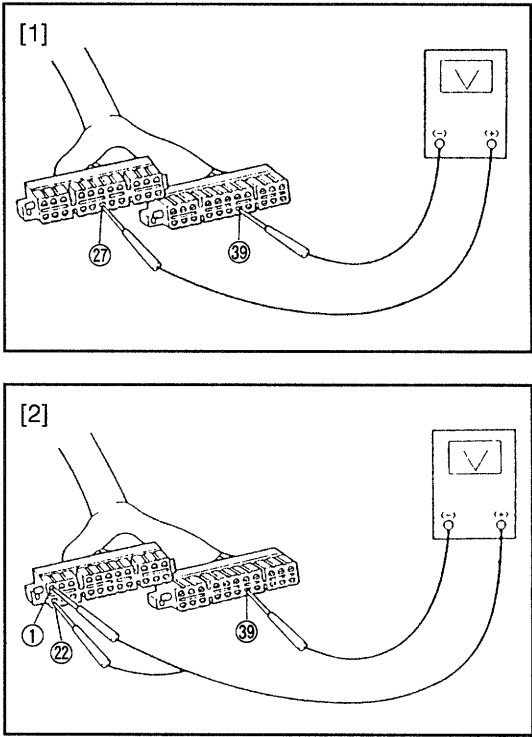
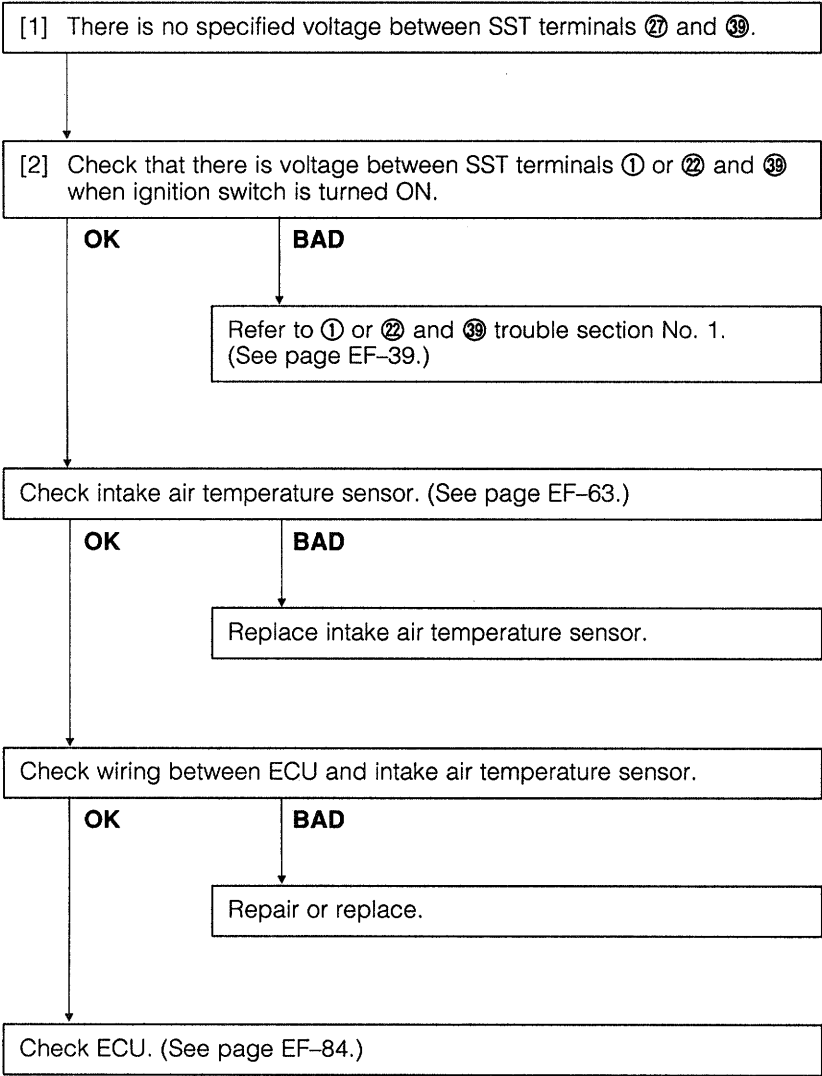
No.	Terminals	Trouble	Condition		STD voltage
8	27 — 39 Ground	No specified voltage	Ignition switch ON	When air temperature inside intake manifold is 20°C (68°F):	1.5 - 3.0 V

WRU90-EF093



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-35.

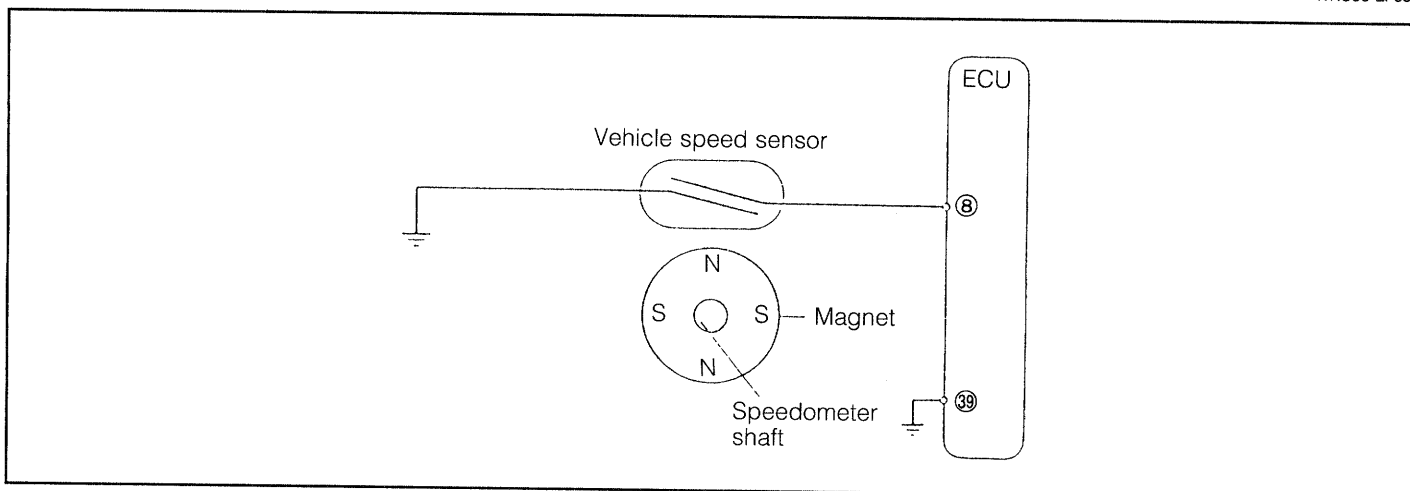
WRU90-EF094



WRU90-EF095

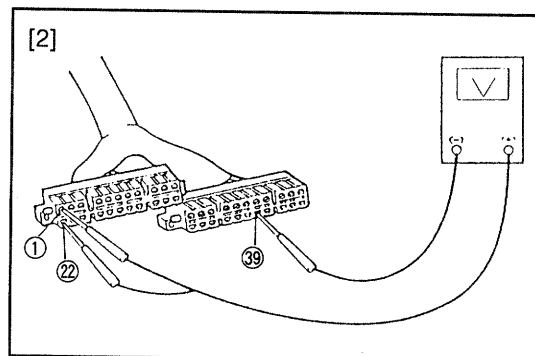
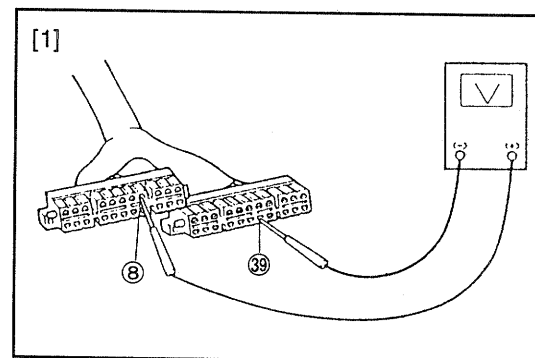
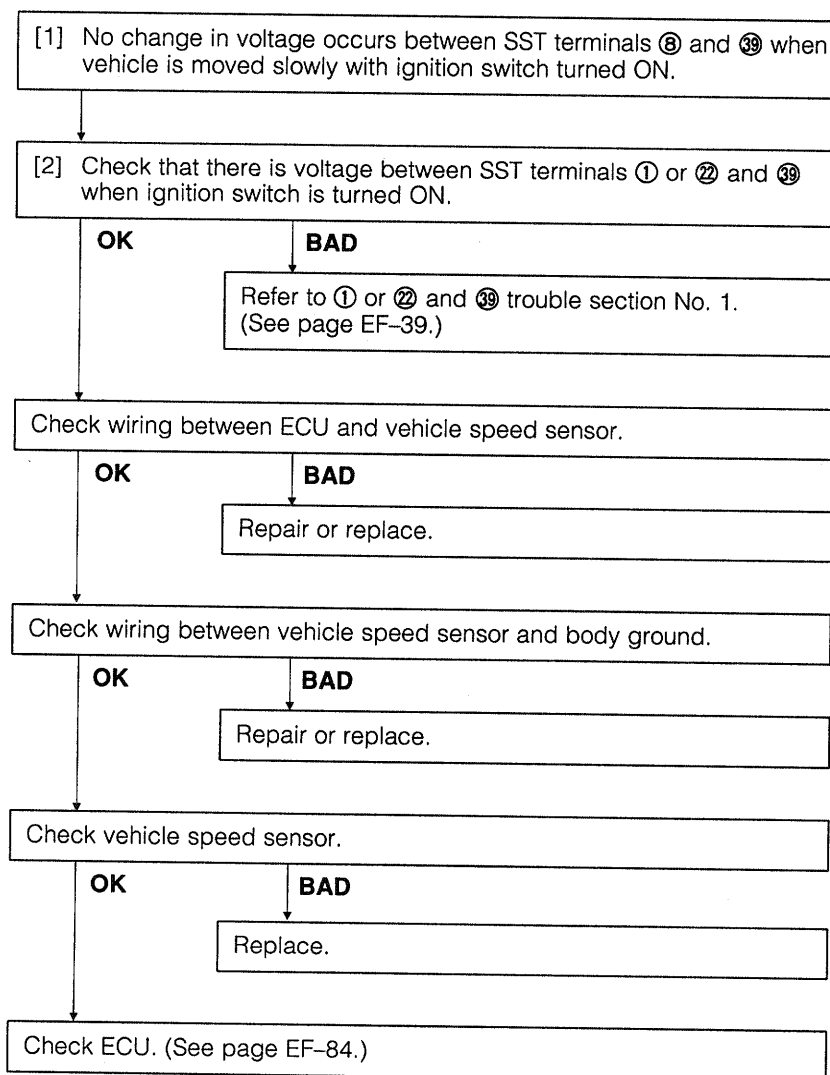
No.	Terminals	Trouble	Condition		STD voltage
9	⑧ — ③⑨ Ground	No voltage changes	Ignition switch ON	When vehicle is moved slowly:	0 - Approx. battery voltage

WRU90-EF096



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-35.

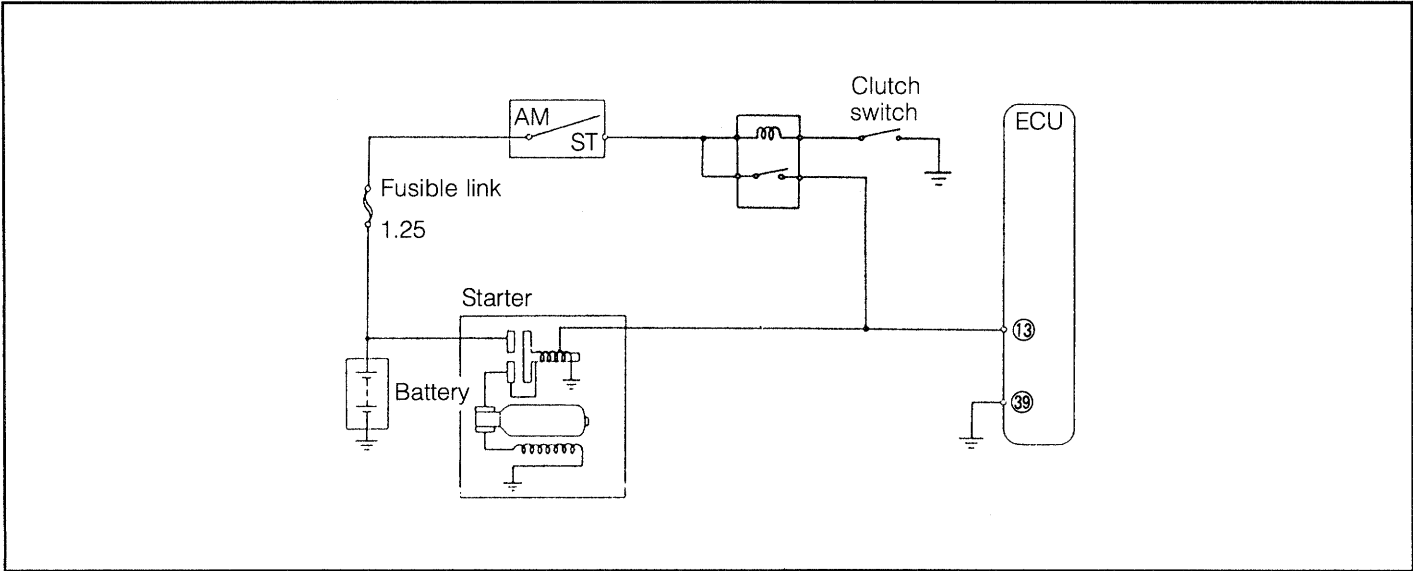
WRU90-EF097



WRU90-EF098

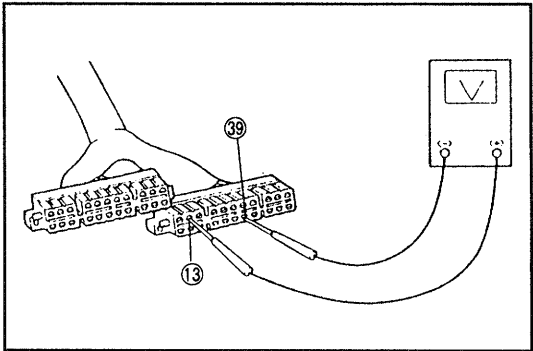
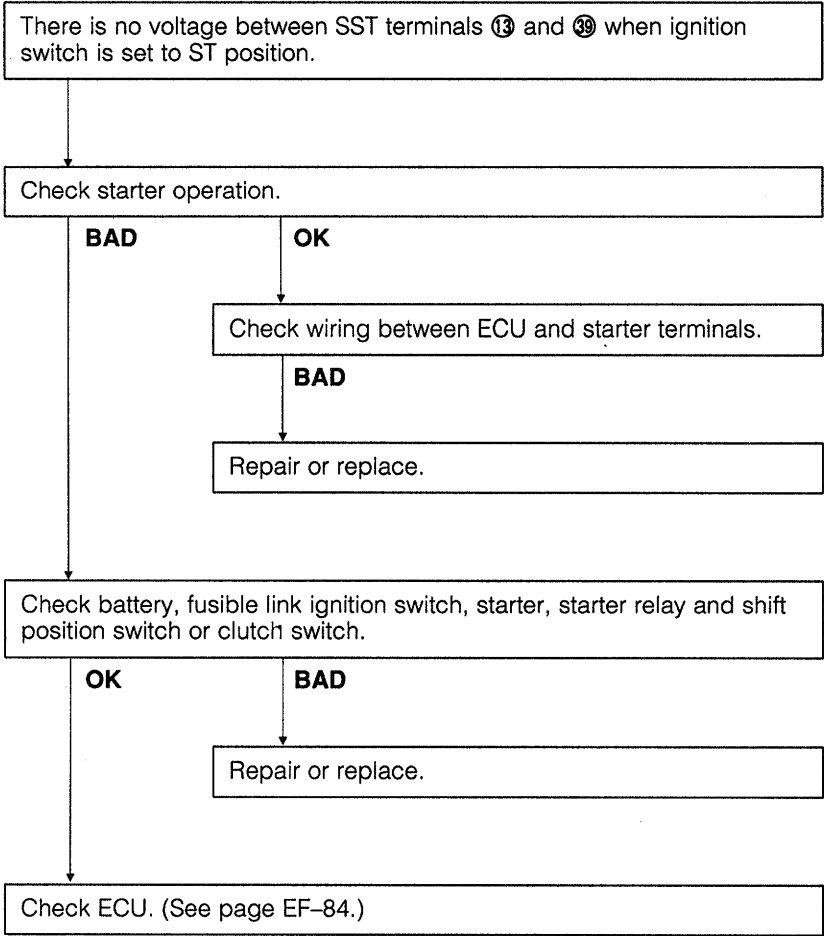
No.	Terminals	Trouble	Condition	STD voltage
10	⑬ — ③⑨ Ground	No voltage	Ignition switch set to ST position	More than 6 V

WRU90-EF099



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-35.

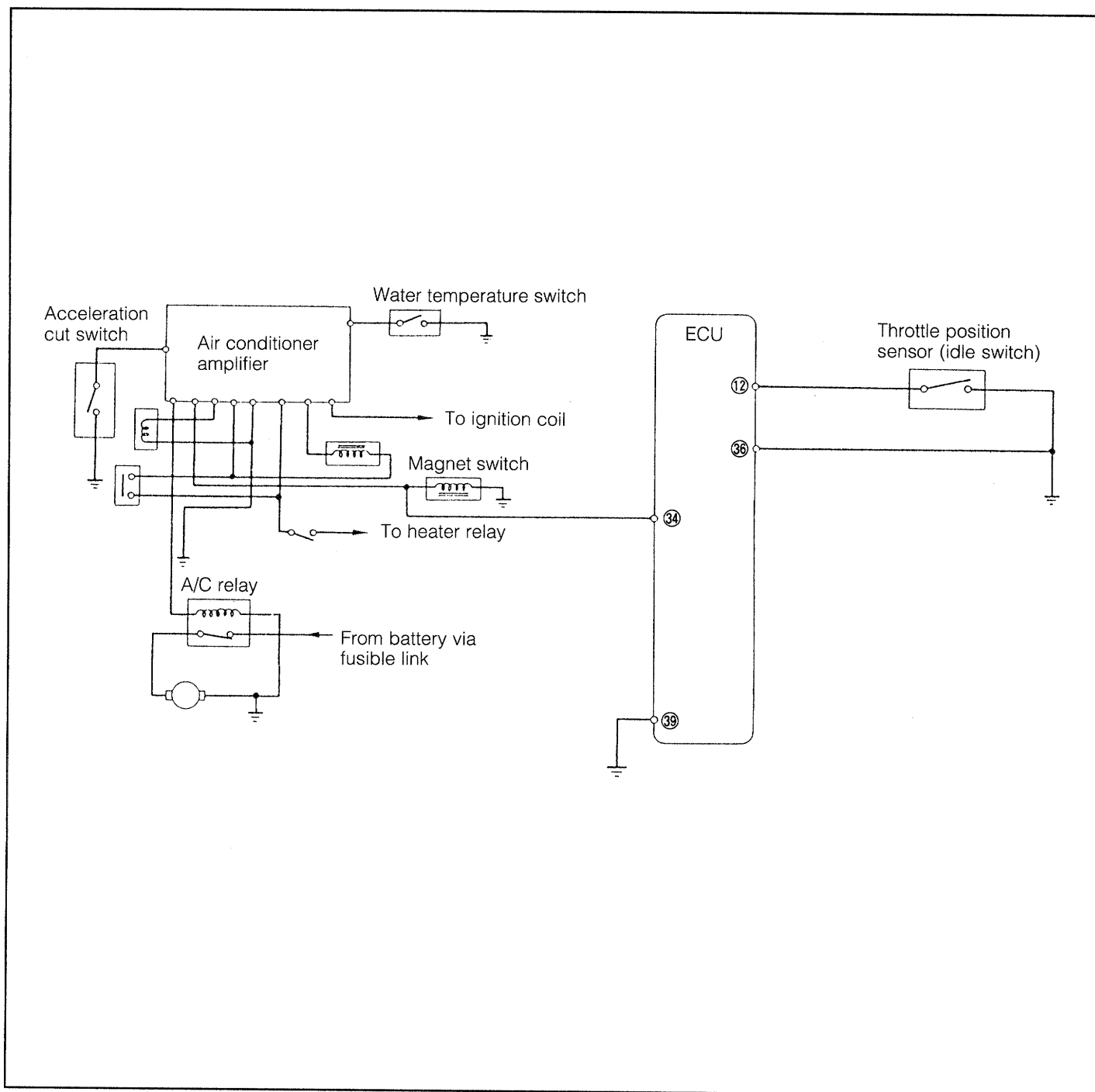
WRU90-EF100



WRU90-EF101

No.	Terminals	Trouble	Condition		STD voltage
11	③④ — ③⑨ Ground	No voltage	When engine is operating and compressor magnet clutch of air conditioner is energized:		Approx. battery voltage
	⑫ — ③⑨ Ground	More than 5 V	Ignition switch ON	Throttle valve fully closed	Less than 5 V
		No voltage		Throttle valve fully opened	Approx. battery voltage

WRU90-EF102



If the SST (09842-87704-000) has not been installed yet, install the SST, referring to the section under "Preparation of Trouble-shooting" at page EF-35.

WRU90-EF103

③④ — ③⑨

There is no specified voltage between SST terminals ③④ and ③⑨ when magnet clutch is operated.

Check magnet clutch operation.

BAD

OK

Check wiring between ECU terminal ③④ and air conditioner amplifier terminal.

BAD

Check air conditioner system.

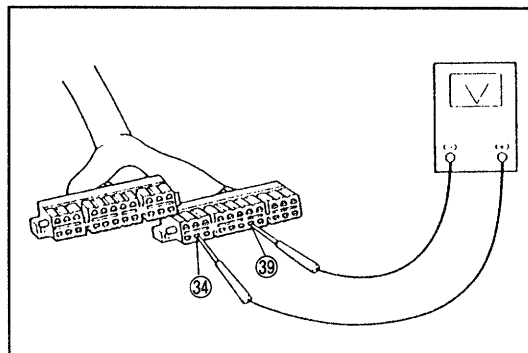
OK

BAD

Repair.

Repair or replace.

Check ECU. (See page EF-84.)



①② — ③⑨

[1] There is no specified voltage between SST terminals ①② and ③⑨.

[2] Check that there is voltage between SST terminals ① or ②② and ③⑨ when ignition switch is turned ON.

OK

BAD

Refer to ① or ②② and ③⑨ trouble section No. 1. (See page EF-39.)

Check throttle position sensor. (See page EF-65.)

OK

BAD

Replace throttle position sensor.

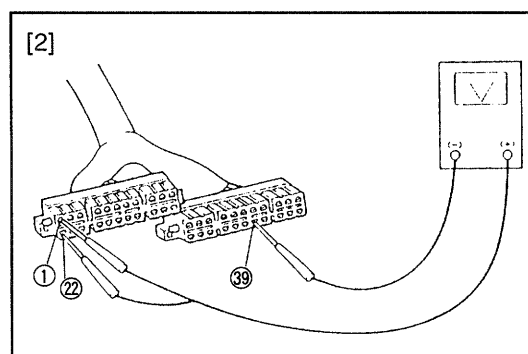
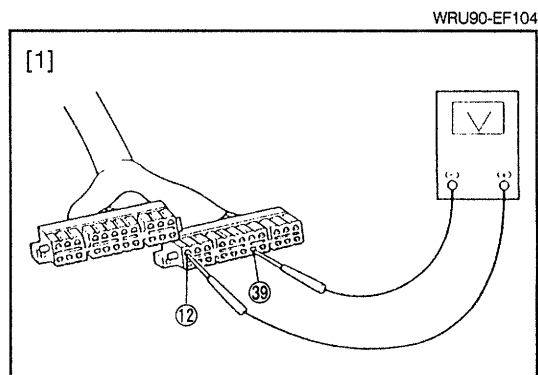
Check wiring between throttle position sensor and body ground.

OK

BAD

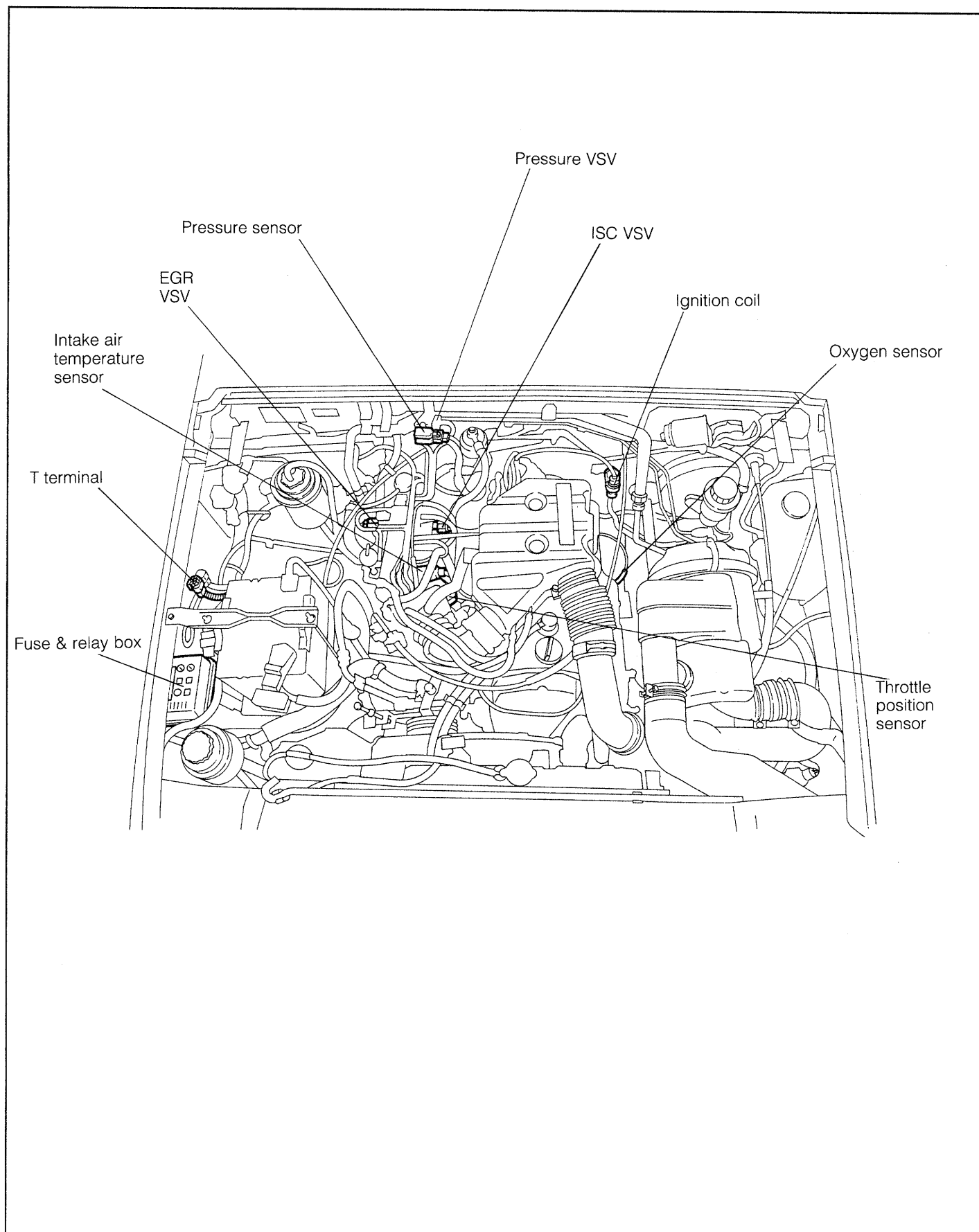
Repair or replace.

Check ECU. (See page EF-84.)

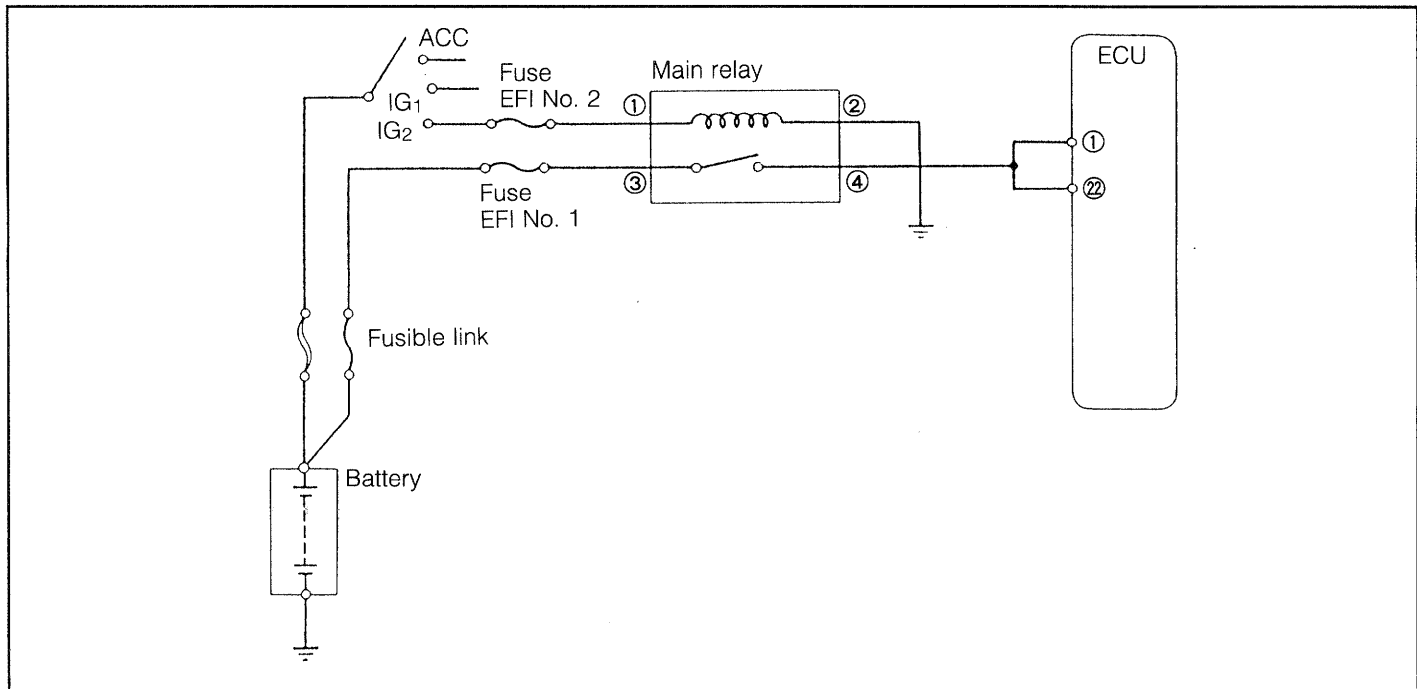


ELECTRONIC CONTROL SYSTEM

LOCATION OF ELECTRONIC CONTROL PARTS



MAIN RELAY



WRU90-EF107

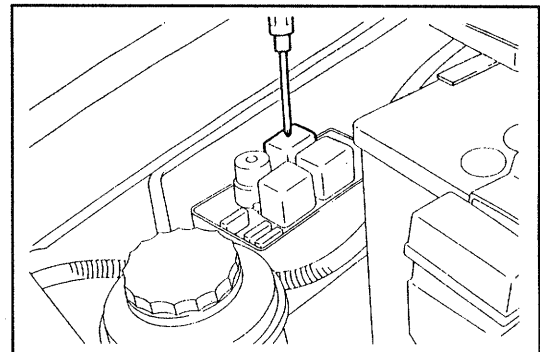
Inspection of EFI main relay

1. Check of main relay operation

Turn ON the ignition switch. Check to see if you can hear a relay operating sound or if you can feel operating vibrations when a screwdriver or the like is brought into contact with the relay.

CAUTION:

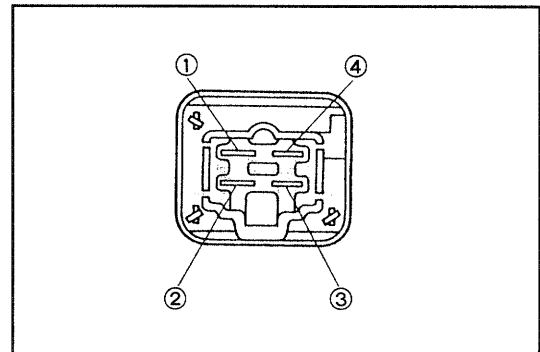
The relay may become very hot during the operation. Hence, do not touch the relay by your hand.



WRU90-EF108

2. Inspection of relay continuity

- (1) Remove the main relay from relay box.
- (2) Check that there is continuity between the terminals ① and ②.
- (3) Check that there is no continuity between the terminals ③ and ④.
- (4) Check that there is no continuity between the terminals ① and ③ and also between the terminals ① and ④.
- (5) Check that there is no continuity between the terminals ② and ③ and also between the terminals ② and ④.



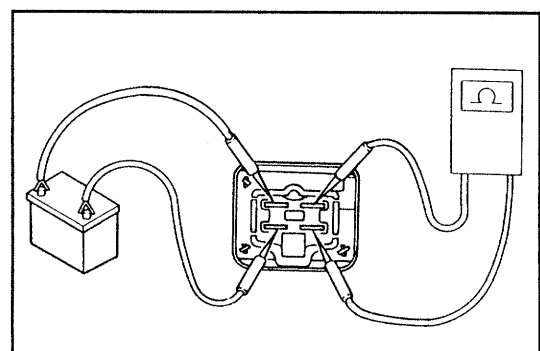
WRU90-EF109

If the continuity test results do not conform to specifications, replace the relay.

3. Inspection of relay operation

- (1) Apply the battery voltage across the terminals ① and ②.
- (2) Check that there is continuity between the terminals ③ and ④.

If the operation test results do not conform to specifications, replace the relay.

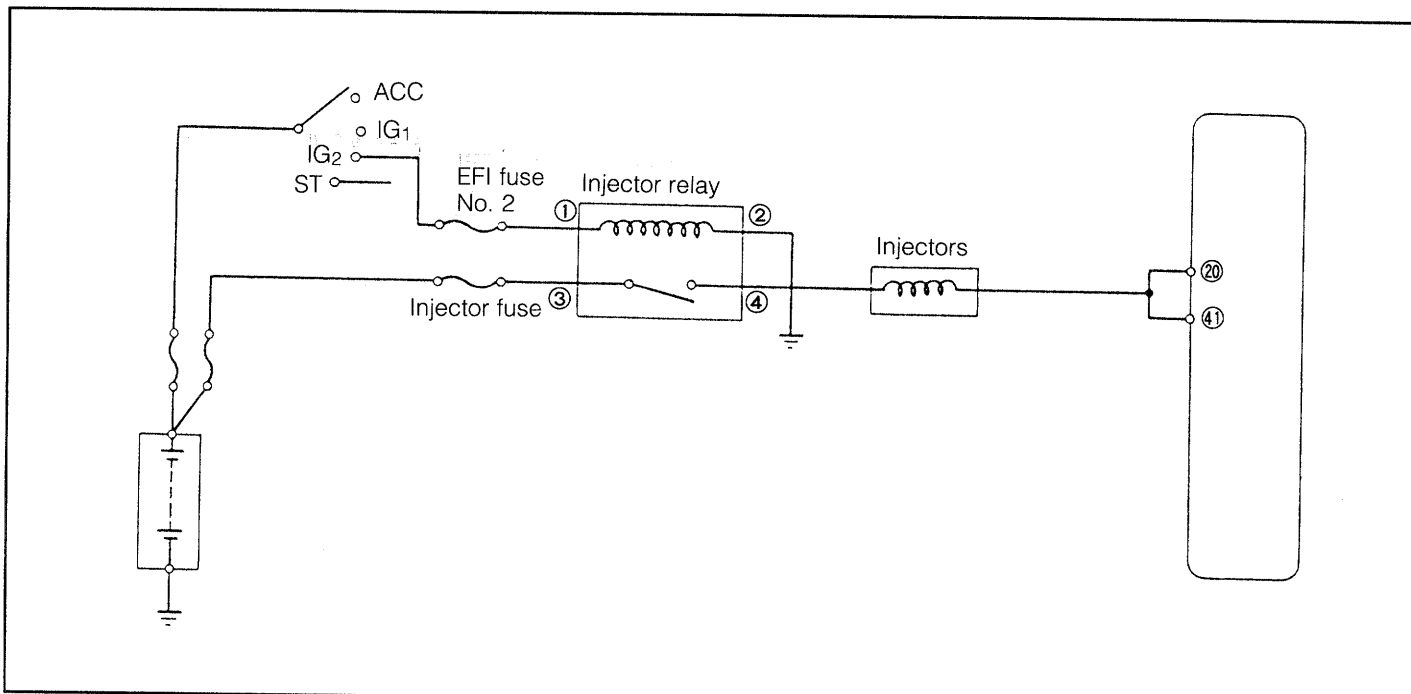


WRU90-EF110

4. If the main relay persists to be inoperative after the checks 1 through 3 have been performed satisfactorily, check the following items.
 - (1) Fusible links
 - (2) Ignition switch
 - (3) Fuses
 - (4) Wiring and wiring connector
5. Install the main relay to the relay box. Attach the cover.

WRU90-EF111

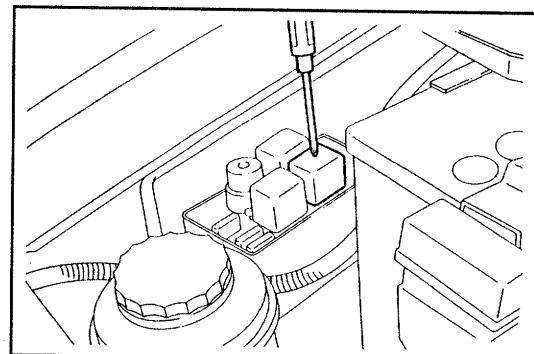
INJECTOR RELAY



WRU90-EF112

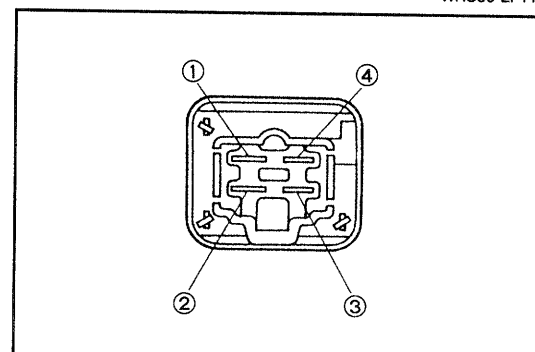
Inspection of injector relay

1. Check of injector relay operation
Turn ON the ignition switch. Check to see if you can hear a relay operating sound or if you can feel operating vibrations when a screwdriver or the like is brought into contact with the relay.
CAUTION:
The relay may become very hot during the operation. Hence, do not touch the relay by your hand.



WRU90-EF113

2. Inspection of relay continuity
 - (1) Remove the injector relay from the relay box.
Check that there is continuity between the terminals ① and ②.



WRU90-EF114

Check that there is no continuity between the terminals

③ and ④.

Check that there is no continuity between the terminals

① and ③ and also between the terminals ① and ④.

Check that there is no continuity between the terminals

② and ③ and also between the terminals ② and ④.

If the continuity test results do not conform to specifications, replace the relay.

WRU90-EF115

3. Inspection of relay operation

(1) Apply the battery voltage across the terminals ① and ②.

(2) Check that there is continuity between the terminals ③ and ④.

If the operation test results do not conform to specifications, replace the relay.

4. If the injector relay persists to be inoperative after the checks 1 through 3 have been performed satisfactorily, check the following items.

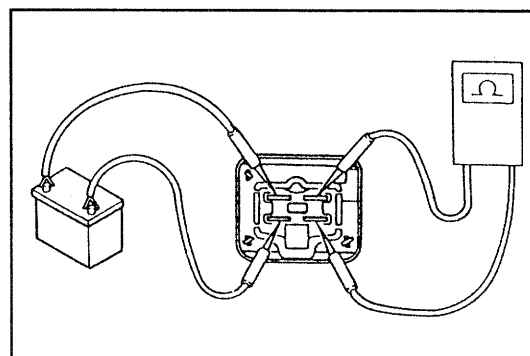
(1) Fusible links

(2) Fuses

(3) Ignition switch

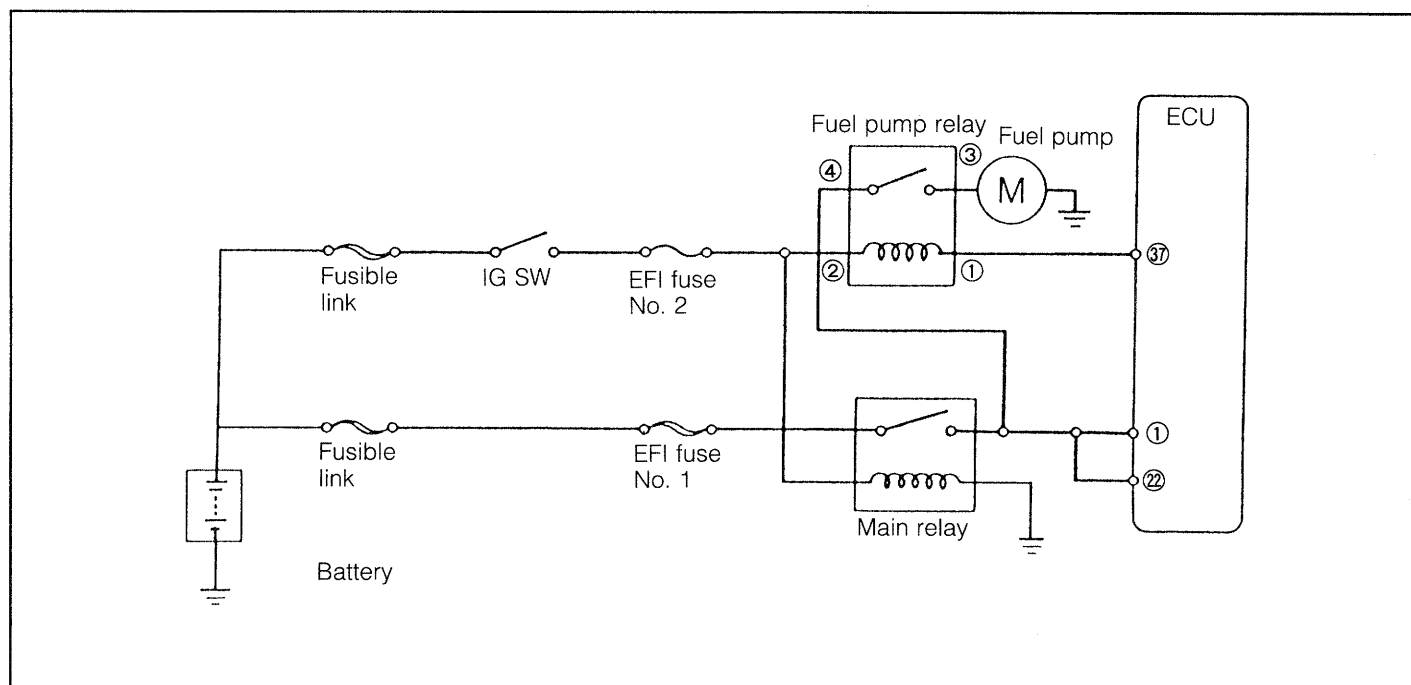
(4) Wiring and wiring connector

5. Install the injector relay to the relay box. Attach the cover.



WRU90-EF116

FUEL PUMP RELAY



WRU90-EF117

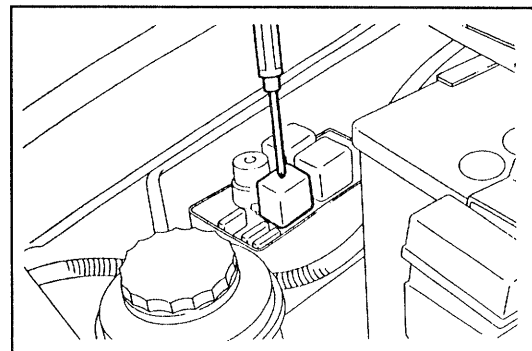
Inspection of Fuel Pump Relay

1. Check of fuel pump relay operation

When the ignition switch is set to the ON position, check to see if the relay emits an operating sound. Or check to see if you will feel an operating vibration with a screwdriver or the like placed on the relay.

CAUTION:

The relay may become very hot during the operation. Hence, do not touch the relay by your hand.

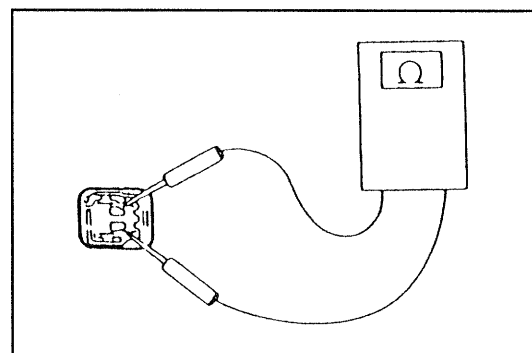


WRU90-EF118

2. Inspection of relay continuity

(1) Check that there is continuity between the terminals ① and ②.

(2) Check that there is no continuity between the terminals ③ and ④.

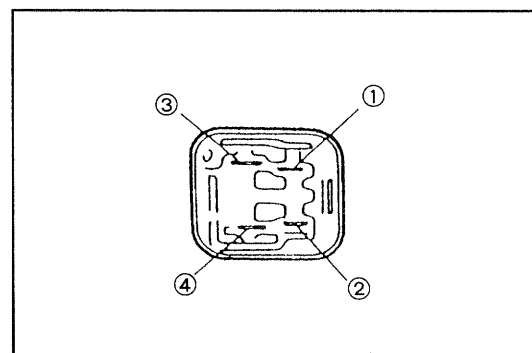


WRU90-EF119

(3) Check that there is no continuity between the terminals ① and ③ and also between the terminals ① and ④.

(4) Check that there is no continuity between the terminals ② and ③ and also between the terminals ② and ④.

If the continuity test results do not conform to specifications, replace the relay.



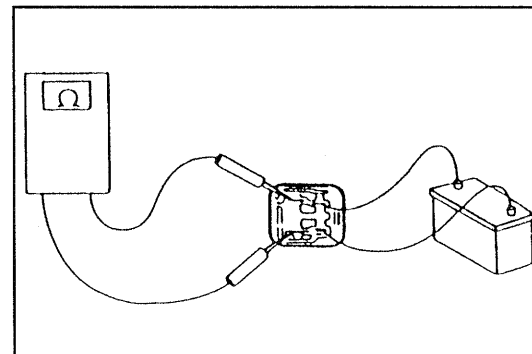
WRU90-EF120

3. Inspection of relay operation

(1) Apply the battery voltage across the terminals ① and ②.

(2) Check that there is continuity between the terminals ③ and ④.

If the operation test results do not conform to specifications, replace the relay.

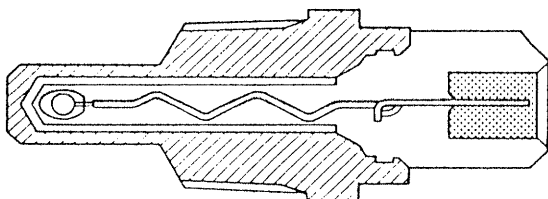


4. If the fuel pump relay persists to be inoperative after the checks 1 through 3 have been performed satisfactorily, check the following items.

- (1) Fusible links
- (2) Ignition switch
- (3) Fuses
- (4) Main relay (See page EF-56.)
- (5) Wiring and wiring connector
- (6) ECU (See page EF-84.)

WRU90-EF121

WATER TEMPERATURE SENSOR



Specification

Water temperature °C (°F)	Resistance kΩ
80 (176)	0.322 ± 0.1
60 (140)	0.584 ± 0.2
40 (104)	1.140 ± 0.3
20 (68)	2.450 ± 0.5
0 (32)	5.88 ± 1.5
-20 (-4)	16.2 ± 3.2

WRU90-EF122

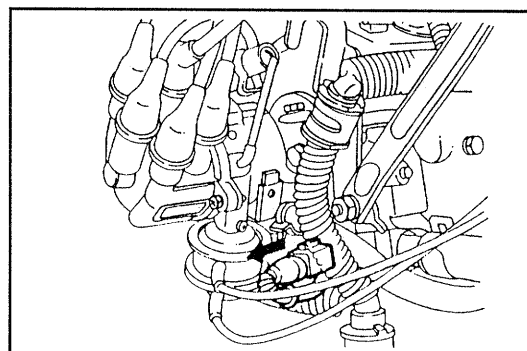
Inspection of Water Temperature Sensor

Measurement of resistance of water temperature sensor

1. Disconnect the connector.

NOTE:

Be sure to un-lock the lock of connector, when disconnect the connector.

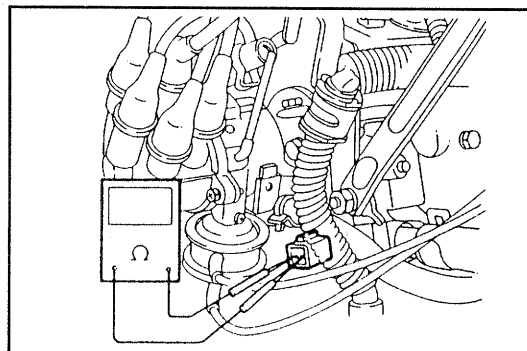


WRU90-EF123

2. Start the engine. Read the resistance at the time when the engine is warmed up fully.

Resistance: 0.32 ± 0.1 kΩ

If the measured resistance will not conform to the specification, remove the water temperature sensor and perform the unit inspection.



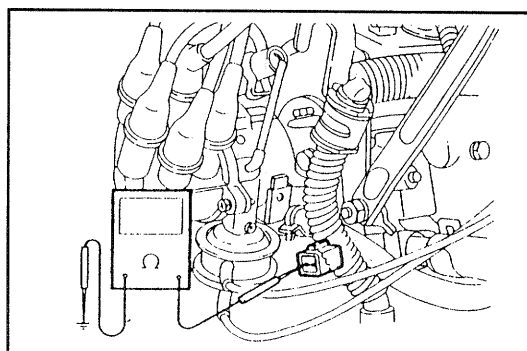
WRU90-EF124

3. Check that there is no continuity between each terminal of the water temperature sensor and the body.

If there is continuity, replace the water temperature sensor.

NOTE:

- Before the water temperature sensor is removed, drain the coolant. (See page CO-3.)
- After completion of the sensor replacement, refill the coolant. (See page CO-3.)



WRU90-EF125

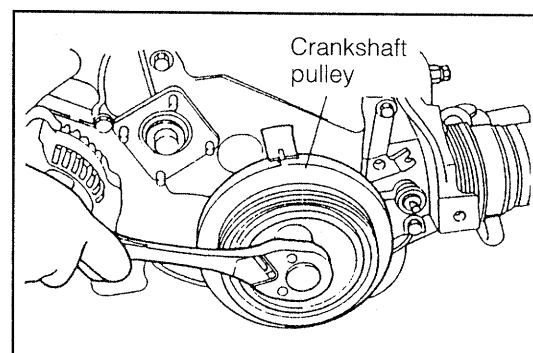
Water temperature sensor removal and unit test

1. Disconnect the ground cable terminal from the negative (-) terminal of the battery.
2. Drain the cooling water. (See page CO-3.)

WRU90-EF126

3. Distributor removal

- (1) Turn the crankshaft, until the mark on the crankshaft timing belt pulley is aligned with the indicator mark on the timing belt cover. Ensure that the rocker arms of the cylinder No.1 at the timing belt side are in a free state. If the rocker arms are not in a free state, turn the crankshaft one more complete turn (360°).

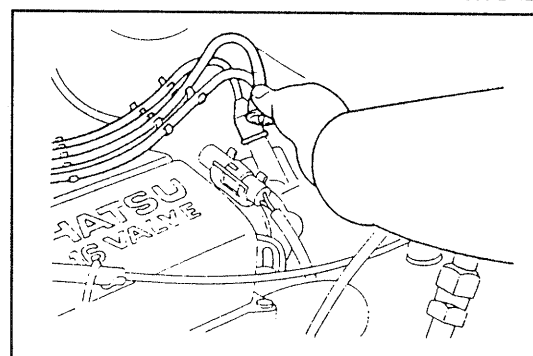


WRU90-EF127

- (2) Remove the spark plug wires from the distributor cap.

NOTE:

Be sure to remove the spark plug wire by holding the rubber grommet. Never pull out the cord section.



- (3) Disconnect the distributor connector.
- (4) Disconnect the vacuum hoses from the vacuum advancer.
- (5) Remove the distributor by removing the distributor set bolts.

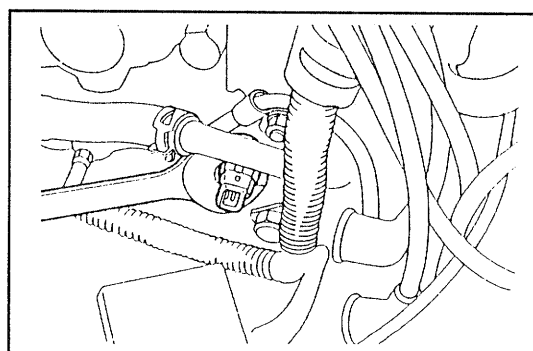
NOTE:

Since the oil flows out during the removal, place a suitable cloth underneath the distributor.

WRU90-EF128

4. Removal of water temperature sensor

- (1) Remove the water temperature sensor connector.
- (2) Remove the water temperature sensor.



WRU90-EF129

5. Unit check

- (1) Immerse the heat sensing section of the water temperature sensor in water. Raise the water temperature gradually. Check to see if the resistance varies within the specified values in accordance with the table below.

Specifications

Water temperature °C (°F)	Resistance (kΩ)
80 (176)	0.322 ± 0.1
60 (140)	0.584 ± 0.2
40 (104)	1.140 ± 0.3
20 (68)	2.450 ± 0.5
0 (32)	5.88 ± 1.5
-20 (-4)	16.2 ± 3.2

If the resistance will not conform to the specifications, replace the water temperature sensor.

- (2) Check that there is no continuity between each terminal of the water temperature sensor and sensor body. If there is continuity, replace the intake air temperature sensor.

6. Installation of water temperature sensor

- (1) Wind sealing tape to the water temperature sensor switch and install it to the cylinder head. Connect the connector.

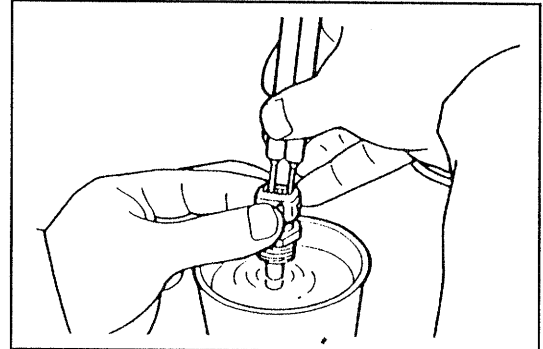
Tightening Torque: 2.5 - 3.5 kg-m
(18.1 - 25.3 ft-lb, 24.4 - 34.3 N·m)

NOTE:

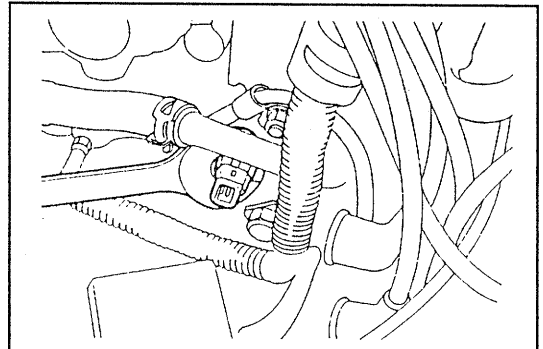
The new sensor is coated with sealer. Hence, when the sensor is replaced with a new one, first remove the sealer thoroughly. Then, wind the seal tape. Also, be sure to clean the threaded holes at the cylinder head side.

- (2) Distributor installation (See page IG-17.)

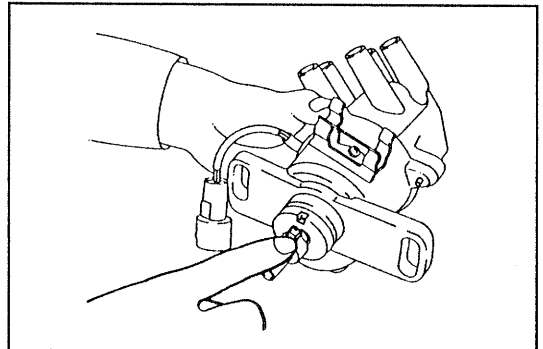
- ① Replace the distributor "O" ring with a new part.
- ② With the coupling cut-out section of the distributor aligned with the cut-out section of the distributor body, insert the distributor into the cylinder head. At this time, ensure that the distributor attaching bolt hole of the cylinder head comes at the center of the elongated hole for the distributor bolt. Then, torque the distributor set bolt.
- ③ Connect the vacuum hoses to the vacuum advance.
- ④ Connect the distributor connector. Install the connector to the clamp.
- ⑤ Connect the high-tension cords to the distributor cap.



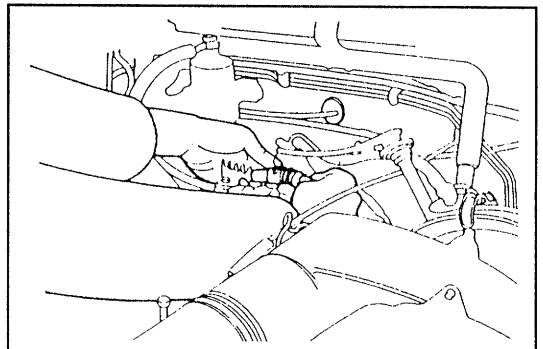
WRU90-EF130



WRU90-EF131



WRU90-EF132

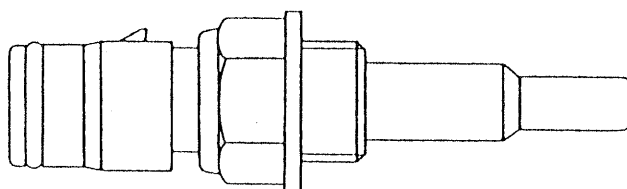


WRU90-EF133

- (3) Connect the ground cable terminal to the battery negative (–) terminal.
- (4) Fill cooling water. (See page CO–3.)
- (5) Adjust the ignition timing. (See page IG–23.)
- (6) Start the engine. Ensure that no water or oil leakage is present.
- (7) Check the oil level. (See page LU–2.)

WRU90-EF134

INTAKE AIR TEMPERATURE SENSOR



Specification

Intake air temperature °C (°F)	Resistance kΩ
80 (176)	0.322 ± 0.1
60 (140)	0.584 ± 0.2
40 (104)	1.140 ± 0.3
20 (68)	2.450 ± 0.5
0 (32)	5.88 ± 1.5
–20 (–4)	16.2 ± 3.2

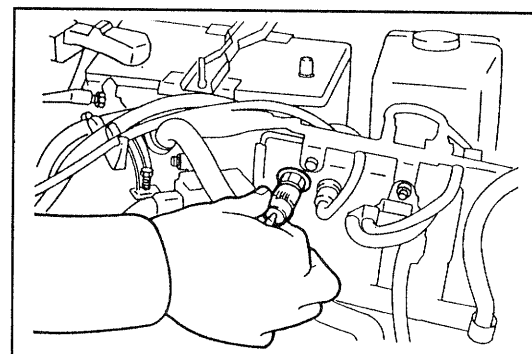
WRU90-EF135

Inspection of Intake Air Temperature Sensor Measurement of resistance of intake air temperature sensor

1. Disconnect the connector.

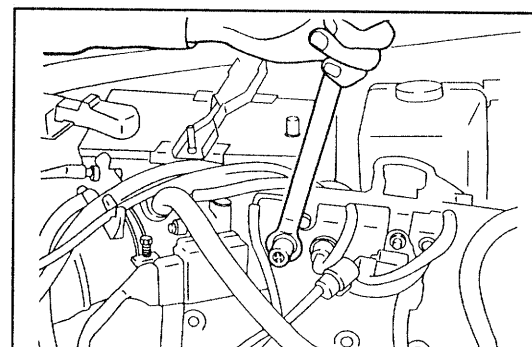
NOTE:

Do not pull out the lead wire. While holding the connector section, unlock the lock and pull out the connector.



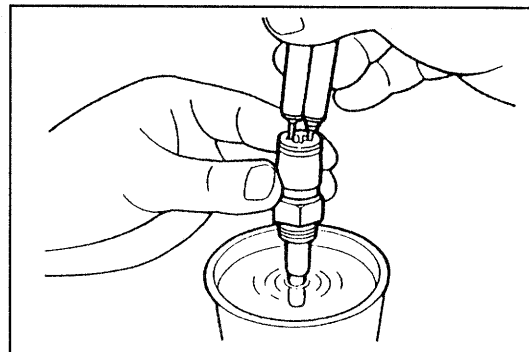
WRU90-EF136

2. Remove the intake air temperature sensor.

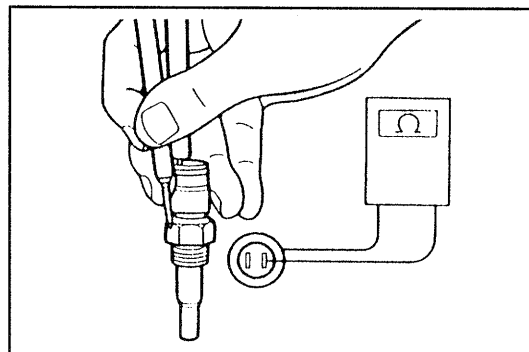


WRU90-EF137

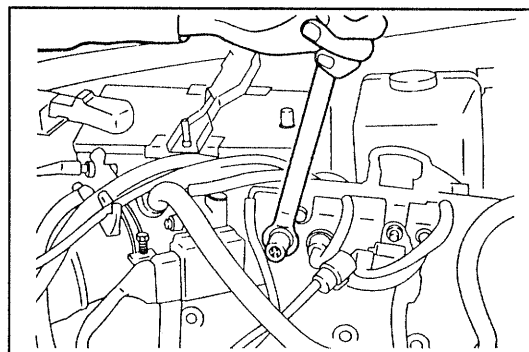
3. Immerse the heat sensing section of the intake air temperature sensor in water. Raise the water temperature gradually. Check to see if the resistance varies within the specified values in accordance with the table in the preceding page. If the measured resistance will not conform to the specifications, replace the intake air temperature sensor.
4. Check that there is no continuity between each terminal of the intake air temperature sensor and the sensor body. If there is continuity, replace the intake air temperature sensor.
5. Install the intake air temperature sensor to the surge tank with a new gasket interposed.
Tightening Torque: 3.0 - 4.0 kg-m
(21.7 - 28.9 ft-lb, 29.4 - 39.2 N·m)
6. Connect the intake air temperature sensor connector.



WRU90-EF138

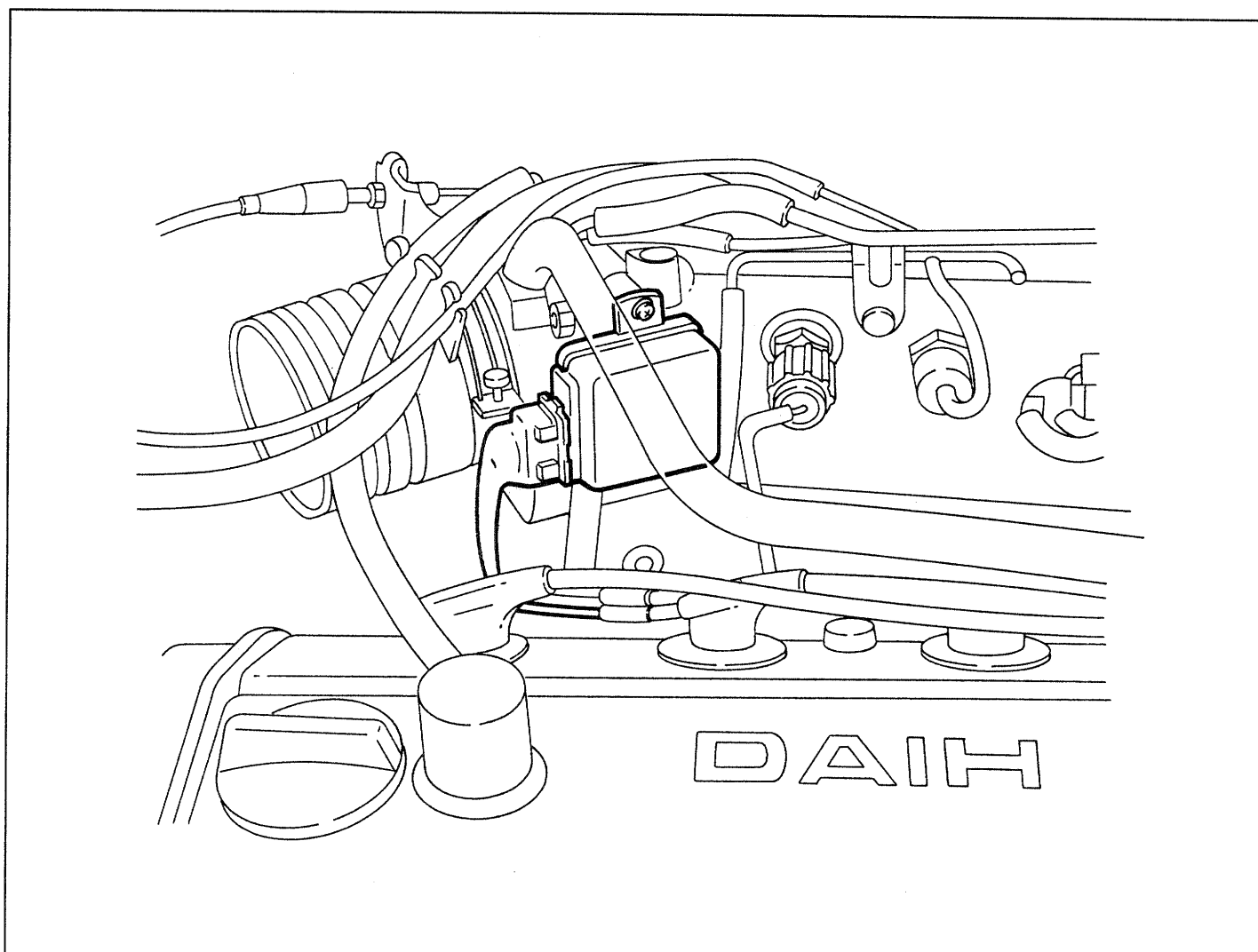


WRU90-EF139



WRU90-EF140

THROTTLE POSITION SENSOR



WRU90-EF141

Inspection of throttle position sensor

1. Remove the air chamber. (See page EM-10.)
2. Unlock the throttle position sensor connector and disconnect it.

CAUTION:

When disconnecting the connector, care must be exercised to ensure that no excessive load is applied to the throttle position sensor.

3. Measure the resistance between the terminals of the throttle position sensor.

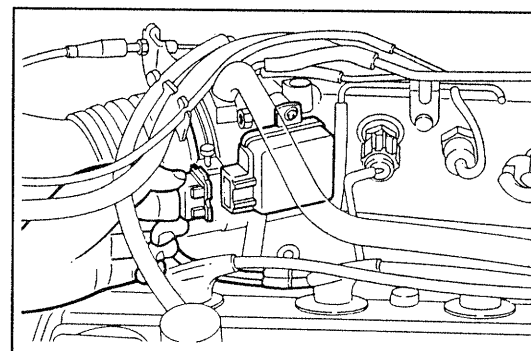
(1) Measure the resistance between ⑫ and ⑳ under the following conditions.

Throttle valve closed fully	29 k Ω or less at 20°C (68°F)
Throttle valve opened fully	1000 k Ω or more

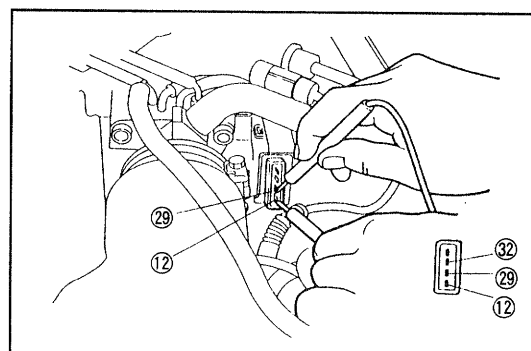
If the measured resistance does not conform to the specification, replace the throttle body. (See page EF-119.)

CAUTION:

Be very careful not to damage the terminal.



WRU90-EF142



WRU90-EF143

- (2) Measure the resistance between ③② and ②⑨ under the following conditions.

Throttle valve closed fully	1000 k Ω or more
Throttle valve opened fully	29 k Ω or less

If the measured resistance does not conform to the specification, replace the throttle body. (See page EF-119.)

CAUTION:

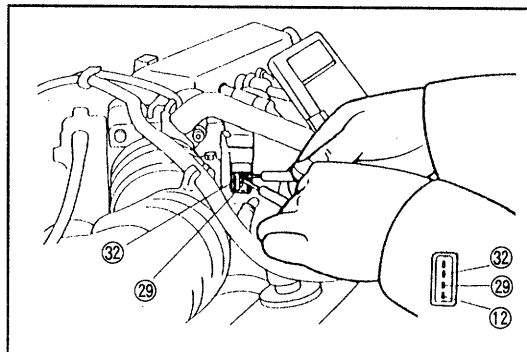
Be very careful not to damage the terminal.

4. Connect the throttle position sensor connector.

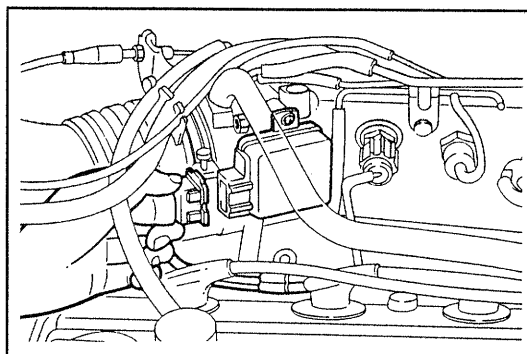
CAUTION:

When connecting the connector, care must be exercised to ensure that no excessive load is applied to the throttle position sensor.

5. Install the air chamber. (See page EM-14.)

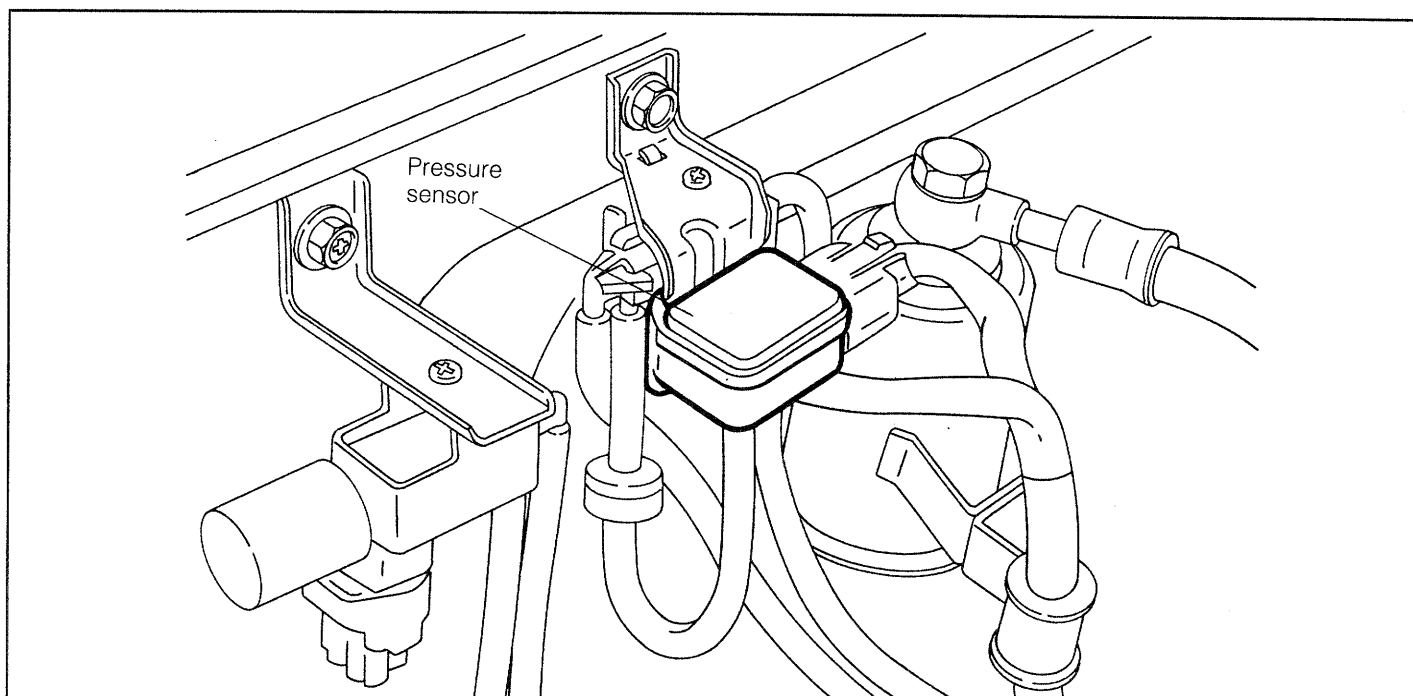


WRU90-EF144



WRU90-EF145

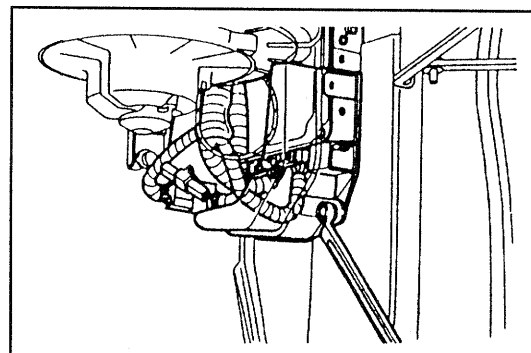
PRESSURE SENSOR



WRU90-EF146

Inspection of Pressure Sensor (Measurement of output voltage of pressure sensor)

1. Connection of SST
 - (1) Disconnect the ground cable terminal from the negative (-) terminal of the battery.
 - (2) Remove the ECU cover.



WRU90-EF147

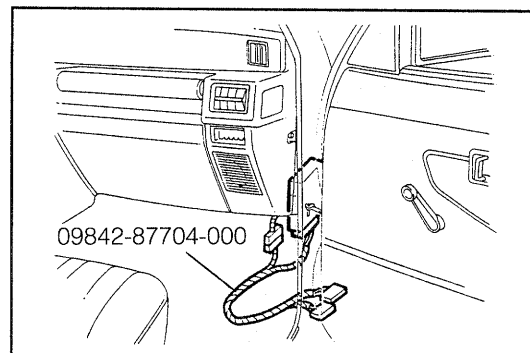
- (3) Connect the following SST between the ECU and the engine wire.

SST: 09842-87704-000

NOTE:

Before the SST is installed, be sure to perform continuity and short tests between the SST terminals.

- (4) Reconnect the ground cable terminal to the negative (-) terminal of the battery.

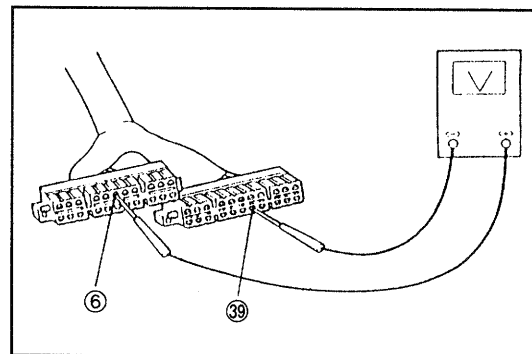


WRU90-EF148

2. Check of output of pressure sensor
 - (1) Measure the voltage between the SST terminals ⑥ and ③⑨ when the ignition switch is turned ON.

Specified Value

Measuring point	Atmospheric pressure mmHg (inchHg)	Voltage V
Altitude (height above sea level) m (ft)		
0 (0)	760 (29.92)	3.2 - 4.0
500 (1640)	716 (28.19)	3.1 - 3.8
1000 (3280)	674 (26.54)	3.0 - 3.6



WRU90-EF149

If the measured voltage does not conform to the specification, measure the voltage between the SST terminals ⑤ and ③⑥. Ensure that the measured voltage is within a range of 4.5 to 5.5 volts. Then, proceed to replace the pressure sensor.

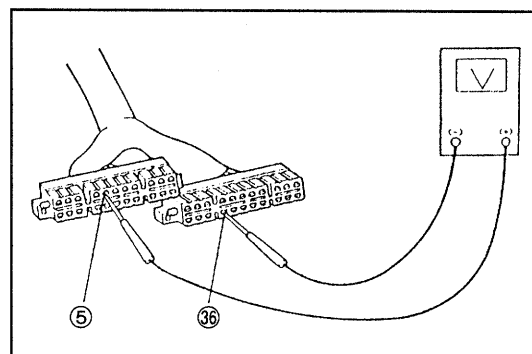
When the pressure sensor is replaced, it is necessary to replace the gas filter, too.

If the measured voltage between the SST terminals ⑤ and ③⑥ does not conform to the specification, check the wiring between the ECU and the pressure sensor. If there is no trouble with the wiring, check the ECU. (See page EF-84.)

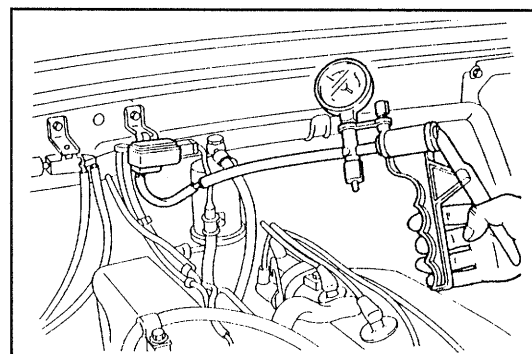
- (2) Disconnect the rubber hose connected to the pressure sensor. Apply a negative pressure of 200 mmHg (7.87 inchHg) to the pressure sensor, using a MityVac. Check that the measured voltage between the SST terminals ⑥ and ③⑥ drops by 0.65 - 0.95, compared with the voltage measured in the step (1).

If the measured voltage fails to drop by the specified value, replace the pressure sensor.

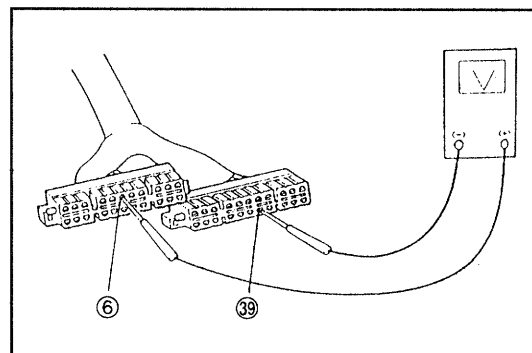
When the pressure sensor is replaced, it is necessary to replace the gas filter, too.



WRU90-EF150



WRU90-EF151



WRU90-EF152

- (3) Remove the MityVac from the pressure sensor.
- (4) Connect the rubber hose disconnected in the step (2) to the pressure sensor.

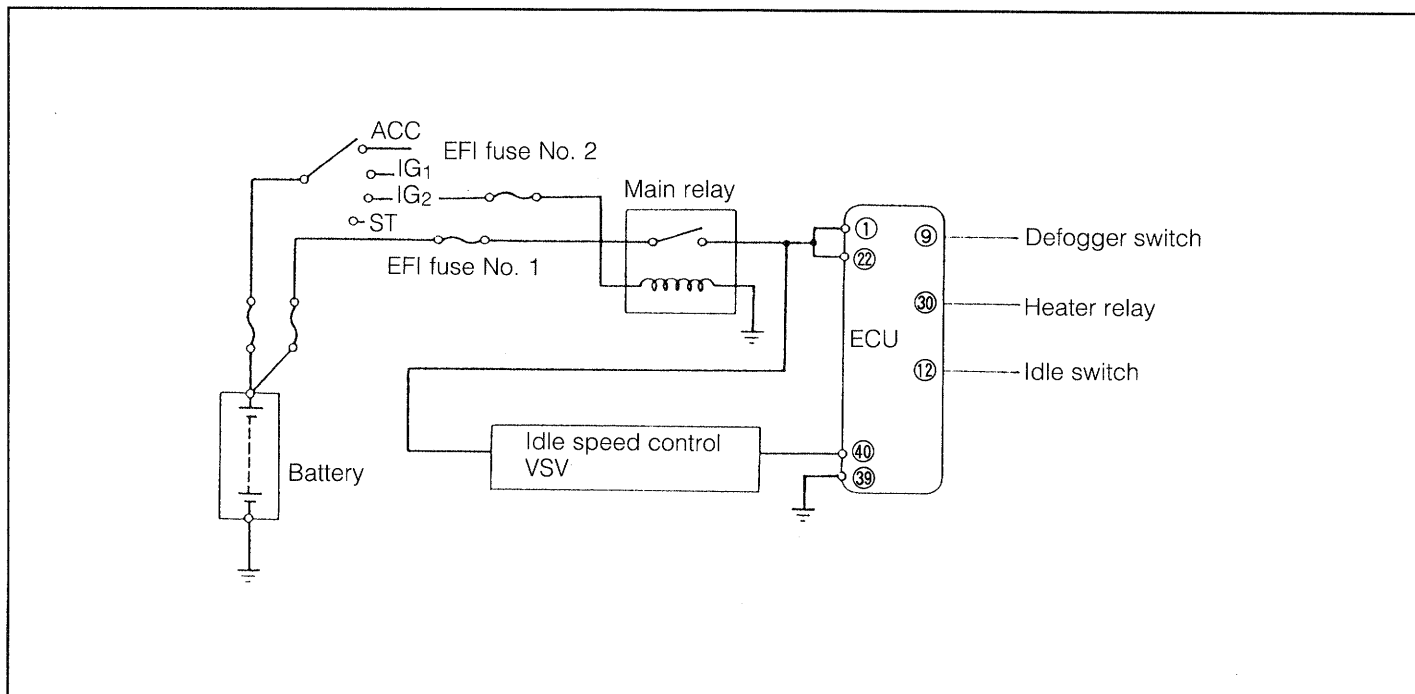
WRU90-EF153

3. SST removal

- (1) Disconnect the ground cable terminal from the negative (-) terminal of the battery.
- (2) Remove the SST by disconnecting the ECU and engine wire connectors of the SST.
- (3) Connect the engine wire to the ECU.
- (4) Install the glove compartment box to the instrument panel.
- (5) Reconnect the ground cable terminal to the negative (-) terminal of the battery.

WRU90-EF154

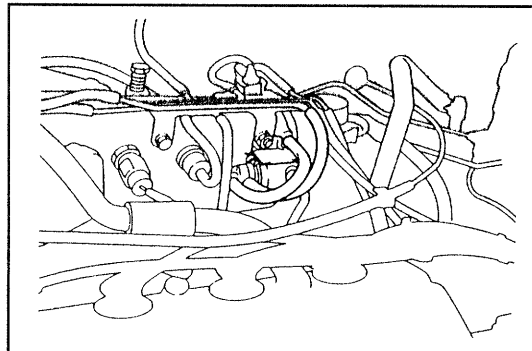
IDLE SPEED CONTROL VSV



WRU90-EF155

Inspection of idle speed control VSV

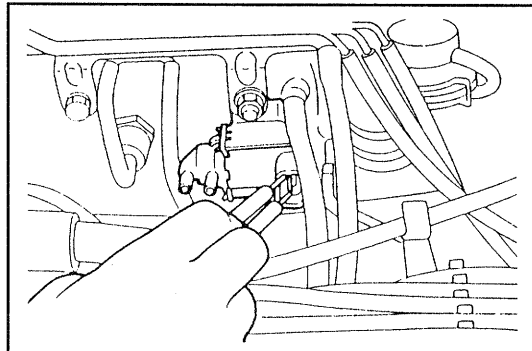
1. Unit inspection of idle speed control VSV
 - (1) With the ignition switch turned OFF, disconnect the connector and vacuum hoses which are connected to the idle speed control VSV.



WRU90-EF156

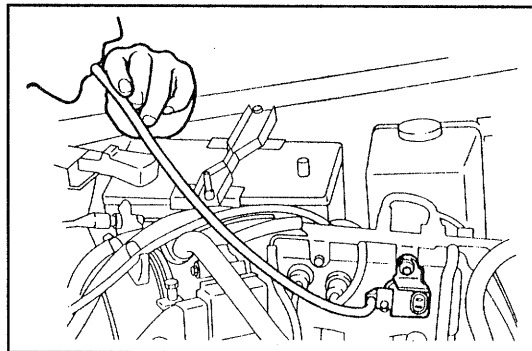
- (2) Check that the resistance between the terminals of the VSV conforms to the specification.
Specified Resistance: 10 - 50 Ω

Replace the VSV with a new part if the resistance does not conform to the specification.



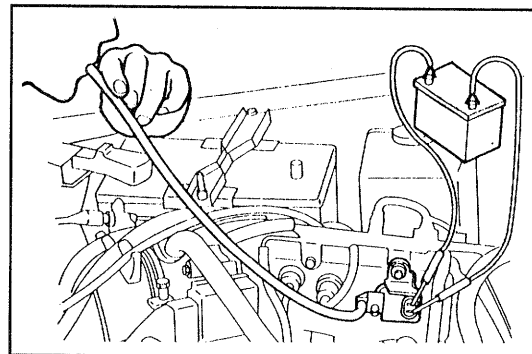
WRU90-EF157

- (3) Connect a suitable rubber hose to the VSV. Ensure that you feel resistance while blowing your breath. Replace the VSV with a new part if you feel no resistance while blowing your breath.



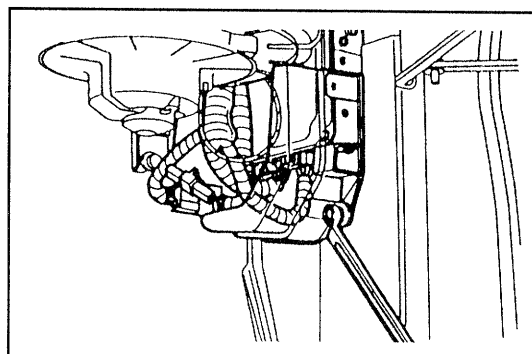
WRU90-EF158

- (4) Apply the battery voltage to the idle speed control VSV as shown in the right figure.
- (5) Connect a suitable rubber hose to the idle speed control VSV. Ensure that air continuity exists. Replace the VSV with a new part if no air continuity exists.
- (6) Remove the battery voltage from the VSV.
- (7) Connect the disconnected vacuum hoses and connector to the VSV.



WRU90-EF159

2. Measurement of operation voltage of idle speed control VSV
 - (1) Disconnect the battery ground cable from the negative (-) terminal of the battery.
 - (2) Remove the ECU cover.



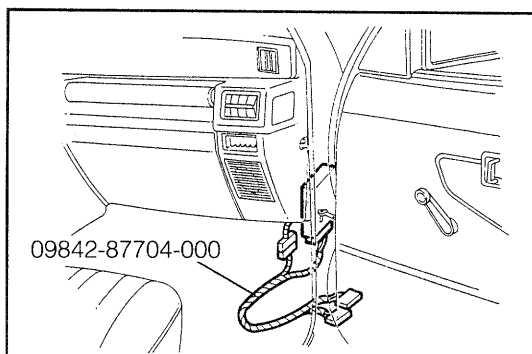
WRU90-EF160

- (3) Connect the following SST between the ECU and the engine wire.

SST: 09842-87704-000

NOTE:

Before connecting the SST, ensure that no open wire or short exists between the terminals.

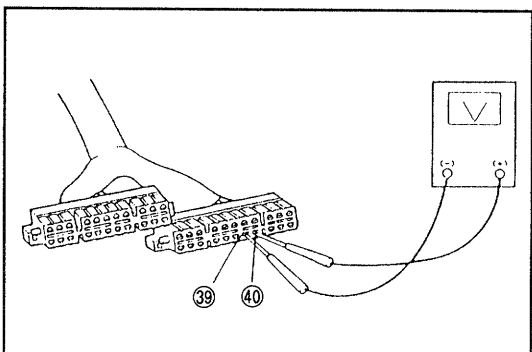


WRU90-EF161

- (4) Reconnect the battery ground cable to the negative (-) terminal of the battery.
- (5) Turn ON the ignition switch.

- (6) Ensure that the voltage between the SST terminals ④⑩ and ③⑨ (negative) is less than the specified voltage.
Specified Voltage: 3 V or less

Check the ECU if the measured voltage exceeds the specified voltage. (See page EF-84.)



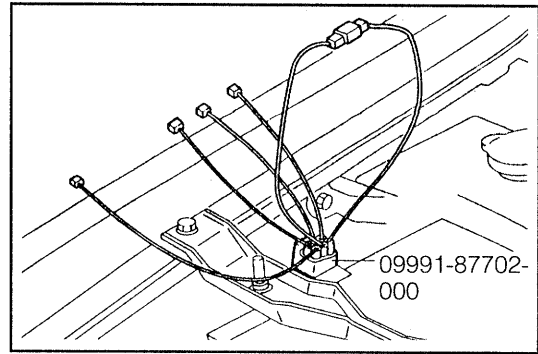
WRU90-EF162

- (7) Remove the cap of the check connector. Connect the following SST.

SST: 09991-87702-000

NOTE:

Before connecting the SST, ensure that no open wire or short exists in each wiring.



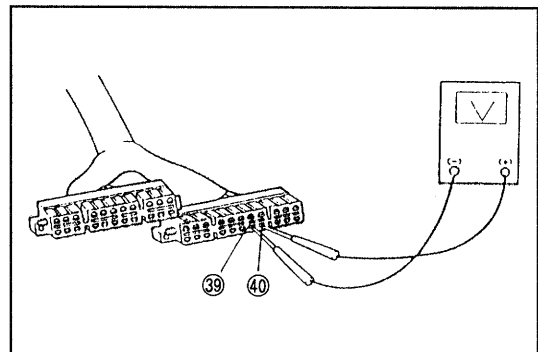
- (8) Connect the test terminal (Brown) with the ground terminal (Black).

WRU90-EF163

- (9) Ensure that the voltage between the SST terminals ④⑩ and ③⑨ (negative) is approximately the battery voltage.
Specified Voltage: Approximately battery voltage

Check the wiring from the battery to the ECU terminal ④⑩ if the measured voltage is less than the specified voltage.

If no abnormality exists in the wiring, check the ECU.
(See page EF-84.)



- (10) Turn OFF the ignition switch.
(11) Remove the SST from the check connector.
(12) Attach the cap to the check connector.
(13) Disconnect the battery ground cable from the negative (-) terminal of the battery.
(14) Remove the SST by disconnecting the ECU and engine wire connectors of the SST.
(15) Reconnect the engine wire to the ECU.
(16) Install the ECU cover to the cowl panel.
(17) Reconnect the ground cable terminal to the negative (-) terminal of the battery.

WRU90-EF164

System inspection of idle speed control VSV

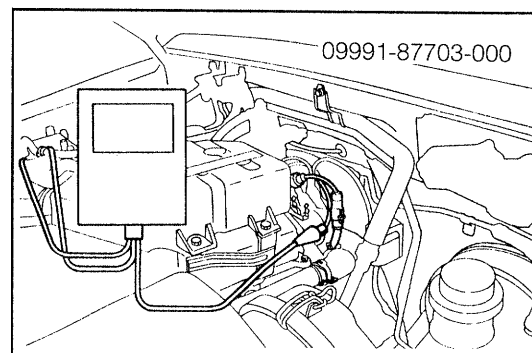
1. Setting conditions prior to check
 - (1) Start and warm up the engine.
 - (2) Turn OFF all accessory switches.
 - (3) Move the shift lever to the neutral position.
 - (4) On the vehicle equipped with power steering, set the steering wheel to the straight-ahead condition.
 - (5) Ensure that the intake or exhaust system exhibits no air and/or gas leakage.
 - (6) Ensure that the air cleaner filter element is installed.
 - (7) Ensure that all vacuum hoses and pipes are connected correctly.

2. Connecting tachometer to engine
Connect the measuring terminal of a tachometer to the engine.

NOTE:

In case where your tachometer is to be connected to the negative (–) terminal of the ignition coil, connect the following SST, which is to be connected to the distributor connector, between the distributor and the engine wire. Then, connect the tachometer as shown in the right figure.

SST: 09991-87703-000



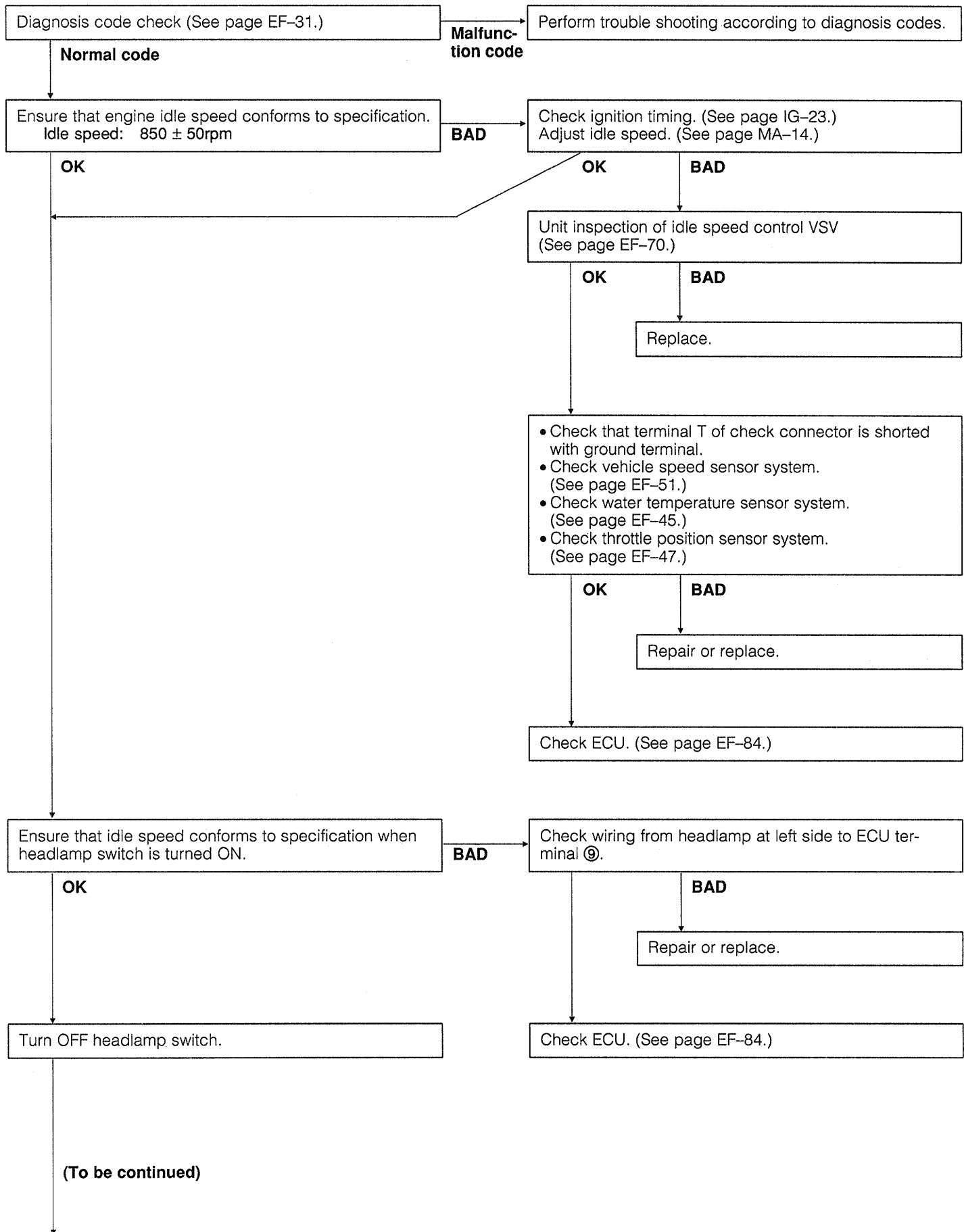
WRU90-EF165

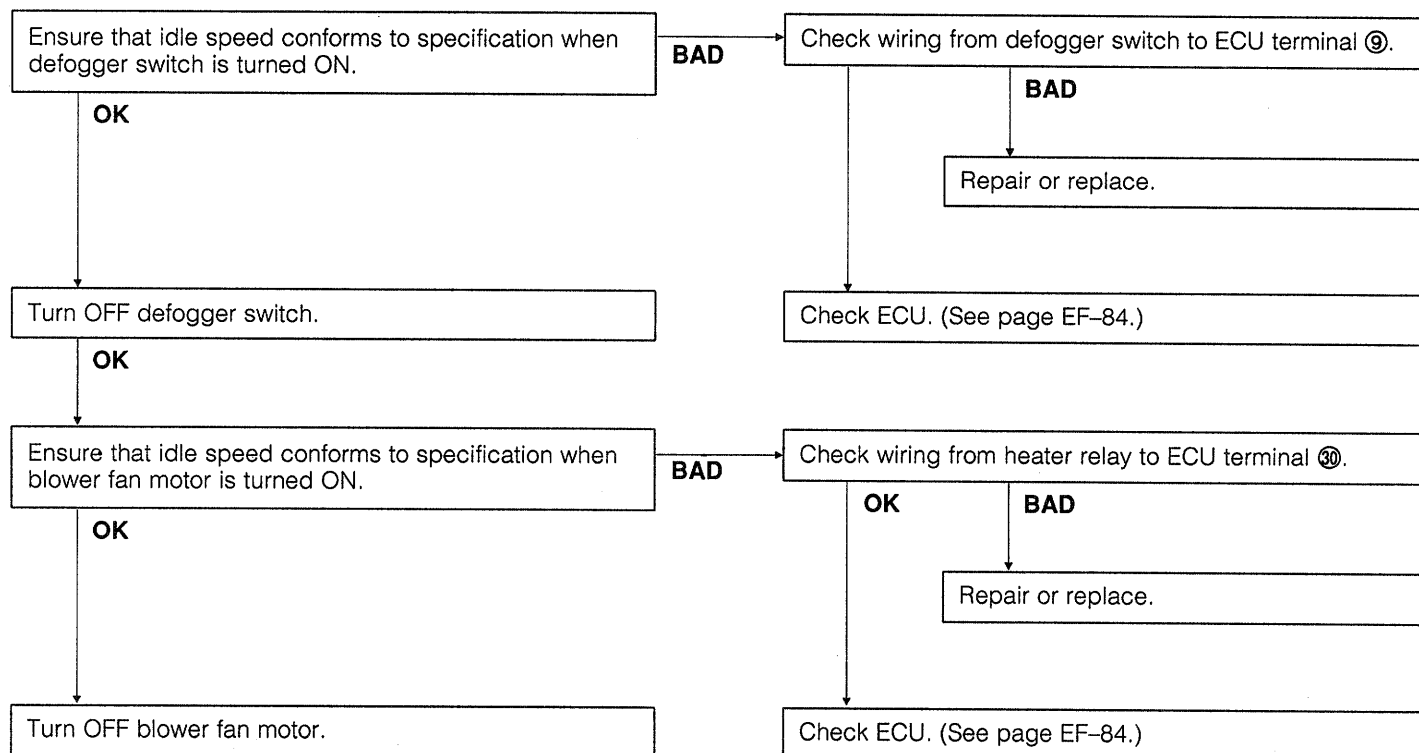
WRU90-EF166

CAUTION:

- Never allow the tachometer terminal to touch the ground terminal as it could result in damage of the ignitor and/or the ignition coil.
- As some tachometers are not compatible with this ignition system, it is imperative to confirm the compatibility of your meter before it is used.

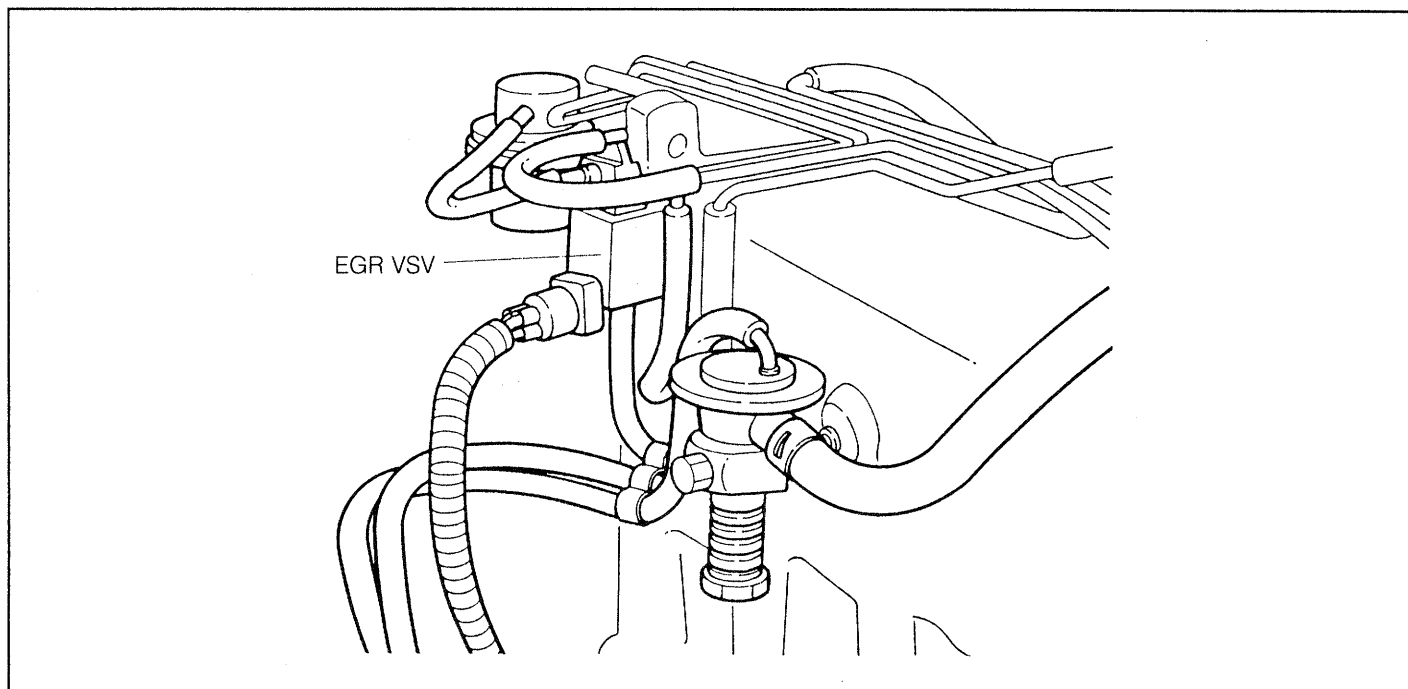
3. Perform the inspection according to the following flow chart.





WRU90-EF168

EGR VSV



WRU90-EF169

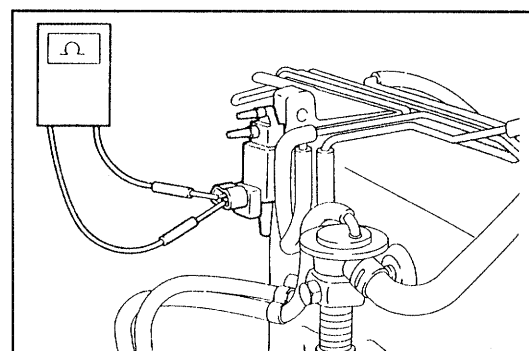
Inspection of EGR VSV

1. Unit inspection of EGR VSV

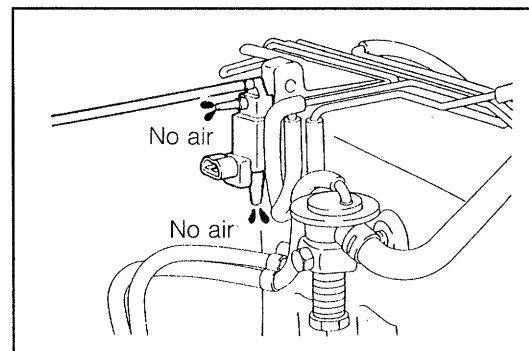
- (1) With the ignition switch turned OFF, disconnect the connector and vacuum hoses which have been connected to the EGR VSV.
- (2) Check that the resistance between the terminals of the VSV conforms to the specification.
Specified Resistance: 20 - 60 Ω

Replace the VSV with a new part if the resistance does not conform to the specification.

- (3) Connect a suitable rubber hose to the VSV as shown in the right figure. Ensure that no air continuity exists. Replace the VSV with a new part if air continuity exists.

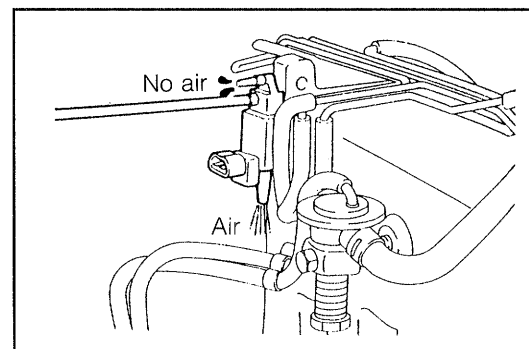


WRU90-EF170



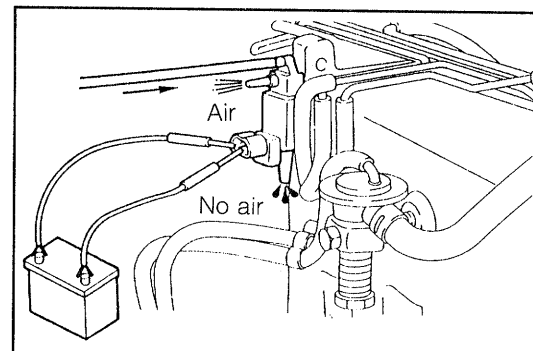
WRU90-EF171

- (4) Connect a suitable rubber hose to the VSV as shown in the right figure. Ensure that air continuity exists. Replace the VSV with a new part if no air continuity exists.



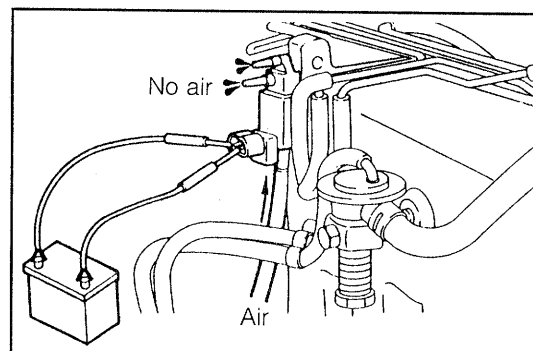
WRU90-EF172

- (5) Apply the battery voltage to the EGR VSV as shown in the right figure.
- (6) Connect a suitable rubber hose to the EGR VSV as shown in the right figure. Ensure that air continuity exists.
Replace the VSV with a new part if no air continuity exists.



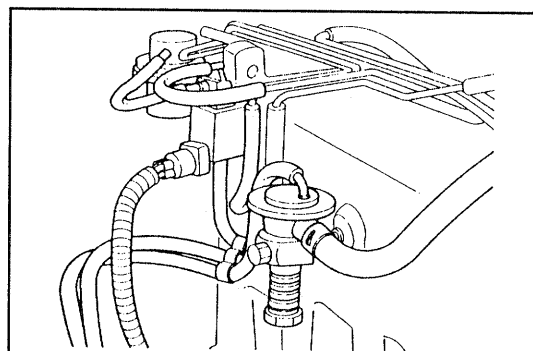
WRU90-EF173

- (7) Connect a suitable rubber hose to the EGR VSV as shown in the right figure. Ensure that no air continuity exists.
Replace the VSV with a new part if air continuity exists.



WRU90-EF174

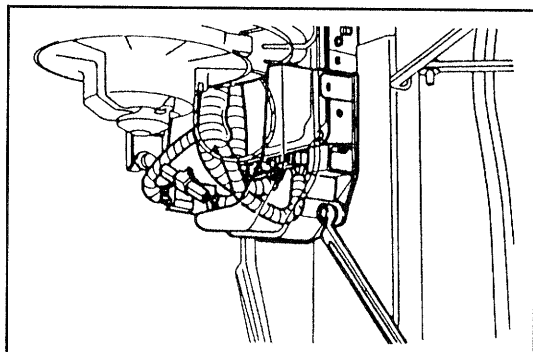
- (8) Disconnect the battery voltage from the VSV.
- (9) Connect the disconnected vacuum hoses and connector to the VSV.



WRU90-EF175

2. Measurement of operation voltage of EGR VSV

- (1) Disconnect the battery ground cable from the negative (-) terminal of the battery.
- (2) Remove the ECU cover.



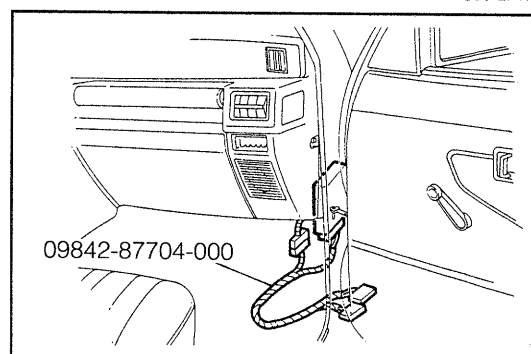
WRU90-EF176

- (3) Connect the following SST between the ECU and the engine wire.
SST: 09842-87704-000

NOTE:

Before connecting the SST, ensure that no open wire or short exists between the terminals.

- (4) Reconnect the battery ground cable to the negative (-) terminal of the battery.



WRU90-EF177

- (5) Start the engine. Ensure that the specified voltage is applied between the SST terminals ⑮ and ③⑨ (negative) when the cooling water temperature is below 40°C (104°F).

Specified Voltage: About battery voltage

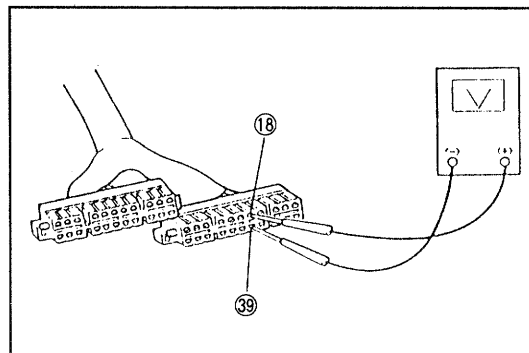
Check the wiring from the battery to the ECU terminal ③⑧ if the measured value is less than the specified voltage.

If no abnormality exists in the wiring, proceed to the ECU check. (See page EF-84.)

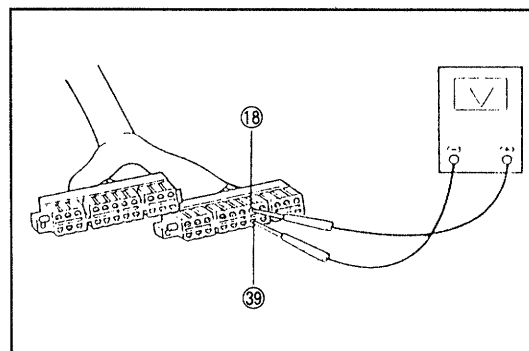
- (6) Warm up the engine until the cooling water temperature becomes above 40°C (104°F).
(7) Ensure that the specified voltage is applied between the SST terminals ⑮ and ③⑨ (negative).

Specified Voltage: 3 V or less

If the measured value exceeds the specified voltage, Proceed to the ECU check. (See page EF-84.)



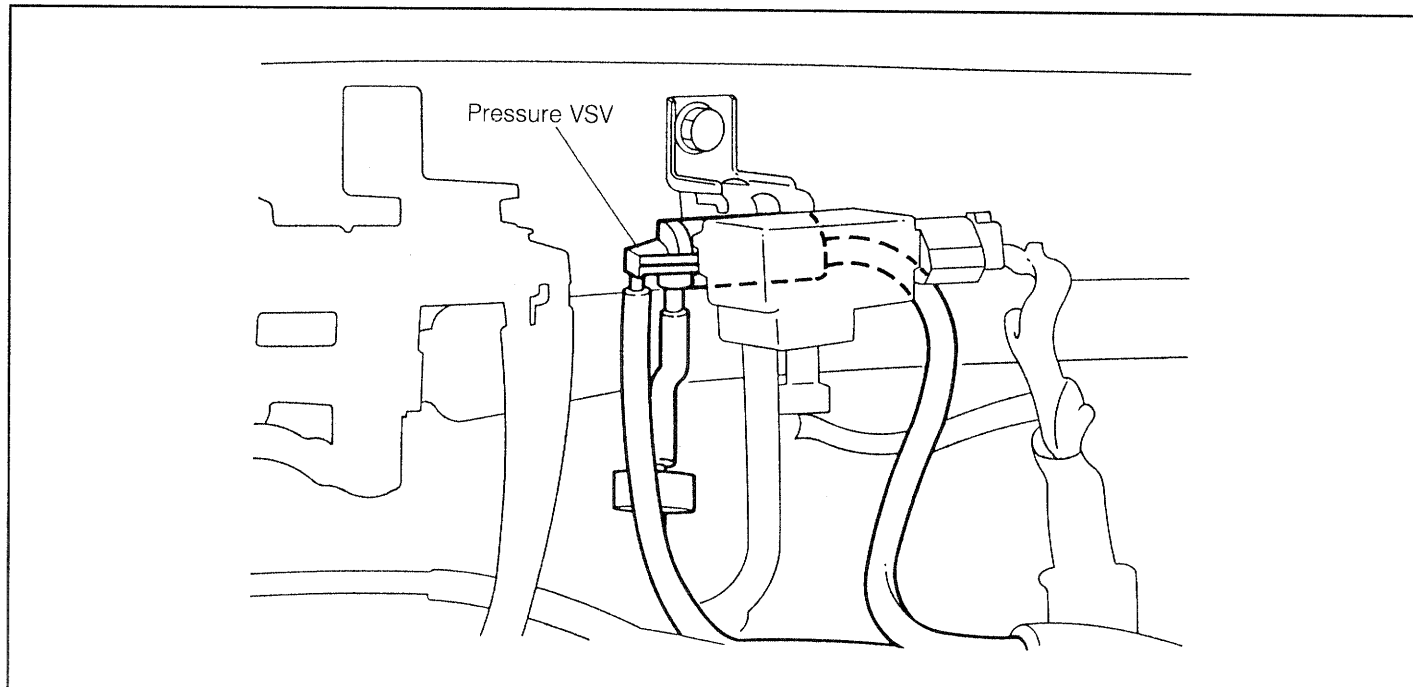
WRU90-EF178



- (8) Turn OFF the ignition switch.
(9) Disconnect the battery ground cable from the negative (-) terminal of the battery.
(10) Remove the SST by disconnecting the ECU and engine wire connectors of the SST.
(11) Connect the engine wire to the ECU.
(12) Install the ECU cover to the cowl panel.
(13) Reconnect the ground cable terminal to the negative (-) terminal of the battery.

WRU90-EF179

PRESSURE VSV

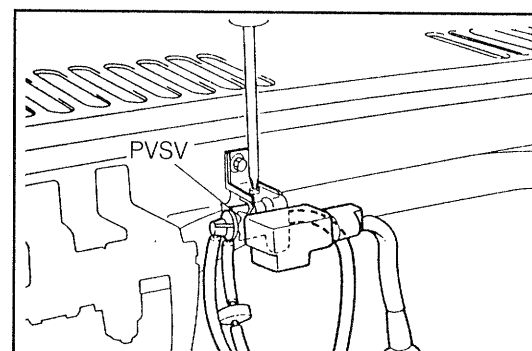


WRU90-EF180

INSPECTION OF PRESSURE VSV

1. Unit inspection of pressure VSV

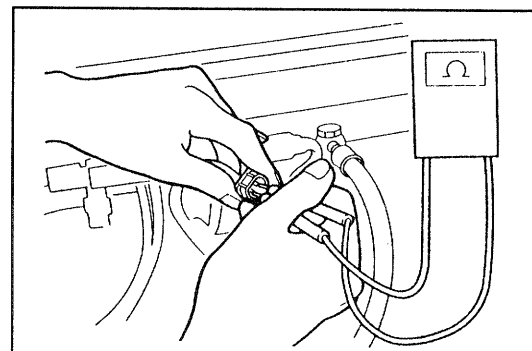
- (1) Detach the pressure VSV from the bracket, disconnect the connector and vacuum hoses that have been connected to the pressure VSV.



WRU90-EF181

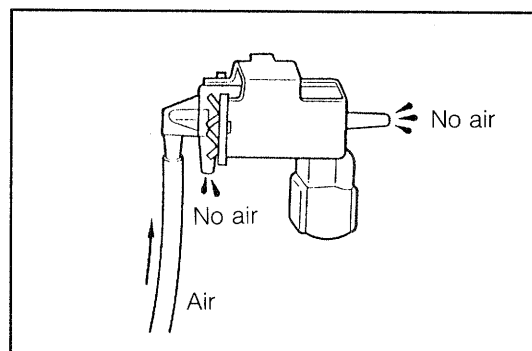
- (2) Check that the resistance between the terminals of the VSV conforms to the specification.
Specified Resistance: 20 - 60 Ω

Replace the VSV with a new part if the resistance does not conform to the specification.



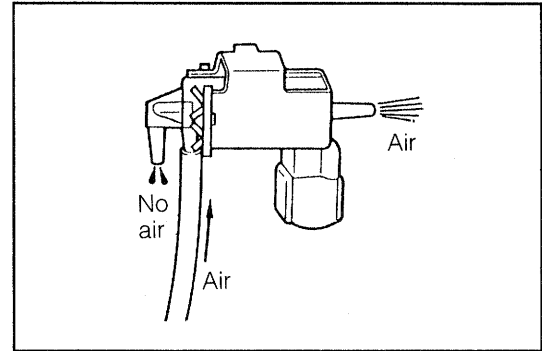
WRU90-EF182

- (3) Connect a suitable rubber hose to the VSV as shown in the right figure. Ensure that no air continuity exists. Replace the VSV with a new part if air continuity exists.



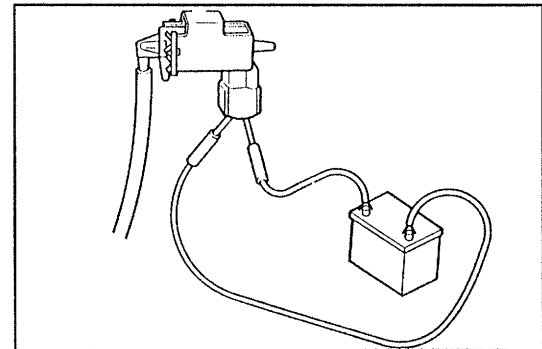
WRU90-EF183

- (4) Connect a suitable rubber hose to the VSV as shown in the right figure. Ensure that air continuity exists. Replace the VSV with a new part if no air continuity exists.



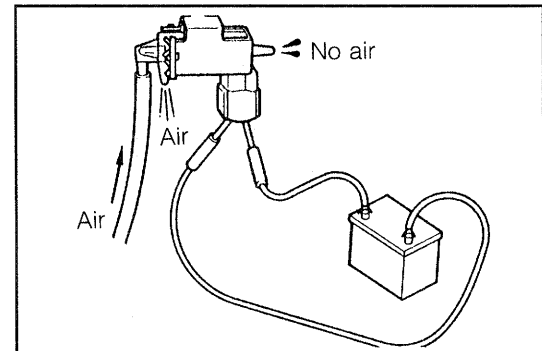
WRU90-EF184

- (5) Apply the battery voltage to the pressure VSV as shown in the right figure.



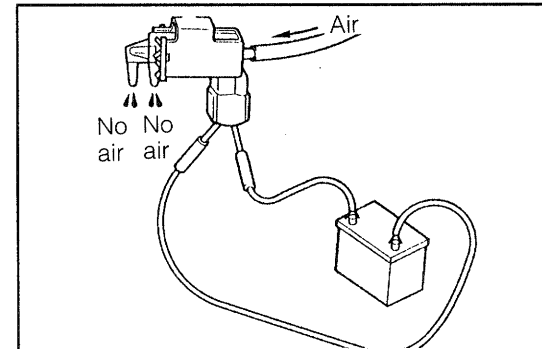
WRU90-EF185

- (6) Connect a suitable rubber hose to the pressure VSV as shown in the right figure. Ensure that air continuity exists. Replace the VSV with a new part if no air continuity exists.



WRU90-EF186

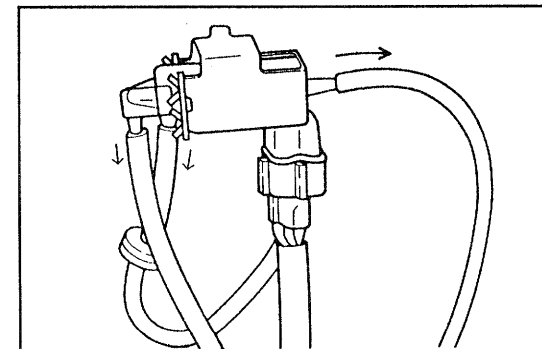
- (7) Connect a suitable rubber hose to the pressure VSV as shown in the right figure. Ensure that no air continuity exists. Replace the VSV with a new part if air continuity exists.
- (8) Remove the battery voltage being applied to the VSV.
- (9) Connect the disconnected vacuum hoses and connector.



WRU90-EF187

2. Inspection of pressure VSV system

- (1) With the ignition switch turned OFF, disconnect the vacuum hoses which have been connected to the pressure VSV.



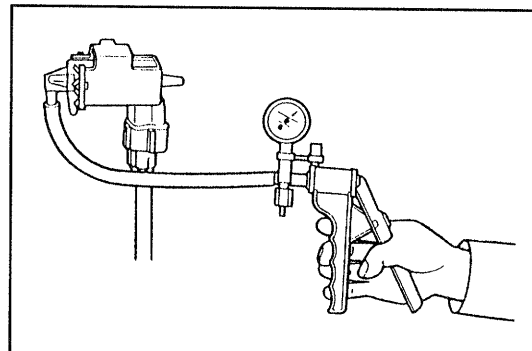
WRU90-EF188

- (2) Connect a MityVac (vacuum pump) as shown in the right figure. Apply a negative pressure of 200 mmHg (7.87 inchHg).
- (3) Ensure that the negative pressure which was applied in the step (2) becomes zero when the ignition switch turned ON.

Check the wiring from the battery to the ECU terminal ③⑧ if the negative pressure does not become zero.

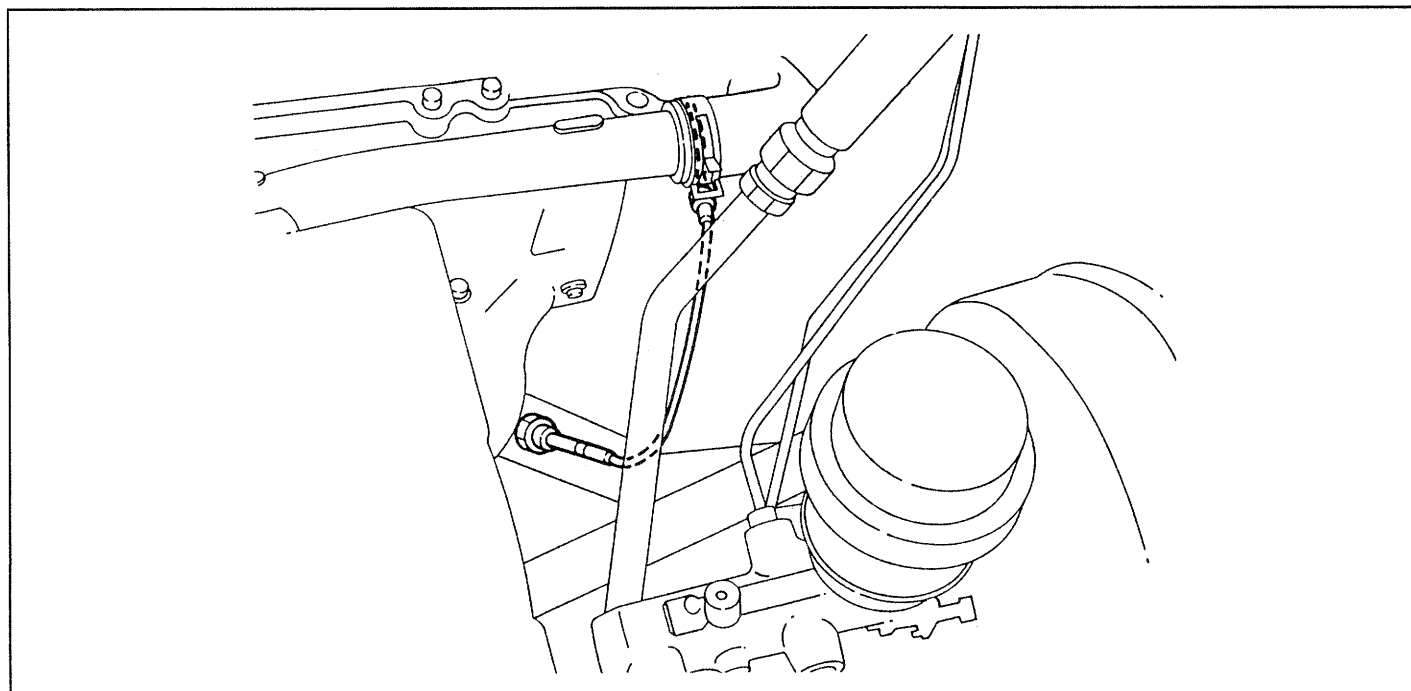
If no abnormality exists in the wiring, proceed to the ECU check. (See page EF-84.)

- (4) Remove the MityVac. Connect the vacuum hose to the pressure VSV.



WRU90-EF189

OXYGEN SENSOR



WRU90-EF190

Inspection of oxygen sensor

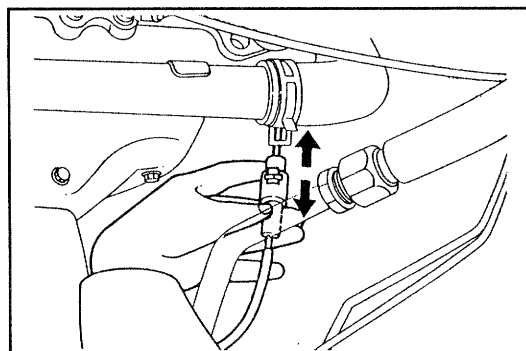
1. Unit inspection of oxygen sensor
 - (1) Disconnect the oxygen sensor connector.

WARNING:

Do not attempt this operation unless the engine has been cooled.

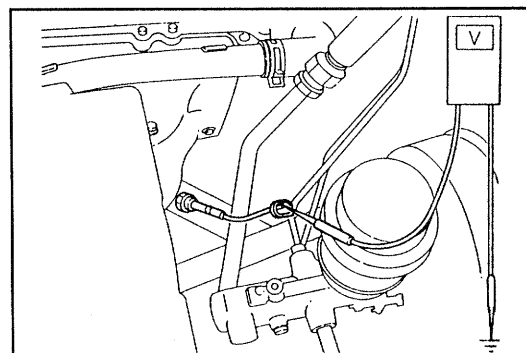
CAUTION:

Securely tie the disconnected connector to safety position with the string.



WRU90-EF191

- (2) Start and warm up the engine completely.
- (3) Connect a voltmeter to the connector of the oxygen sensor.
- (4) Depress the accelerator pedal. At this time, ensure that the reading of the voltmeter is 0.45 V or more. Replace the oxygen sensor with a new part if the reading is not 0.45 V or more.
- (5) Remove the voltmeter from the oxygen sensor connector. Reconnect the connector. Install the connector to the clamp.

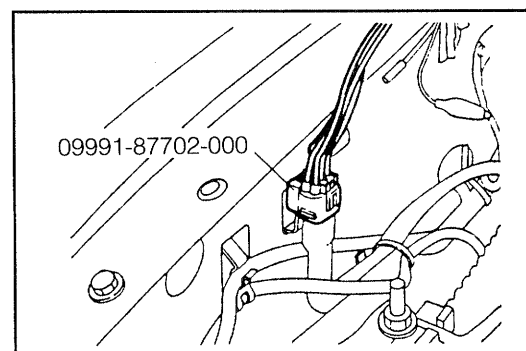


WRU90-EF192

WARNING:

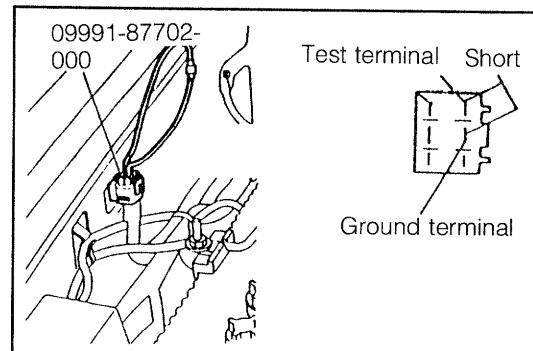
Be very careful not to scald your hand.

2. System inspection of oxygen sensor
 - (1) Remove the cap of the check connector. Connect the following SST to the check connector.
SST: 09991-87702-000



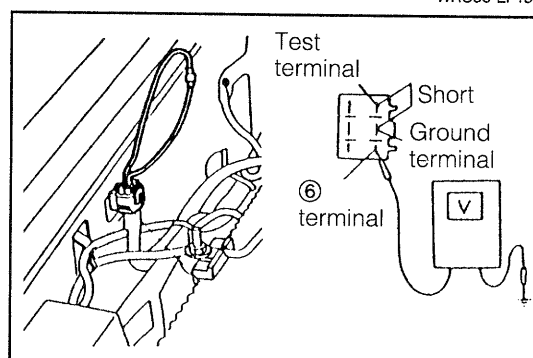
WRU90-EF193

- (2) Start and warm up the engine completely.
- (3) Connect the test terminal (brown) of the SST to the ground terminal (black).



WRU90-EF194

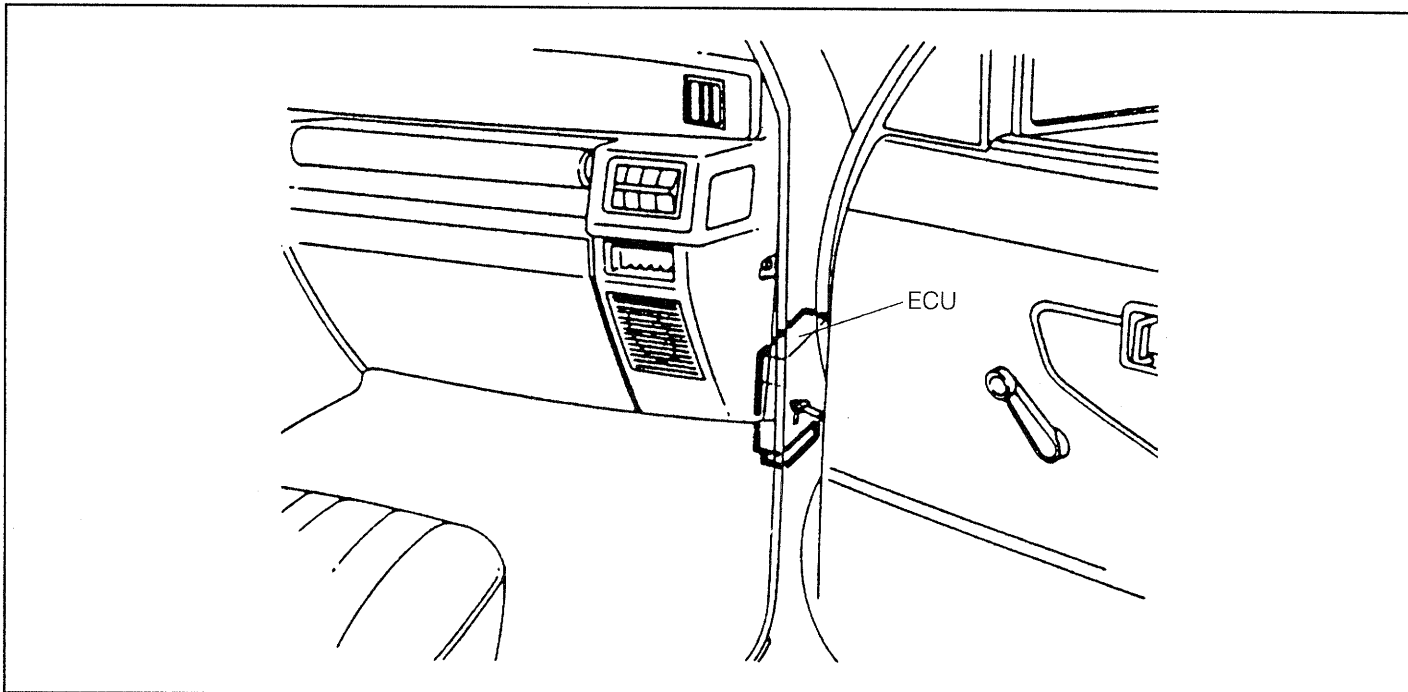
- (4) Connect a voltmeter to the output terminal (green) of the SST.



- (5) Hold the engine speed at 3000 rpm.
- (6) After a lapse of 2 minutes, ensure that the reading of the voltmeter connected in the step (4) changes eight times or more for 10 seconds.
If the change in voltage fails to occur eight times or more, check the diagnosis code. Replace the oxygen sensor if no malfunction code is memorized.
- (7) Stop the engine.
- (8) Remove the SST which was connected to the check connector. Attach the cap to the check connector.

WRU90-EF195

ELECTRONIC CONTROL UNIT (ECU)



WRU90-EF196

INSPECTION OF ECU

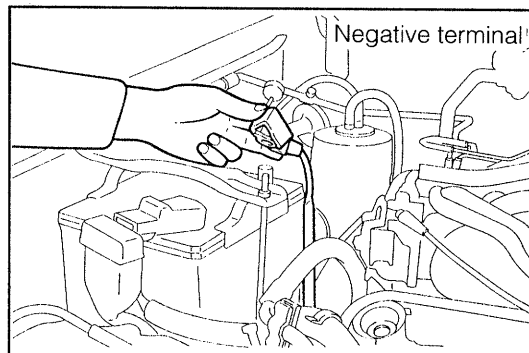
1. Measurement of ECU input/output voltage

NOTE:

- The wiring circuit of the EFI can be checked by measuring the voltage and resistance at the ECU connector terminals.
- The measurement of voltage should be conducted while all of the connectors are connected.
- Make sure that the battery voltage is 11 V or more when the ignition switch is turned ON.

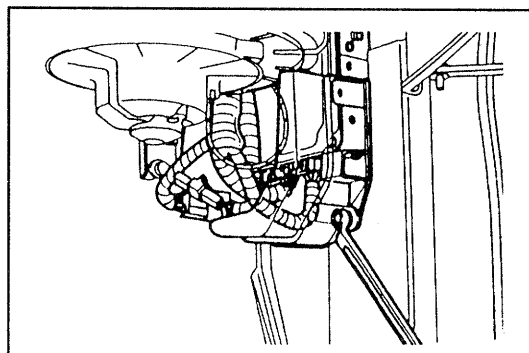
- (1) Disconnect the battery ground cable from the negative terminal (-) of the battery.

WRU90-EF197



WRU90-EF198

- (2) Remove the ECU cover.



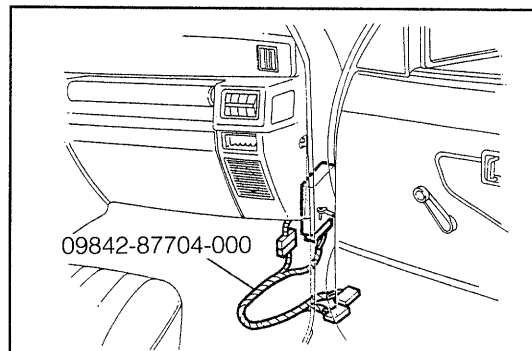
WRU90-EF199

- (3) Connect the following SST between the ECU and the engine wire.

SST: 09842-87704-000

NOTE:

Before the SST is connected, make sure that no open wire and/or no short exists between the SST terminals.



WRU90-EF200

- (4) Connect the battery ground cable to the negative (-) terminal of the battery.

- (5) Measure the voltage between the terminals under each condition shown in the table below.

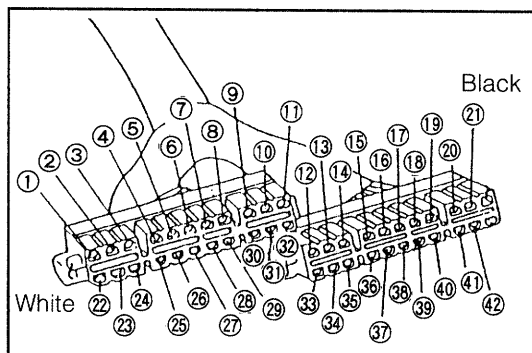
Replace the ECU if the engine shows abnormality despite the fact that all measured results are normal.

If the measured results are abnormal, check the malfunctioning system. Repair or replace the malfunctioning part.

Replace the ECU if no abnormality exists in the wiring system.

NOTE:

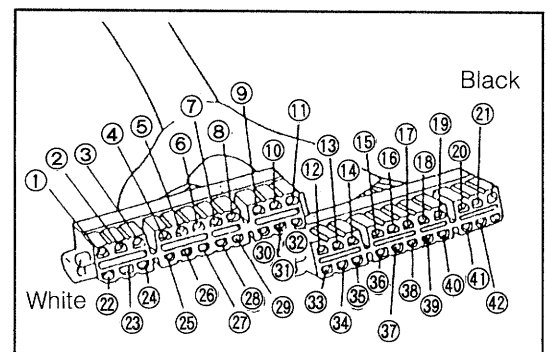
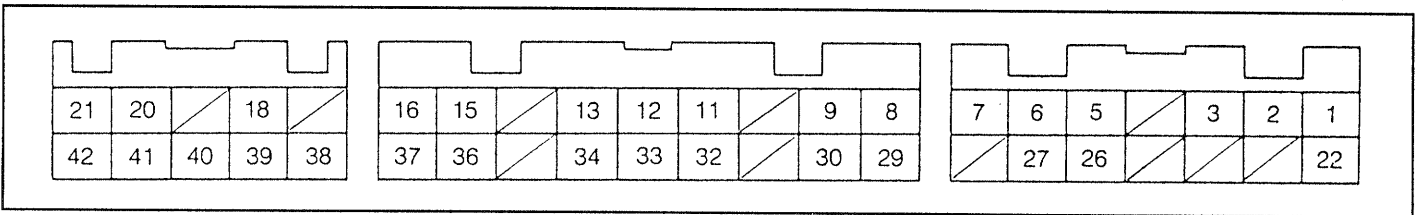
The measurement should be carried out at the measuring terminals of the SST.



WRU90-EF201

Table Showing ECU Connections

Terminal code	Contents of connection	Terminal code	Contents of connection
1	Main relay (Power supply)	22	Main relay (Power supply)
2	Battery (Backup power supply)	23	
3	Ignition coil primary voltage	24	
4		25	
5	Pressure sensor power supply	26	Oxygen sensor
6	Pressure sensor	27	Intake air temperature sensor
7	Cooling water temperature sensor	28	
8	Vehicle speed sensor	29	Operation system ground (Engine)
9	Electrical load (Headlamp and defogger)	30	Electrical load (Blower fan)
10		31	
11	Check connector (Test terminal)	32	Throttle position switch (Power switch)
12	Throttle position switch (Idle switch)	33	Stop lamp
13	Starter	34	Air conditioner magnet switch
14		35	
15	Oxygen sensor feedback check terminal	36	Operation system ground
16	Check engine lamp	37	Fuel pump relay
17		38	Pressure VSV
18	EGR VSV	39	System ground
19		40	Idle speed control VSV
20	Injector	41	Injector
21	Actuator drive ground (Engine)	42	Actuator drive ground (Engine)



Voltages at ECU connectors

Terminals	STD Voltage	Condition		See page
① — ③⑨	Approx. battery voltage	Ignition switch ON		EF-39
② — ③⑨	Approx. battery voltage	At all time		EF-39
③ — ③⑨	Approx. battery voltage	Ignition switch ON	When engine is stopped:	EF-44
⑤ — ③⑥	4.5 - 5.5 V	Ignition switch ON		EF-42
⑥ — ③⑨	3.2 - 4.0 V	Ignition switch ON	When atmospheric pressure of 760 mmHg (29.9 inchHg) exists.	EF-42
⑦ — ③⑨	0.4 - 0.65 V	Ignition switch ON	When cooling water temperature is 80°C (176°F):	EF-45
⑧ — ③⑨	0 - Approx. battery voltage	Ignition switch ON	Measured voltage changes when vehicle is moved 1.5 m (4.93 ft).	EF-51
⑨ — ③⑨	Less than 5.0 V	Ignition switch ON	When defogger and headlamp switches are turned OFF:	EF-70
	Approx. battery voltage	Ignition switch ON	When defogger and/or headlamp switches are turned ON:	
⑪ — ③⑨	Approx. battery voltage	Ignition switch ON	When test terminal of check connector is not connected with ground terminal:	—
	Less than 1.0 V	Ignition switch ON	When test terminal of check connector is connected with ground terminal:	—
⑫ — ③⑨	Less than 5.0 V	Ignition switch ON	Throttle valve fully closed	EF-47
	Approx. battery voltage	Ignition switch ON	Throttle valve fully opened	
⑬ — ③⑨	0 V	Ignition switch ON		EF-52
	More than 6 V	When ignition switch is set to ST position:		
⑮ — ③⑨	Measured voltage changes at a point between 0 - 5.0 V.	After warming up engine completely, connect test terminal of check connector with ground terminal. Hold engine revolution speed at 3000 rpm for two minutes.		EF-82
⑯ — ③⑨	Less than 3.0 V	Ignition switch ON	<ul style="list-style-type: none">• Engine is stopped.• When check engine lamp is illuminated:	EF-33
	Approx. battery voltage	Ignition switch ON	<ul style="list-style-type: none">• After engine starts:• When check engine lamp is extinguished:	

WRU90-EF203

EFI SYSTEM

Terminals	STD Voltage	Condition		See page
⑮ — ③⑨	Approx. battery voltage	Ignition switch ON	<ul style="list-style-type: none"> After engine starts: Cooling water temperature is below 40°C (104°F). 	EF-76
	Less than 3.0 V	Ignition switch ON	<ul style="list-style-type: none"> After engine starts: Cooling water temperature is above 41°C (106°F). 	
⑳ — ③⑨	Less than 1.0 V	At least 30 seconds have elapsed after turning OFF ignition switch.		EF-57
	Approx. battery voltage	Ignition switch ON	<ul style="list-style-type: none"> Engine is stopped. 	
㉑ — ③⑨	Less than 0.01 V	Ignition switch ON		—
㉒ — ③⑨	Approx. battery voltage	Ignition switch ON		EF-56
㉔ — ③⑨	Change in output voltage	Ignition switch ON	After warming up engine completely, hold engine revolution speed at 3000 rpm for two minutes.	EF-82
㉗ — ③⑨	1.5 - 3.0 V	Ignition switch ON	Air temperature inside intake manifold is 20°C(68°F);	EF-63
㉙ — ③⑨	Less than 0.1 V	Ignition switch ON		—
③⑩ — ③⑨	Approx. battery voltage	Ignition switch ON	<ul style="list-style-type: none"> Blower fan switch turned OFF 	EF-70
	Less than 2.0 V	Ignition switch ON	When blower fan switch turned ON:	
③⑫ — ③⑨	Approx. battery voltage	Ignition switch ON	Throttle valve fully closed	EF-65
	Less than 5.0 V	Ignition switch ON	Throttle valve fully opened	
③③ — ③⑨	Less than 1.0 V	Ignition switch ON	When brake pedal is not depressed:	—
	Approx. battery voltage	At all time	When brake pedal is depressed:	—

WRU90-EF204

Terminals	STD Voltage	Condition		See page
③④ — ③⑨	Less than 1.0 V	Ignition switch ON	When compressor magnet switch of air conditioner is turned OFF:	EF- 53
	Approx. battery voltage	Ignition switch ON	When compressor magnet switch of air conditioner is turned ON:	
③⑥ — ③⑨	Less than 0.1 V	Ignition switch ON		—
③⑦ — ③⑨	Approx. battery voltage	Ignition switch ON	When fuel pump is stopped:	EF- 58
	Less than 2.0 V	Ignition switch ON	When fuel pump is operating:	
③⑧ — ③⑨	Approx. battery voltage	Ignition switch ON	When pressure VSV is turned OFF:	EF- 67
	Less than 3.0 V	Ignition switch ON	For 0.5 second immediately after engine starts	
③⑨ — Engine ground	Less than 0.1 V	Ignition switch ON		—
④① — ③⑨	Less than 3.0 V	Ignition switch ON	Engine is stopped.	EF- 79
	Approx. battery voltage	Ignition switch ON	When test terminal of check connector is connected with ground terminal:	
④① — ③⑨	Less than 1.0 V	At least 30 seconds have elapsed after turning OFF ignition switch.		EF-115
	Approx. battery voltage	Ignition switch ON	Engine is stopped.	
④② — ③⑨	Less than 0.1 V	Ignition switch ON		—

- (6) Turn OFF the ignition switch.
- (7) Disconnect the battery ground cable from the negative (–) terminal of the battery.
- (8) Remove the SST by disconnecting the ECU and engine wire connectors of the SST.
- (9) Reconnect the engine wire to the ECU.
- (10) Install the ECU cover to the cowl panel.
- (11) Reconnect the ground cable terminal to the negative (–) terminal of the battery.

WRU90-EF205

2. Measurement of resistance of sensor circuits

CAUTION:

- Be sure to conduct the voltage measurement at the SST terminals.
- The resistance measurement should be conducted with the connector of the ECU disconnected.

(1) Disconnect the battery ground cable from the negative (–) terminal of the battery.

(2) Remove the ECU cover.

(3) Disconnect the engine wire connectors of the ECU.

(4) Connect the following SST to the engine wire connectors.

SST: 09842-87704-000

NOTE:

Do not connect the SST to the ECU side.

(5) Measure the resistance between the terminals shown in the table under each condition.

Replace the ECU if the engine is abnormal despite the fact that the measurement results are normal.

If the measurement results are abnormal, check the malfunctioning system. Repair or replace the malfunctioning part.

NOTE:

As for the ECU terminal connection table, refer to page EF–86.

WRU90-EF206

Terminals	STD Voltage	Condition	See page
⑦ — ⑳	0.322 ± 0.1	When cooling water temperature is 80°C (176°F):	EF–60
⑫ — ㉓	Less than 29	Throttle valve fully closed	EF–65
	More than 1000	Throttle valve fully opened	
㉗ — ㉙	2.45 ± 0.5	When air temperature inside intake manifold is 20°C (68°F):	EF–63
㉚ — ㉜	More than 1000	Throttle valve fully closed	EF–65
	Less than 29	Throttle valve fully opened	

(6) Disconnect the SST connectors from the engine wire.

(7) Connect the engine wire connectors to the ECU.

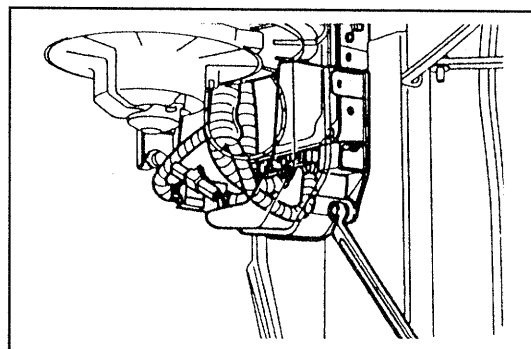
(8) Install the ECU cover to cowl panel.

(9) Reconnect the ground cable terminal to the negative (–) terminal of the battery.

WRU90-EF207

REMOVAL/INSTALLATION OF ECU

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.
2. Remove the ECU cover.
3. Disconnect the engine wire connectors from the ECU.



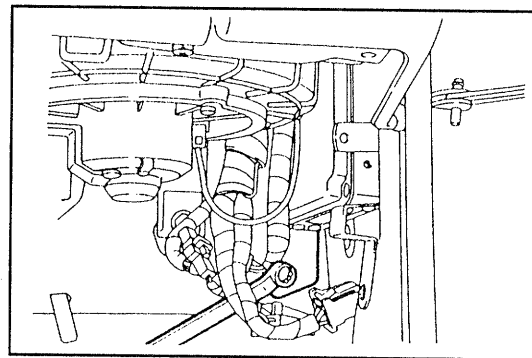
WRU90-EF208

4. Remove the ECU from the instrument panel by removing the attaching screws.
5. Install a new ECU to the instrument panel.

CAUTION:

Do not touch the bracket screws mounted on the ECU proper.

This tampering will cause an ECU malfunction.



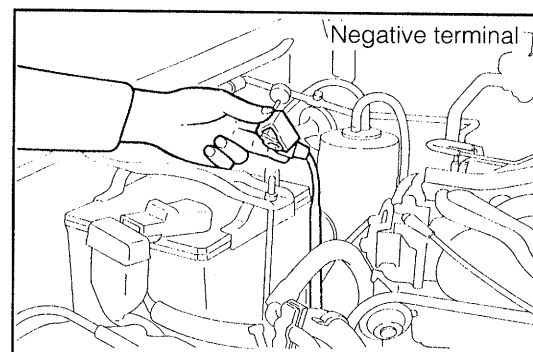
6. Connect the engine wire connectors to the ECU.
7. Install the ECU cover to the cowl panel.
8. Connect the ground cable terminal to the negative (-) terminal of the battery.

WRU90-EF209

FUEL CUT RPM

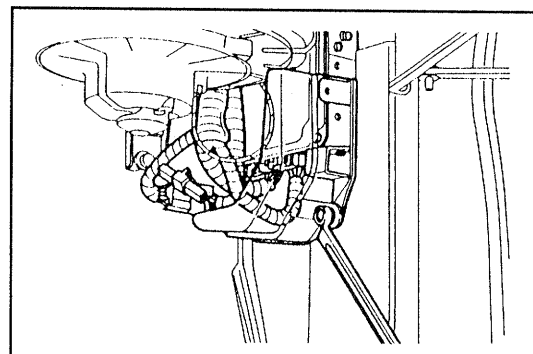
INSPECTION OF FUEL CUT RPM

1. Disconnect the battery ground cable from the negative (-) terminal of the battery.



WRU90-EF210

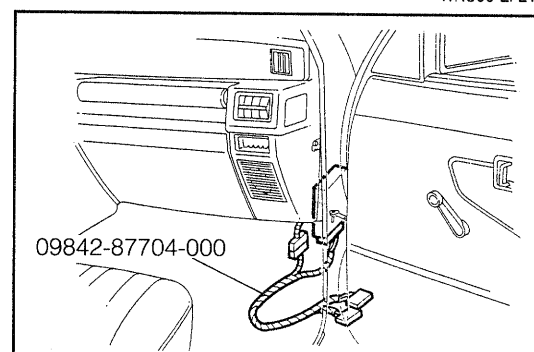
2. Remove the ECU cover.



WRU90-EF211

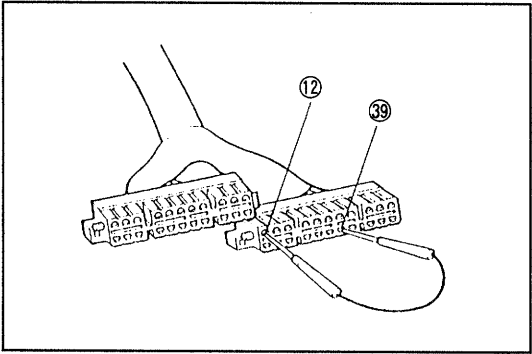
3. Connect the following SST between the ECU and the engine harness.

SST: 09842-87704-000



WRU90-EF212

4. Connect the SST terminals ⑫ and ③⑨.



5. Connect the battery ground cable to the negative (–) terminal of the battery.
6. Start and warm up the engine fully.

WRU90-EF213

7. After the engine has been warmed up completely, increase the engine revolution speed gradually. Ensure that the change in the engine revolution speed occurs between the fuel cut revolution speed and the fuel return revolution speed.

Fuel cut revolution speed (rpm)	AC OFF	1650
	AC ON	2300
Fuel return revolution speed (rpm)	AC OFF	1300
	AC ON	1600

WRU90-EF214

8. Turn OFF the ignition switch.
9. Disconnect the battery ground cable from the negative (–) terminal of the battery.
10. Remove the SST by disconnecting the ECU and engine wire connectors of the SST.
11. Reconnect the engine wire to the ECU.
12. Install the ECU cover to the cowl panel.
13. Reconnect the ground cable terminal to the negative (–) terminal of the battery.

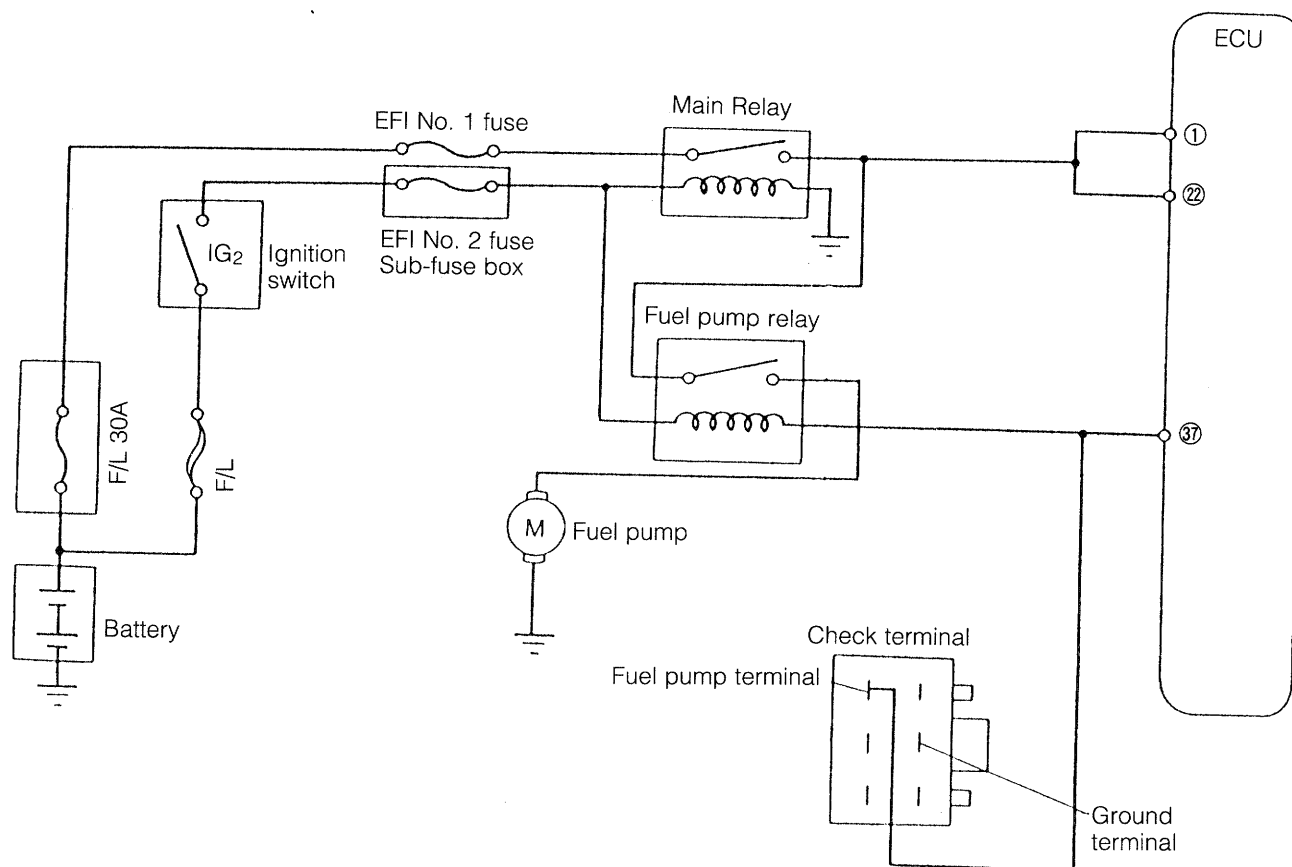
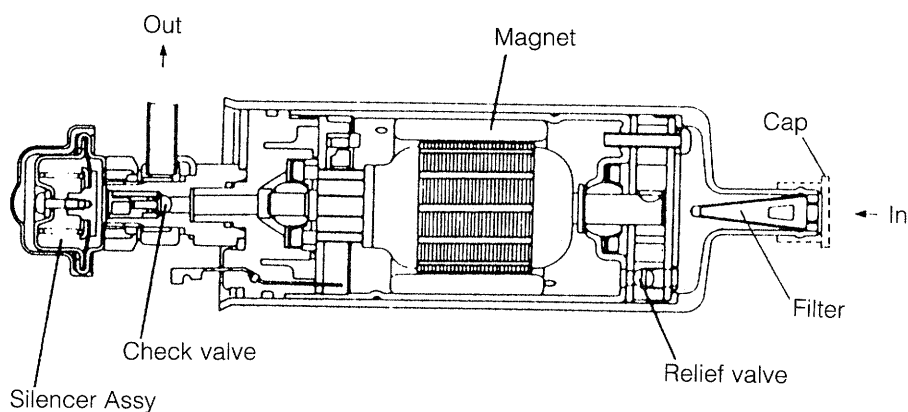
WRU90-EF215

FUEL SYSTEM

FUEL PUMP

WARNING:

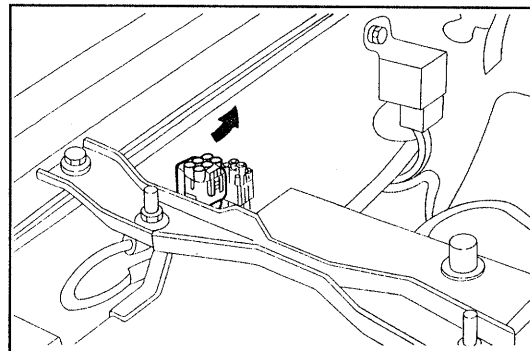
When working on the fuel system, never smoke nor allow any open flame to be brought near the working site.



IN-VEHICLE INSPECTION

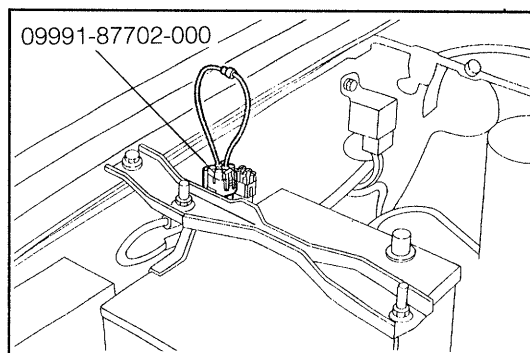
Check of fuel pump operation

1. Connection of SST (09991-87702-000)
 - (1) Detach the check connector cap.



WRU90-EF217

- (2) Connect the SST to the check connector. Connect the SST terminal F (white/black) to the ground terminal (black).

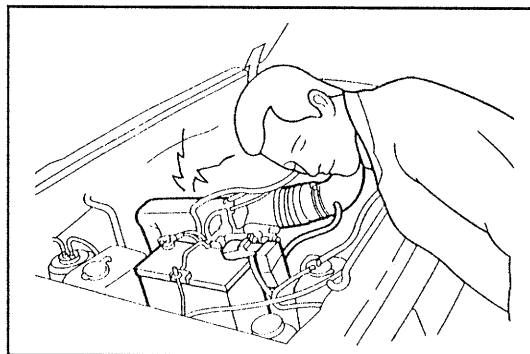


WRU90-EF218

2. Check of fuel flowing sound
 - (1) Turn ON the ignition key switch.

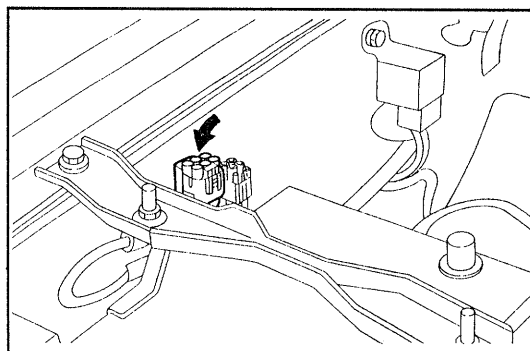
WRU90-EF219

- (2) Check to see if you can hear fuel flowing sound around the pressure regulator.
 - (3) If you can hear no fuel flowing sound, check the following parts. Repair them, as required.
 - Fusible links
 - Fuses
 - Main relay
 - Fuel pump
 - Wiring and wiring connections



WRU90-EF220

3. SST Removal
 - (1) Turn OFF the ignition switch.
 - (2) Remove the SST from the check connector.
 - (3) Attach the cap on the check connector.



WRU90-EF221

Check of fuel pressure

1. Ensure that the battery voltage is 12 volts or more.
2. Disconnect the ground cable terminal from the negative (-) terminal of the battery.
3. Place a suitable container or cloth, etc. under the fuel filter.

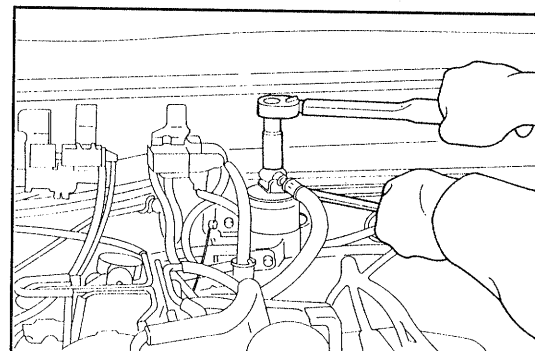
WRU90-EF222

4. Loosen the union bolt gradually.

CAUTION:

The fuel pressure at the inside of the fuel line is approximately 2.55 kg/cm^2 (36.3 psi) higher than the atmospheric pressure. Hence, be sure to gradually loosen the union bolt so as to prevent fuel from splashing.

Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the fuel filter so that no fuel may get to the resin or rubber parts of the vehicle.

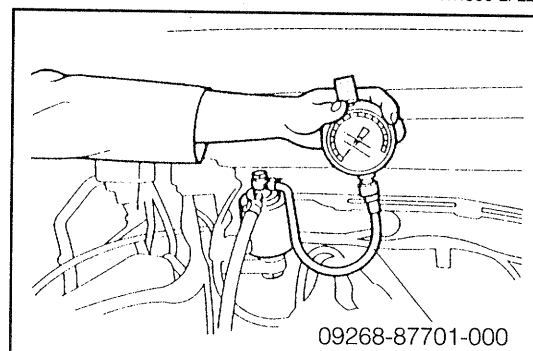


WRU90-EF223

5. Install the SST (fuel pressure gauge) between the fuel hose No. 1 and the fuel filter by means of the union bolt with a new gasket interposed.

SST: 09268-87701-000

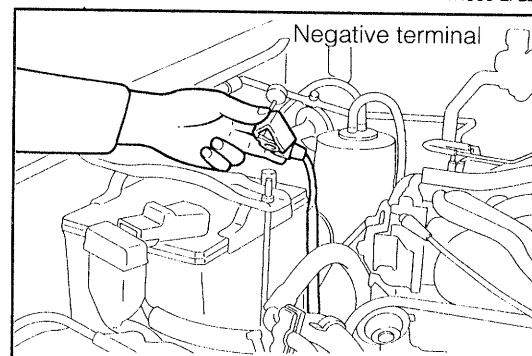
Tightening Torque: 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N·m)



09268-87701-000

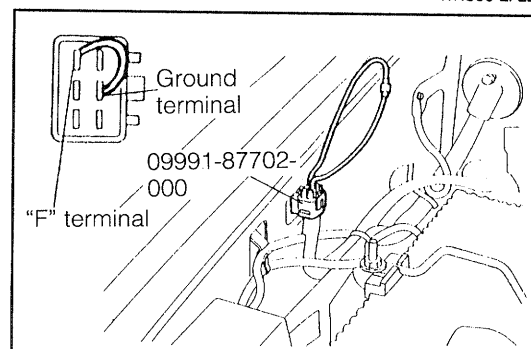
WRU90-EF224

6. Reconnect the ground cable terminal to the negative (-) terminal of the battery.



WRU90-EF225

7. Connection of SST (09991-87702-000)
 - (1) Remove the cap on the check terminal.
 - (2) Connect the SST to the check connector.
 - (3) Connect the SST terminal fuel pump (white/black) to the ground terminal (black).
8. Turn ON the ignition switch.



WRU90-EF226

9. Check to see if the fuel pressure conforms to the specified pressure.

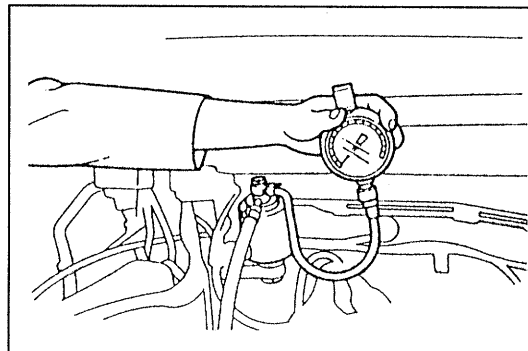
Specified Fuel Pressure: 2.3 - 2.8 kg/cm²
(33 - 40 psi)

If the fuel pressure is higher than the specified pressure, check and/or repair the following items.

- (1) Fuel return hose and/or pipe for restriction or damage.
- (2) Rubber hose connected between pressure regulator and surge tank for restriction.
- (3) If the check results of (1) and (2) are satisfactory, replace the pressure regulator. (See page EF-108.)

If the fuel pressure is lower than the specified pressure, check and/or repair the following items.

- (1) Fuel hose and/or pipe for restriction or damage or leakage.
- (2) Fuel filter for restriction. (See page EF-104.)
- (3) Check fuel flow rate. (See page EF-98.)
- (4) Pressure regulator. (See page EF-108.)



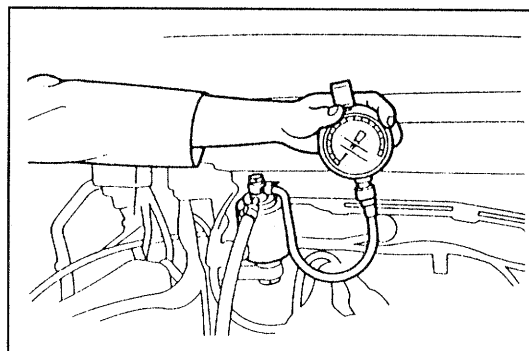
WRU90-EF227

10. Turn OFF the ignition switch. After a lapse of three minutes, check to see if the fuel pressure is the specified pressure or more.

Specified Fuel Pressure: 1.8 kg/cm² or more
(25.6 psi or more)

If the fuel pressure is lower than the specified pressure, check and/or repair the following items.

- (1) Injector (See page EF-115.)
- (2) Pressure regulator (See page EF-108.)
- (3) Fuel hose and/or pipe for damage or leakage.



WRU92-EF338

11. SST removal

- (1) Turn OFF the ignition key switch.
- (2) Disconnect the ground cable terminal from the negative terminal (-) of the battery.
- (3) Loosen the fuel filter union bolt gradually.

CAUTION:

The fuel pressure at the inside of the fuel line is approximately 2.5 atm. higher than the atmospheric pressure. Hence, be sure to gradually loosen the union bolt so as to prevent fuel from splashing. Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the fuel filter so that no fuel may get to the resin or rubber parts of the vehicle.

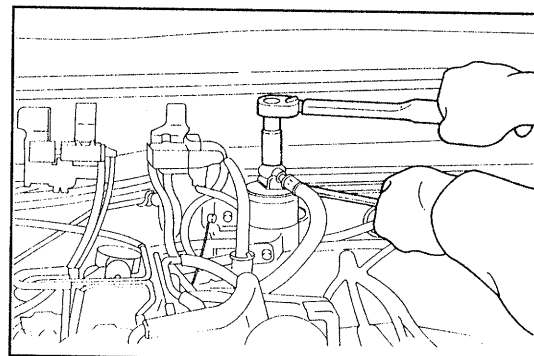
- (4) Remove the SST (fuel pressure gauge).

SST: 09268-87701-000

WRU90-EF229

- (5) Install the fuel hose No. 1 to the fuel filter by means of the union bolt with a new gasket interposed.

Tightening Torque: 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N·m)



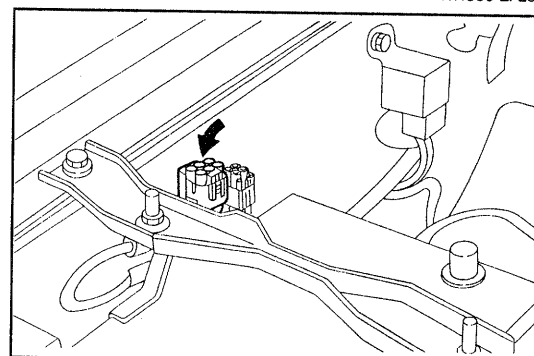
WRU90-EF230

- (6) Remove the SST from the check connector.

SST: 09991-87702-000

- (7) Attach the cap on the check connector.

- (8) Reconnect the ground cable terminal to the negative (-) terminal of the battery.



WRU90-EF231

12. Check of fuel leakage

Start the engine. Check to see if any fuel leakage is present. Repair any defective part if the fuel leakage exists.

WRU90-EF232

Check of fuel flow rate

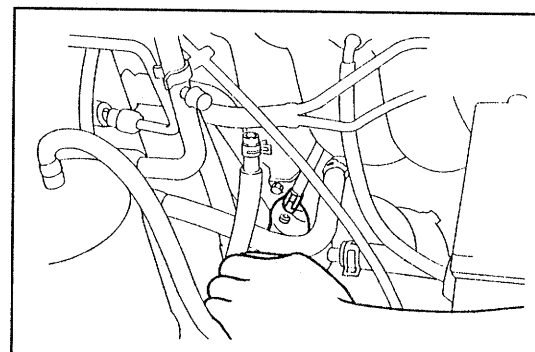
1. Ensure that the battery voltage is 12 volts or more.
2. Disconnect the ground cable terminal from the negative (-) terminal of the battery.
3. Place a suitable container or cloth, etc. under the pressure regulator.

WRU90-EF233

4. Disconnect the fuel return hose connected to the pressure regulator.

CAUTION:

- Release the inner pressure of the fuel tank by removing the fuel filler cap in advance.
- Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the pressure regulator so that no fuel may get to the alternator.

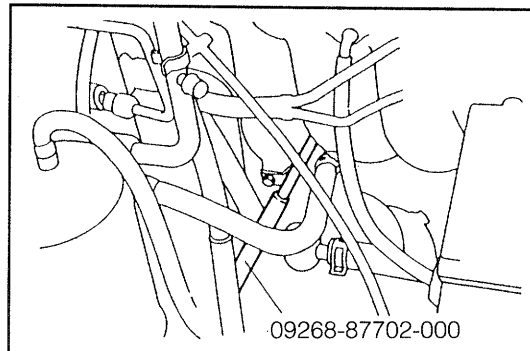


WRU90-EF234

5. Connect a suitable fuel hose (about 2 meter long) to the pressure regulator.

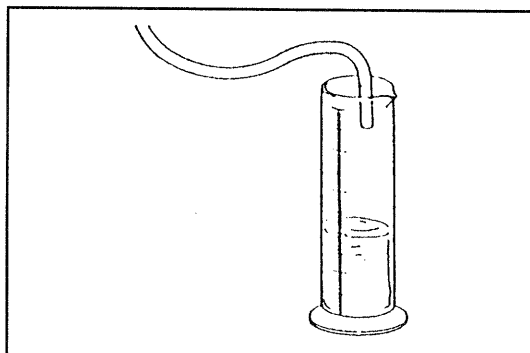
Reference:

This fuel hose is included in the SST (09268-87702-000).



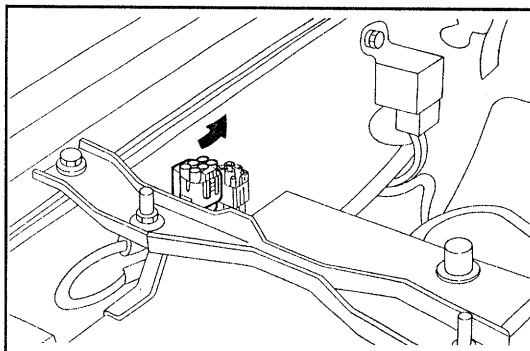
WRU90-EF235

6. Insert one end of the fuel hose in a measuring cylinder.



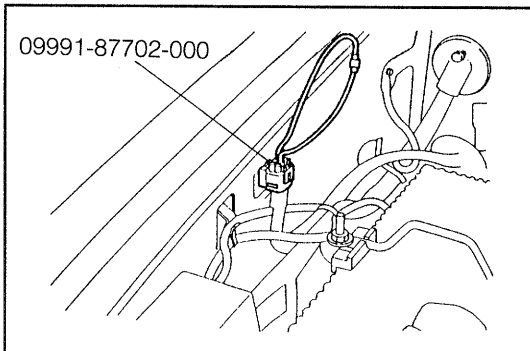
WRU90-EF236

7. Detach the check connector cap.



WRU90-EF237

8. Connect the SST (09991-87702-000) to the check connector. Connect the SST terminal F (White/Black) to the ground terminal (Black).
9. Connect the ground cable terminal to the negative (-) terminal of the battery.
10. Turn ON the ignition switch for 15 seconds. Then, turn OFF the switch.



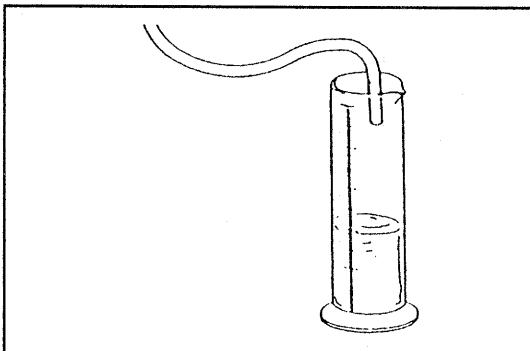
WRU90-EF238

11. Measure the amount of fuel collected in the measuring cylinder.

Specified Amount of Fuel: 235 cc or more
(14.34 cub inch or more)

If the fuel amount is less than the specified amount, check the fuel filter.

12. Disconnect the ground cable terminal from the negative (-) terminal of the battery.

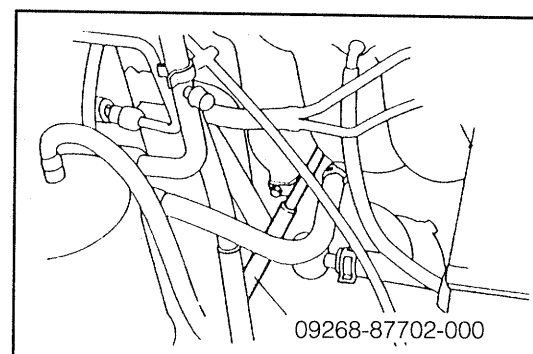


WRU90-EF239

13. Remove the SST (09991-87702-000) from the check connector.
14. Attach the cap on the check connector.

WRU90-EF240

15. Disconnect the fuel hose connected to the pressure regulator.

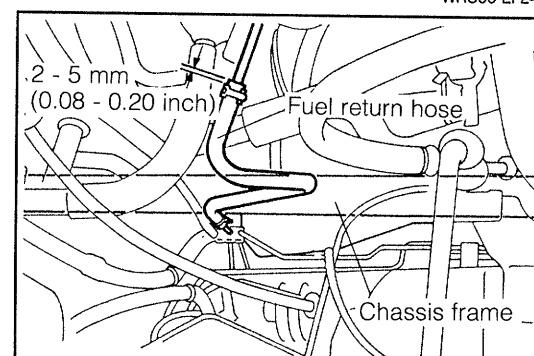


WRU90-EF241

16. Connection of fuel return hose to fuel pipe No. 2.
 - (1) Insert the fuel return hose to the fuel pipe No. 2 until second spool of fuel pipe.
 - (2) Securely clamp the fuel hose at 2 - 5 mm (0.08 - 0.20 inch) from fuel return hose end with new clip.

NOTE:

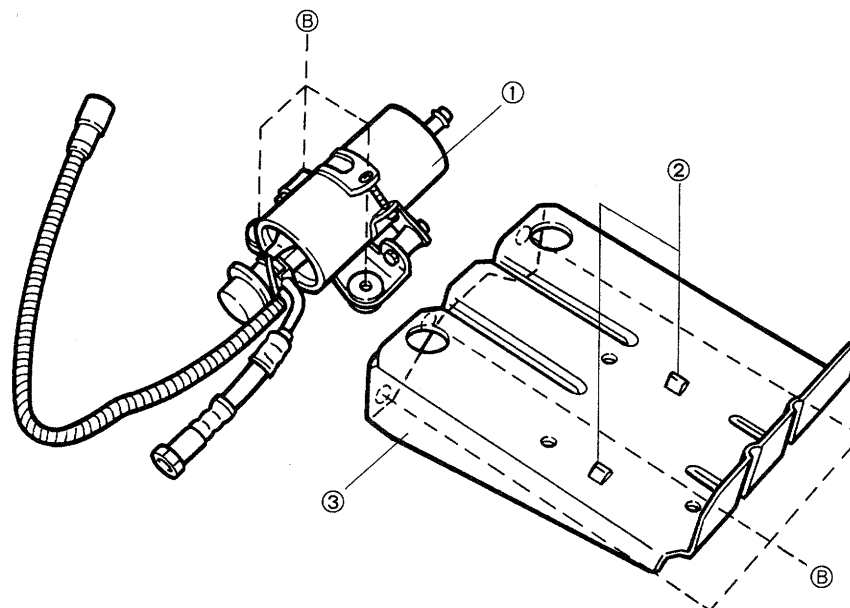
Install the fuel return hose in parallel with chassis frame.



WRU90-EF-242

17. Reconnect the ground cable terminal to the negative (-) terminal of the battery.
18. Start the engine. Check to see if any fuel leakage is present. Repair any defective part if fuel leakage exists.

REMOVAL OF FUEL PUMP



- ① Fuel pump Assy w/motor & bracket
- ② Cushion
- ③ Fuel pump bracket

WRU90-EF243

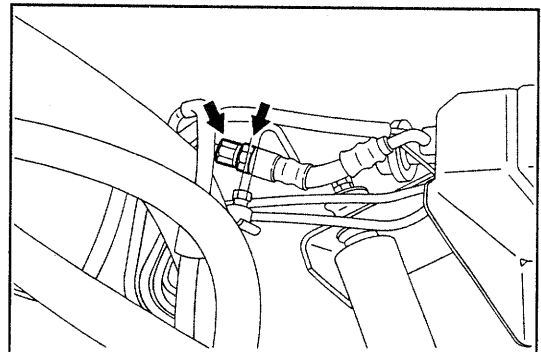
WARNING:

When working on the fuel system, never smoke nor allow any open flame to be brought near the working site.

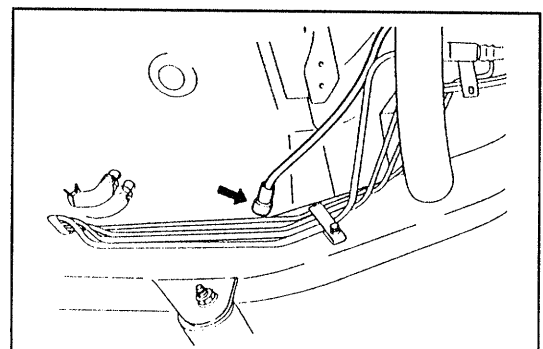
CAUTION:

- Release the inner pressure of the fuel tank by removing the fuel filler cap in advance.
- Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the fuel pump.

1. Disconnect the fuel hose front side from the fuel pump.
2. Disconnect the fuel pump coupler, and detach it from the under floor.



WRU90-EF244

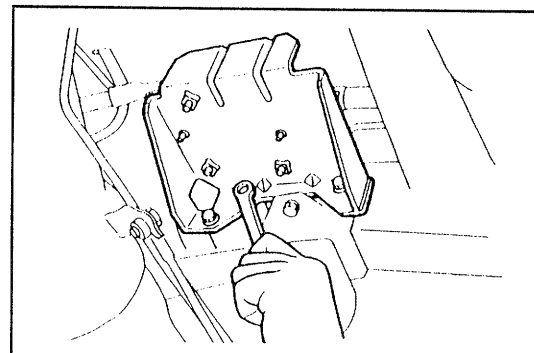


WRU90-EF245

3. Detach the fuel pump bracket by removing the three bolts.
4. Detach the fuel pump bracket from fuel pump by removing the three bolts.
5. Remove the fuel pump by disconnecting the fuel hose rear side.

NOTE:

- Place a suitable container or rags under the disconnecting portion because the fuel flows out.



WRU90-EF246

INSTALLATION OF FUEL PUMP

1. Connect the fuel hose rear side to the fuel pump.

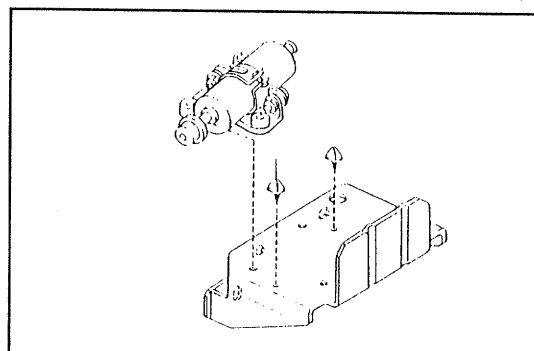
NOTE:

- Ensure that the filter is installed at the fuel pump inlet port.
- Ensure that the hose clamp is securely installed.

2. Install the fuel pump bracket to the fuel pump by tighten the three bolts.

NOTE:

Ensure that the two cushions are installed as correct position.



WRU90-EF247

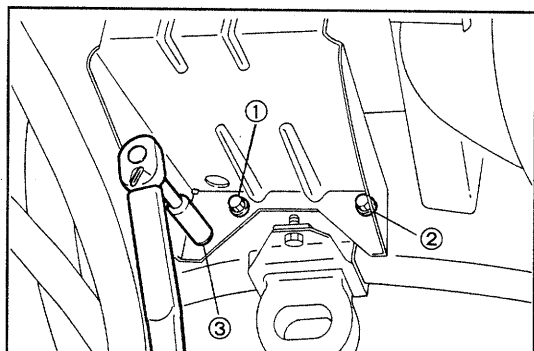
3. Installation of bracket

(1) Temporarily tighten bolt No. ①.

(2) Tighten the bolt No. ② and No. ③.

(3) Securely tighten the bolt No. ①.

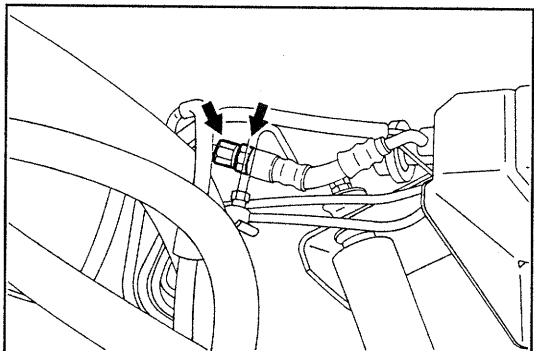
Tightening Torque: 1.0 - 1.6 kg-m
(7.2 - 11.6 ft-lb, 9.8 - 15.7 N-m)



WRU90-EF248

4. Connect the fuel hose front side to the fuel pump.

Tightening Torque: 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N-m)

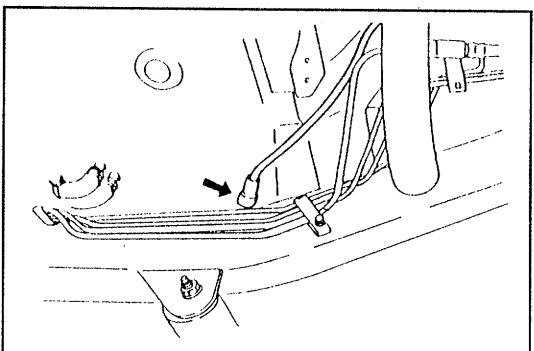


WRU90-EF249

5. Connect the fuel pump coupler.

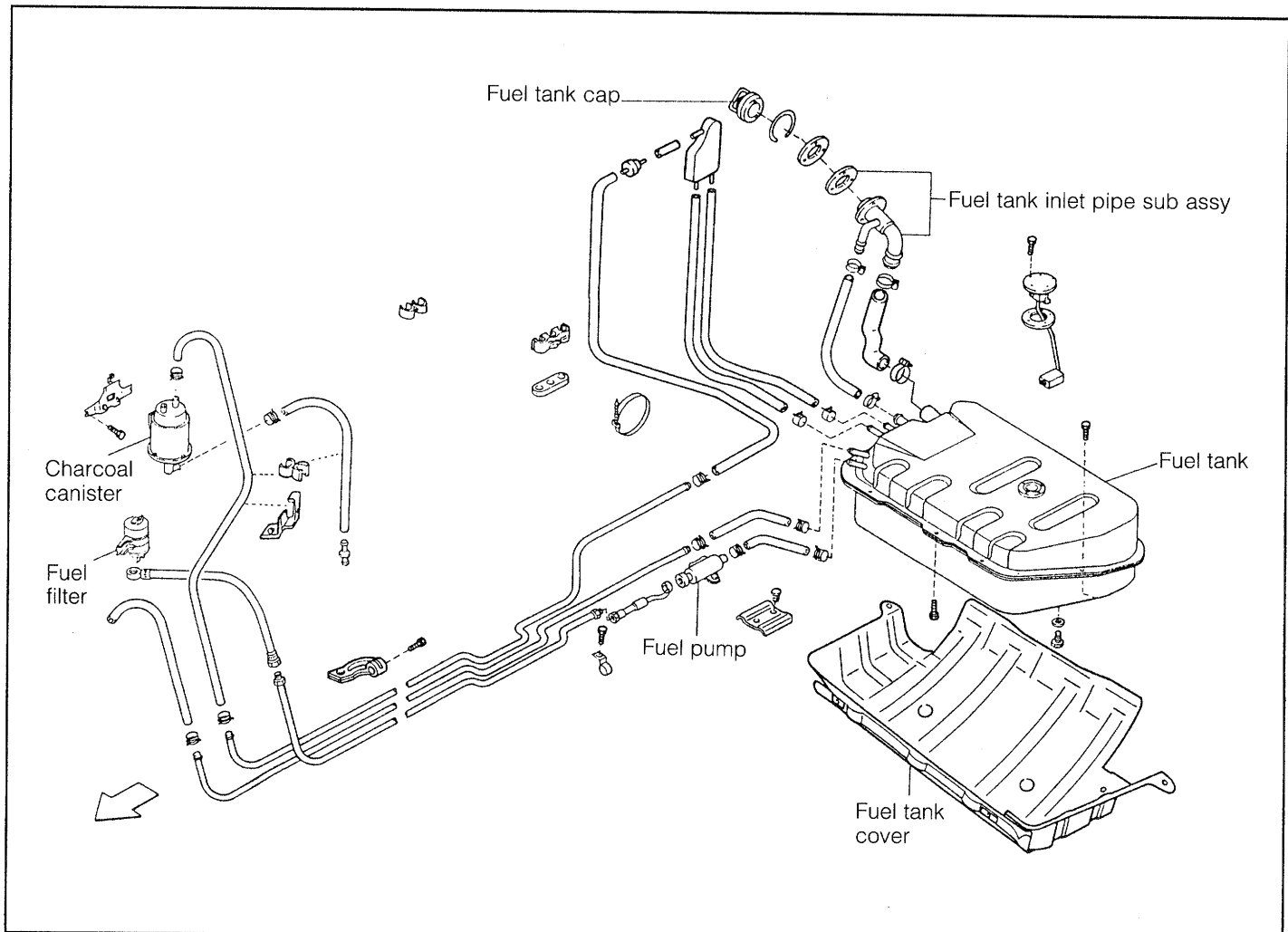
NOTE:

Ensure that the lead wire is clamped at two position.



WRU90-EF250

FUEL TANK AND LINE COMPONENTS



WRU90-EF251

PRECAUTIONS

1. Always use a new gasket and hose band (clip) when replacing the fuel tank or components.
2. Each part should be tightened securely to the specified torque.

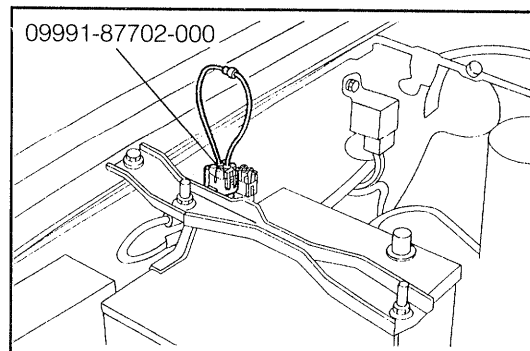
WARNING:

Always keep fire away from the working site.

WRU90-EF252

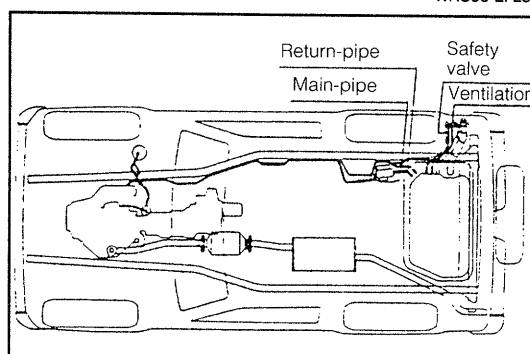
INSPECTION OF FUEL LINES AND CONNECTIONS

1. Connect the following SST to the check connector. Short the terminal F (White/Black) to the ground terminal (Black).
SST: 09991-87702-000



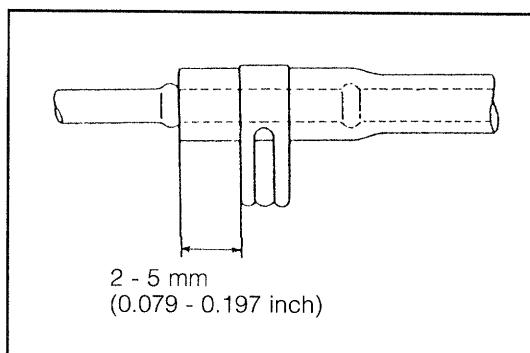
WRU90-EF253

2. Turn ON the ignition switch.
3. Check the fuel lines and connections for cracks, leakage or deformation.
If any crack, leakage or deformation is present, replace or repair the part concerned.
4. Turn OFF the ignition switch. Remove the SST from the check terminal. Attach the cap to the check terminal.
5. Check the fuel tank for deformation, cracks or fuel leakage.
If the fuel tank exhibits any defect, repair or replace the fuel tank.



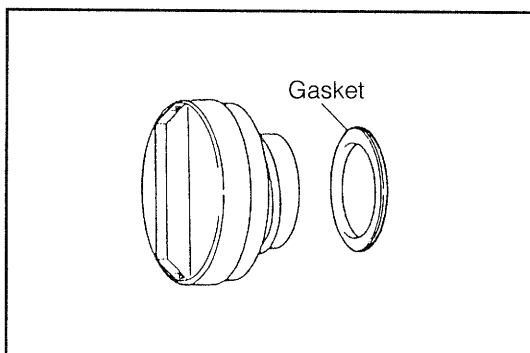
WRU90-EF254

6. Check the filler neck for damage or fuel leakage.
If the filler neck exhibits any defect, repair or replace the filler neck.
7. Check to see if the hose and tube connections are installed as shown in the right figure.
If any problem is found, repair or replace the parts, as required.



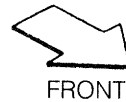
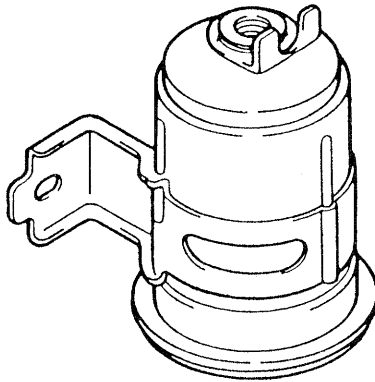
WRU90-EF255

8. Check to see if the fuel tank cap and gasket exhibits damage.
Replace the gasket if it is damaged. Also, replace the fuel tank cap if it exhibits damage.



WRU90-EF256

FUEL FILTER ELEMENT



WRU90-EF257

CHECK OF FUEL FILTER ELEMENT

1. Disconnect the ground cable terminal from the negative (-) terminal of the battery.
2. Disconnect the fuel return hose connected to the pressure regulator. Connect a suitable fuel hose (about 2 meter long) to the pressure regulator.

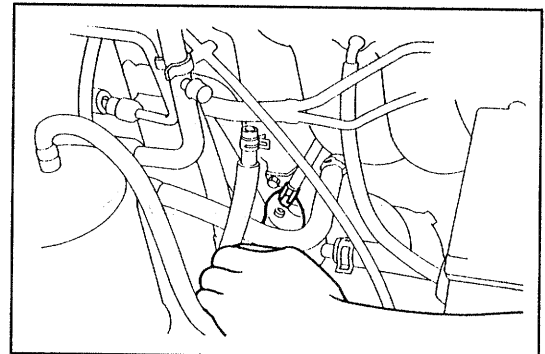
Reference:

This fuel hose is included in the SST (09268-87702-000).

CAUTION:

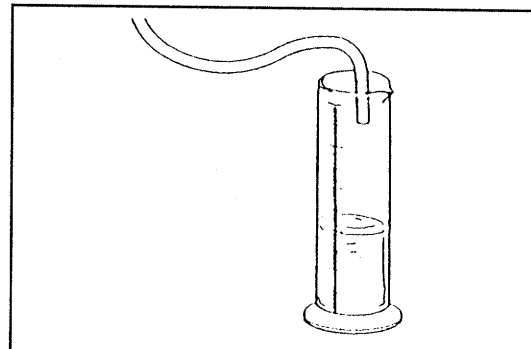
- Before the fuel return hose is disconnected, be sure to release the inner pressure of the fuel tank by detaching the fuel filler cap.
- Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the pressure regulator so as to prevent fuel splashing.

WRU90-EF258



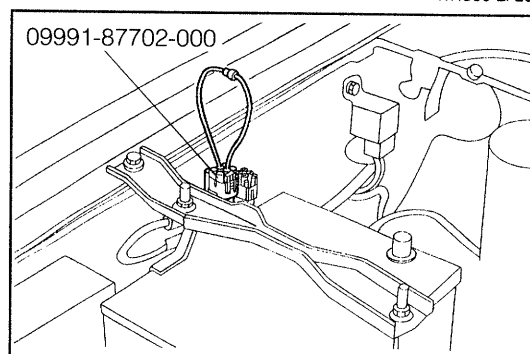
WRU90-EF259

3. Insert one end of the fuel hose in a measuring cylinder.



WRU90-EF260

4. Connection of SST (09991-87702-000)
 - (1) Detach the cap from the check connector.
 - (2) Connect the SST to the check connector.
 - (3) Short the SST terminal F (White/Black) to the ground terminal (Black).
5. Connect the ground cable terminal to the negative (-) terminal of the battery.
6. Turn ON the ignition switch for 15 seconds. Then, turn OFF the switch.



WRU90-EF261

7. Measure the amount of fuel collected in the measuring cylinder. Check to see if the measured amount conforms to the specification.

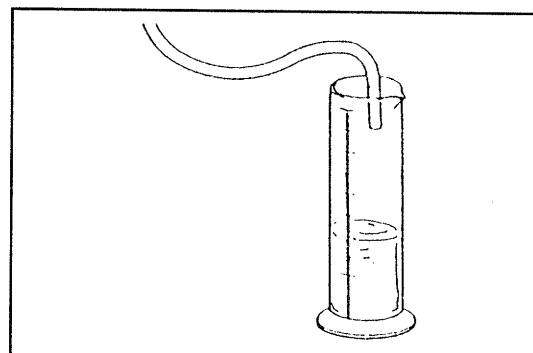
Specified Amount of Fuel: 235 cc or more
(14.34 cub inch or more)

NOTE:

If it becomes necessary to bleed air, be sure to conduct the measurement at least twice.

If the fuel amount conforms to the specification, perform the operation, starting from the step 18 onward.

If the fuel amount is less than the specified amount, perform the operation, starting from the step 8 onward.



WRU90-EF262

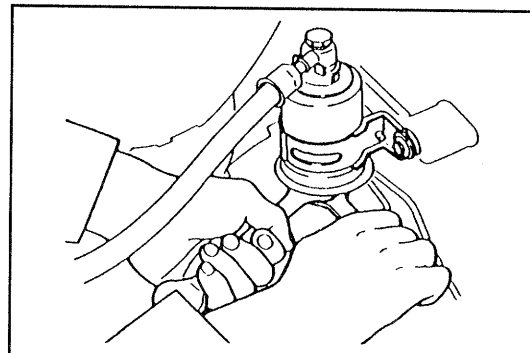
8. Disconnect the ground cable terminal from the negative (-) terminal of the battery.

WRU90-EF263

9. Loosen the union bolt gradually.

CAUTION:

The fuel pressure at the inside of the fuel line is approximately 2.55 kg/cm^2 (36.3 psi) higher than the atmospheric pressure. Hence, be sure to gradually loosen the flare nut and use a cloth, etc. so as to prevent fuel from splashing. Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the fuel filter so that no fuel may get to the resin or rubber parts or electrical parts of the vehicle.

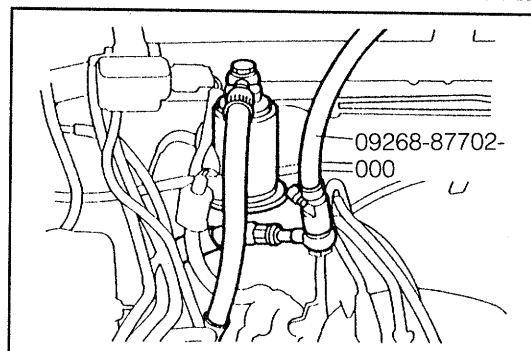


WRU90-EF264

10. Connect a suitable fuel hose (about 2 meter long) to the fuel pipe.

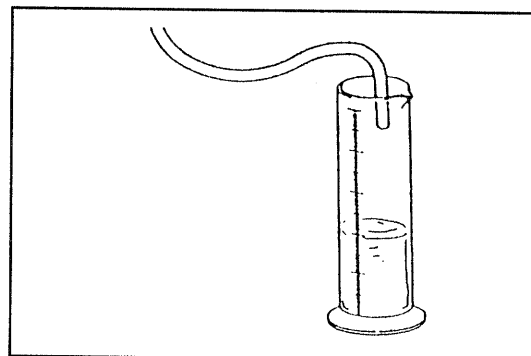
Reference:

This fuel hose is included in the SST (09268-87702-000).



WRU90-EF265

11. Insert one end of the fuel hose in a measuring cylinder.



12. Reconnect the ground cable terminal to the negative (-) terminal of the battery.
13. Turn ON the ignition switch for 15 seconds. Then, turn OFF the switch.

WRU90-EF266

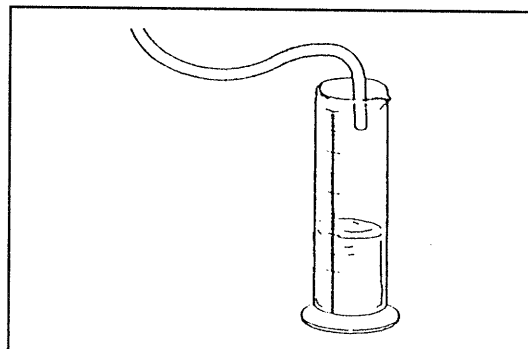
14. Measure the amount of fuel collected in the measuring cylinder.

Specified Amount of Fuel: 235 cc or more
(14.34 cub inch or more)

If the fuel amount conforms to the specification, replace the fuel filter.

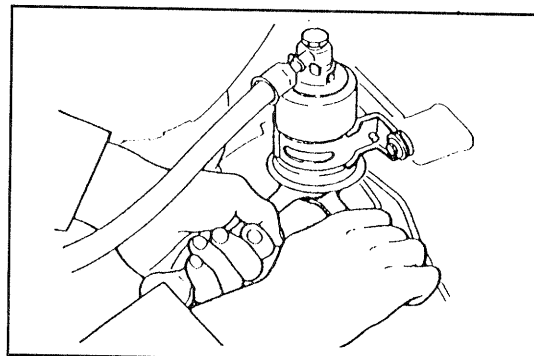
If the fuel amount is less than the specified amount, check the fuel pump filter for restriction. Then, replace the fuel pump as required. (See page EF-100.)

15. Disconnect the ground cable terminal from the negative (-) terminal of the battery.



WRU90-EF267

16. Install the fuel hose to the fuel filter by means of the union bolt with a new gasket interposed.
17. Tighten the union bolt.
Tightening Torque: 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N-m)

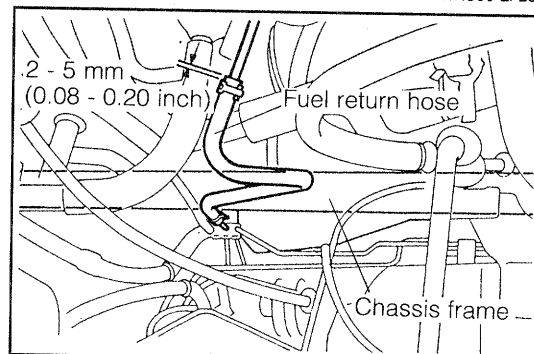


WRU90-EF268

18. Disconnect the fuel hose connected to the pressure regulator.
19. Connection of fuel return hose to fuel pipe No. 2.
 - (1) Insert the fuel return hose to the fuel pipe No. 2 until second spool of fuel pipe.
 - (2) Securely clamp the fuel hose at 2 - 5 mm (0.08 - 0.20 inch) from fuel return hose end with new clip.

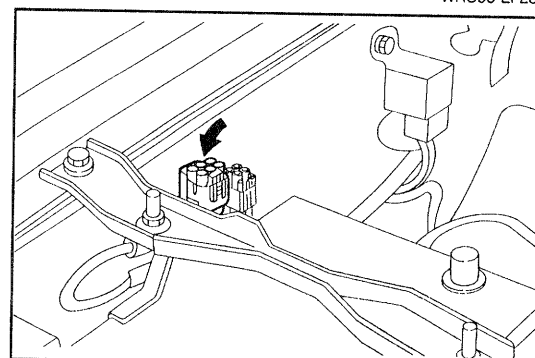
NOTE:

Install the fuel return hose in parallel with chassis frame.



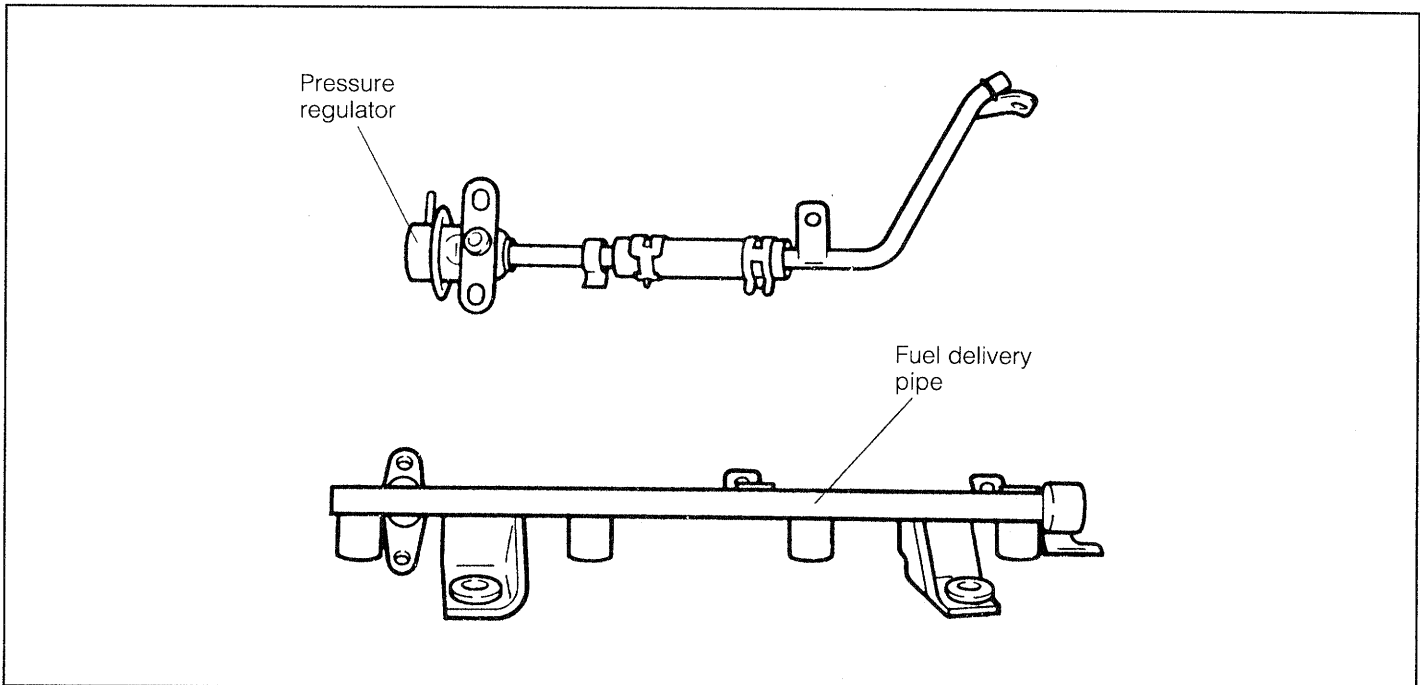
WRU90-EF269

20. Remove the SST from the check connector.
21. Attach the cap on the check connector.
22. Reconnect the ground cable terminal to the negative (-) terminal of the battery.
23. Start the engine. Check to see if any fuel leakage is present. Repair any defective part if fuel leakage exists.



WRU90-EF270

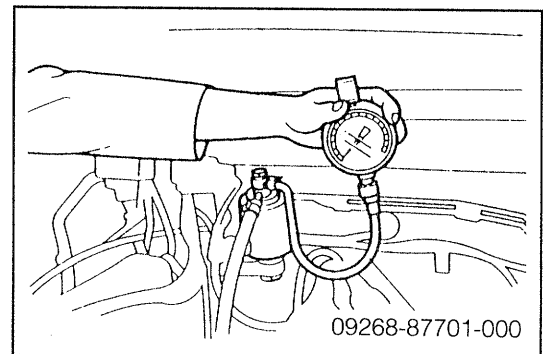
PRESSURE REGULATOR



WRU90-EF271

IN-VEHICLE INSPECTION

Check the fuel pressure. (See page EF-95.)



09268-87701-000

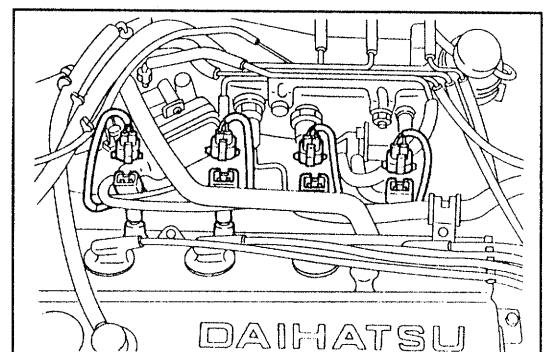
WRU90-EF272

REMOVAL OF PRESSURE REGULATOR

1. Disconnect the ground cable terminal from the negative (-) terminal of the battery.
2. Remove the air chamber assembly. (See page EM-10.)

WRU90-EF273

3. Disconnect the injector connector from each injector.



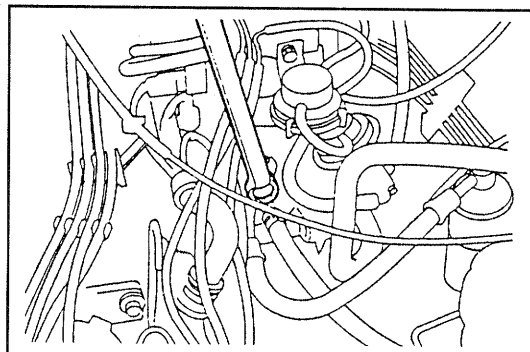
WRU90-EF274

4. Disconnect the fuel hose No. 1 at the delivery pipe side.

CAUTION:

The fuel pressure at the inside of the fuel line is approximately 2.55 kg/cm^2 (36.3 psi) higher than the atmospheric pressure. Hence, be sure to gradually loosen the union bolt so as to prevent fuel from splashing.

Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the fuel filter so that no fuel may get to the resin or rubber parts of the vehicle.



WRU90-EF275

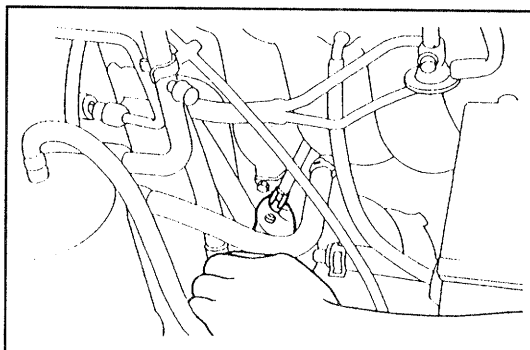
5. Disconnect the fuel return hose from the pressure regulator.

CAUTION:

Since the fuel will flow out, be certain to place a suitable container or cloth, etc. under the connection so as to prevent fuel from splashing.

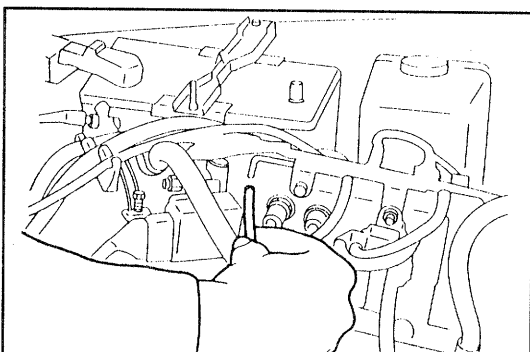
NOTE:

Before the fuel return hose is disconnected, be sure to release the inner pressure of the fuel tank by detaching the fuel filler cap.



WRU90-EF276

6. Disconnect the vacuum hose from the vacuum pipe.



WRU90-EF277

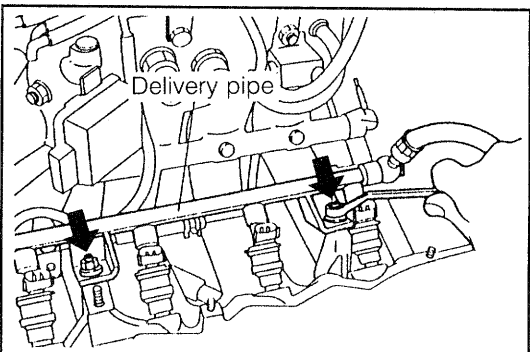
7. Remove the delivery pipe by removing the delivery pipe attaching nuts.

CAUTION:

- Be certain to place a suitable cloth, etc. under the delivery pipe so that no fuel gets to the electrical equipment, such as the alternator and starter, wiring and rubber and plastic parts.
- Be very careful not to drop the injectors.

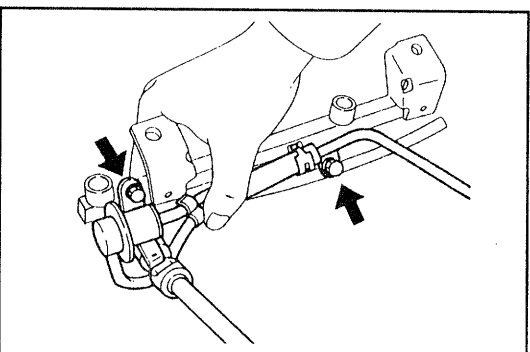
NOTE:

- Leave the injector at the intake manifold side.



WRU90-EF278

8. Disconnect the vacuum hose from the pressure regulator.
9. Remove the pressure regulator from the delivery pipe.



WRU90-EF279

Inspection of Pressure Regulator

1. Using the following SSTs, connect the pressure regulator, as indicated in the figure.

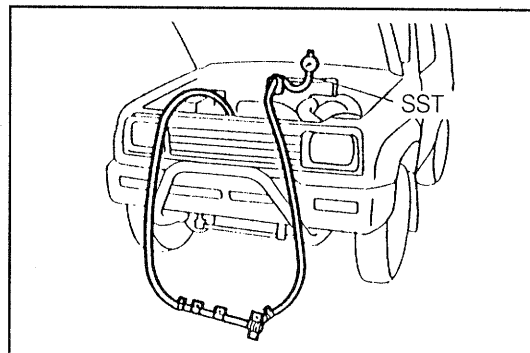
SSTs: 09268-87701-000

09268-87702-000

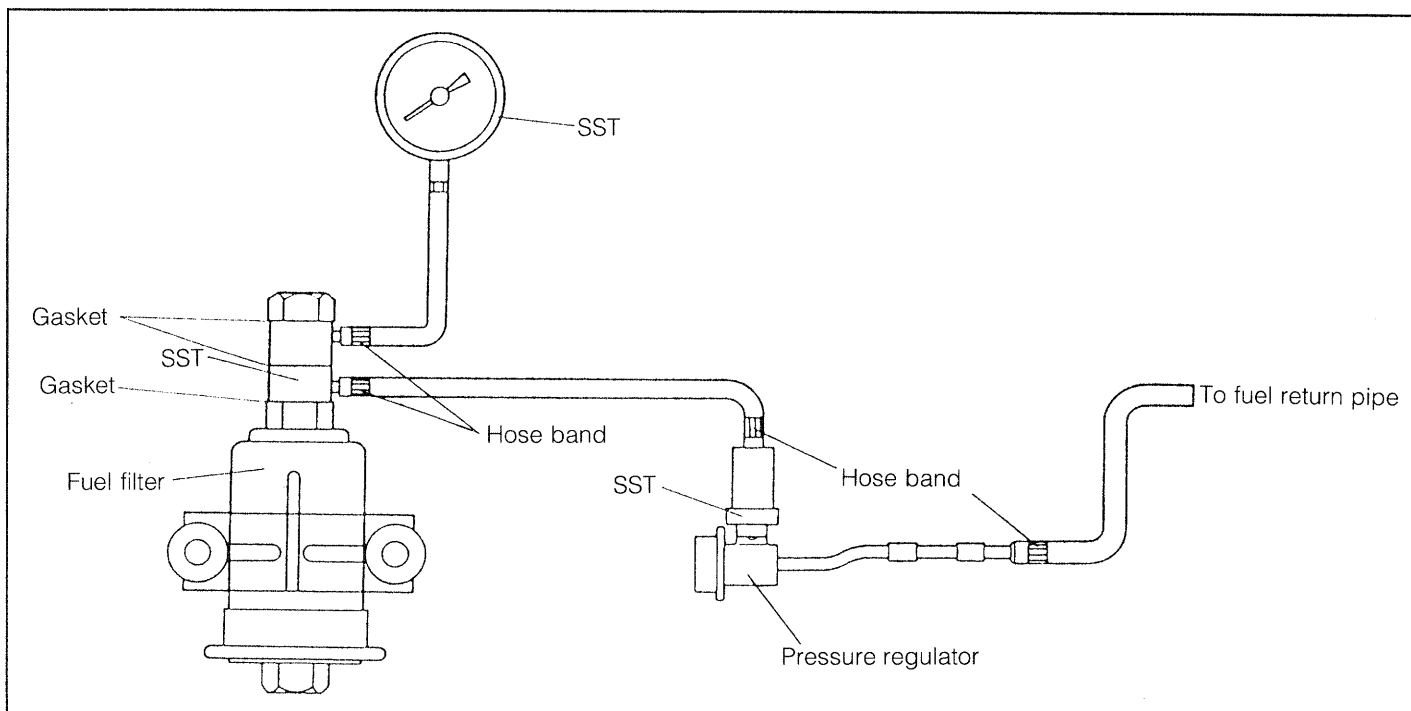
09283-87703-000

NOTE:

When connecting the pressure regulator, install a new gasket to the union bolt connection and a new "O" ring to the "O" ring seal section. Also, attach hose bands to the hose connections.

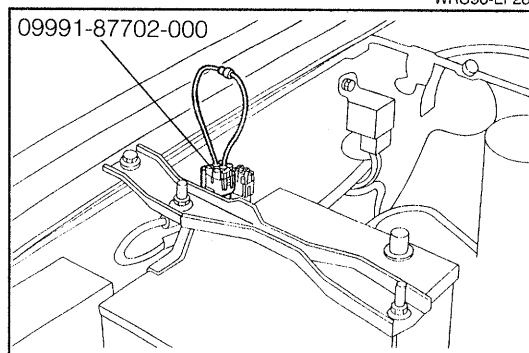


WRU90-EF280



WRU90-EF281

2. Connect the ground cable terminal to the negative (-) terminal of the battery.
3. Connection of SST (09991-87702-000)
 - (1) Detach the cap from the check connector.
 - (2) Connect the SST to the check connector.
 - (3) Connect the fuel pump terminal (White/Black) with the ground terminal (Black).
4. Turn ON the ignition switch.



WRU90-EF282

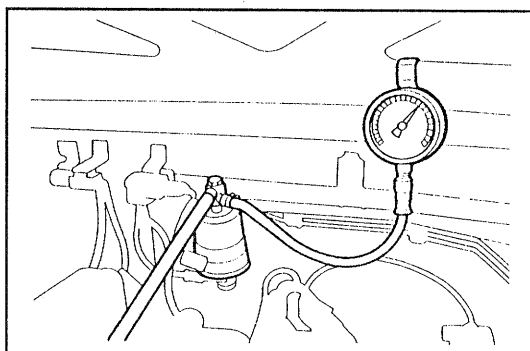
5. Check to see if the fuel pressure conforms to the specification.

Specified Fuel Pressure: 2.3 - 2.8 kg/cm²
(33 - 40 psi)

If the fuel pressure fails to conform to the specification, replace the pressure regulator.

NOTE:

At this stage, ensure that the fuel pump complies with the fuel flow rate requirements.

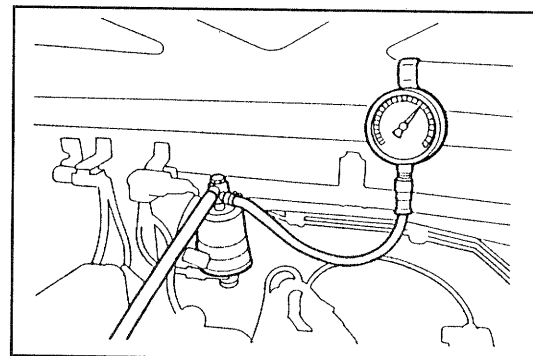


WRU90-EF283

6. Turn OFF the ignition switch. After a lapse of three minutes, check to see if the fuel pressure is the specified pressure or more.

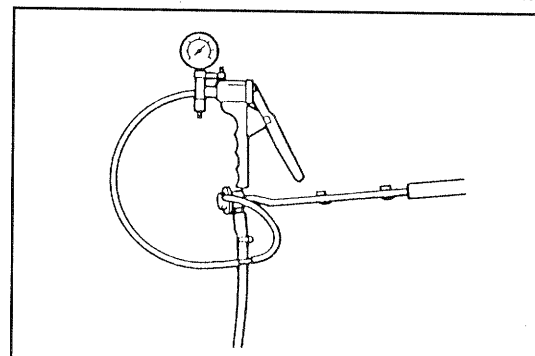
**Specified Fuel Pressure: 1.8 kg/cm² or more
(25.6 psi or more)**

If the fuel pressure fails to conform to the specification, perform the operations described in the step 16 afterward.



WRU90-EF284

7. Connect a suitable hose to the vacuum hose pipe of the pressure regulator. Connect a MityVac to the other end of the hose.



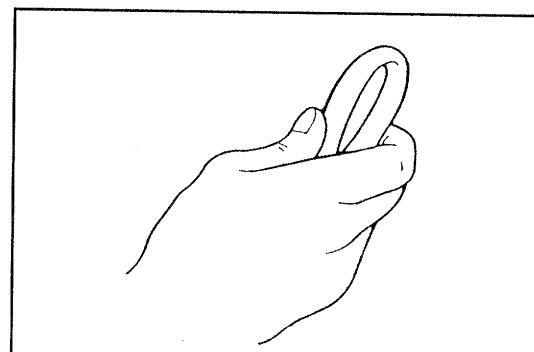
WRU90-EF285

8. Turn ON the ignition switch.
9. While observing the fuel pressure, apply a negative pressure, using the MityVac. At this time, ensure that the fuel pressure drops corresponding to the applied negative pressure.
Replace the pressure regulator if the fuel pressure will not decrease.

10. Turn OFF the ignition switch.
11. Remove the MityVac and hose from the pressure regulator.
12. Disconnect the ground cable terminal to the negative (-) terminal of the battery.
13. Remove the SSTs from the respective parts.
14. Install the cap to the check connector.
Proceed to assembly of the pressure regulator.

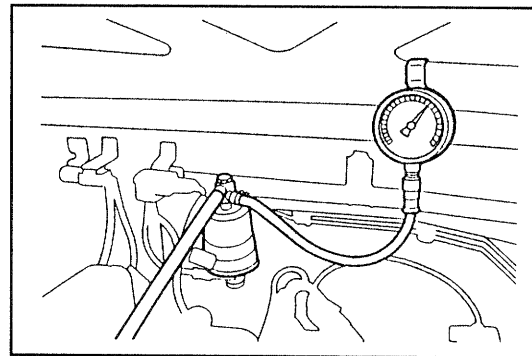
WRU90-EF286

15. Turn OFF the ignition switch after turning ON the ignition switch temporarily.
16. Immediately after the operation described in the step 15, stop the flowing of the fuel by bending the fuel hose between the fuel filter and the pressure regulator. Read the fuel pressure under this condition.



WRU90-EF287

17. After holding the fuel hose in a bent state for 3 minutes, check that the pressure has dropped compared with that measured in the step 6.
Replace the fuel pump if the pressure has dropped.
Replace the pressure regulator if the pressure will not drop.

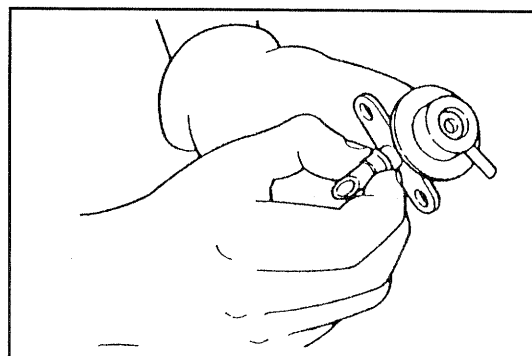


18. Disconnect the ground cable terminal from the negative terminal of the battery.
19. Remove the SSTs from the respective parts.
20. Install the cap to the check connector.

WRU90-EF288

ASSEMBLY OF PRESSURE REGULATOR

1. Replace the pressure regulator "O" ring with a new part.



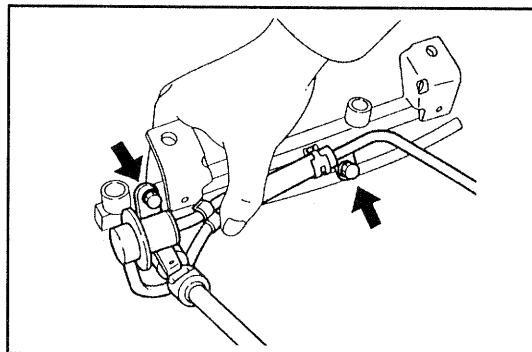
WRU90-EF289

2. Apply silicon oil to the "O" ring of the pressure regulator. Install the "O" ring to the delivery pipe and tighten the attaching bolts.

Tightening Torque: 0.6 - 0.9 kg-m
(4.3 - 6.5 ft-lb, 5.9 - 8.8 N·m)

CAUTION:

Be very careful not to damage the "O" ring. Failure to observe this caution may cause fuel leakage.

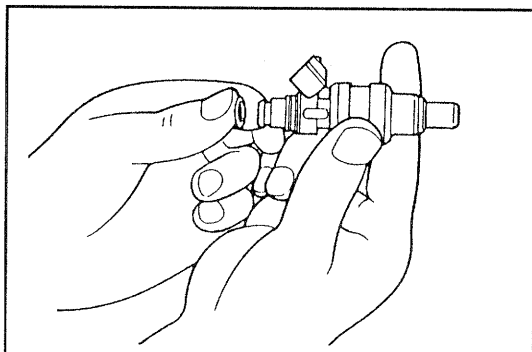


WRU90-EF290

3. Replace the injector "O" ring with a new part.

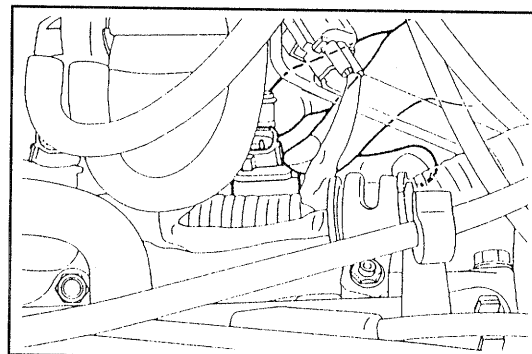
NOTE:

- Visually inspect the grommets and insulators of the injectors for any evidence of damage. Replace any defective parts if they exhibit damage before replacing the "O" ring.
- Be very careful to avoid damaging the "O" ring.



WRU90-EF291

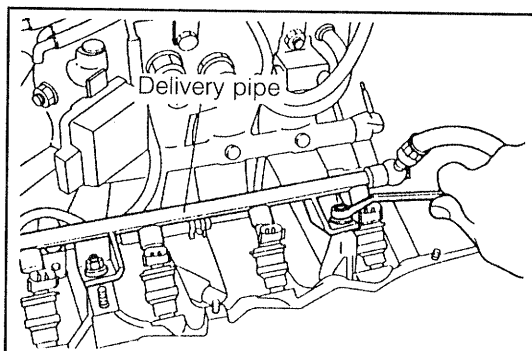
4. Install the injector to the intake manifold.



WRU90-EF292

5. Apply silicon oil or gasoline to the "O" ring of the injector. Install the delivery pipe.

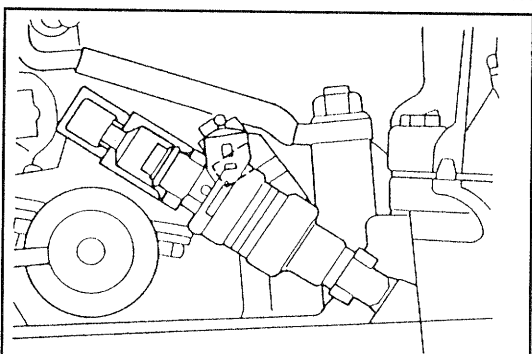
Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 2.6 N-m)



WRU90-EF293

NOTE:

- Be very careful not to damage the injector "O" ring during the installation.
- When connecting the delivery pipe and injector, make sure that they are installed straight, not in a tilted state.

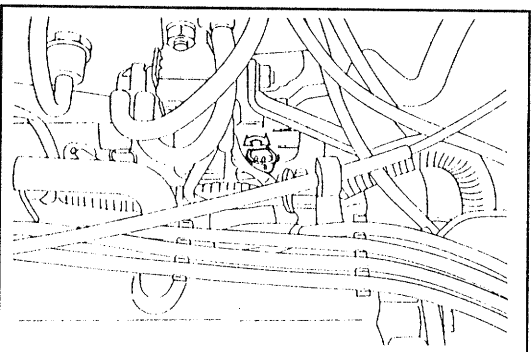


WRU90-EF294

6. Ensure that the injector can rotate by your hand. If the injector can not be rotated smoothly, most likely the injector is installed in a tilted state. It is, therefore, necessary to reassemble the injector using a new injector "O" rings.

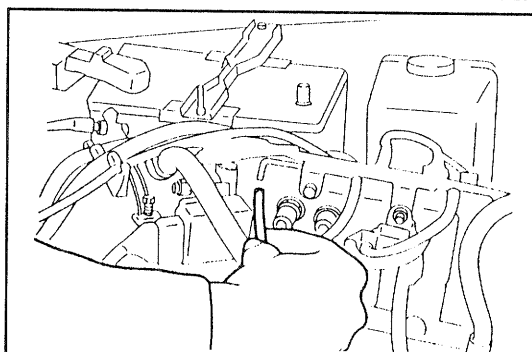
CAUTION:

Never push the injector toward the insulator side or the grommet side. Failure to observe this caution will cause fuel leakage.



WRU90-EF295

7. Connect the rubber hose to the vacuum pipe.

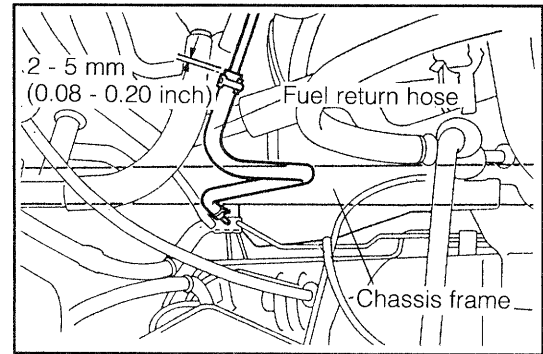


WRU90-EF296

8. Connection of fuel return hose to fuel pipe No. 2.
 - (1) Insert the fuel return hose to the fuel pipe No. 2 until second spool of fuel pipe.
 - (2) Securely clamp the fuel hose at 2 - 5 mm (0.08 - 0.20 inch) from fuel return hose end with new clip.

NOTE:

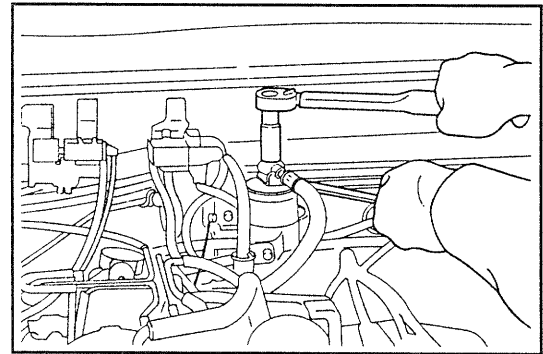
Install the fuel return hose in parallel with chassis frame.



WRU90-EF297

9. Install the fuel hose No.1 to the delivery pipe with a new gasket interposed.

Tightening Torque: 3.5 - 4.5 kg-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N·m)



10. Connect the injector wiring connectors to the injector.
11. Connect the ground cable terminal to the negative (-) terminal of the battery.
12. Turn ON and OFF the ignition switch at intervals of 2 or 3 seconds, until air is expelled from the pressure regulator section.

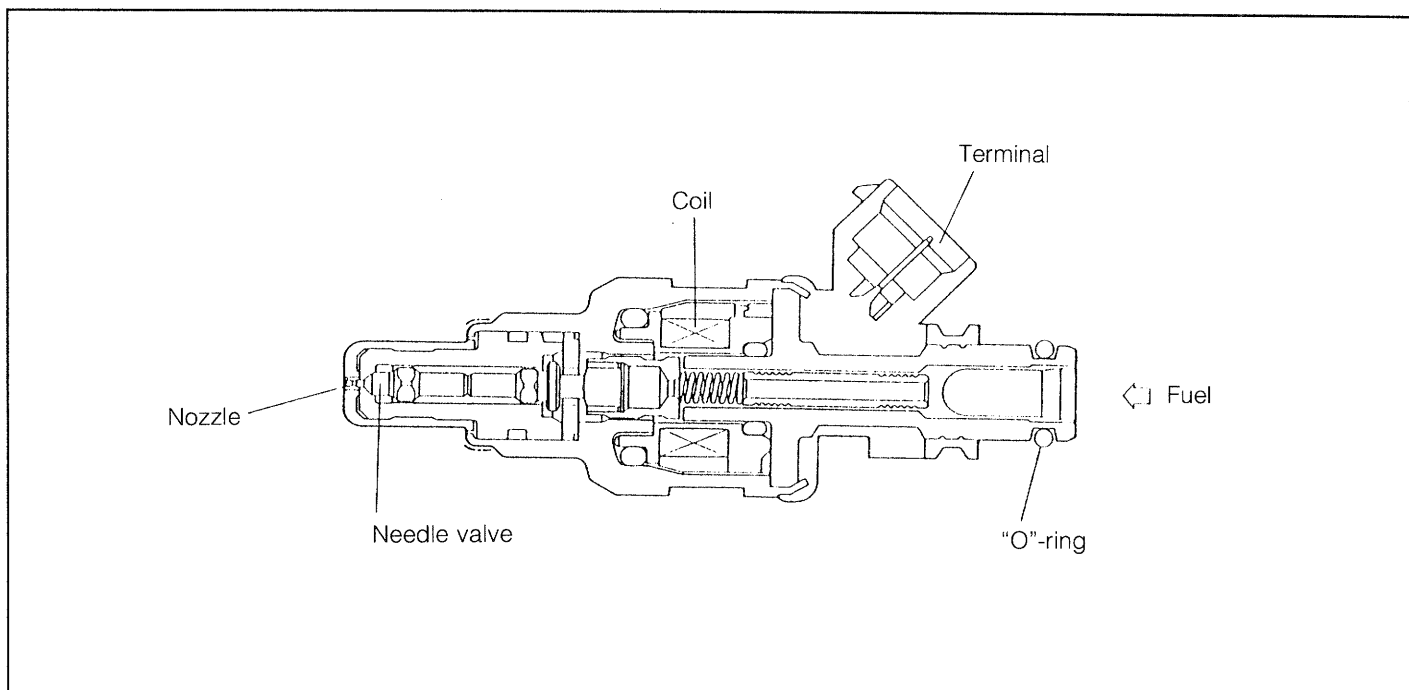
NOTE:

- If air remains inside the piping, you will hear a different sound from the fuel flowing sound.
- Usually the air bleeding can be performed by repeating turning ON/OFF the ignition switch four or five times.

13. Ensure that no fuel leakage exists.
Repair the leaky point if fuel leakage is present.
14. Start the engine. Again, check for fuel leakage.
Repair the leaky point if fuel leakage is present.
15. Install the air chamber assembly. (See page EM-14.)

WRU90-EF298

INJECTORS



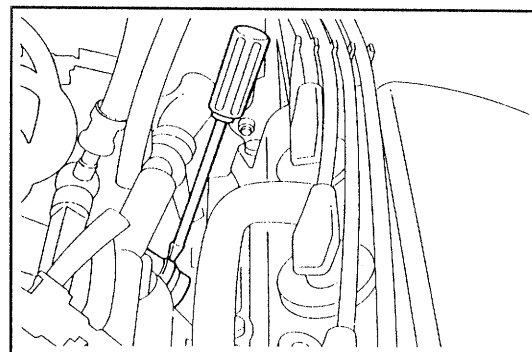
WRU90-EF299

IN-VEHICLE INSPECTION

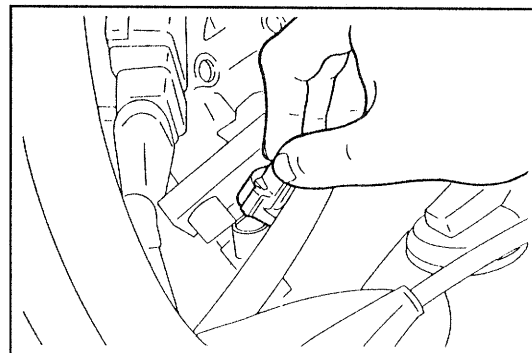
1. Remove the air chamber assembly. (See page EM-10.)
2. Check of injector operation
 - (1) Using a sound scope, check to see if each injector emits an operating sound when the engine is being started or cranked.
 - (2) If a sound scope is not available, apply a screwdriver or the like to the injector and check to see if you can feel an operating vibration.

If the injector emits no operating sound or emits an abnormal sound, check the wiring, wiring connector or injector.

3. Measurement of resistance of injector
 - (1) Disconnect the injector connector of the engine wire.



WRU90-EF300



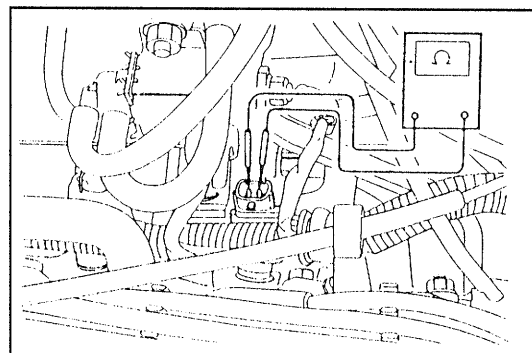
WRU90-EF301

- (2) Measure the resistance between the terminals of each injector.

Specified Resistance: 11 - 17Ω

If the resistance between the terminals is not within the specification, replace the injector.

- (3) Connect the injector connector of the engine wire to the injector.



WRU90-EF302

REMOVAL OF INJECTOR

1. Remove the pressure regulator. (See page EF-108.)
2. Remove the injector.

NOTE:

Do not remove the injector cover.

WRU90-EF303

INSPECTION OF INJECTOR

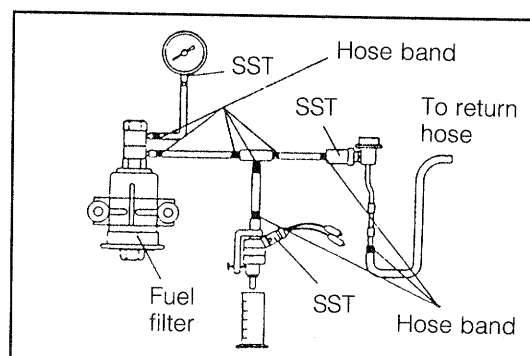
1. Using the following SSTs, connect the injector, as indicated in the figure. Insert the injector in the measuring cylinder.

SST: (1) 09268-87701-000
(2) 09283-87703-000
(3) 09268-87702-000
(4) 09842-30070-000

WRU90-EF304

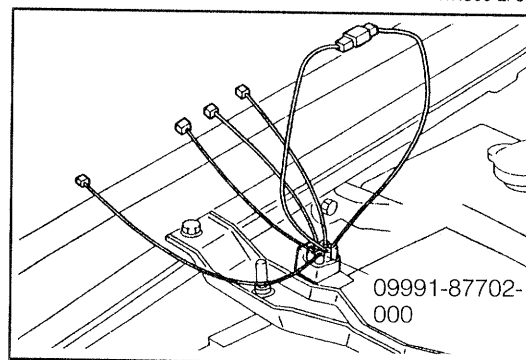
NOTE:

- Install a new gasket to the union bolt connection.
- Install a new "O" ring to the "O" ring seal section.
- Attach the hose bands to the rubber hose connections.
- Attach a suitable vinyl hose to the tip-end of the injector so as to prevent fuel from splashing.
- Remove the injector grommet. Check to see if the injector grommet exhibits any damage.



WRU90-EF305

2. Remove the check connector cap.
3. Connect the SST to the check connector.
SST: 09991-87702-000
4. Connect the terminal F (white/black) of the check connector to the ground terminal (black).



5. Connect the ground cable terminal to the negative (-) terminal of the battery.
6. Turn ON the ignition switch.

WRU90-EF306

7. Perform energizing for 15 seconds by means of the SST (09842-30070-000).
8. Measure the amount of fuel collected in the measuring cylinder.
specified pressure.

Specified Amount of Fuel:

Approx. 45 ± 5 cc (2.75 ± 0.13 cub inch)

Variation between Each Injector:

5 cc or less (0.3 cub inch or less)

NOTE:

- Conduct the measurement two or three times for each injector.
- Before the injector is pulled out, make certain to turn OFF the ignition key.
- When removing the injector, use a suitable cloth or the like so as to prevent fuel from splashing.
- Prior to the test, perform air bleeding for the fuel hose.

If the amount of fuel fails to conform to the specification, replace the injector.

9. Leakage check

With the SST (09842-30070-000) in not energized state, turn ON the ignition key switch. Check any fuel leakage from the injector nozzle.

Fuel Leakage:

Less Than One Drop of Fuel per Minute

If the leakage exceeds the specified value, replace the injector.

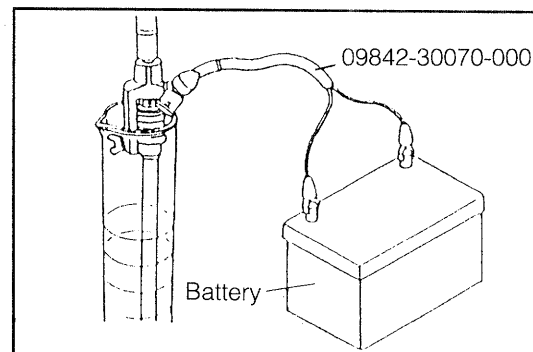
NOTE:

Prior to the test, remove the vinyl hose that was attached on the injector.

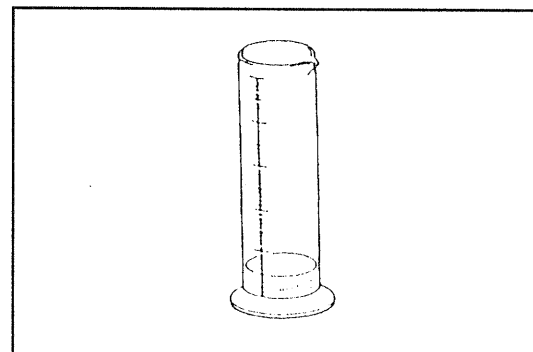
10. Turn OFF the ignition key.
11. Disconnect the ground cable terminal from the negative (–) terminal of the battery.
12. Disconnect the SST.

NOTE:

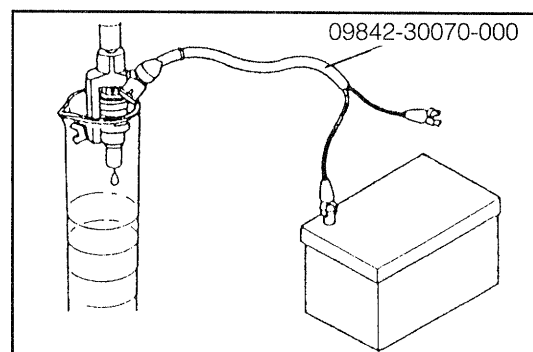
Care must be exercised as to fuel splashing and fuel flowing.



WRU90-EF307



WRU90-EF308



WRU90-EF309

INSTALLATION OF INJECTOR

1. Check the insulator and grommet of each injector for damage.
Replace the insulator and/or grommet if damage exists.
2. Install the insulator on the manifold section.

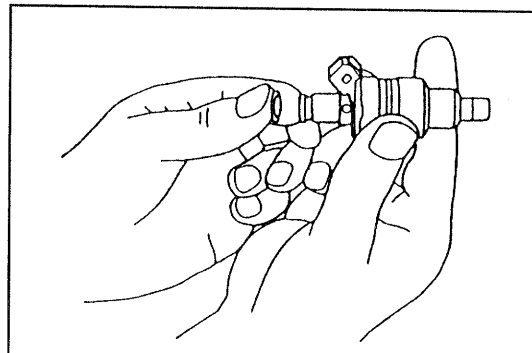
WRU90-EF310

3. Install the grommet on the injection.
4. Replace the injector "O" ring with a new part.

NOTE:

Be very careful to avoid damaging the "O" ring.

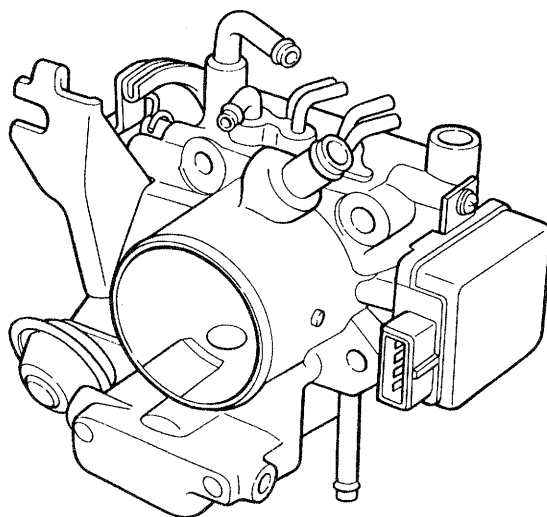
5. Insert the injector into the insulator.
6. Install the delivery pipe. (See page EF-112.)
7. Install the air chamber assembly. (See page EM-14.)



WRU90-EF311

AIR INDUCTION SYSTEM

THROTTLE BODY

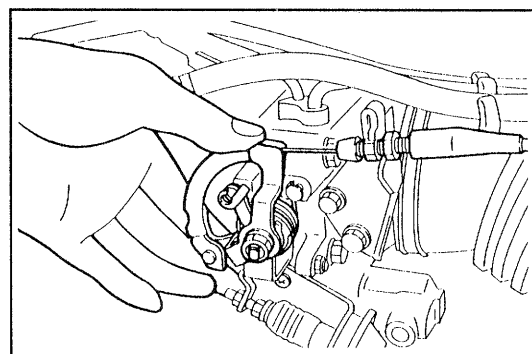


WRU90-EF312

IN-VEHICLE INSPECTION

Check of throttle body

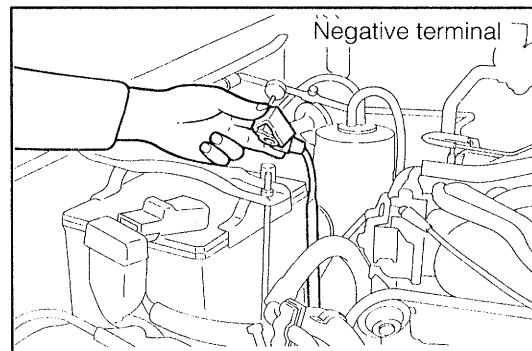
1. Ensure that the throttle linkage operates smoothly.
Replace the throttle body if the throttle lever fails to operate smoothly.
2. Check the throttle positioner sensor.
(See page EF-65.)
3. Check the throttle positioner.
(See page EC-9.)



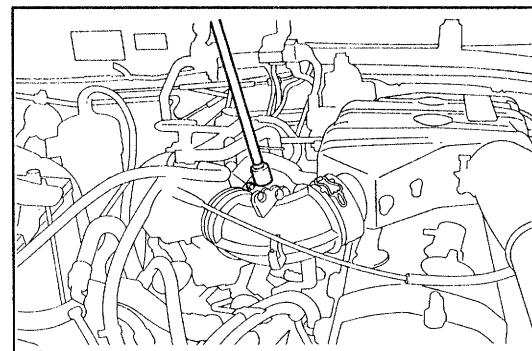
WRU90-EF313

Removal of throttle body

1. Disconnect the ground cable terminal from the negative (-) terminal of the battery.
2. Drain the coolant. (See page CO-3.)
3. Disconnect the hoses for air conditioner and power steering idle-up from the air chamber.
4. Disconnect the air chamber hose from the throttle body.

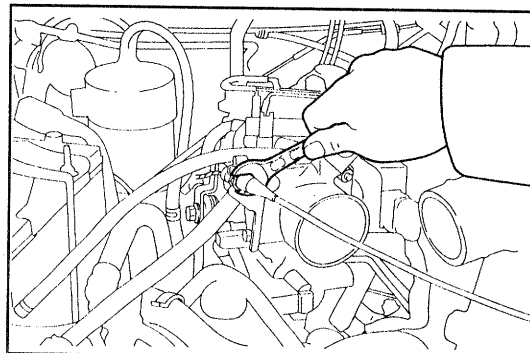


WRU90-EF314



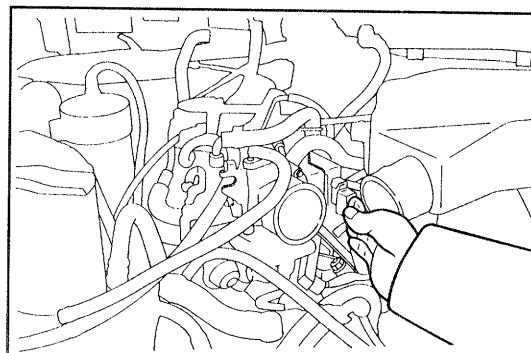
WRU90-EF315

5. Disconnect the accelerator cable.



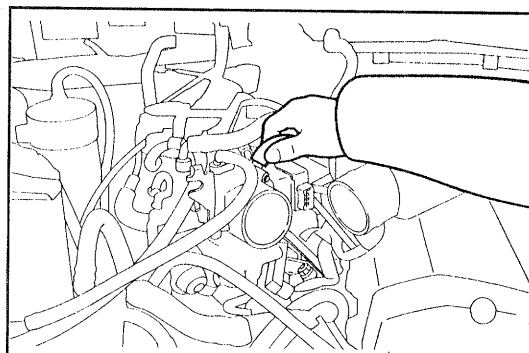
WRU90-EF316

6. Disconnect the connector of the throttle positioner sensor.



WRU90-EF317

7. Disconnect the vacuum hoses from the throttle body.

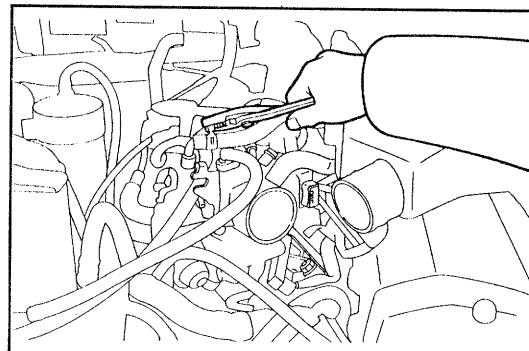


WRU90-EF318

8. Disconnect the water hoses from the throttle body.

NOTE:

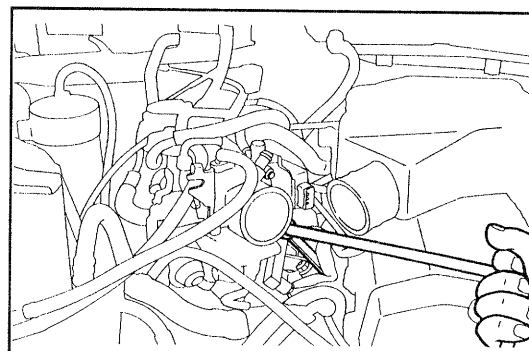
- Using a suitable cloth, take a precautionary measure so that no water gets to the electrical equipment of the vehicle.
- Be sure to plug the disconnected water hoses by suitable plug to prevent the water from flowing out.



WRU90-EF319

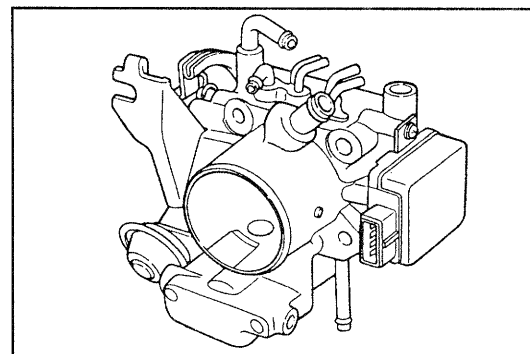
9. Removal of throttle body

- (1) Remove the attaching bolts and nuts of the surge tank stay No. 1.



WRU90-EF320

- (2) Remove the attaching bolts and nuts of the throttle body.
- (3) Remove the throttle body.



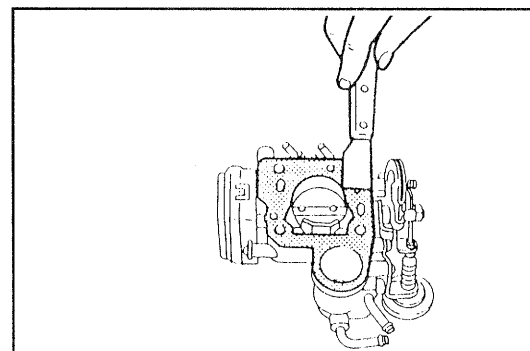
WRU90-EF321

Inspection of throttle body

1. Cleaning of throttle body prior to inspection
 - (1) Clean the cast part with a soft brush, a wet cloth or the like.

WRU90-EF322

- (2) Remove the gasket material from the surge tank attaching surface of the throttle body.

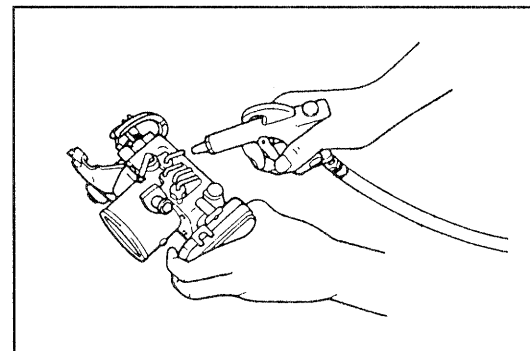


WRU90-EF323

- (3) Clean all passages by blowing compressed air.

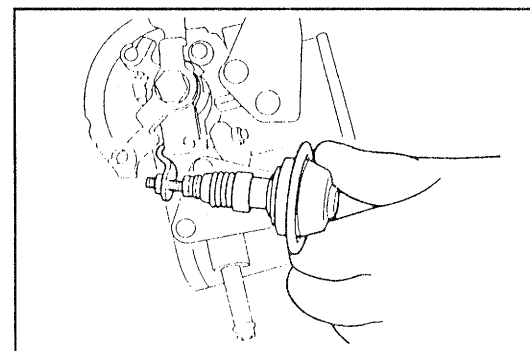
WARNING:

Be sure to protect your eyes, wearing goggles.



WRU90-EF324

2. Check of throttle valve
 - (1) Check that the throttle lever is in full contact with the dashpot.
 - (2) When the throttle lever is opened, check to see if the dashpot lever comes out.



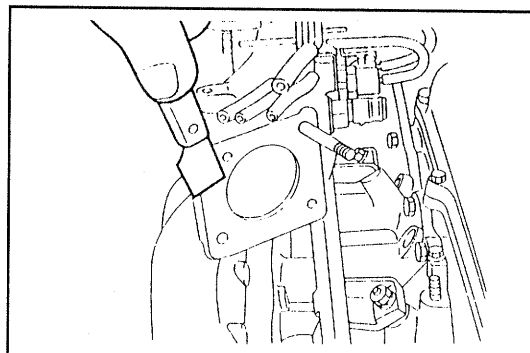
WRU90-EF325

- (3) Check the throttle position sensor.
(See page EF-65.)
Replace the throttle body if it exhibits any defect.

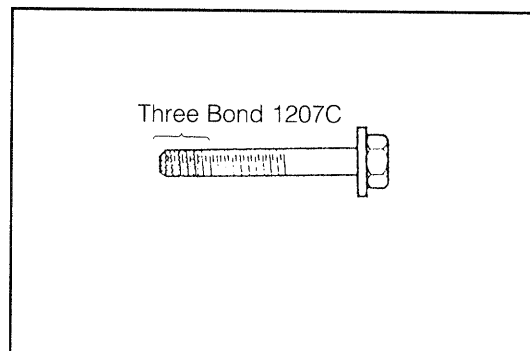
WRU90-EF326

Installation of throttle body

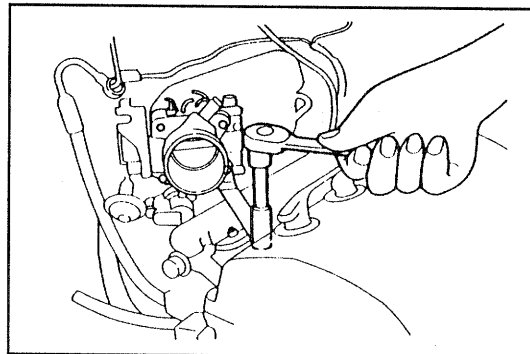
1. Remove any gasket material from the throttle body attaching surface of the surge tank.
2. Install the throttle body on the surge tank with a new gasket interposed. Attach the surge tank stay No. 1.
3. Apply a seal bond (Three Bond 1207C) to the threaded portions of the throttle body tightening bolts.
4. Tighten the attaching bolts and nuts of the throttle body and surge tank stay No. 1.
Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)
5. Connect the water hoses to the throttle body. Attach the hose clips.



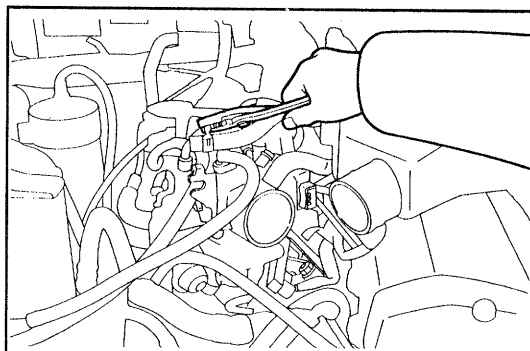
WRU90-EF327



WRU90-EF328

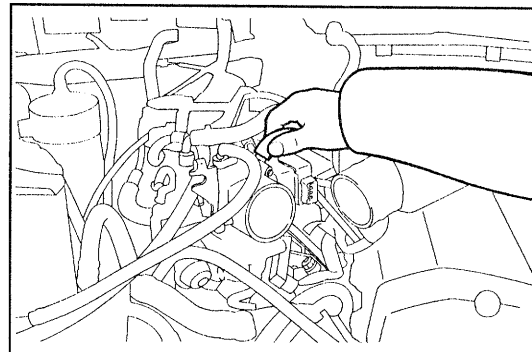


WRU90-EF329



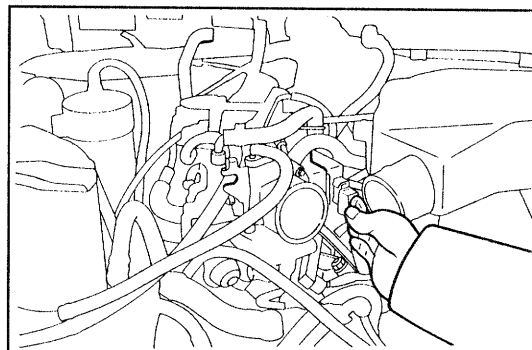
WRU90-EF330

6. Connect the vacuum hoses to the throttle body.



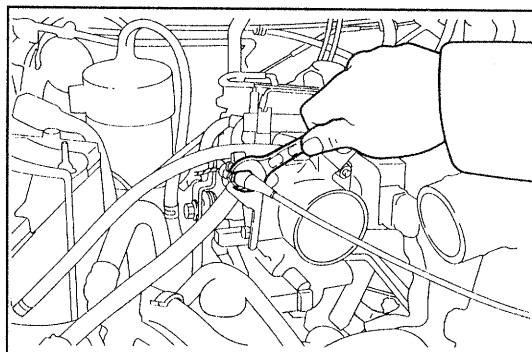
WRU90-EF331

7. Connect the throttle position sensor connector.



WRU90-EF332

8. Connect the accelerator cable to the throttle body. Perform the adjustment so that the accelerator pedal free play may become 1 - 5 mm (0.04 - 0.20 inch).

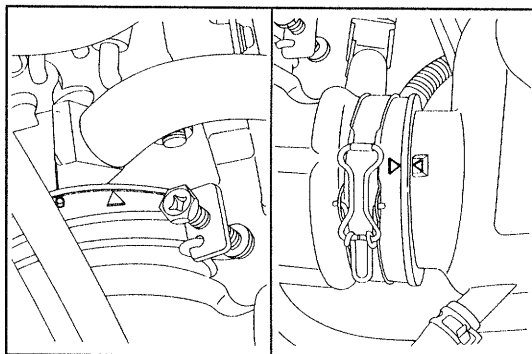


WRU90-EF333

9. Connect the air chamber hose to the throttle body and the air chamber.

NOTE:

- Be sure to align the mating marks between the throttle body and air chamber hose, and the air chamber hose and the air chamber.
- Be sure to clamp the air chamber hose bands.



10. Fill coolant.

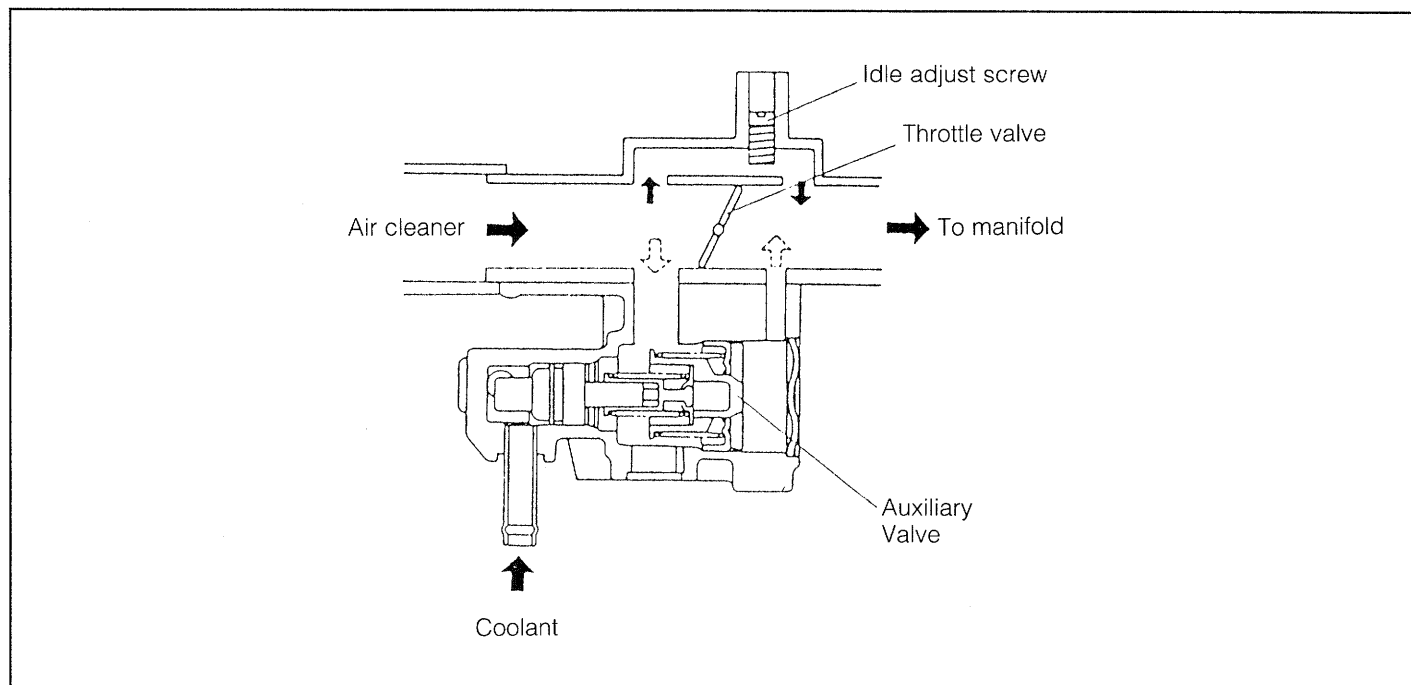
(See page CO-3.)

11. Connect the ground cable terminal to the negative (-) terminal of the battery.

12. Start the engine. Recheck the engine for water leakage. Repair the leaky point if water leakage exists.

WRU90-EF334

AUXILIARY AIR VALVE

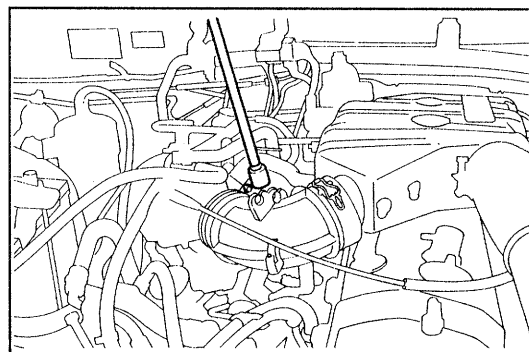


WRU90-EF335

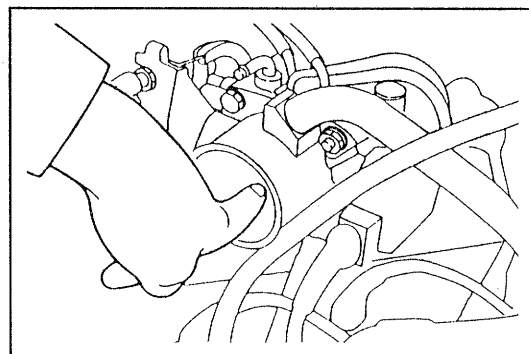
IN-VEHICLE INSPECTION

Check operation

1. Disconnect the air chamber hose from the throttle body.
2. Start the engine. Check that there is air continuity at the auxiliary air valve port under the following conditions. Perform the check, following the procedures given below.
 When the cooling water temperature is below 40°C (104°F), apply your finger to the auxiliary air valve port. Ensure that the engine speed drops.
 When the cooling water temperature is above 70°C (158°F), apply your finger to the auxiliary air valve port. Ensure that the engine speed does not change.
 If the auxiliary air valve exhibits any malfunction, replace the throttle body.



WRU90-EF336



WRU90-EF337

DAIHATSU

Rocky

CO

COOLING SYSTEM

DESCRIPTION	CO- 2
TROUBLE SHOOTING	CO- 3
PRECAUTIONS	CO- 3
CHECK & CHANGE OF ENGINE	
COOLANT	CO- 3
WATER PUMP	CO- 5
THERMOSTAT	CO- 8
RADIATOR	CO-10

WRU90-CO001

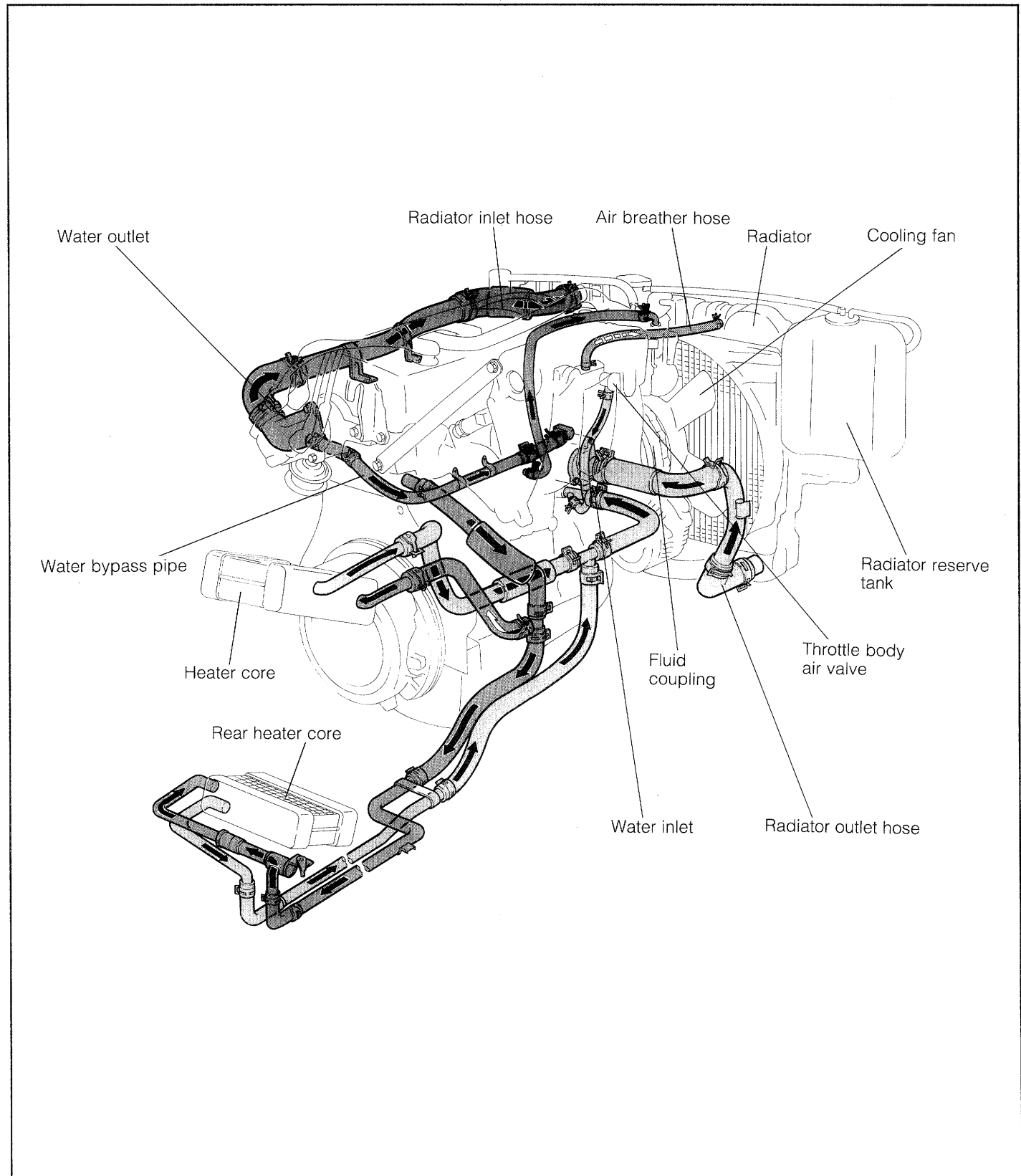
COOLING SYSTEM

DESCRIPTION

The cooling system is a water cooled, forced-circulation type.

The cooling system employs a bottom by-pass type in which the thermostat equipped with a by-pass valve is provided at the inlet side.

The cooling system is composed of the radiator, water pump, cooling fan, fluid coupling, water jackets of cylinder head and cylinder block, water hoses and their connecting parts.



TROUBLE SHOOTING

Problem	Possible cause	Remedies	Page
Engine overheats	Poor quality coolant	Change coolant.	CO-3
	Water pump drive belt loose or missing	Adjust or replace belt.	CH-23
	Dirt, leaves or insects on radiator	Clean radiator.	CO-10
	Leaky hoses, water pump, thermostat housing, radiator, heater, core plugs or head gasket	Repair as necessary.	
	Thermostat faulty	Check thermostat.	CO-8
	Ignition timing retarded	Set timing.	IG-22
	Radiator hose plugged or deteriorated	Replace hose.	
	Water pump faulty	Replace water pump.	CO-5
	Radiator plugged or cap faulty	Check radiator.	CO-10
	Cylinder head or block cracked or plugged	Repair as necessary.	EM-36

WRU90-CO003

PRECAUTIONS

- As regards water to be used as cooling water, use soft water which does not contain salts of minerals, calcium, magnesium and so forth.
- If the coolant gets to the vehicle body, immediately flush away the coolant using water.
- Never open the radiator cap when the cooling water is hot.

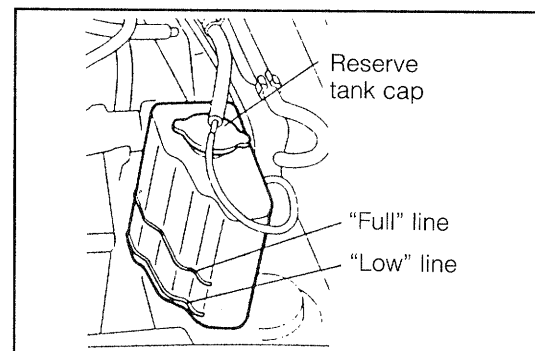
WARNING:

The inside of the radiator is under a pressurized condition when the cooling water is hot. Therefore, if the radiator cap should be removed, the cooling water will blow off, possibly causing injuries such as scald.

WRU90-CO004

CHECK & CHANGE OF ENGINE COOLANT

- Check of coolant level
Check to see if the coolant level is between the LOW and FULL lines of the reserve tank.
If the coolant level is near the low level or below the low level, add the coolant up to the full level.

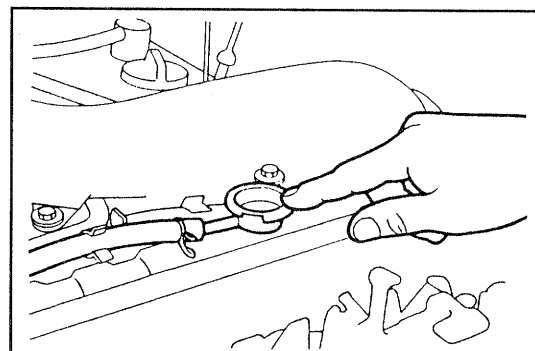


WRU90-CO005

- Check of coolant quality
There should not be any excessive deposits of rust or water scales around the radiator cap or the radiator filler hole. Also, the coolant should be free of oil.
Change the coolant if it is excessively dirty or the time due to change the coolant has already arrived.

WARNING:

Never open the radiator cap when the engine is hot.



WRU90-CO006

COOLING SYSTEM

3. Change of engine coolant
 - (1) Remove the radiator cap.

WARNING:

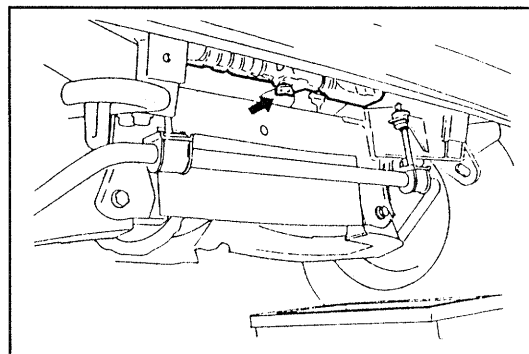
Never open the radiator cap and/or the drain plug when the engine is still hot. Care must be exercised to avoid getting scalded.

WRU90-CO007

- (2) Remove the engine under cover.
- (3) Place an adequate container below the radiator drain plug. Drain the coolant by removing the drain plug.
- (4) Close the drain plug.
- (5) Fill the system with water.
- (6) Start the engine, and stop it.
- (7) Repeat the steps (1) through (5) two to three times.

NOTE:

Replace the drain plug gasket with a new one.

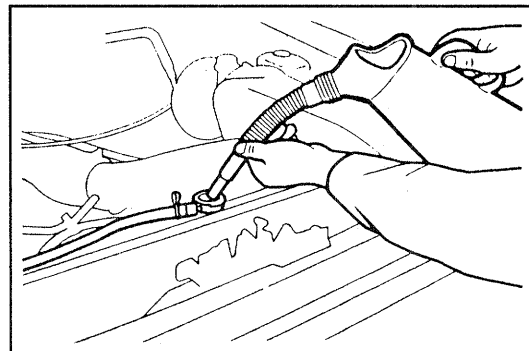


WRU90-CO008

- (8) Fill the radiator and reserve tank with antifreeze solution in accordance with the instructions of the manufacturer of the antifreeze solution.

CAUTION:

Use a Good brand of ethylene-glycol base antifreeze solution.

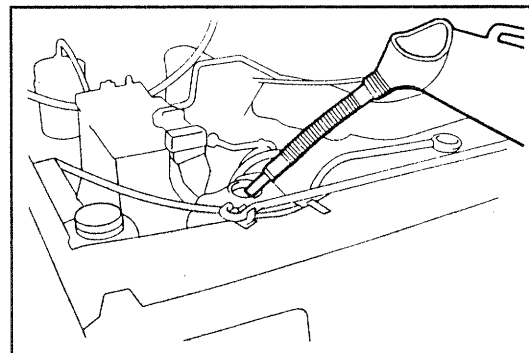


WRU90-CO009

Coolant capacity (Vehicle with front heater):

5.5 liter (5.8 US qt)

[excluding 1.0 liter (1.1 US qt) for reserve tank]



WRU90-CO010

- (9) Fill the system with water.
- (10) Start the engine. Check the coolant level. Add water, as required.
- (11) Tighten the radiator cap.
- (12) Warm the engine. Afterwards, allow the coolant to cool down to the atmospheric temperature. Recheck the coolant level at the reserve tank. Add coolant to the full level, as required.

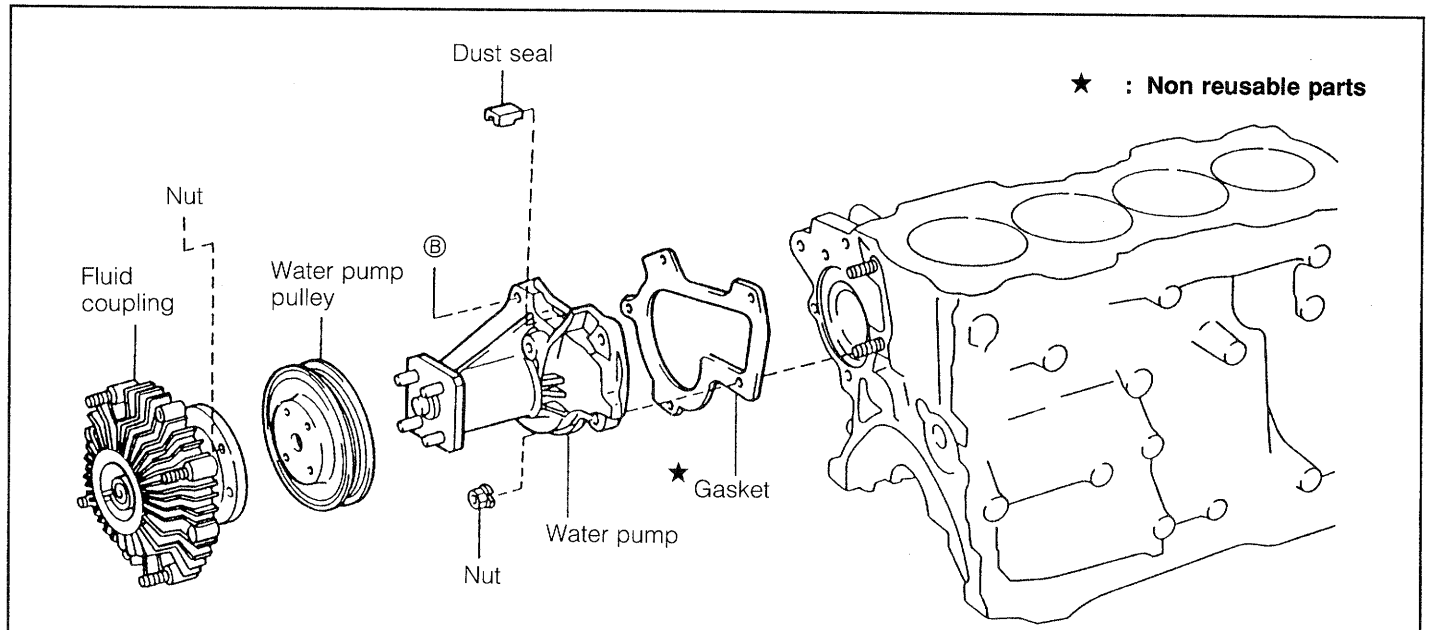
If no coolant remains at all in the reserve tank, recheck the coolant level in the radiator. Replenish the radiator with water, as required. Replenish the reserve tank with coolant up to the full level.

NOTE:

Here, the coolant refers to the mixture of water and antifreeze that has been mixed in accordance with the instructions of the antifreeze manufacturer.

- (13) Install the engine under cover with attaching bolts.

WATER PUMP COMPONENTS



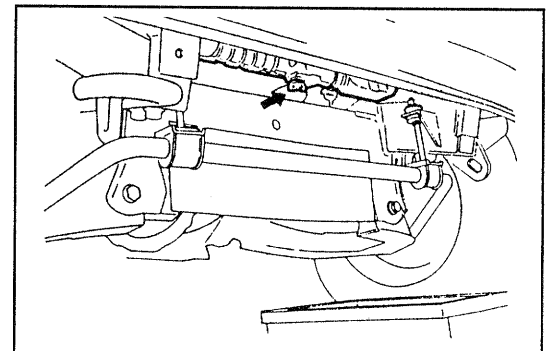
WRU90-CO011

REMOVAL OF WATER PUMP

1. Disconnect the battery ground cable from the negative (-) terminal of the battery.
2. Remove the engine under cover.
3. Drain the coolant. (See page CO-4.)
Open the radiator cap and drain plug, and allow the coolant to drain into a clean container.

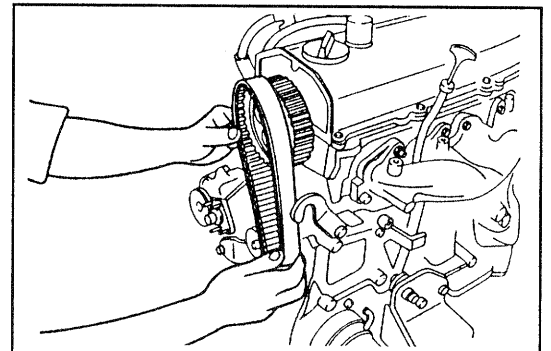
WARNING:

Never open the radiator cap and/or drain plug. When the engine is hot.



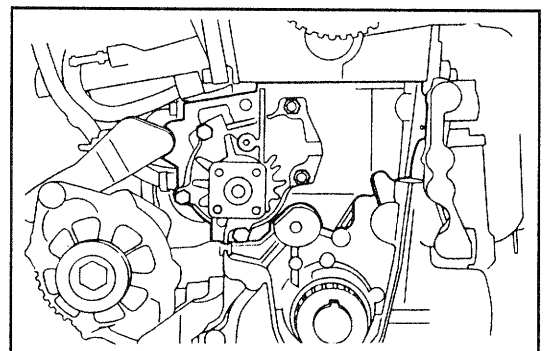
WRU90-CO012

4. Remove the timing belt.
(See pages EM-21.)



WRU90-CO013

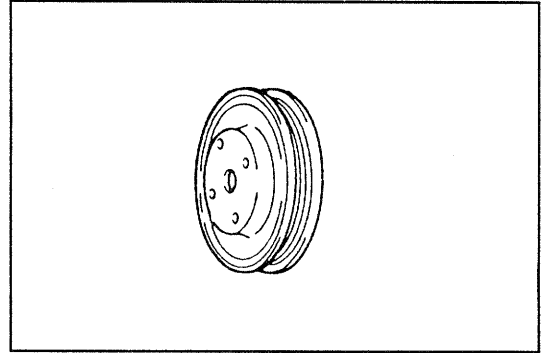
5. Remove the water pump by removing the attaching bolts and nuts of the water pump.



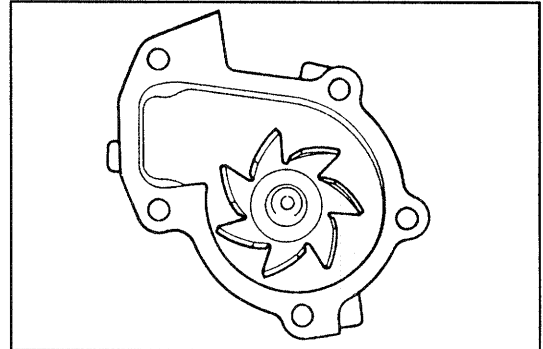
WRU90-CO014

INSPECTION OF WATER PUMP-RELATED PARTS

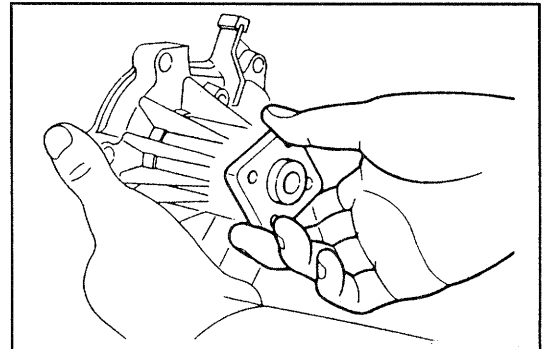
1. Check the water pump pulley for damage or deformation.
Replace the water pump if it exhibits damage or deformation.
2. Visually inspect the water pump rotor for damage or deformation.
Replace the water pump if the water pump rotor exhibits damage or deformation.
3. Ensure that the water pump rotates smoothly by hand.
Replace the water pump if it will not rotate smoothly.
4. Check the water pump cover section of the cylinder block for damage or wear.
Replace the cylinder block if the water pump cover section exhibits damage or wear.



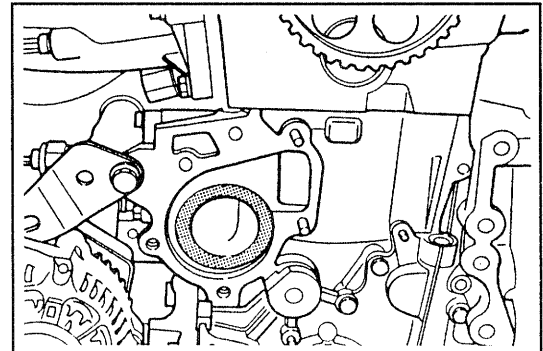
WRU90-CO015



WRU90-CO016



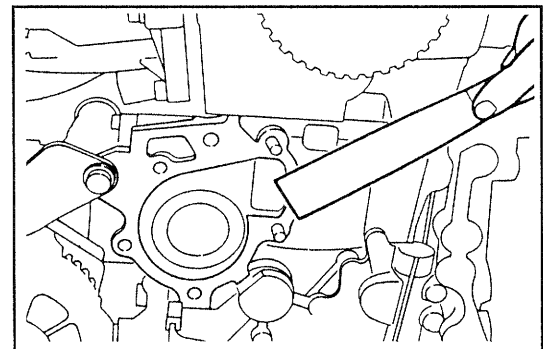
WRU90-CO017



WRU90-CO018

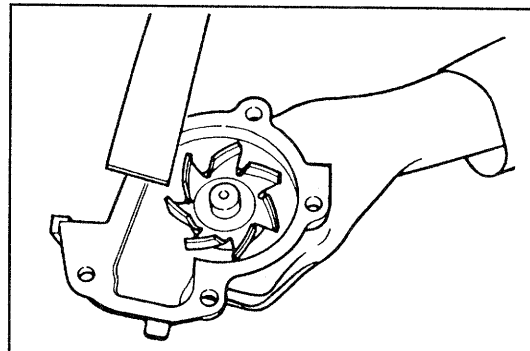
INSTALLATION OF WATER PUMP

1. Remove the gasket material from the water pump installing surface of the cylinder block, using a gasket scraper.



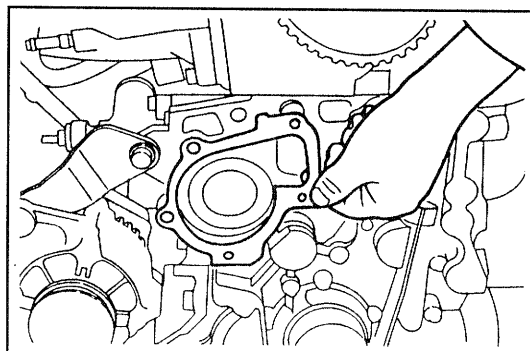
WRU90-CO019

2. Remove the gasket material from the water pump, using a gasket scraper.



WRU90-CO020

3. Install a new gasket to the cylinder block.



WRU90-CO021

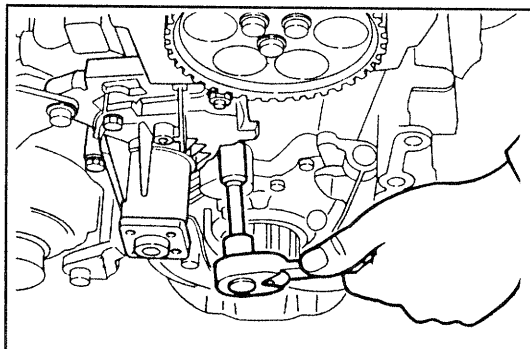
4. Install the water pump to the cylinder block. Tighten the attaching bolts and nuts evenly over two or three stages to the specified torque.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

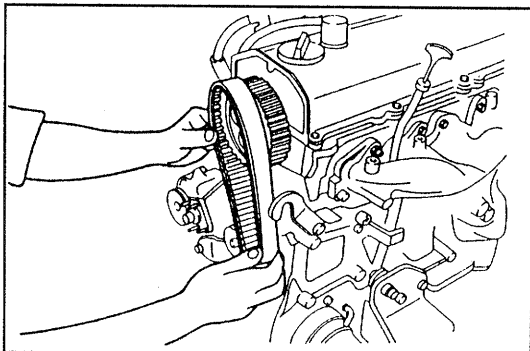
NOTE:

After tightening bolts, ensure that the water pump rotates smoothly by hand.



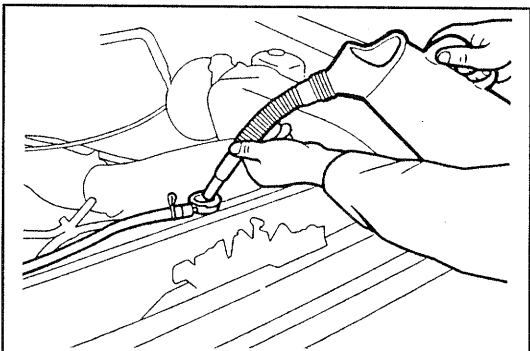
WRU90-CO022

5. Install the timing belt.
(See page EM-30.)



WRU90-CO023

6. Fill coolant.
(See page CO-4.)
7. Install the engine under cover.
8. Connect the battery ground cable to the negative (-) terminal of the battery.



WRU90-CO024

THERMOSTAT

REMOVAL OF THERMOSTAT

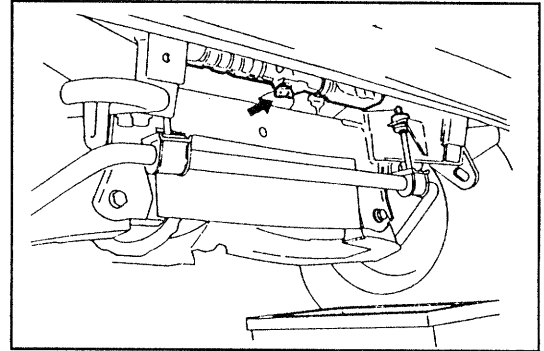
1. Disconnect the ground cable terminal from the negative (-) terminal of battery.
2. Drain the coolant
(See page CO-4.)

WARNING:

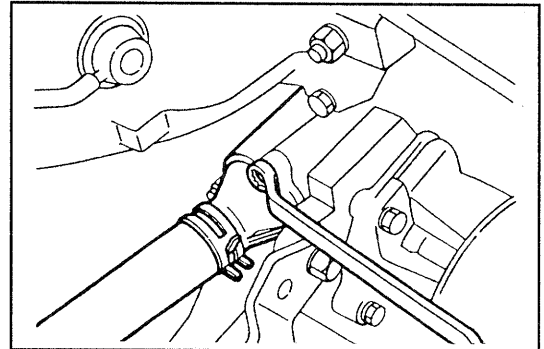
Never open the radiator cap and/or drain plug when the coolant is hot.

3. Remove the power steering vane pump assembly.
(See page EM-37.)
4. Remove the radiator hose No. 2 from the water inlet.
CAUTION:
Cover the alternator to prevent entering the cooling water to the alternator.

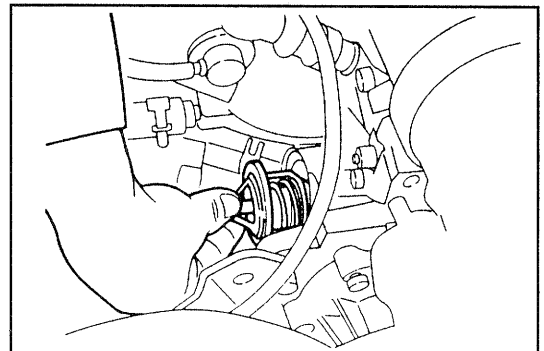
5. Remove the thermostat by removing the water inlet.



WRU90-CO025



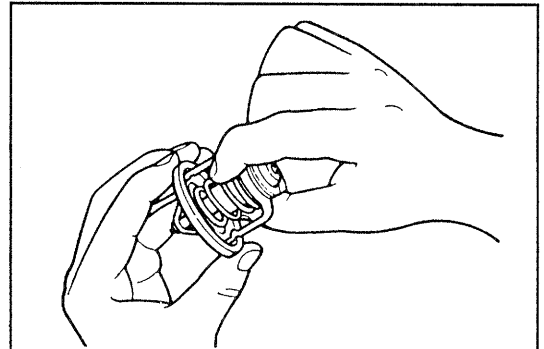
WRU90-CO026



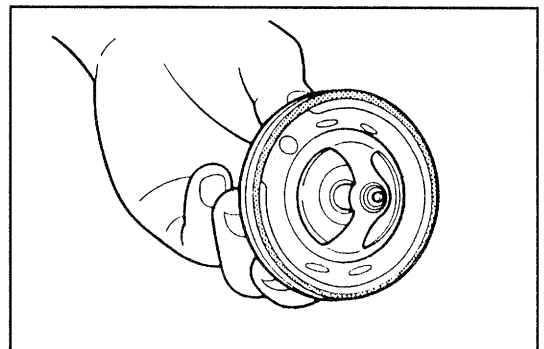
WRU90-CO027

INSPECTION OF THERMOSTAT

1. Ensure that the thermostat valve is closed completely at room temperature 20°C (68°F) and the spring has no play. Replace the thermostat if the valve is open or the spring has a play.
2. Check the rubber grommet of the thermostat for damage or crack. Replace the thermostat if the rubber grommet exhibits damage or crack.



WRU90-CO028

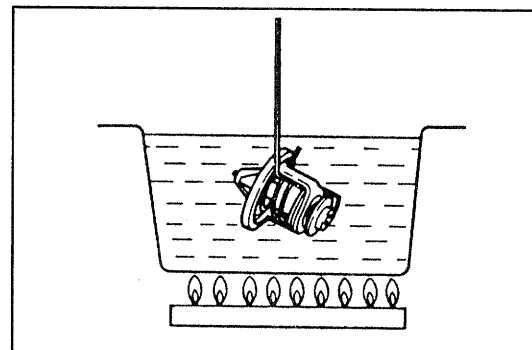


WRU90-CO029

3. Immerse the thermostat in water, and check the valve opening temperature by heating the water gradually.

Specifications	Valve opening temperature °C (°F)	Valve lift
Standard specifications	76 - 80 (168.8 - 176)	8.5 mm or more at 91°C (0.34 inch or more at 195.8°F)
Cold area specifications	82 - 86 (179.6 - 186.8)	8.5 mm or more at 97°C (0.34 inch or more at 208.4°F)

Replace the thermostat if the valve operation fails to conform to the specifications.



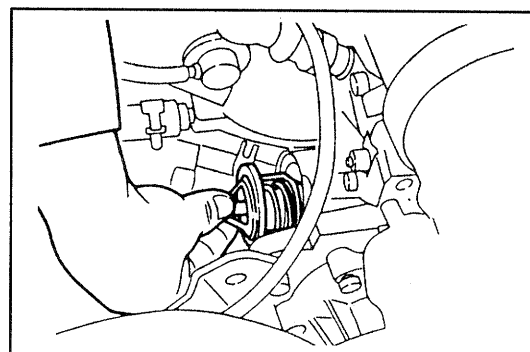
WRU90-CO030

INSTALLATION OF THERMOSTAT

1. Assemble the thermostat in such a way that the jiggle pin comes exactly at the top of the engine.

NOTE:

The thermostat should be installed in such a way the jiggle pin may face upward. Failure to observe this caution may cause engine malfunction.



WRU90-CO031

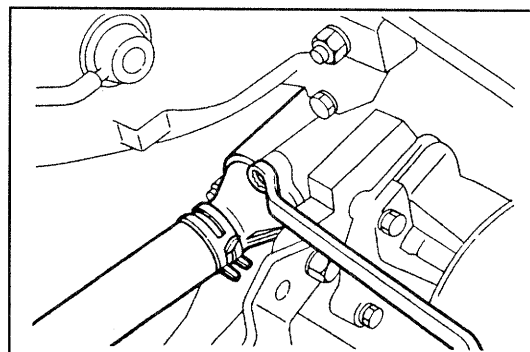
2. Install the water inlet.

Tightening Torque:

0.6 - 0.9 kg-m (4.3 - 6.5 ft-lb, 5.9 - 8.8 N·m)

3. Install the power steering vane pump assembly into position.

(See page EM-77.)



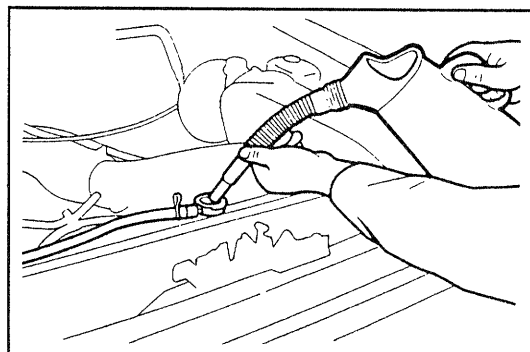
WRU90-CO032

4. Fill coolant.

(See page CO-4.)

5. Connect the battery ground cable to the negative (-) terminal of battery.

6. Start the engine and check it for leakage. Repair the leaky point if the leakage exists.



WRU90-CO033

RADIATOR

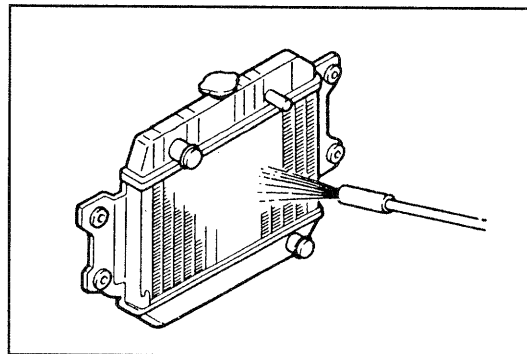
CLEANING OF RADIATOR

Using water or steam cleaner, remove mud and dirt from the radiator core.

CAUTION:

When using a high pressure type cleaner, be careful not to deform radiator core fins.

Keep a distance of more than 40 - 50 cm (16 - 20 inch) between the radiator core and cleaner nozzle when the cleaner nozzle pressure is 30 - 35 kg/cm² (427 - 500 psi). Also, the injection angle of pressurized water should be right angles to the radiator.



WRU90-CO034

INSPECTION OF RADIATOR

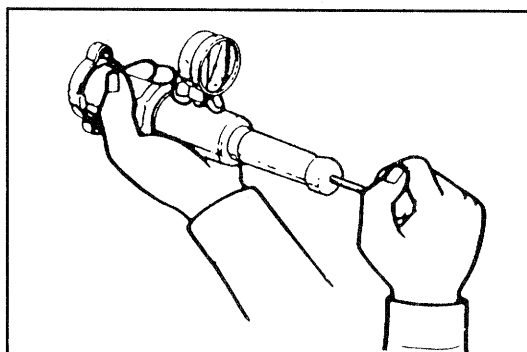
1. Check of radiator cap

- (1) Check the radiator cap by means of a radiator cap tester to see if the relief valve opens at a pressure of 0.6 - 1.05 kg/cm² (8.53 - 14.9 psi).

If the radiator cap does not conform to the specification, replace the radiator cap.

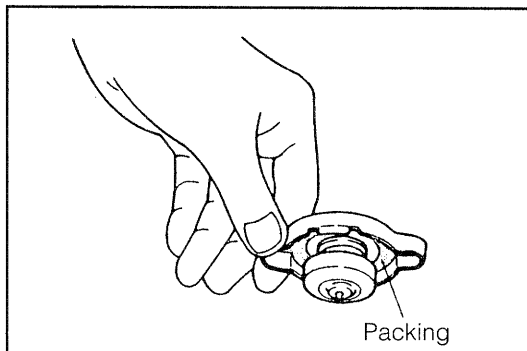
WARNING:

Never open the radiator cap when the engine is hot.



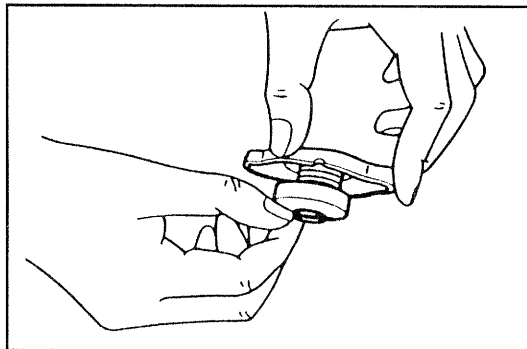
WRU90-CO035

- (2) Check the seal packing of the radiator cap for damage. Replace the radiator cap with a new one, if any damage exists.



WRU90-CO036

- (3) Lift the valve at the vacuum side with your fingers. Ensure that the valve is functioning properly. Replace the radiator cap with a new one, if the valve fails to function.

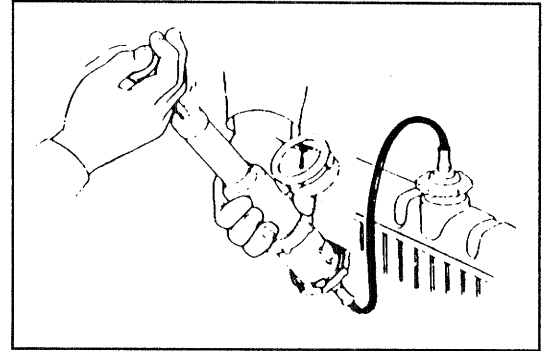


WRU90-CO037

2. Check of cooling system for leakage
 - (1) Fill the radiator with coolant. Attach a radiator cap tester.
 - (2) Warm up the engine.
 - (3) Apply a pressure of 1.2 kg/cm² (17 psi) to the cooling system by means of a radiator tester.
If the pressure drops, check the hoses, radiator, water pump and heater for evidence of leakage.
If no external leakage is found, check the heater core, cylinder block, cylinder head, oil cooler and throttle body for evidence of leakage.
Check the hoses for deterioration, cracks, bulge or damage.
Replace the defective part(s) if necessary.
 - (4) Remove the radiator cap tester from the radiator.

WARNING:

Never remove the radiator cap tester when the coolant temperature is high.



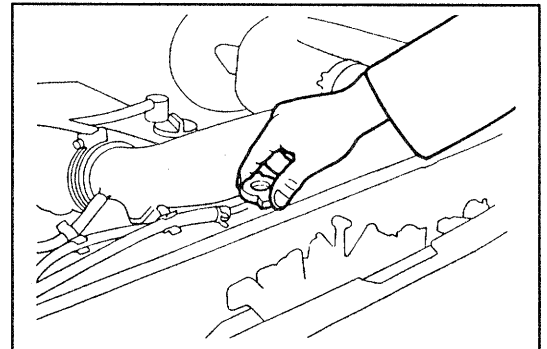
WRU90-CO038

REMOVAL OF RADIATOR

1. Disconnect the battery ground cable terminal from the negative (-) terminal of the battery.
2. Drain the coolant as follows:
 - (1) Remove the radiator cap.

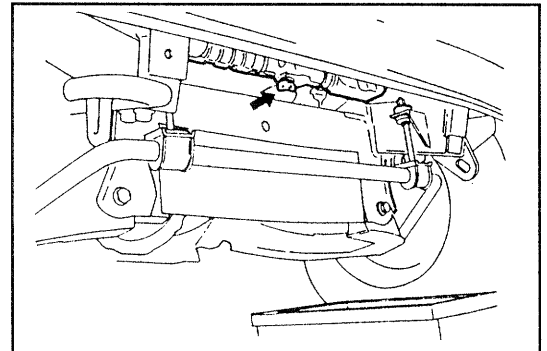
WARNING:

Never open the radiator cap and/or drain plug when the coolant is hot.



WRU90-CO039

- (2) Remove the engine under cover.
- (3) Place a suitable container below the radiator drain plug.
Drain the coolant by removing the drain plug.
- (4) Tighten the drain plug.

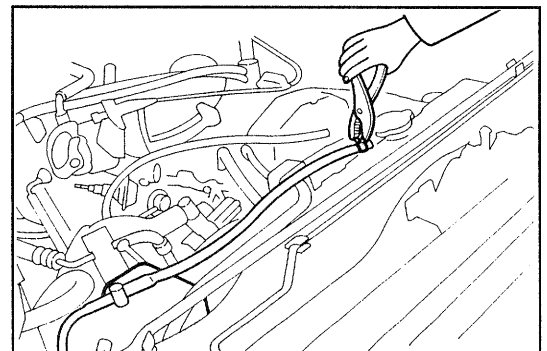


WRU90-CO040

3. Removal of radiator
 - (1) Remove the reserve tank.
 - (2) Temporarily detach the power steering vane pump.
(See page EM-41.)
 - (3) Remove the radiator hose No. 1 and No. 3 at radiator side.

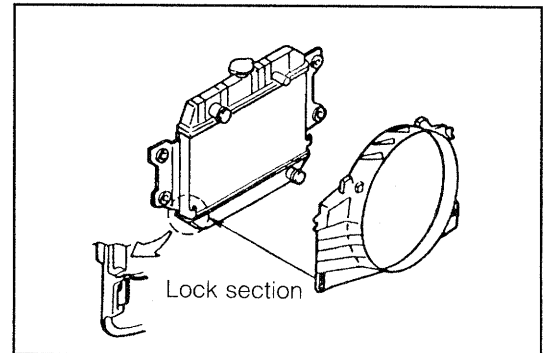
CAUTION:

When the radiator hose is loosened, be sure to protect the alternator because the coolant flows out.

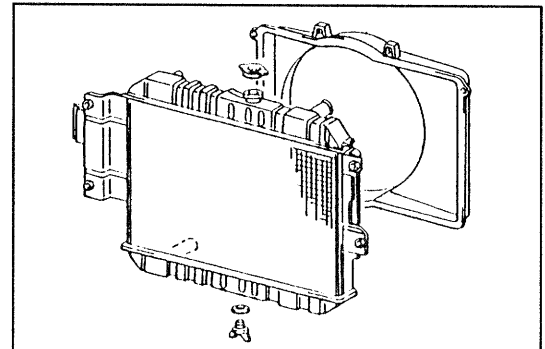


WRU90-CO041

- (4) Disconnect the breather hose from the radiator upper tank.
- (5) Remove the three clamps for clutch cable on the fan shroud.
- (6) Remove the air cleaner and hose assembly.
(See page EM-22.)
- (7) Disconnect the oil cooler hose from the radiator lower tank.
- (8) Remove the two attaching bolts of the fan shroud. Then, disconnect the lock section of the fan shroud from radiator.
- (9) Remove the radiator grill.
(See page EM-4.)
- (10) Remove the radiator by removing the four attaching bolts.
- (11) Remove the fan shroud.

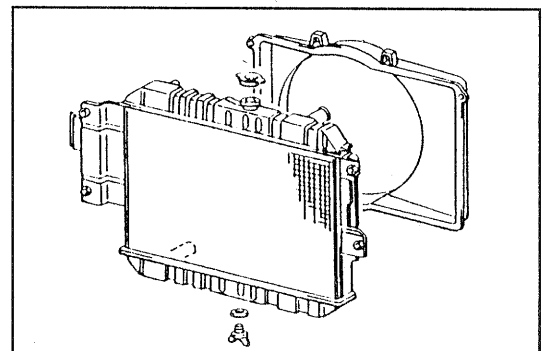


WRU90-CO042



INSTALLATION OF RADIATOR

1. Radiator installation
 - (1) Place the radiator fan shroud to the cooling fan side.
 - (2) Install the radiator in the engine room. Then, tighten the four attaching bolts.

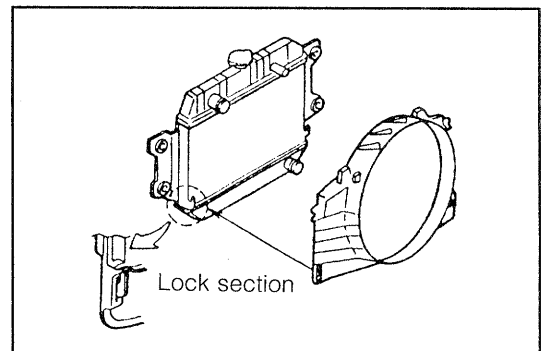


- (3) Install the radiator fan shroud with two attaching bolts.

NOTE:

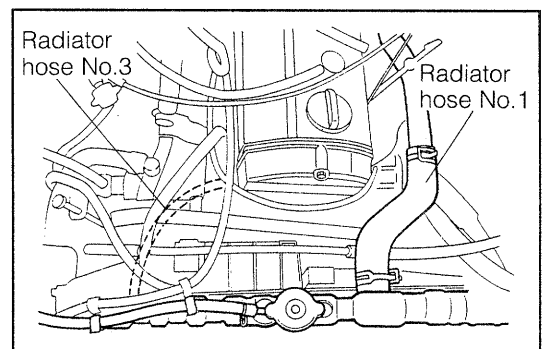
Before attaching the fan shroud to the radiator, insert the lock section of the fan shroud to the lower section of the radiator.

- (4) Install the radiator grill.



WRU90-CO045

- (5) Connect the radiator hose No. 1 to the radiator upper tank.
- (6) Connect the radiator hose No. 3 to the radiator lower tank.



WRU90-CO046

(7) Connect the oil cooler hose to the radiator lower tank.

NOTE:

Ensure that the clamp is securely installed.

(8) Install the power steering vane pump.

(See page EM-77.)

(9) Clamp the clutch cable on the fan shroud with the three clamps.

(10) Install the reserve tank and breather pipe to the radiator.

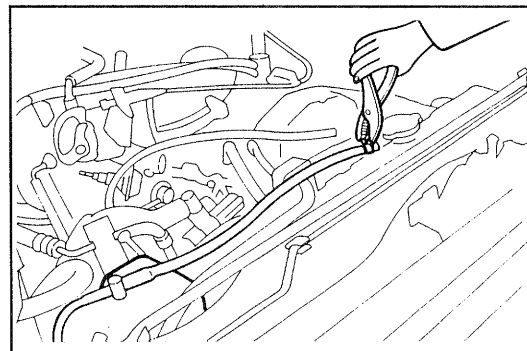
(11) Install the air cleaner and hose assembly into the position.

2. Fill the coolant.

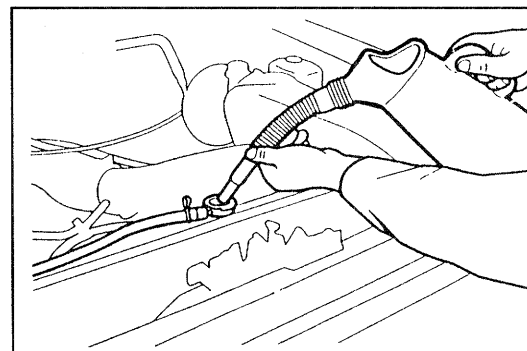
(See page CO-4.)

3. Connect the battery ground cable to the negative (-) terminal of the battery.

4. Start the engine and check it for leakage.
Repair the leaky point if leakage exists.



WRU90-CO047



WRU90-CO048

DAIHATSU

Rocky

LU

LUBRICATION SYSTEM

DESCRIPTION	LU-2
TROUBLE SHOOTING	LU-3
OIL PRESSURE CHECK	LU-3
ENGINE OIL CHANGE & OIL FILTER REPLACEMENT	LU-5
OIL COOLER	LU-7

WRU90-LU001

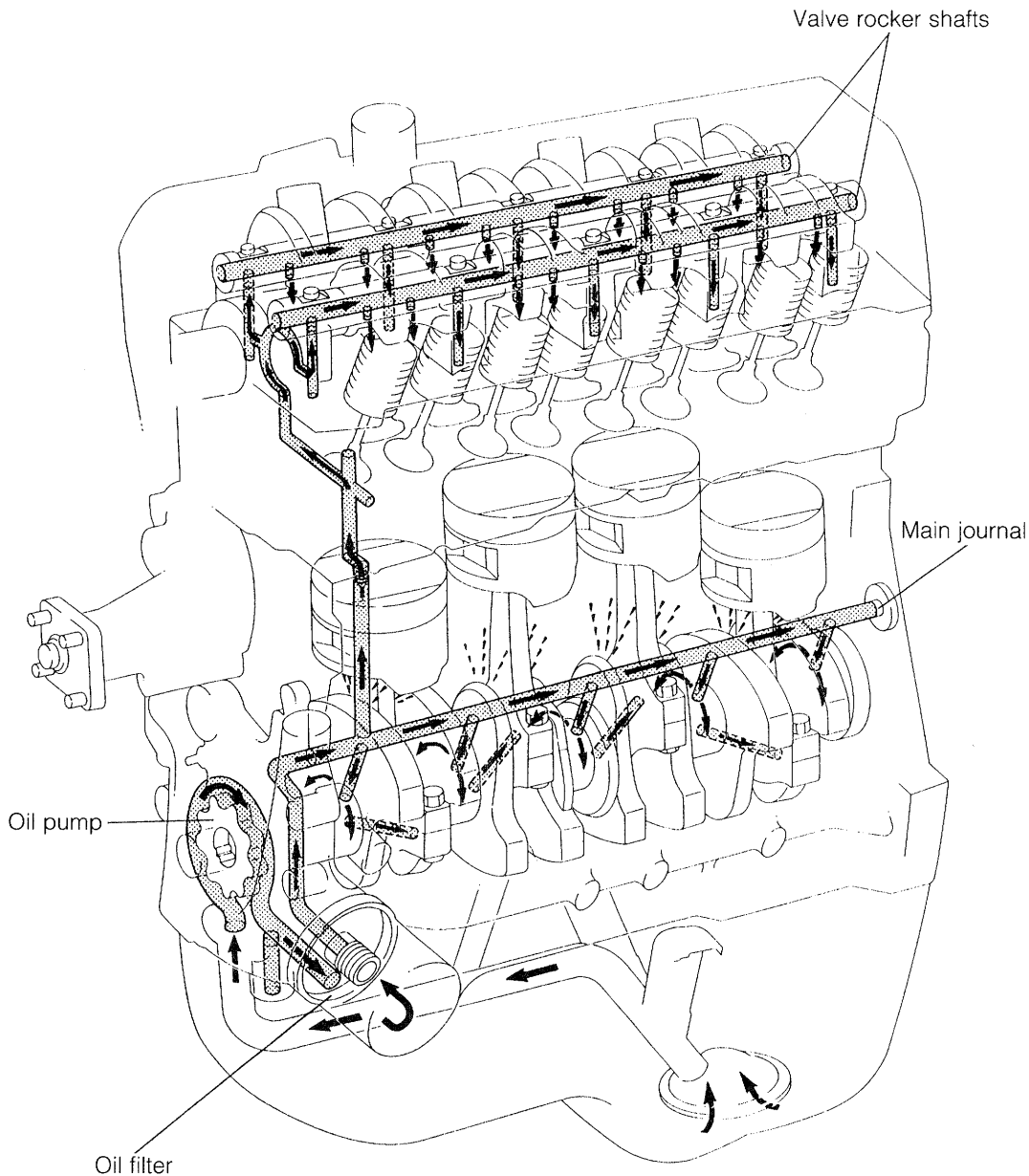
DESCRIPTION

The lubrication system employs a fully-forced feed, filtering method.

The oil stored in the oil pan is sucked by an oil pump which is directly driven by the crankshaft. Then, the thus-sucked oil flows through an oil pump strainer and is filtered at an oil filter. After having passed through the passages of the cylinder block, it will be divided into two streams so as to lubricate various sections.

One stream of the lubrication oil performs lubrication of various sections of the crankshaft and connecting rod- and piston-related parts. The other stream of the lubrication oil rises to the cylinder head section.

Then, it performs lubrication of the camshaft and valve rocker shaft-related parts.



TROUBLE SHOOTING

Problem	Possible causes	Remedies	Page
Oil leakage	Cylinder head, cylinder block, oil cooler or oil pump body damaged or cracked Oil seal faulty Gasket faulty	Repair, if necessary. Replace oil seal. Replace gasket.	EM- 36
Low oil pressure	Oil leakage Relief valve faulty Oil pump faulty Poor quality engine oil Crankshaft bearing faulty Connecting rod bearing faulty Oil filter clogged Low oil level	Repair, as necessary. Replace relief valve. Repair oil pump. Change engine oil Replace bearing. Replace bearing. Replace oil filter. Check oil level	EM-122 EM-121 LU- 2 EM-106 EM-110 LU- 5 LU- 3
High oil pressure	Relief valve faulty	Replace relief valve.	EM-122

WRU90-LU003

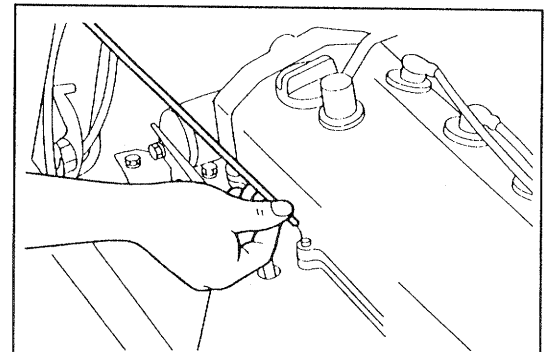
OIL PRESSURE CHECK

1. Oil quality check

Check the oil for deterioration, water entry, discoloring or dilution.

If oil quality is poor, change the oil.

Use API grade SG or SF multigrade viscosity, fuel-efficient oil. (See page LU-5.)



WRU90-LU004

2. Oil level check

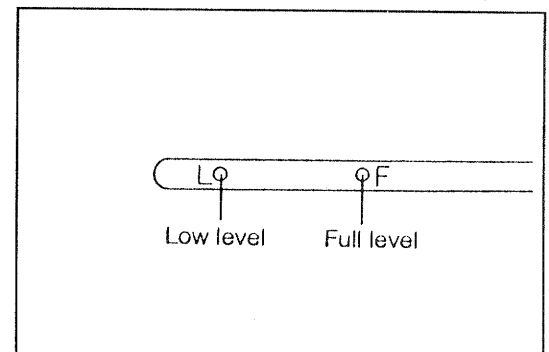
The oil level should be between the L and F levels on the dipstick.

If the level is low, check to see if any oil leakage is present.

Add oil to the F level.

NOTE:

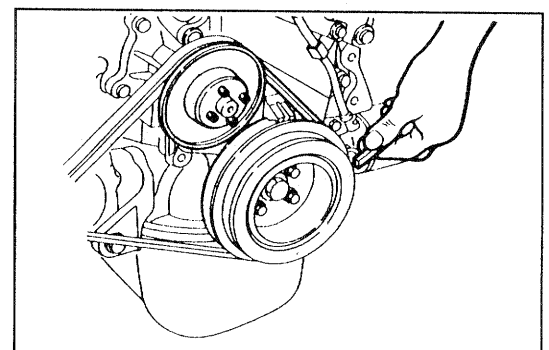
The amount of oil between the [L] level and the [F] equals to one liter (1.1 US qt.).



WRU90-LU005

3. Oil pressure check

- (1) Disconnect the battery ground cable from the negative (–) terminal of the battery.
- (2) Remove the air cleaner and hose assembly.
- (3) Temporarily detach the air conditioner compressor assembly. (See EM-86.)
- (4) Disconnect the oil pressure switch connector.



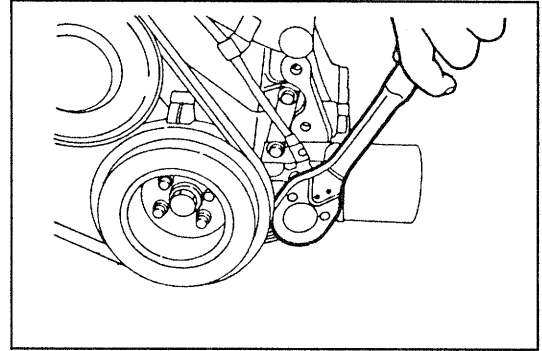
WRU90-LU006

LUBRICATION SYSTEM

(5) Remove the oil pressure switch.

NOTE:

Use a hexagonal long box wrench for the removal.



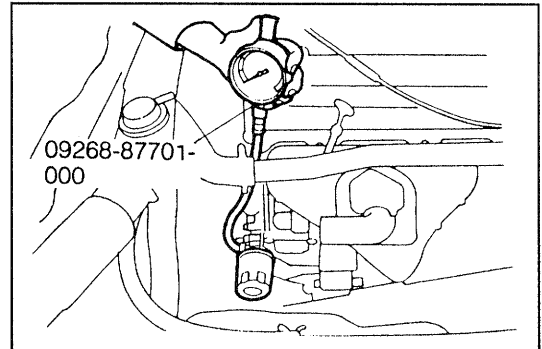
WRU90-LU007

(6) Install the oil pressure gauge.

NOTE:

The pressure gauge is available as a SST.

SST: 09268-87701-000



WRU90-LU008

(7) Start the engine and warm it to the normal operating temperature. Check the oil pressure.

At Idle Speed: More Than 0.2 kg/cm² (2.8 psi)

At 3000 rpm: 2.5 - 5.0 kg/cm² (35.6 - 71.0 psi)

If the measured value fails to conform to the specified value, check and repair the oil pump.

(See page EM-121.)

(8) Stop the engine.

(9) Remove the oil pressure gauge.

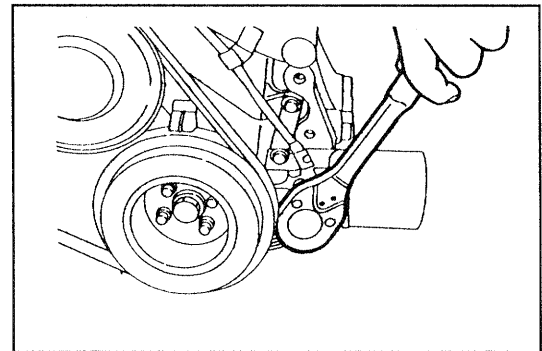
(10) Clean the threaded portion of the oil pressure switch. Wind seal tape around the threaded portion. Install the oil pressure switch in the oil pump.

Tightening Torque:

1.2 - 2.0 kg-m (8.7 - 14.5 ft-lb, 11.8 - 19.6 N-m)

NOTE:

- Use a hexagonal long box wrench for the installation.
- The new oil pressure switch is coated with sealing materials.



WRU90-LU009

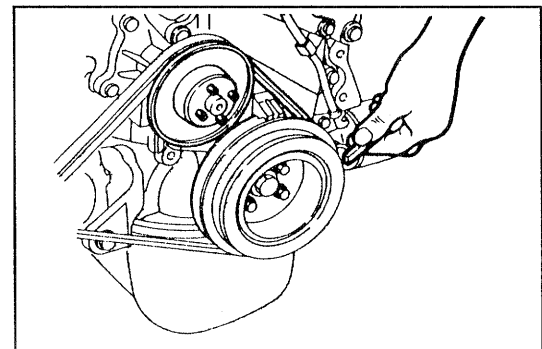
(11) Connect the connector of the oil pressure switch.

(12) Install the air conditioner compressor assembly onto bracket. (See page EM-146.)

(13) Install the air cleaner and hose assembly into position. (See page EM-35.)

(14) Connect the battery ground cable to the negative (-) terminal of the battery.

(15) Start the engine and check it for oil leakage. Repair the leaky point if oil leakage exists.



WRU90-LU010

ENGINE OIL CHANGE & OIL FILTER REPLACEMENT

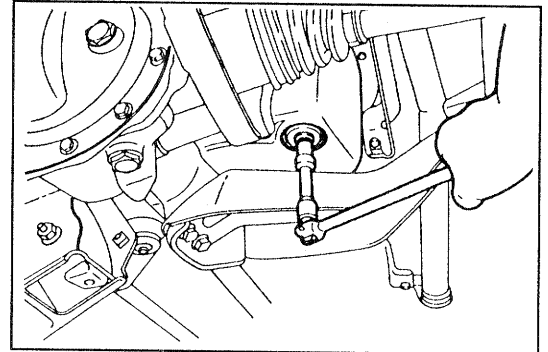
1. Drain the engine oil as follows:
 - (1) Disconnect the battery ground cable from the negative (-) terminal of the battery.
 - (2) Place a suitable container under the oil drain plug.
 - (3) Remove the engine under cover.
 - (4) Drain the oil by removing the oil drain plug.

WARNING:

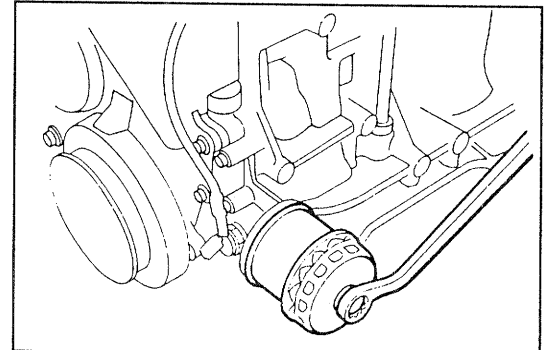
When the oil is still hot, care must be exercised to avoid getting scalded.

2. Oil filter replacement
 - (1) Remove the air cleaner and hose assembly.
 - (2) Remove the oil filter element, using the oil filter remover.

NOTE:
Place a suitable container under the oil filter because the engine oil flows out.

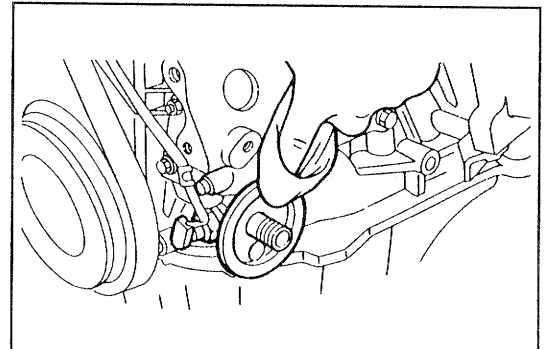


WRU90-LU011



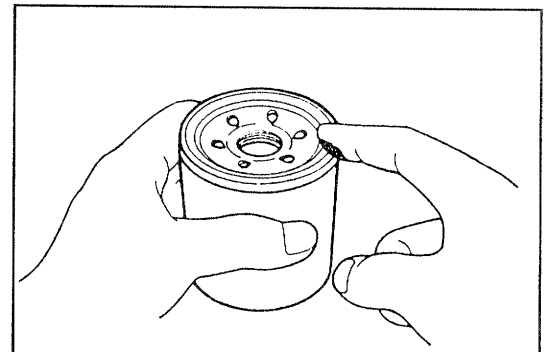
WRU90-LU012

- (3) Inspect and clean the oil filter installation surface.



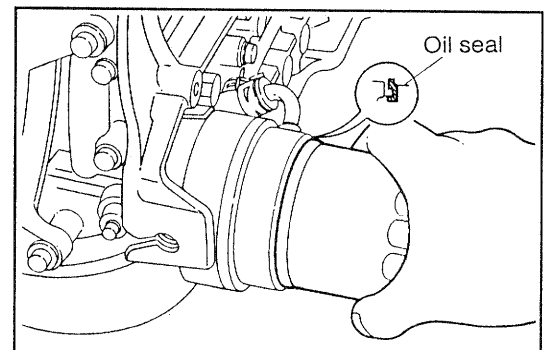
WRU90-LU013

- (4) Thinly apply engine oil to the "O" ring of a new oil filter.



WRU90-LU014

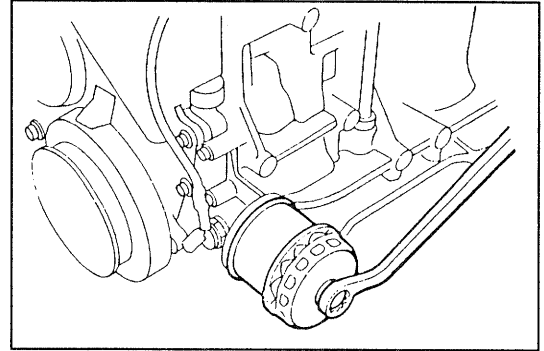
- (5) Screw in the oil filter by hand, until the "O" ring of the oil filter contacts the oil filter installing surface.



WRU90-LU015

LUBRICATION SYSTEM

- (6) Tighten the oil filter three fourths to one complete turn, using the oil filter remover.
- (7) Install the air cleaner and hose assembly into position.
(See page EM-35.)



WRU90-LU016

3. Filling engine oil

- (1) Clean the oil drain plug. Install it with a new gasket interposed.

NOTE:

Remove any remaining gasket material from the oil pan, using a gasket scraper.

Tightening Torque:

2.0 - 3.0 kg-m (14.5 - 21.7 ft-lb, 19.6 - 29.4 N·m)

- (2) Fill the engine with engine oil.

The oil should be API grade SG or SF multigrade viscosity, fuel-efficient oil.

Oil capacity

When only engine oil is changed:

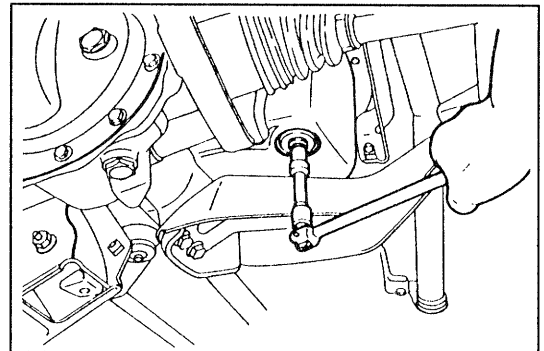
3.3 liter (3.5 US qt.)

When engine oil is changed and oil filter is replaced:

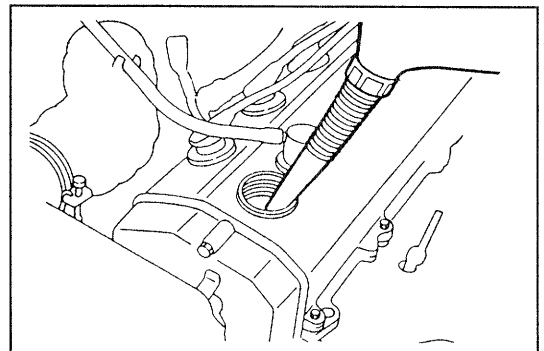
3.5 liter (3.7 US qt.)

After engine has been overhauled or when engine oil has been drained completely from engine:

3.8 liter (4.0 US qt.)

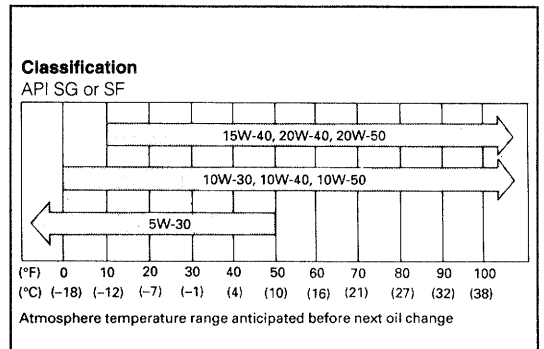


WRU90-LU017



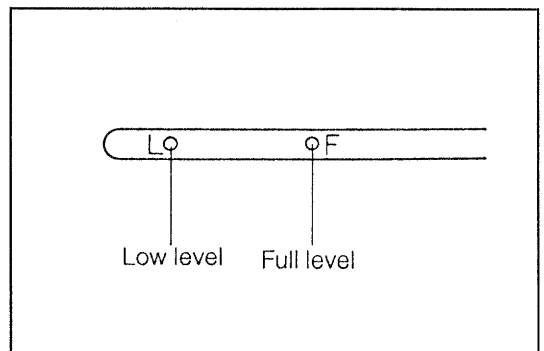
WRU90-LU018

- (3) Connect the battery ground cable to the negative (-) terminal of the battery.



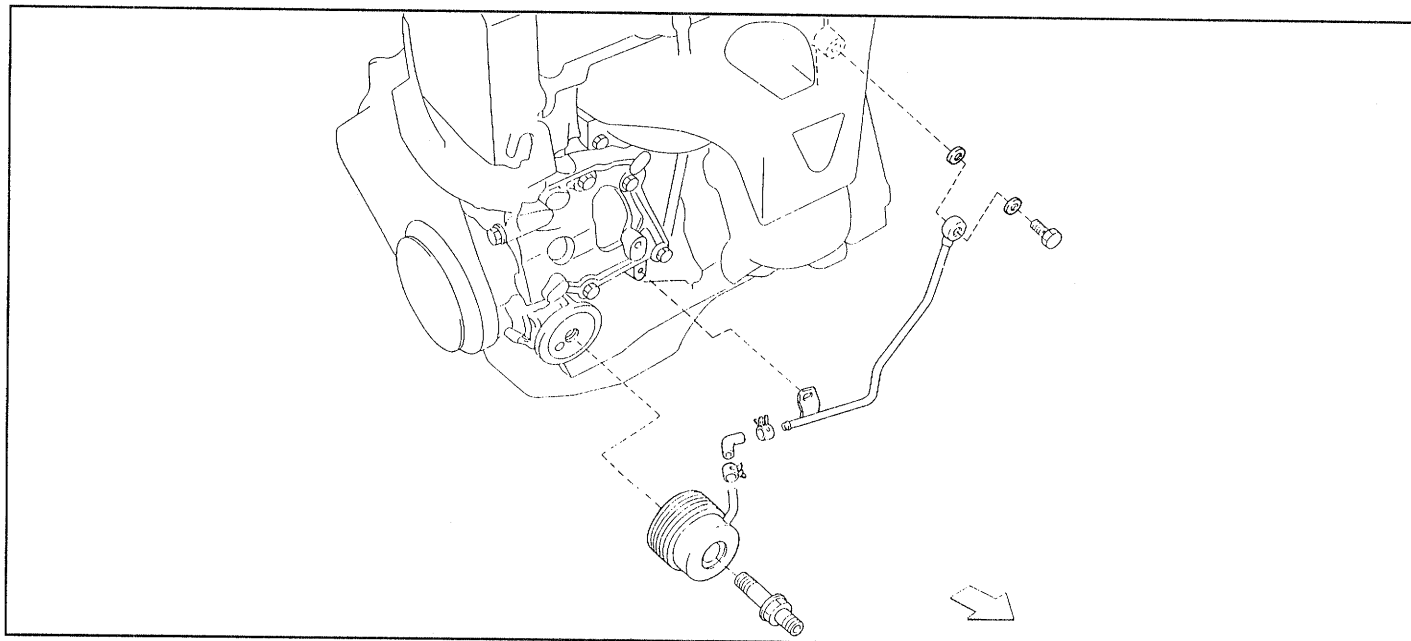
WRU90-LU019

- (4) Start the engine and check it for leakage.
Repair the leaky point if oil leakage exists.
- (5) Stop the engine. After a lapse of two or three minutes, check the oil level.
If oil level is less than the full level, replenish the oil to the full level.



WRU90-LU020

OIL COOLER COMPONENTS



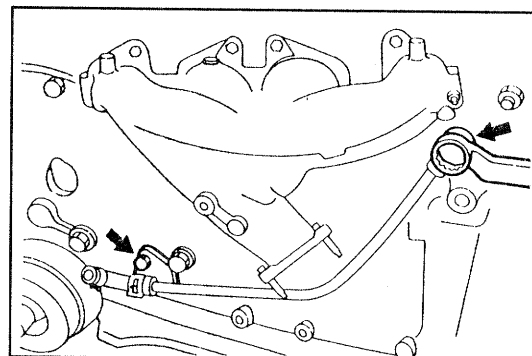
WRU90-LU021

REMOVAL OF OIL COOLER

1. Disconnect the battery ground cable from the negative (-) terminal of the battery.
2. Drain the coolant. (See page CO-4.)
3. Remove the air cleaner and hose assembly.
4. Temporarily remove the air conditioner compressor assembly. (See EM-86.)
5. Remove the oil filter. (See page LU-5.)
6. Disconnect the oil cooler hose at the radiator side.

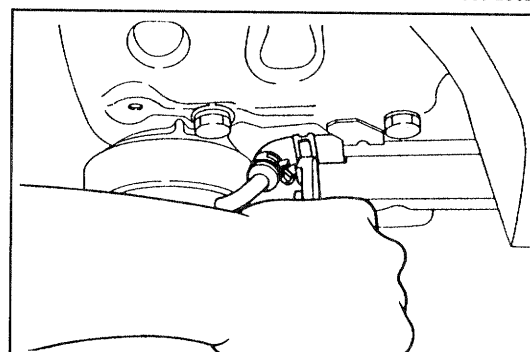
WRU90-LU022

7. Disconnect the oil cooler pipe from the cylinder block.



WRU90-LU023

8. Remove the oil cooler pipe from the hose by sliding the hose bands.



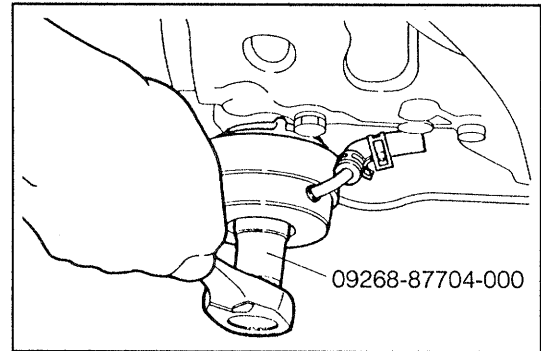
WRU90-LU024

LUBRICATION SYSTEM

9. Remove the oil cooler, using the following SST.
SST: 09268-87704-000

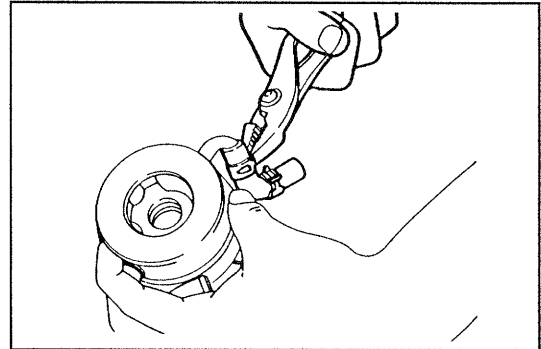
NOTE:

Place a suitable container below the oil cooler attaching section so as to receive any oil and water flowing from the oil cooler.



WRU90-LU025

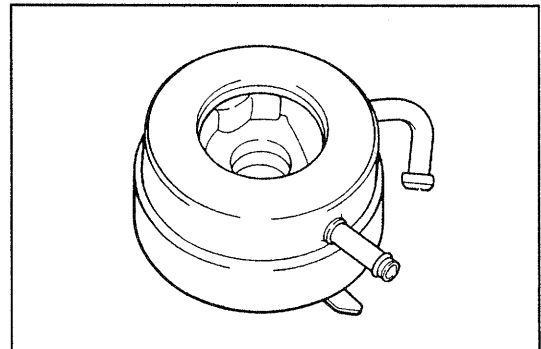
10. Disconnect the water hose from the oil cooler.



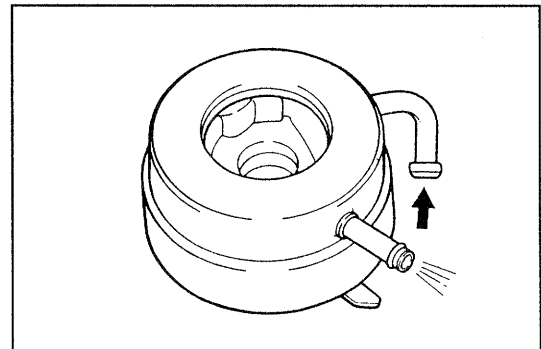
WRU90-LU026

INSPECTION OF OIL COOLER

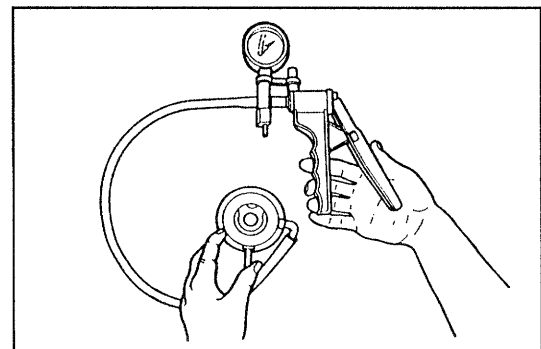
1. Check the oil cooler for damage.
Replace the oil cooler if the oil cooler exhibits damage.
2. Blow air from one end of the oil cooler pipe. Ensure that air continuity exists.
3. With one end of the oil cooler pipe plugged with your finger, apply a negative pressure of 100 mmHg (3.937 inchHg) to the other end, using a MityVac or a vacuum pump. Ensure that the applied negative pressure is retained.
If the negative pressure is not kept, replace the oil cooler.



WRU90-LU027

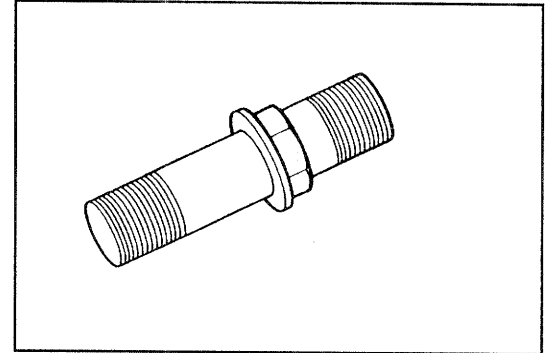


WRU90-LU028



WRU90-LU029

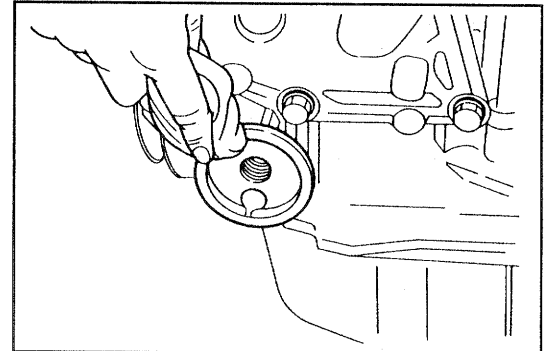
4. Check the oil cooler set bolt for damage.
Replace the oil cooler set bolt if it exhibits damage.



WRU90-LU030

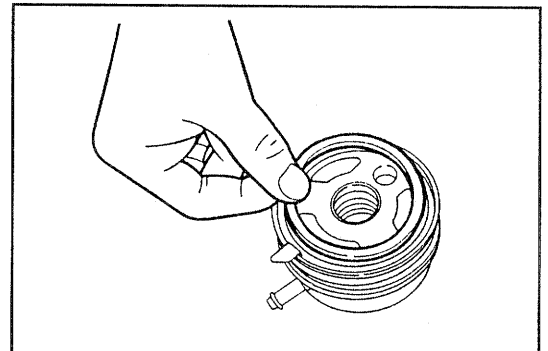
INSTALLATION OF OIL COOLER

1. Clean the oil cooler attaching surface of the oil pump.



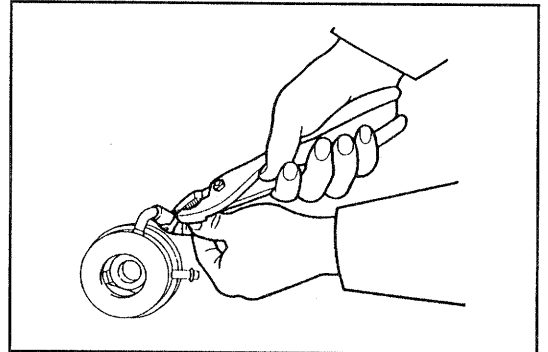
WRU90-LU031

2. Install the new "O" ring on the cooler.



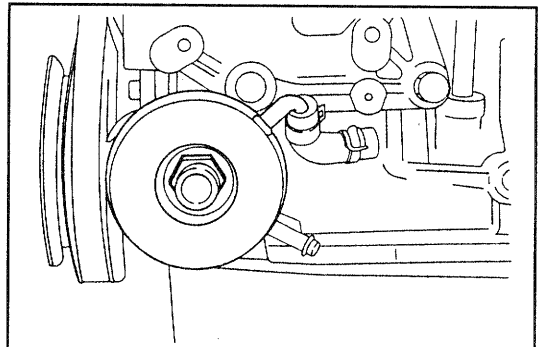
WRU90-LU032

3. Connect the water hose to the oil cooler. Attach the hose bands.



WRU90-LU033

4. Using the set bolts, install the oil cooler by making the locating rib of the oil cooler contact with the cylinder block.
NOTE:
Care must be exercised to ensure that the "O" ring may not be displaced during the installation.



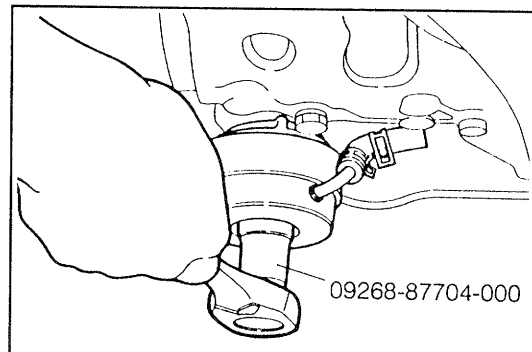
WRU90-LU034

5. Tighten the set bolts to the specified torque, using the following SST.

SST: 09268-87704-000

Tightening Torque:

2.5 - 3.5 kg-m (18.1 - 25.3 ft-lb, 24.5 - 34.3 N-m)

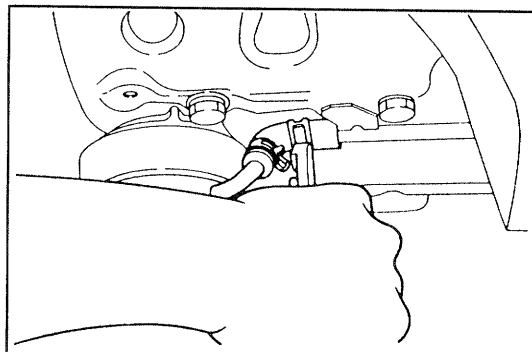


WRU90-LU035

6. Connect the oil cooler inlet pipe to the oil cooler hose that has been installed on the oil cooler.

NOTE:

Install the oil cooler pipe, by taking into consideration an angle at which it is mounted on the cylinder block.

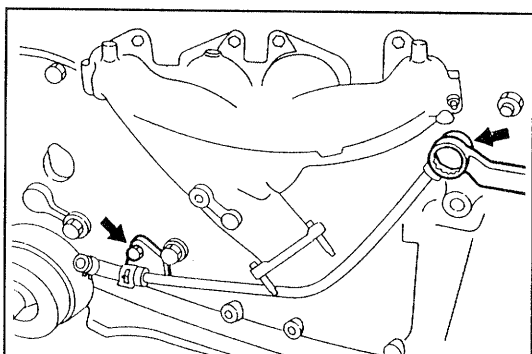


WRU90-LU036

7. Connect the oil cooler hose to the radiator lower tank.

NOTE:

Ensure that the clamp is securely installed.



WRU90-LU037

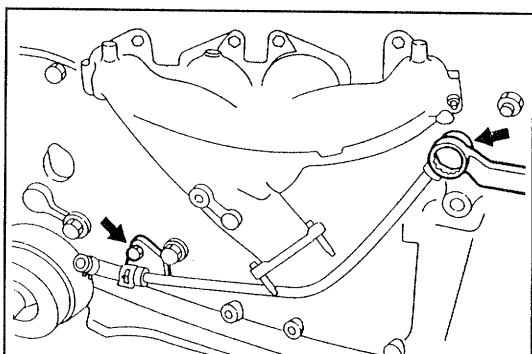
8. Install the oil cooler pipe on the cylinder block with a new gasket interposed.

Tightening Torque (Union bolt):

2.5 - 3.5 kg-m (18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)

NOTE:

Never reuse the gasket.



WRU90-LU037

9. Installation of oil filter
- (1) Clean the oil filter installation surface of the oil cooler.
 - (2) Install the oil filter. (See page LU-6.)
10. Install the air conditioner compressor assembly. (See EM-146.)
11. Install the air cleaner and hose assembly onto position. (See EM-35.)
12. Fill coolant. (See page CO-4.)
13. Connect the battery ground cable to the negative (-) terminal of the battery.
14. Start the engine. Check to see if any oil leakage or fuel leakage is present.
If the engine exhibits any defect, repair it or replace the defective part, as required.
15. Stop the engine. After two or three minutes, check the engine oil level, using the oil level gauge. Replenish engine oil to the FULL level, as required. (See page LU-6.)

WRU90-LU038



IGNITION SYSTEM



PRECAUTIONS	IG-2
TROUBLE SHOOTING	IG-2
IGNITION SYSTEM	IG-3
DISTRIBUTOR	IG-9

WRU90-IG001

PRECAUTIONS

1. Do not leave the ignition key switch turned ON for more than ten minutes while the engine is stopped.
2. When a tachometer is connected to the system, connect the test probe of the tachometer to the negative (–) terminal of the ignition coil.
3. As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility of your unit before using.
4. Never allow the ignition coil terminals to touch ground. It could result in damage to the ignitor and/or the ignition coil.
5. Do not disconnect the battery cable when the engine is running.
6. Make sure that the igniter is properly grounded to the body.

WRU90-IG002

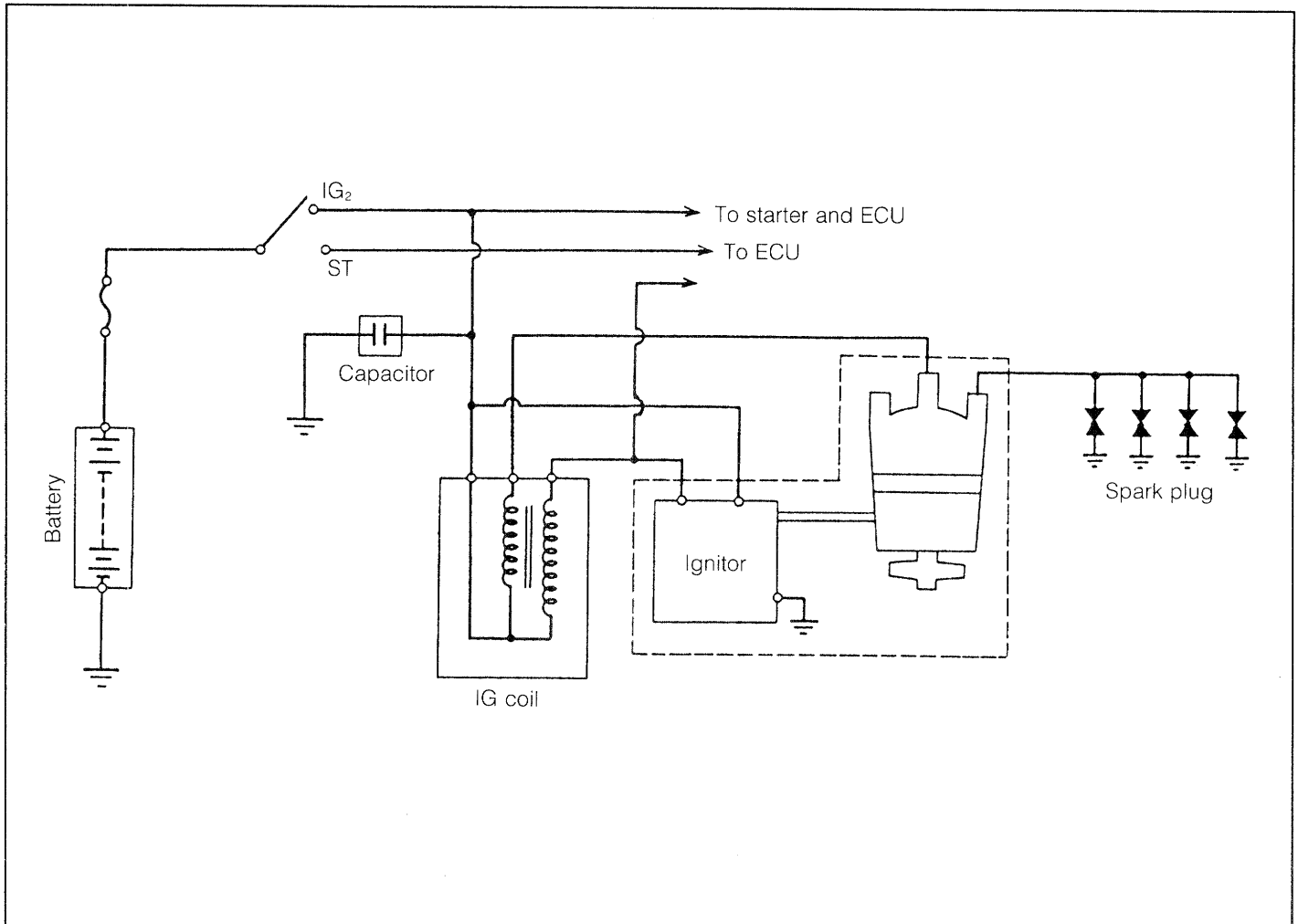
TROUBLE SHOOTING

Problem	Possible causes	Remedies	Page
Engine will not start/hard to start. (Engine crank normally.)	Incorrect ignition timing Ignition coil faulty Igniter faulty Distributor faulty Spark plug wires faulty Spark plugs faulty Ignition wiring disconnected or broken	Reset timing. Inspect coil. Inspect igniter. Inspect distributor. Inspect spark plug wires. Inspect plugs. Inspect wiring.	IG–22 IG–8 IG–3, IG–5 IG–10 IG–5 IG–6
Rough idle or engine stalls.	Spark plugs faulty Ignition wiring faulty Incorrect ignition timing Ignition coil faulty Igniter faulty Distributor faulty Spark plug wires faulty	Inspect plugs. Inspect wiring. Reset timing. Inspect coil. Inspect igniter. Inspect distributor. Inspect spark plug wires.	IG–6 IG–22 IG–8 IG–3, IG–5 IG–10 IG–5
Engine hesitation/poor acceleration	Spark plugs faulty Ignition wiring faulty Incorrect ignition timing	Inspect plugs. Inspect wiring. Reset timing.	IG–6 IG–22
Engine dieseling (Engine runs after ignition switch is turned OFF.)	Incorrect ignition timing	Reset timing.	IG–22
Muffler explosion (after fire) all the time	Incorrect ignition timing	Reset timing.	IG–22
Engine backfire	Incorrect ignition timing	Reset timing.	IG–22
Poor fuel economy	Spark plugs faulty Incorrect ignition timing	Inspect plugs. Reset timing.	IG–6 IG–22
Engine overheating	Incorrect ignition timing	Reset timing.	IG–22

WRU90-IG003

IGNITION SYSTEM

IGNITION SYSTEM CIRCUIT



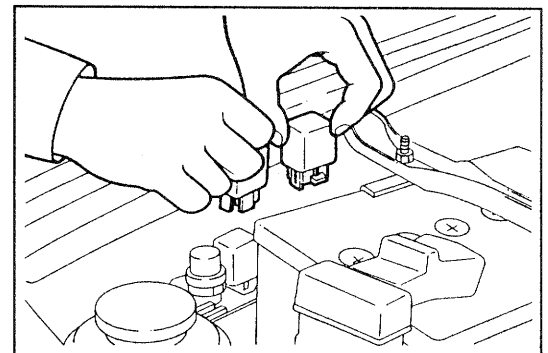
WRU90-IG004

IN-VEHICLE INSPECTION

Spark Test

(Check to see if spark occurs)

1. Turn OFF the ignition key switch.
2. Disconnect the fuel pump relay and injector relay from the relay box.



WRU90-IG005

3. Connect a timing light to the spark plug wire between the distributor and the ignition coil.

WRU90-IG006

IGNITION SYSTEM

4. Ensure that the timing light flashes while the engine is being cranked by the starter motor.

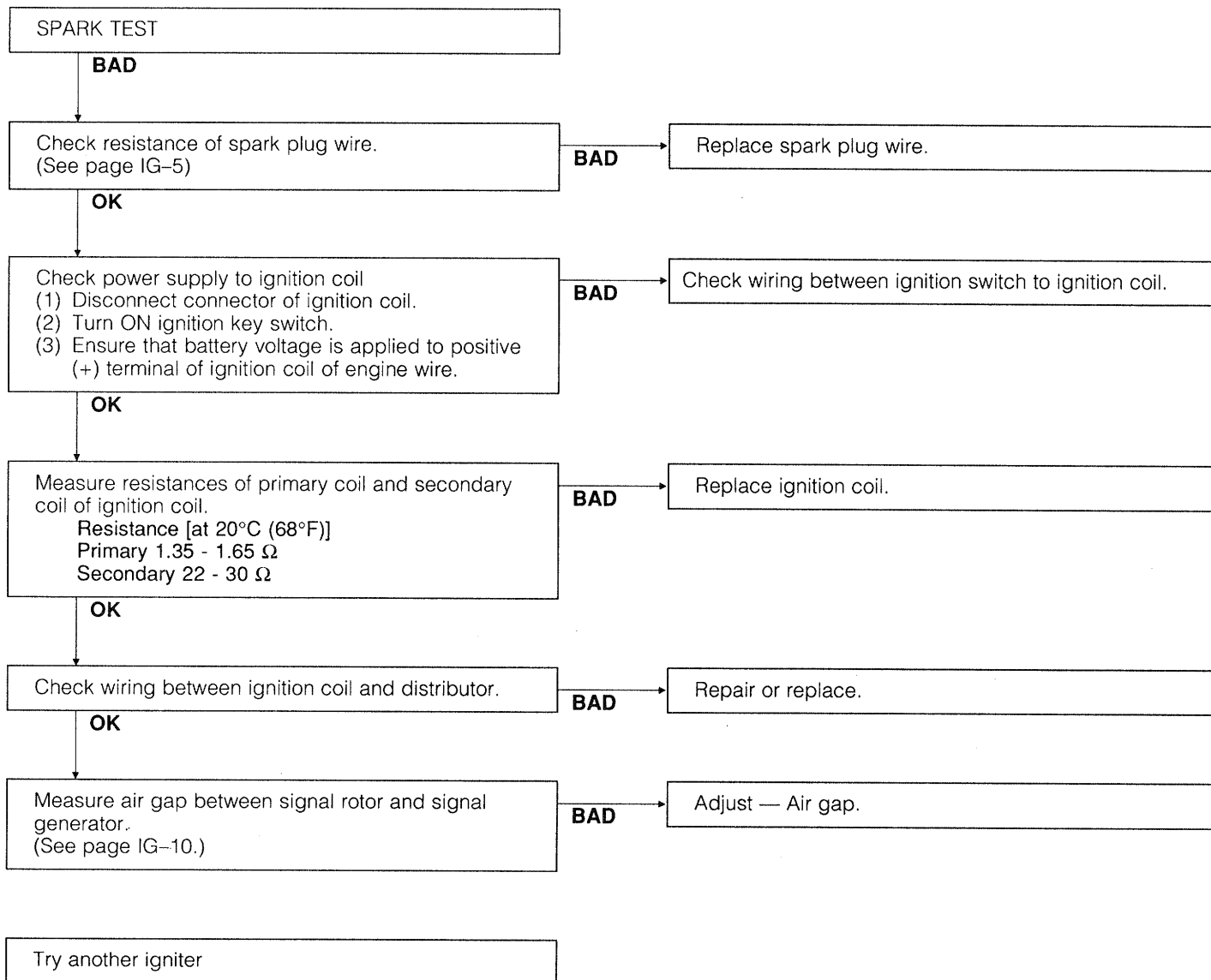
If the timing light flashes, check the spark plug wire and spark plug.

If the timing light will not flash, perform the check according to the chart given below.

NOTE:

After completion of the inspection, reconnect the fuel pump relay and injector relay to the relay box.

WRU90-IG007



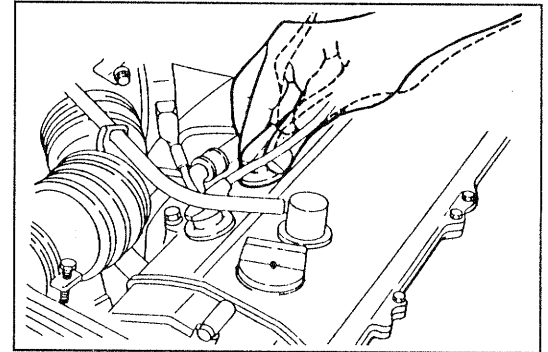
WRU90-IG008

INSPECTION OF SPARK PLUG WIRES

1. Remove the air chamber. (See page EM-10.)
2. Carefully remove the spark plug wires from the spark plugs and ignition coil by holding their rubber boots.

CAUTION:

Do not hold the cord portion or bend the cord. Otherwise, the conductor inside the cord may be damaged.



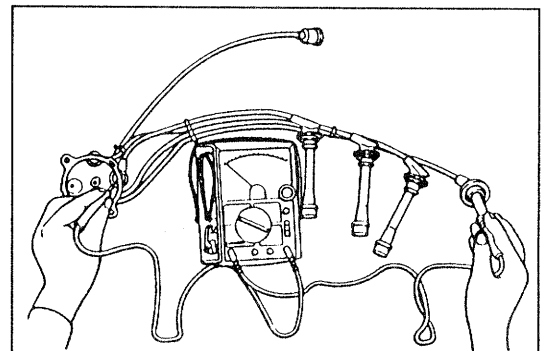
WRU90-IG009

3. Disconnect the distributor connector from the connector clamp.
4. Remove the distributor cap.

WRU90-IG010

5. Inspection of resistance of spark plug wire and distributor cap terminal

Maximum resistance: 15 k Ω



WRU90-IG011

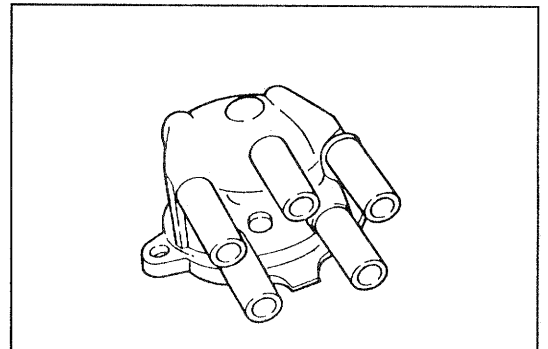
If the resistance exceeds the maximum limit, check the distributor cap terminals.

Replace the spark plug wire and/or distributor cap, as required.

6. Install the distributor cap with distributor cap gasket interposed.

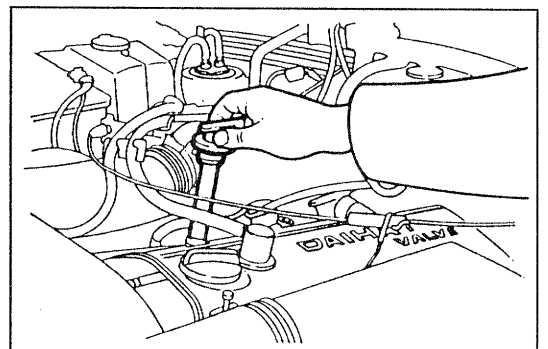
NOTE:

If the distributor gasket is damaged, replace it with a new one.



WRU90-IG012

7. Connect the spark plug wires to the spark plugs and ignition coil.
8. Install the air chamber.(See page EM-14.)



WRU90-IG013

IGNITION SYSTEM

INSPECTION OF SPARK PLUG

1. Remove the air chamber. (See page EM-10.)
2. Carefully remove the spark plug wires from the spark plugs by holding their rubber boots.
3. Inspection of electrode

(1) When a megger (Insulation resistance meter) is used:
Measure the insulation resistance of the spark plug.
Minimum Insulation Resistance: 15 MΩ

If the measured insulation resistance is less than 15 MΩ, proceed to the step 4.

- (2) When a megger is not available:
- ① Start the engine. Warm up the engine completely.
 - ② Race the engine at 4000 rpm for five seconds.
 - ③ Remove the spark plug, using the following SST.
- SST: 09268-87703-000**

WARNING:

Since the spark plugs are hot, care must be exercised to avoid getting scalded.

- ④ Visually inspect the spark plug.
If the electrode is dry: Satisfactory
If the electrode is wet: Proceed to the step 5.

4. Removal of spark plug
Remove the spark plug, using the following SST.
SST: 09268-87703-000

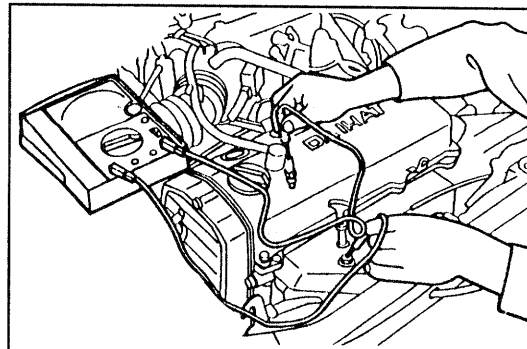
5. Visual inspection of spark plug
Visually inspect the spark plug for electrode wear, thread or insulator damage.
Replace the spark plug if it exhibits damage.

Recommended Spark Plug

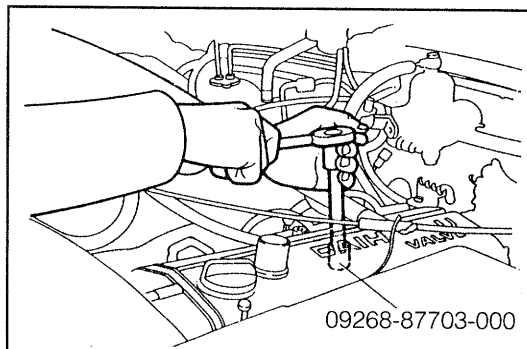
CHAMPION	NIPPONDENSO	NGK
RC9YC4	K20PR-U11	BKR6E-11

NOTE:

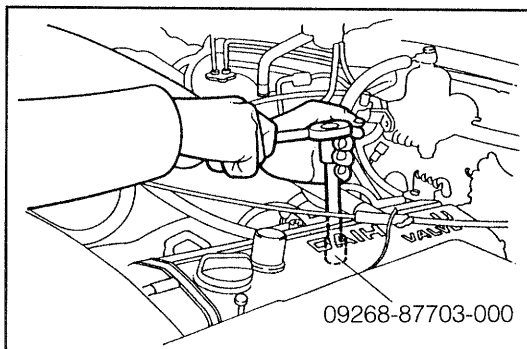
All four spark plugs should have the same heat range and be ones manufactured by the same manufacturer.



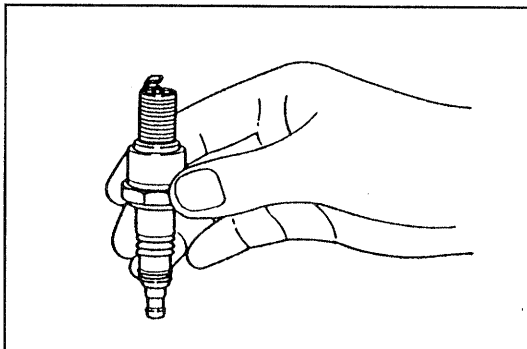
WRU90-IG014



WRU90-IG015



WRU90-IG016



WRU90-IG017

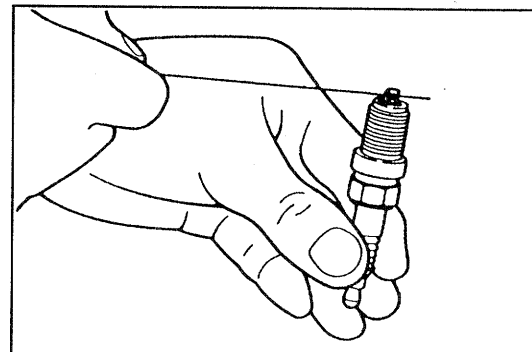
6. Inspection of electrode gap

Measure the electrode gap, using a plug gap gauge.

Electrode Gap: 1.0 - 1.1 mm (0.040 - 0.043 inch)

If the electrode gap of a used spark plug is not within the specification, replace the spark plug with a new one.

If the electrode gap of a new spark plug is not within the specification, adjust the gap by bending the base of the ground electrode, being careful not to touch the tip.



WRU90-IG018

7. Cleaning of spark plug

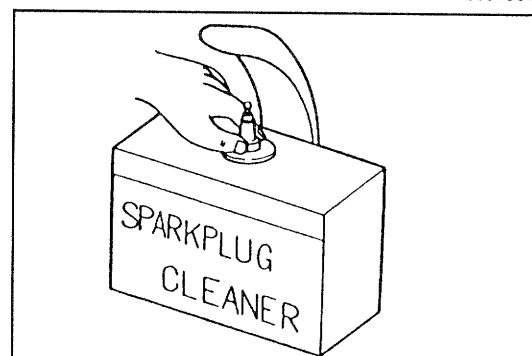
If the electrode has traces of wet carbon, dry the electrode and clean it with a spark plug cleaner.

Air Pressure: Not to Exceed 6 kg/cm² (85 psi)

Duration: Less Than 20 Seconds

NOTE:

If there are traces of oil, remove it with gasoline before the spark plug is cleaned by the spark plug cleaner.

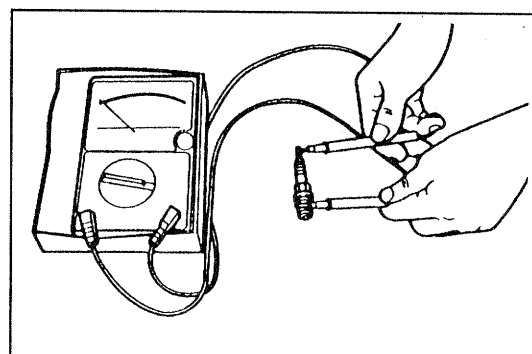


WRU90-IG019

8. Inspection of spark plug insulation resistance

More Than 20 MΩ

If the insulation resistance is less than the specified value, replace the spark plug.



WRU90-IG020

9. Installation of spark plug

Install the spark plugs. Tighten them to the specified torque, using the following SST.

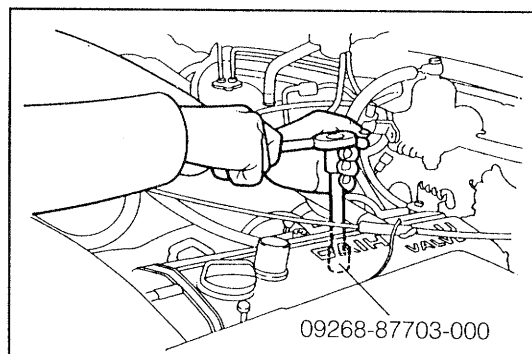
SST: 09268-87703-000

Tightening Torque:

1.5 - 2.2 kg-m (10.8- 15.9 ft-lb, 14.7 - 21.6 N-m)

NOTE:

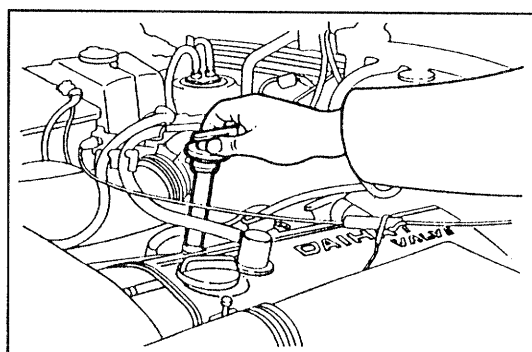
Since the insulator strength of a small spark plug is comparatively smaller than that of regular spark plugs, when tightening, be sure to use the tool exclusively used for this application. Also, when tightening, never use the wrench in a crooked way.



WRU90-IG021

10. Connect the spark plug wire to the spark plug.

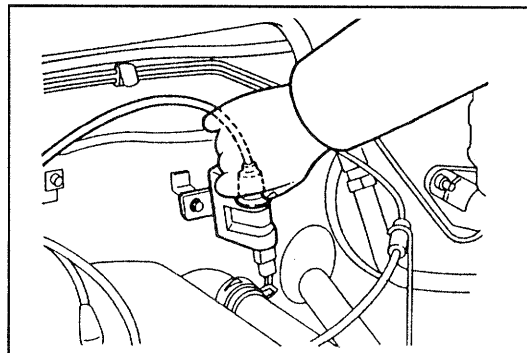
11. Install the air chamber. (See page EM-14.)



WRU90-IG022

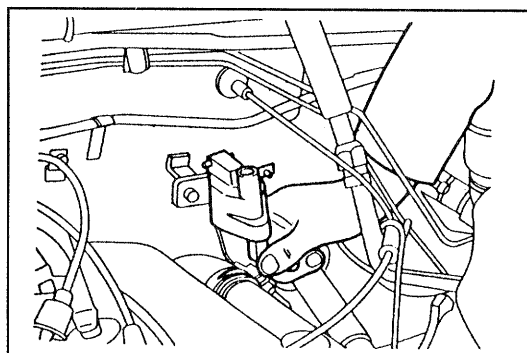
INSPECTION OF IGNITION COIL

1. Disconnect the spark plug wire from the ignition coil.
NOTE:
Do not hold the cord portion during disconnection. Be sure to disconnect the cord by holding the rubber boot.



WRU90-IG023

2. Disconnect the cowl wire connector from the ignition coil.

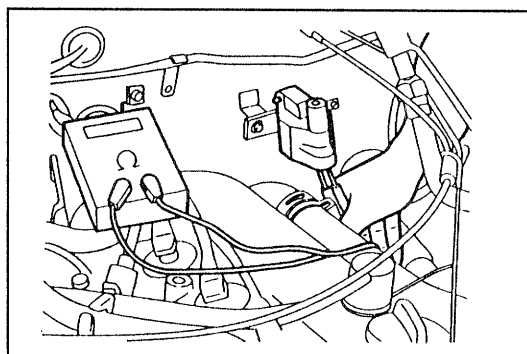


WRU90-IG024

3. Check of primary coil resistance
Measure the resistance of the primary coil across the ignition coil terminals, as shown in the right figure.

Primary Coil Resistance at 20°C (68°F):
1.35 - 1.65 Ω

If the measured value fails to conform to the specification, replace the ignition coil.

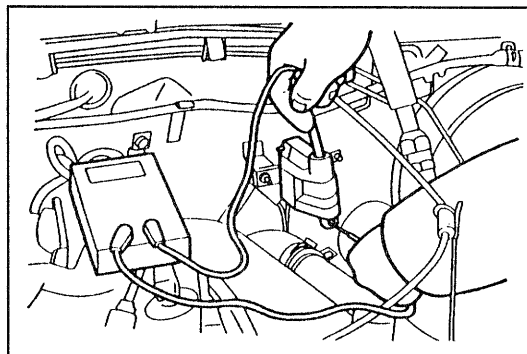


WRU90-IG025

4. Check of secondary coil resistance
Measure the resistance of the secondary coil between the positive (+) terminal of the ignition coil and the resistive cord terminal, as shown in the right figure.

Secondary Coil Resistance at 20°C (68°F):
22 - 30 k Ω

If the measured value fails to conform to the specification, replace the ignition coil.

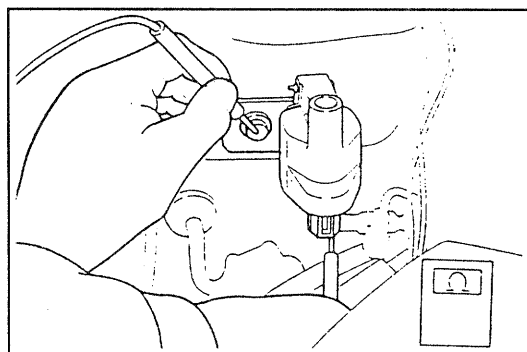


WRU90-IG026

5. Check of insulation resistance
Measure the insulation resistance between positive (+) terminal of the ignition coil and coil case.

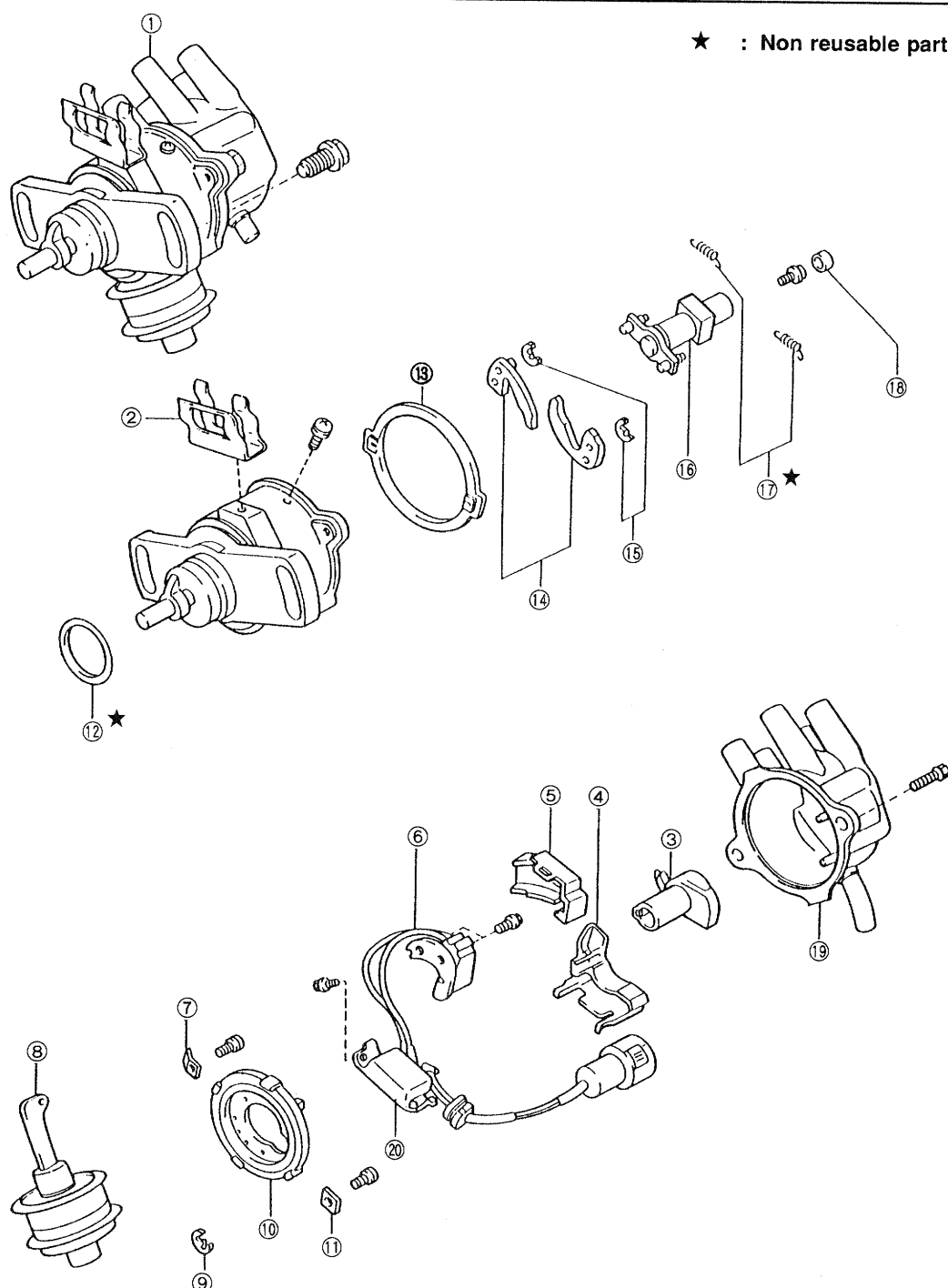
Insulation resistance: More than 1000 k Ω
(Infinity)

If the measured value fails to conform to the specification, replace the ignition coil.



WRU90-IG027

DISTRIBUTOR COMPONENTS



★ : Non reusable parts

- ① Distributor assembly
- ② Distributor connector clamp
- ③ Distributor rotor
- ④ Dust-proof cover
- ⑤ Dust-proof cover
- ⑥ Pick-up coil
- ⑦ Plate washer
- ⑧ Distributor vacuum advancer
- ⑨ Snap washer
- ⑩ Stationary plate

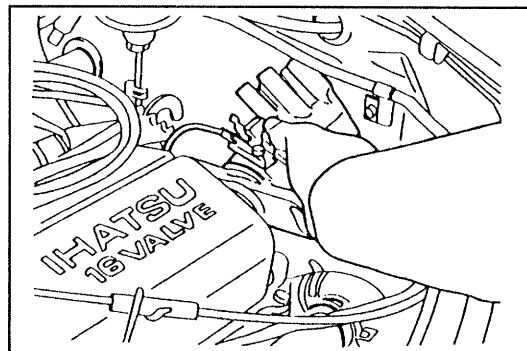
- ⑪ Plate washer
- ⑫ "O" ring
- ⑬ Distributor gasket
- ⑭ Governor weight
- ⑮ Snap washer
- ⑯ Signal rotor assembly
- ⑰ Governor spring
- ⑱ Grease stopper
- ⑲ Distributor cap
- ⑳ Ignitor

INSPECTION OF DISTRIBUTOR

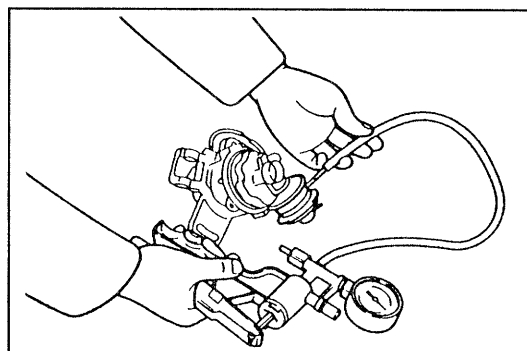
Check and Adjustment of Air Gap

1. Remove the spark plug wire from the distributor cap.
2. Remove the distributor. (See page IG-12.)
3. Remove the distributor cap.
4. Check of vacuum advancer
Apply a negative pressure of more than 150 mmHg (7.87 inchHg).
Ensure that vacuum advancer operates.
Repair or replace the vacuum advancer, as required, if it will not operate.
5. Check of governor advancer
 - (1) Turn the rotor counterclockwise and release it. Ensure that the rotor returns clockwise rapidly.
Repair or replace the rotor, as required, if it will not return to the original position.
 - (2) Check the rotor for excessive play.
6. Pull out the rotor.
7. Turn the crankshaft until the signal generator faces toward the signal rotor.
8. At all four points check to see if the air gap between the signal generator and the signal rotor conforms to the specified value.
Specified Gap: 0.2 - 0.4 mm (0.0079 - 0.015 inch)

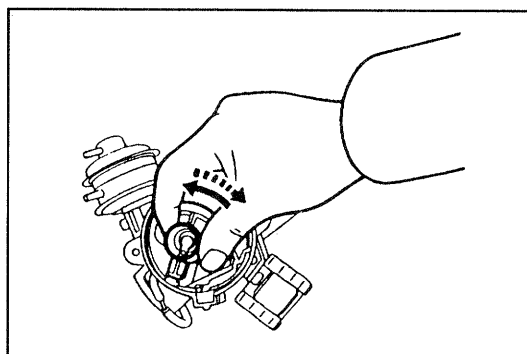
If the air gap fails to conform to the specified value, adjust the air gap.
9. Adjustment of air gap
 - (1) Remove the lock, being very careful not to damage the ignitor dust-proof cover. Then, pull out the wire from the signal generator, making sure that no damage is made to the wire.
 - (2) From the dust-proof cover, remove the wire led from the signal generator. Be very careful not to damage the wire.



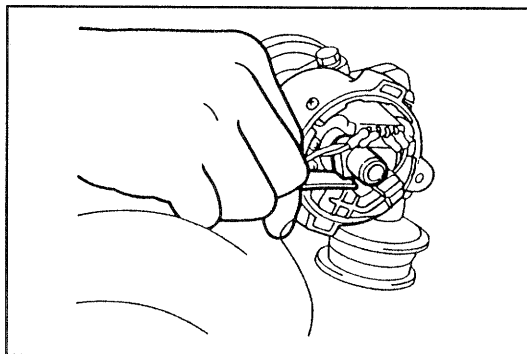
WRU90-IG029



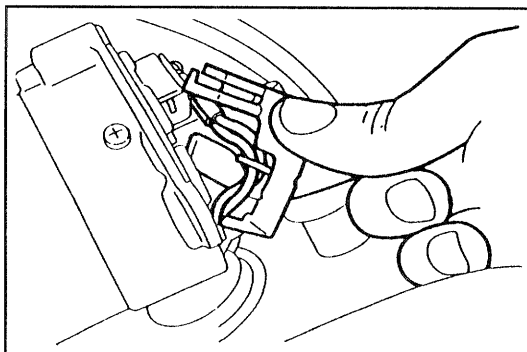
WRU90-IG030



WRU90-IG031

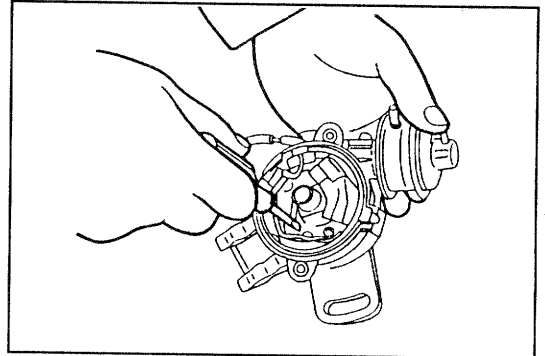


WRU90-IG032



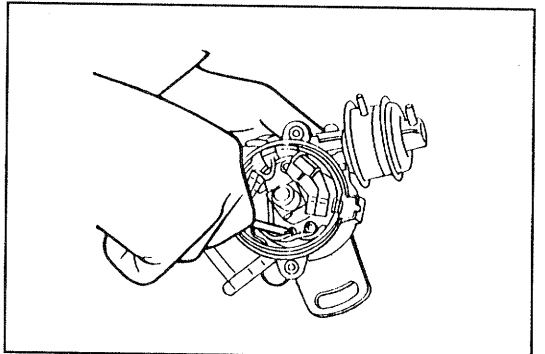
WRU90-IG033

- (3) Loosen the attaching screws of the signal generator.
- (4) Adjust the air gap between the signal generator and the signal rotor to the specified value.



WRU90-IG034

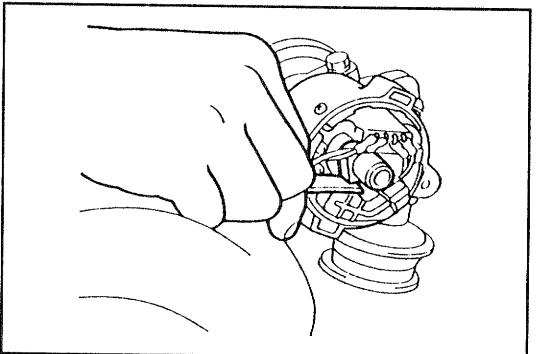
- (5) Tighten the attaching screws of the signal generator.
Specified Value:
12 - 21 kg-cm (10.5 - 18.2 inch-lb, 1.2 - 2.0 N·m)



WRU90-IG035

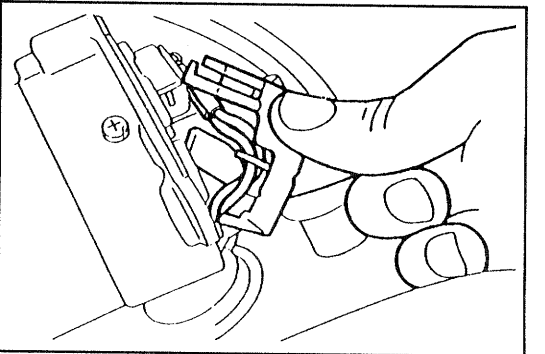
- (6) Check the air gap.
Specified Value: 0.2 - 0.4 mm (0.0079 - 0.015 inch)

If the air gap fails to conform to the specified value, adjust the air gap again.



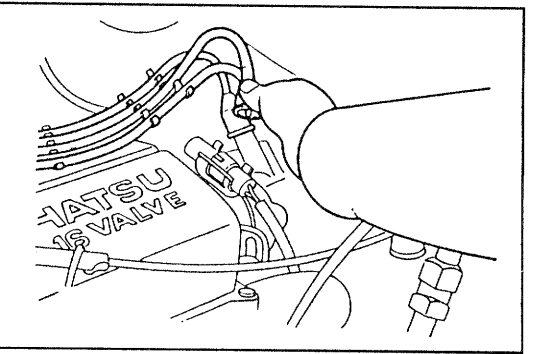
WRU90-IG036

10. Install the wire from the signal generator to dust proof cover.
11. Install the dust proof cover to the ignitor.
12. Install the rotor.
13. Check the distributor cap gasket for cracks or damage.
If it exhibits cracks or damage, replace the gasket with new one.



WRU90-IG037

14. Install the distributor cap gasket and distributor cap.
15. Install the distributor to the cylinder head. (See page IG-21.)
16. Connect the distributor connector.
17. Connect the resistive cord to the distributor cap.
18. Perform the ignition timing adjustment.
(See page IG-22.)



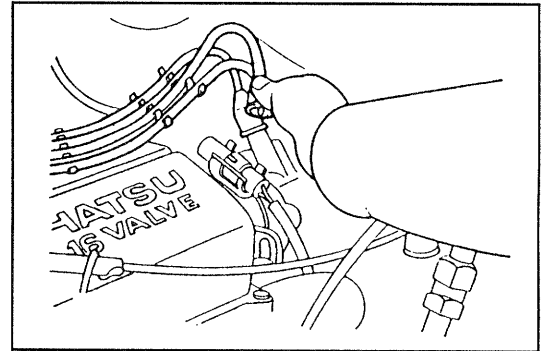
WRU90-IG038

REMOVAL OF DISTRIBUTOR

1. Disconnect the battery ground cable from the negative terminal of the battery.
2. Disconnect the spark plug wires from the distributor cap.

NOTE:

Do not hold the cord during disconnection. Be sure to disconnect the cord by holding the rubber boot.



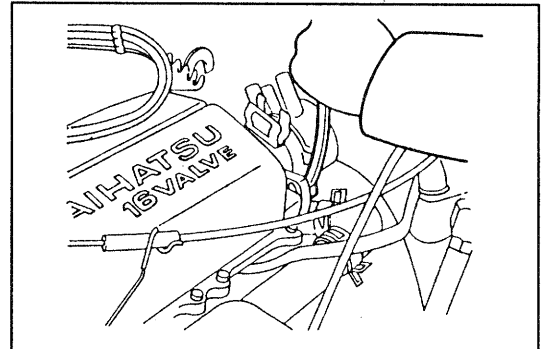
WRU90-IG039

3. Disconnect the distributor connector.
4. Disconnect the vacuum advancer hoses.

NOTE:

Prior to the disconnection, put a tag so that the original installation position may be identified readily.

5. Remove the distributor set bolt.

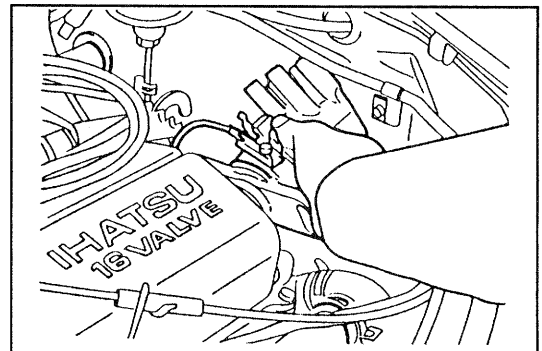


WRU90-IG040

6. Pull out the distributor from the cylinder head.

NOTE:

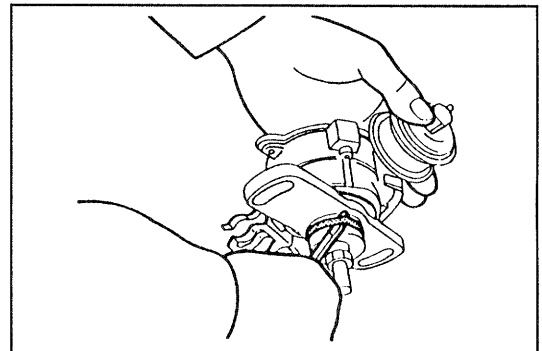
Since the engine oil flows out, insert a suitable cloth under the distributor connecting section.



WRU90-IG041

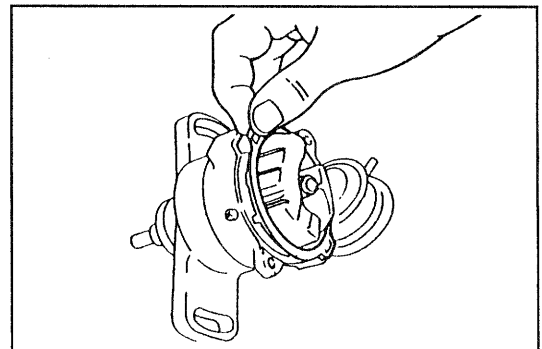
DISASSEMBLY OF DISTRIBUTOR

1. Remove the "O" ring from the distributor housing.
2. Remove the distributor cap from the distributor housing.



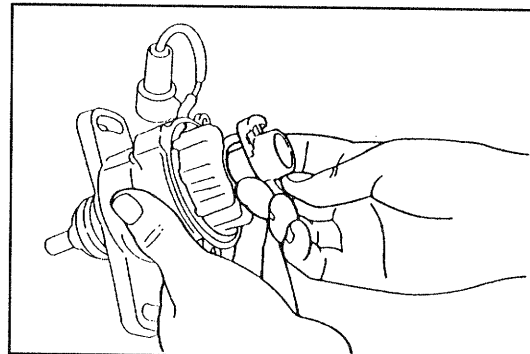
WRU90-IG042

3. Remove the distributor cap gasket.



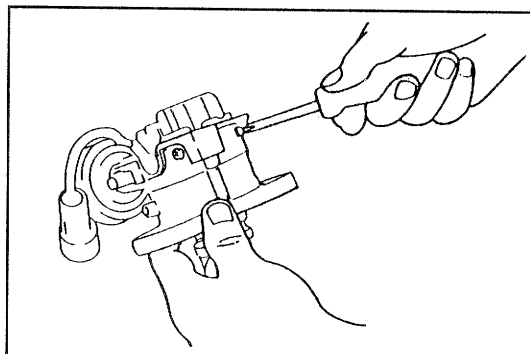
WRU90-IG043

4. Remove the rotor.



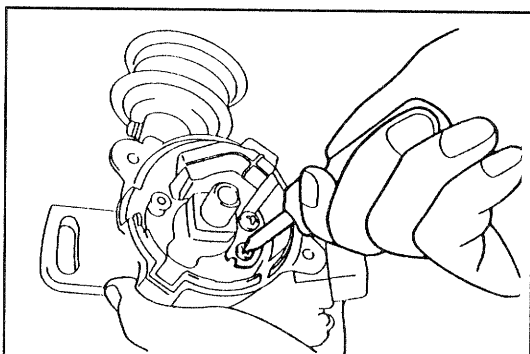
WRU90-IG044

5. Remove the ignitor by removing the two attaching screws.
CAUTION:
 Be very careful not to damage the wire.



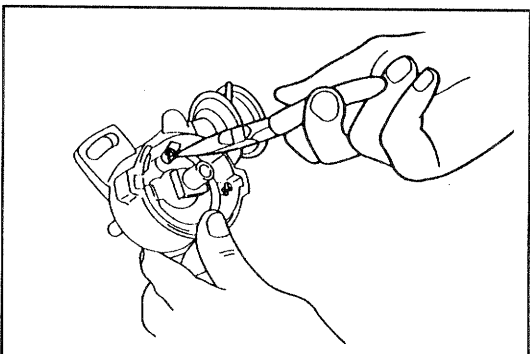
WRU90-IG045

6. Remove the signal generator by removing the two attaching screws.



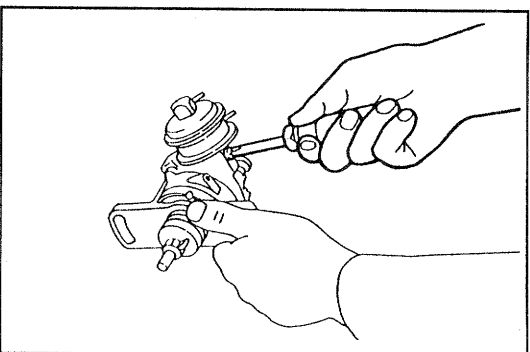
WRU90-IG046

7. Remove the "E" ring of the vacuum advancer.



WRU90-IG047

8. Remove the attaching screw of the vacuum advancer.

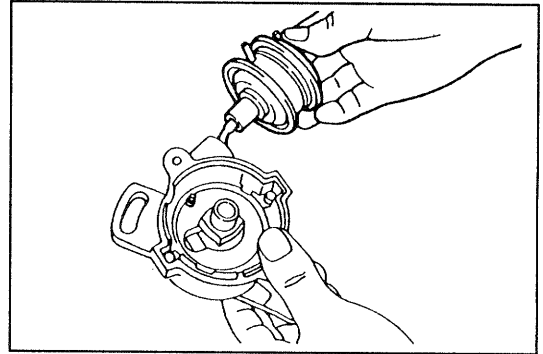


WRU90-IG048

IGNITION SYSTEM

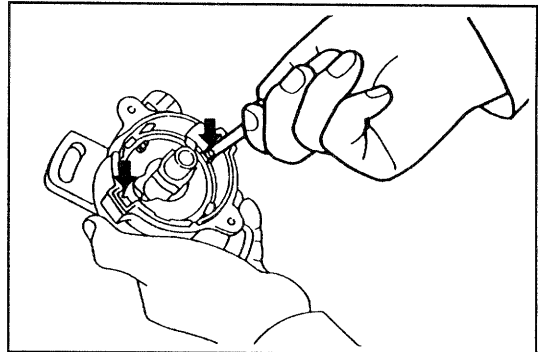
9. Remove the vacuum advancer from the pin of the stationary plate.

Pull out the vacuum advancer from the distributor housing.



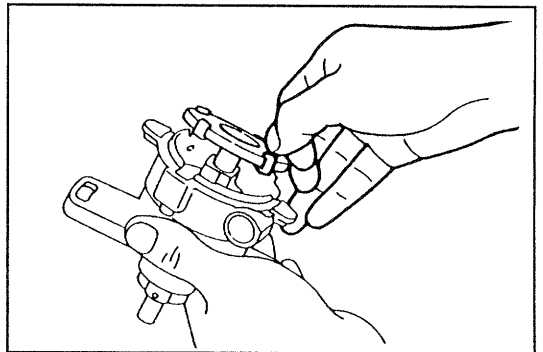
WRU90-IG049

10. Remove the attaching screws and plate of the distributor stationary plate.



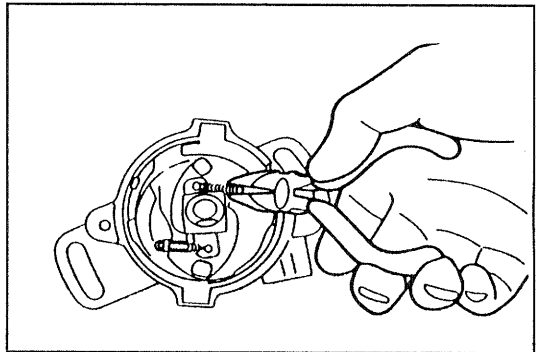
WRU90-IG050

11. Remove the stationary plate from the distributor housing.



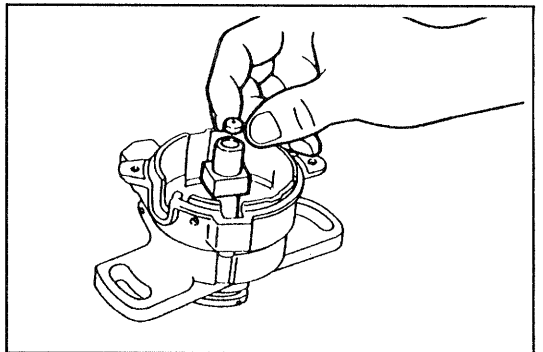
WRU90-IG051

12. Remove the governor springs.



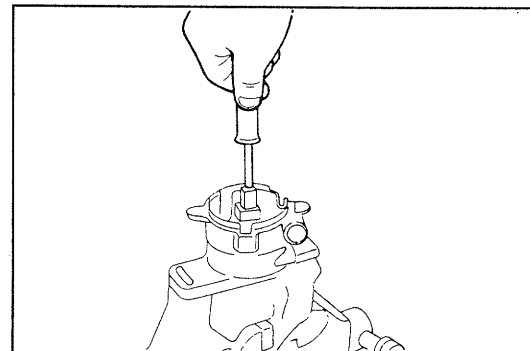
WRU90-IG052

13. Removal of signal rotor assembly
(1) Remove the grease stopper.



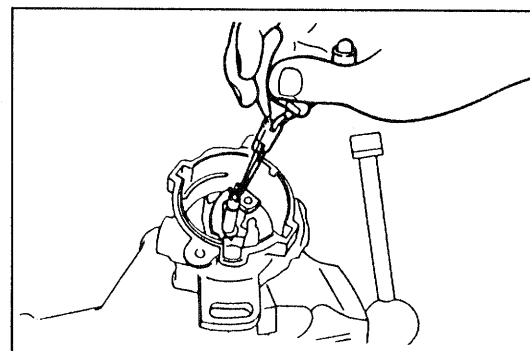
WRU90-IG053

- (2) Remove the attaching screws of the signal rotor assembly.
- (3) Remove the signal rotor assembly.



WRU90-IG054

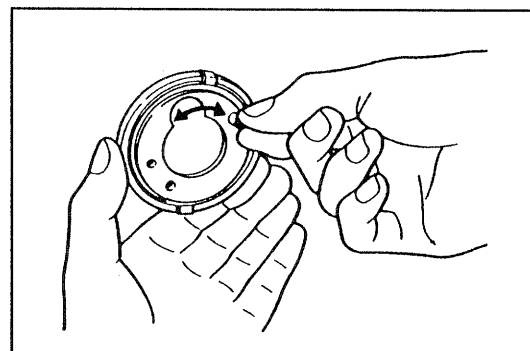
14. Remove the snap washer of the governor weight. Remove the governor weight.



WRU90-IG055

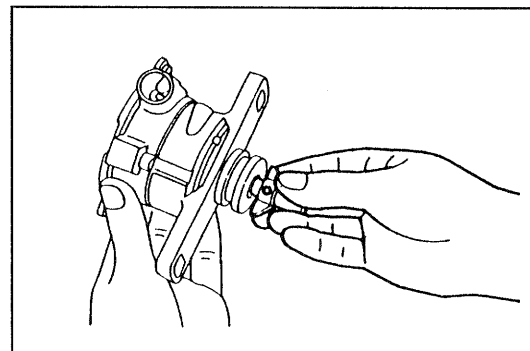
INSPECTION OF DISTRIBUTOR COMPONENTS

1. Inspect the stationary plate.
Check to see if the stationary inner plate rotates on the outer plate smoothly.
If the inner plate will not rotate smoothly, replace the stationary plate.



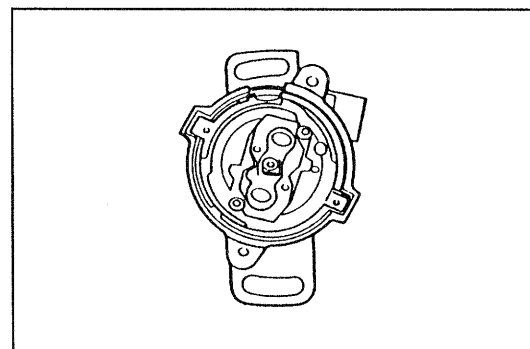
WRU90-IG056

2. Inspection of distributor housing
 - (1) Check to see if the governor shaft rotates smoothly.
If it will not rotate smoothly, replace the distributor housing.



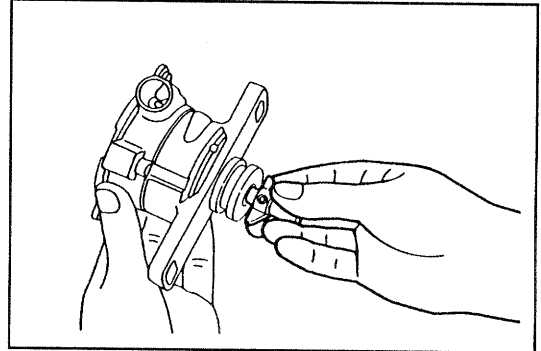
WRU90-IG057

- (2) Check the sliding section of the governor weight for wear or damage.
Replace the distributor housing if it exhibits wear or damage.



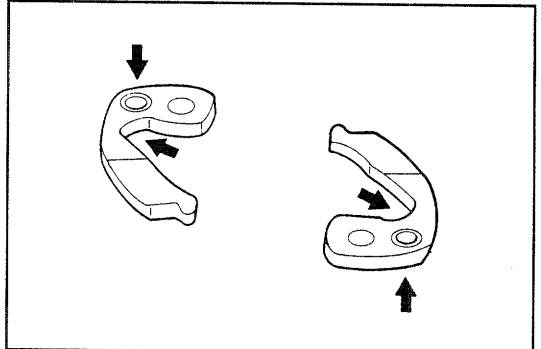
WRU90-IG058

- (3) Check the coupling section of the governor shaft for wear or damage. Also, check to see if any excessive play is present in the turning direction.
Replace the distributor housing if it exhibits wear, damage and/or excessive play in the turning direction.



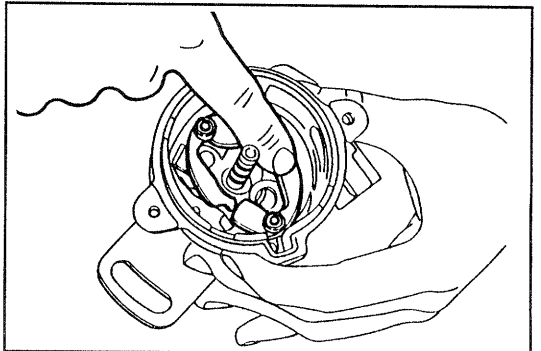
WRU90-IG059

3. Inspection of governor weight for damage or wear
(1) Visually inspect the governor weight for damage or wear.
Replace the governor weight if it exhibits damage or wear.



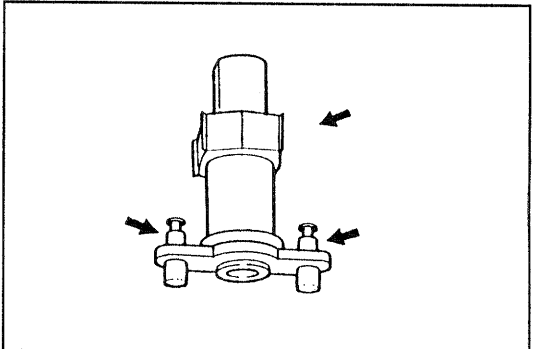
WRU90-IG060

- (2) Install the governor weight to the governor shaft. Check to see if any excessive play is present.
If excessive play is present, replace the governor weight and/or distributor housing, as required.



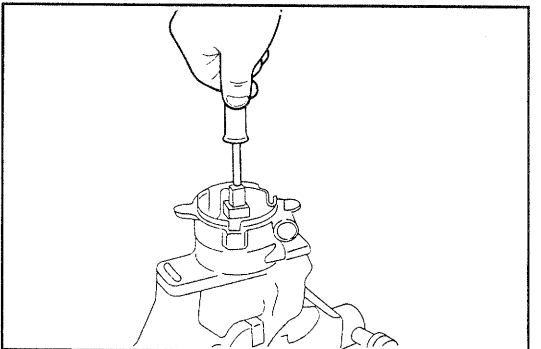
WRU90-IG061

4. Inspection of signal rotor assembly
(1) Visually inspect the signal rotor for damage.
Replace the signal rotor assembly if it exhibits damage.
(2) Check the pin section of the signal rotor assembly for wear or damage.
Replace the signal rotor assembly if the pin section exhibits wear or damage.



WRU90-IG062

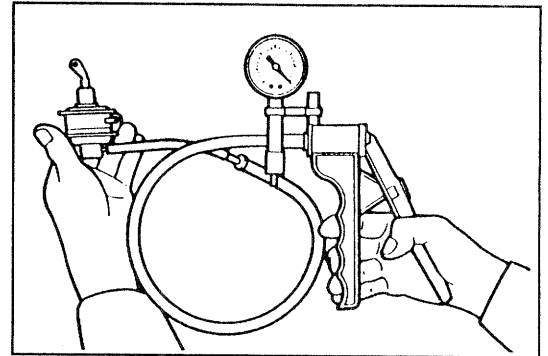
- (3) Install the signal rotor assembly to the governor shaft temporarily. Check to see if the signal rotor is tilted.
Replace the signal rotor assembly and/or distributor housing if it is tilted.



WRU90-IG063

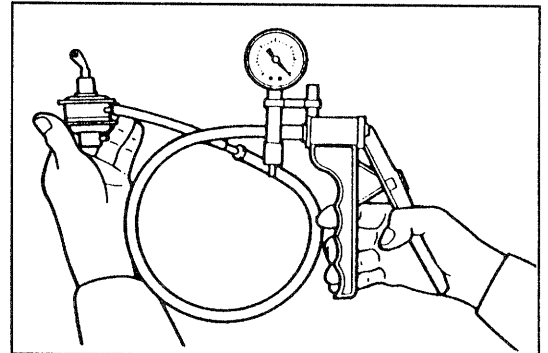
5. Inspection of vacuum advancer

- (1) Gradually apply a negative pressure to the main diaphragm of the vacuum advancer. Ensure that the rod of the vacuum advancer is drawn into the diaphragm room side, corresponding to the negative pressure. Replace the vacuum advancer if the rod will not be drawn.



WRU90-IG064

- (2) Gradually apply a negative pressure to the sub diaphragm of the vacuum advancer. Ensure that the rod of the vacuum advancer is drawn into the diaphragm room side, corresponding to the negative pressure. Replace the vacuum advancer if the rod will not be drawn.

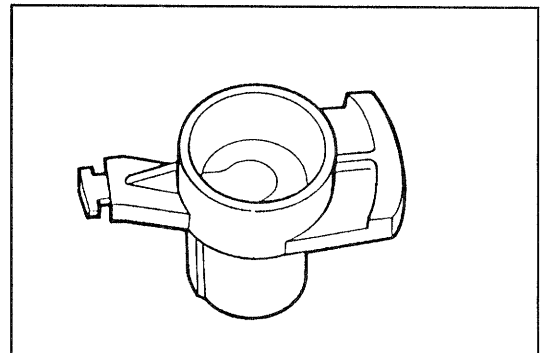


WRU90-IG065

6. Inspection of rotor

Check the center carbon contacting surface and electrode for damage, such as wear, electrolytic corrosion and cracks.

If the surface or electrode exhibits damage, replace the rotor, as required.

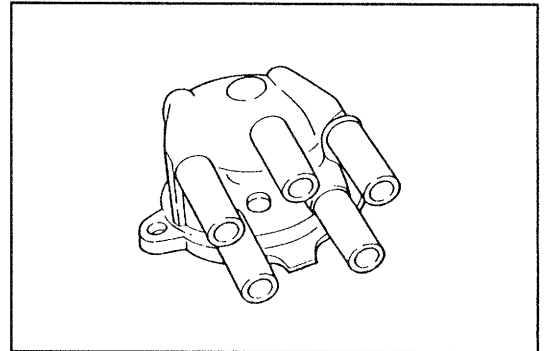


WRU90-IG066

7. Inspection of distributor cap

Check the distributor cap for cracks. Also, check the electrode and center carbon for damage, such as wear.

Replace the distributor cap if the cap, electrode or carbon exhibits damage.



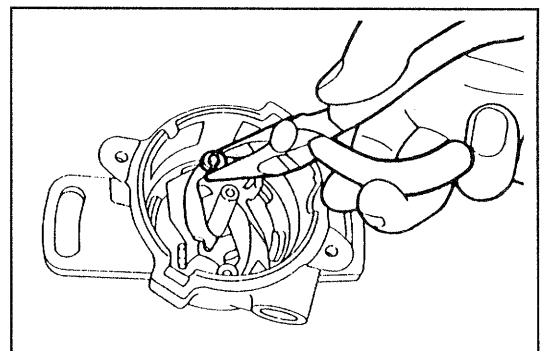
WRU90-IG067

ASSEMBLY OF DISTRIBUTOR

1. Install the governor weight to the distributor housing. Install the snap washer.

NOTE:

Thinly apply high-temperature grease to the sliding section.

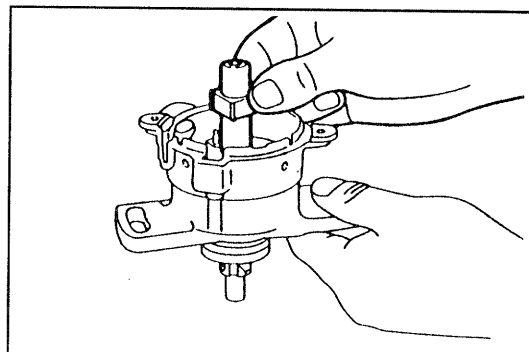


WRU90-IG068

IGNITION SYSTEM

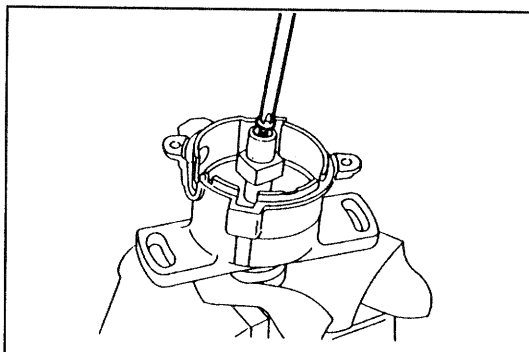
2. Installation of signal rotor assembly

- (1) Thinly apply high-temperature grease to the sliding section of the signal rotor assembly. Install the signal rotor assembly to the distributor housing.



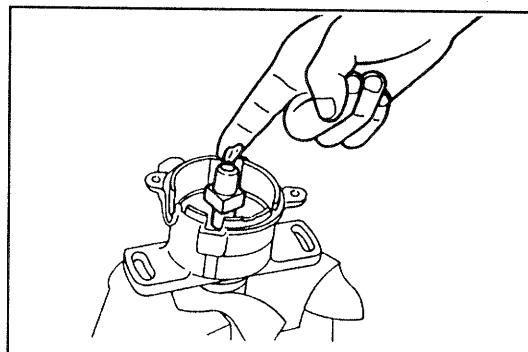
WRU90-IG069

- (2) Tighten the attaching screw.



WRU90-IG070

- (3) Pack high-temperature grease in the signal rotor assembly.

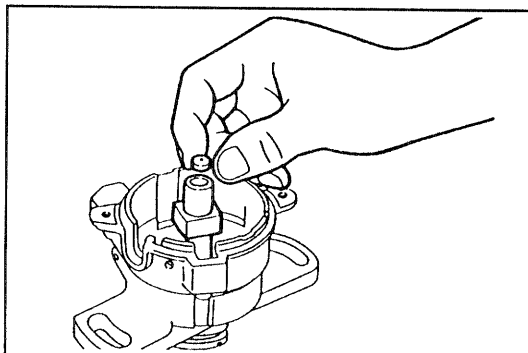


WRU90-IG071

- (4) Press the grease stopper by your hand.

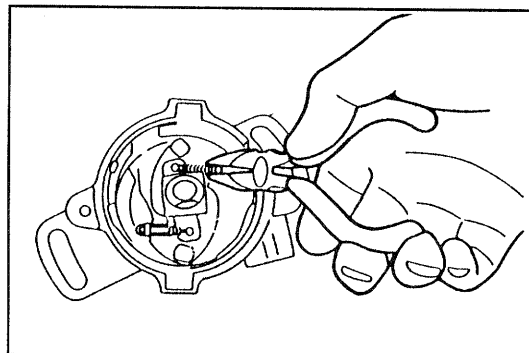
NOTE:

Wipe off any excess grease which has oozed out.



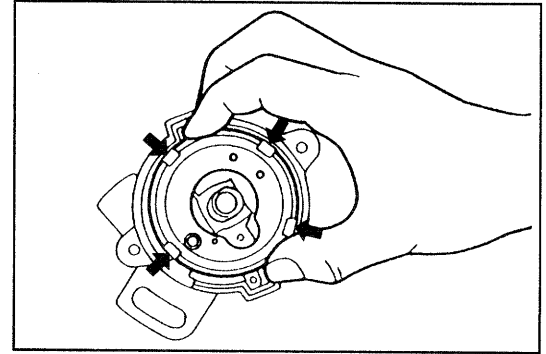
WRU90-IG072

3. Install the new governor spring to the distributor.



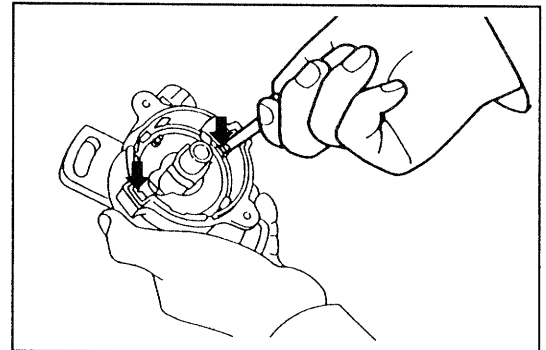
WRU90-IG073

4. Assemble the stationary plate, lining up the cut-out section of the distributor housing.



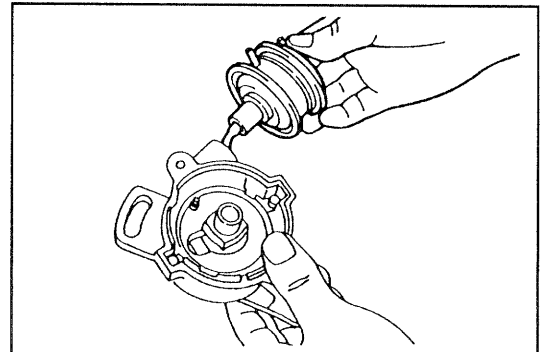
WRU90-IG074

5. Secure the stationary plate installation seat and stationary plate with the screws.



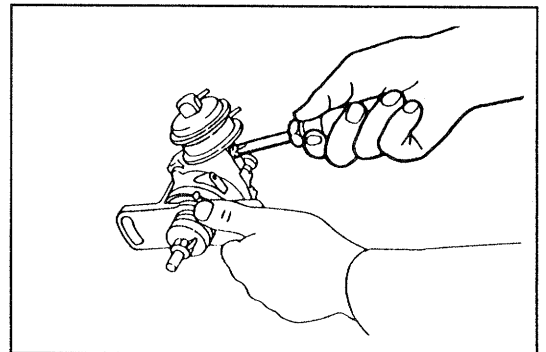
WRU90-IG075

6. Insert the vacuum advancer into the distributor housing. Connect it to the pin of the stationary inner plate.



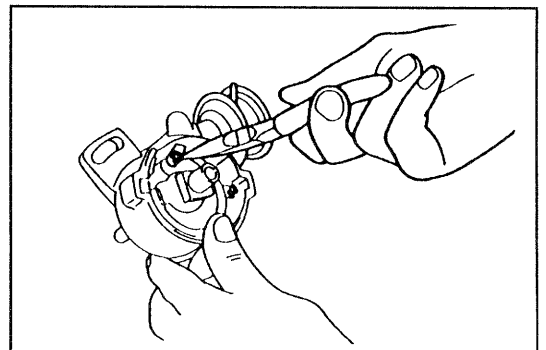
WRU90-IG076

7. Align the screw hole of the vacuum advancer with the screw hole of the distributor housing. Install and tighten the attaching screw.



WRU90-IG077

8. Attach the snap washer of the vacuum advancer.

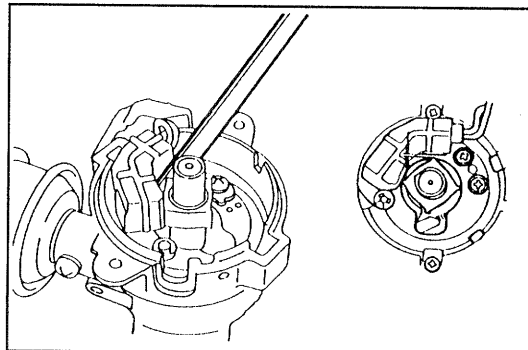


WRU90-IG078

IGNITION SYSTEM

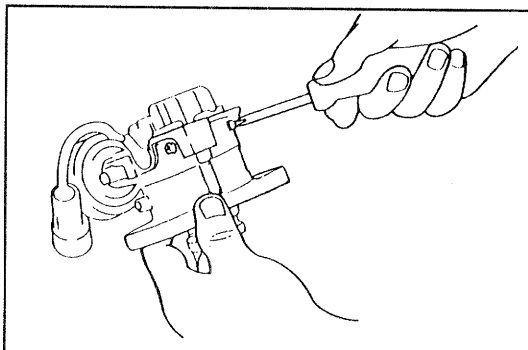
9. Installation of signal generator

Install the signal generator to the stationary plate. Adjust the air gap in such a way that the air gap in relation to the signal rotor is 0.2 - 0.4 mm (0.0079 - 0.015 inch).



WRU90-IG079

10. Install the ignitor to the distributor with the screw.



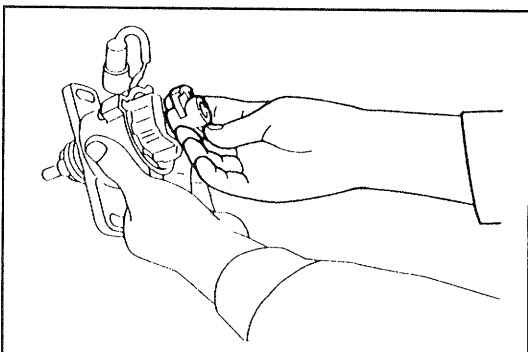
WRU90-IG080

11. Attach the rotor.

12. Install a distributor cap gasket to distributor body.

NOTE:

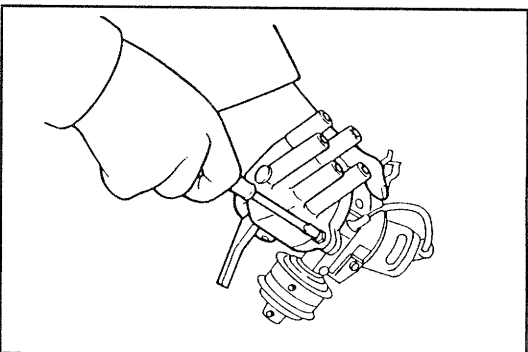
If the gasket is damaged, replace it with a new one.



WRU90-IG081

13. Install the distributor cap to the distributor housing.

Also, tighten the clamp of the distributor connector, too, at the vacuum advancer side of the distributor cap attaching screw.

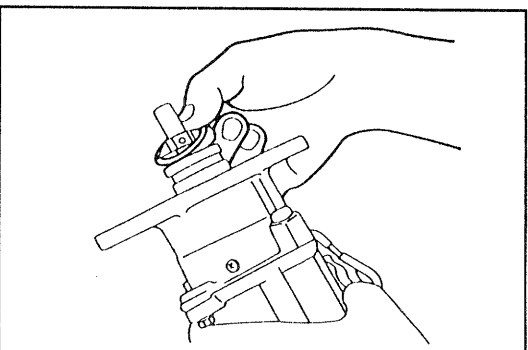


WRU90-IG082

14. Install a new "O" ring to the distributor housing.

NOTE:

- Be very careful not to damage the "O" ring.
- When the distributor is pulled from the cylinder head once, be sure to replace the "O" ring with a new part.



WRU90-IG083

INSTALLATION OF DISTRIBUTOR

1. Turn the crankshaft, until the No.1 cylinder (at the timing belt side) comes at the top dead center at the end of the compression stroke.
Under this conditions, the crankshaft timing marks should be aligned and the valve rocker arms should be inoperative (the rocker arms actuated by the camshaft are not pushing down the valves).

NOTE:

Ensure that the No.1 rocker arms are not operating. This check can be performed by moving the rocker arms with your fingers after removing the oil filler cap.

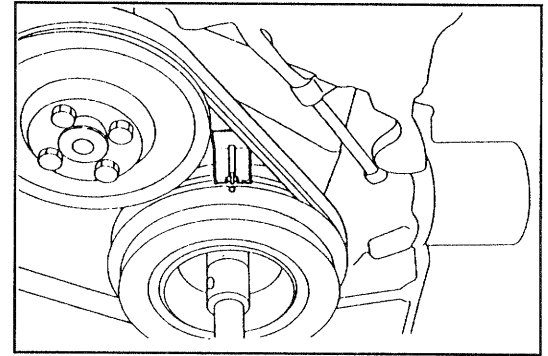
2. Align the cut-out section of the distributor housing with the cut-out section of the coupling.

3. Insert the distributor into the cylinder head. At this time, ensure that the distributor attaching hole of the cylinder head comes at the center of the elongated hole for the distributor bolt.

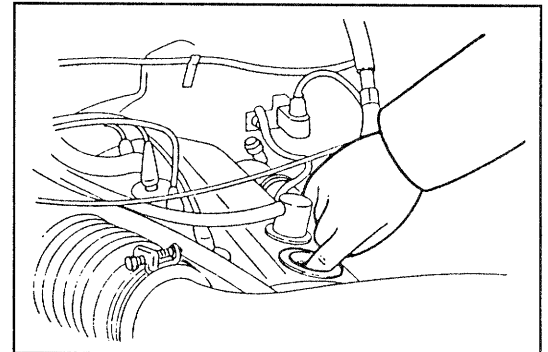
4. Tighten the distributor attaching bolts temporarily.

NOTE:

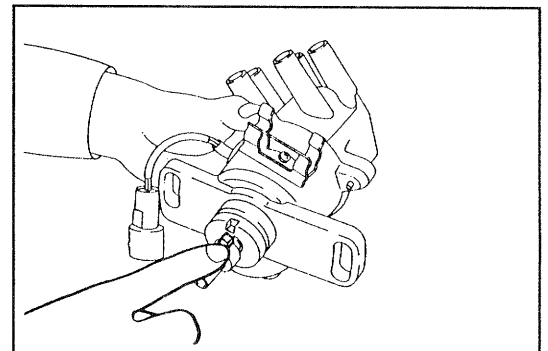
The final tightening should be performed after the check and adjustment of the ignition timing have been completed.



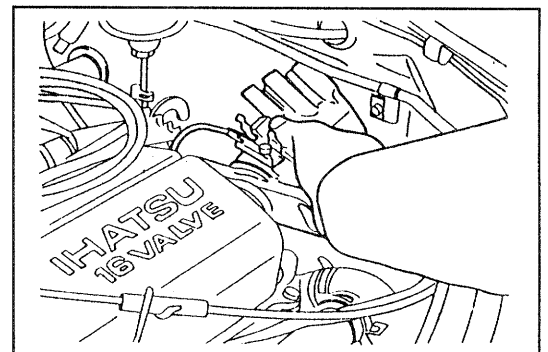
WRU90-IG084



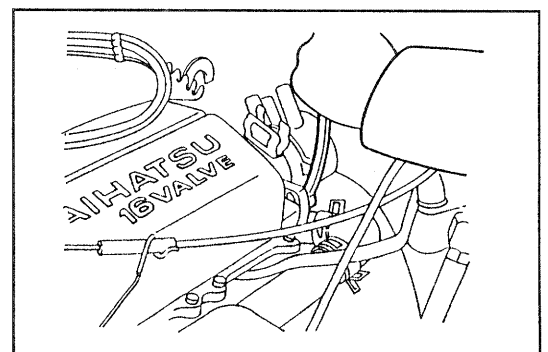
WRU90-IG085



WRU90-IG086



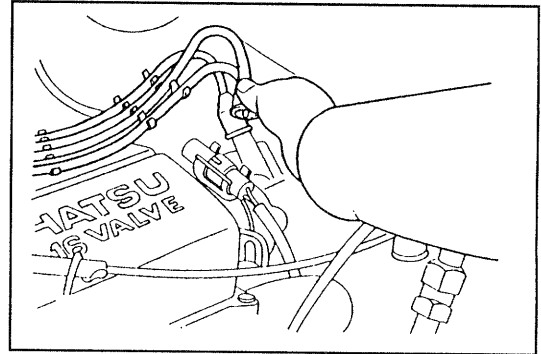
WRU90-IG087



WRU90-IG088

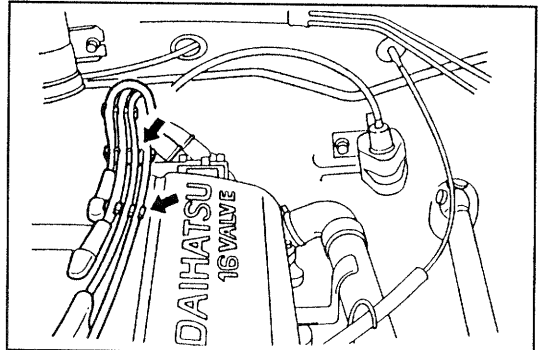
IGNITION SYSTEM

5. Connect the vacuum advancer hoses.
6. Connect the distributor connector. Install it to the clamp.
7. Connect the spark plug wires to the distributor cap.



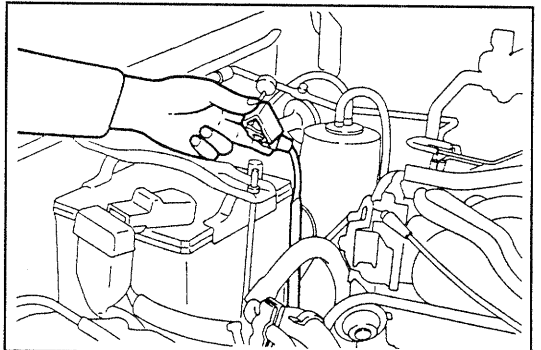
WRU90-IG089

8. Install the clamp to the spark plug wire.



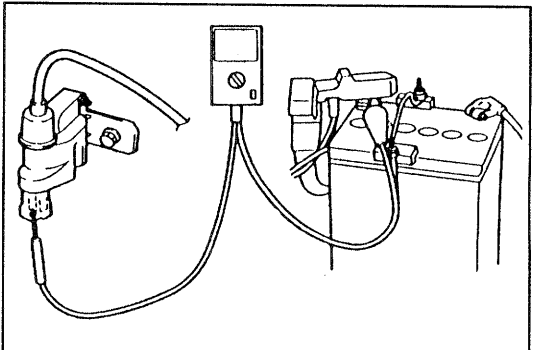
WRU90-IG090

9. Connect the ground cable terminal to the negative (-) terminal of the battery.



WRU90-IG091

10. Check and adjustment of ignition timing
 - (1) Start the engine. Warm up the engine.
 - (2) Connection of tachometer and timing light
 - 1) Connect the cable for measuring tachometer use to the negative terminal of the ignition coil.



WRU90-IG092

NOTE:

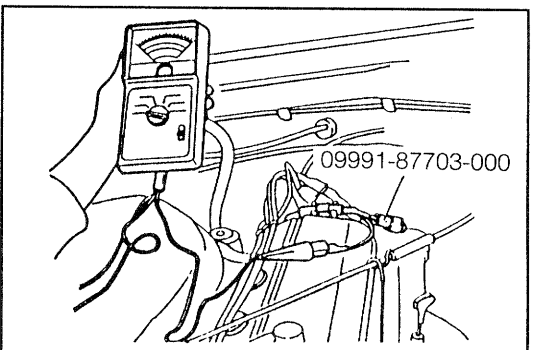
Fully use the following SST which is capable of connecting tachometers other than a clamp-on type tachometer.

SST: 09991-87703-000

CAUTION:

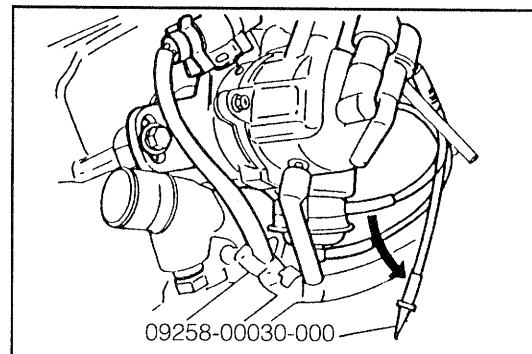
- Never allow the tachometer terminal to touch ground. It could result in damage to the ignitor and/or ignition coil.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility of your unit before using.

- 2) Connect the timing light to the spark plug wire of the No.1 cylinder (at the timing belt side).



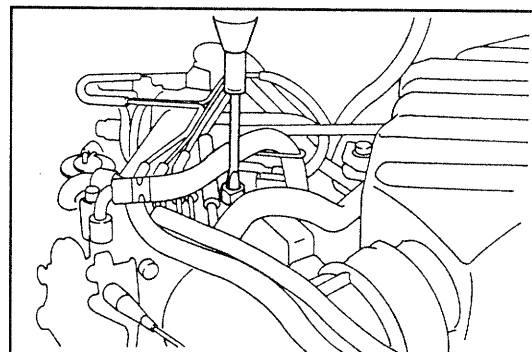
WRU90-IG093

- (3) Disconnect the vacuum hose at the sub side of the vacuum advancer of the distributor. Plug the disconnected vacuum hose, using the following SST (stopper).
SST: 09258-00030-000



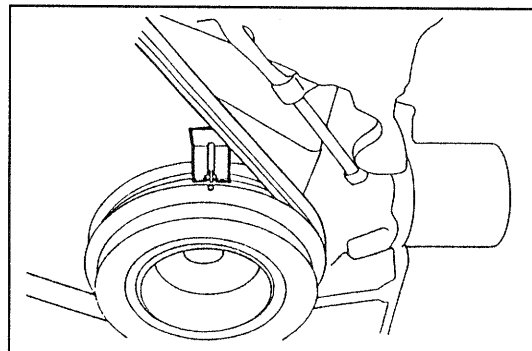
WRU90-IG094

- (4) Ensure that the engine revolution is under 1000 rpm and stable.
If the engine revolution exceeds 1000 rpm or is unstable, adjust the engine idle speed.
(See page MA-10.)



WRU90-IG095

- (5) Check to see if the ignition timing mark of the crankshaft pulley is aligned with the indicator of the timing belt cover.
Tighten the distributor attaching bolts to the specified torque if the ignition timing mark is aligned with the indicator.

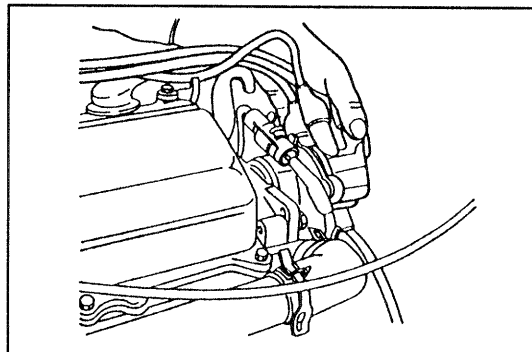


WRU90-IG096

- (6) Loosen the distributor attaching bolts. Adjust the distributor installation position, until the ignition timing mark of the crankshaft pulley is aligned with the indicator of the timing belt cover.

Reference

If the distributor is turned clockwise, the timing will be advanced. Conversely, if the distributor is turned counterclockwise, the timing will be retarded.



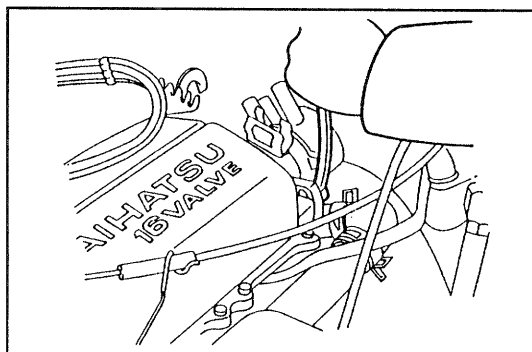
WRU90-IG097

- (7) Tighten the distributor attaching bolts to the specified torque, making sure that the ignition timing is not disturbed.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

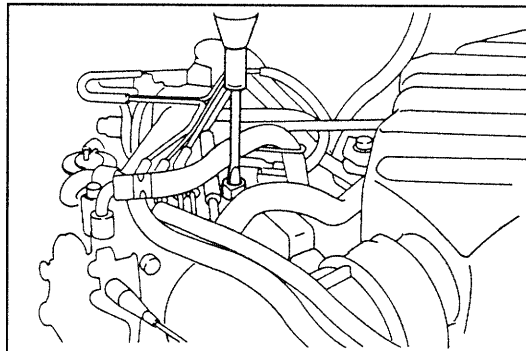
11. Connect the vacuum hose at the sub side of the vacuum advancer to the vacuum advancer.



WRU90-IG098

IGNITION SYSTEM

12. Adjust the engine idle speed.
(See page MA-10.)
13. Check the oil level.
(See page LU-2.)



WRU90-IG099

DAIHATSU

Rocky

STARTING SYSTEM

ST

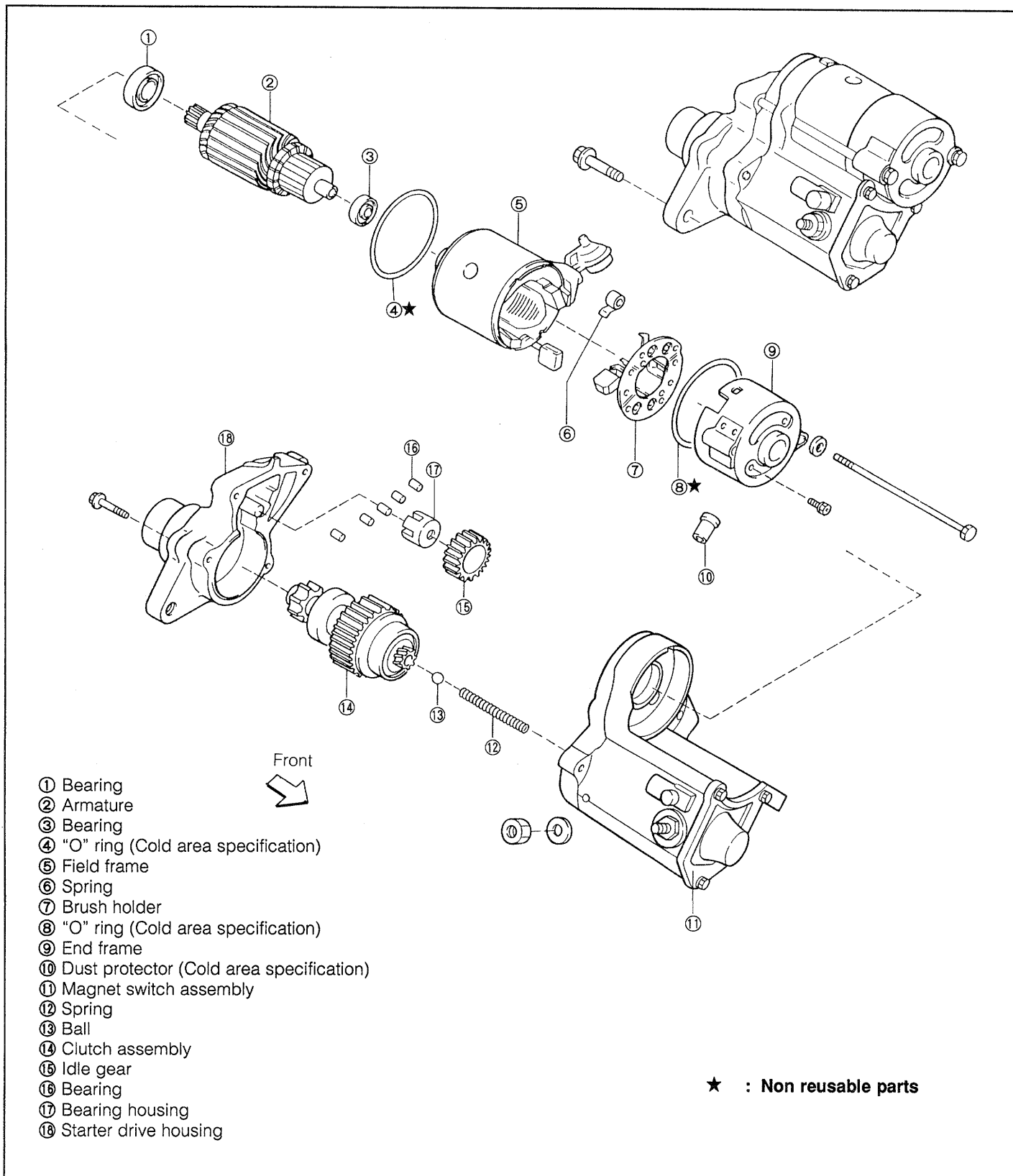
STARTER MOTOR	ST- 2
CLUTCH SWITCH	ST-18
STARTER RELAY	ST-20

WRU90-ST001

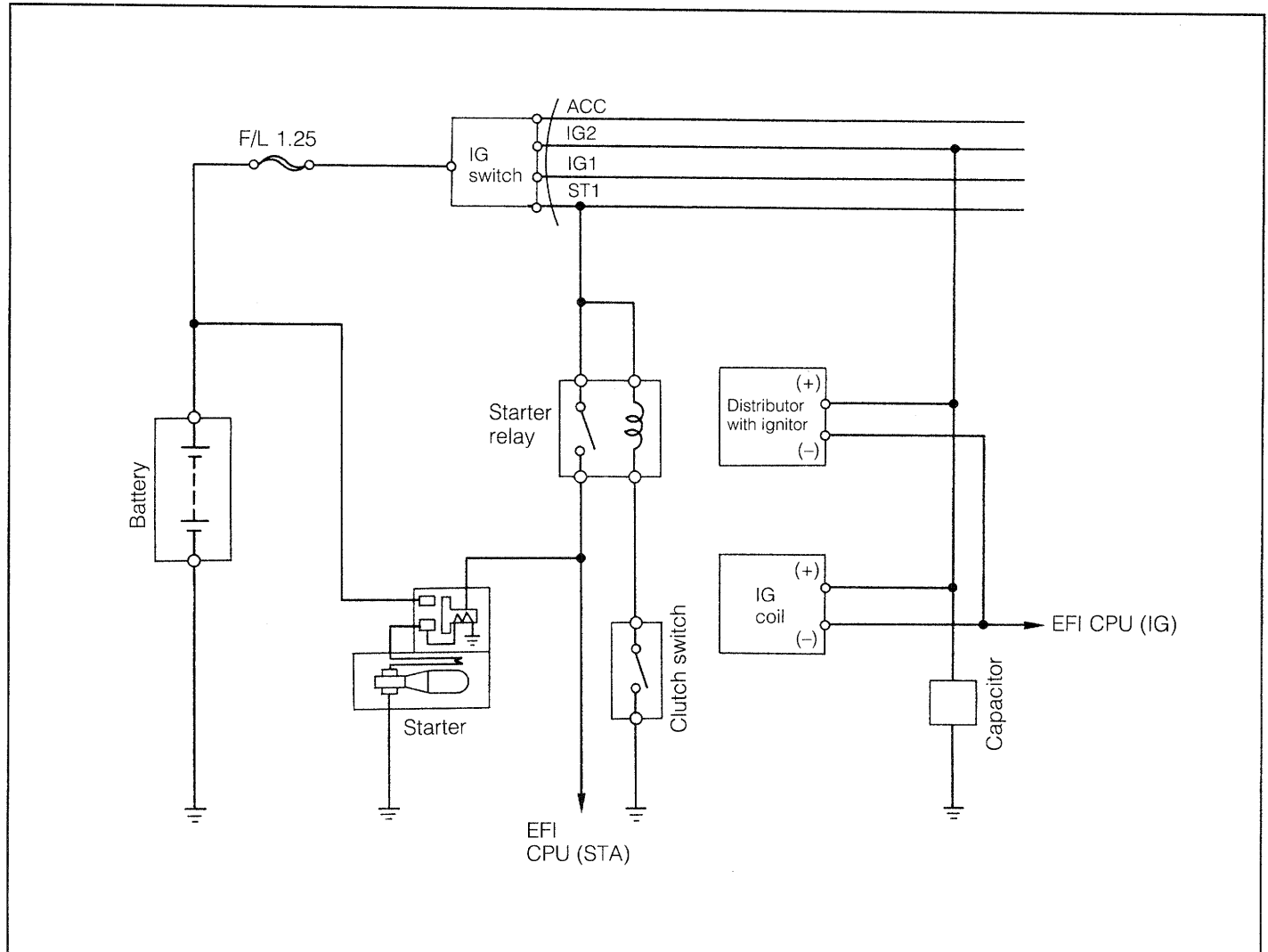
STARTER MOTOR

1. COMPONENTS

The starter consists of a solenoid switch and a motor. The power generated at the motor is transmitted to the clutch assembly through the idle gear. The rotation speed is reduced in accordance with the gear ratio between the drive gear provided at the motor and the clutch gear. On the other hand, the torque of the rotation increases.



2. STARTING SYSTEM CIRCUIT



WRU90-ST003

3. TROUBLE SHOOTING

Problem	Possible cause	Remedies
Engine will not crank.	Battery not fully charged. Battery cables loose, corroded or worn. Starter relay faulty. Fusible link blown. Starter faulty. Ignition switch faulty. Clutch switch faulty.	Check specific gravity of battery electrolyte. Charge or replace battery. Repair or replace cables. Replace starter relay. Replace fusible link. Repair starter. Replace ignition switch. Replace clutch switch.
Engine cranks slowly.	Battery not fully charged. Battery cables loose, corroded or worn. Starter faulty.	Check specific gravity of battery electrolyte. Charge or replace battery. Repair or replace cables. Repair starter.
Starter keeps running.	Starter faulty. Ignition switch faulty. Short in wiring.	Repair starter. Replace ignition switch. Repair or replace wiring.
Starter spins. – Engine will not crank.	Pinion gear teeth broken or faulty starter. Flywheel teeth broken.	Repair starter. Replace flywheel.

WRU90-ST004

STARTING SYSTEM

4. DESCRIPTION

Principles of operation & starting system circuit

The starter operations can be divided into two operations.

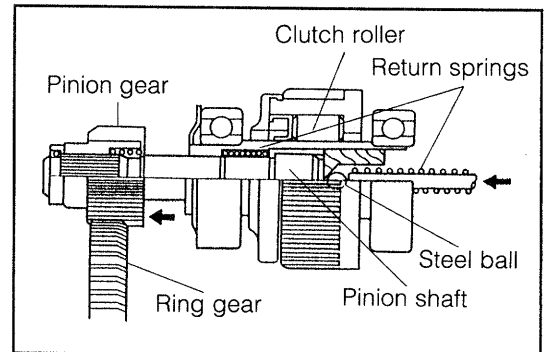
When the clutch is depressed and the ignition switch is set to the START (ST) position, the current from the battery flows to the motor through the solenoid. The motor starts to rotate. This power is transmitted to the drive gear, idle gear and clutch gear. At the same time, the solenoid pushes the pinion shaft, thereby bringing the pinion gear into mesh with the ring gear.

When the pinion gear has shifted into a complete mesh with the ring gear, the solenoid contact points are closed. The current from the battery now directly goes to the motor, thus supplying high power enough for cranking the engine. In this way, the starter motor begins cranking the engine.

The solenoid is composed of two coils. One is a low-resistance coil which moves the pinion shaft. The other is a high-resistance coil which retains the solenoid at the "start" position. The low-resistance coil is connected to the battery ground through the motor brush (and armature coil) and field coil. The high-resistance coil is directly grounded to the solenoid case.

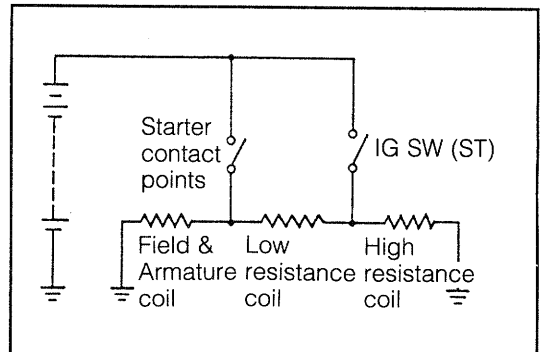
During the engine cranking, the solenoid is energized at the high-resistance coil alone. Since the low-resistance coil has the same potential at its both ends, no current flows. Consequently, the solenoid is retained at the "start" position by means of the high-resistance coil only. The right figure shows an equivalent circuit of the system.

WRU90-ST005



WRU90-ST006

WRU90-ST007



WRU90-ST008

During the starting period, the low-resistance coil provides the solenoid with a large amount of current to move the pinion shaft. Afterward, however, it is no longer necessary to use a large amount of current to hold the solenoid. Therefore, the above-described circuit has been employed for the starting system so that no burning takes place.

The plunger of the solenoid has two functions; One is to move the pinion shaft and the other is to close the electric contact points, which is simultaneous with the first function. For positive contact, the contact points are connected to the plunger through a spring.

When the ignition switch is set to the start (ST) position, current from the battery goes to the low-resistance coil and the field and armature coils. As a result, the motor starts rotating. Simultaneously, the high-resistance coil is also energized. These two coils exert drawing force on the plunger, thus making the plunger overcome the force of a spring (a spring which is provided to return the plunger and differs from the aforesaid spring provided at the contact points). The plunger then moves the pinion shaft strongly and brings the pinion gear into mesh with the ring gear. Simultaneously, the starter contact points are closed and current is directly drawn from the battery. At this stage, the low-resistance coil has an equal potential at its both ends, as previously described. Hence, no current flows to the motor through the low-resistance coil.

After the engine has started, when the ignition switch is returned to the IG position, current to the solenoid is cut off (NOTE). The spring built in the solenoid returns the plunger, thereby opening the contact points and cutting the current to the motor. At the same time, the pinion shaft which has been pushing the pinion gear is returned to the original position by means of the aforesaid spring force. Consequently, the pinion gear is disengaged and separated from the ring gear.

This pinion gear's separation from the ring gear can not be performed positively and assuredly by the spring at the pinion shaft alone. To achieve positive separation, a screw-shaped spline is provided at the pinion shaft gear. After start of the engine, the rotation speed of the ring gear continues to increase. Consequently, it becomes possible for the ring gear to drive the pinion gear.

At this point, owing to the screw-shaped spline, the pinion gear is moved in such a direction that it tends to disengage from the ring gear. On the other hand, this screw-shaped spline helps the pinion gear to be pushed and moved into mesh with the ring gear during the starting period.

NOTE:

In fact, at this moment, the current to the solenoid goes to the starter contact points and passes in series through the low-resistance coil and the high-resistance coil. Consequently, electromagnet function continues and drawing forces are generated. However, the electromagnetic forces generated at the low-resistance and high-resistance coils counteract, for the winding direction of the coil is opposite to each other. As a result, no drawing force is produced.

On the other hand, when the ignition switch is set to the ON (ST/ON) position, a parallel circuit is formed. The electromagnetic forces generated at both coils are in the same direction, resulting in an increased drawing force.

Namely, the direction of the current at the low-resistance coil changes reversely when the ignition switch is switched between the ON and OFF states. (This explanation applies only to the instance when the ignition switch is changed from the ST position to the IG position.)

WRU90-ST009

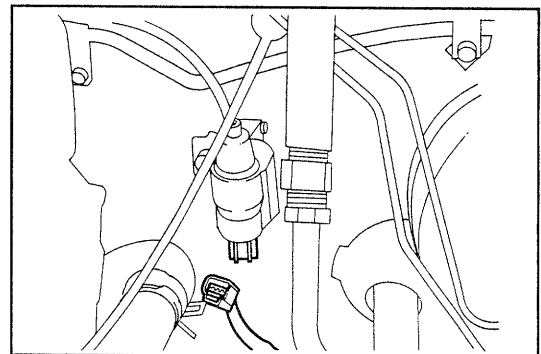
5. SERVICING INSTRUCTIONS OF STARTER

- (1) When connecting the starter terminal or battery terminal, perform positive tightening so as to avoid poor connection.
If poor connection should exist, it presents the hazard of serious danger that a large amount of current flowing during starter operation can overheat the poor connection.
- (2) When removing the starter, first disconnect the negative \ominus terminal of the battery. Then, disconnect the terminals (+B, ST) at the starter side. Since the battery voltage is always applied to the starter +B terminal, failure to observe this removing sequence may lead to battery short, which is extremely dangerous.
- (3) When installing the starter, install the starter in the clutch housing positively and be sure to tighten the attaching bolts to the specified torque. Improper installation can cause premature wear of the teeth of the pinion gear or ring gear and also can cause breakage of the clutch housing.

WRU90-ST010

6. IN-VEHICLE INSPECTION

- (1) Place the shift lever to the neutral position. Apply the parking brake lever.
- (2) Disconnect the ignition coil coupler so that the engine will not start.



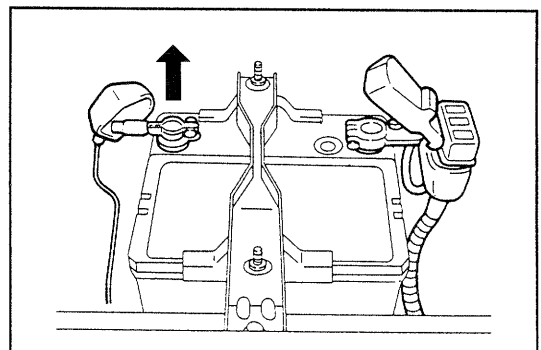
WRU90-ST011

- (3) Set the ignition switch to the ST position. Check to see if the engine cranks.
- (4) If the engine will not crank, perform the following checks.
 - Inspect the battery for damage. Charge the battery.
 - Perform harness continuity test.
 - Perform the clutch switch check. See page ST-18.
- (5) If the starter motor still will not rotate even after the checks above have been performed, remove the starter motor and perform the unit check.

WRU90-ST012

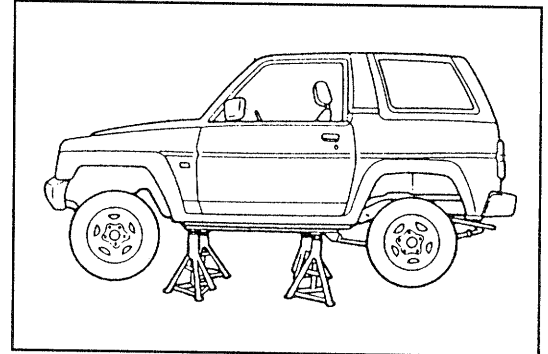
7. REMOVAL

- (1) Disconnect the ground cable terminal from the negative (-) terminal of the battery.



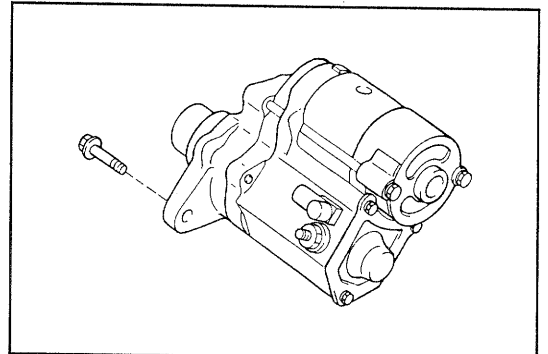
WRU90-ST013

(2) Jack up the vehicle and support it with safety stands.



WRU90-ST014

(3) Disconnect the starter terminals ST and B from the starter.
 (4) Remove the starter motor from the clutch housing.

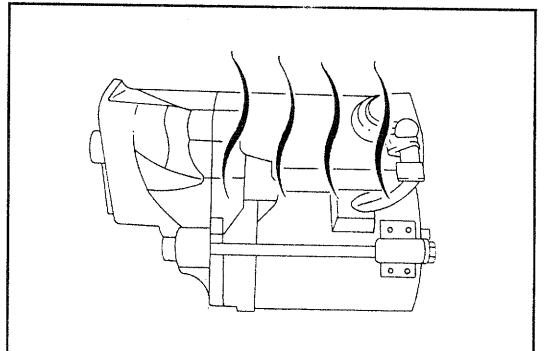


WRU90-ST015

8. UNIT CHECK OF STARTER MOTOR ASSEMBLY

CAUTION:

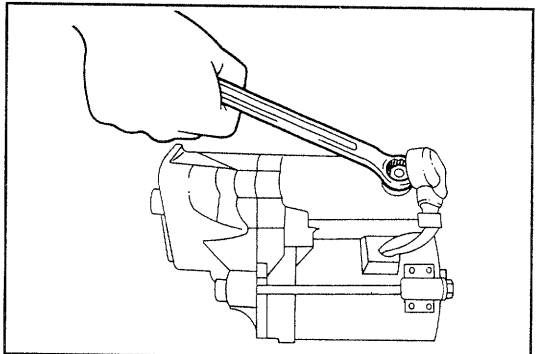
Each of the following tests must be performed within three to five seconds. If you fail to observe this caution and the starter is energized for more than this duration, the coil may be burnt out.



WRU90-ST016

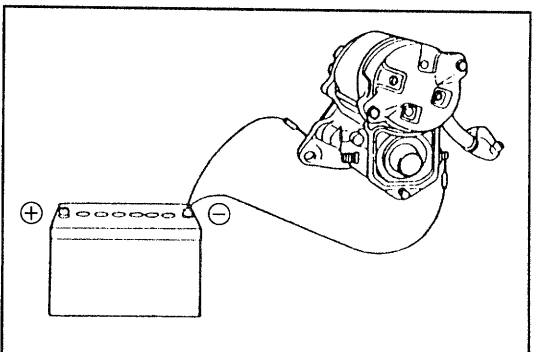
(1) Pull-in Test

① Disconnect the lead wire from the magnetic switch terminal.



WRU90-ST017

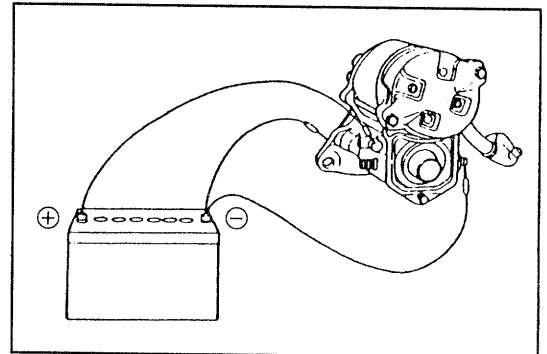
② Connect the negative (-) terminal of the battery to the starter body and magnetic switch terminal.



WRU90-ST018

STARTING SYSTEM

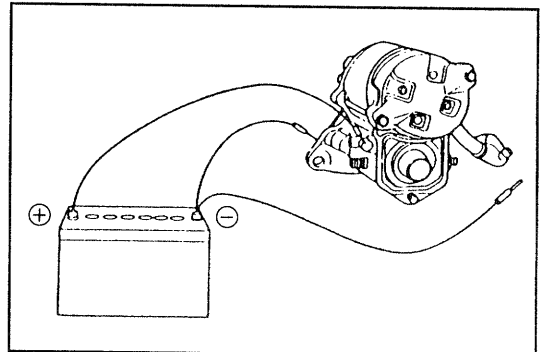
- ③ Connect the positive (+) terminal to the terminal ST. Ensure that the pinion is pushed outward. If the drive pinion fails to move out, replace the magnetic switch.



WRU90-ST019

(2) Hold-in Test

After the check has been performed following the same procedure as with the pull-in test, disconnect the negative terminal of the magnetic switch terminal. Ensure that the drive pinion is held in a pushed-out state. If the drive pinion fails to be held, replace the magnetic switch.



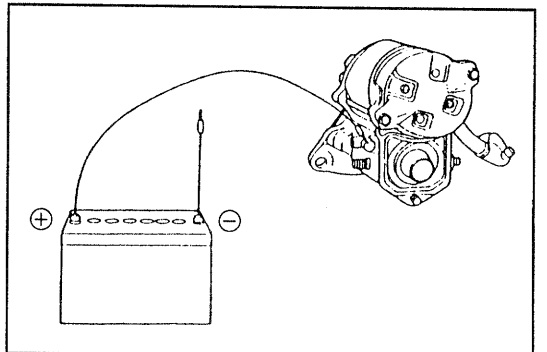
WRU90-ST020

(3) Inspection of Plunger Return

After the check has been performed following the same procedure as with the hold-in test, disconnect the ground terminal of the starter body. Ensure that the drive pinion is drawn into the drive housing. If the drive pinion fails to be drawn into the drive housing, replace the clutch assembly and return spring.

NOTE:

Connect the lead wire to the magnetic switch terminal after inspection is carried out.



WRU90-ST021

(4) No-load Performance Test

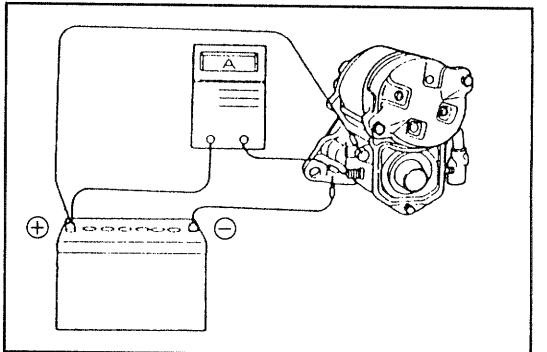
Connect the battery and an ammeter to the starter as shown in the right figure. Ensure that the starter rotates smoothly with the pinion moving out.

Measure the current the starter is drawing:

Specified Current: Less Than 90A at 11.5V

NOTE:

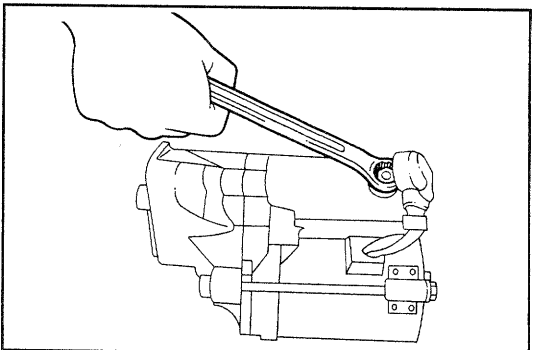
Prior to the test, be sure to connect the lead wire to the magnetic switch.



WRU90-ST022

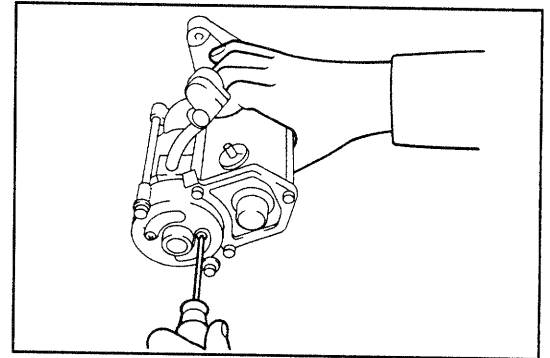
9. DISASSEMBLY

- (1) Disconnect the lead wire from the magnetic switch.



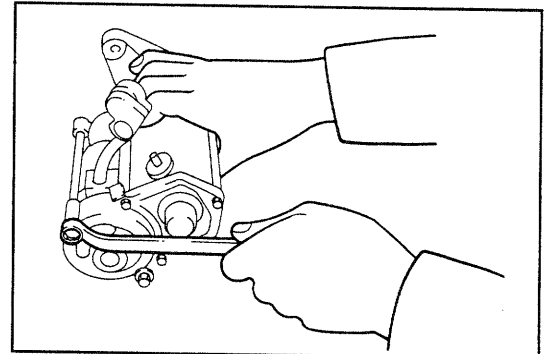
WRU90-ST023

- (2) Remove the brush holder retaining screws from the commutator end frame.



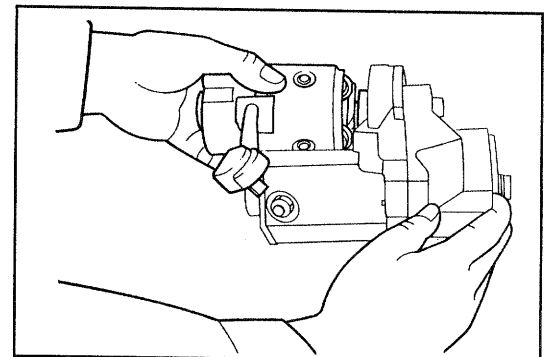
WRU90-ST024

- (3) Remove the two through bolts from the commutator end frame.



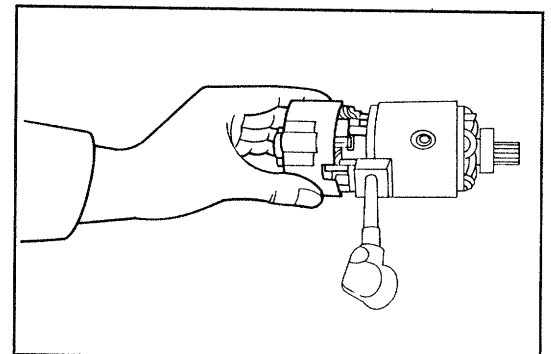
WRU90-ST025

- (4) Remove the yoke together with the armature from the drive housing.
 (5) Remove the "O" ring. (Cold area specification)



WRU90-ST026

- (6) Remove the commutator end frame.

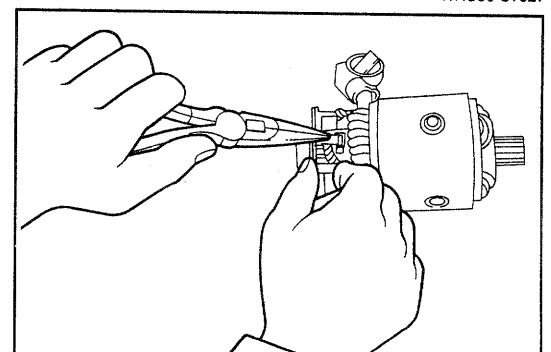


WRU90-ST027

- (7) Remove the brushes from the brush holder by means of nose pliers or the like.

NOTE:

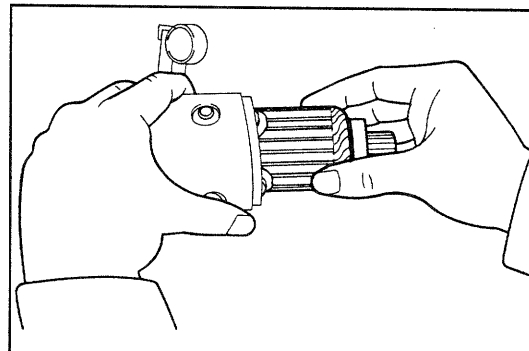
Care must be exercised not to damage the brushes during the removal.



WRU90-ST028

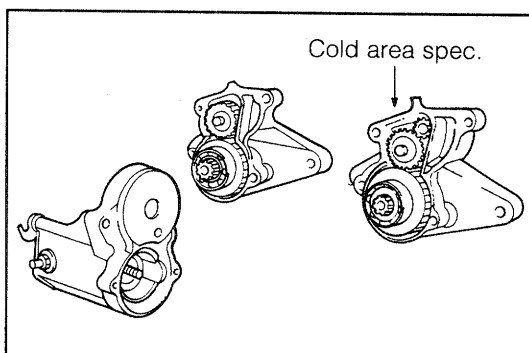
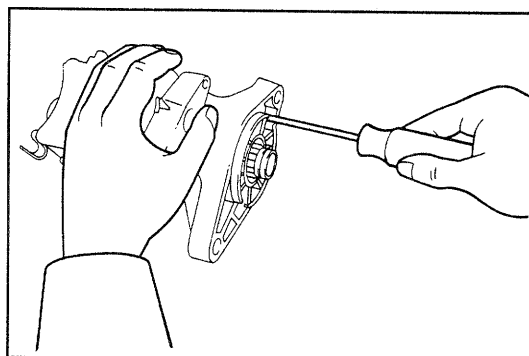
STARTING SYSTEM

- (8) Remove the armature from the yoke, being very careful not to damage the brushes.



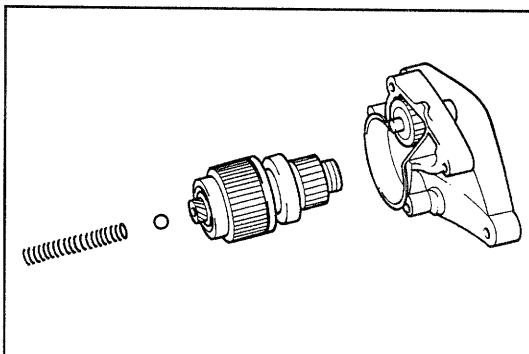
WRU90-ST029

- (9) Remove the starter switch assembly from the drive housing by removing the two screws.



WRU90-ST030

- (10) Remove the clutch assembly from the drive housing.
(11) Remove the seal ball from the clutch assembly.
(12) Remove the return spring from the magnet switch assembly.

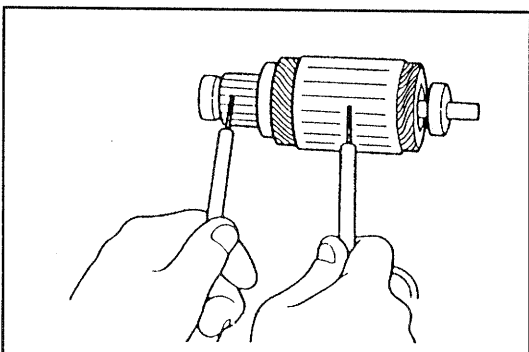


WRU90-ST031

10. INSPECTION

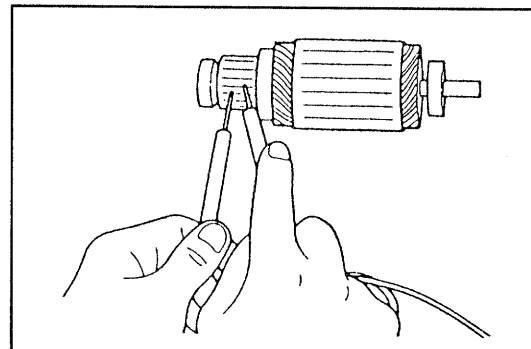
10-1 Check of Armature

- (1) Check of armature insulation
Ensure that no continuity exists between the commutator and the armature coil, using an ohmmeter.
If continuity exists, replace the armature.



WRU90-ST032

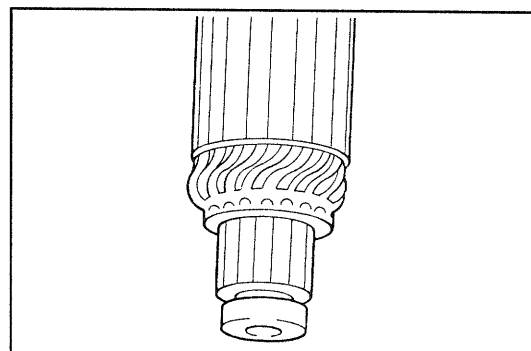
- (2) Check of commutator continuity
Check continuity between each adjacent segment of the commutator, using an ohmmeter.
If no continuity exists between any adjacent segments, replace the armature.



WRU90-ST033

10-2 Check of Commutator

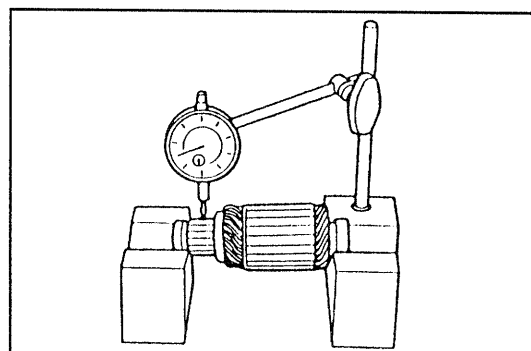
- (1) Check each contact surface of the commutator segments with the brushes for burning.
If the surfaces are dirty or burnt, correct the commutator surfaces, using abrasive paper (No. 400) or a lathe.



WRU90-ST034

- (2) Check of commutator for circle runout
Support the armature at its both ends on a Vee block.
Check the commutator for circle runout, using a dial gauge.
Circle Runout Limit: 0.05 mm (0.002 inch)

If the circle runout exceeds the allowable limit, turn down the commutator on a lathe.



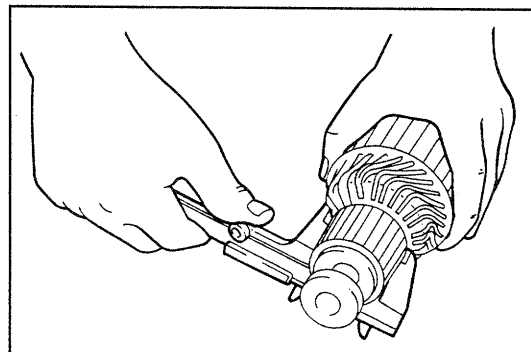
WRU90-ST035

- (3) Measurement of commutator diameter
Measure the commutator diameter by means of a micrometer or vernier calipers.

Standard Diameter: 30.0 mm (1.181 inch)

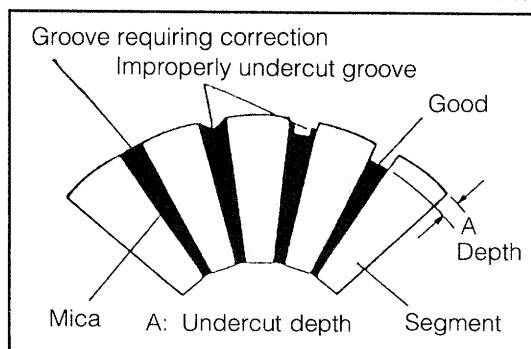
Minimum Diameter: 29.0 mm (1.142 inch)

If the commutator diameter is less than the minimum diameter, replace the armature.



WRU90-ST036

- (4) Check of commutator undercut
If the depth of the insulator groove between commutator segments is less than 0.2 mm (0.0079 inch), it is necessary to undercut the insulator so that the groove depth may become 0.5 - 0.8 mm (0.020 - 0.031 inch).



WRU90-ST037

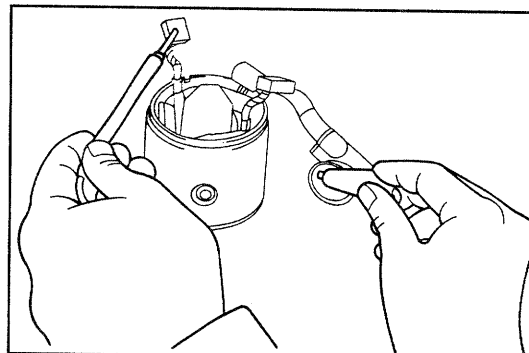
STARTING SYSTEM

10-3 Check of Field Coil

(1) Field coil continuity test

Perform field coil continuity test at a point between the lead wire and the brush, using an ohmmeter.

If no continuity exists, replace the yoke.

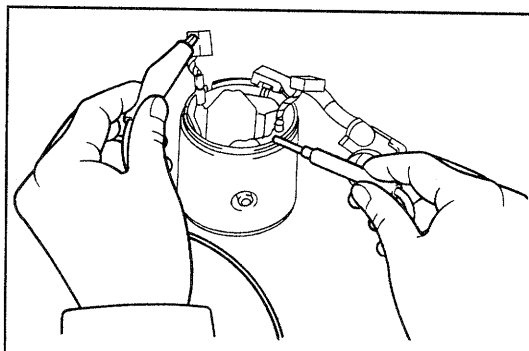


WRU90-ST038

(2) Field coil short test

Perform field coil short test at a point between the brush and the yoke proper, using an ohmmeter.

If continuity exists, replace the yoke.



WRU90-ST039

10-4 Check of Brushes

Measurement of brush length

Measure the brush length, using vernier calipers.

Standard Length:

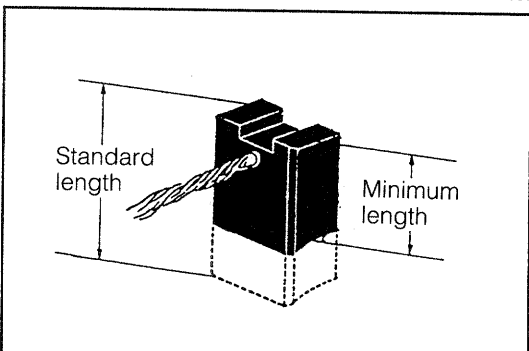
13.0 mm (0.51 inch)

15.0 mm (0.59 inch) Cold area specification

Minimum Length:

11.3 mm (0.44 inch)

11.0 mm (0.43 inch) Cold area specification



WRU90-ST040

If the length is less than the minimum requirement, replace the brush holder or the yoke, as required.

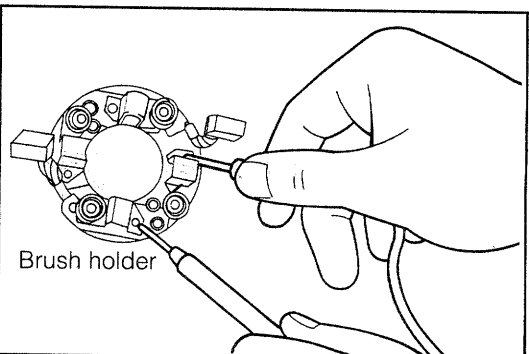
10-5 Check of Brush Holder

Check of brush holder for insulation

Measure the insulation between the positive and negative terminals of the brush holder, using an ohmmeter.

Insulation Resistance: 100 MΩ or more

If the insulation resistance is less than the specification, replace the brush holder.



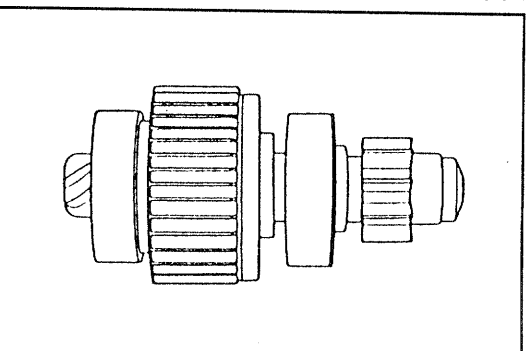
WRU90-ST041

10-6 Inspection of Clutch

(1) Inspection of pinion gear and spline teeth

Check the teeth of the pinion gear and spline for wear or damage.

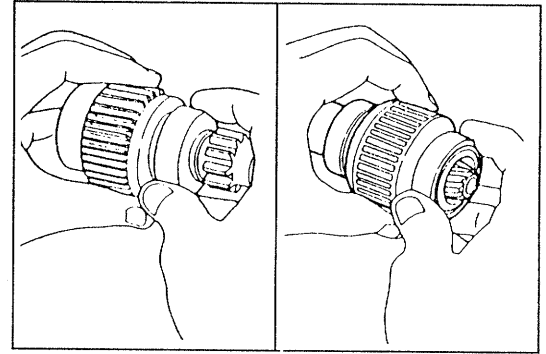
If the teeth exhibit any damage, replace the clutch. Also, inspect the flywheel ring gear for wear or damage.



WRU90-ST042

(2) Check of bearing

Lightly turn the bearing hand. Ensure that the bearing turns smoothly.



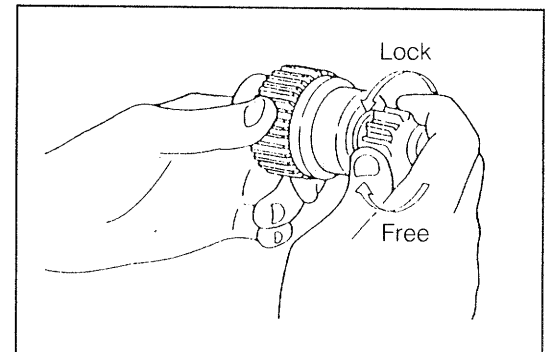
WRU90-ST043

(3) Check of starter clutch

While holding the clutch, turn the pinion clockwise. Ensure that the pinion turns smoothly.

Turn the pinion counterclockwise. Ensure that the pinion is locked.

If the check results are unsatisfactory, replace the starter clutch.



WRU90-ST044

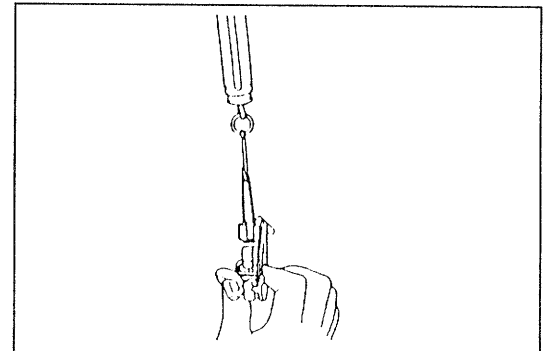
10-7 Check of Brush Spring

Measure the brush spring tension, using a spring scale.

Tension with Spring Installed:

1.93 - 2.36 kg (4.26 - 5.20 lb)

If the spring tension is less than the specification, replace the spring.



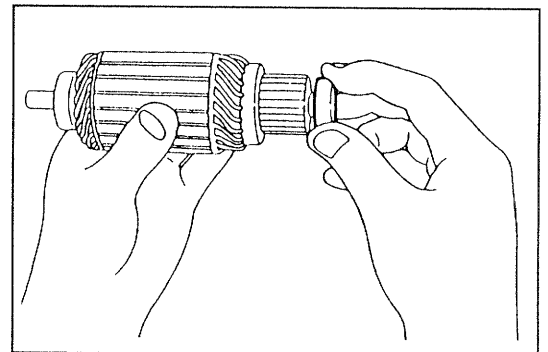
WRU92-ST074

10-8 Inspection of Bearings

(1) Inspection of bearings

Turn the bearing while applying force to it by your hand.

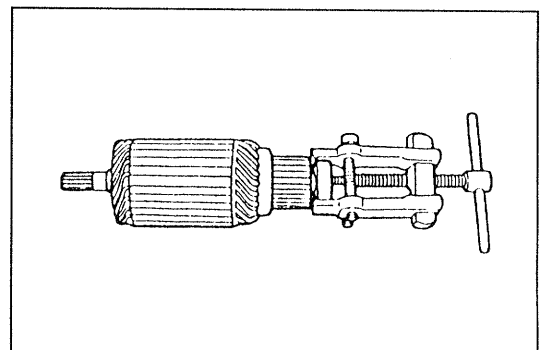
Ensure that the bearing turns smoothly. If the bearing fails to turn smoothly, replace the bearing.



WRU90-ST046

(2) Replacement of bearings (Only when bearing is faulty.)

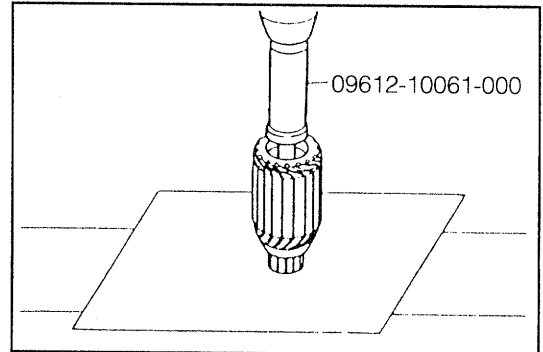
① Remove the bearing, using an armature bearing puller.



WRU90-ST047

STARTING SYSTEM

- ② Press the bearing into the armature shaft, using a press in conjunction with the SST.
SST: 09612-10061-000

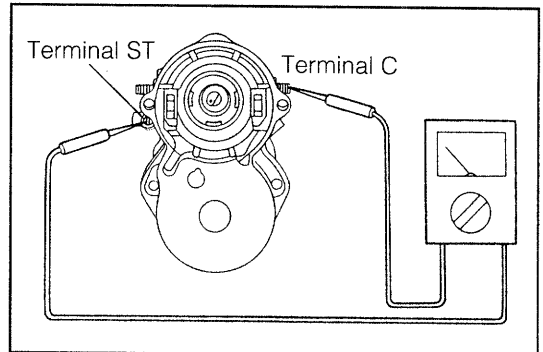


WRU90-ST048

10-9 Check of Magnetic Switch

(1) Pull-in coil test

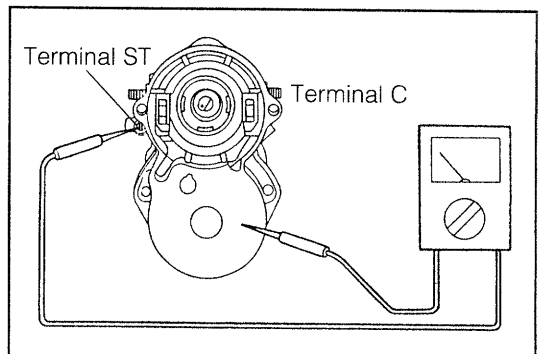
Using an ohmmeter, ensure that continuity exists between the terminal ST of the starter and the terminal C.
If no continuity exists, replace the magnetic switch.



WRU90-ST049

(2) Hold-in coil test

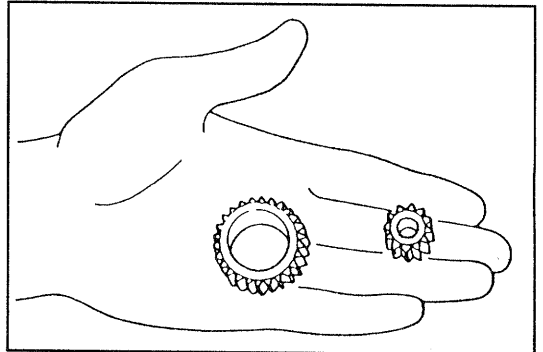
Ensure that continuity exists between the terminal ST of the magnetic switch and the switch body.
If no continuity exists, replace the magnetic switch.



WRU90-ST050

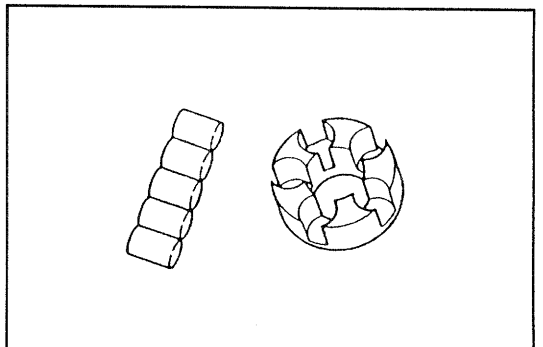
10-10 Inspection of Gears

- (1) Inspect the starter drive gear (cold area specifications) and starter idle gear for damage or wear.
Replace the gear which exhibits damage or wear.



WRU90-ST051

- (2) Inspect the starter idle gear bearing and bearing housing for damage or wear.
Replace the clutch or retainer, as required.



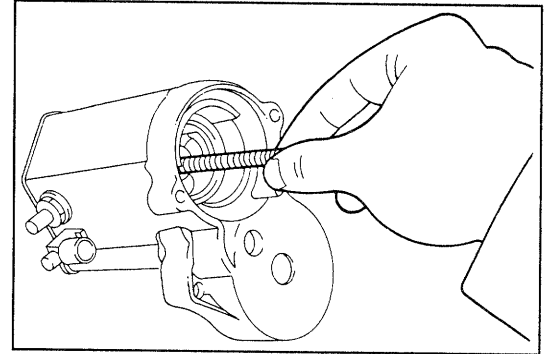
WRU90-ST052

11. ASSEMBLY

NOTE:

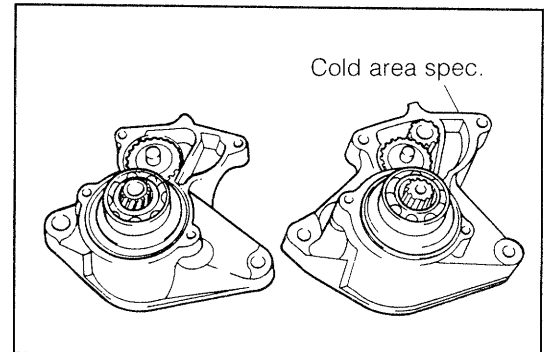
Use high-temperature grease to lubricate the bearings and gears when assembling the starter.

(1) Install the return spring in the starter switch assembly.



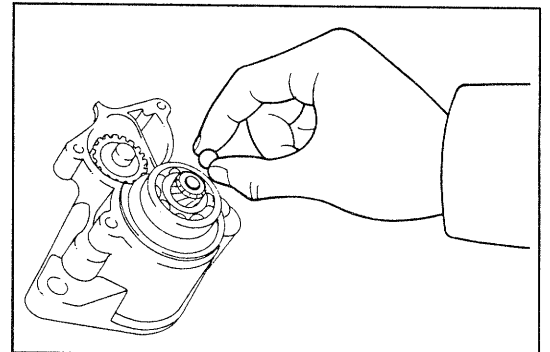
WRU90-ST053

(2) Assemble the clutch housing, idle gear, clutch and drive gear (cold area specifications) in the starter drive housing.



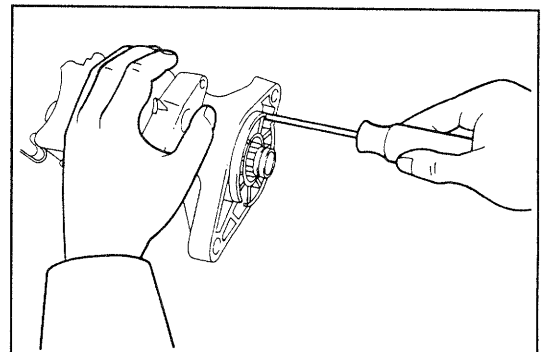
WRU90-ST054

(3) Fit the steel ball in the starter clutch assembly.



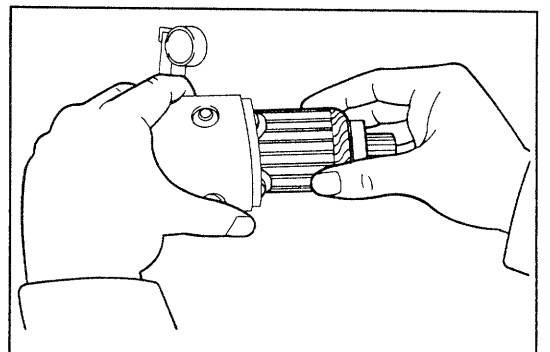
WRU90-ST055

(4) Install the starter magnetic switch assembly in the starter drive housing. Secure the switch assembly with the two screws.



WRU90-ST056

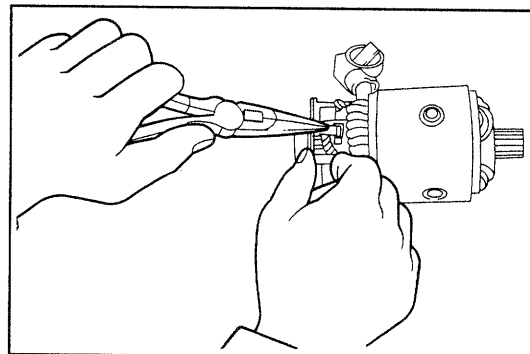
(5) Insert the armature into the yoke.



WRU90-ST057

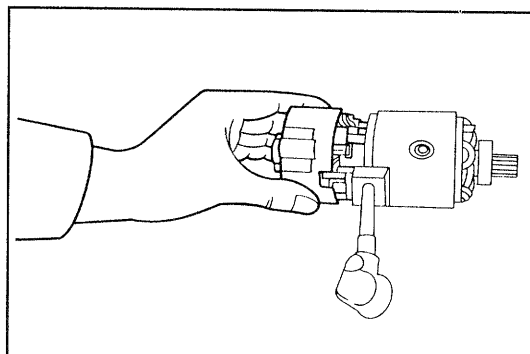
STARTING SYSTEM

- (6) While the brush holder is held in a raised state by means of a screwdriver or nose pliers, insert the brushes.



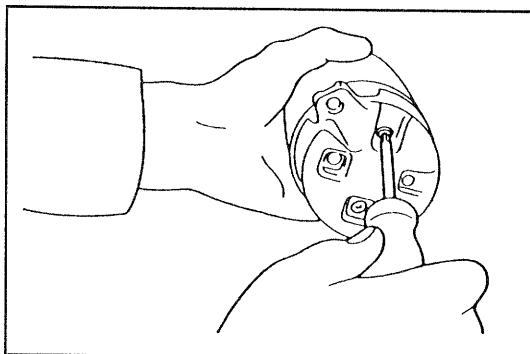
WRU90-ST058

- (7) Attach the commutator end frame to the yoke with a new "O" ring (Cold area specification) interposed.



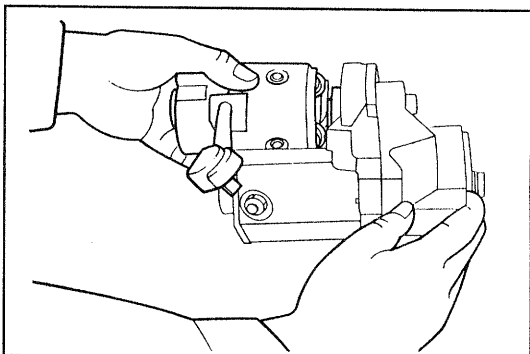
WRU90-ST059

- (8) Install the brush holder on the end frame, using the two screws.



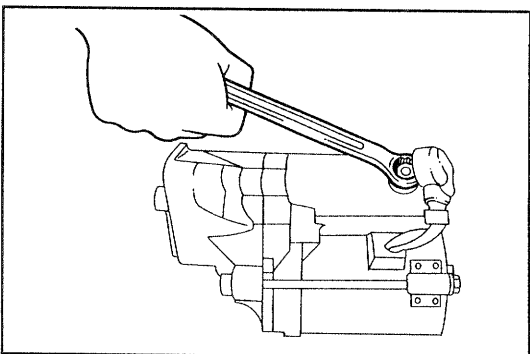
WRU90-ST060

- (9) Install the yoke on the drive housing. Make sure that the cut-out marks are aligned with each other. Secure the yoke with the two through bolts.



WRU90-ST061

- (10) Connect the lead wire to the magnetic switch terminal.



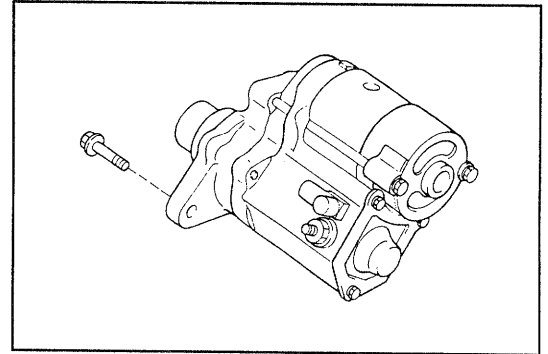
WRU90-ST062

12. INSTALLATION

- (1) Install the starter motor to the clutch housing.
- (2) Tighten the attaching bolts of the starter motor to the specified torque.

Tightening Torque: 5.0 - 7.0 kg-m
(36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)

- (3) Connect the starter terminals B and ST of the alternator wire to the starter.
- (4) Install the engine undercover.
- (5) Jack up the vehicle. Remove the safety stands from the vehicle. Then, remove the jack.
- (6) Connect the ground cable terminal to the negative (-) terminal of the battery.



WRU90-ST063

CLUTCH SWITCH

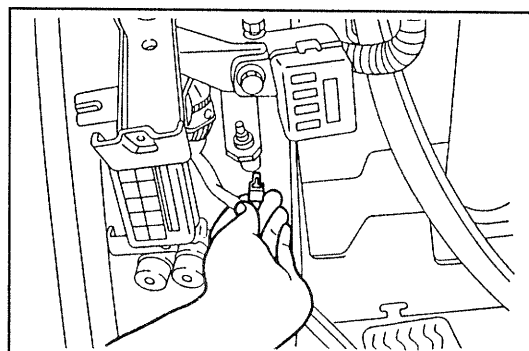
1. INSPECTION OF CLUTCH SWITCH

- (1) Inspection of clutch pedal
 - ① Ensure that the clutch pedal installation height is correct.
 - ② Ensure that the clutch pedal free travel is correct.
- (2) Inspection of clutch start system
 - ① Ensure that the engine will not start when the clutch pedal is released.
 - ② Ensure that the engine can start when the clutch pedal is depressed fully.
Adjust or replace the clutch switch, as required.

2. REMOVAL

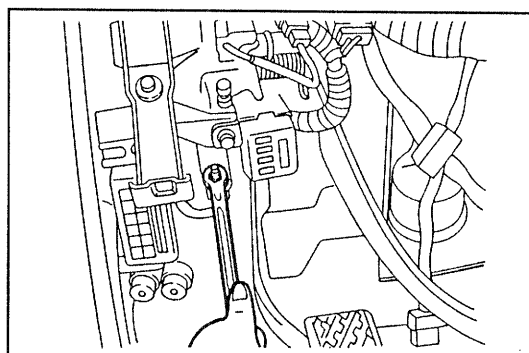
- (1) Disconnect the coupler of the clutch switch.

WRU90-ST064



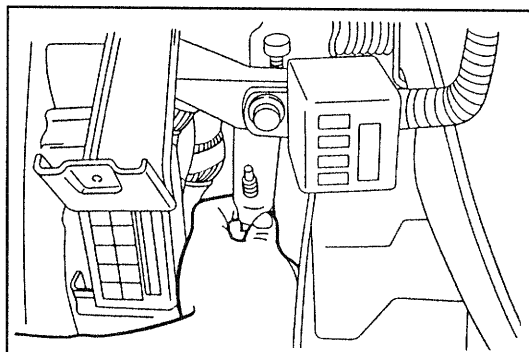
WRU90-ST065

- (2) Remove the attaching nut of the clutch switch.



WRU90-ST066

- (3) Remove the clutch switch from the pedal bracket by turning the clutch switch.



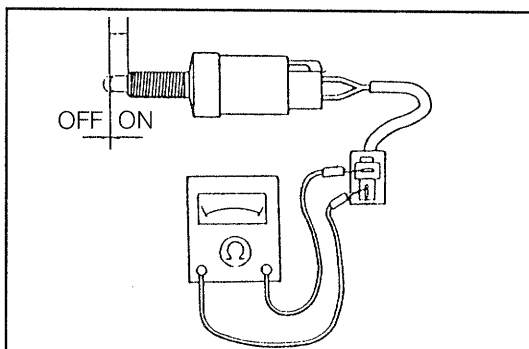
WRU90-ST067

3. INSPECTION

Unit inspection of clutch switch (if necessary)

- (1) Disconnect the coupler of the clutch switch. Connect an ohmmeter.
- (2) When the clutch switch is pressed (in the ON state), ensure that there is continuity between both poles.
- (3) When the clutch switch is released (in the OFF state), ensure that there is no continuity between both poles.
- (4) Securely connect the coupler of the clutch switch.

Tightening torque: 1.8 - 3.0 kg-m
(13.0 - 21.7 ft-lb, 17.7 N·m)



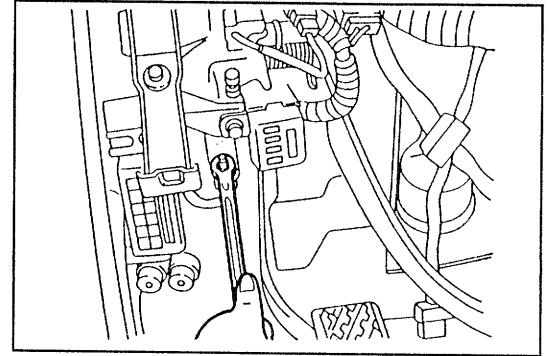
WRU90-ST068

4. INSTALLATION

- (1) Install the clutch switch to the pedal bracket. Tighten the attaching nut to the specified torque.

Tightening Torque: 1.8 - 3.0 kg-m
(13.0 - 21.7 ft-lb, 17.7 - 29.4 N·m)

- (2) Connect the coupler to the clutch switch.

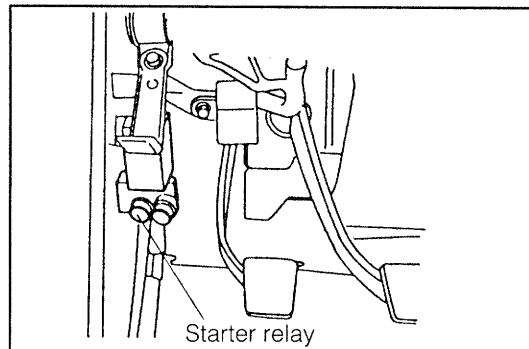


WRU90-ST069

STARTING SYSTEM

STARTER RELAY

(1) Remove the starter relay.



(2) Inspection of relay continuity

- 1) Ensure that the resistance between the terminals ① and ② meets the specification.

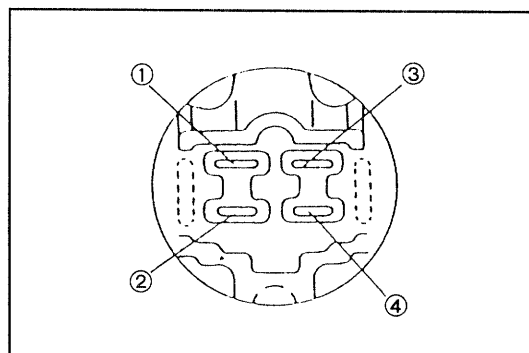
Specified Resistance: 40 - 100Ω

If the resistance does not conform to the specification, replace the relay with a new one.

- 2) Ensure that no continuity exists between the terminals ① and ③ and between the terminals ① and ④.

If continuity exists, replace the relay with a new one.

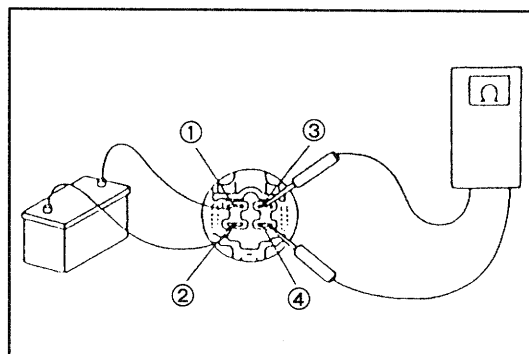
- 3) Ensure that no continuity exists between the terminals ② and ③ and between the terminals ② and ④.



(3) Inspection of relay operation

Apply the battery voltage across the terminals ① and ②.

Ensure that there is continuity between the terminals ③ and ④.



(4) Installation of starter relay

- 1) Install the starter relay to the cowl side.
- 2) Connect the starter relay connector.

WRU90-ST073

DAIHATSU

Rocky

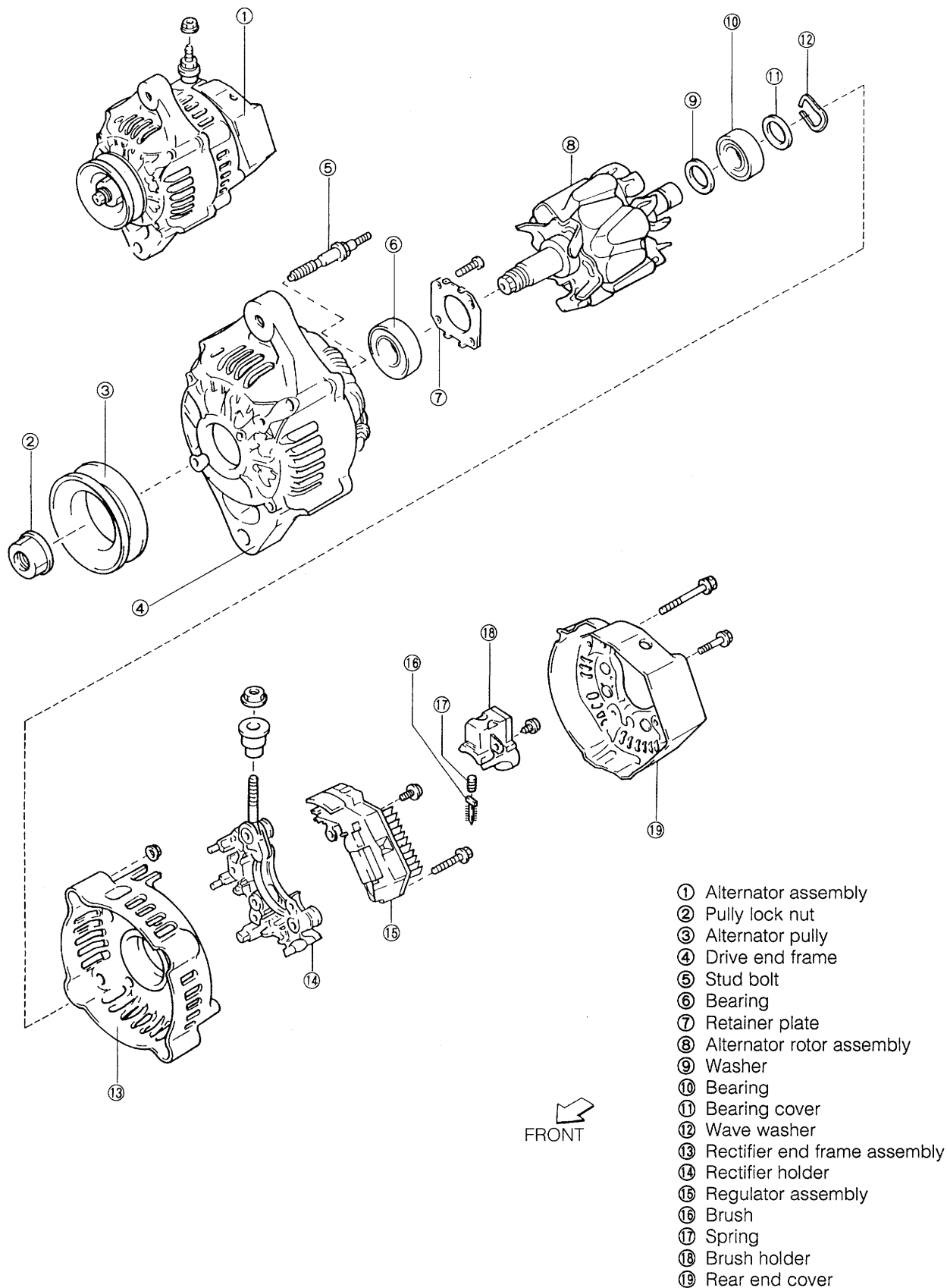
CHARGING SYSTEM

CH

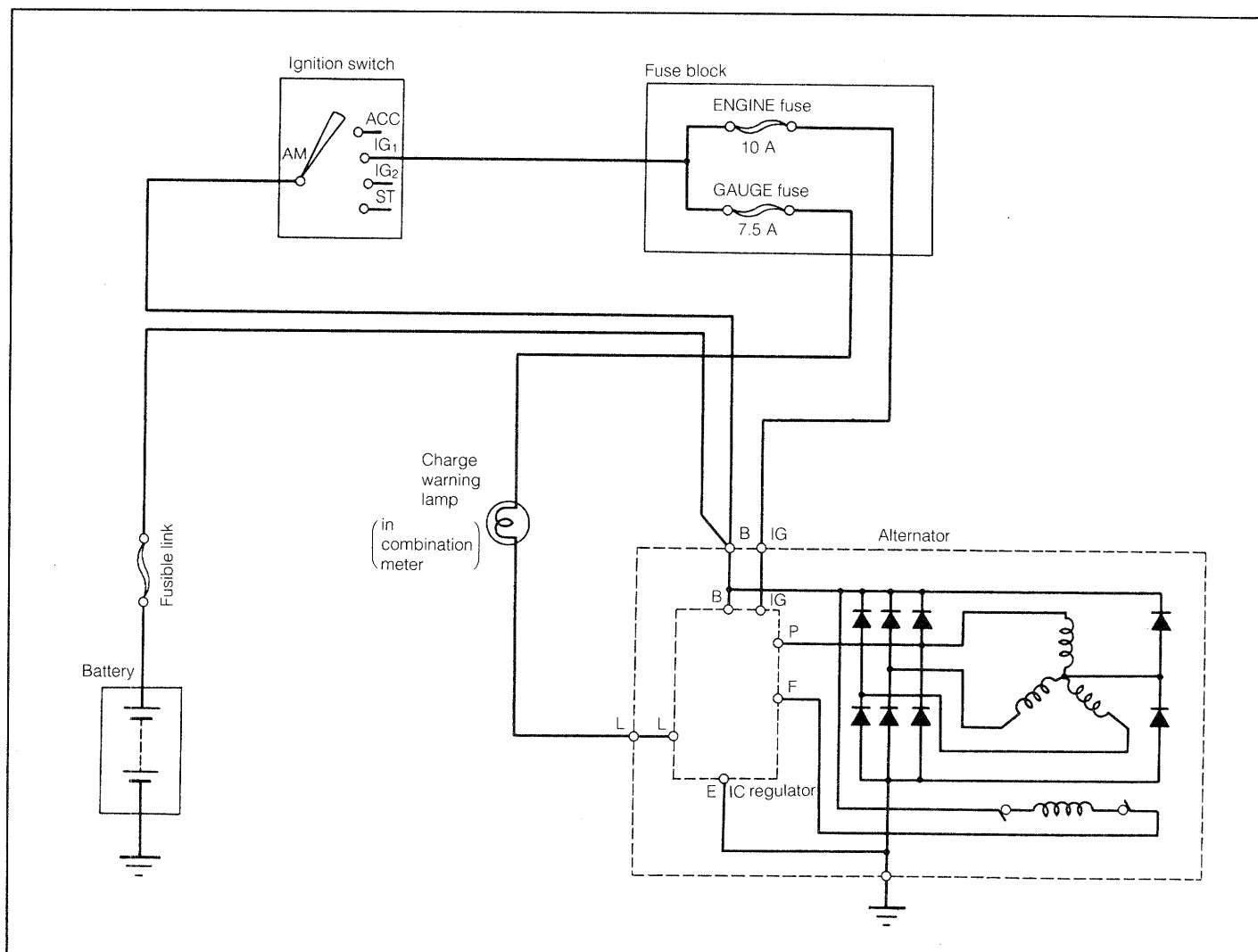
1. COMPONENTS	CH- 2
2. CHARGING SYSTEM CIRCUIT	CH- 3
3. TROUBLE SHOOTING	CH- 3
4. DESCRIPTION	CH- 4
5. IN-VEHICLE INSPECTION	CH- 7
6. REMOVAL	CH-11
7. DISASSEMBLY	CH-12
8. INSPECTION	CH-14
9. ASSEMBLY	CH-20
10. INSTALLATION	CH-23

WRU90-CH001

1. COMPONENTS



2. CHARGING SYSTEM CIRCUIT



WRU90-CH003

3. TROUBLE SHOOTING

Problem	Possible causes	Remedies
Charge warning lamp will not glow even if ignition switch is turned ON.	Fuse blown Lamp bulb burnt Poor connection of wiring Open wire IC regulator faulty	Check gauge fuse. Replace bulb. Repair poor connection of wiring. Repair or replace. Replace regulator assembly.
Charge warning lamp will not go out even if engine has started.	Drive belt loose or worn Battery cables loose, corroded or worn Fuse blown Fusible link blown IC regulator or alternator faulty Wiring faulty	Adjust or replace. Repair or replace cables. Check gauge fuse. Replace fusible link. Check charging system. Repair or replace.

WRU90-CH004

4. DESCRIPTION

The charging device consists of an alternator and a regulator. The alternator produces alternating current (AC), which is converted to direct current (DC) by a rectifier.

The battery supplies power for operating the starter as well as power required while the engine is stopped.

The alternator recharges the battery so as to maintain it in an operational state at all times. The alternator also furnishes power for the electric equipment.

Electricity is produced when a magnet is moved in the vicinity of a coil. When the magnet is getting close to the coil, voltage is produced in one direction. However, when the magnet is leaving the coil, the direction of the voltage changes. This type of current is generally called alternating current, for the direction of the current is alternating.

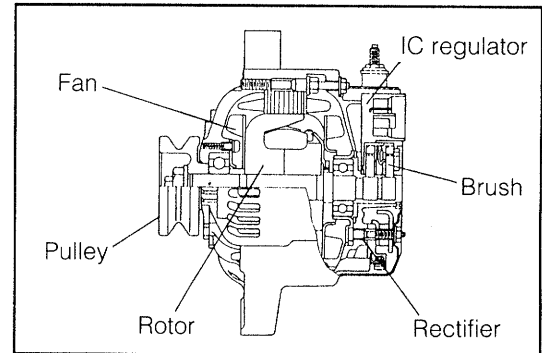
The main purpose of a generator for motor vehicles is to charge the battery. Hence, a generator which produces alternating current is not suited for this purpose. It is, therefore, necessary to convert alternating current to direct current. As semiconductor technology has advanced, today it has become possible to convert alternating current to direct current at a low cost. Consequently, alternators (AC generators) have been commonly used. The following are advantages of alternators compared with DC generators.

- (1) Compact design, light weight and remarkable vibration-resistant characteristics
- (2) Capable of withstanding high-speed rotation, quick acceleration and deceleration.
- (3) Being enduring under severe environment prevailing with dirt, dust and moisture, etc.
- (4) Having a fewer number of consuming parts and being easy to repair

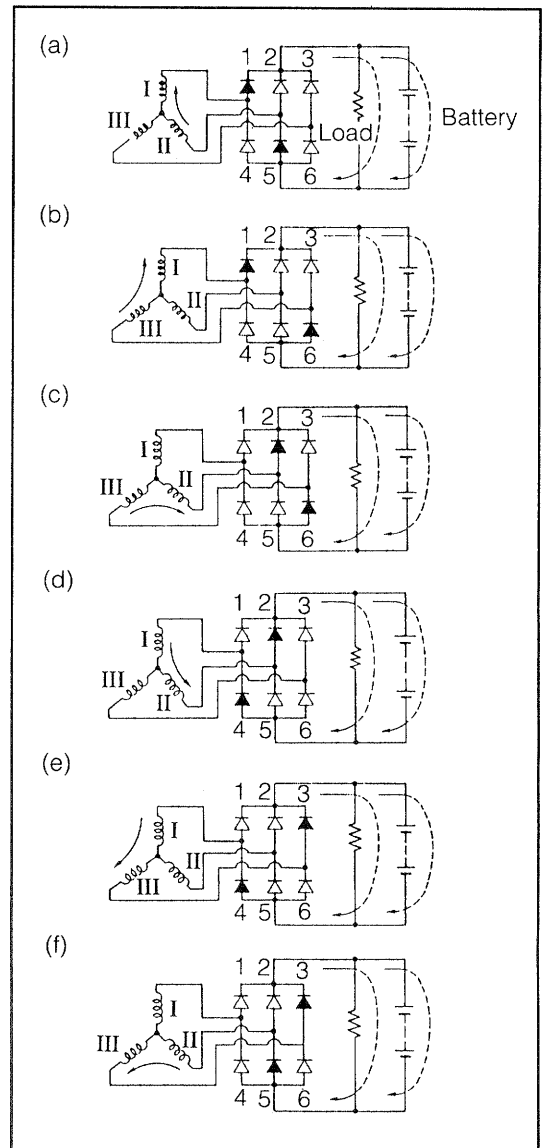
The alternator has three pairs of stator coils and rotor (coil) and produces three-phase current. The alternator employs six rectifiers, which performs three-phase full-wave rectification. The generated voltage (electromotive force) is in proportion to the strength of the magnetic field (magnet). This means that the voltage is proportional to the current of the rotor coil and to the rotation speed, i.e. the moving speed of the magnet.

The generated voltage varies as the engine revolution speed of the vehicle changes. It is, therefore, necessary to regulate the voltage so that the battery can be charged. For this purpose, the current of the rotor coil is regulated, thereby producing a regulated generator voltage. To achieve this operation, a regulator has been employed.

The regulator is of an IC (integrated circuit) type and it is built inside the alternator itself.



WRU90-CH005



WRU90-CH006

The electromotive force generated in a coil is generally expressed by the following formula.

$$e = -N \cdot \frac{d\phi}{dt}$$

where,

e : Induced electromotive force in coil (V)

N : Number of turns of wire in coil

$\frac{d\phi}{dt}$: Rate of change in magnetic flux (ϕ) per unit time

– : This means voltage is generated in such a direction that the change in magnetic flux is prevented.

The magnetic flux increases in proportion to the current of the rotor coil. However, as the magnetic flux is reaching a saturation point, the increase of the magnetic flux is no longer proportional to the current.

The output of the alternator increases as the rotation ($\frac{d\phi}{dt}$) increases, eventually reaching a saturation point.

This saturation is believed to be caused by the decline of the rate of change ($\frac{d\phi}{dt}$) i.e. the rate of change in magnetic flux (ϕ) per unit time when the magnetic flux of the rotor is applied to the stator coil.

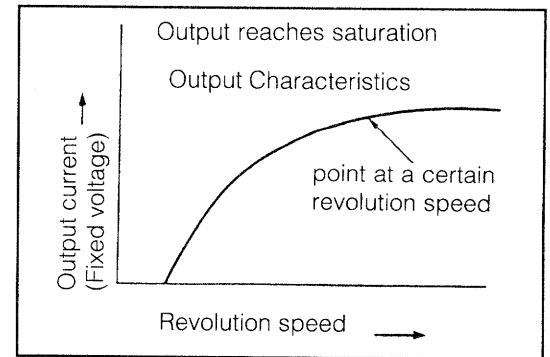
Besides the controlling by the magnetic flux and rotation speed described above, the output is restricted by the electric resistance of the stator coil. This resistance, mainly attributable to the induction reactance of ac current, increases as the frequency (rotation speed) rises.

The alternator is so designed that its electromotive force is generated at the stator coil. Therefore, the alternator features easy cooling and virtually trouble-free operation.

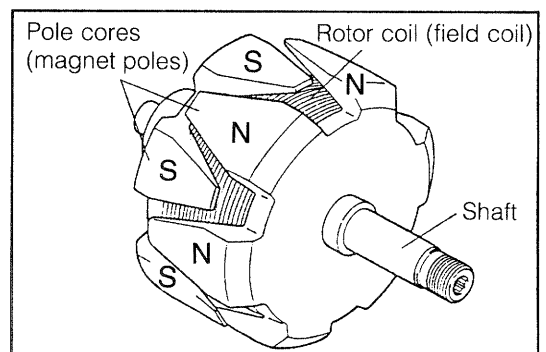
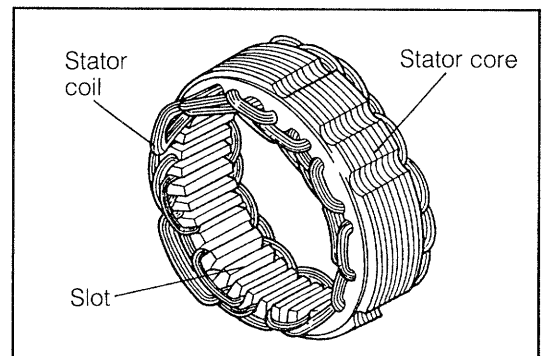
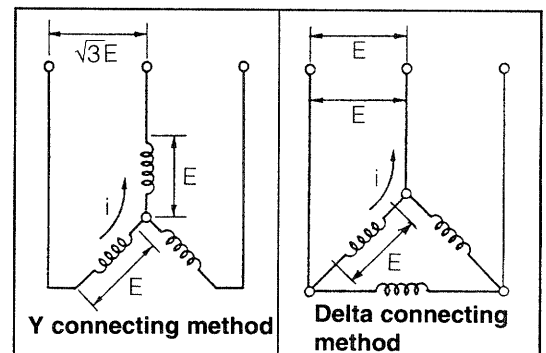
To connect the three pairs of stator coils, a "Y" connecting method is employed. Although this Y connecting method is inferior to a Delta-type connecting method in the maximum output current, the Y connecting method has a greater electromotive force at lower speeds. Moreover, the Y connecting method has an advantage of use of the neutral point. For these reasons, the Y connecting method has been widely used on small capacities less than 1 kW.

The stator assembly is made up of a laminated iron frame. This construction has been adopted so as to hold the stator coil and allow the magnetic flux from the rotor to pass through the coil easily (improvement of permeability).

The installation of an iron core in the coil increases the self inductance. This causes an increase of the inductive reactance in the case of AC current, resulting in reduced electromotive force. However, in the case of comparatively-low frequencies, the installation of iron core has more favorable effects in increasing the electromotive force which is attained by improved permeability, even counteracting the aforesaid disadvantage. For this reason, the iron core is generally employed. The purpose of slots provided at the core is to retain the wound stator coil. These slots also serve as magnetic flux passages which have been so designed that the rotor magnetic flux intersects the stator coil effectively.



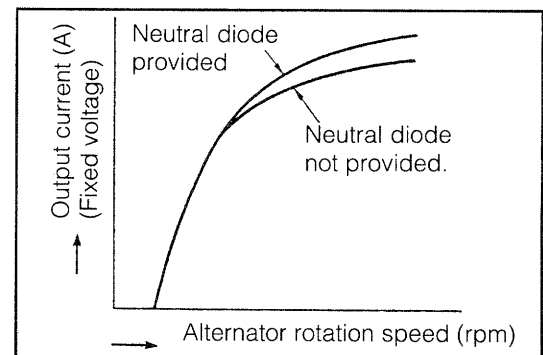
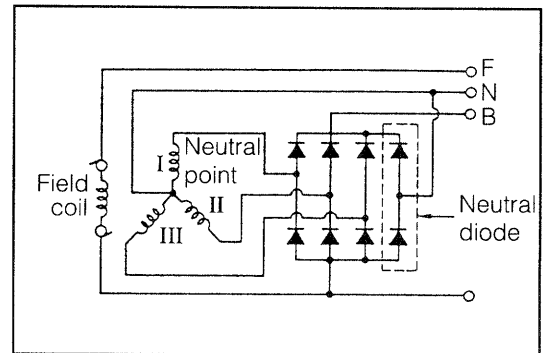
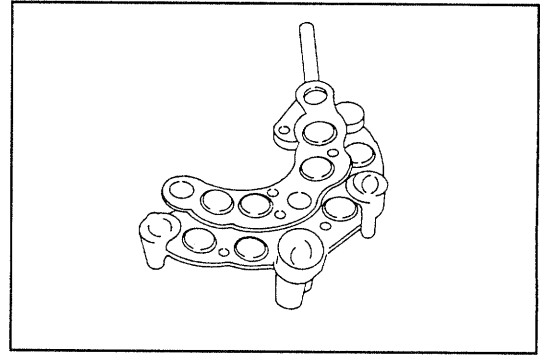
WRU90-CH007



WRU90-CH008

CHARGING SYSTEM

Theoretically speaking, six pieces of diodes are sufficient for full-wave rectification. However, the latest alternators have employed two more diodes for the purpose of utilizing the electromotive force at the neutral point. As a result, the latest alternator can produce a greater output current than the conventional alternators.



WRU90-CH009

5. IN-VEHICLE INSPECTION

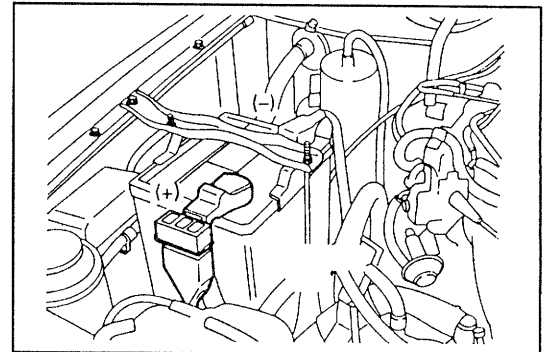
CAUTION:

- Never touch at the battery terminals immediately after the vehicle has been operated.
- Be certain to turn OFF the ignition key switch during the inspection.

WRU90-CH010

- (1) Check the battery case for proper installing condition and cracks.

If the batter case exhibits improper installing condition or cracks, replace or repair the battery, as required.



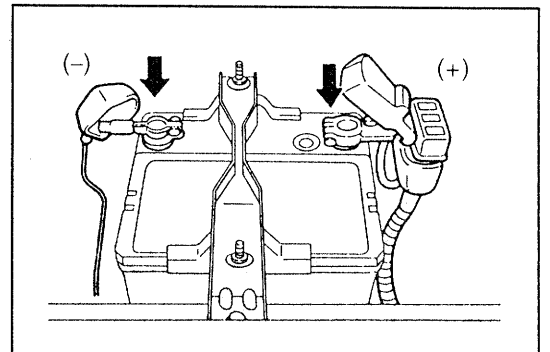
WRU90-CH011

- (2) Check to see if the battery terminals exhibit corrosion and/or loose condition.

If the battery terminals exhibit corrosion and/or loose condition, remove the battery cable terminals from the terminal of the battery. Remove any rust, using a wire brush or a fine abrasive paper. After the battery terminals have been connected, coat these terminal with a thin film of lithium grease.

NOTE:

- After the battery terminals have been cleaned, make sure that no rust particle remains on the terminals.



WRU90-CH012

- (3) Check battery specific gravity and electrolyte level
Check the color of the Hydrometer.

REFERENCE (For Delco battery):

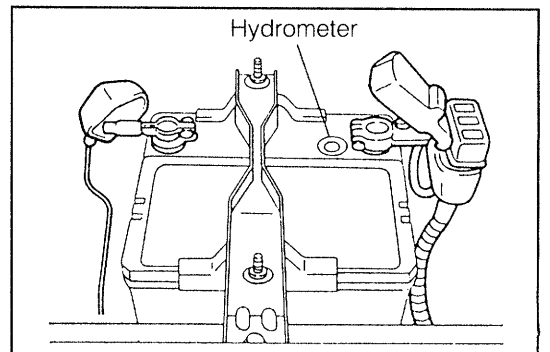
Green dot is visible:

The battery is adequately charged.

Dark (The green dot is invisible.):

The battery must be charged.

Clear or light yellow: Replace the battery.



WRU90-CH013

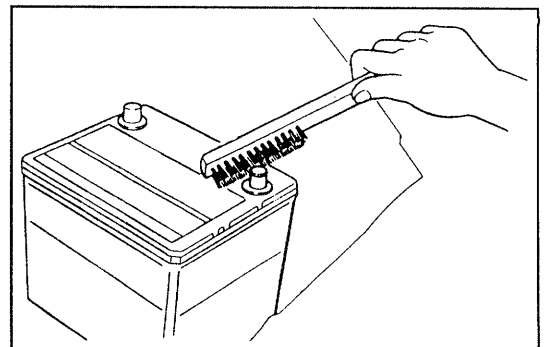
NOTE:

- On the Delco battery, it is impossible to add the electrolyte, for it is permanently sealed.

- (4) Check of battery terminals

① Visually check the battery terminals for corrosion.

If necessary, clean and flush the terminals, using a brush with baking soda solution.



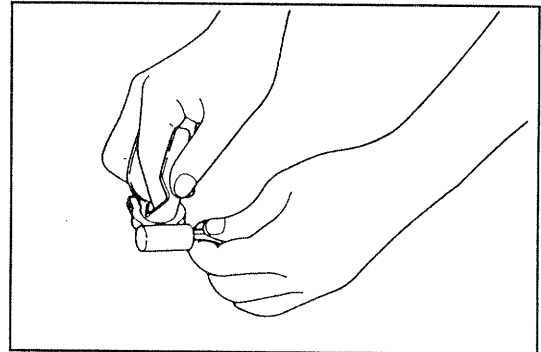
WRU90-CH014

CHARGING SYSTEM

- ② If the inside of the clamp at the cable side becomes corroded, clean out the terminal with a wire brush or coarse emery cloth.

NOTE:

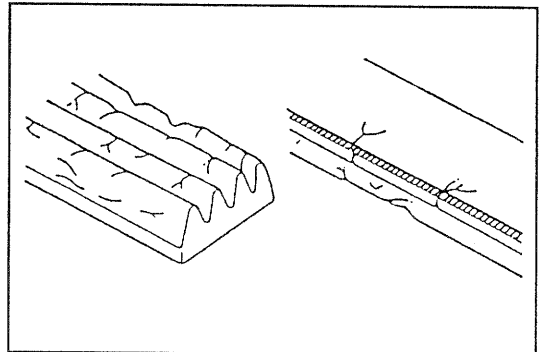
- Coat the terminal sections of the battery with a thin film of grease. This is an effective method to prevent rust formation.



WRU90-CH067

(5) Inspection of drive belt

- ① Visually check the belt for separation of the adhesive rubber above and below the core, core separation from the adhesive rubber, cracking or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs. If necessary replace the drive belt.



WRU90-CH068

② Measurement amount of belt deflection

Push the midpoint of the drive belt between the alternator pulley and the water pump pulley by applying a force of 22 lb (10 kg). Measure the deflection of the drive belt.

Specified Belt Deflection

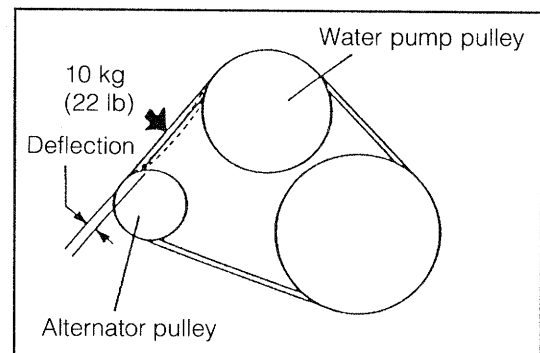
New belt: 4.0 - 5.0 mm (0.16 - 0.19 inch)

(With a pressed force of 22 lb (10 kg) applied to a point indicated in figure)

Used belt: 5.0 - 6.0 mm (0.20 - 0.23 inch)

(With a pressed force of 22 lb (10 kg) applied to a point indicated in figure)

Adjust the drive belt tension, if necessary.



WRU90-CH069

NOTE:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After replacing the drive belt, check that it fits properly in the ribbed grooves, especially in the places difficult to see.
- After installing a new belt, run the engine for about 5 minutes and then recheck the tension.

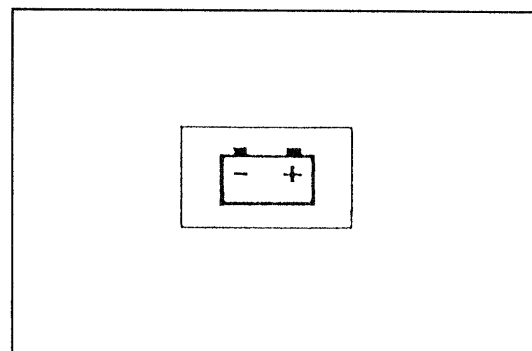
WRU90-CH070

- (6) Check of fuses for continuity
 - Fusible link
 - Fusible link block
 - EFI No. 1 fuse
 - Engine fuse
 - Gauge fuse
- (7) Checking alternator wiring and listening for abnormal noises
 - ① Check to see if the alternator wire is connected properly to the alternator.
 - ② Ensure that the alternator emits no abnormal noise while the engine is running.

WRU90-CH071

- (8) Check of charge warning lamp circuit
 - ① Turn OFF all accessory switches.
 - ② Start the engine and warm up the engine thoroughly. Turn OFF the ignition switch.
 - ③ When the ignition switch is turned ON, ensure that the charge warning lamp goes on.
 - ④ After the engine has started, ensure that the charge warning lamp goes out.

If the warning lamp does not function as specified, troubleshoot warning lamp circuit.



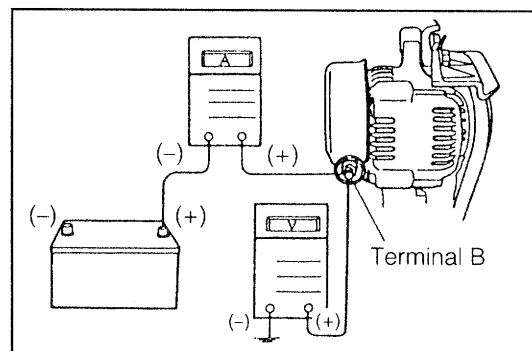
WRU90-CH072

- (9) Check of charging circuit under no-loaded state

NOTE:

- If a battery/alternator tester is available, connect such tester to the charging circuit according to the manufacturer's instructions.

- ① If such a tester is not available, connect a voltmeter and an ammeter to the alternator wiring and alternator as follows:
 - Disconnect the battery ground cable from the negative (-) terminal of the battery.
 - Connect an ammeter in series between the alternator wire terminal B and the alternator as indicated in the right figure.
 - Connect the positive (-) terminal of a voltmeter to the terminal B as indicated in the right figure.
 - Connect the negative (-) terminal of the voltmeter to the engine ground.
 - Wind vinyl tape around each connection section so as to prevent short.
 - Reconnect the battery ground cable to the negative (-) terminal of the battery.



WRU90-CH073

CHARGING SYSTEM

- ② Check the charging circuit as follows:
- (1) Start the engine and warm it up.
 - (2) Raise the engine speed from the idle speed to 2000 rpm. Take the readings of the ammeter and voltmeter.

Standard Amperage: Not to exceed 10 A

Standard Voltage: 13.5 - 14.3 V

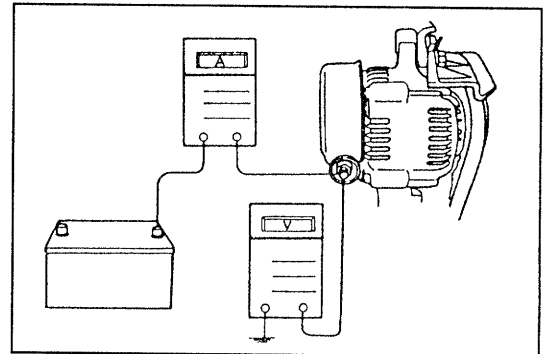
If the voltage reading is greater than the standard voltage, replace IC regulator.

If the voltage reading is less than the standard voltage, ground the terminal F as indicated in the right figure.

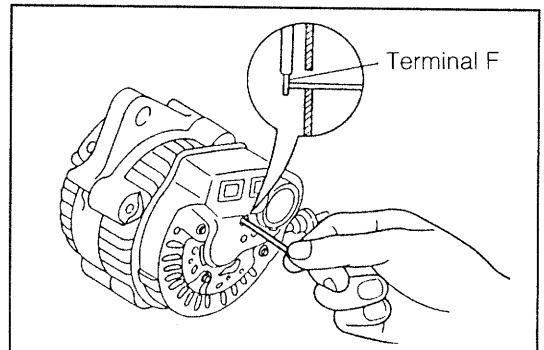
Proceed to start the engine.

If the voltage reading becomes greater than the standard voltage under this setting, replace the IC regulator.

If the voltage reading is still less than the standard voltage under this setting, check the alternator.



WRU90-CH074



WRU90-CH075

(10) Check of charging circuit under loaded state

- ① Start the engine. Maintain the engine speed at 2000 rpm.

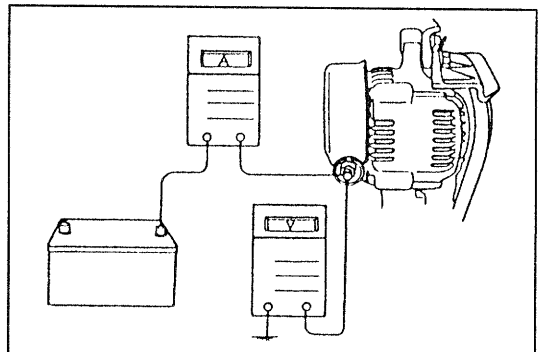
Turn ON the high beams of the headlamps and set the blower fan motor switch to the Hi position. Take the reading of the ammeter.

Standard Amperage: 30 A or more

If the ammeter reading is less than 30 A, repair the alternator. (See page CH-8.)

NOTE:

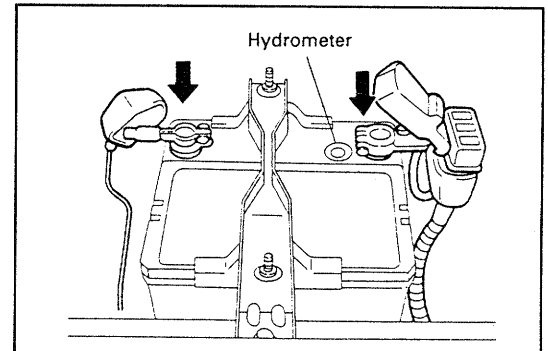
- When the battery is in a fully charged state, the ammeter reading may be less than 30 A during the aforesaid test.



WRU90-CH076

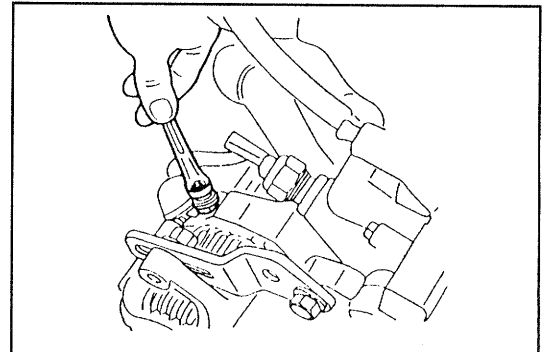
6. REMOVAL

- (1) Disconnect the ground cable terminal from the negative (-) terminal of the battery.



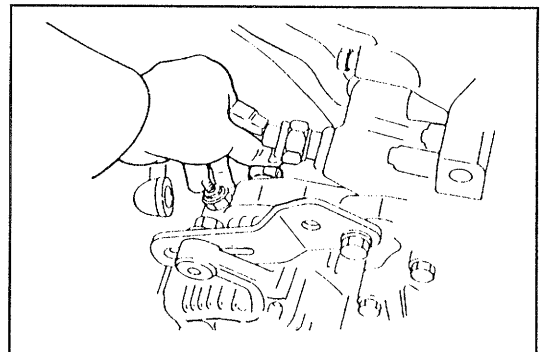
WRU90-CH015

- (2) Disconnection of wires from alternator
① Remove the nut and wire from the alternator.



WRU90-CH016

- ② Disconnect the connector from the alternator.



WRU90-CH017

- (3) Removal of alternator drive belt
Loosen the alternator attaching bolts. Remove the drive belt.

- (4) Removal of alternator
① Remove the alternator attaching bolts.
② Remove the alternator from the engine compartment.

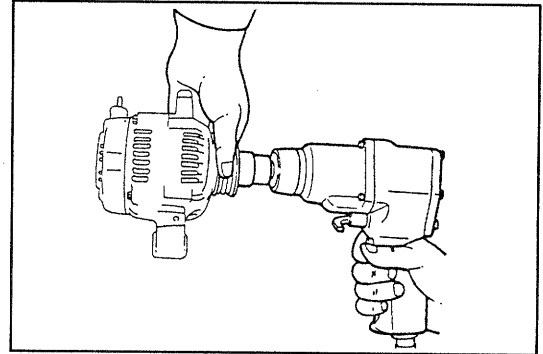
WRU90-CH018

7. DISASSEMBLY

- (1) Remove the alternator pulley lock nut by means of an impact wrench.

NOTE:

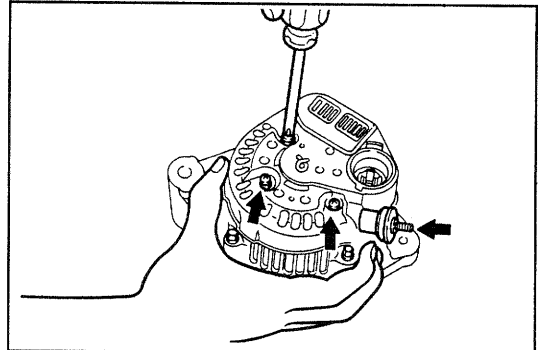
Be sure to use an impact wrench having a hexagonal hole.



WRU90-CH019

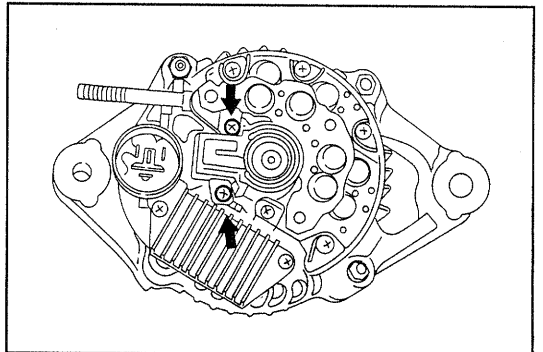
- (2) Removal of rear end cover

- ① Remove the nut and terminal insulator.
- ② Remove the three screws.
- ③ Remove the rear end cover.



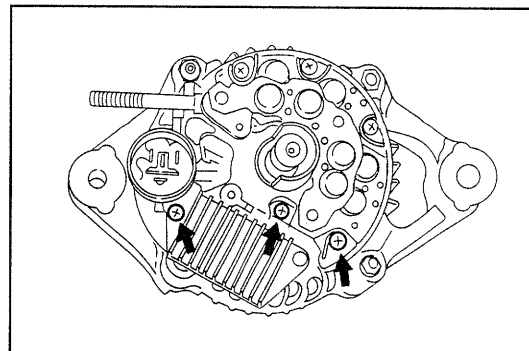
WRU90-CH020

- (3) Remove the brush holder.



WRU90-CH021

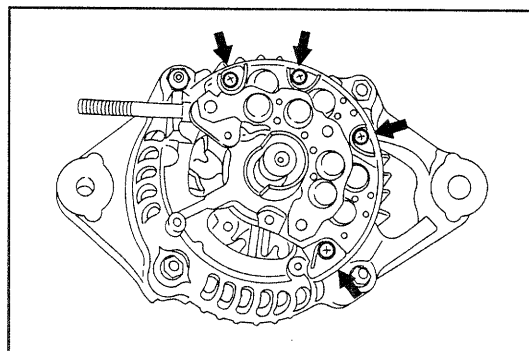
(4) Remove the regulator assembly.



WRU90-CH022

(5) Removal of rectifier holder

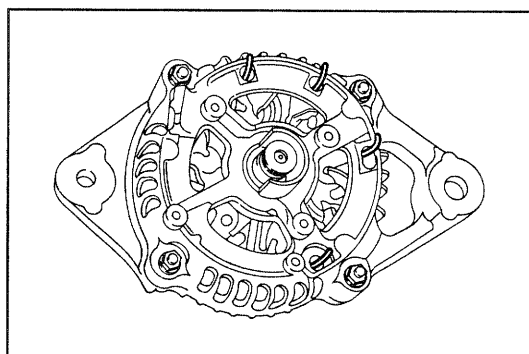
① Remove the attaching screws.



WRU90-CH023

② Straighten the stator wire.

③ Remove the rectifier holder.

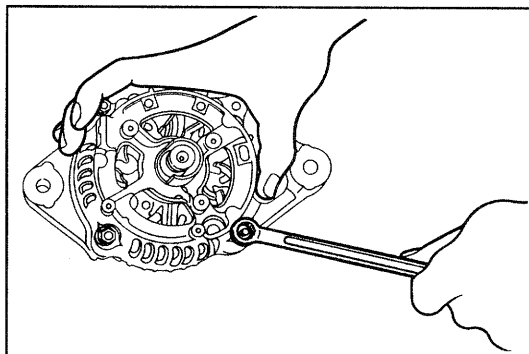


WRU90-CH024

(6) Remove the rectifier end frame from the drive end frame by removing the two nuts and bolts.

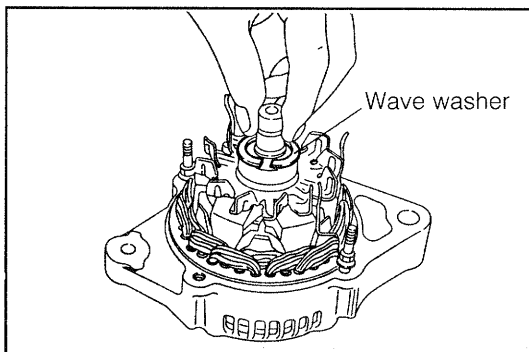
NOTE:

- Be very careful not to damage the stator wire
- If any difficulty is encountered in the removal, lightly tap the shaft with a plastic hammer to facilitate the removal.



WRU90-CH025

(7) Remove the rotor from the drive end frame assembly.



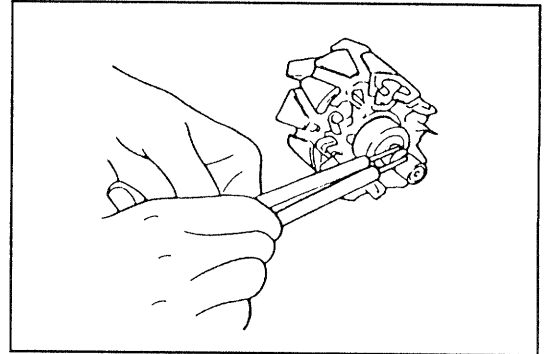
WRU90-CH026

8. INSPECTION

(1) Rotor

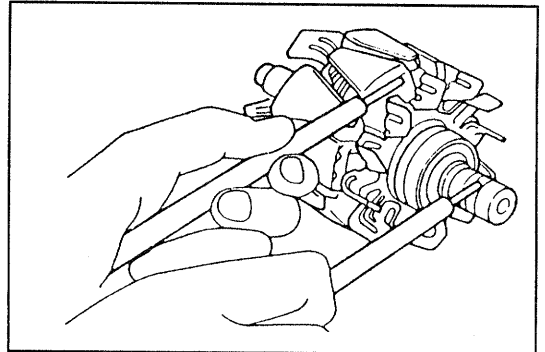
- ① Inspection of rotor for open circuit
Using an ohmmeter, check to see if specified resistance exists between the rotor slip rings.
Standard Resistance: $2.9 \pm 0.2 \Omega$

If no specified resistance exists, replace the rotor.



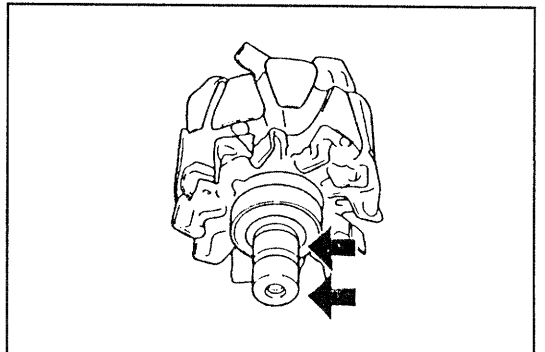
WRU90-CH027

- ② Inspection of rotor for ground
Ensure that no continuity exists between the rotor slip rings and the rotor core.
If continuity exists, replace the rotor.



WRU90-CH028

- ③ Inspection of slip rings
 - a. Check to see if the slip ring surface exhibits roughness, abnormal wear and/or burning.
Replace the rotor, if necessary.



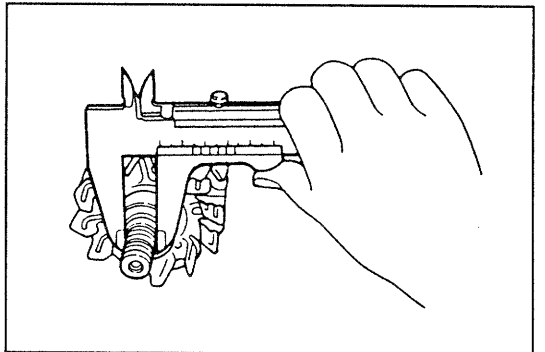
WRU90-CH029

- b. Measure the outer diameter of the slip ring, using vernier calipers.

Standard Diameter: 14.4 mm (0.57 inch)

Minimum Diameter: 14 mm (0.55 inch)

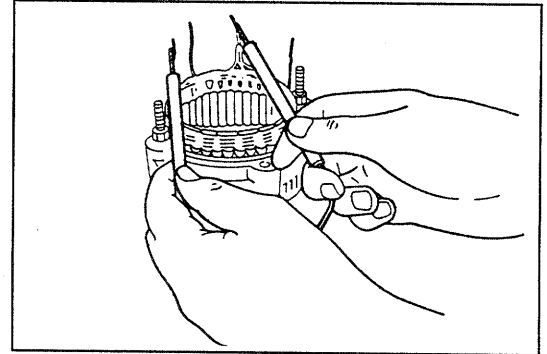
If the slip ring diameter is less than the minimum diameter, replace the rotor assembly.



WRU90-CH030

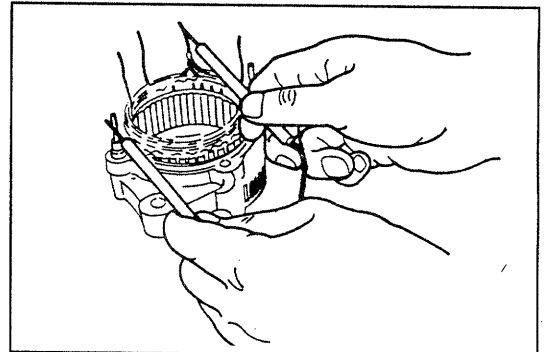
(2) Stator

- ① Inspection of stator for open circuit
Using an ohmmeter, check to see if any open circuit of the stator coil is present between the leads.
If no continuity exists, replace the end frame assembly.
Specified Resistance: About 0.2 Ω



WRU90-CH031

- ② Inspection of stator for short circuit
Using an ohmmeter, check to see if any short circuit of the stator coil is present between the coil lead and the drive end frame.
If continuity exists, replace the drive end frame assembly.

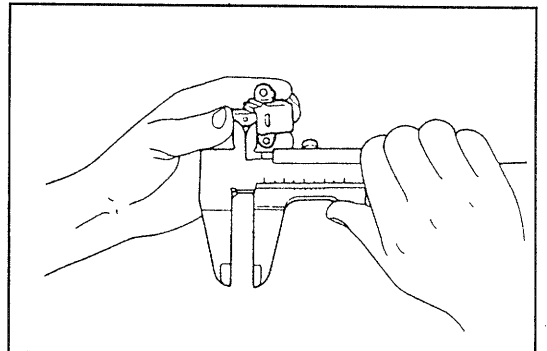


WRU90-CH032

(3) Brush and Brush Holder

- ① Measurement of exposed brush length
Measure the exposed brush length, using a scale.
Standard Exposed Length: 10.5 mm
Minimum Exposed Length: 1.5 mm

If the exposed length is less than the minimum requirement, replace the brushes.

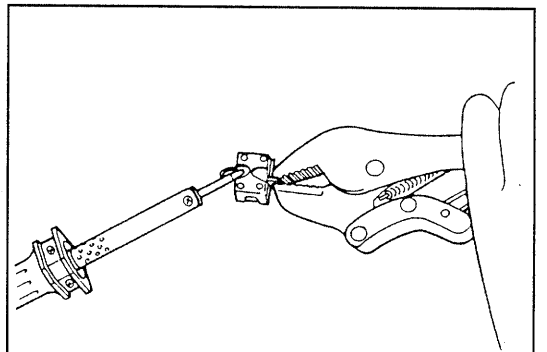


WRU90-CH033

- ② Replacement of brushes (If necessary)
 - a. Remove the brush and spring from the brush holder by melting the solder by means of a soldering iron.

NOTE:

- Prior to the operation, remove the painting film at the solder surface with a knife or the like.
- For this operation, it is advisable to use a soldering iron with a capacity of about 40 W.

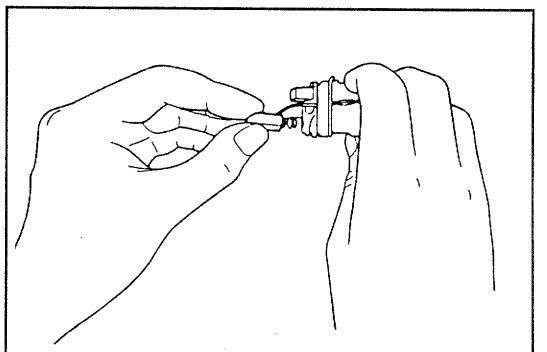


WRU90-CH034

- b. Install the brush cord in the brush holder with the spring fitted in place.

NOTE:

- Using a knife, etc., remove the soldered section of the brush holder to form a flat surface until the bare metal is exposed.



WRU90-CH035

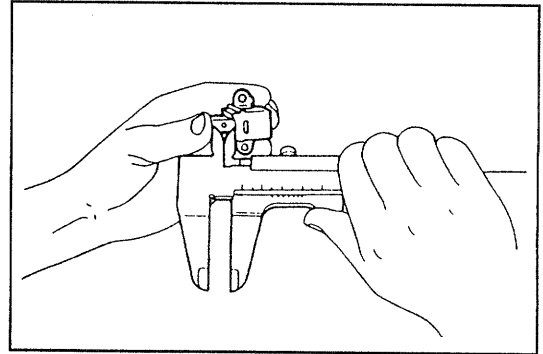
CHARGING SYSTEM

- c. Solder the brush cord in the brush holder in such a way that the exposed length of the brush meets the specification.

Standard Exposed Length: 10.5 mm

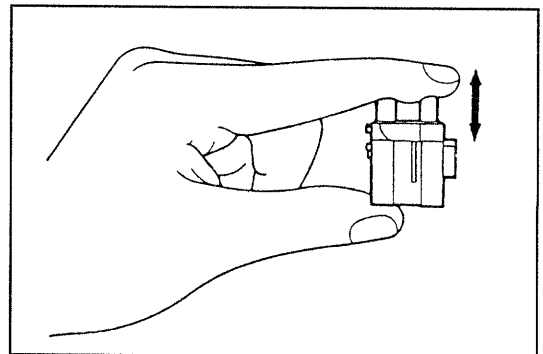
NOTE:

- Prior to the operation, let solder flow onto the forward end of the brush wire.
- To facilitate soldering:
Route the wire through the holder hole and adjust the exposed length of the brush to the specification. Bend the wire at its forward end on which solder has been applied in the preceding step. Then, solder the wire to the holder.



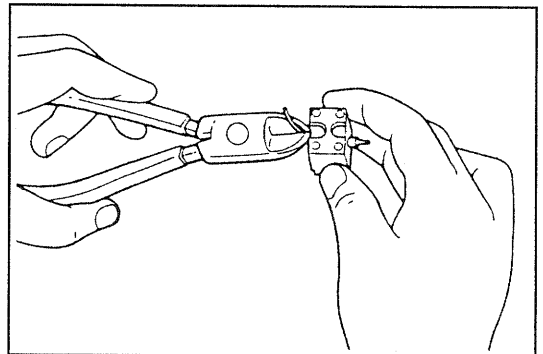
WRU90-CH036

- d. Ensure that the brush moves freely in the brush holder.



WRU90-CH037

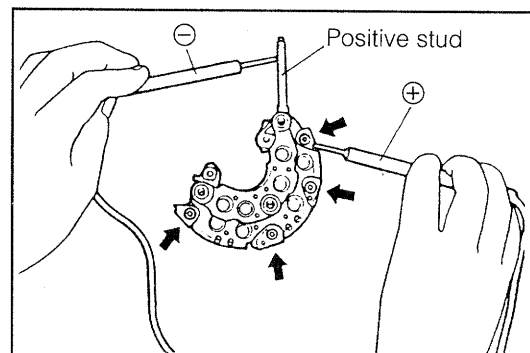
- e. Cut off any excess remaining wire and apply an insulation paint.



WRU90-CH038

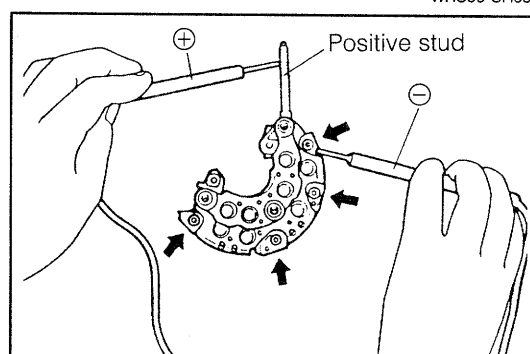
(4) Rectifier

- ① Inspection of rectifier at positive \oplus side
 - a. While using an ohmmeter, connect one tester probe to the positive stud. Also, connect the other probe to each of the rectifier terminals.



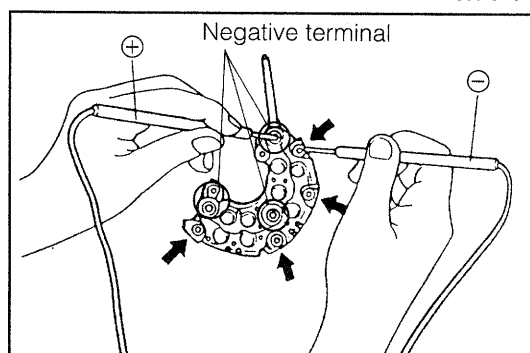
WRU90-CH039

- b. Repeat the same steps described in a. above with the polarity of the tester probes reversed this time.
 - c. Ensure that continuity exists either in the step a. or in the step b. and no continuity exists at the other test.
- If not, replace the rectifier holder.



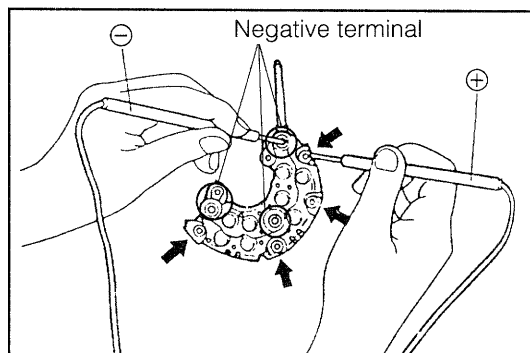
WRU90-CH040

- ② Inspection of rectifier at negative \ominus side
 - a. While using an ohmmeter, connect one tester probe to each rectifier negative terminal. Also, connect the other probe to each rectifier terminal.



WRU90-CH041

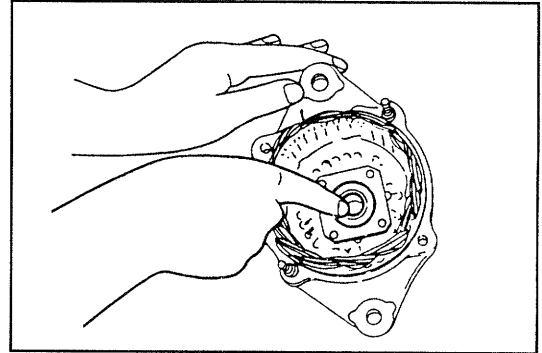
- b. Repeat the same steps described in a. above with the polarity of the tester probes reversed this time.
 - c. Ensure that continuity exists either in the step a. or in the step b. and no continuity exists at the other test.
- If not, replace the rectifier holder.



WRU90-CH042

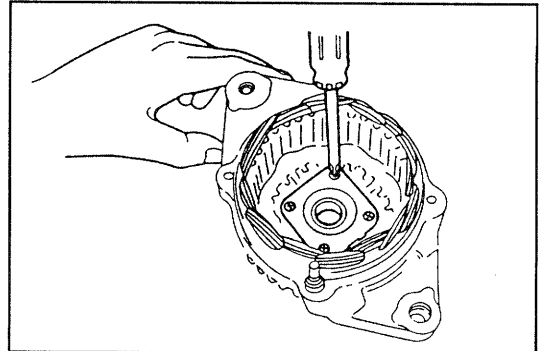
(5) Bearings

- ① Inspection of front bearing
Ensure that the bearing turns smoothly.
Replace the bearing, if necessary.



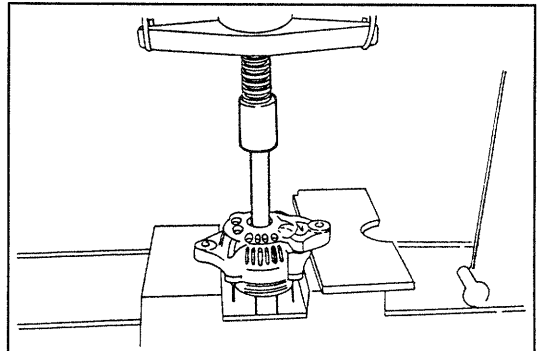
WRU90-CH043

- ② Replacement of front bearing (If necessary)
 - a. Remove the four screws and retainer plate.



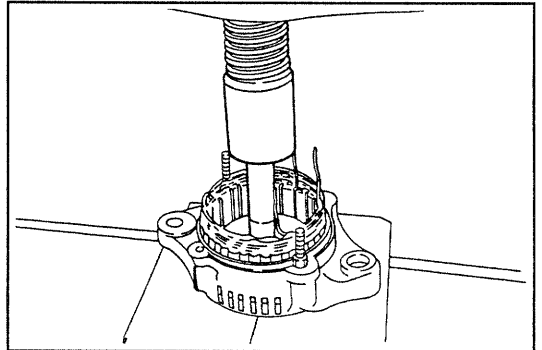
WRU90-CH044

- b. Remove the front bearing from the drive end frame, using a socket wrench in conjunction with a press.



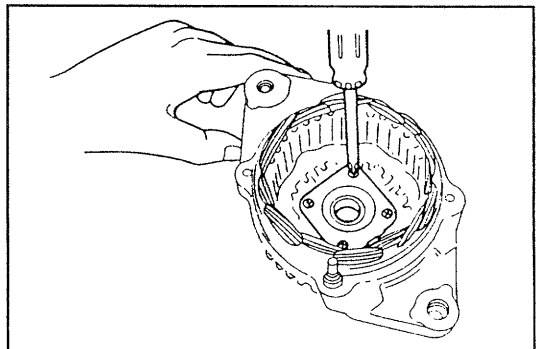
WRU90-CH045

- c. Press the new front bearing into the drive end frame, using suitable socket wrench.



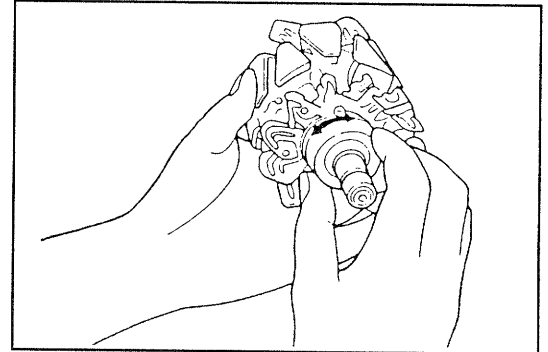
WRU90-CH046

- d. Attach the retainer plate to the drive end frame with the four screws.



WRU90-CH047

- ③ Inspection of rear bearing
Ensure that the bearing turns smoothly.
Replace the bearing, if necessary.

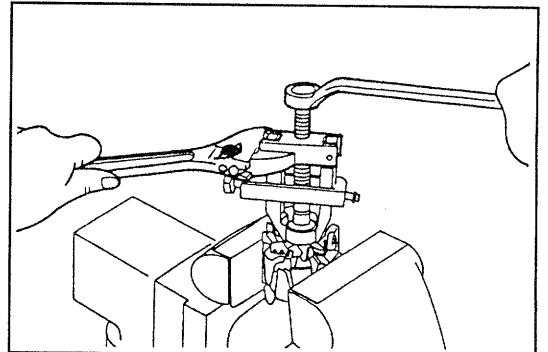


WRU90-CH048

- ④ Replacement of rear bearing (if necessary)
a. Remove the rear bearing and bearing cover from the rotor, using the armature bearing puller.

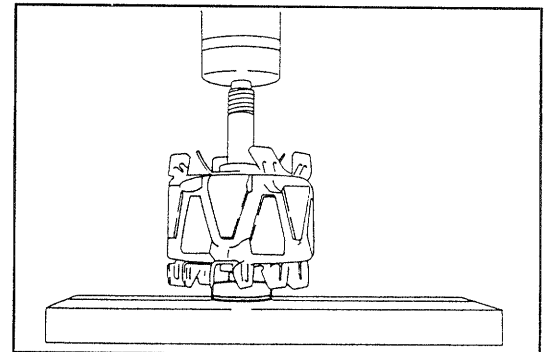
NOTE:

- Be very careful not to damage the fan during the removal.



WRU90-CH049

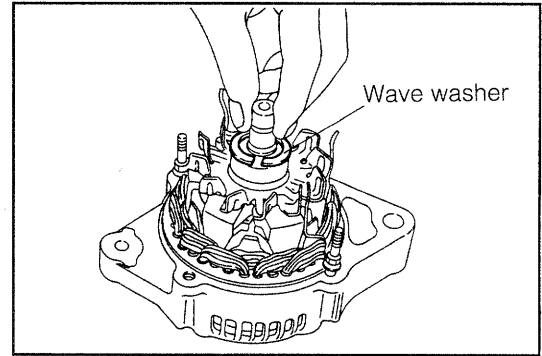
- b. Press a new rear bearing with spacer, using a hydraulic press.
c. Press a new bearing cover, using a suitable steel pipe.



WRU90-CH050

9. ASSEMBLY

(1) Install the rotor into the drive end frame assembly.

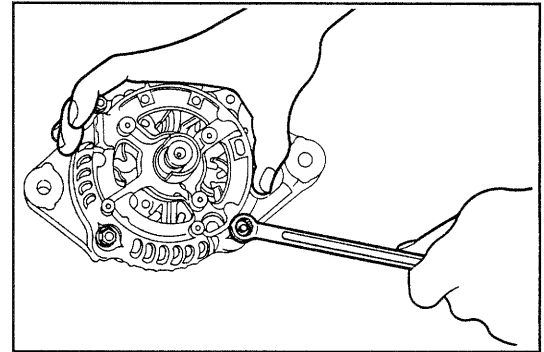


WRU90-CH051

(2) Installation of rectifier end frame on drive end frame.
Install the rectifier end frame on the drive end frame with the two bolts and two nuts.

NOTE:

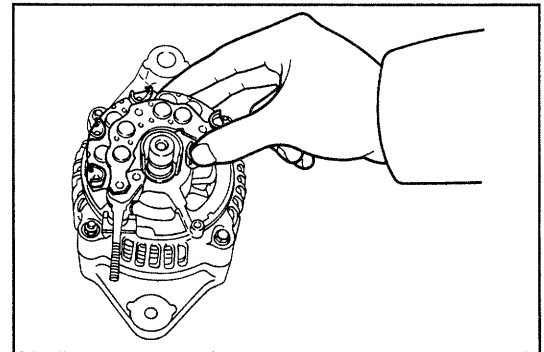
- Be very careful not to damage the stator wire during the installation.
- If some resistance is encountered during the insertion, lightly tap the frame with a plastic hammer.



WRU90-CH052

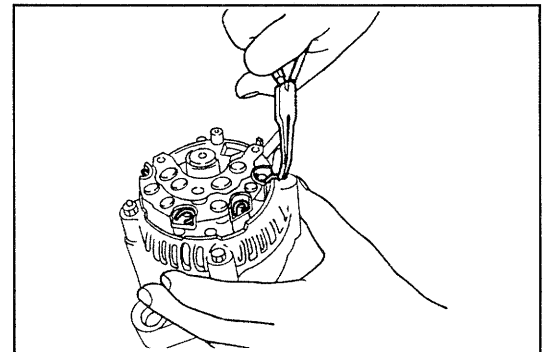
(3) Installation of rectifier holder, regulator assembly and brush holder.

① Attach the rectifier holder to the end frame with the coil wires passed through the aperture of the rectifier holder.



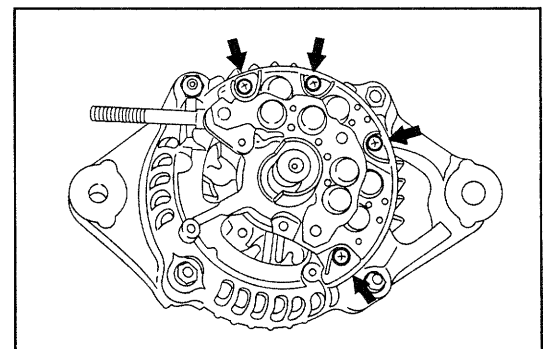
WRU90-CH053

② Wind the coil wire around the installing section of the rectifier attaching screws.



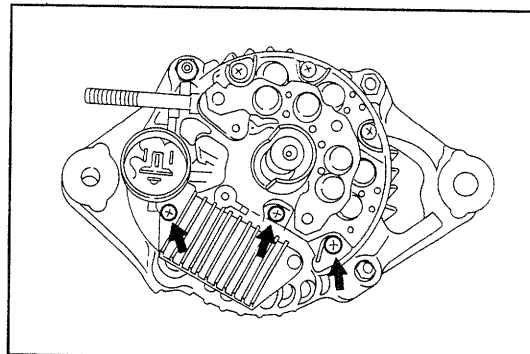
WRU90-CH054

③ Secure the four attaching screws.



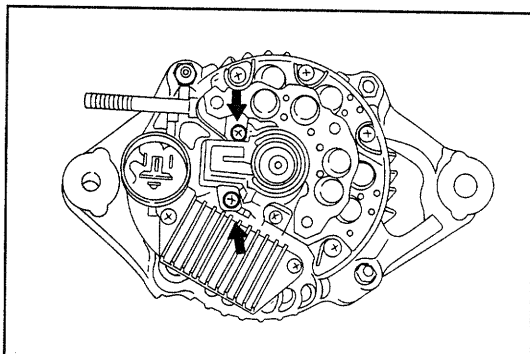
WRU90-CH055

- (4) Install the regulator assembly with the three attaching screws.



WRU90-CH056

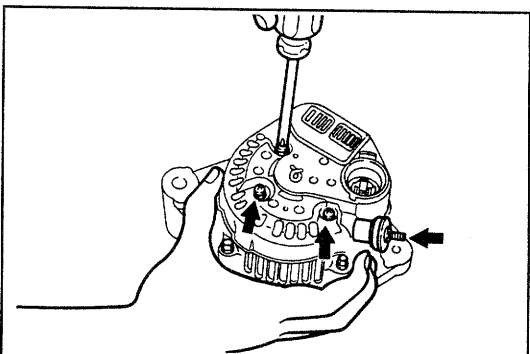
- (5) Install the brush holder in such a way that a gap of at least 1 mm (0.04 inch) is provided between the brush holder and the regulator assembly. Secure the brush holder with the two screws.



WRU90-CH057

- (6) Installation of rear cover

- ① Install the rear end cover with the three attaching screws.
- ② Install the terminal insulator and tighten it with the nut.

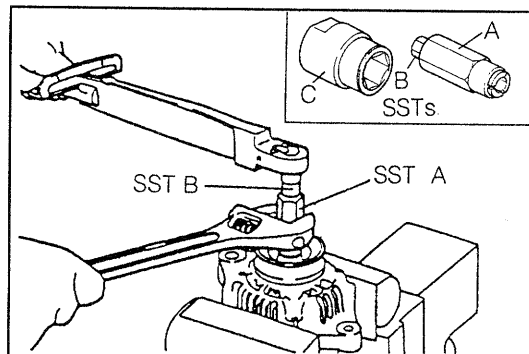


WRU90-CH058

- (7) Attach the pulley to the alternator shaft.
 (8) Tighten the SST B to the specified torque. Secure the the SST B to the alternator shaft.

SSTs: 09820-87201-000

Specified Torque: 39 N·m (4 kgf-m)

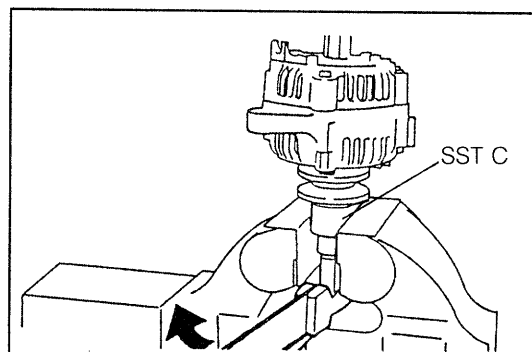


WRU90-CH059

- (9) Clamp the SST C in a vise. Tighten the nut by turning the SST B.

Specified Torque: 110 N·m (11.25 kgf-m)

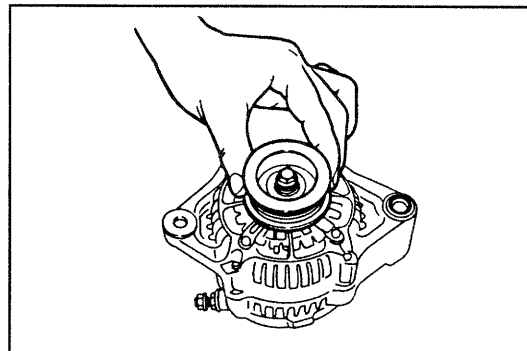
- (10) Remove the SSTs A and B.



WRU90-CH060

CHARGING SYSTEM

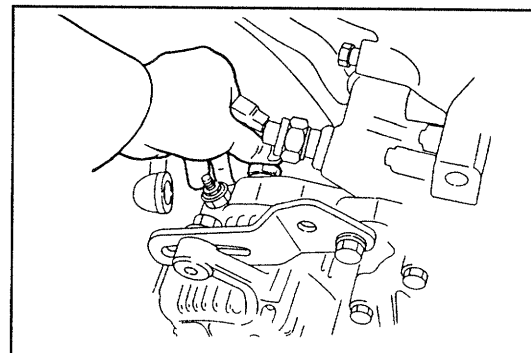
(11) Ensure that the rotor turns smoothly.



WRU90-CH061

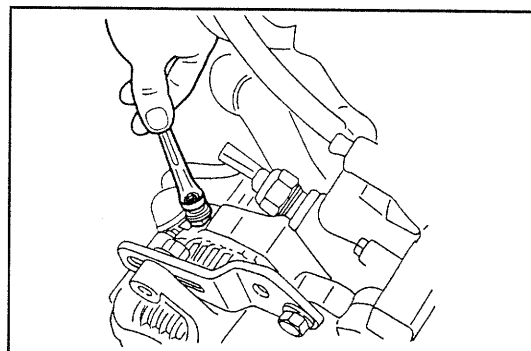
10. INSTALLATION

- (1) Temporarily install the alternator on the engine with the two attaching bolts.
- (2) Connection of wire to alternator
 - ① Connect the connectors to the alternator.



WRU90-CH062

- ② Install the wire and nut to the alternator.



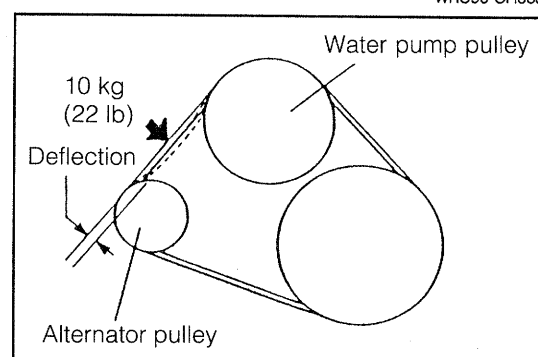
WRU90-CH063

- (3) Installation of alternator drive belt

- ① Install the alternator drive belt properly.

NOTE:

- Make sure that the alternator drive belt is properly engaged in the grooves of each pulley.



WRU90-CH064

- ② Tension adjustment of drive belt

Adjust the belt tension in such a way that the deflection of the drive belt meets the specification when you push the midpoint of the drive belt between the alternator pulley and the water pump pulley by applying a force of 10 kg (22 lb).

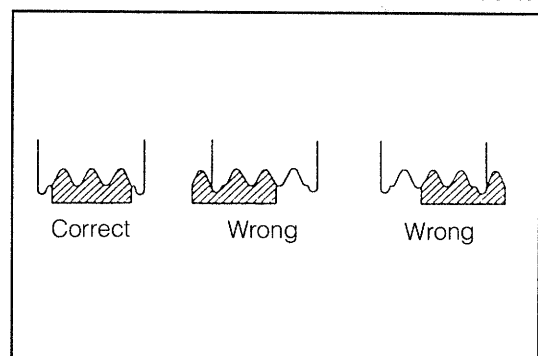
Specified Belt Deflection

New belt: 4.0 - 5.0 mm (0.16 - 0.20 inch)

Used belt: 5.0 - 6.0 mm (0.20 - 0.24 inch)

NOTE:

- "New belt" refers to a belt with has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine 5 minutes or more.
- If belt replaced with new one, run the engine for about 5 minutes and then recheck the tension.



WRU90-CH065

CHARGING SYSTEM

(4) Reconnect the ground cable terminal to the negative (–) terminal of the battery.

WRU90-CH066

DAIHATSU

Rocky

CLUTCH

CLUTCH	CL- 2
CLUTCH RELEASE	CL- 3
CLUTCH PEDAL ADJUSTMENT	CL- 4
CLUTCH UNIT	CL- 5
TROUBLE SHOOTING	CL- 5
CLUTCH PEDAL	CL-12
CLUTCH PEDAL & RELEASE	
CABLE INSPECTION	CL-15

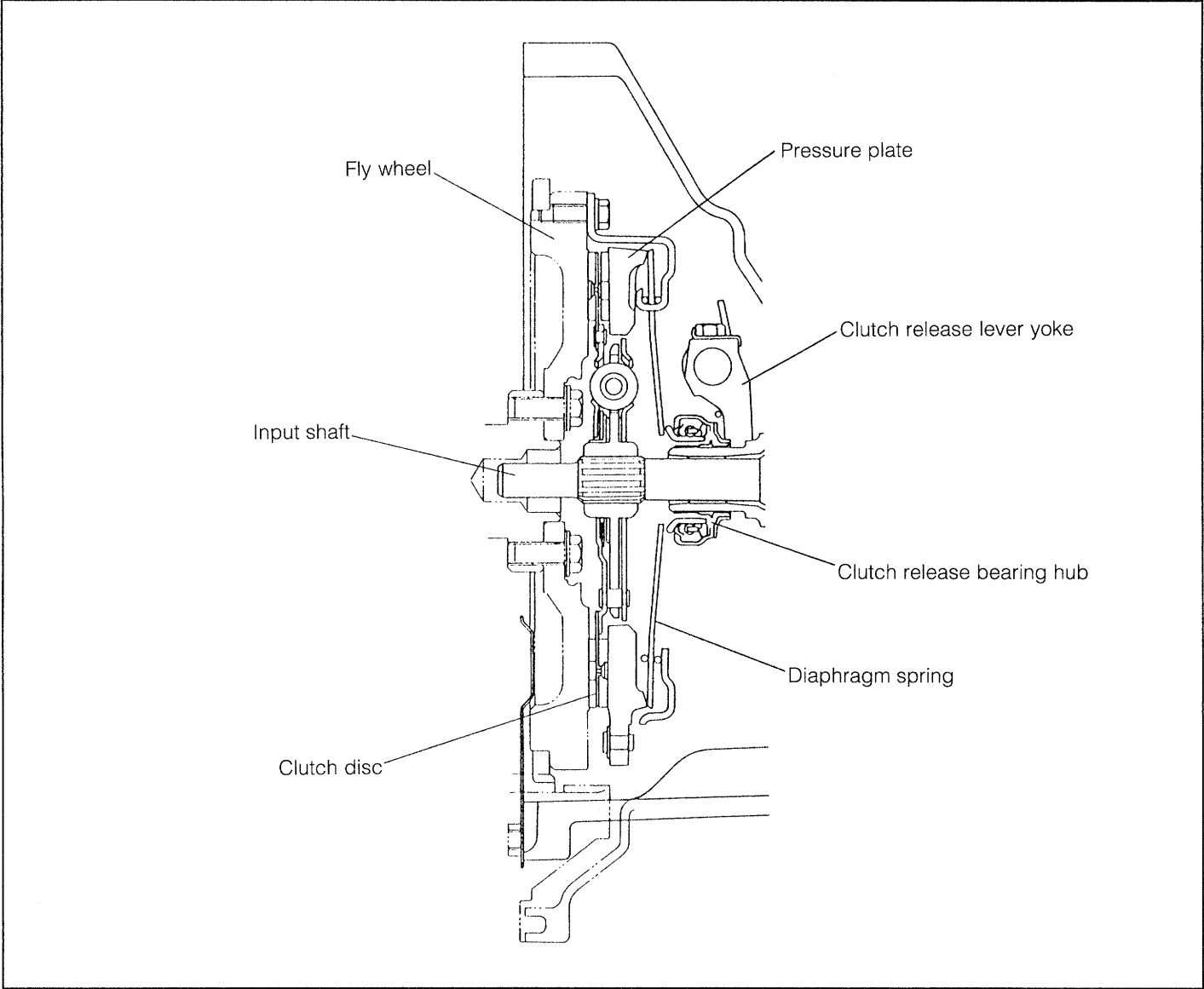
WRU90-CL001

CL

CLUTCH

CLUTCH

The clutch mechanism employs a dry, single-disc, diaphragm spring type. As for its operating method, it adopts a cable method which features positive operation and excellent serviceability.



WRU90-CL061

Clutch disc specifications

Clutch disc outer diameter		mm (inch)	200 (7.87)
Clutch disc inner diameter		mm (inch)	140 (5.51)
Thickness	Flywheel side	mm (inch)	3.5 (0.138)
	Pressure plate side	mm (inch)	3.5 (0.138)
Lining surface area		cm ² (inch ²)	160.14 (24.82)

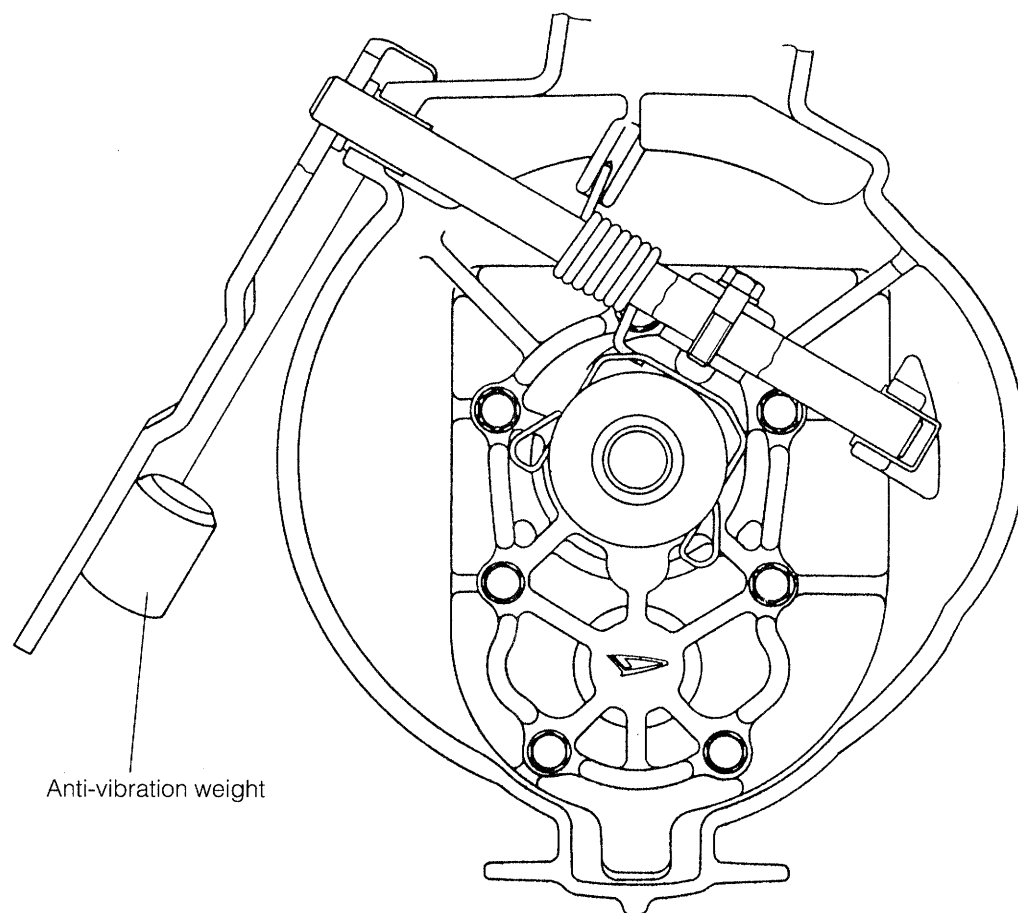
Clutch cover specifications

Clutch cover outer diameter	mm (inch)	253 (9.96)
Diaphragm spring load as assembled	kg (lb)	350 (772)

WRU90-CL061

CLUTCH RELEASE

The clutch release lever yoke is attached to the clutch release lever by means of a bolt. Furthermore, an anti-vibration weight is provided at the outer lever section



CLUTCH PEDAL ADJUSTMENT

1. Check the clutch pedal for installation height.
Pedal installation height

NOTE:

- Ensure that the clutch pedal installation height is 5.8 mm (0.228 inch) higher than the brake pedal surface. Adjust the clutch pedal installation height, as required. Then, adjust the clutch pedal installation height to the following specification.

(Distance between pedal pad upper surface's center and dash panel)

Clutch Pedal Installation Height:

221^{+6 mm}_{-2 mm} (8.700^{+0.236 inch}_{-0.0787 inch})

NOTE:

- The figure above indicates the dimension from the body metal section to the pedal. It is, therefore, necessary to roll up the carpet and floor mat prior to the measurement.

Tightening Torque:

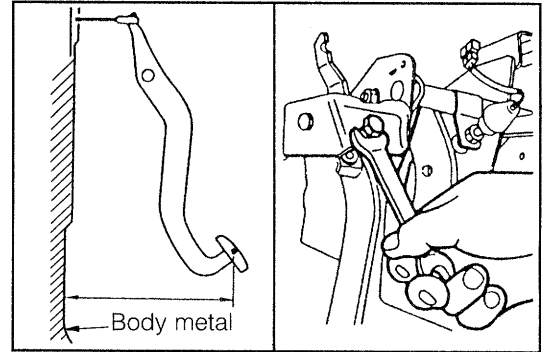
1.8 - 3.0 kg-m (13.0 - 21.7 ft-lb, 17.7 - 29.4 N-m)

2. Adjust the pedal installation height, as required.
(1) Slacken the lock nut. Turn the stopper bolt until the installation height conforms to the specification.
(2) Tighten the lock nut.
3. Clutch pedal free travel
(1) Depress the clutch pedal gradually until you feel a resistance from the clutch. Measure the depressing distance up to this point.

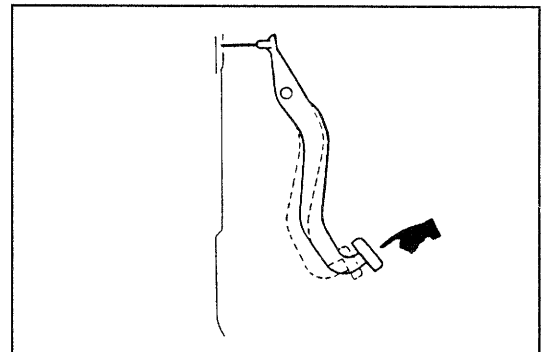
Specified Clutch Pedal Free Travel:

18 - 27 mm (0.709 - 1.063 inches)

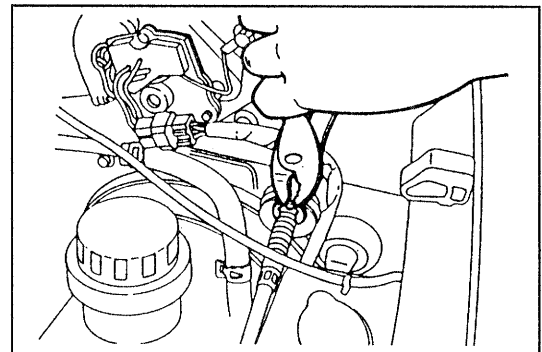
If the free travel of the clutch pedal fails to conform to the specification, adjust it to the specified value by changing the clip position of the clutch cable.



WRU90-CL063

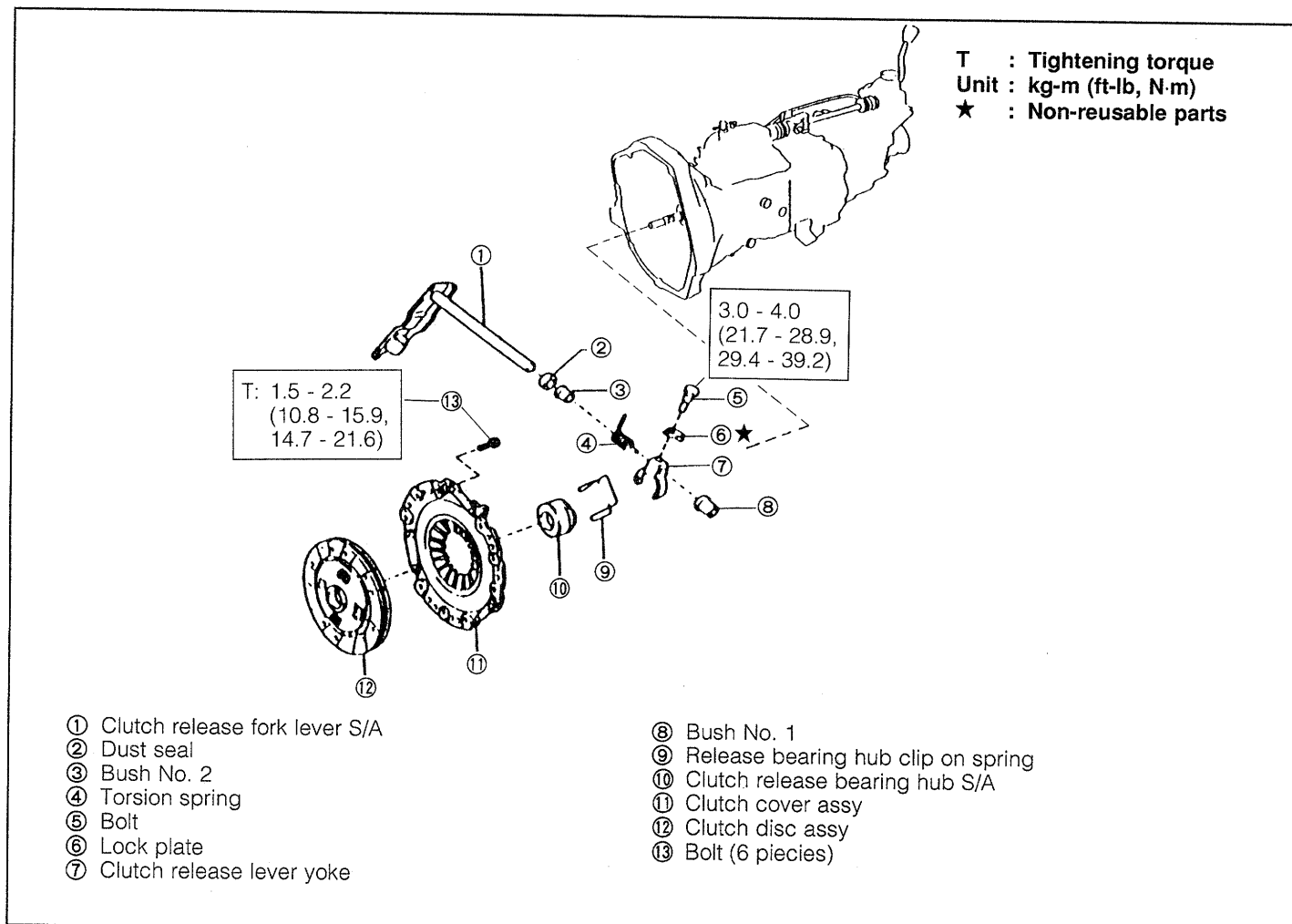


WRU90-CL064



WRU90-CL065

CLUTCH UNIT COMPONENTS



TROUBLE SHOOTING

WRU90-CL002

Symptom	Possible causes	Remedies
Dragging clutch	<ul style="list-style-type: none"> Excessive free travel or clutch pedal travel improperly adjusted Deformed clutch disc Clutch disc spline malfunctioning 	<ul style="list-style-type: none"> Adjust free travel or clutch pedal travel. Check clutch disc. Check clutch disc.
Clutch judder	<ul style="list-style-type: none"> Abnormal surface of clutch disc Excessive runout of clutch disc Unevenness of clutch cover diaphragm spring heights Faulty clutch release bearing 	<ul style="list-style-type: none"> Check clutch disc. Check clutch disc runout. Check clutch cover. Check clutch release bearing.
Slipping clutch	<ul style="list-style-type: none"> Worn clutch disc Excessively worn clutch pressure plate Faulty clutch cover diaphragm springs 	<ul style="list-style-type: none"> Check clutch disc. Check pressure plate. Check clutch cover.

WRU90-CL066

CLUTCH

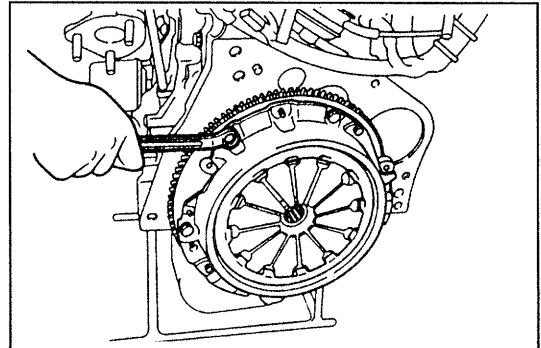
REMOVAL

1. Remove the transmission from the vehicle.

See page
MT-Section.

WRU90-CL003

2. Remove the clutch disc by removing the clutch cover with the six bolts.

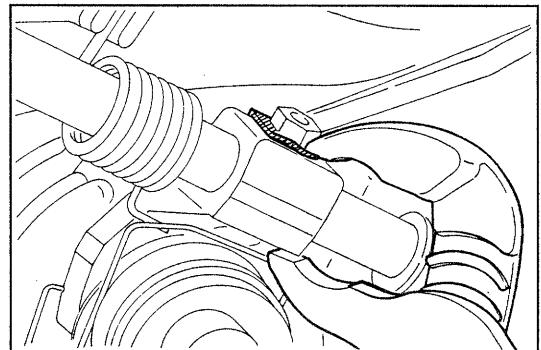


WRU90-CL004

3. Raise the lock plate by means of a common tool of water pump pliers.

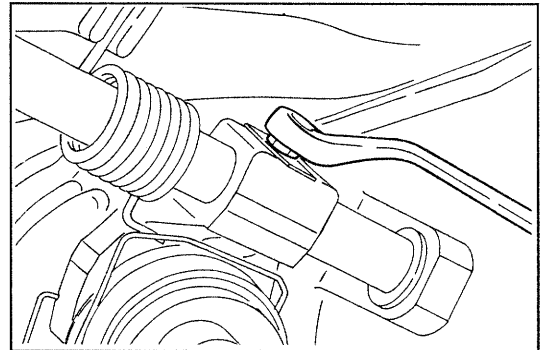
CAUTION:

- Never reuse the removed lock washer.



WRU92-CL073

4. Remove the bolt tightened to the clutch release lever.

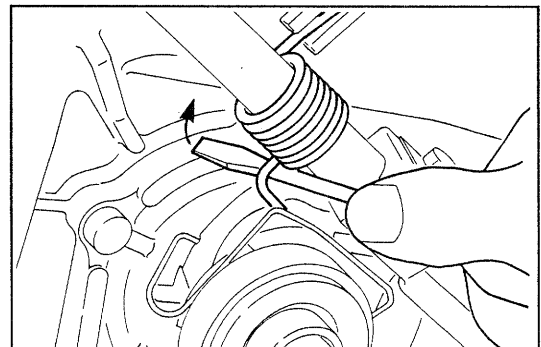


WRU90-CL006

5. Remove the torsion spring from the release lever yoke, using a standard screwdriver.

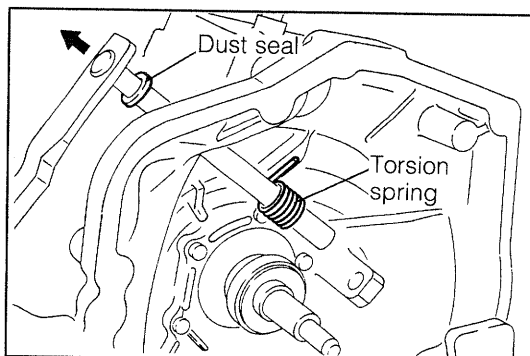
NOTE:

- Care must be exercised so that the torsion spring and standard screwdriver may not interfere with the release bearing hub clip when removing the torsion spring.



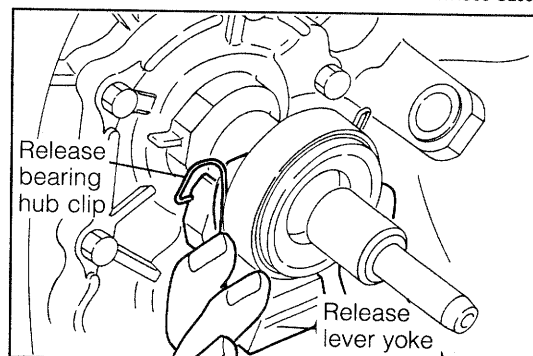
WRU90-CL007

6. While pulling out the clutch release lever subassembly, remove the torsion spring.
7. Remove the clutch release lever subassembly, with the dust seal attached, from the transmission case.



WRU90-CL008

8. Remove the release lever yoke, release bearing hub clip and clutch release bearing hub assembly as a set from the front bearing retainer.

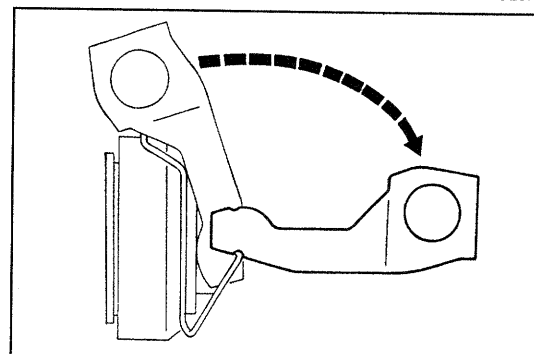


WRU92-CL074

9. Remove the release lever yoke from the release bearing hub clip by turning the release lever yoke clockwise.

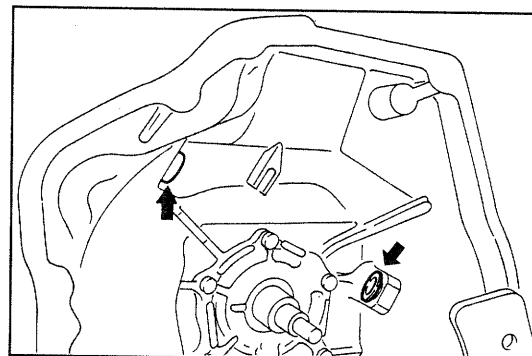
CAUTION:

- If the release bearing hub clip should be removed using a method other than the procedure above, it will cause the clip deformation.



WRU90-CL0010

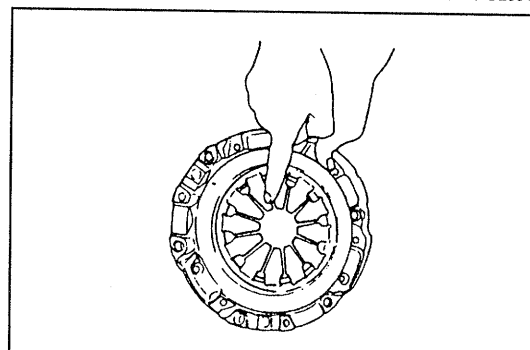
10. Remove the two bushes from the clutch housing.



WRU90-CL0011

INSPECTION

1. Check the diaphragm spring for damage or wear.

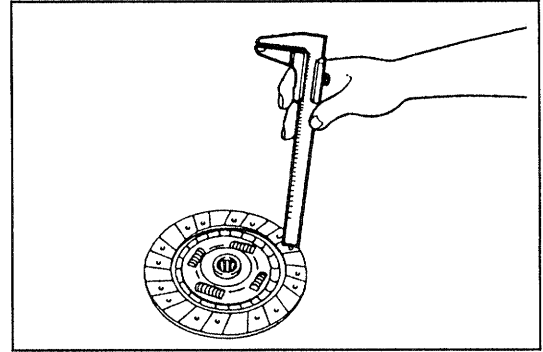


WRU90-CL0012

CLUTCH

2. Check of clutch disc for wear
Measure the height of the clutch disc from each rivet. Compare the lowest height against the allowable use limit below.

Allowable Use Limit: 0.3 mm (0.0118 inch)



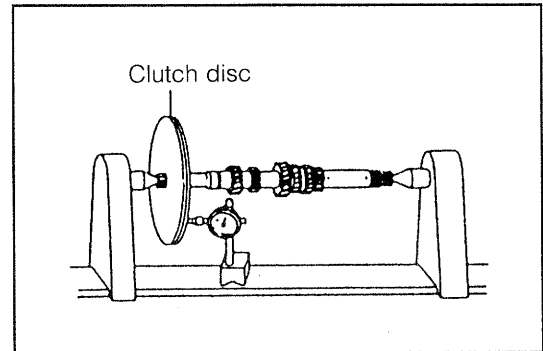
WRU90-CL067

3. Check of clutch disc for runout

Allowable Runout Limit

(Longitudinal Runout): 1.0 mm (0.0394 inch)

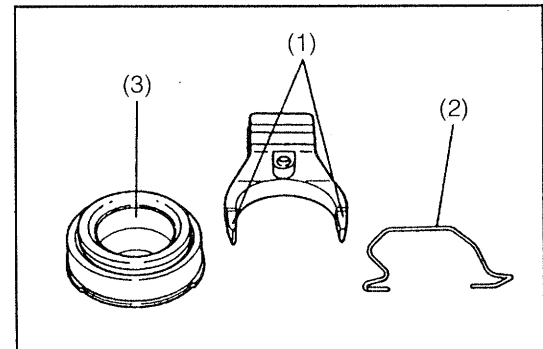
(Lateral Runout): 0.7 mm (0.0276 inch)



WRU90-CL013

4. Check the following parts.

- (1) Contact surface of release lever yoke with release bearing for wear
- (2) Release bearing hub clip for damage
- (3) Inner race of release bearing for wear

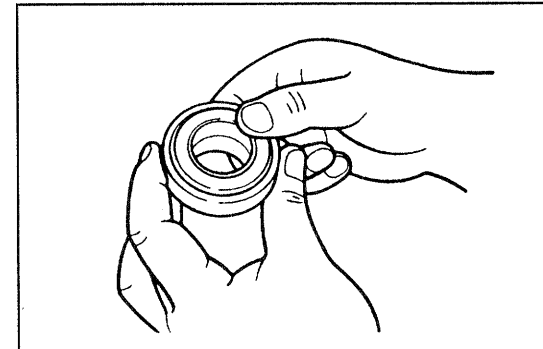


WRU90-CL068

5. Rotate the release bearing with your fingers. Ensure that the release bearing rotates smoothly without any binding.

NOTE:

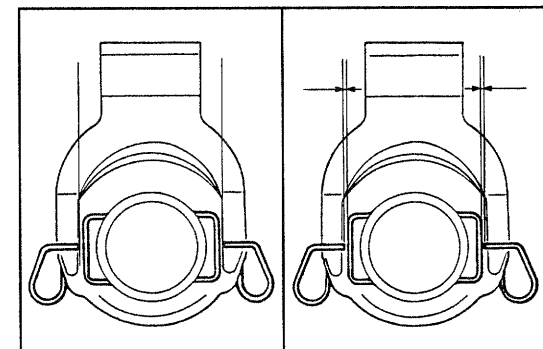
- Since the release bearing is packed with grease, never clean it, using oil.



WRU90-CL069

6. Assemble the release lever yoke, release bearing hub clip and clutch release bearing hub assembly as a set. (See page CL-10.)

- Visually inspect whether the release bearing hub clip comes at the end section of the release lever yoke within the range indicated in the right figure.



WRU90-CL014

7. Rotate the pilot bearing with your fingers. Prior to the installation of the clutch disc, ensure that the pilot bearing rotates smoothly without any binding.

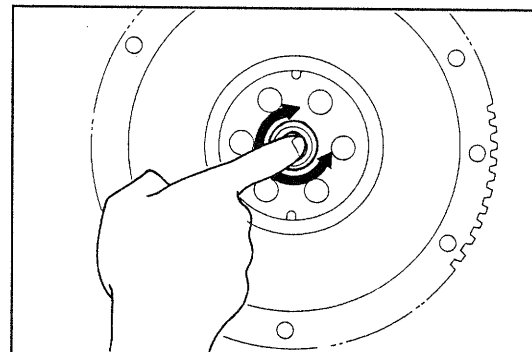
* As for the installation and removal of the pilot bearing, refer to the EM section.

INSTALLATION

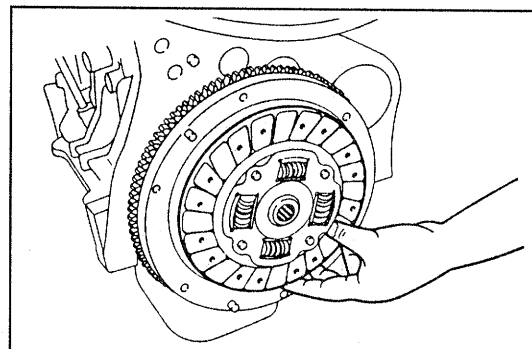
1. Install the clutch disc.

CAUTION:

- Do not allow oil grease to get on the rubbing face.



WRU90-CL015



WRU90-CL070

2. Install the clutch cover, using the following SST.

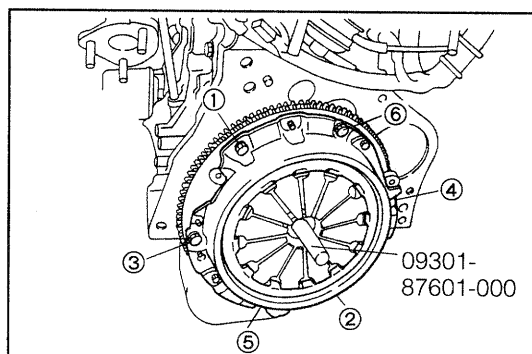
SST: 09301-87601-000

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

CAUTION:

- Be sure to tighten the bolts diagonally within the tightening torque range above so that the clutch cover may be tightened evenly.
(The right figure shows a typical example of tightening sequence.)



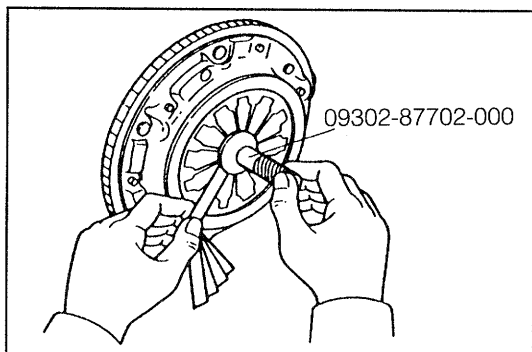
WRU90-CL016

3. Check the diaphragm spring fingers for unevenness in height, using the following SST.

Allowable Limit of Unevenness in Height:

0.8 mm (0.0315 inch)

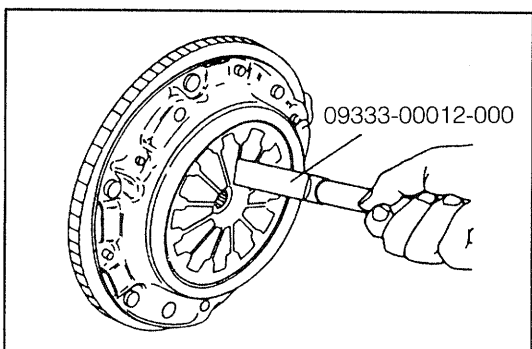
SST: 09302-87702-000



WRU90-CL071

4. If the inspection results reveal that the unevenness in height exceeds the allowable limit, correct the unevenness, using the following SST.

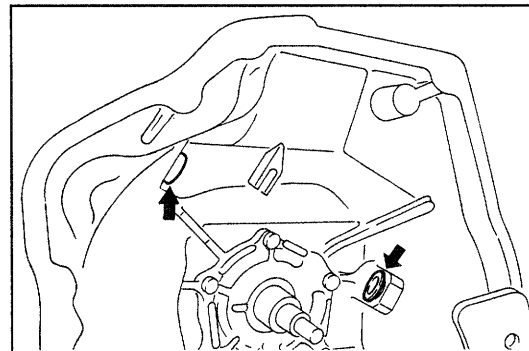
SST: 09333-00012-000



WRU90-CL072

CLUTCH

5. Apply Lithium base multi purpose grease to the entire periphery of the inner surface of the bush.
6. Insert the bush into the transmission case.

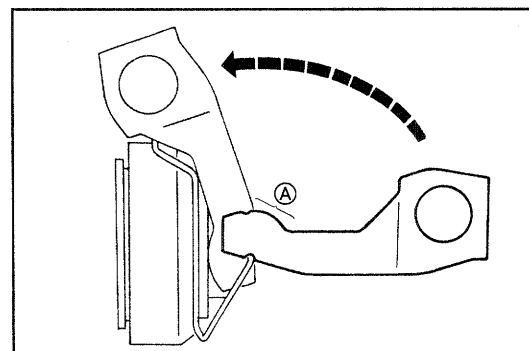


WRU90-CL017

7. Place the cut-out section of the release lever yoke on the release bearing hub clip. Turn the release lever yoke counterclockwise so as to set the clutch release bearing hub assembly, release bearing hub clip and release lever yoke.

NOTE:

- Prior to the setting, apply a suitable amount of Lithium base multi purpose grease (A section) to the clutch release bearing hub or to the sliding surface with the release lever yoke.

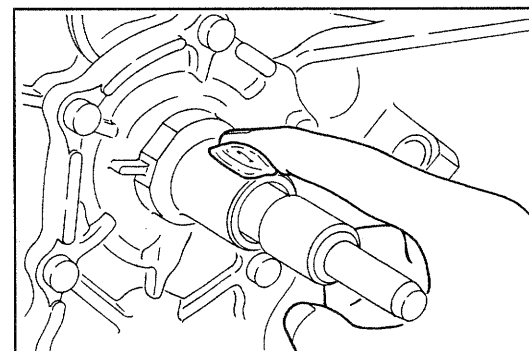


WRU90-CL018

8. Apply molybdenum disulphide lithium base grease to the surface of the front retainer bearing sliding section.

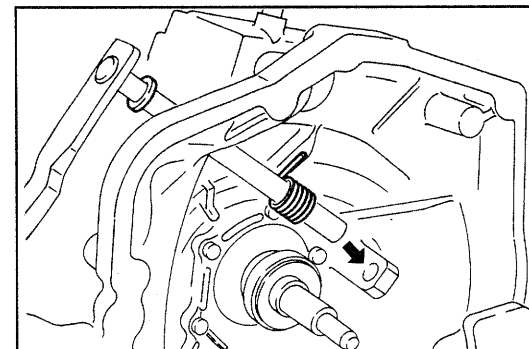
CAUTION:

- Excessive application of grease may cause clutch slippage.



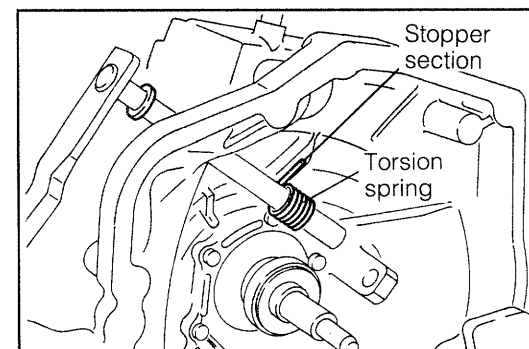
WRU90-CL019

9. Attach the dust seal to the clutch release lever subassembly.
10. Insert the clutch release lever subassembly into the transmission case.



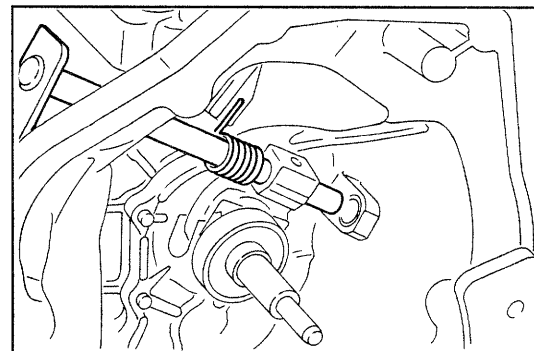
WRU90-CL020

11. Align the torsion spring with the stopper of the transmission case.



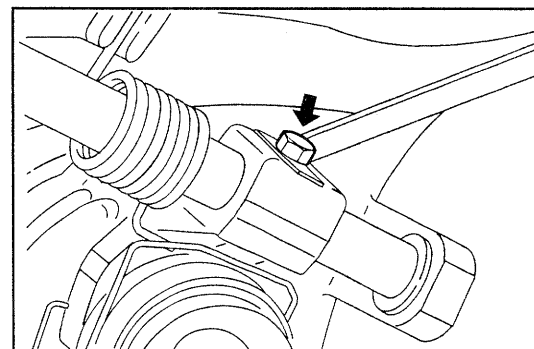
WRU90-CL021

12. Pass the clutch release lever subassembly through the release lever yoke provided with the release bearing hub clip and clutch release bearing hub assembly.



WRU90-CL022

13. Tighten the bolt. (Use the new lock plate.)
 Tightening Torque: 3.0 - 4.0 kg-m
 (21.7 - 28.9 ft-lb, 29.4 - 39.2 N-m)

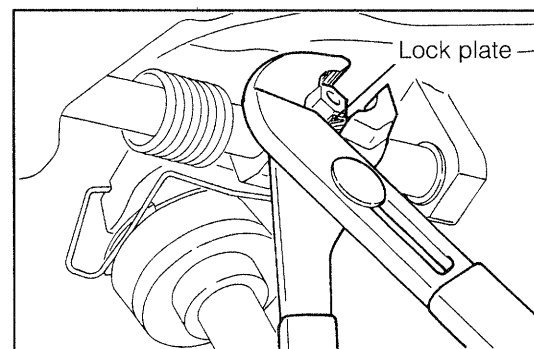


WRU90-CL023

14. After tightening the bolt, positively bend the lock plate along the side of the bolt, using a common tool of water pump pliers.

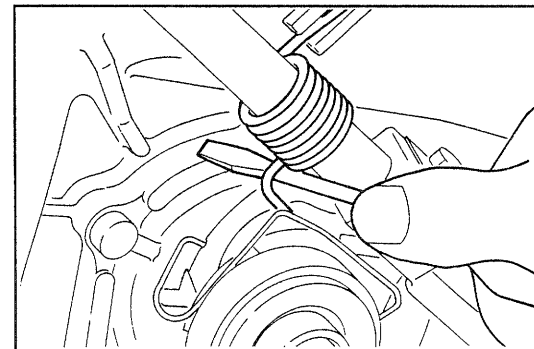
NOTE:

- Never use a chisel for this operation. If a chisel or the like should be used for bending the lock plate, the release bearing hub clip may be detached.



WRU90-CL024

15. Apply the torsion spring to the release lever yoke by means of a standard screwdriver.
16. Move the clutch release lever subassembly in a fore-&-aft direction by hand. Thus, visually inspect the clutch release bearing hub assembly, release bearing hub clip, release lever yoke and spring torsion operate as a set. Also, ensure that they move smoothly.



WRU90-CL025

17. Install the transmission on the vehicle.

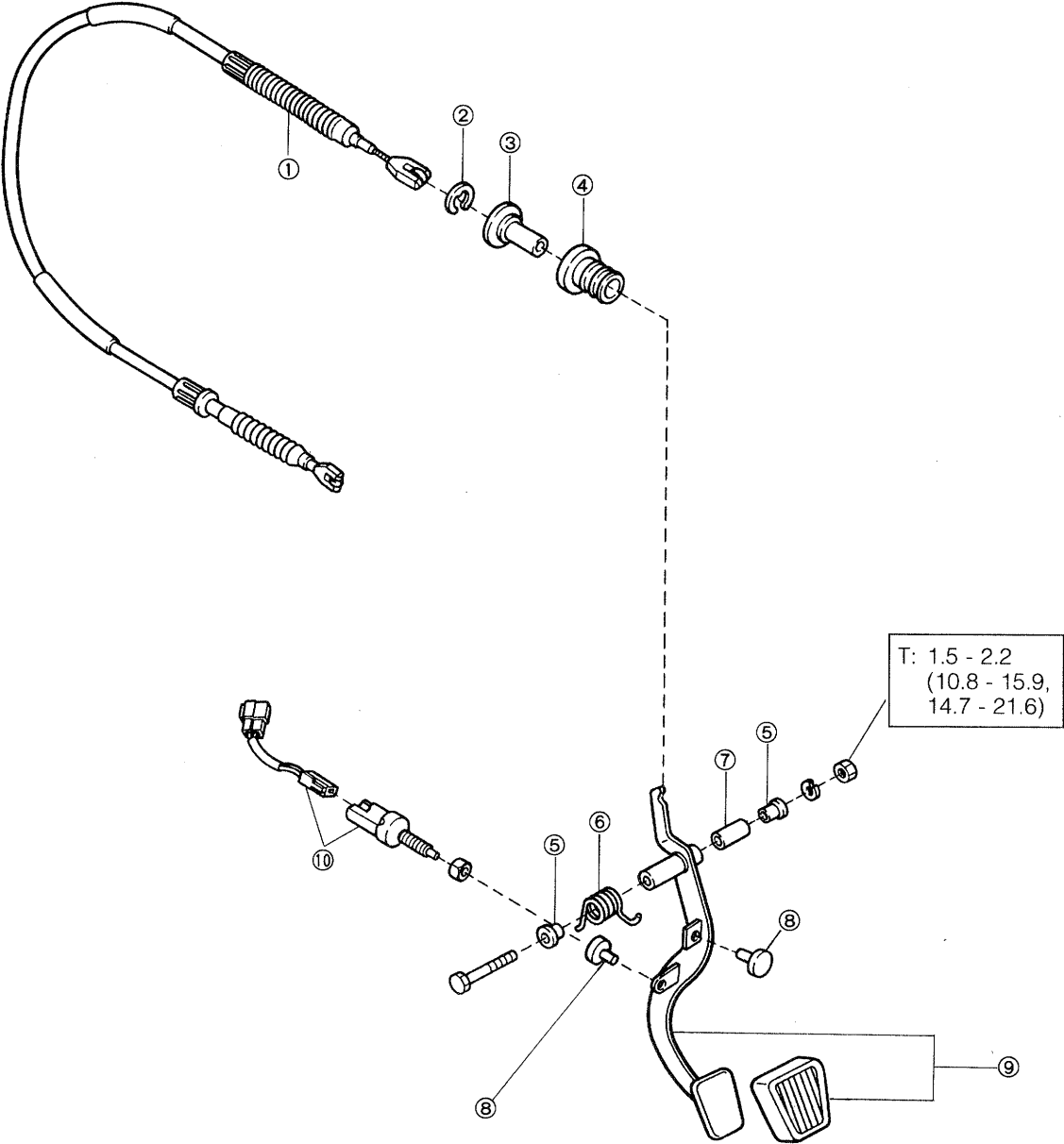
**See page
MT-Section.**

WRU90-CL026

CLUTCH

CLUTCH PEDAL
COMPONENTS

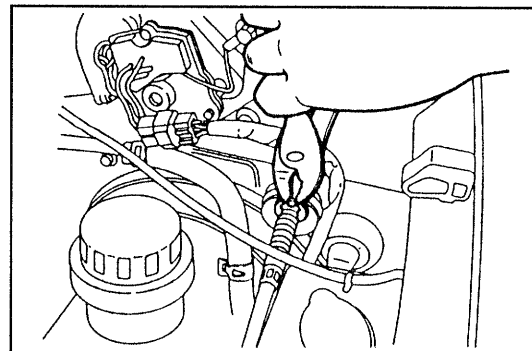
T : Tightening torque
Unit : kg-m (ft-lb, N-m)



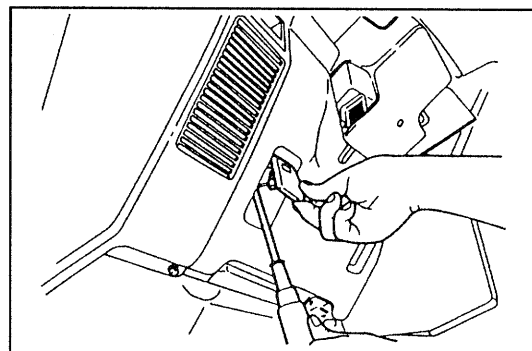
- | | |
|-----------------------------|--------------------|
| ① Clutch release cable assy | ⑥ Spring |
| ② "E" Ring | ⑦ Spacer |
| ③ Clutch cable inner holder | ⑧ Cushion |
| ④ Bush | ⑨ Clutch pedal S/A |
| ⑤ Bush | ⑩ Clutch switch |

REMOVAL

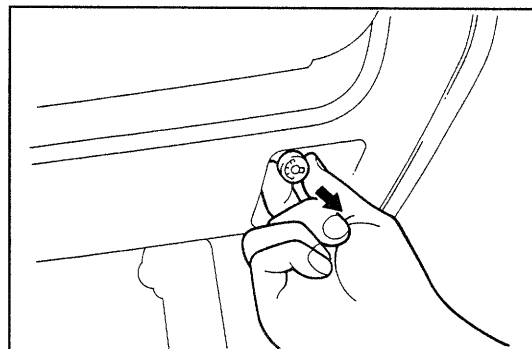
1. Remove the clutch cable and the clip of the clutch cable.
2. Remove the handle of the hood opener cable by removing the two screws.
3. Pull out the instrument light control switch knob toward you.
4. Remove the two screws at the instrument panel light control switch.
5. Remove the two screws located under the instrument panel finish lower panel.



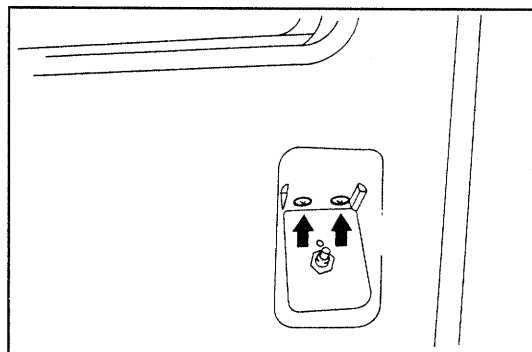
WRU90-CL028



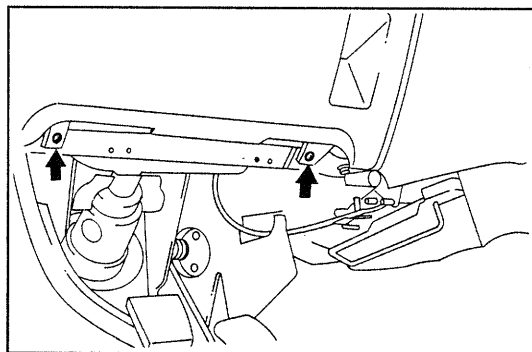
WRU90-CL029



WRU90-CL030



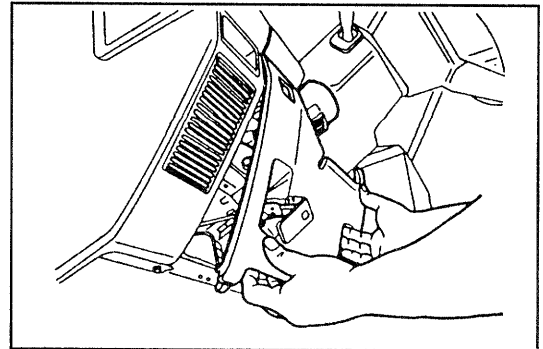
WRU90-CL031



WRU90-CL032

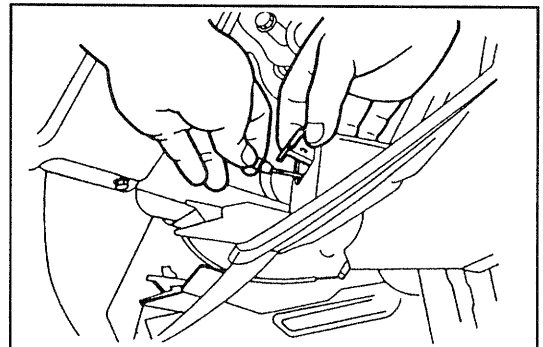
CLUTCH

6. Push up the instrument panel finish lower panel. Then, pull out them lightly toward you.



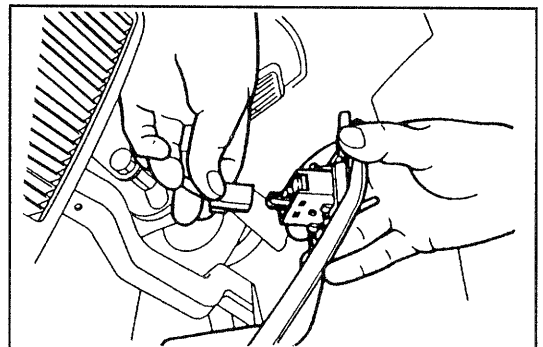
WRU90-CL033

7. Disconnect the hood opener cable.



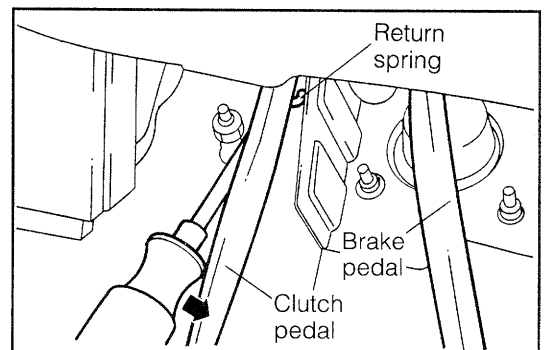
WRU90-CL034

8. Disconnect the coupler of the instrument panel light control switch.

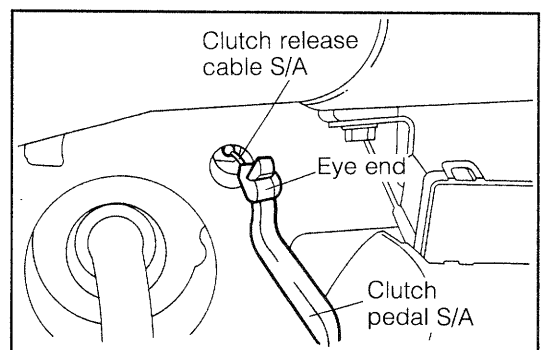


WRU90-CL035

9. Insert a standard screwdriver into between the return spring and the clutch pedal. Release the return spring which hooks at the clutch pedal by lowering the standard screwdriver.
10. At the lower side of the back of the instrument panel assembly, disconnect the eye end section of the clutch release cable subassembly from the forward end of the clutch pedal subassembly.



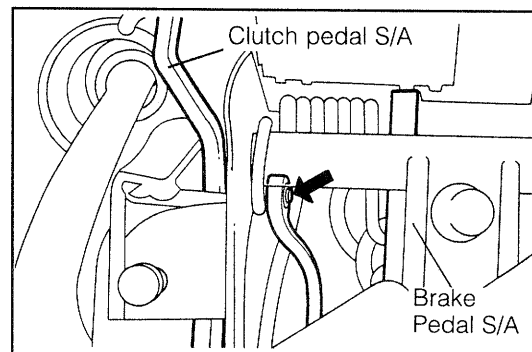
WRU90-CL036



WRU90-CL037

11. Removal of clutch pedal

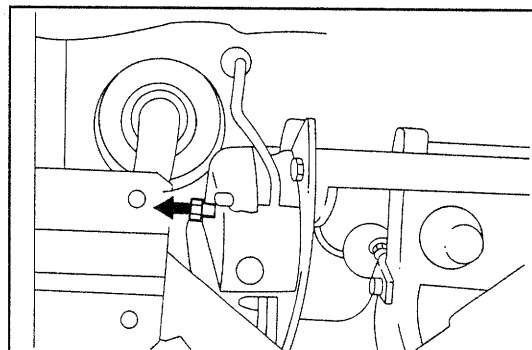
(1) Remove the clutch pedal shaft bolt by removing a nut.



WRU90-CL038

(2) Remove the clutch shaft bolt from the clutch pedal sub assembly.

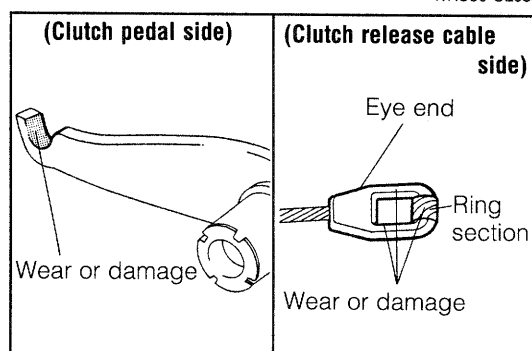
(3) Remove the clutch pedal sub assembly with the return spring installed.



WRU90-CL039

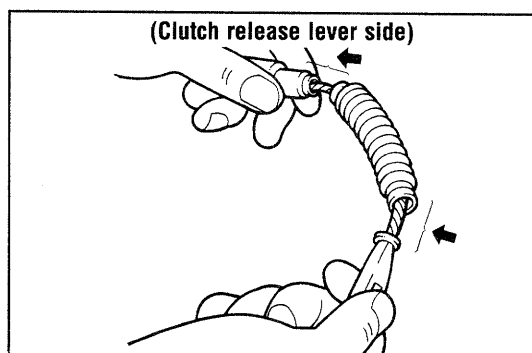
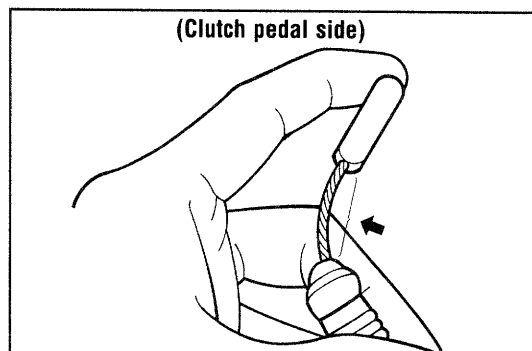
INSPECTION (Clutch pedal & Release cable)

1. Visually inspect the eye end's ring section of the clutch release cable assembly and clutch pedal assembly for wear or damage.



WRU90-CL040

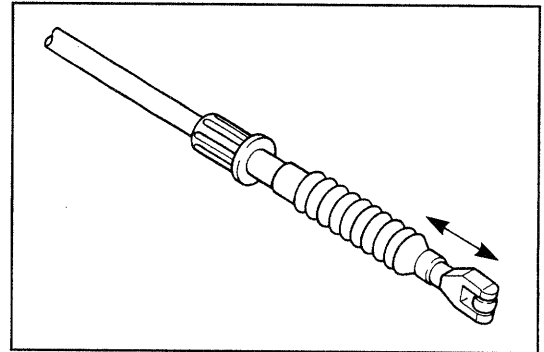
2. Visually inspect the inner cable at the clutch pedal and clutch release lever sides for damage, open wire and rust formation by bending the cable by hands.



WRU90-CL041

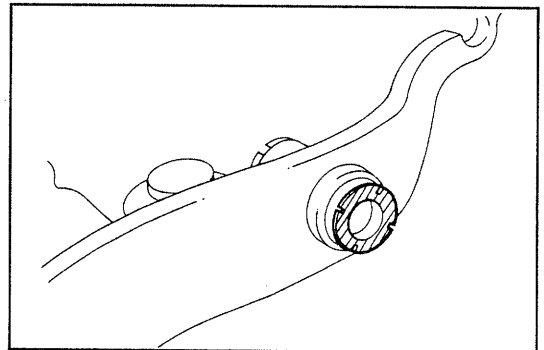
CLUTCH

3. Holding the eye end section of the inner cable by hands, move the inner cable in a fore-&-aft direction. Thus, check that the cable moves smoothly.



WRU90-CL042

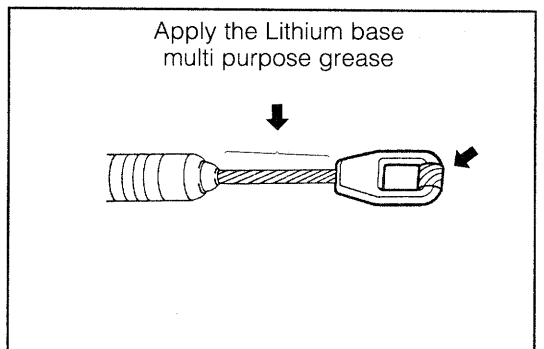
4. Visually inspect the bush for wear due to lack of grease.



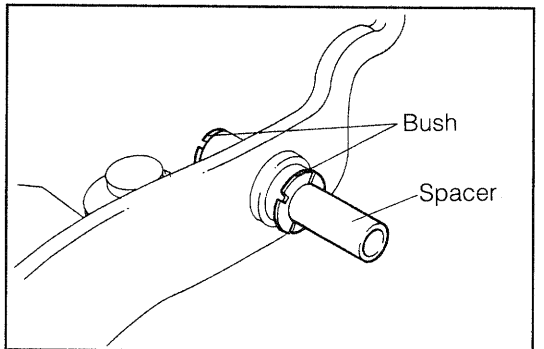
WRU90-CL043

INSTALLATION

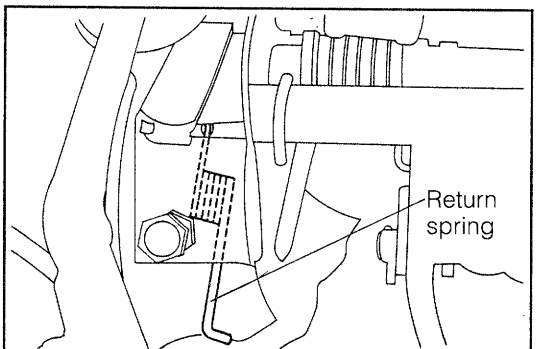
1. Apply Lithium base multi purpose grease to the eye end section of the clutch cable and inner cable.
2. Temporarily insert the clutch cable into the cable insertion hole.
3. After applying Lithium base multi purpose grease, install the two bushes and spacer to the clutch pedal subassembly.
4. Hook the return spring to the hook position of the pedal bracket.



WRU90-CL044

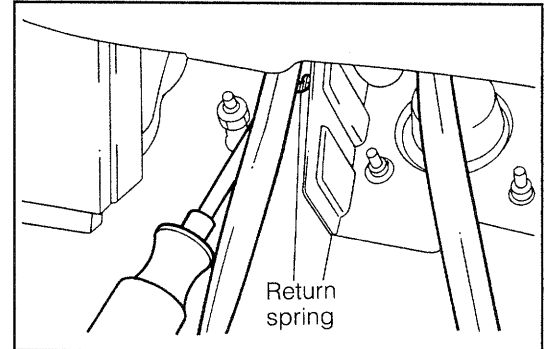


WRU90-CL045



WRU90-CL046

5. Install the clutch pedal subassembly to the return spring which has been hooked to the pedal bracket.



WRU90-CL047

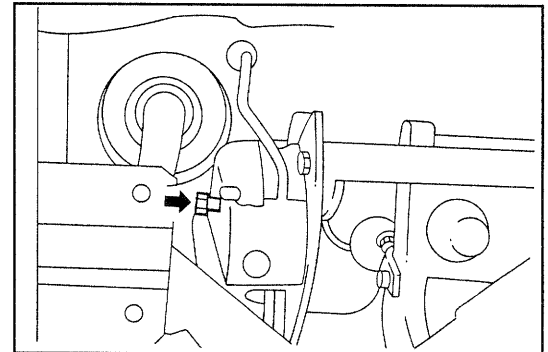
6. Insert the clutch pedal shaft bolt from the left side of the pedal bracket. Proceed to install and tighten the clutch pedal.

NOTE:

- Apply lithium base multi purpose grease to the clutch pedal.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

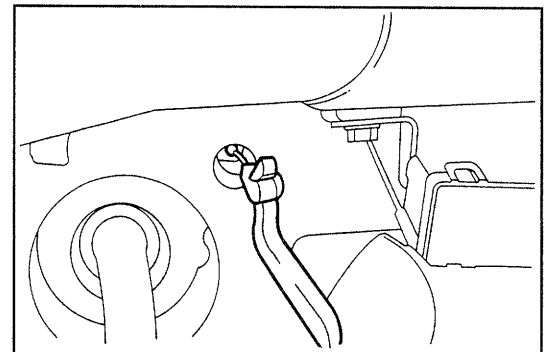


WRU90-CL048

7. Connect the clutch release cable subassembly to the clutch pedal subassembly.
8. Attach the return spring to the clutch pedal and pedal bracket, using a standard screwdriver.

NOTE:

- Apply lithium base multi purpose grease to the clutch cable and the installation section of the pedal.

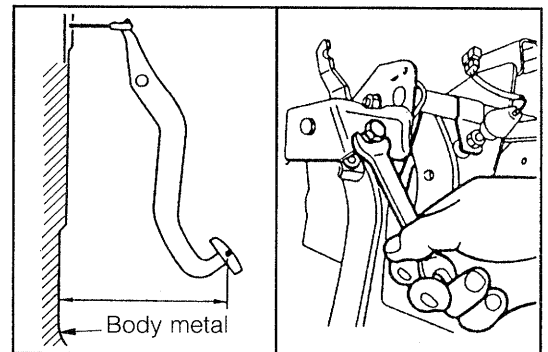


WRU90-CL049

9. Adjust the clutch pedal height by means of the set bolt.

NOTE:

- As for the adjusting procedure for the clutch pedal installation height, see the step 1 at page CL-4.

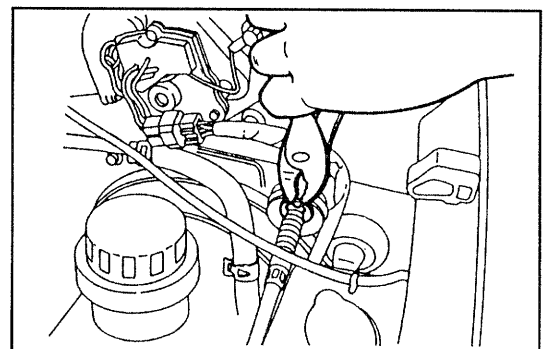


WRU90-CL050

10. Adjust the clutch free travel by moving the clip of the clutch cable.

NOTE:

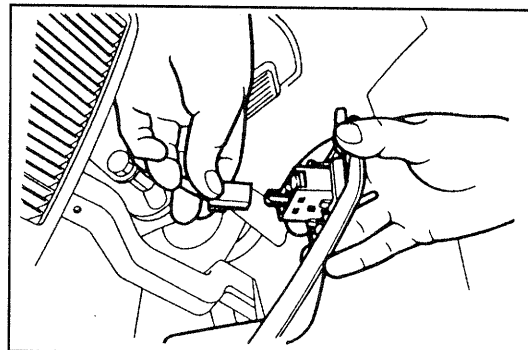
- As for the adjustment of the free travel, see the step 3 at page CL-4.



WRU90-CL051

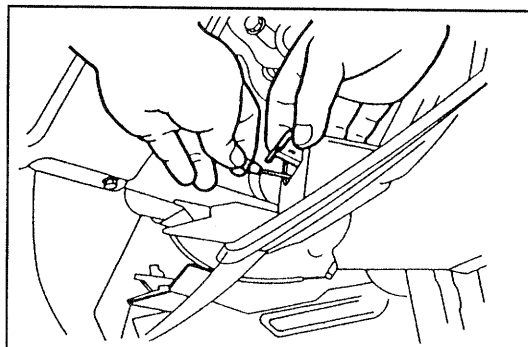
CLUTCH

11. Connect the coupler of the instrument panel light control switch.



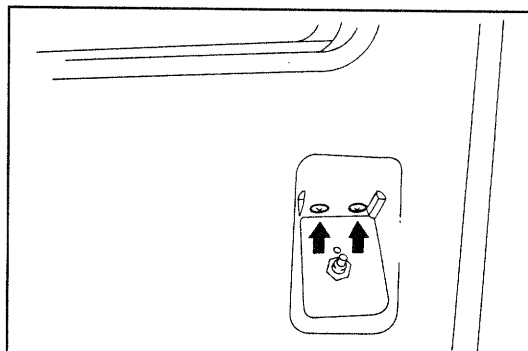
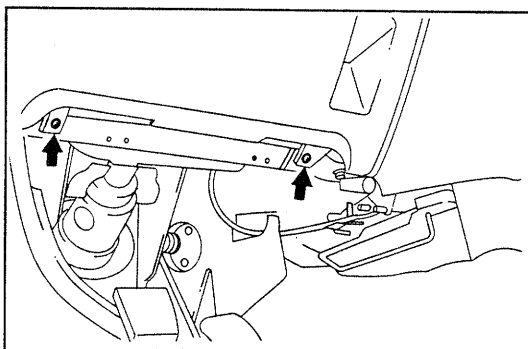
WRU90-CL052

12. Connect the hood opener cable.



WRU90-CL053

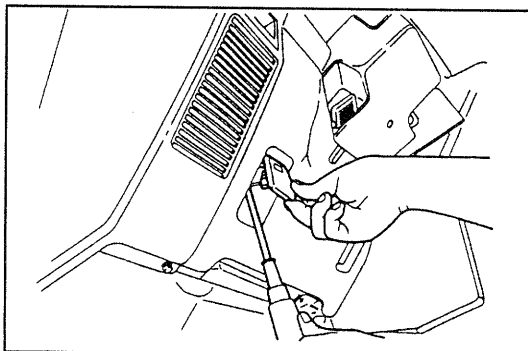
13. Install the instrument panel finish lower panel with the two screws.



WRU90-CL054

14. Install the handle of the hood opener cable with the two screws.

15. Insert the instrument panel light control switch knob.



WRU90-CL055

DAIHATSU

Rocky

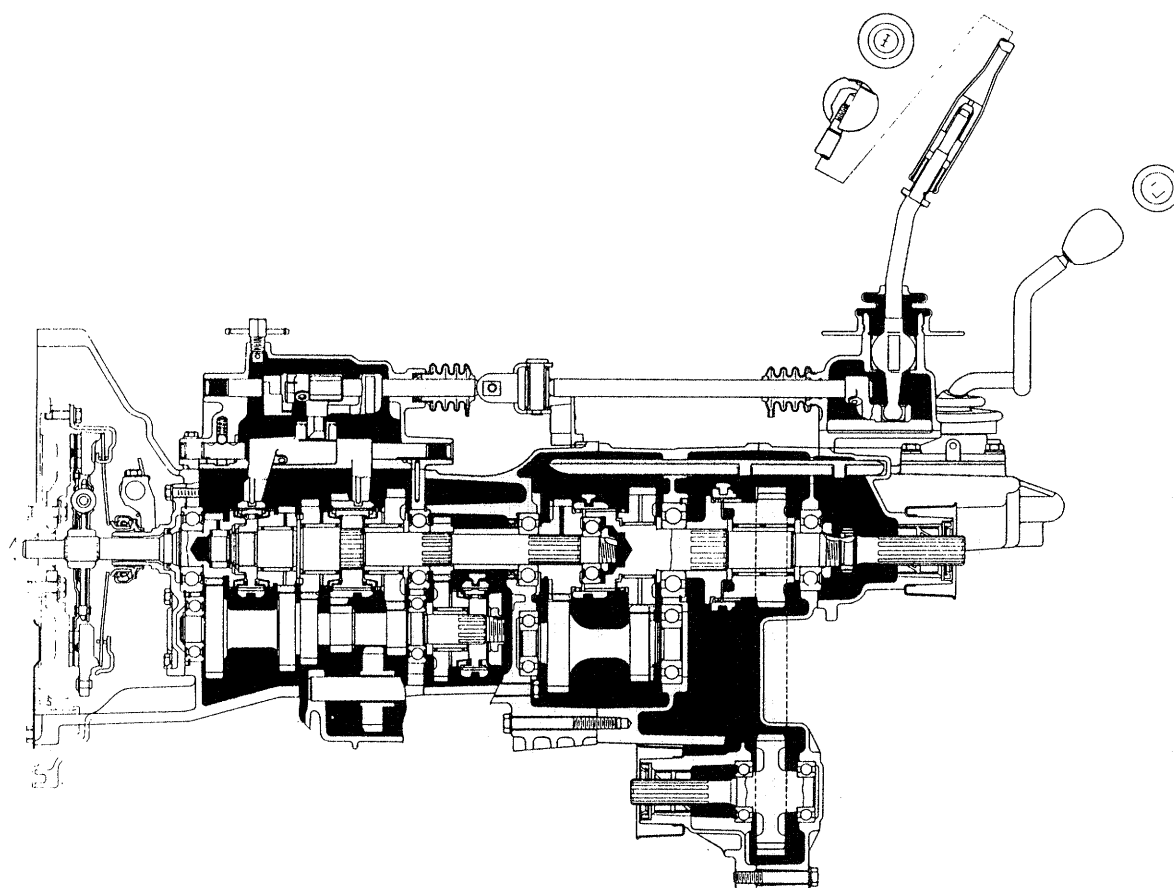
MANUAL TRANSMISSION

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(T/M)	MT- 25		
(T/M OUTPUT SHAFT)	MT- 32		
(T/F ADAPTER)	MT- 35		

MT

SECTIONAL VIEW

The manual transmission is connected directly to the engine and mounted longitudinally. A five-speed transmission is available on all models. A center-through type transfer is employed, in which the power train components from the input shaft to the output shaft are arranged straight in one row. The transmission controls employ a semi-direct method in which the transmission control section is connected with the shift lever section by means of a cross joint.



Transmission and transfer gear ratio specifications

Transmission	Gear ratio	1st gear	3.752
		2nd gear	2.182
		3rd gear	1.428
		4th gear	1.000
		5th gear	0.865
		Reverse gear	3.942
Transfer	Oil used	Kind	API GL-3 or GL-4 SAE 75W-85 or 75W-90
		Capacity liter (USA gal, US qts)	1.7 (0.44, 1.79)
	Gear ratio	High gear	1.000
		Low gear	1.754
	Oil used	Kind	API GL-3 or GL-4 SAE 75W-85 or 75W-90
		Capacity liter (USA gal, US qts)	1.4 (0.36, 1.48)

WRU92-MT504

Transmission and transfer teeth number

Transmission	Input shaft gear		23
	Counter gear	Driven gear	34
		1st gear	13
		2nd gear	21
		3rd gear	30
		5th gear	41
		Reverse gear	12
	Output gear	1st gear	33
		2nd gear	31
		3rd gear	29
		5th gear	24
		Reverse gear	32
	Reverse idle gear		23
Transfer	Input shaft gear		33
	Counter gear	Driven gear	32
		Low gear	21
	Output shaft gear		38
	Sprocket	Driven gear	33
		Drive gear	33

WRU90-MT004

TRANSMISSION

TRANSMISSION SHIFT & SELECT MECHANISM

The transmission controls employ a semi-direct method, where the control section at the transmission side is connected to the shift lever section by means of a cross joint.

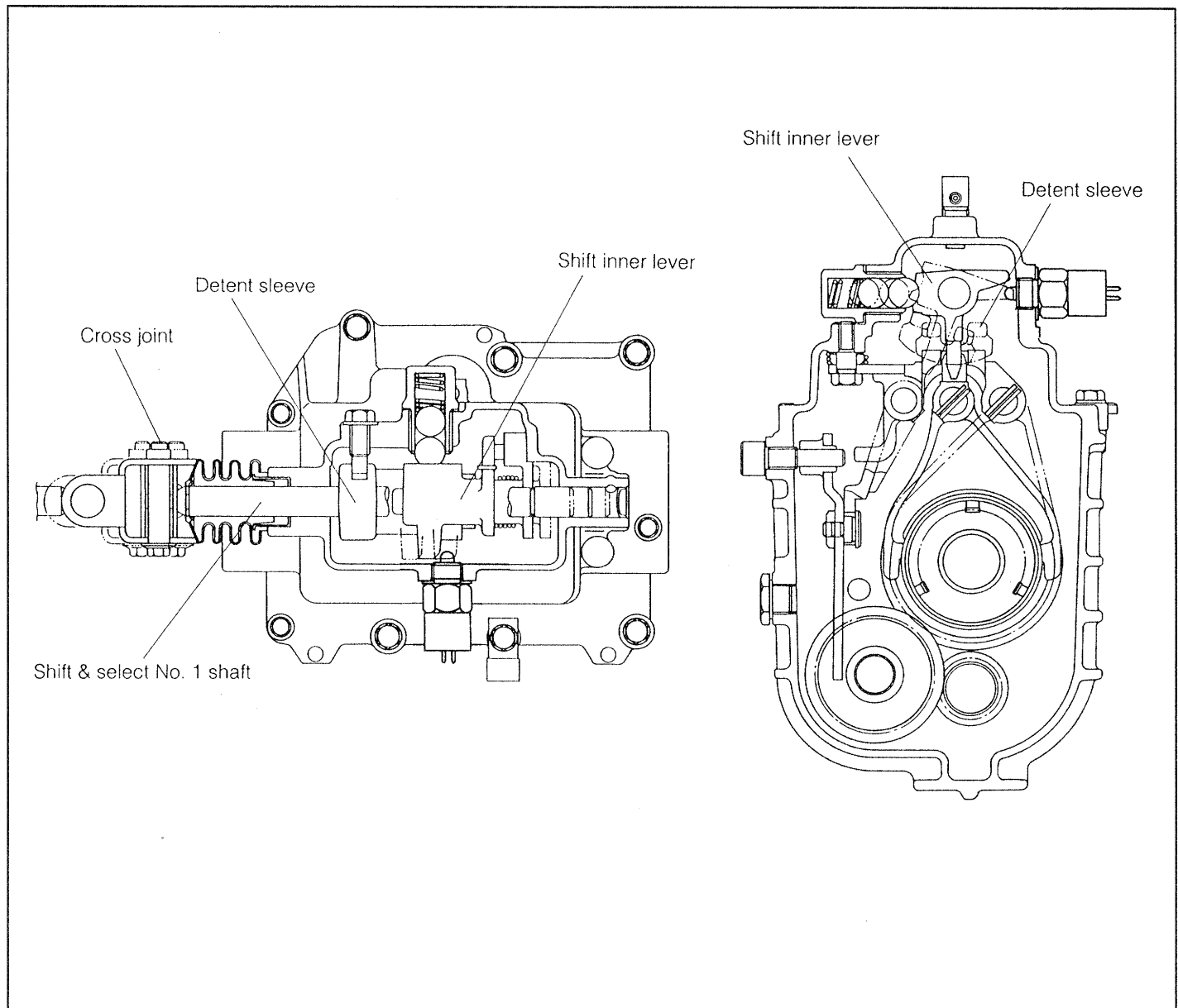
The shift & select mechanism incorporates such safe mechanisms as mis-shift preventing mechanism, interlock mechanism and one-way mechanism.

WRU90-MT005

INTERLOCK MECHANISM

The transmission control shaft is connected to the shift & select No. 1 shaft by means of a cross joint. When the transmission control shaft is moved in the selecting direction, the shift inner lever attached to the shift & select No. 1 shaft swings in the selecting direction like a pendulum.

When the transmission control shaft is moved in the shifting direction, the shift inner lever moves the shift fork of each gear. This movement is restricted by a detent sleeve, thus preventing two gears from being engaged simultaneously.

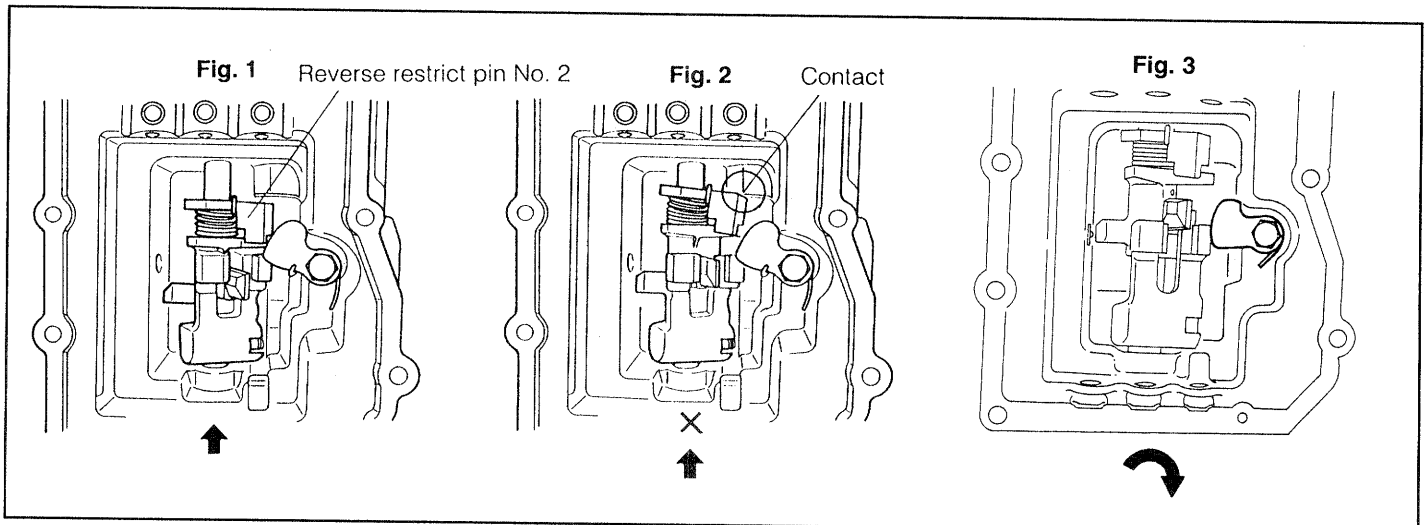


WRU90-MT006

MIS-SHIFT PREVENTING MECHANISM (5TH GEAR-TO-REVERSE GEAR SHIFT)

When the transmission control shaft is shifted into the 5th gear position, the shift inner lever attached to the transmission control shaft is shifted into the 5th gear position, as shown in Fig. 1. Simultaneously, the same movement of the reverse restrict pin No. 2 also takes place. However, if an effort is made under this condition to shift the transmission control shaft from the 5th gear position directly into the reverse gear position, the reverse restrict pin No. 2 is brought into contact with the stopper surface of the transmission case cover, thus preventing the shifting of the control shaft into the reverse gear, as shown in Fig. 2.

Once the transmission control shaft is returned to the neutral position, as shown in Fig. 3, the reverse restrict pin No. 2 returns to the original position, thus making it possible for the control shaft to be shifted into the reverse gear.

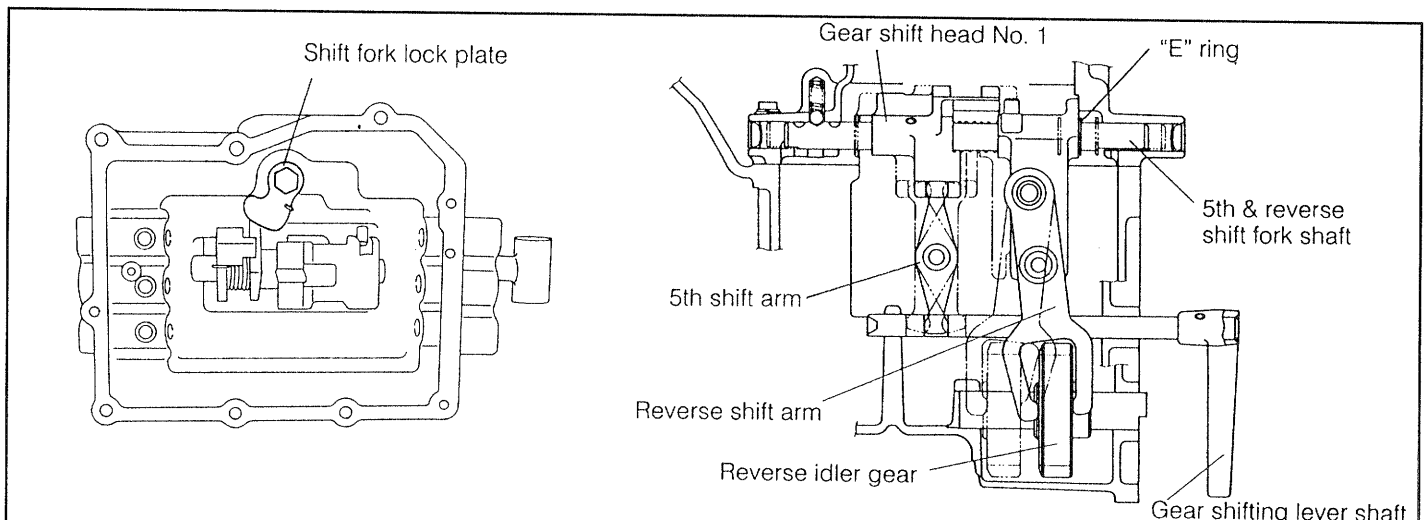


WRU90-MT007

ONE-WAY MECHANISM

When the transmission control shaft is shifted into the 5th gear position, the gear shift head No. 1 attached to the 5th & reverse shift fork shaft moves backward (to the transfer side). In this way, the shift is made into the 5th gear from the 5th shift arm through the gear shifting lever shaft.

On the other hand, when the transmission control shaft is shifted into the reverse gear position, the "E" ring of the 5th & reverse shift fork shaft pushes the reverse shift fork forward (to the clutch side). Then, the reverse idler gear is shifted into the reverse gear position through the reverse shift arm. Moreover, when the transmission control shaft is returned to the neutral position, the returning force of the return spring of the shift fork lock plate returns the reverse shift fork to the original position. Consequently, the reverse idler gear is returned to the neutral position.



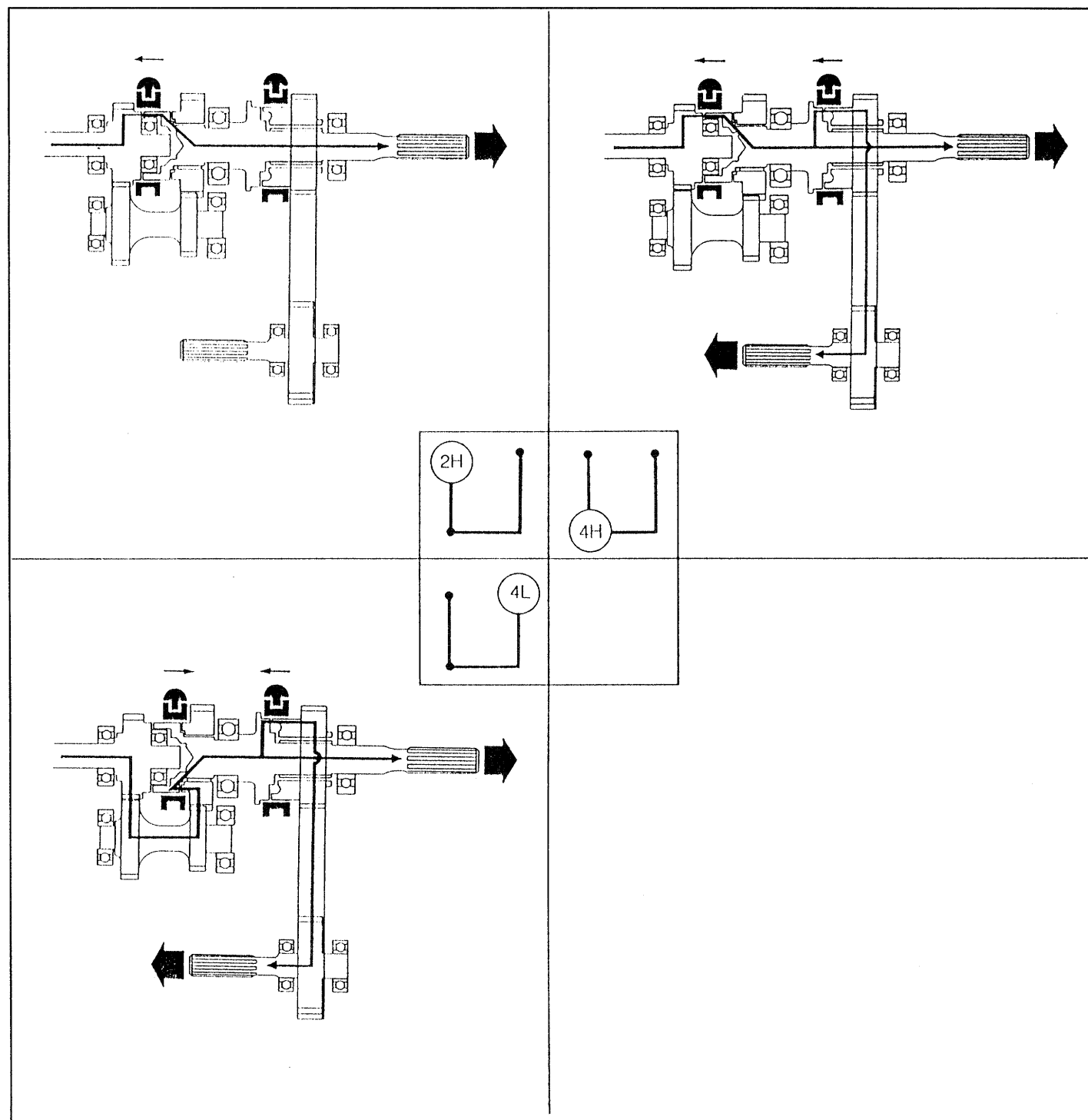
WRU90-MT008

TRANSFER

TRANSFER POWER TRANSMITTING MECHANISM

When the transfer shift lever is shifted into the 2H position, the power from the transmission output shaft is transmitted to the rear wheels through the transfer output rear shaft. Furthermore, when the transfer shift lever is shifted into the 4H position, the shift is made into the transfer front drive gear. Then, the power is transmitted to the transfer output front shaft through the transfer front drive chain, finally driving the front and rear wheels.

When the transfer shift lever is placed in the 4L position, the shift is made into the transfer low speed input gear. Then, the power is transmitted in the following sequence; the transfer countergear, transfer output rear shaft, transfer front drive chain and transfer output front shaft. Finally, the power drives the front and rear wheels.



TRANSFER SHIFT & SELECT MECHANISM

4H→2H

1. The transfer high & low shift fork shaft is pressed by a ball indicated in Fig. 1. Since this ball engagement is so deep that the center of the ball nearly reaches the outer contour of the transfer high & low shift fork shaft as shown by ① in the figure below, the transfer high & low shift fork shaft is in a locked state.

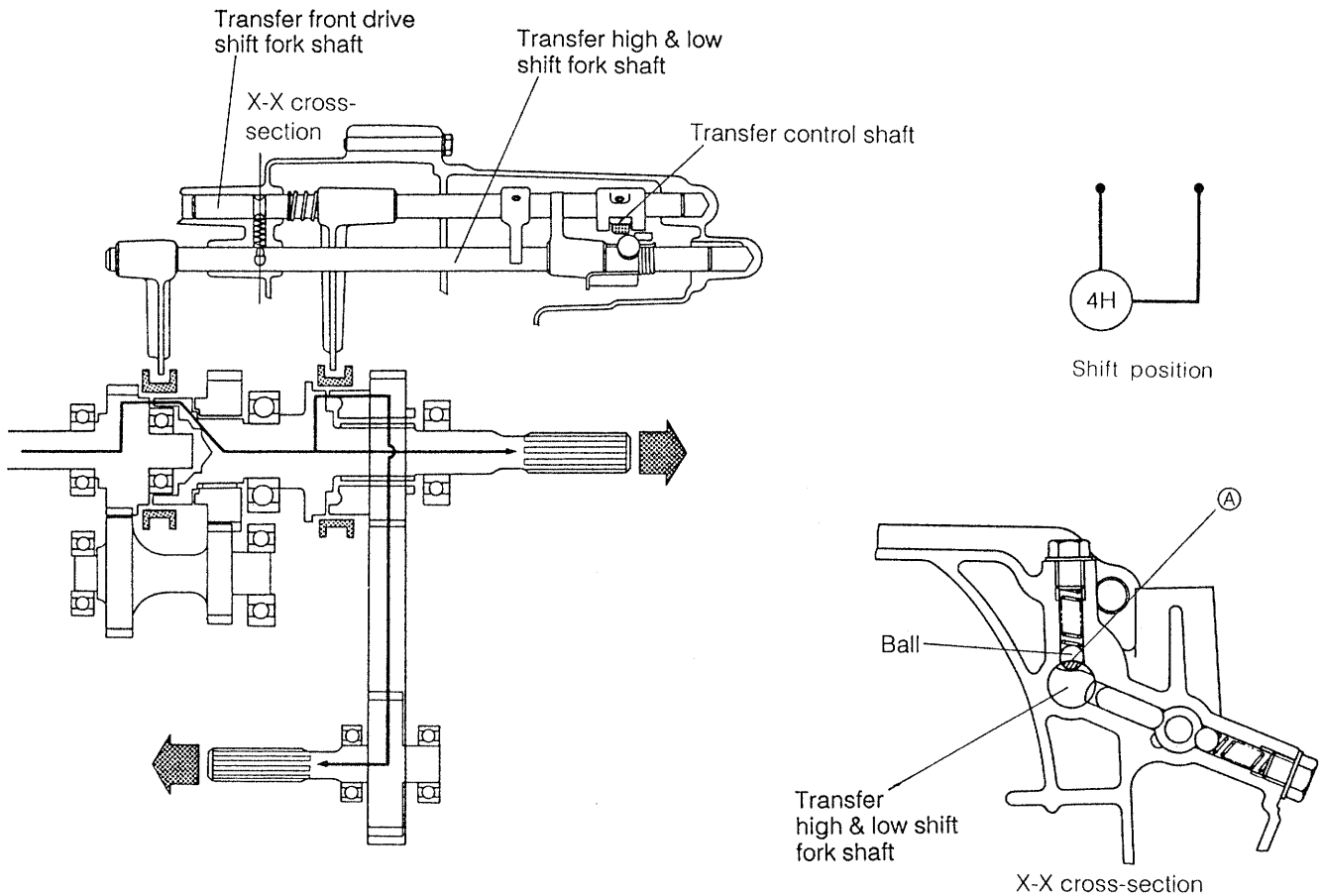
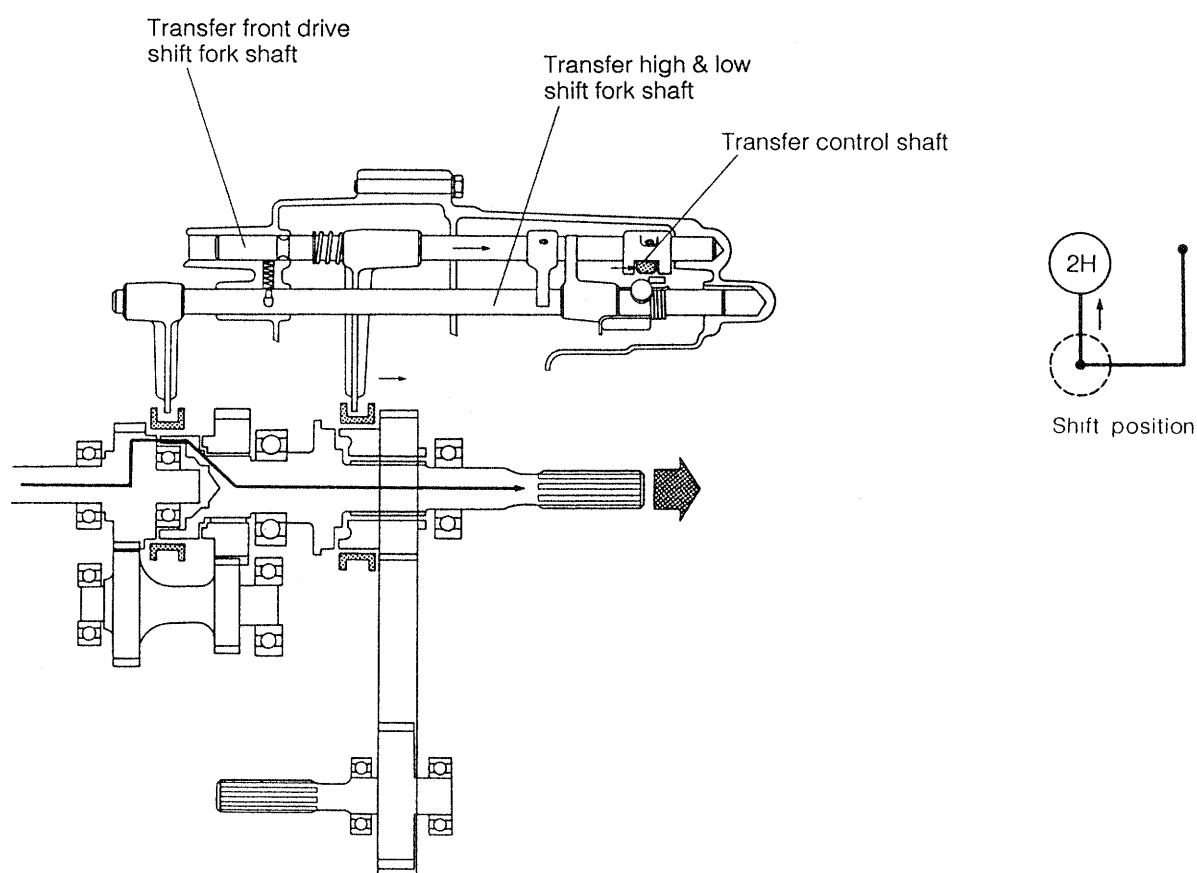


Fig. 1

4H condition

2. When the transfer control shaft is shifted from the 4H position to the 2H position, the transfer front drive shift fork shaft alone moves to the right, for the transfer high & low shift fork shaft is locked by the ball. If there is any difference in rotating torque between the front wheel and the rear wheel at this time, a wait mechanism described later functions owing to the resistance by a twisting torque between the front drive clutch hub and the front drive gear. As a result, the front drive shift fork is kept in the 4H condition. When the difference in rotating torque diminishes, the front drive shift fork is returned to the right by a spring tension, thus switching to the 2H condition.



2H condition .

4H→4L

- When the transfer control shaft is switched from the 4H direction to the 4L direction, the transfer shift lever moves downward. Thus, the transfer fork shaft pin is erected almost vertically as shown in Fig. 2 below. Inasmuch as the transfer fork shaft pin is secured to the transfer high & low shift fork shaft, the transfer fork shaft pin is erected almost vertically. Consequently, the transfer high & low shift fork shaft turns to the left, as shown in Fig. 1 below. Simultaneously the roller moves and fits into the groove of the transfer front drive fork shaft. As a result, the transfer front drive shift fork shaft is brought into a locked state.

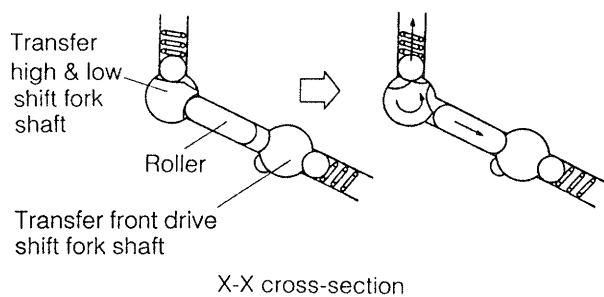
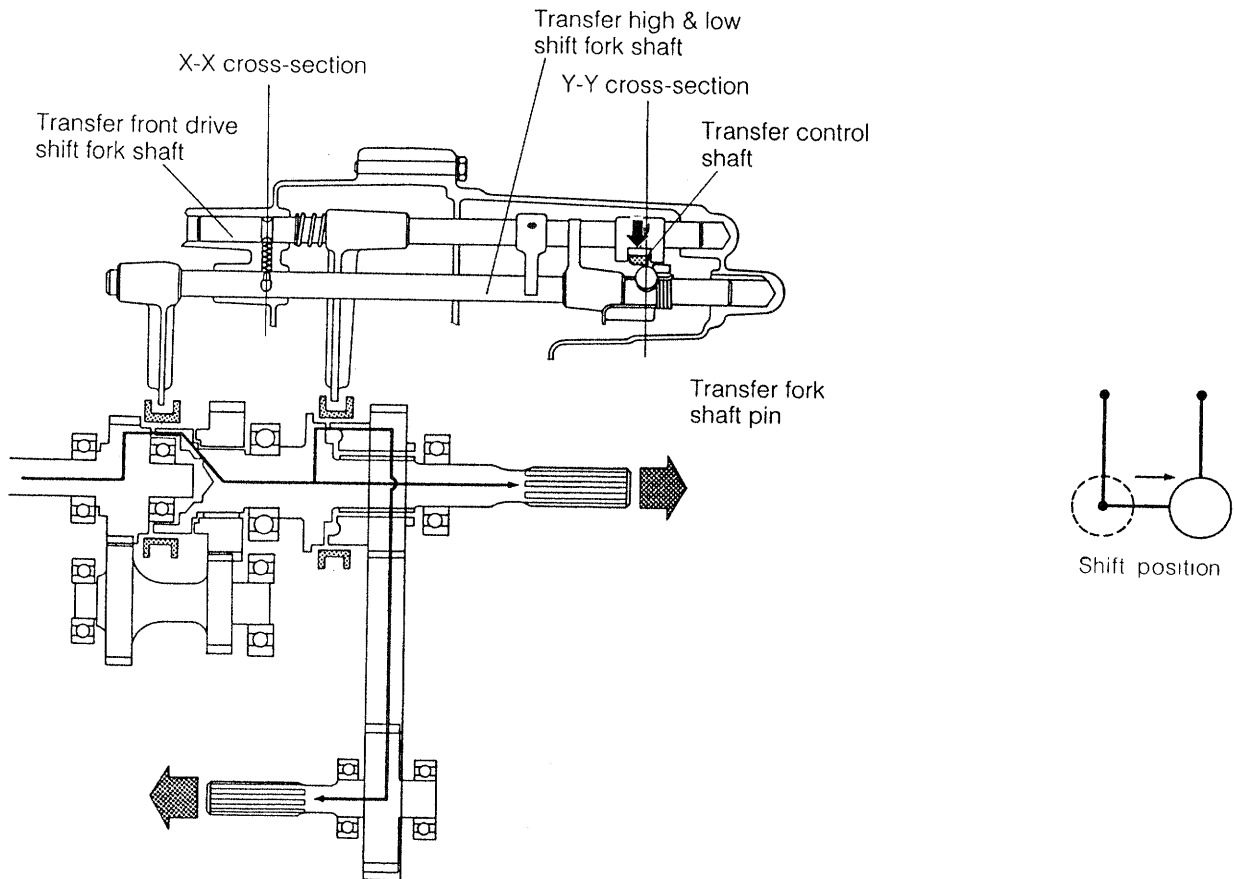


Fig. 1

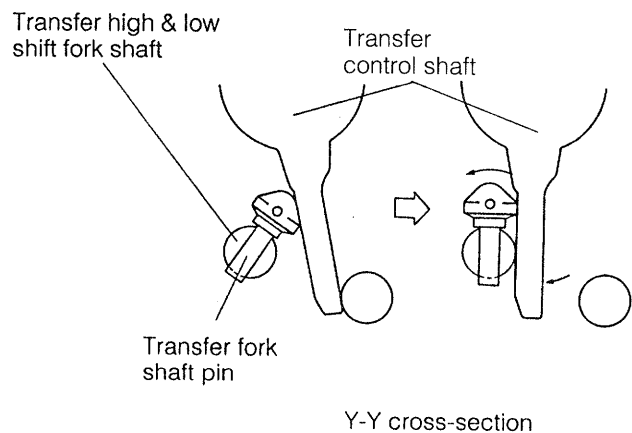
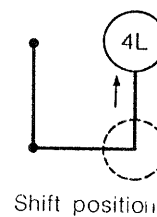
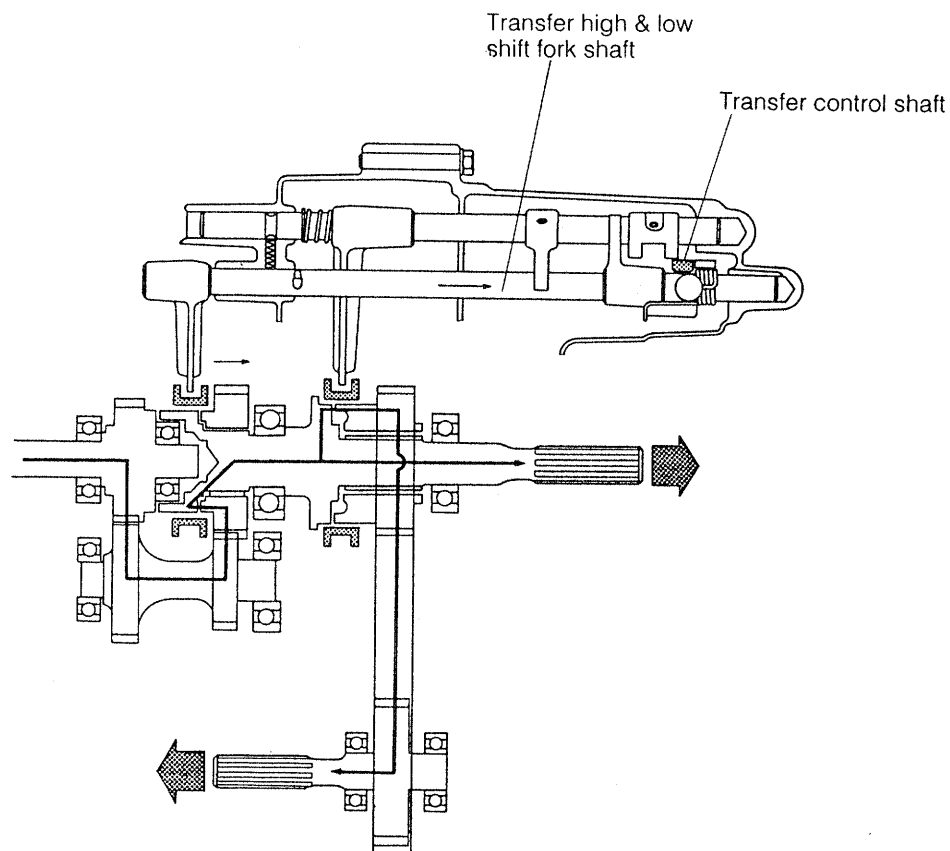


Fig. 2

4H condition

2. When the transfer control shaft is shifted to the 4L direction, the transfer high & low shift fork shaft alone moves to the right, thereby attaining the 4L condition.



4L condition

TROUBLE SHOOTING

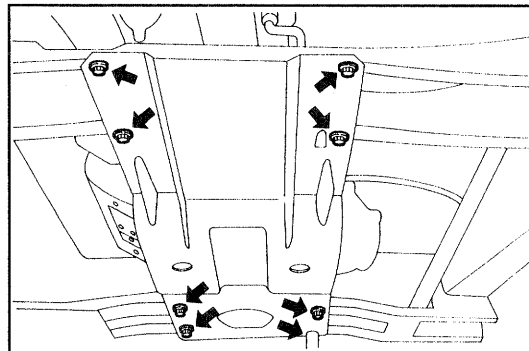
Symptom	Possible causes	Checking points
Noise emitted from gear Slipping out of gear	Malfunctioning control-related components	Check control-related components.
Abnormal noise from bearing	Bearing seizure, Abnormal wear	Check bearing and gear for seizure.
Hard shifting	Malfunctioning control-related components	Check control-related components.
	Improper contact of synchronizer rings	Check synchronizer rings.

WRU90-MT014

OIL SEAL REPLACEMENT (IN-VEHICLE SERVICE)

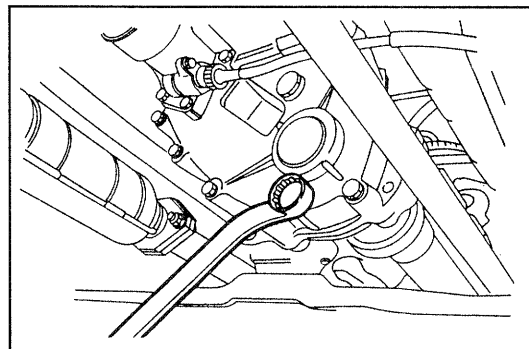
REMOVAL

1. Remove the transmission undercover by removing the eight bolts.



WRU90-MT044

2. Drain the oil of the transfer.

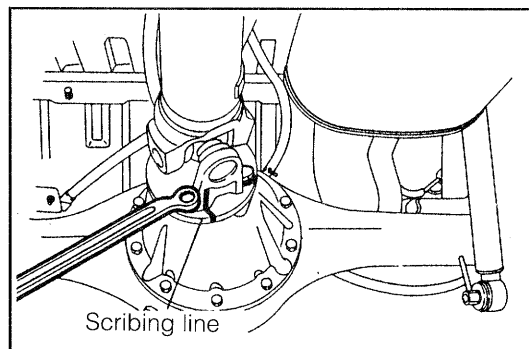


WRU90-MT045

3. Remove the rear propeller shaft.

CAUTION:

- Prior to the removal, be sure to put a scribing line. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.

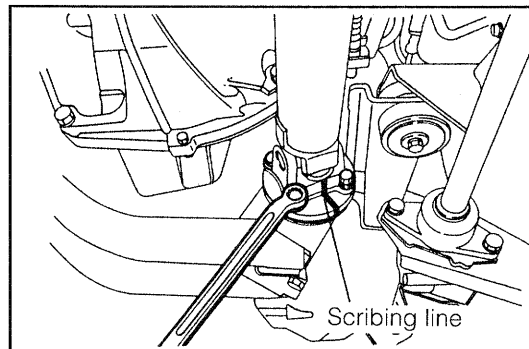


WRU90-MT046

4. Remove the front propeller shaft.

CAUTION:

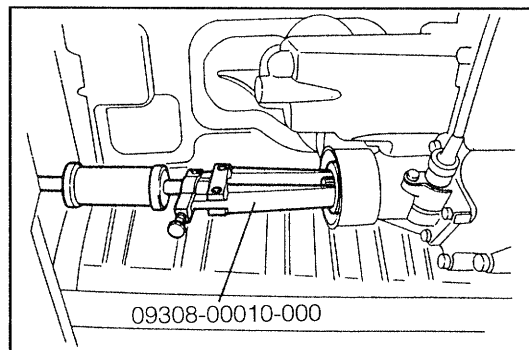
- Prior to the removal, be sure to put a scribing line. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.



WRU90-MT047

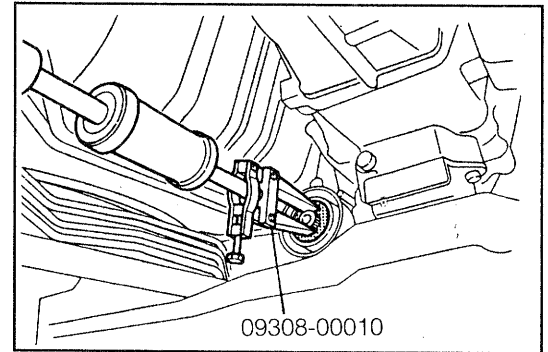
5. Remove the rear oil seal, using the following SST.

SST: 09308-00010-000



WRU90-MT048

6. Remove the front oil seal, using the following SST.
SST: 09308-00010-000



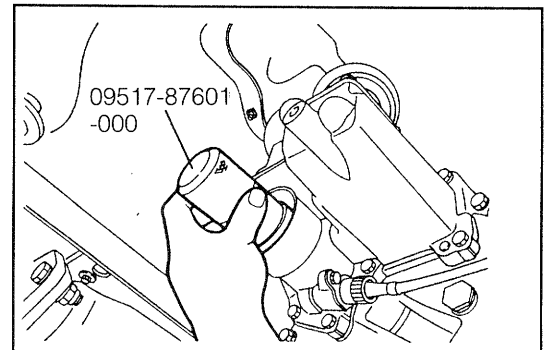
WRU90-MT049

INSTALLATION

1. Press the rear oil seal, using the following SST.
SST: 09517-87601-000

NOTE:

- Apply MP grease to the lip section of the oil seal.

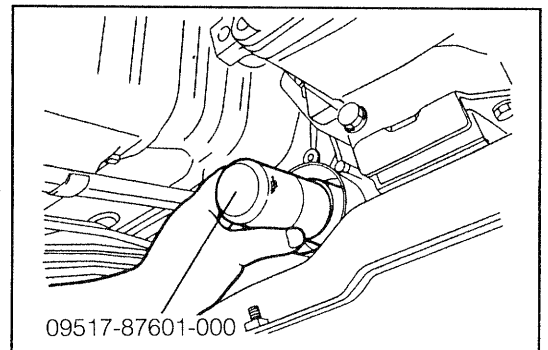


WRU90-MT050

2. Press the front oil seal, using the following SST.
SST: 09517-87601-000

NOTE:

- Apply MP grease to the lip section of the oil seal.

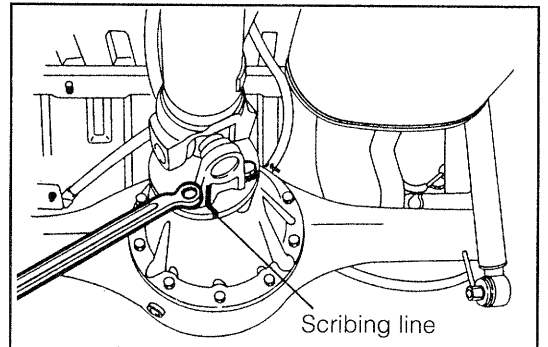


WRU90-MT051

3. Install the rear propeller shaft.
Tightening Torque:
6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

CAUTION:

- Install the propeller shaft, while aligning the scribing lines which were put during the removal.
If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.

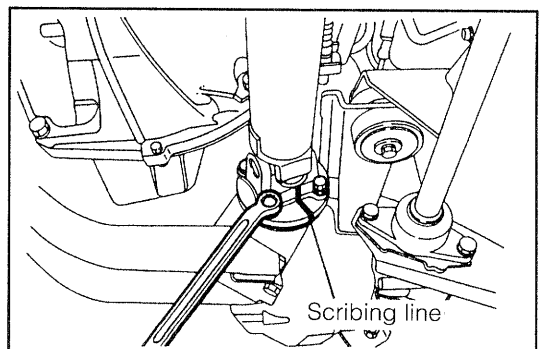


WRU90-MT052

4. Install the front propeller shaft.
Tightening Torque:
6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

CAUTION:

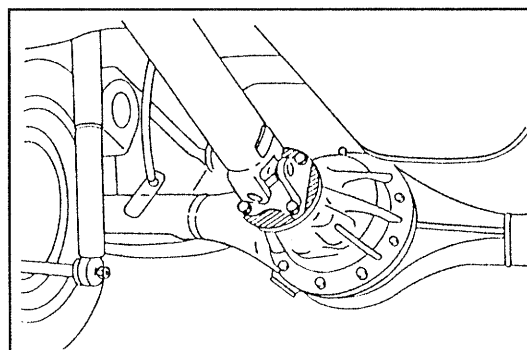
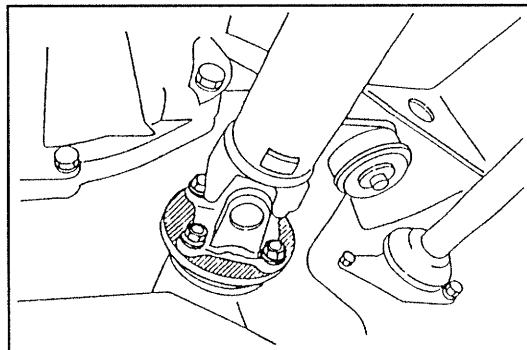
- Install the propeller shaft, while aligning the scribing lines which were put during the removal.
If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.



WRU90-MT053

MANUAL TRANSMISSION

5. After installing the propeller shaft, apply black paint to the exposed machined surface of the differential (slant line section in the right figure) as a rust preventive measure.

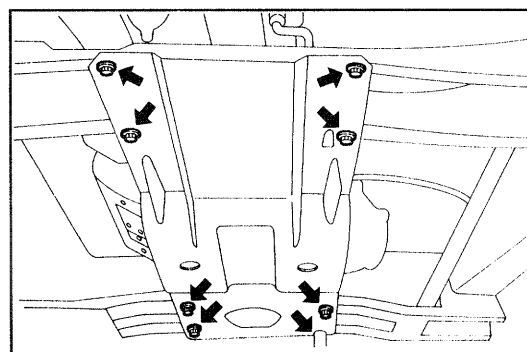


WRU90-MT054

6. Install the transmission undercover with the eight bolts.
7. Fill the transfer with oil.

Transfer Oil Capacity: 1.4 liters
(0.36 USA gal, 1.48 US qts)

Transfer Oil: API GL-3 or GL-4
SAE 75W-85 or 75W-90

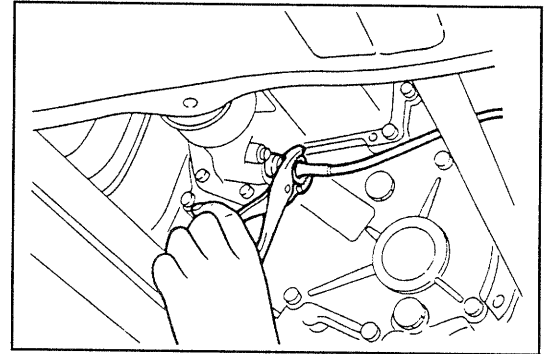


WRU90-MT055

SPEEDOMETER GEAR

REMOVAL

1. Disconnect the speedometer cable with oil seal from the transfer shift lever retainer, using the common tool of plier.

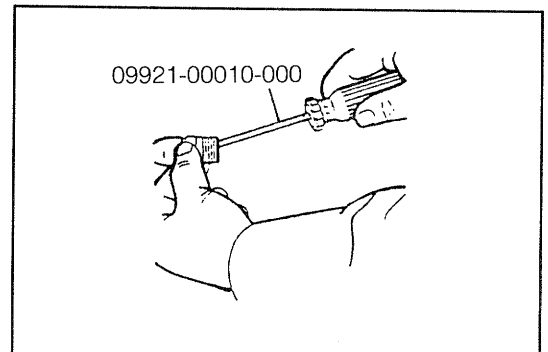


WRU90-MT058

DISASSEMBLY

Remove the oil seal, using the following SST.

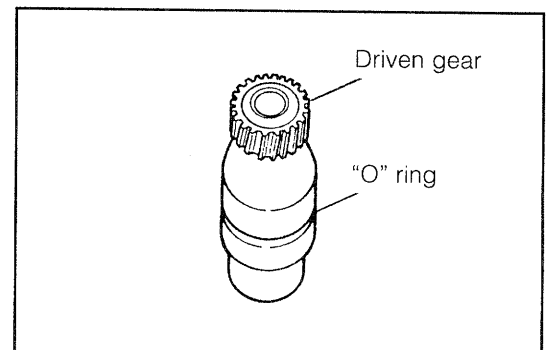
SST: 09921-00010-000



WRU90-MT059

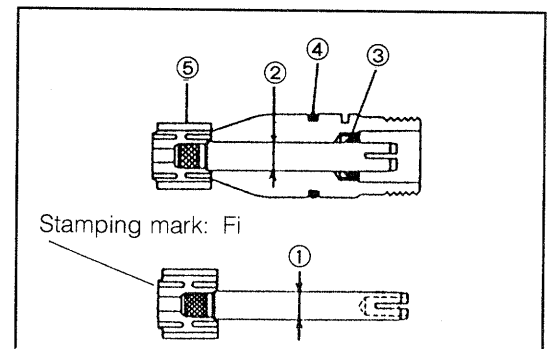
INSPECTION

1. Check the oil seal, "O" ring and driven gear of the speedometer shaft sleeve for wear or damage.



WRU90-MT060

Part		Specified value mm (inch)	Limit mm (inch)
Driven gear shaft diameter	①	8 ^{-0.013} _{-0.028} (0.3150 ^{-0.00051} _{-0.00110})	7.96 (0.313)
Shaft sleeve bore	②	8 ^{+0.065} _{+0.029} (0.3150 ^{+0.0026} _{+0.0011})	8.10 (0.319)
Oil seal lip section	③	Visually inspect the section for excessive wear or damage.	
"O" ring	④		
Driven gear tooth surface	⑤		



WRU90-MT061

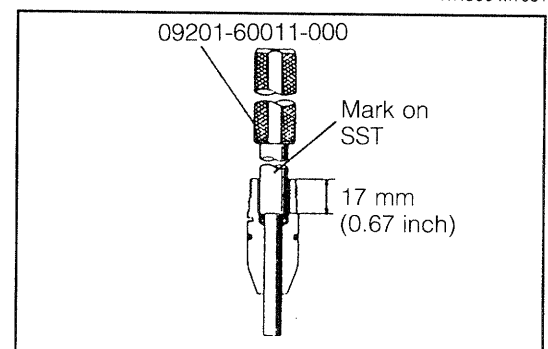
ASSEMBLY

Assembly the oil seal for speedometer shaft sleeve, using the following SST.

SST: 09201-60011-000

INSTALLATION

Install the speedometer shaft sleeve to the transfer rear output shaft bearing retainer.

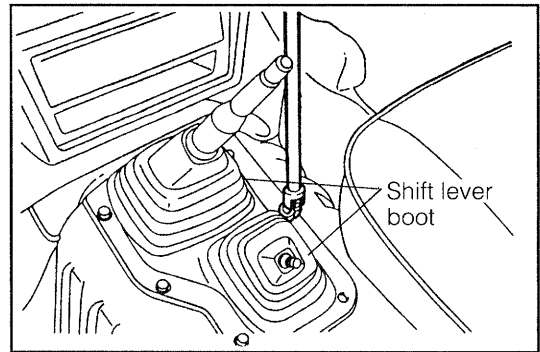


WRU90-MT062

MANUAL TRANSMISSION & TRANSFER REMOVAL

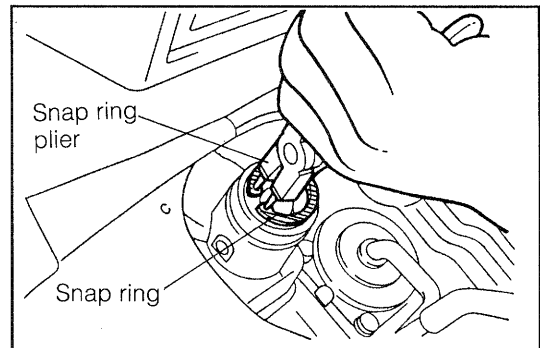
REMOVAL

1. Working from the vehicle interior
 - (1) Remove the Transmission and Transfer shift lever knob by turning the counterclockwise directions.
 - (2) Turn over the floor carpet.
 - (3) Remove the shift lever boot by removing the six bolts and then, pull up toward you.



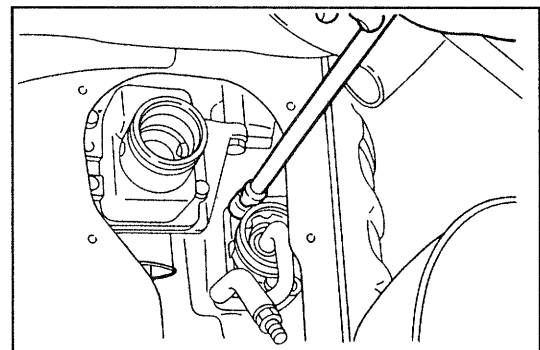
WRU90-MT063

- (4) Remove the transmission control lever by detaching the snap ring, using the common tool of snap ring plier.



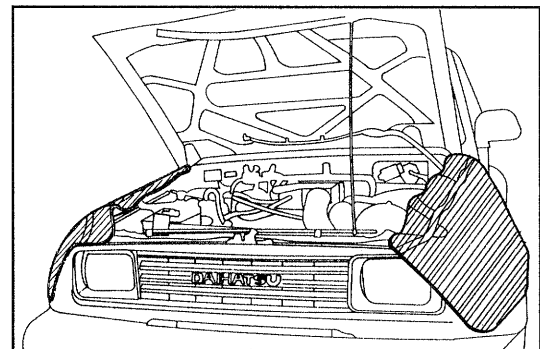
WRU90-MT064

- (5) Remove the transfer control lever by removing the four bolts attaching to the transfer rear case.



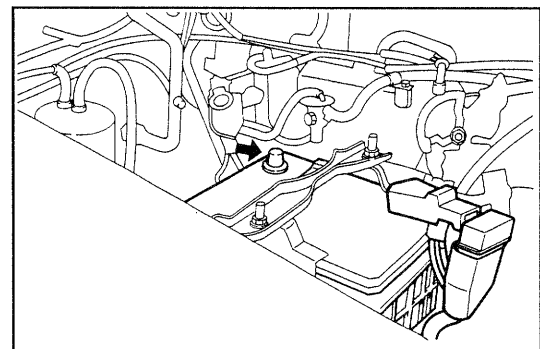
WRU90-MT065

2. Working from the engine compartment room
 - (1) Install the fender cover to the fenders so that no scratch may be made to the fenders.



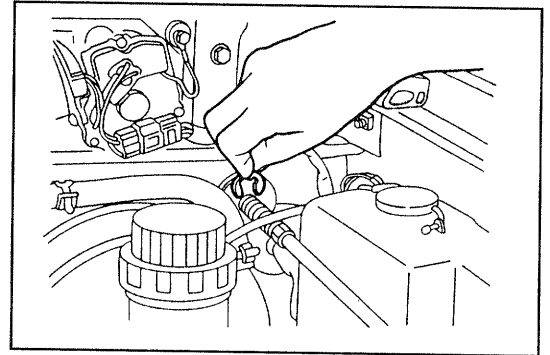
WRU90-MT066

- (2) Disconnect the battery ground cable from the negative (-) terminal of the battery.



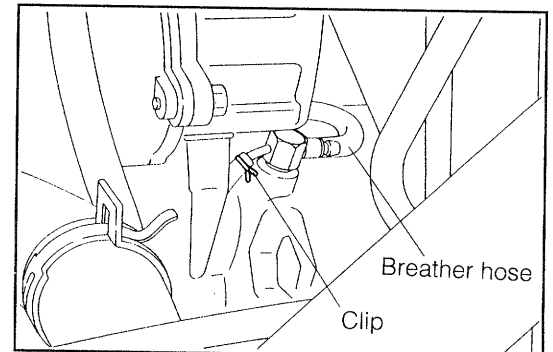
WRU90-MT067

(3) Remove the E-ring for the adjusting play.



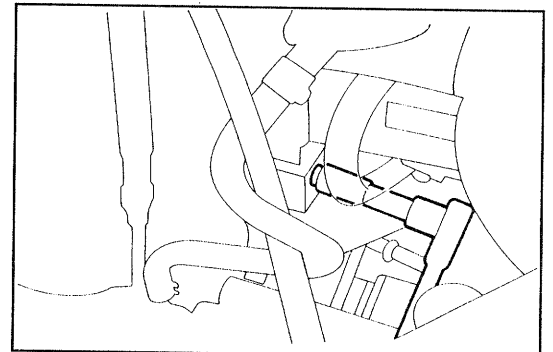
WRU90-MT068

(4) Detach a clip on the transmission breather hose from the union.



WRU90-MT069

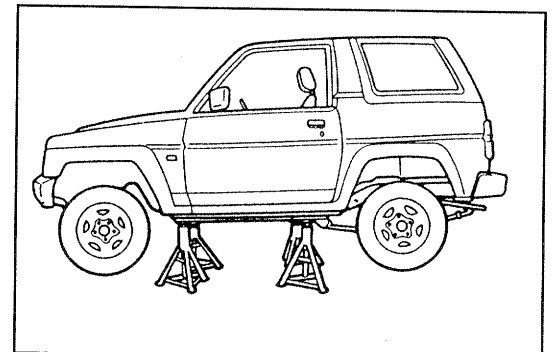
(5) Remove the direct connecting one-bolt under the starter motor.



WRU90-MT070

3. Working from the vehicle outside

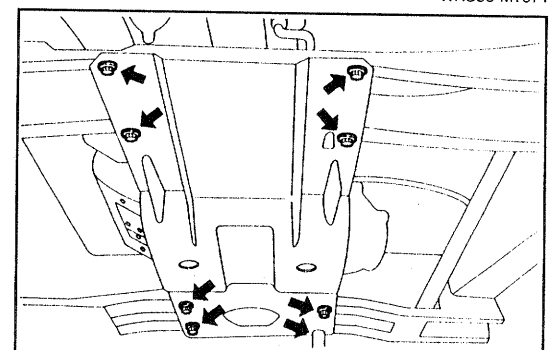
(1) Jack or lift up the vehicle and support the vehicle body with safety stands securely. (As for the jack or lift up points, refer with the GI-section.)



WRU90-MT071

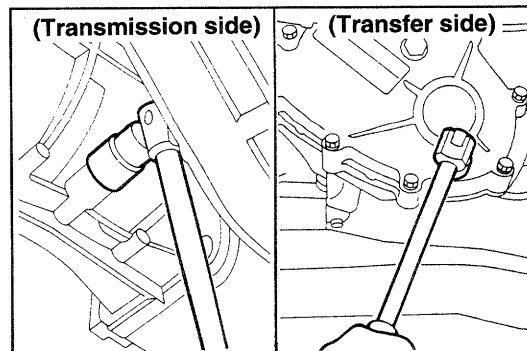
4. Working from the under vehicle

(1) Remove the transmission under cover by removing the eight bolts.



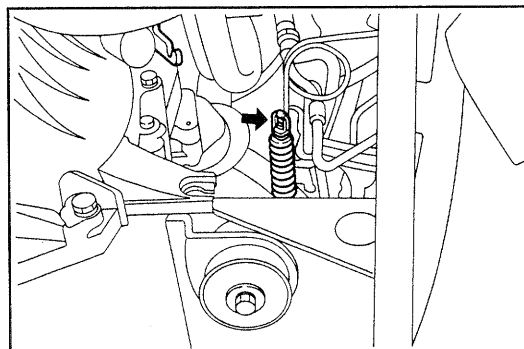
WRU90-MT072

- (2) Drain the oil from the transmission and transfer by removing the drain plugs.



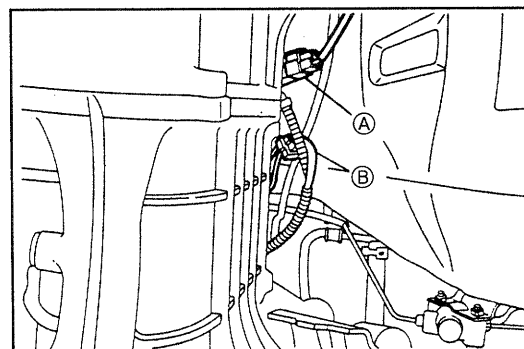
WRU90-MT073

- (3) Disconnect the clutch release cable subassembly at the clutch housing side.



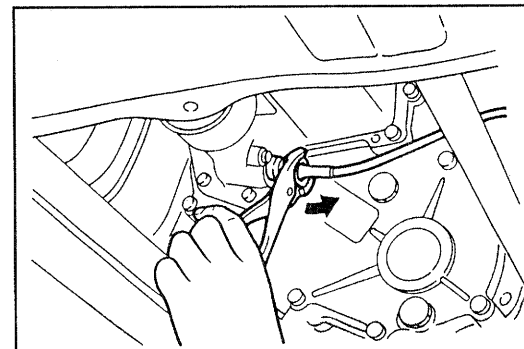
WRU90-MT074

- (4) Disconnect the coupler of back up lamp (A) and transmission position detect switch (B).



WRU90-MT075

- (5) Disconnect the speedometer cable with oil seal from the transmission case, using the common tool of plier.

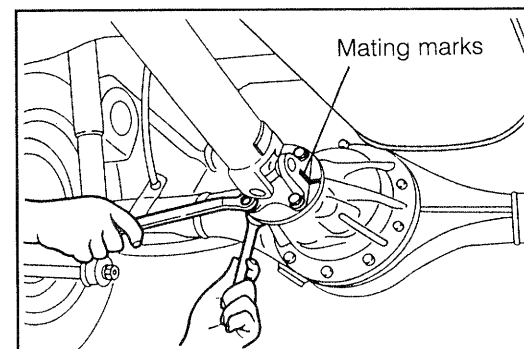


WRU90-MT076

- (6) Remove the front propeller shaft and rear propeller shaft by removing the four bolts and four nuts.

CAUTION:

- When installing these parts, align the mating marks with each other which were put on the connecting section during the removal as guide during the installation. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.

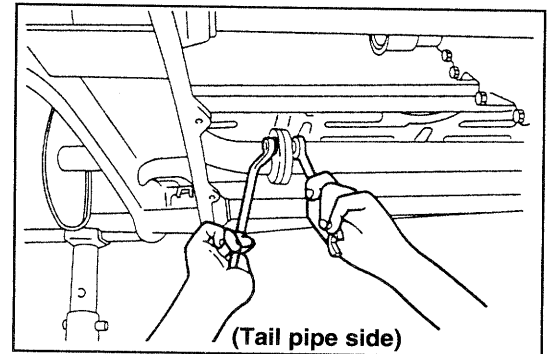
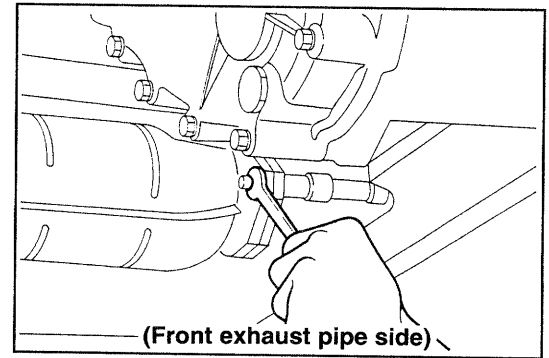


WRU90-MT077

- (7) Separate by catalyst converter assembly by removing the two nuts.

WARNING:

Be sure to put on a pair of gloves because the exhaust pipe may be still hot for a little while after the engine has stopped.

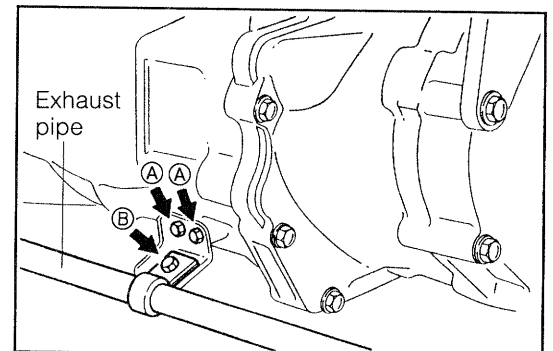


WRU90-MT078

- (8) Remove the exhaust pipe support bracket by removing the three bolts.

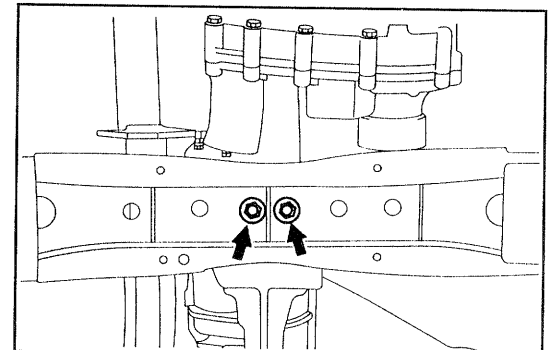
WARNING:

Be very careful not to touch the exhaust pipe because the exhaust pipe may be still hot for a little while after the engine has stopped.



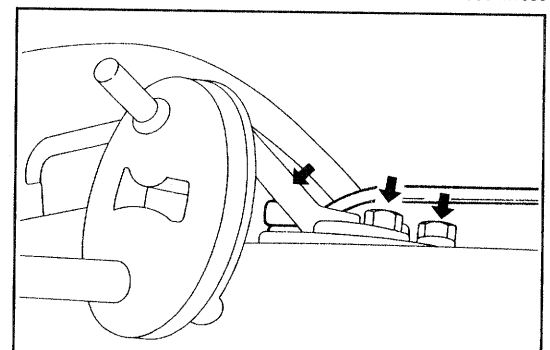
WRU90-MT079

- (9) Remove the two attaching nuts at the crossmember No. 2.



WRU90-MT080

- (10) Remove the exhaust pipe bracket attaching to the crossmember No. 3 by removing the three bolts.



WRU90-MT081

- (11) Remove the starter motor by removing the two bolts.
- (12) Remove the transmission direct-connecting six bolts and leave them in inserted condition.

WARNING:

Be very careful not to touch the exhaust pipe, engine and transmission because they may be still hot for a little while after engine has stopped.

NOTE:

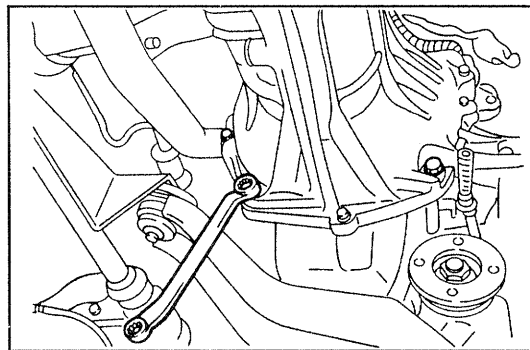
- As directed in the relevant section on remounting, insert a wooden piece(s) between the oil pan and the differential carrier support front bracket to prevent downward movement of the engine assembly to the transmission side (and to prevent contact between the fan and the fan shroud).

- (13) Support the transmission with a transmission jack.

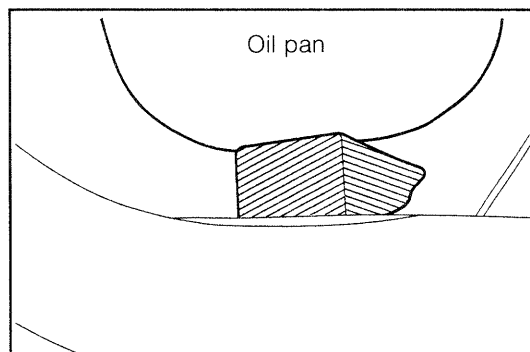
- (14) Remove the crossmember No. 2 by removing the four bolts on both left and right sides.
- (15) While supporting the transmission with a transmission jack, remove the transmission direct-connecting bolts. Then, take out the transmission from the engine with installed the crossmember No. 2.

NOTE:

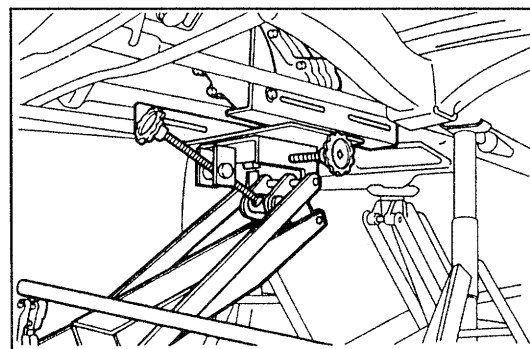
- The transmission direct-connecting bolts should be removed, while raising the rear section of the transfer with a transmission jack. Then, pull out the transmission input shaft from the clutch. Thus, remove the transmission and transfer by sliding them toward the rear.



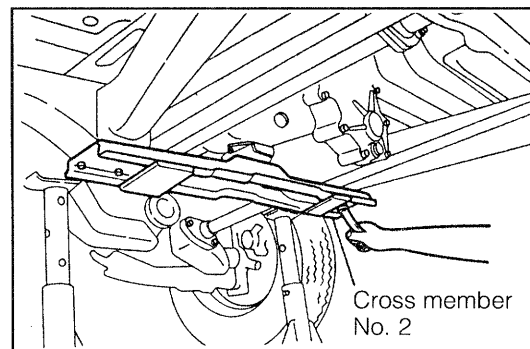
WRU90-MT082



WRU90-MT083

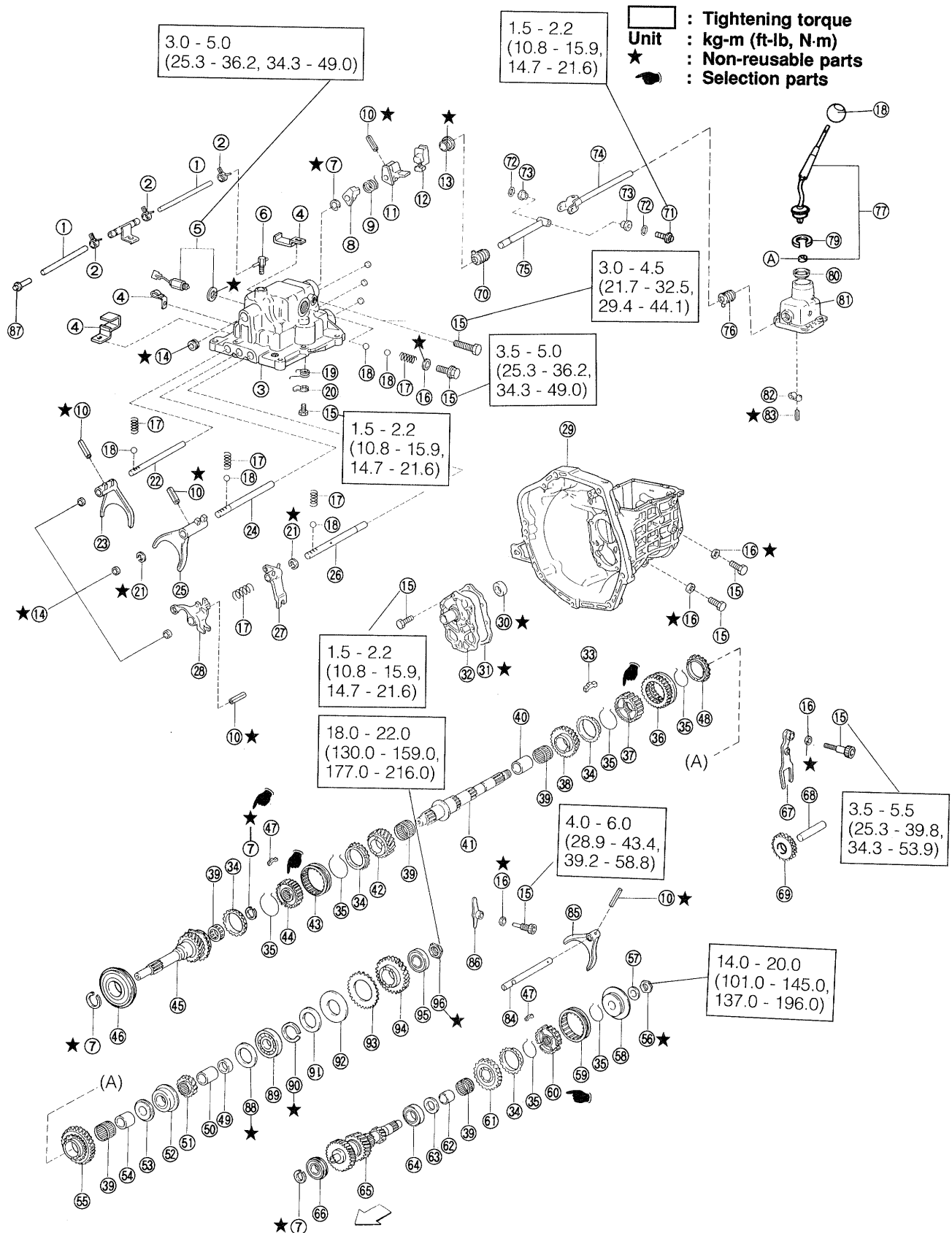


WRU90-MT084



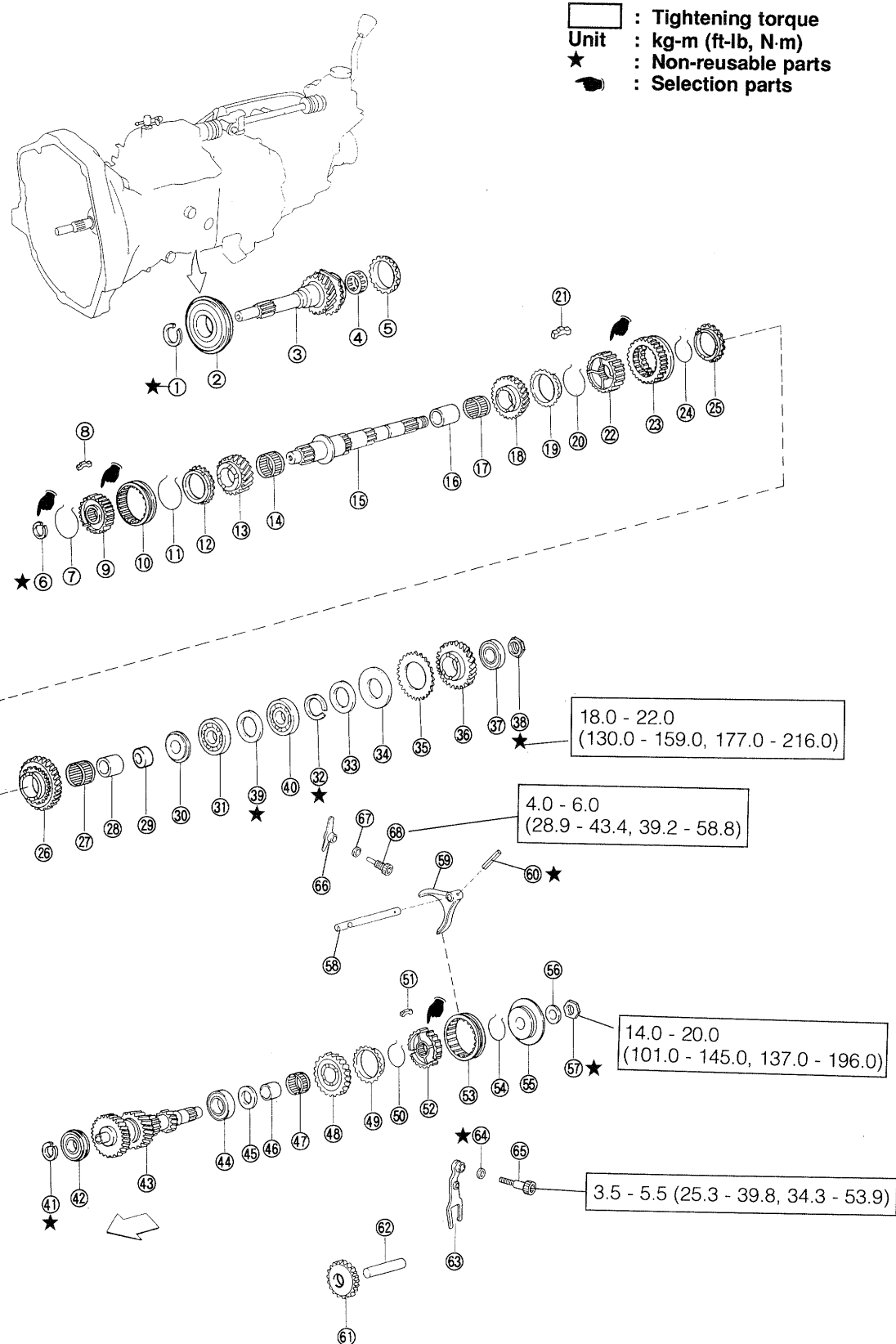
WRU90-MT085

TRANSMISSION COMPONENTS



- | | |
|---------------------------------------|------------------------------------|
| ① Breather hose | ④⑨ Output shaft gear spacer No. 2 |
| ② Clip | ⑤⑩ Output shaft gear spacer No. 1 |
| ③ T/M case cover | ⑥⑪ 5th gear |
| ④ Clamp | ⑦⑫ Radial ball bearing |
| ⑤ Backup lamp switch | ⑧⑬ 1st gear thrust washer |
| ⑥ Union | ⑨⑭ 1st gear bearing inner race |
| ⑦ Snap ring | ⑩⑮ 1st gear |
| ⑧ Reverse restrict pin No. 2 | ⑪⑯ Lock nut |
| ⑨ Torsion spring | ⑫⑰ Conical washer spring |
| ⑩ Slotted pin | ⑬⑱ Shifting key retainer |
| ⑪ Shift inner lever | ⑭⑲ T/M hub sleeve |
| ⑫ Detent sleeve | ⑮⑳ Synchronizer hub No. 1 |
| ⑬ Oil seal | ⑯㉑ Counter shaft 5th gear |
| ⑭ Tight plug | ⑰㉒ 5th gear bearing inner race |
| ⑮ Bolt | ⑱㉓ 5th gear thrust washer |
| ⑯ Gasket | ㉑㉔ Radial ball bearing |
| ⑰ Spring | ㉔㉕ Counter gear |
| ⑰ Ball | ㉕㉖ Radial ball bearing |
| ⑲ Torsion spring | ㉖㉗ Reverse shift arm |
| ⑳ Shift fork lock plate | ㉗㉘ Reverse idle gear shaft |
| ㉑ "E" ring | ㉘㉙ Reverse idle gear S/A |
| ㉒ 1st & 2nd shift fork shaft | ㉙㉚ Shift & select shaft No. 1 boot |
| ㉓ 1st & 2nd shift fork | ㉚㉛ Bolt |
| ㉔ 3rd & 4th shift fork shaft | ㉛㉜ "O" ring |
| ㉕ 3rd & 4th shift fork | ㉜㉝ Bush |
| ㉖ 5th & reverse shift fork shaft | ㉝㉞ Control shaft |
| ㉗ Reverse shift fork | ㉞㉟ Shift & select shaft No. 1 |
| ㉘ Gear shift head No. 1 | ㉟㊱ Control shaft boot |
| ㉙ T/M case assy | ㊱㊲ T/M shift lever assy (A: Bush) |
| ㊱ Oil seal | ㊲㊳ T/M control shift knob |
| ㊳ Gasket | ㊳㊴ Snap ring |
| ㊴ Bearing front retainer | ㊴㊵ T/M shift lever ball seat |
| ㊵ Synchronesh shifting key (3 pieces) | ㊵㊶ Shift lever retainer S/A |
| ㊶ Synchronizer ring No. 3 | ㊶㊷ Shift lever outer |
| ㊷ Synchronesh shifting key spring | ㊷㊸ Slotted spring pin |
| ㊸ Reverse gear | ㊸㊹ Gear shifting lever shaft |
| ㊹ T/M clutch hub No. 1 | ㊹㊺ 5th shift fork |
| ㊺ 2nd gear | ㊺㊻ 5th shift arm |
| ㊻ Needle roller bearing | ㊻㊼ 2way |
| ㊼ 1st gear bearing inner race | ㊼㊽ Oil seal |
| ㊽ Output shaft | ㊽㊾ Radial ball bearing |
| ㊾ 3rd gear | ㊾㊿ Snap ring |
| ㊿ Hub sleeve No. 1 | ㊿① Conical spring washer |
| ① T/M clutch hub No. 2 | ①② Washer plate |
| ② Input shaft | ②③ Sub gear No. 1 |
| ③ Radial ball bearing | ③④ Transfer low speed input gear |
| ④ Synchronesh shifting key No. 2 | ④⑤ Bearing |
| ⑤ Synchronizer ring No. 2 | ④⑥ Lock nut |

INPUT SHAFT-, OUTPUT SHAFT- & COUNTERSHAFT-RELATED COMPONENTS



- | | |
|--|---|
| ① Snap ring | ③⑤ Transfer low speed input gear |
| ② Radial ball bearing | ③⑦ Bearing |
| ③ Input shaft | ③⑧ Lock nut |
| ④ Needle roller bearing | ③⑨ Oil seal |
| ⑤ Synchronizer ring No. 3 | ④⑩ Bearing |
| ⑥ Snap ring | ④⑪ Snap ring |
| ⑦ Synchronmesh shifting key spring | ④⑫ Radial ball bearing |
| ⑧ Synchronmesh shifting key No. 2 (3 pieces) | ④⑬ Counter gear |
| ⑨ Transmission clutch hub No. 2 | ④⑭ Radial ball bearing |
| ⑩ Transmission hub sleeve No. 1 | ④⑮ 5th gear thrust washer |
| ⑪ Synchronmesh shifting key spring | ④⑯ 5th gear bearing inner race |
| ⑫ Synchronizer ring No. 3 | ④⑰ Needle roller bearing |
| ⑬ 3rd gear | ④⑱ Counter shaft 5th gear |
| ⑭ Needle roller bearing | ④⑲ Synchronizer ring No. 3 |
| ⑮ Output shaft | ④⑳ Synchronmesh shifting key spring |
| ⑯ 1st gear bearing inner race | ④㉑ Synchronmesh shifting key No. 2 (3 pieces) |
| ⑰ Needle roller bearing | ④㉒ Synchronizer No. 1 hub |
| ⑱ 2nd gear | ④㉓ Transmission hub sleeve No. 2 |
| ⑲ Synchronizer ring No. 3 | ④㉔ Synchronmesh shifting key spring |
| ⑳ Synchronmesh shifting key spring | ④㉕ 5th Shifting key retainer |
| ㉑ Synchronmesh shifting key No. 1 (3 pieces) | ④㉖ Conical spring washer |
| ㉒ Transmission clutch hub No. 1 | ④㉗ Lock nut |
| ㉓ Reverse gear | ④㉘ Gear shifting lever shaft |
| ㉔ Synchronmesh shifting key spring | ④㉙ 5th shift fork |
| ㉕ Synchronizer ring No. 2 | ④㉚ Slotted pin |
| ㉖ 1st gear | ④㉛ Reverse idle gear S/A |
| ㉗ Needle roller bearing | ④㉜ Reverse idle gear shaft |
| ㉘ 1st gear bearing inner race | ④㉝ Reverse shift arm |
| ㉙ 1st gear bearing inner race No. 2 | ④㉞ Gasket |
| ㉚ 1st gear thrust washer | ④㉟ Bolt |
| ㉛ Radial ball bearing | ④㊱ 5th shift arm |
| ㉜ Snap ring | ④㊲ Gasket |
| ㉝ Conical spring washer | ④㊳ Bolt |
| ㉞ Washer plate | |
| ㉟ Sub gear No. 1 | |

TRANSMISSION DISASSEMBLY

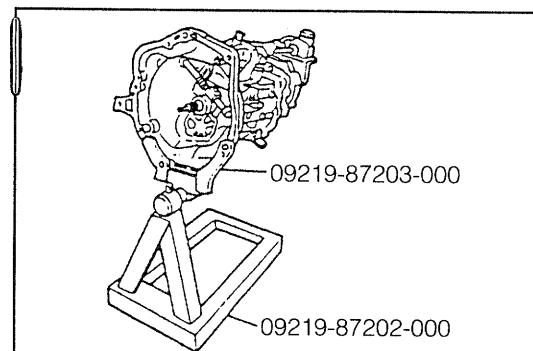
1. Install the transmission assembly with transfer on the over-haul stand using the following SSTs.

SST: 09219-87202-000

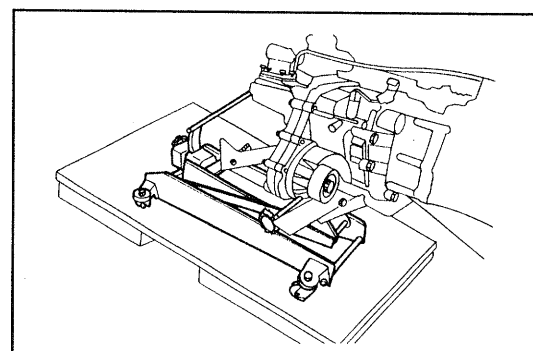
09219-87203-000

As for the removal of transmission assembly with transfer, see page MT-16 to MT-20.

2. Place wooden plates or any other suitable materials on the overhauling stand, as shown in the diagram at right.
3. Support the transfer front and transfer rear case with a transmission jack.

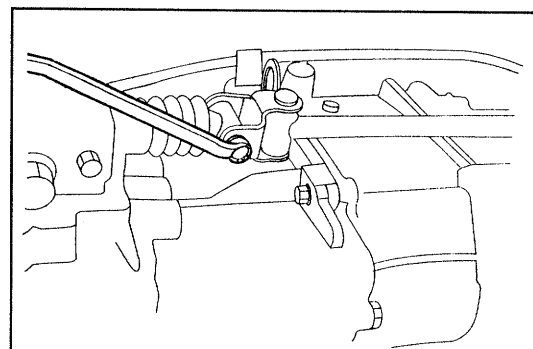


WRU92-MT493



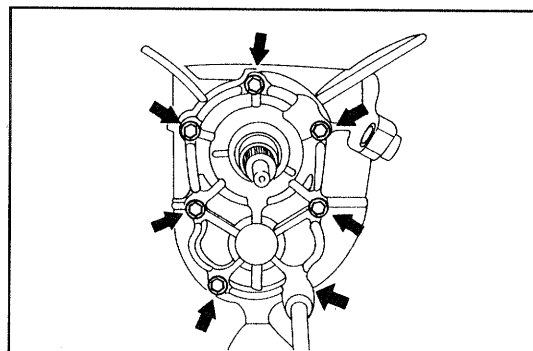
WRU90-MT114

4. Remove the control shaft with installed the shift lever retainer subassembly by removing the hexagon bolt.



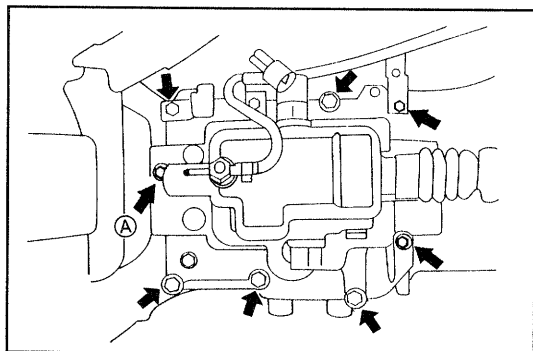
WRU90-MT115

5. Remove the clutch release bearing and related parts. (Refer CL-section.)
6. Remove the front bearing retainer by removing the seven bolts.



WRU90-MT116

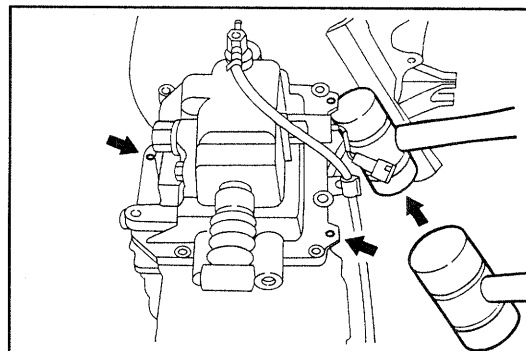
7. Remove the transmission case cover subassembly by removing the seven bolts and a reamer bolt (A).



WRU90-MT117

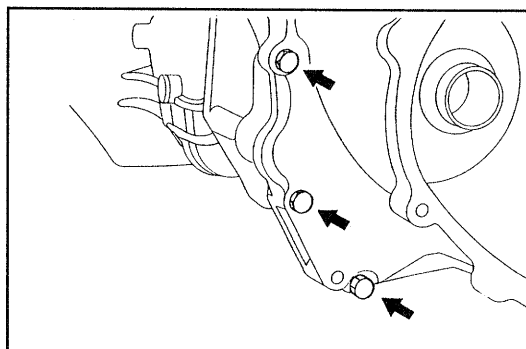
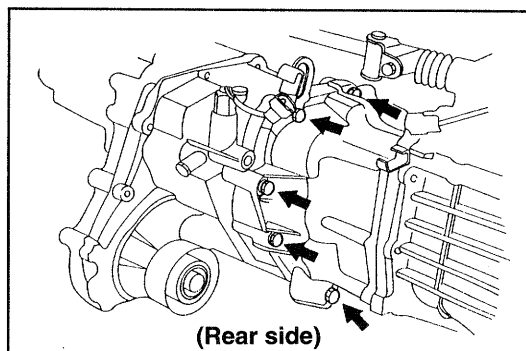
MANUAL TRANSMISSION

8. Disconnect the breather hose by detaching a clip.
9. Remove the transmission case cover subassembly by lightly tapping each of the ribs evenly toward the upper side of the transmission case.



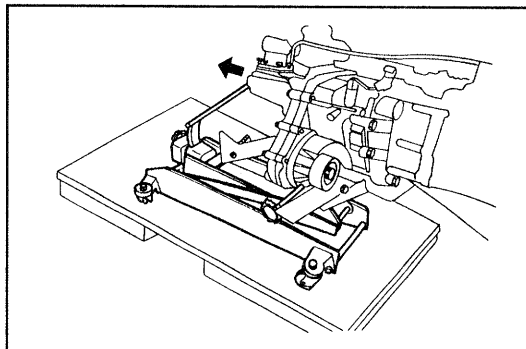
WRU90-MT118

10. Remove the eight bolts that hold the transfer front case and the transfer adapter together.



WRU90-MT119

11. Pull out the transfer front case subassembly toward you.



WRU90-MT120

12. Interlock the first and third gears.

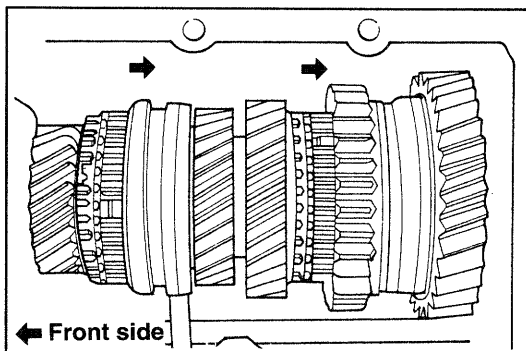
NOTE:

- Measure the following section, prior to an interlock.

Specified Value:

Unit: mm (inch)

	1st	2nd	3rd	4th
Gear backlash	0.05 - 0.18 (0.0019 - 0.0070)	0.05 - 0.16 (0.0019 - 0.0062)	0.05 - 0.14 (0.0019 - 0.0055)	0.05 - 0.13 (0.0019 - 0.0051)
Thrust clearance	0.17 - 0.30 (0.0067 - 0.011)	0.10 - 0.37 (0.0039 - 0.014)	0.10 - 0.33 (0.0039 - 0.013)	

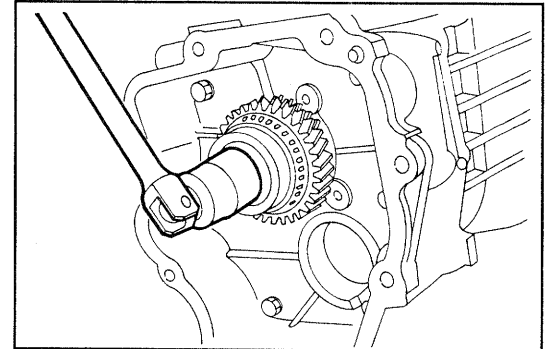


WRU90-MT121

13. Raise the lock section of the lock nut of the transfer lower speed input gear. Remove the lock nut.

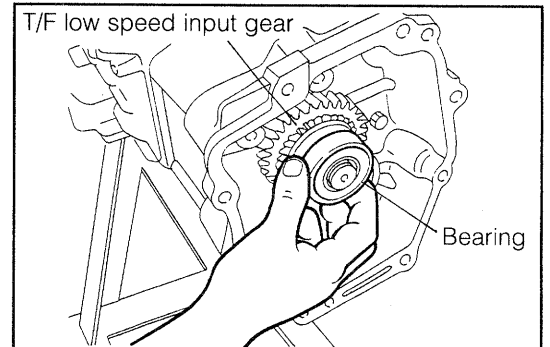
NOTE:

- Never use the impact wrench.
- The radial ball bearing seal face may be avoided from the damage.
- Never reuse the removed lock nut.



WRU90-MT122

14. Remove the bearing and transfer lower speed input gear. (As for the inspection for the removed parts. See page MT-35.)

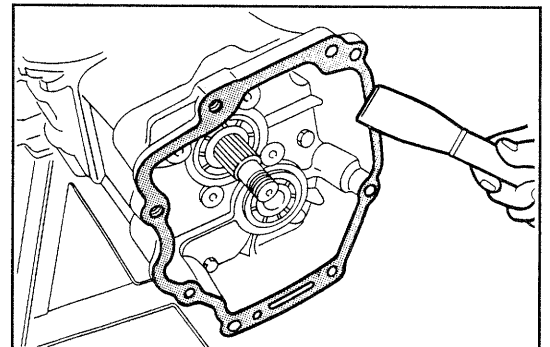


WRU92-MT494

15. Remove the gasket on the transfer adapter with a gasket scraper.

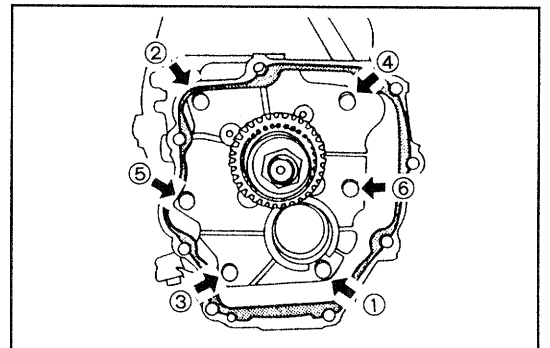
NOTE:

- Remove the gasket on the transmission case attaching surface of the transfer adapter, using a gasket scraper. Be very careful not to scratch the attaching surface.



WRU90-MT124

16. Remove the transfer adapter by removing the six bolts with installed the radial ball bearing and oil seal.



WRU90-MT125

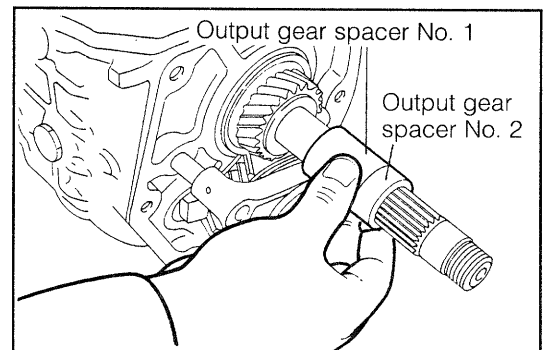
17. Remove the output gear spacer No. 1 and output gear spacer No. 2.

NOTE:

- Measure the backlash and thrust clearance of the 5th gear.

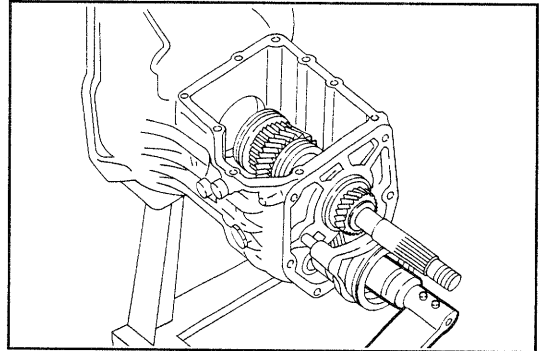
Unit: mm (inch)

Backlash	0.05 - 0.13 (0.0019 - 0.0051)
Thrust clearance	0.11 - 0.30 (0.0039 - 0.011)



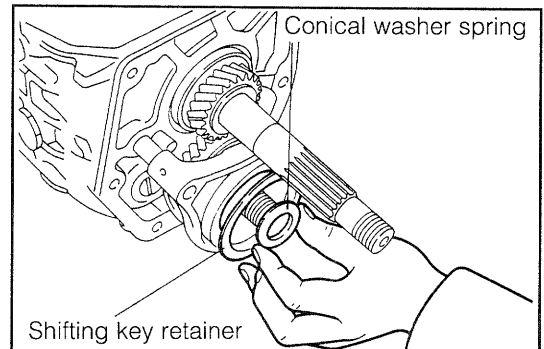
WRU90-MT126

18. Raise the lock section of the lock nut of the countershaft 5th gear.
19. Remove the lock nut of the countershaft 5th gear.
NOTE:
 - Never reuse the removed lock nut.



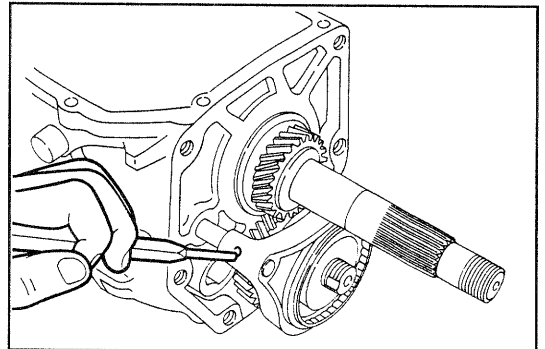
WRU90-MT127

20. Remove the conical washer spring and shifting key retainer.



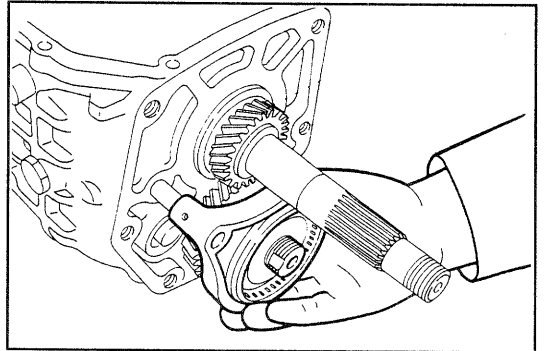
WRU90-MT128

21. Drive off the slotted pin of the 5th shift fork.
NOTE:
 - Never reuse the removed slotted pin.



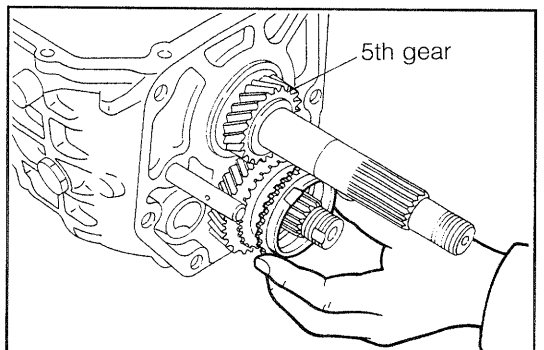
WRU90-MT129

22. Remove the 5th shift fork together with synchronizer hub sleeve in a set.



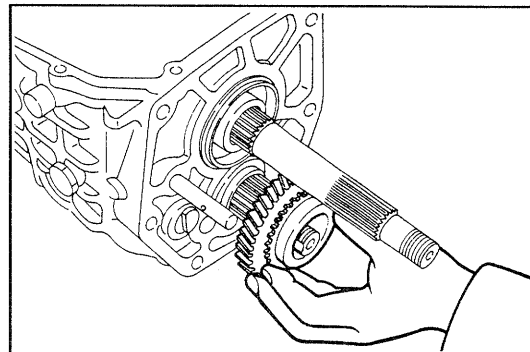
WRU90-MT130

23. Remove the synchronizer ring and 5th gear.



WRU90-MT131

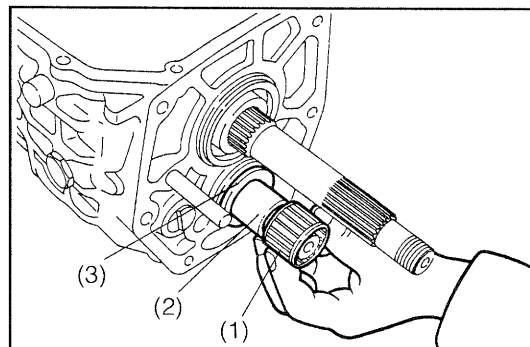
24. Remove the countershaft 5th gear.



WRU90-MT132

25. Remove the following parts from the countershaft.

- (1) Needle roller bearing
- (2) 5th gear bearing inner race
- (3) 5th gear thrust washer

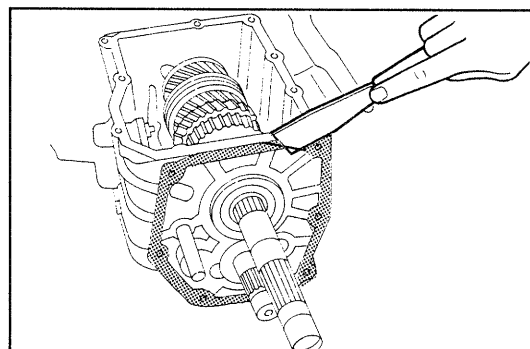


WRU90-MT133

26. Remove the liquid gasket from the transmission case, using a gasket scraper.

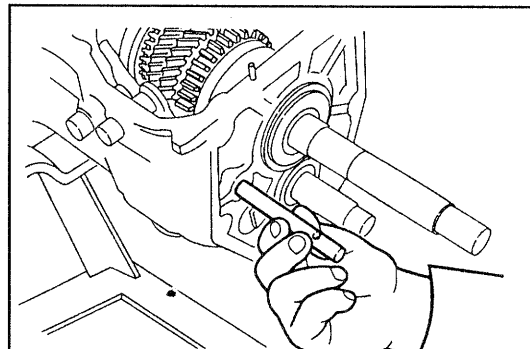
NOTE:

- Be very careful not to scratch the transmission case during the removal.



WRU90-MT134

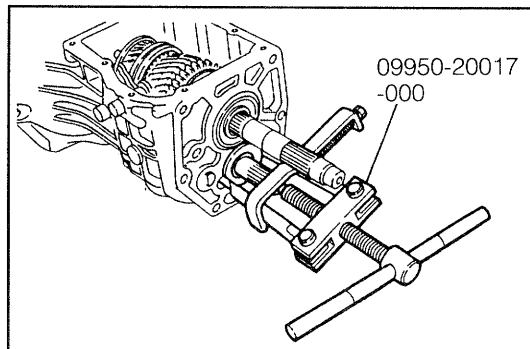
27. Remove the gear shifting lever shaft.



WRU90-MT135

28. Remove the countershaft rear bearing, using the following SST.

SST: 09950-20017-000

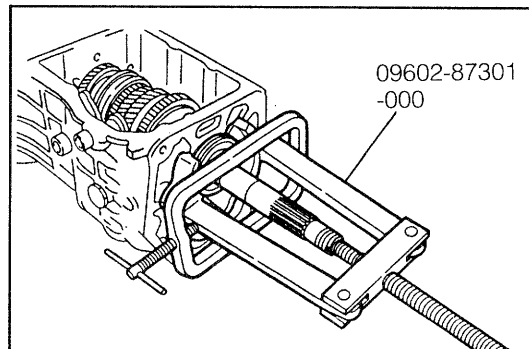


WRU90-MT136

MANUAL TRANSMISSION

29. Detach the stop ring of the output shaft bearing. Remove the output shaft bearing, using the following SST.

SST: 09602-87301-000



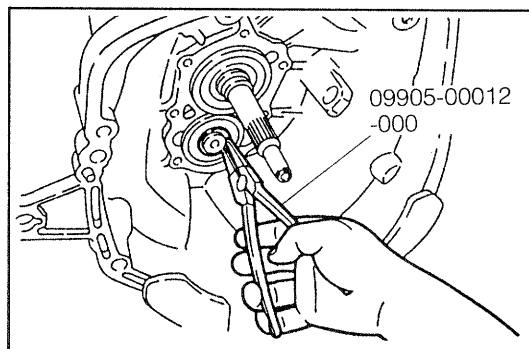
WRU90-MT137

30. Detach the snap ring of the countershaft, using the following SST.

SST: 09905-00012-000

NOTE:

- Never reuse the removed snap ring.



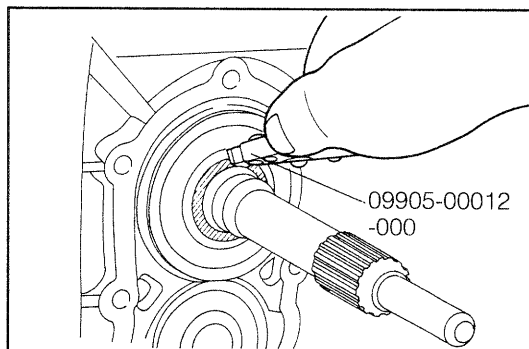
WRU90-MT138

31. Detach the snap ring of the input shaft, using the following SST.

SST: 09905-00012-000

NOTE:

- Never reuse the removed snap ring.



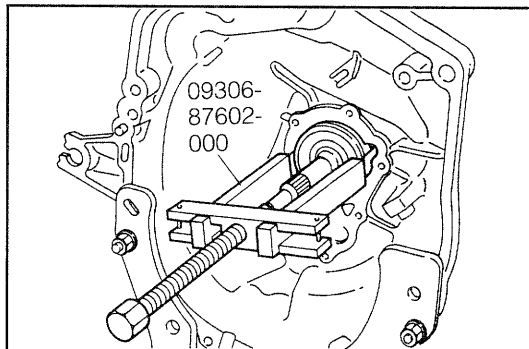
WRU90-MT139

32. Remove the input shaft bearing, using the following SST.

SST: 09306-87602-000

NOTE:

- Detach the stop ring, prior to remove the bearing.



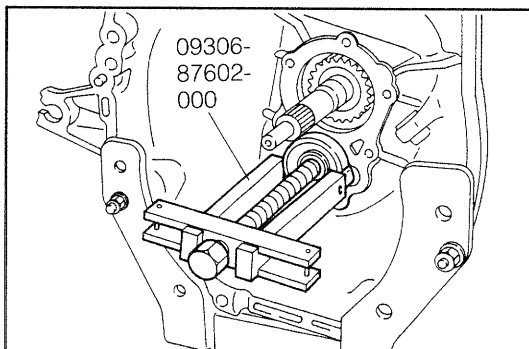
WRU90-MT140

33. Remove the bearing of the countershaft at the clutch side, using the following SST.

SST: 09306-87602-000

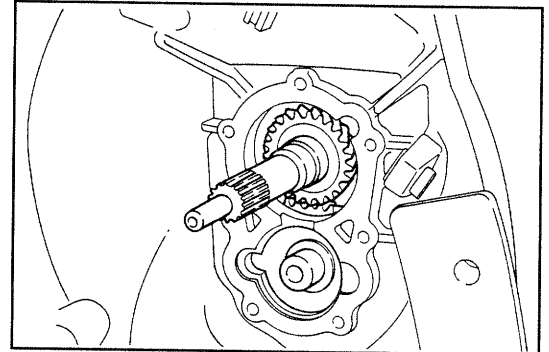
NOTE:

- Push out the bearing by tapping the countershaft at the output shaft side, using a plastic hammer.
- Detach the stop ring, prior to remove the bearing.



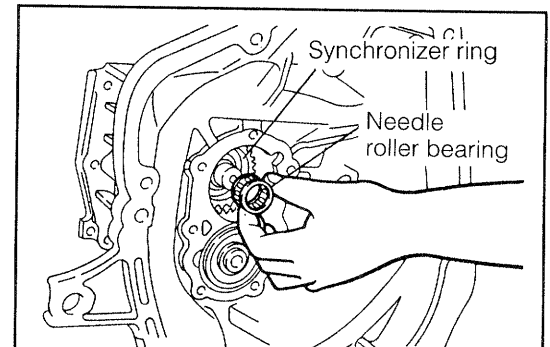
WRU90-MT141

34. Remove the input shaft.
(As for the inspection procedures for each section, see page MT-37.)



WRU92-MT495

35. Remove the needle roller bearing and synchronizer ring.
(As for the inspection on the removed parts, see page MT-37.)

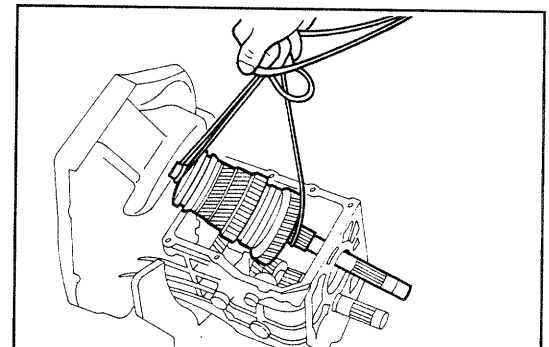


WRU92-MT496

36. Remove the output shaft assembly.
(As for the disassembly, inspection and assembly for the removed parts, see page MT-32.)

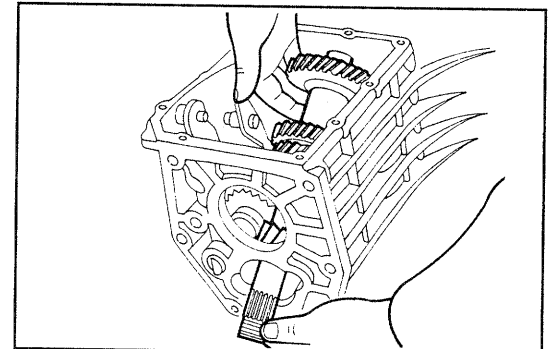
NOTE:

- It is recommended that as shown in the diagram at right, an operation rope (about 3 mm in outside diameter) be used to remove the output shaft assembly from the transmission case assembly.



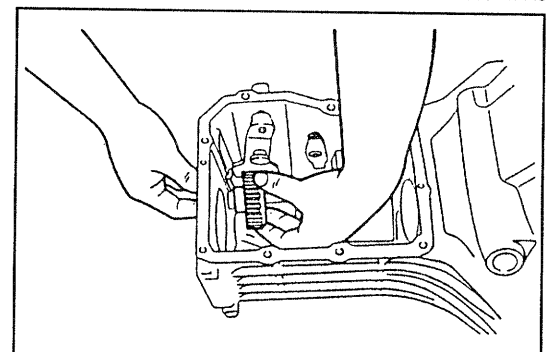
WRU92-MT497

37. Remove the countershaft from the transmission case.



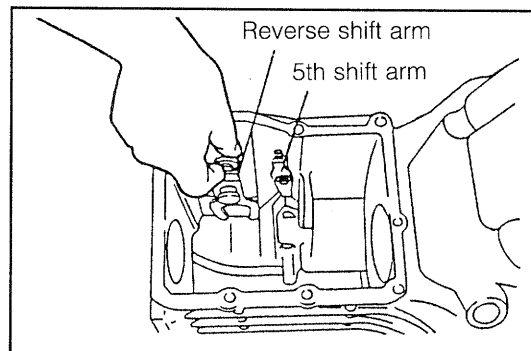
WRU90-MT145

38. Remove the reverse idler gear and reverse idler gear shaft.



WRU90-MT146

39. Remove the reverse shift arm and 5th shift arm.

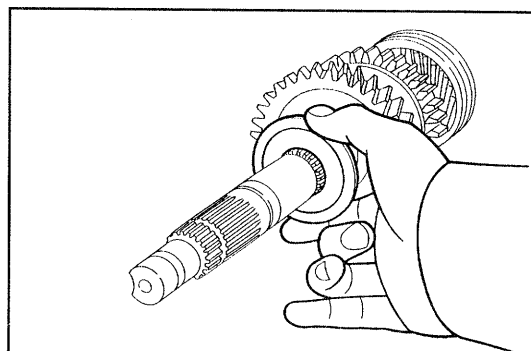


WRU90-MT147

TRANSMISSION OUTPUT SHAFT

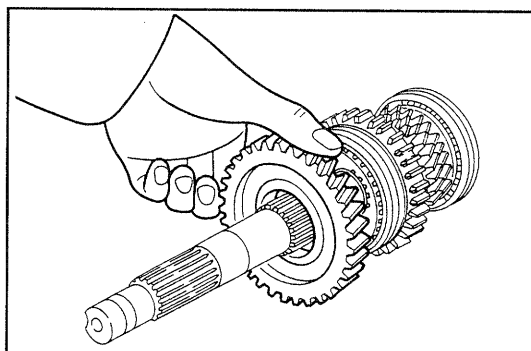
DISASSEMBLY

1. Remove the 1st gear thrust washer.



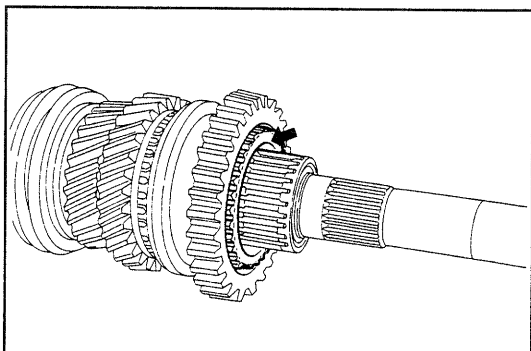
WRU90-MT148

2. Remove the 1st gear.



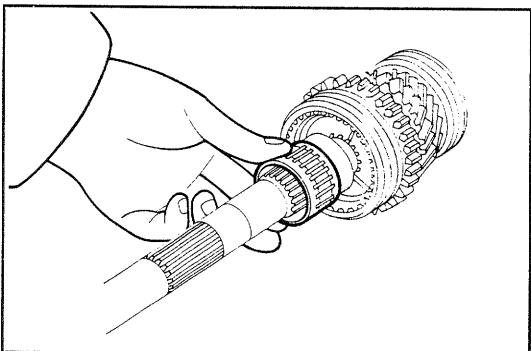
WRU90-MT149

3. Remove the synchronizer ring No. 2.



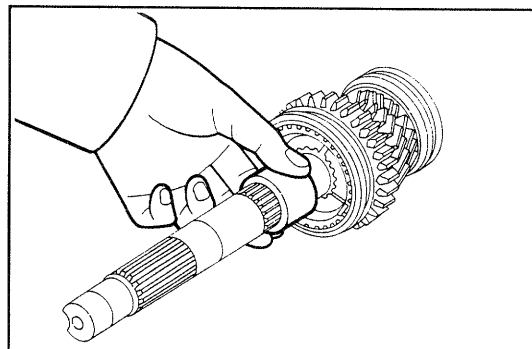
WRU90-MT150

4. Remove the needle roller bearing.



WRU90-MT151

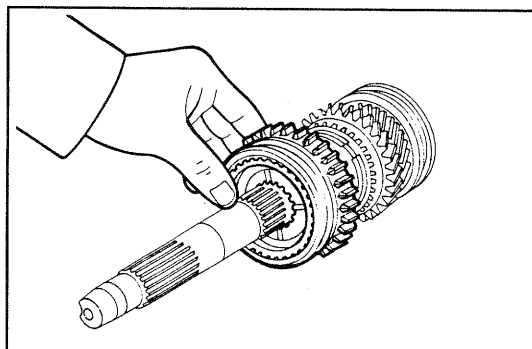
5. Remove the 1st gear bearing inner race.



WRU90-MT152

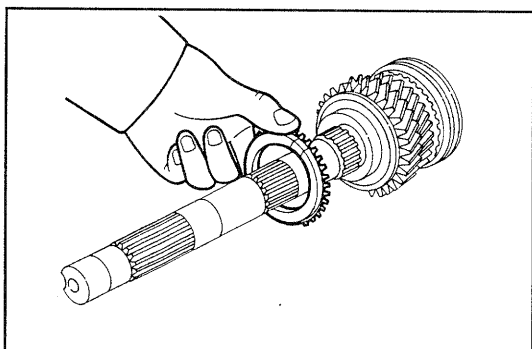
6. Remove the reverse gear with installed the following parts in a set.

- (1) Transmission clutch hub No. 1
- (2) Synchromesh shifting key spring
- (3) Synchromesh shifting key



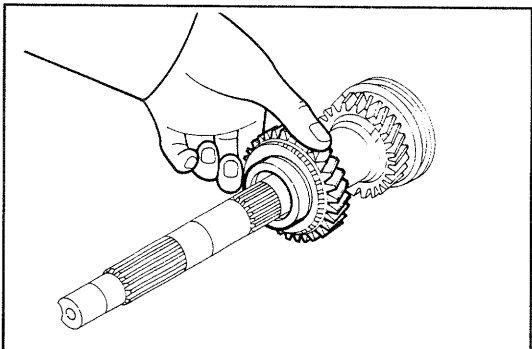
WRU90-MT153

7. Remove the synchronizer ring.



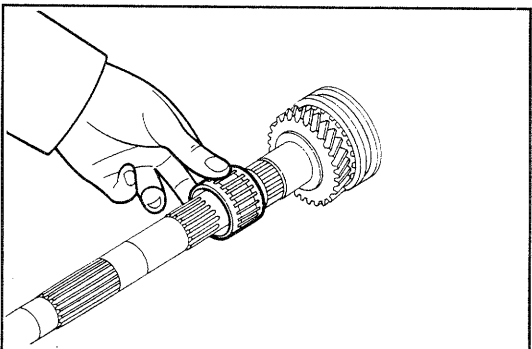
WRU90-MT154

8. Remove the 2nd gear.



WRU90-MT155

9. Remove the needle roller bearing.

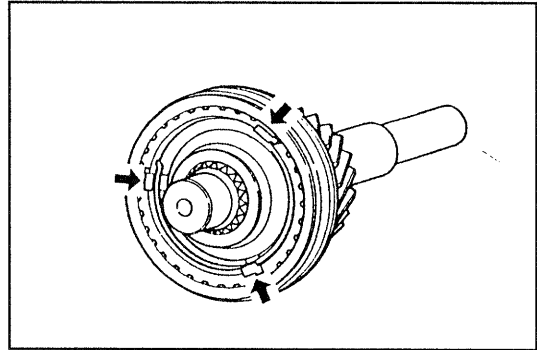


WRU90-MT156

10. Remove the following parts.
- (1) Transmission hub sleeve No. 1
 - (2) Synchromesh shifting key spring (1 piece)
 - (3) Synchromesh shifting key (3 pieces)

NOTE:

- Make sure that an axial clearance of transmission clutch hub No. 2 should be measured, prior to assembly the above parts (See page MT-43).

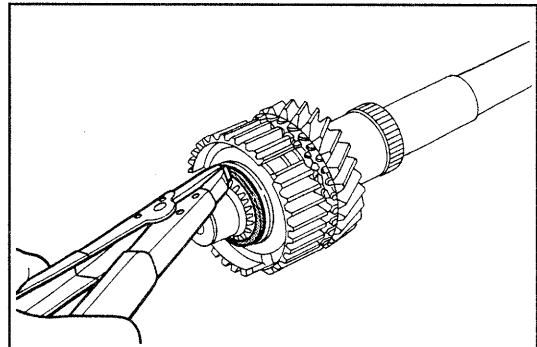


WRU92-MT498

11. Detach the snap ring.

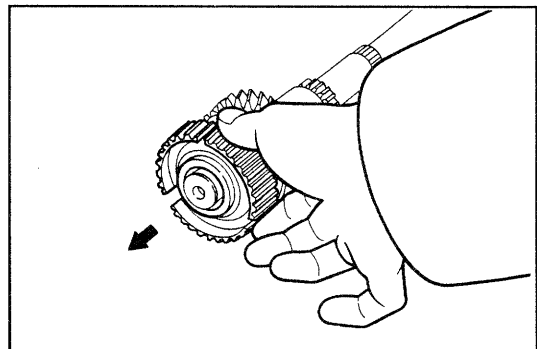
NOTE:

- Never reuse the removed snap ring.



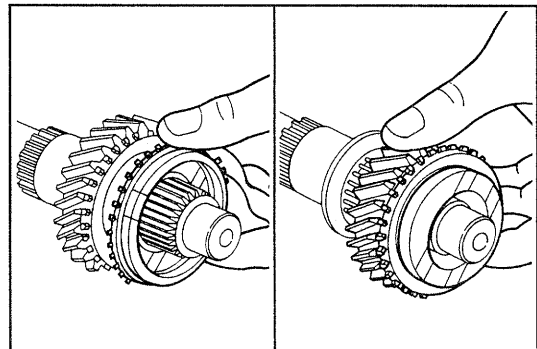
WRU90-MT158

12. Remove the following parts in a set
- (1) Transmission clutch hub No. 2.
 - (2) Synchromesh shifting key spring (1 piece)



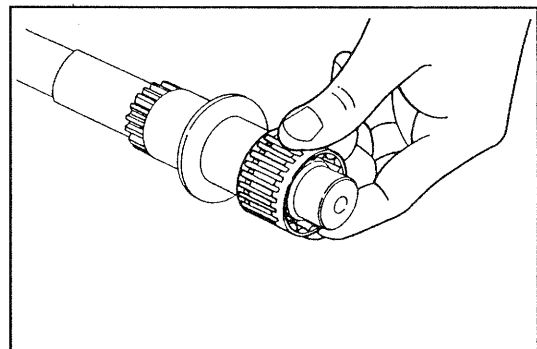
WRU90-MT159

13. Remove the synchronizer ring No. 3 and 3rd gear.



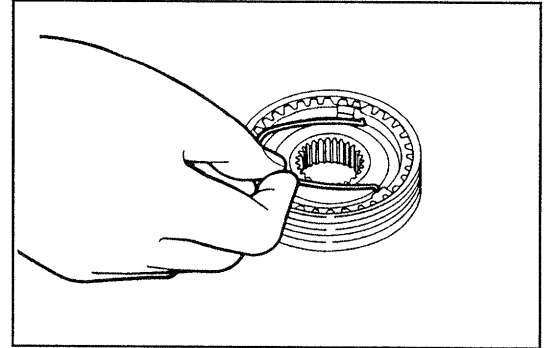
WRU90-MT160

14. Remove the needle roller bearing.



WRU90-MT161

15. Remove the synchromesh shifting key spring and synchromesh shifting key from the following transmission clutch hub sleeve No. 1, No. 2 and hub sleeve.



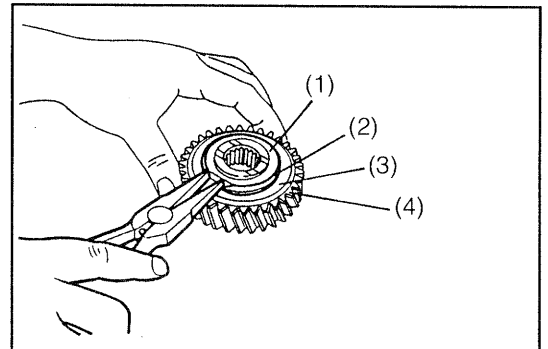
WRU90-MT162

TRANSFER ADAPTER

DISASSEMBLY

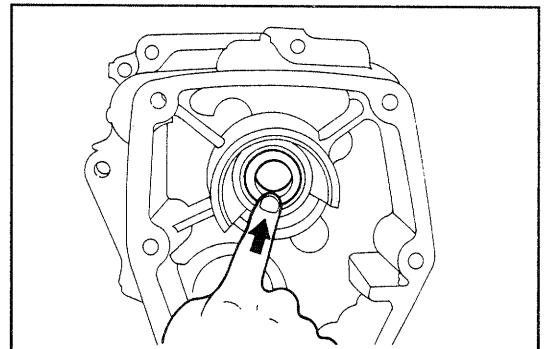
1. Remove the following parts of the transfer low speed input gear in this sequence.

- (1) Snap ring
- (2) Conical spring
- (3) Washer plate
- (4) Sub gear No. 1



WRU90-MT163

2. Remove the bearing of the transmission output shaft of the transfer adapter by pushing the output gear spacer No. 2 to the transfer front case side.



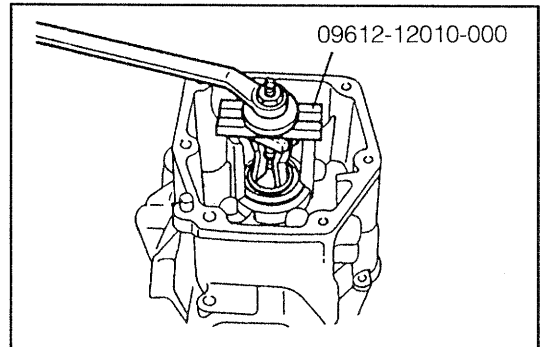
WRU90-MT164

3. Remove the oil seal of the transmission output shaft, using the following SSTs.

SST: 09612-12010-000

NOTE:

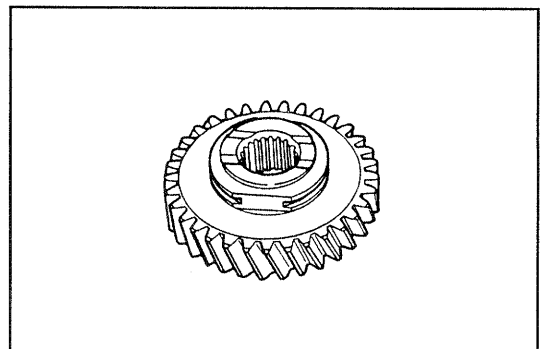
- Never reuse the removed oil seal.



WRU90-MT165

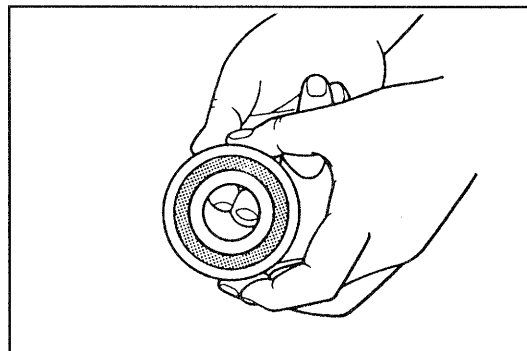
INSPECTION

1. Check the transfer low speed input gear for wear or damage.



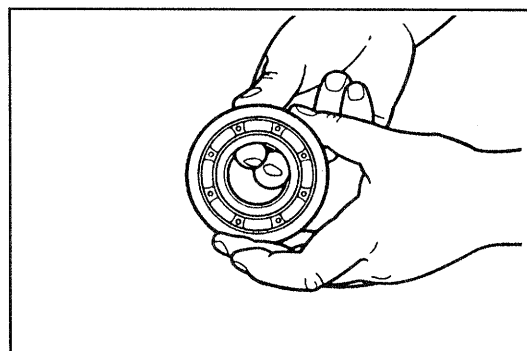
WRU90-MT166

2. Rotate the bearing inner race of the following parts by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any binding.
 - (1) Transmission input shaft and out put shaft rear
 - (2) Transmission counter front



WRU90-MT167

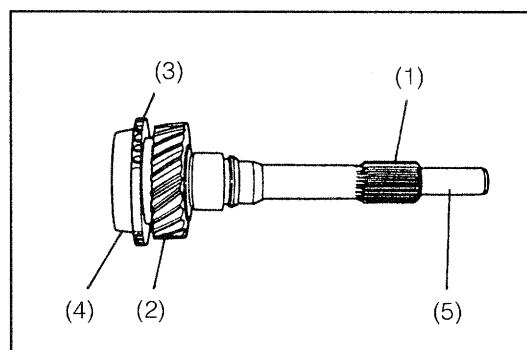
3. Rotate the bearing inner race of the following parts by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any binding.
 - (1) Transfer counter gear of the transfer adapter.
 - (2) Transmission output shaft of the transfer adapter.



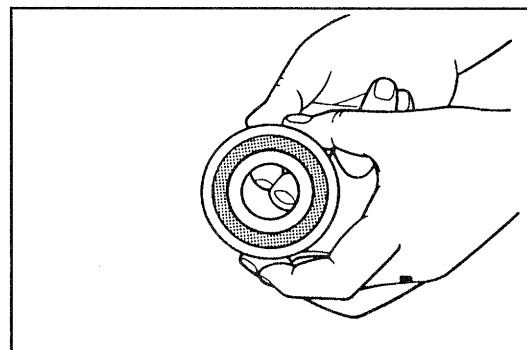
WRU90-MT168

INPUT SHAFT

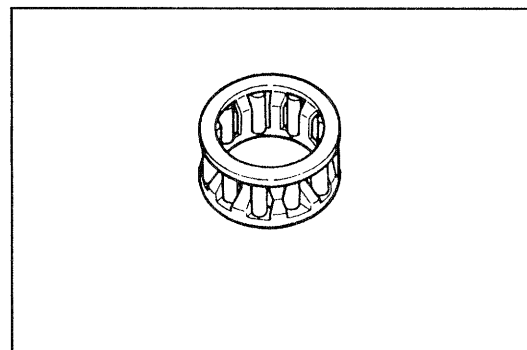
1. Check the input shaft for the following items.
 - (1) Spline section for damage
 - (2) Gear for damage and wear
 - (3) Engaging section of hub sleeve for damage
 - (4) Tapered section for wear or damage
 - (5) Race section of roller bearing for wear or damage
2. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any sticking.
3. Check the needle roller bearing for wear or damage.



WRU90-MT169



WRU90-MT170



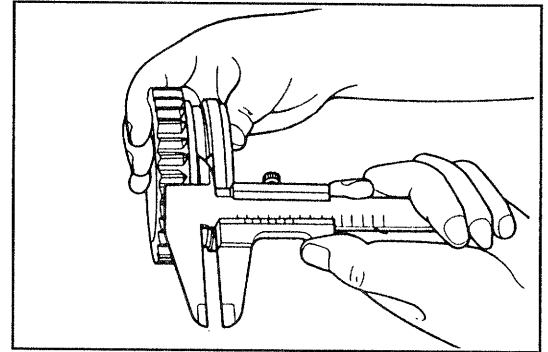
WRU90-MT171

HUB SLEEVE, SYNCHRONIZER RING & GEARS

1. Measure the contact width of the reverse gear with the shift fork, using vernier calipers.

mm (inch)

Item	Specified value	Allowable limit
Part name		
Reverse gear	7.05 - 7.12 (0.278 - 0.280)	7.3 (0.287)

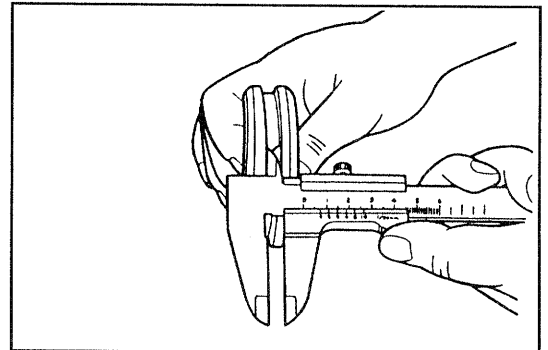


WRU90-MT172

2. Measure the contact width of the transmission hub sleeve with the shift fork, using vernier calipers.

mm (inch)

Item	Specified value	Allowable limit
Part name		
Transmission hub sleeve	7.05 - 7.12 (0.278 - 0.280)	7.3 (0.287)

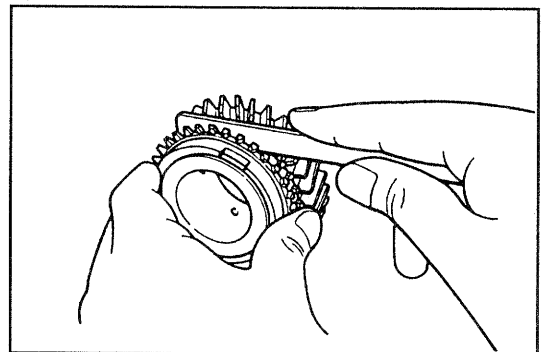


WRU90-MT173

3. Measure the clearance between each gear and the synchronizer ring, using a thickness gauge.

mm (inch)

Item	Specified value	Allowable limit
Measuring point		
1st gear 2nd gear 3rd gear 4th gear 5th gear	0.85 - 1.45 (0.0335 - 0.0571)	0.5 (0.0197)



WRU90-MT174

NOTE:

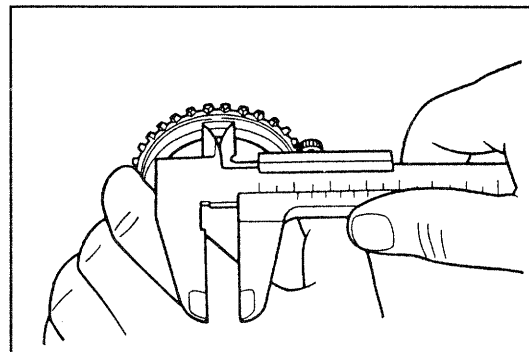
- The measurement should be performed at several points for each gear. The minimum value is regarded as the clearance for the said gear.

MANUAL TRANSMISSION

4. Measure the contact width of each synchronizer ring with the synchromesh shifting key, using vernier calipers. Replace the synchronizer ring which does not conform to the specifications with a new one.

mm (inch)

Measuring point \ Item	Specified value
1st gear	9.9 - 10.1 (0.3898 - 0.3976)
2nd gear 3rd gear 4th gear 5th gear	11.3 - 11.5 (0.4449 - 0.4528)



WRU90-MT175

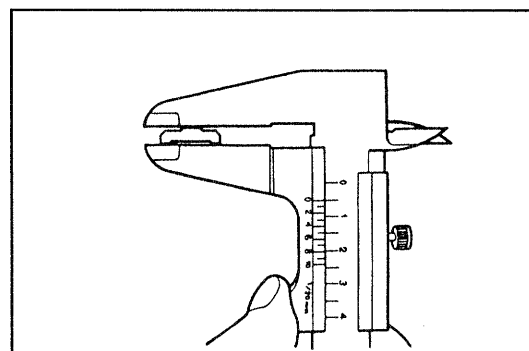
NOTE:

- The measurement should be performed at three points for each synchronizer ring. The maximum value is regarded as the contact width for the said ring.

5. Measure the height of each synchromesh shifting key, using vernier calipers.

mm (inch)

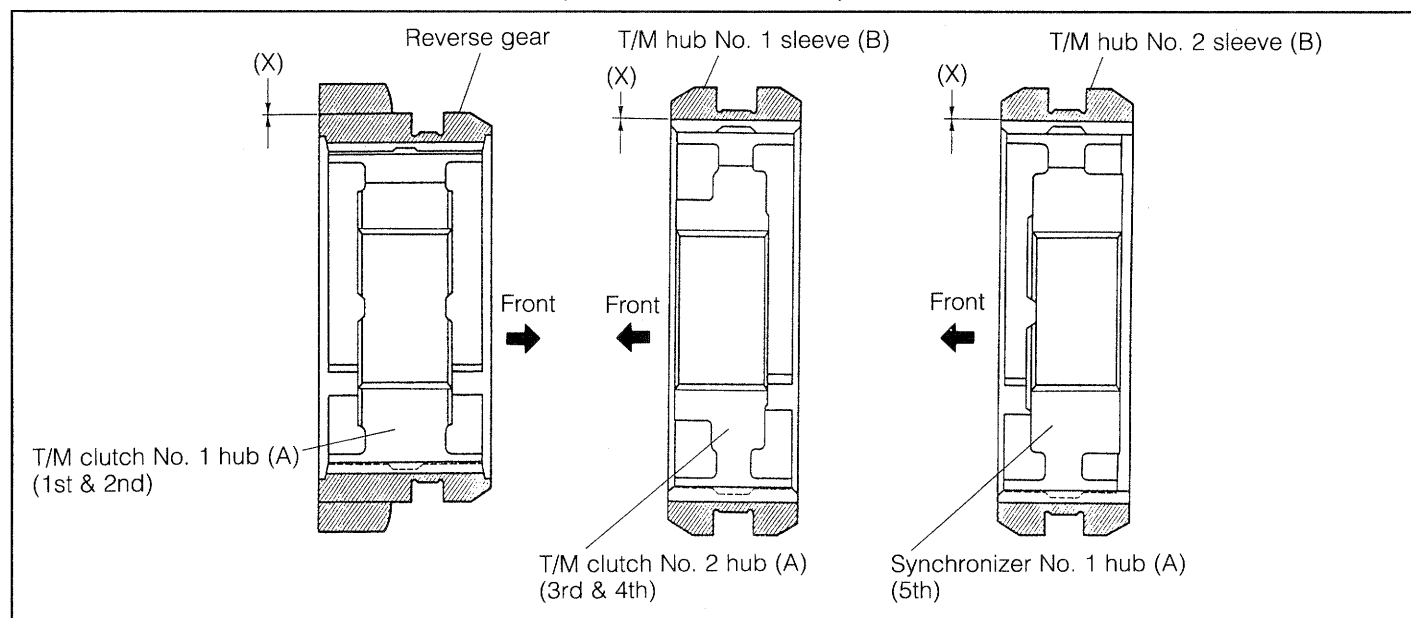
Measuring point \ Item	Specified value	Allowable limit
1st & 2nd gears 3rd & 4th gears 5th gear	5.0 - 5.2 (0.1969 - 0.2047)	4.7 (0.1850)



WRU90-MT176

6. Measure the dimension (A) and (B) of the followings parts. Make sure that the clearance (X) between this hubs and sleeves may confirm to the specification.

Specified Valve: 0.03 - 0.19 mm (0.0012 - 0.0075 inch)



WRU90-MT177

7. The outer diameter dimension of the (A) above parts has been machined in accordance with the bore dimension of the (B) parts. If either part exceeds the specified value above, be certain to replace them as a set.

CAUTION:

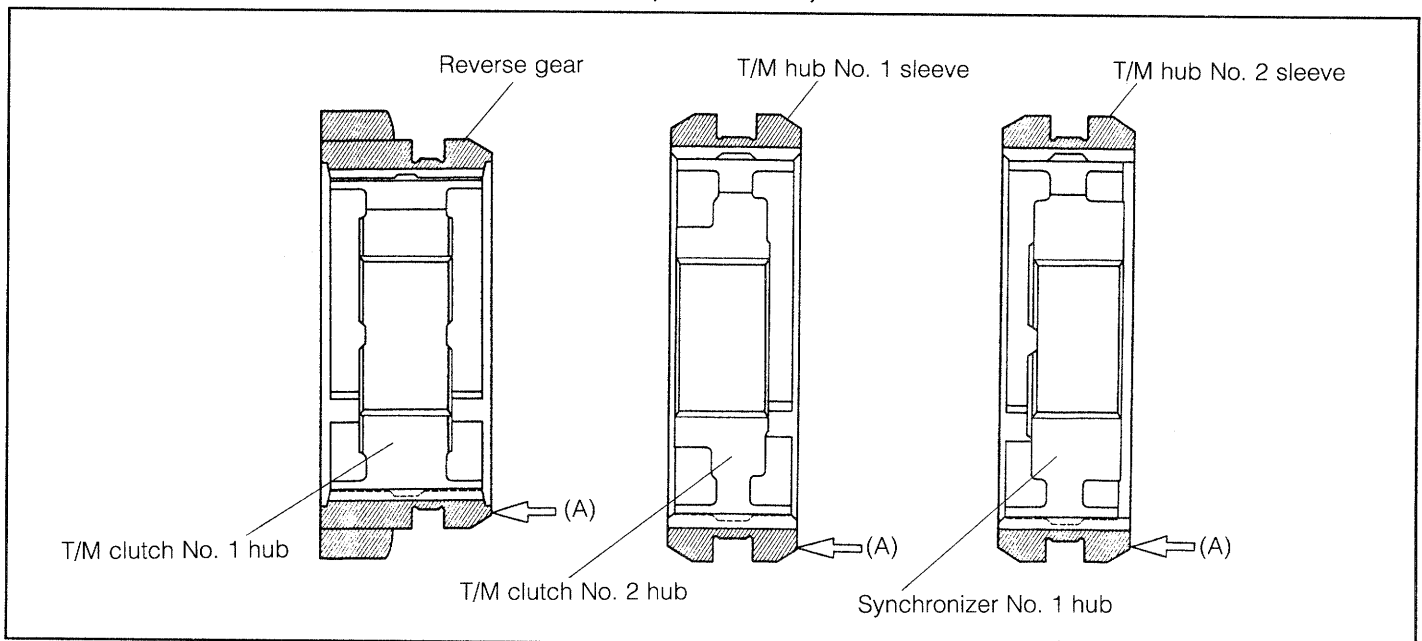
- If either part which has been exceeded the the specified value should be used against this caution, it would cause slipping-out of gear and or emanation of abnormal noise.

Units: mm (inch)

	Outer dimension	Classification No.		Bore dimension
T/M clutch No. 1 hub	69.78 - 69.84 (2.747 - 2.749)	2	Reverse gear	69.871 - 69.97 (2.750 - 2.754)
T/M clutch No. 2 hub	69.68 - 69.74 (2.743 - 2.745)	1	T/M hub No. 1 sleeve	69.971 - 69.87 (2.754 - 2.750)
Synchronizer No. 1 hub	69.58 - 69.64 (2.739 - 2.741)	3	T/M hub No. 2 sleeve	69.67 - 69.77 (2.742 - 2.746)

WRU90-MT178

8. With the sleeves assembled to the hubs, measure the tilt width at the section (A) of the sleeves.
Specified Value: Not to exceed 0.5 mm (0.0197 inch)

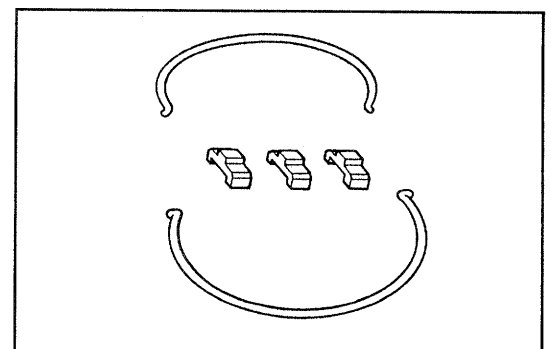


NOTE:

- If the tilt width of the sleeves exceeds the above specified value, be certain to replace those parts as a set.

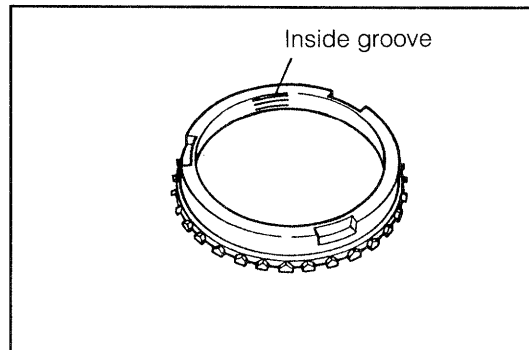
WRU90-MT179

9. Check the synchromesh shifting key and synchromesh shifting key spring for evidence of wear or damage.



WRU90-MT180

10. Check the inside groove of the synchronizer ring for wear or damage.

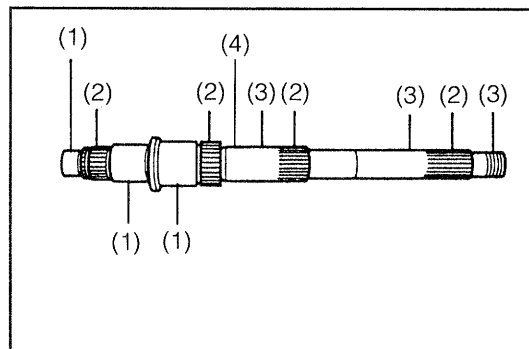


WRU90-MT181

OUTPUT SHAFT

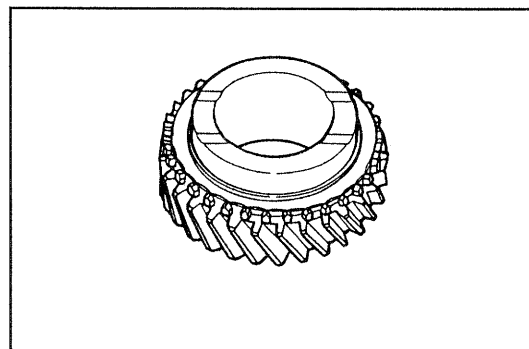
1. Check the output shaft for the following items.
 - (1) Needle roller bearing race section for wear or damage
 - (2) Spline section for damage
 - (3) Fitting section of bearing inner race for wear
 - (4) Measure the runout of the output shaft, using a dial gauge and V-block.

Allowable Runout Limit: 0.05 mm (0.0020 inch)



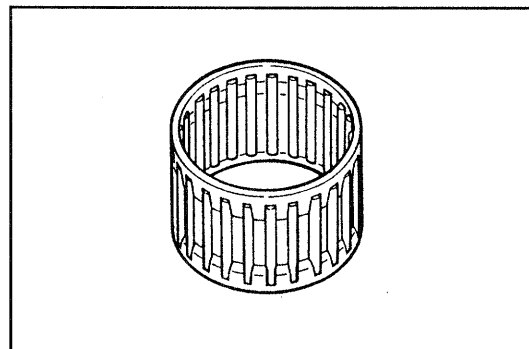
WRU90-MT182

2. Check the gear section of each gear for damage or abnormal wear.



WRU90-MT183

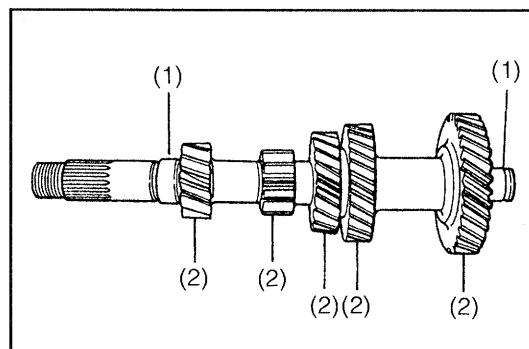
3. Check each needle roller bearing for damage.



WRU90-MT184

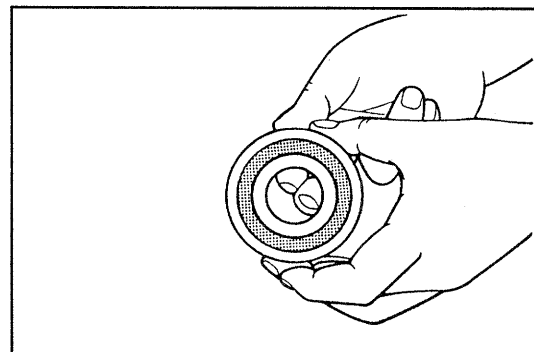
COUNTER GEAR- & REVERSE IDLER GEAR-RELATED PARTS

1. Check the transmission countershaft for the following items.
 - (1) Bearing fitting section for wear or damage
 - (2) Gear engaging section for damage or abnormal wear



WRU90-MT185

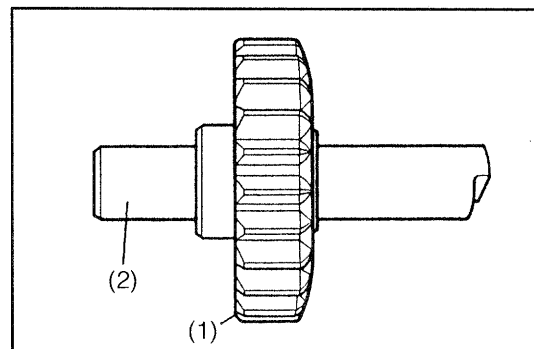
2. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any sticking.



WRU90-MT186

3. Check the reverse idler gear and reverse idler gear shaft for the following items.

- (1) Reverse gear engaging section for damage or abnormal wear
- (2) Reverse gear sliding section for damage or wear



WRU90-MT187

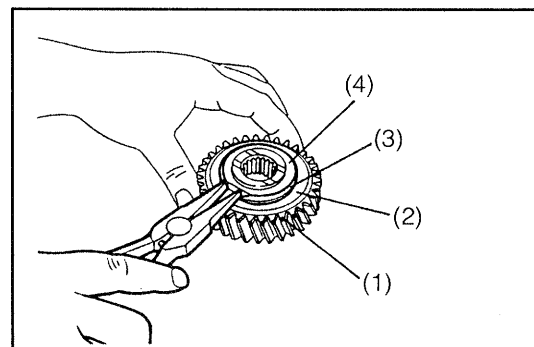
ASSEMBLY (TRANSFER ADAPTER)

1. Install the following parts to the transfer low speed input gear in this sequence.

- (1) Sub gear No. 1
- (2) Plate washer
- (3) Conical spring washer
- (4) Snap ring

NOTE:

- Never reuse the removed snap ring.
- Install the conical spring washer with its expanded side facing toward the sub gear No. 1.



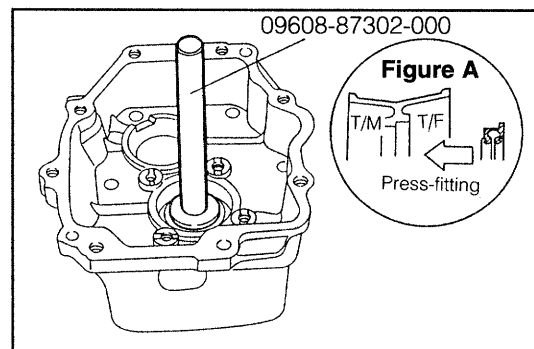
WRU90-MT188

2. Press a new oil seal from the bearing side of the transmission output shaft, using the following SST.

SST: 09608-87302-000

NOTE:

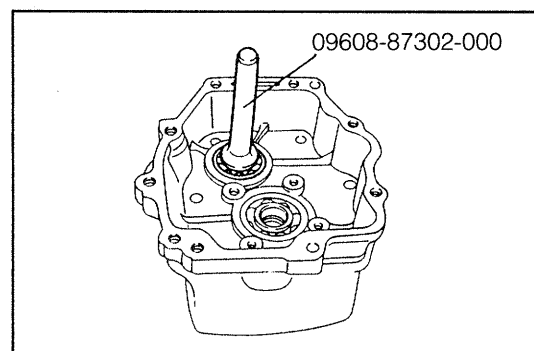
- Be sure to install the oil seal in the correct direction, as indicated in the right figure A.
- Make sure that the oil seal exhibits no tilt and the garter spring of the oil seal is not disengaged.
- Apply gear oil to the oil seal lip section, prior to press.



WRU90-MT189

3. Press the bearing of the transfer counter gear of the transfer adapter, using the following SST.

SST: 09608-87302-000



WRU90-MT190

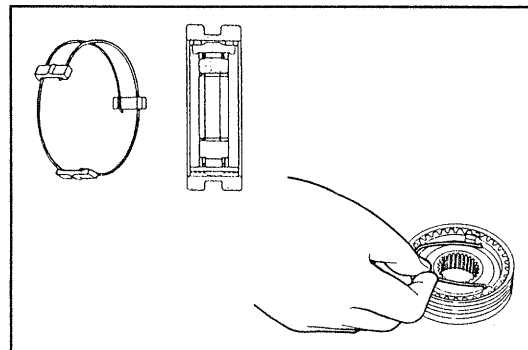
ASSEMBLY OF CLUTCH HUB

1. Assemble the selected transmission clutch hub to the following parts, using the synchromesh shifting key and synchromesh shifting key spring.

- (1) Reverse gear
- (2) Transmission hub sleeve (3rd ↔ 4th)
- (3) Transmission hub sleeve (5th)

NOTE:

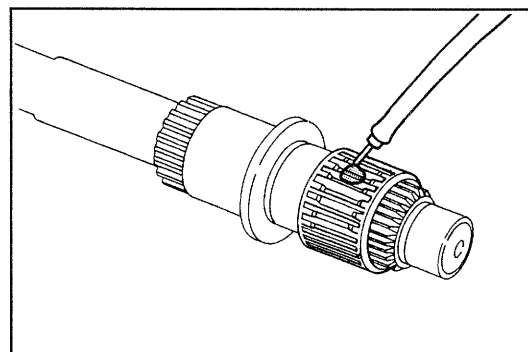
- As for the synchromesh shifting key spring, the bent sections at the front and rear should not come at the same direction, as shown in the right figure.



WRU90-MT191

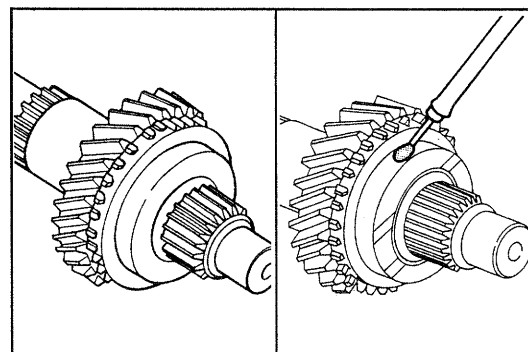
TRANSMISSION OUTPUT SHAFT ASSEMBLY

1. Apply the gear oil to the needle roller bearing and then, install to the output shaft.



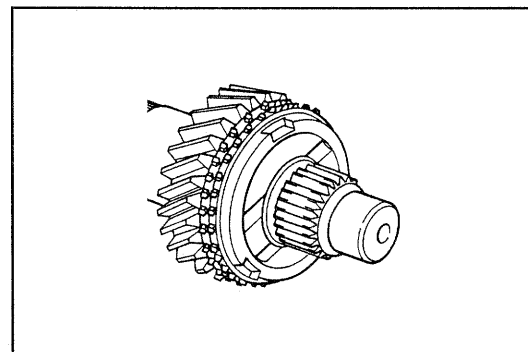
WRU90-MT192

2. Install the 3rd gear to the output shaft.
3. Apply the gear oil to the tapered section of the 3rd gear.



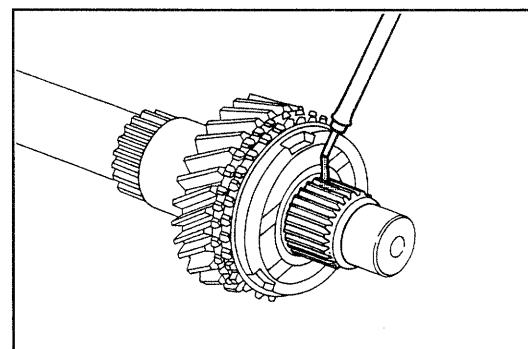
WRU90-MT193

4. Install the synchronizer ring No. 3.



WRU90-MT195

5. Apply the gear oil to the sprine section of the output shaft.



WRU90-MT196

6. Attach the new snap ring. Ensure that the clearance (A) in the right figure conforms to the specification. If it does not conform to the specification, select a suitable snap ring.

NOTE:

- Never reuse the removed snap ring.

Specification:

Not to exceed 0.1 mm (Not to exceed 0.0039 inch)

Snap Ring Availability

mm (inch)

Snap ring thickness:	2.0 (0.0787)
	2.1 (0.0827)
	2.2 (0.0666)

7. Install the transmission clutch hub No. 2 with installed the two pieces of the synchromesh shifting key spring to the output shaft.

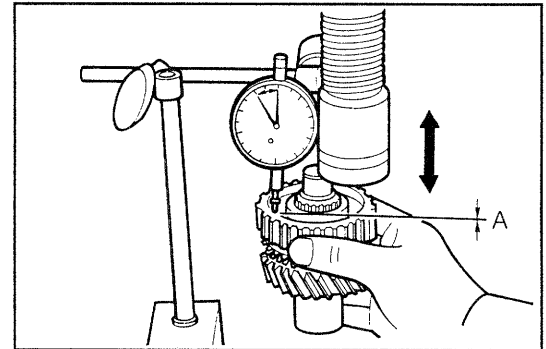
8. Install the synchromesh shifting key (three pieces) to the transmission clutch hub No. 2 and then, install the transmission clutch hub No. 2 and then, install the transmission hub sleeve No. 1.

NOTE:

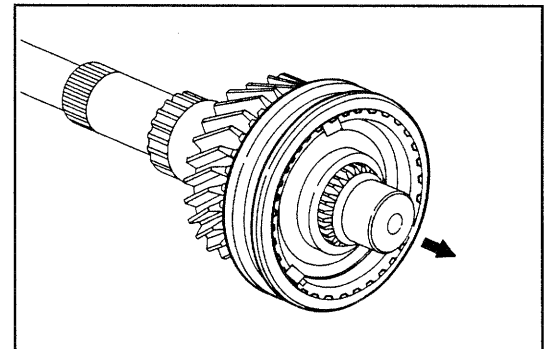
- Ensure that the groove section of the transmission hub sleeve No. 1 faces toward the input shaft.

9. Apply the gear oil to the needle roller bearing and then, install to the output shaft.

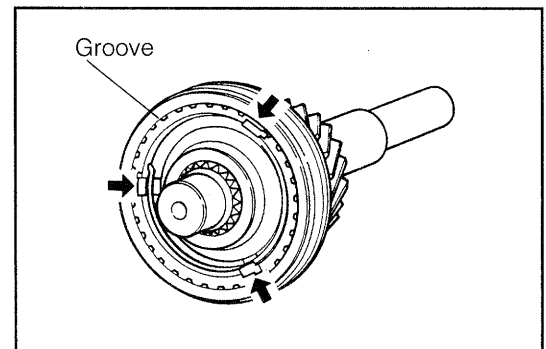
10. Apply the gear oil to the tapered section of the 2nd gear and then, install to the output shaft.



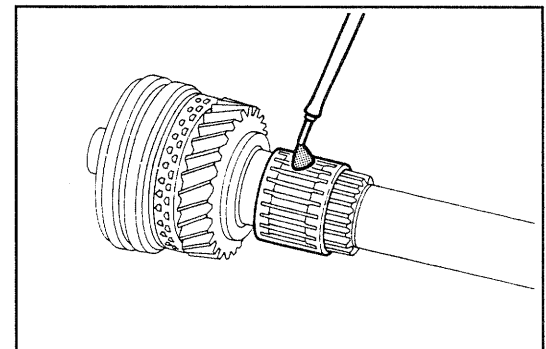
WRU90-MT194



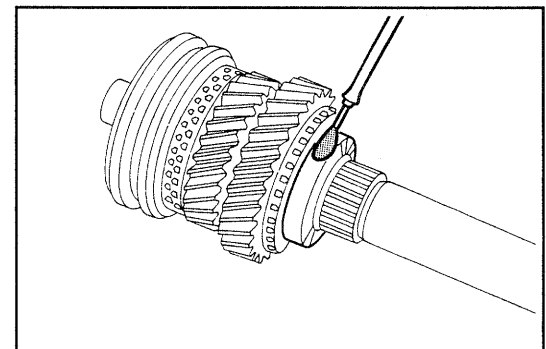
WRU90-MT197



WRU90-MT198

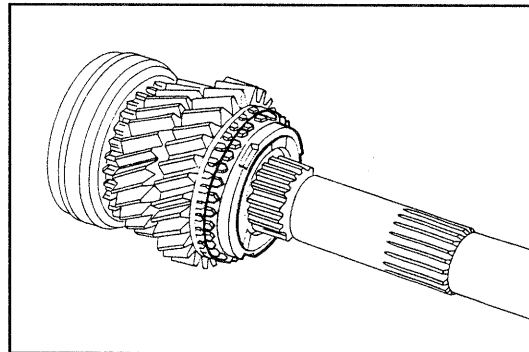


WRU90-MT199

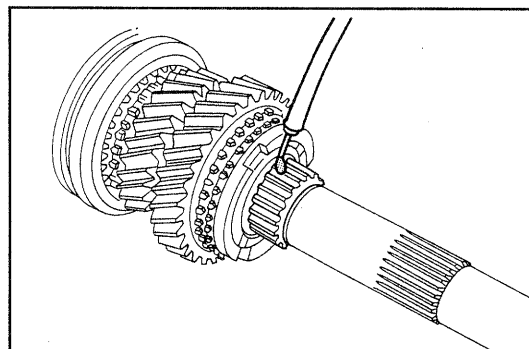


WRU90-MT200

11. Install the synchronizer ring No. 3.



12. Apply the gear oil to the spline section of the output shaft.



13. Install the reverse gear to the output shaft in a set.

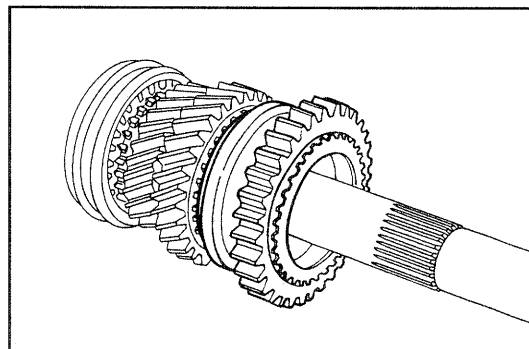
(1) Synchromesh shifting key (Three pieces)

(2) Synchromesh shifting key spring (Two pieces)

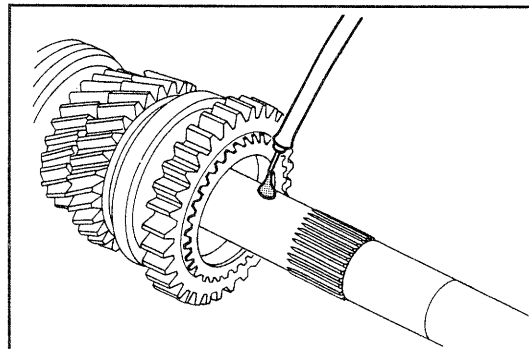
(3) Transmission clutch hub sleeve No. 1

NOTE:

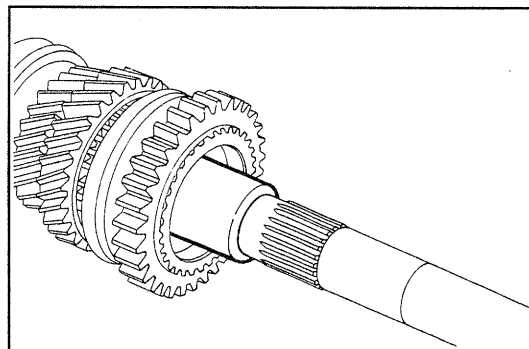
- Make sure that the sleeve section of the reverse gear faces toward the input shaft.



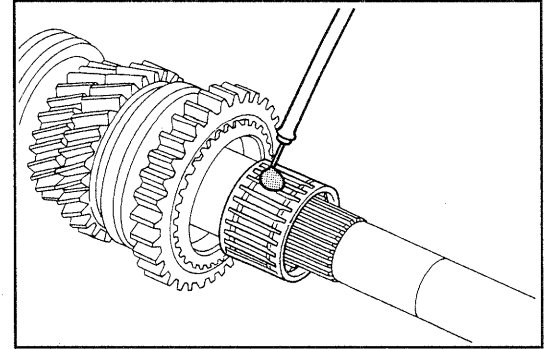
14. Apply the gear oil to the outer periphery of the output shaft.



15. Install the 1st gear inner race to the output shaft.

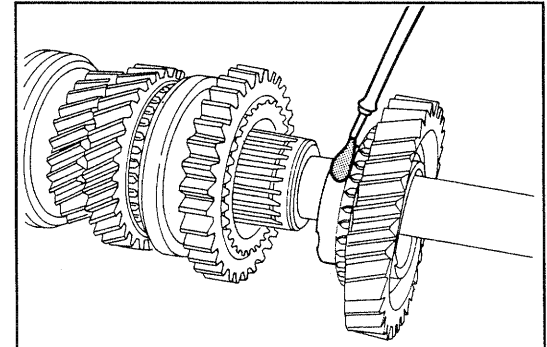


16. Apply the gear oil to the needle roller bearing and then, install to the outer periphery of the 1st gear inner race.



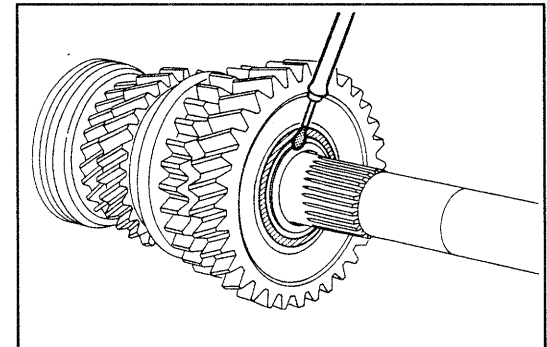
WRU90-MT206

17. Apply the gear oil to the tapered section of the 1st gear and then, install to the output shaft.



WRU90-MT207

18. Apply the gear oil to the end section of the 1st gear as shown in the right figure illustration and then, install the 1st gear thrust washer.



WRU90-MT208

TRANSMISSION ASSEMBLY

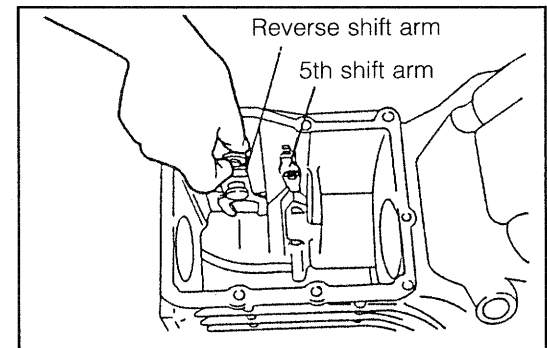
NOTE:

Prior to assembling the transmission case, clean the transmission case by removing any dirt, gasket materials or the like.

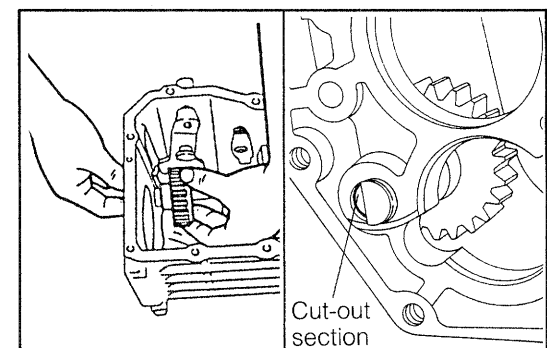
1. Install the reverse shift arm and 5th shift arm.
2. Install the reverse idler gear shaft and reverse idler gear.

NOTE:

- Be sure to install the reverse idler gear shaft in such a way that the cut-out section of the shaft faces toward the opposite side of the countershaft.
- If this operation should fail to be observed correctly, there may be a case where the transfer adaptor can not be installed.
- Before remounting the reverse idler gear, make sure that the gear chambering section faces toward the front side. If the reverse idler gear is remounted with the gear chambering section facing toward the rear, it may become difficult to put the gear in reverse or noise may result during shifting to reverse.

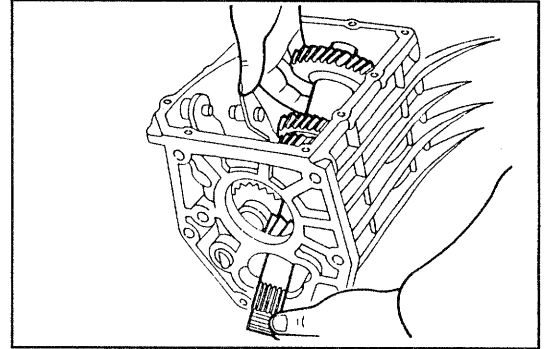


WRU90-MT209



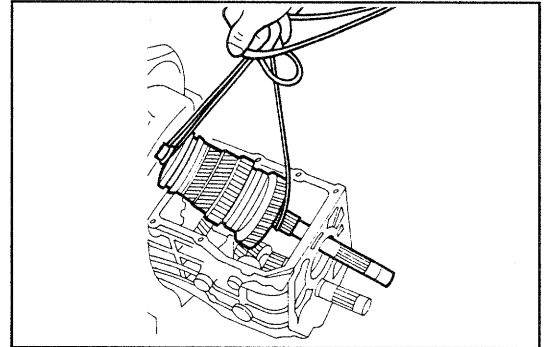
WRU90-MT210

3. Insert the transmission countershaft into the transmission case.



WRU90-MT211

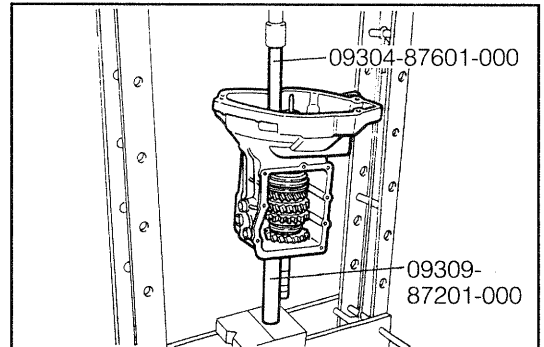
4. Place the output shaft in the transmission case.



WRU90-MT212

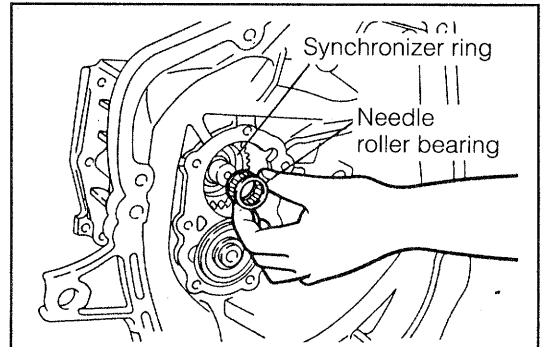
5. Press the bearings provided at the front and rear of the transmission countershaft, using the following SSTs at the same time.

SSTs: 09304-87601-000
09309-87201-000



WRU90-MT213

6. Apply the gear oil to the needle roller bearing and then, install to the output shaft.
7. Install the synchronizer ring No. 3.



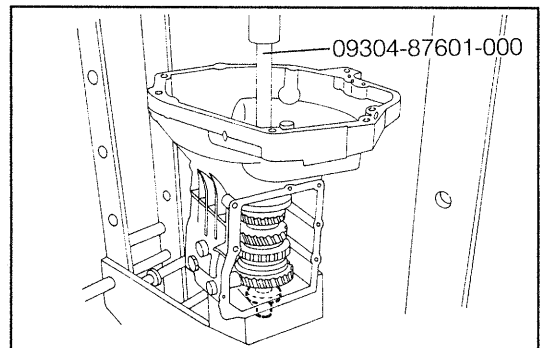
WRU90-MT214

8. Press the input shaft bearing into position, using the following SST at the same time.

SST: 09304-87601-000

NOTE:

- Prior to install the above bearing, remove the stop ring.



WRU90-MT215

9. Install new snap ring to the countershaft, using the following SST:

SST: 09306-87601-000

NOTE:

- Make sure that the snap ring should be installed to the groove section of the countershaft securely.

10. Install the stop ring to the countershaft front bearing.

NOTE:

- Push out the bearing by tapping the countershaft at the output shaft side, using a plastic hammer.

11. Install the new snap ring to the input shaft, using the following SST:

SST: 09304-87601-000

12. Install the stop ring to the input shaft bearing.

13. With a new gasket used, install the front bearing retainer.

NOTE:

- (1) Apply gear oil to the oil seal lip section.
 - (2) Apply molybdenum disulphide lithium base grease to the clutch hub sliding section of the front bearing retainer.
- Tightening Torque:**
1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

- (3) Be sure to tighten the bolts alternately and diagonally. (Right figure illustration indicates a typical example of the tightening sequence.)

14. Install the clutch related parts (Refer CL-section).

15. Install the transmission case on the overhaul stand.

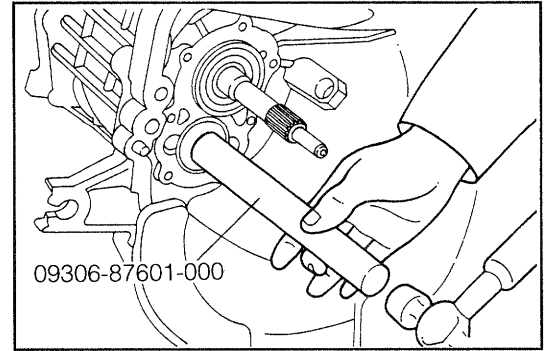
NOTE:

- After the transmission case has been remounted on the overhauling stand, cover the transmission case temporarily with a cloth or any other suitable materials to prevent foreign matter, dust, etc. from entering the transmission case.

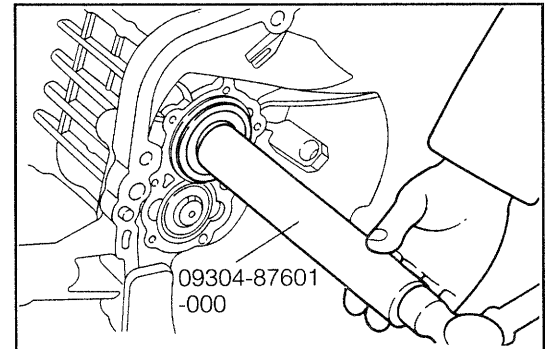
16. Remove any remaining gasket material from the transmission, using a gasket scraper.

NOTE:

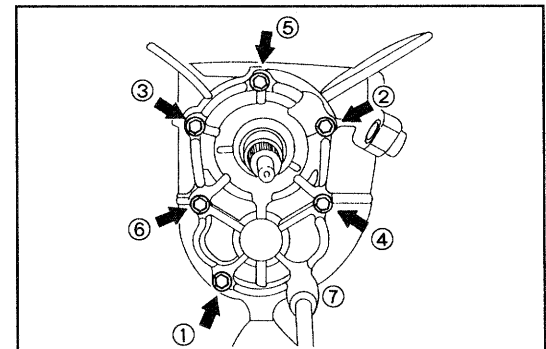
- Be very careful not to scratch the attaching surface.



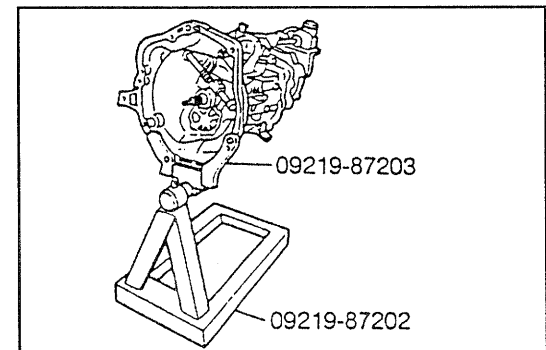
WRU90-MT216



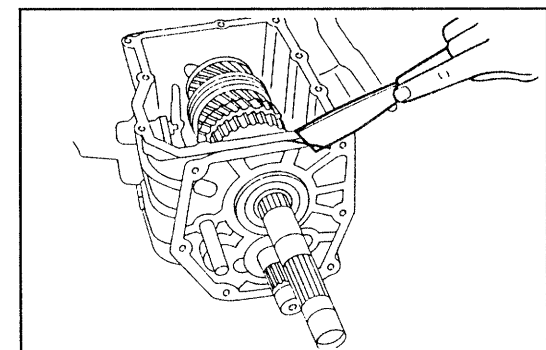
WRU90-MT217



WRU90-MT218



WRU90-MT219

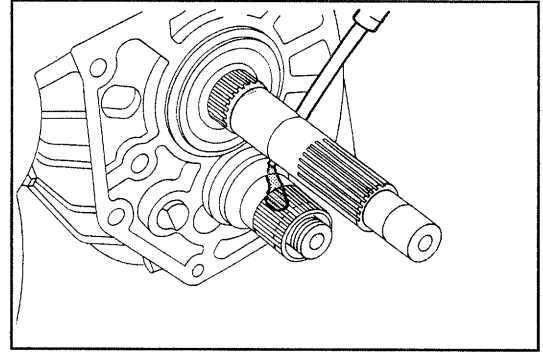


WRU90-MT220

MANUAL TRANSMISSION

17. Apply the gear oil to the following parts and then, install then in this sequence to the countershaft.

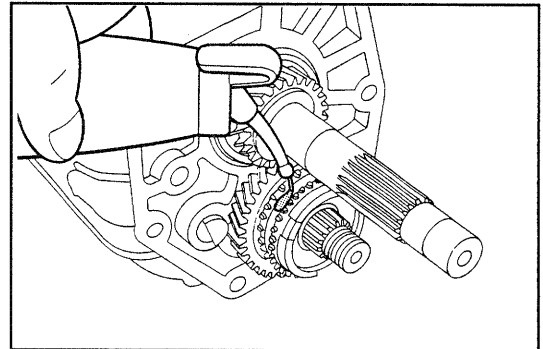
- (1) 5th gear thrust washer
- (2) 5th gear bearing inner race
- (3) Needle roller bearing



WRU90-MT221

18. Apply the gear oil to the following parts in this sequence.

- (1) 5th gear
- (2) Countershaft 5th gear (Tapped section)
- (3) Synchronizer ring.

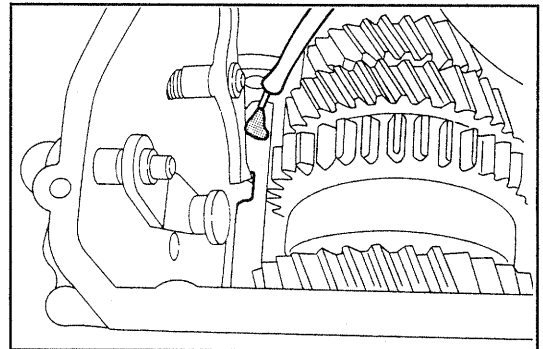


WRU90-MT222

19. Apply the gear oil to the gear shifting lever shaft and then, insert to the transmission case.

NOTE:

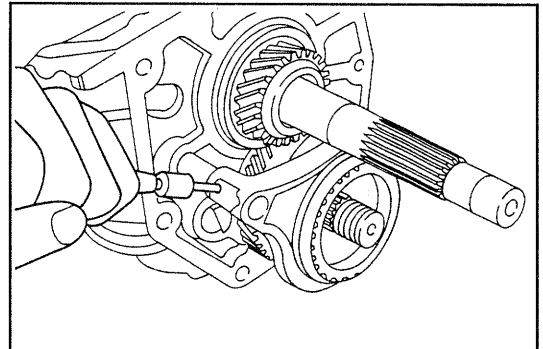
- Make sure that cut out section of the gear shifting lever faces toward the outside of transmission case.



WRU90-MT223

20. Install the following parts to the counter shaft in a set (use new slotted pin securely).

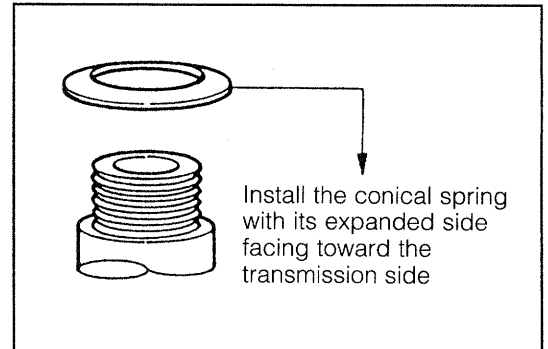
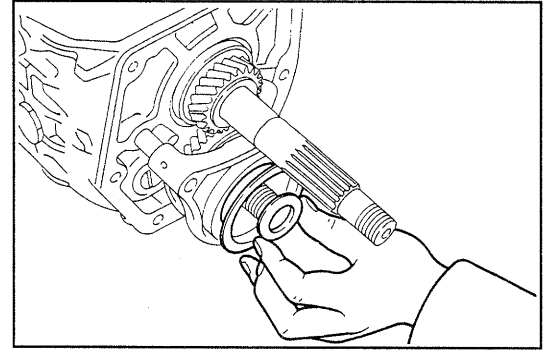
- (1) Transmission hub sleeve No. 2
- (2) Synchronizer hub assy No. 1
- (3) Synchromesh shifting key spring (Three pieces)
- (4) Synchromesh shifting key (Two pieces)
- (5) Synchronizer ring



WRU90-MT224

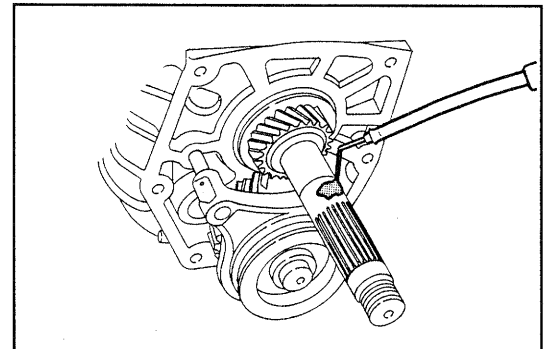
21. Install the following parts in this sequence.

- (1) Shifting key retainer
- (2) Conical washer spring



WRU90-MT225

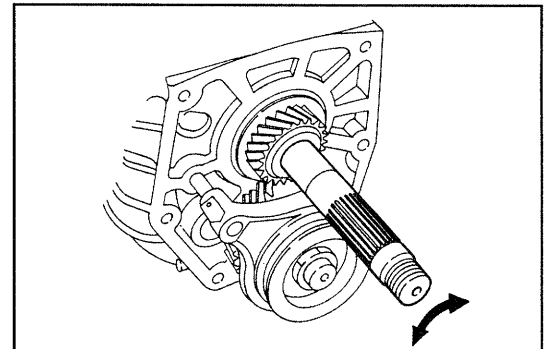
22. Apply the gear oil onto the outer periphery of the output shaft.



WRU90-MT226

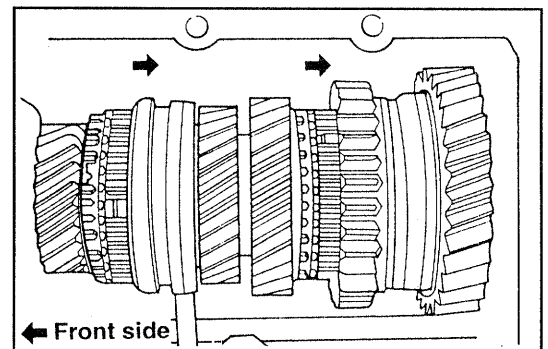
23. Perform checks for smooth gear shifting by manual operation of the transmission, using the following procedure:

- (1) Fully hand-tighten the lock nut on the fifth gear of the countershaft.
- (2) Engage each gear in order of the manual transmission shift position.
- (3) Visually check that both the input shaft and the output shaft rotate clockwise during engagement of each gear (for the reverse gear, however, the output shaft rotates counterclockwise).



WRU90-MT227

24. Interlock the first and third gears.



WRU90-MT228

25. Tighten the countershaft 5th gear with the lock nut. Stake the lock nut with a chisel or the like.

Tightening Torque:

14.0 - 20.0 kg-m

(101.0 - 145.0 ft-lb, 137.0 - 196.0 N·m)

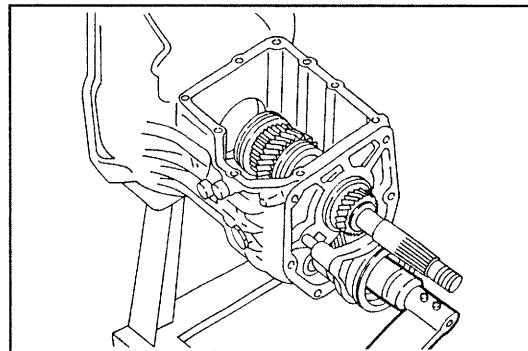
NOTE:

- Measure the following sections, prior to stake the lock nut.

Specified Valve:

Unit: mm (inch)

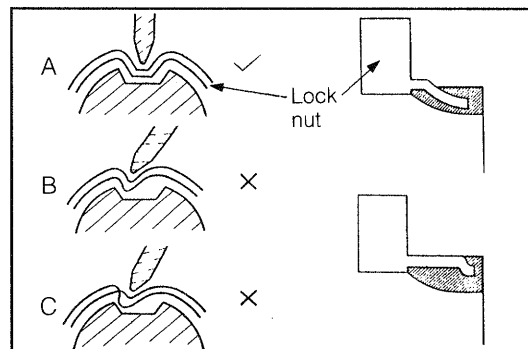
	1st	2nd	3rd	4th	5th
Backlash	0.05 - 0.18 (0.0019 - 0.0070)	0.05 - 0.16 (0.0019 - 0.0062)	0.05 - 0.14 (0.0019 - 0.0055)	0.05 - 0.13 (0.0019 - 0.0051)	0.05 - 0.13 (0.0019 - 0.0051)
Thrust clearance	0.17 - 0.30 (0.0067 - 0.011)	0.10 - 0.37 (0.0039 - 0.014)	0.10 - 0.33 (0.0039 - 0.013)		0.11 - 0.30 (0.0039 - 0.011)



WRU90-MT229

NOTE:

- When staking the lock nut, point a suitable staking tool toward the transmission counter shaft axis center and stake to lock nut securely as shown in the right figure A.
- Poor staking may cause abnormal noise as shown in the right figure illustration B and C.



WRU90-MT230

26. Install the output gear spacer No. 1 and No. 2 to the output shaft.
27. Apply gear oil to the outer periphery of the output gear spacer No. 2.
28. Apply the following bond to the transfer adapter attaching surface of the transmission case.

Bond: Three bond 1216 (Three bond made)

29. Apply the following bond to the threaded section of the bolts. Install the transfer adaptor and bearing.

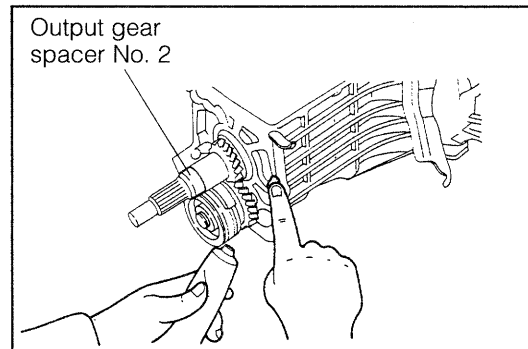
Tightening Torque:

3.0 - 4.5 kg-m (21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)

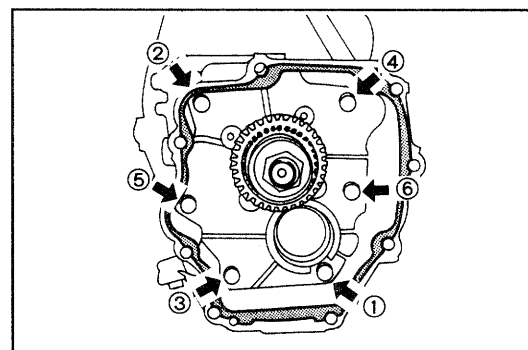
Bond: Three bond 1324 (Three bond made)

NOTE:

- If the transmission adaptor can not be installed properly (i.e. a gap occurs between the transmission case and the transmission adaptor), probably it is caused by the reverse idle gear shaft that has not been installed correctly.
(As for the installing procedure of the reverse idle gear shaft, see page MT-45.)



WRU90-MT231



WRU92-MT499

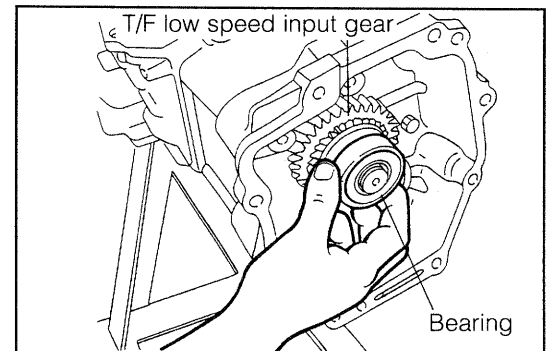
NOTE:

- Be sure to tighten the bolts alternately and diagonally (The right figure illustration indicates a the typical example of the tightening sequence).
- Apply the gear oil to the lip section of the oil seal so that the lip may be avoided from the turned over.

WRU90-MT234

30. Install the following parts in this sequence.

- (1) Transfer low speed input gear
- (2) Bearing



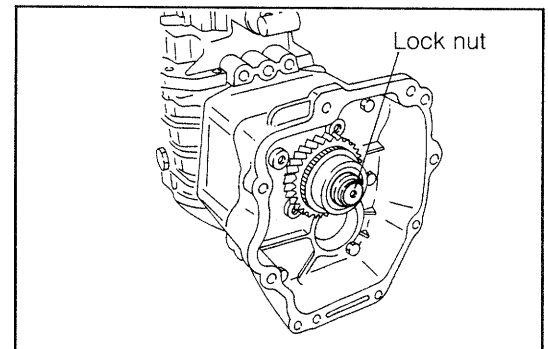
WRU90-MT235

31. Tighten the transfer low speed input gear by means of the lock nut. Stake the lock nut, using a chisel as below illustration securely.

Tightening Torque:

18.0 - 22.0 kg-m

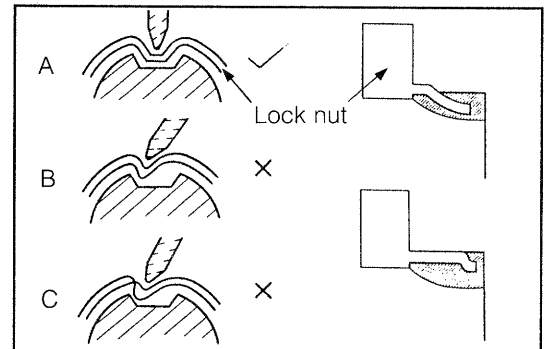
(130.0 - 159.0 ft-lb, 177.0 - 216.0 N-m)



WRU90-MT236

NOTE:

- When staking the lock nut, point a suitable staking tool toward the transmission output rear shaft axis center and stake to lock nut securely as shown in the right figure A.
- Poor staking may cause abnormal noise as shown in the right figure illustration B and C.



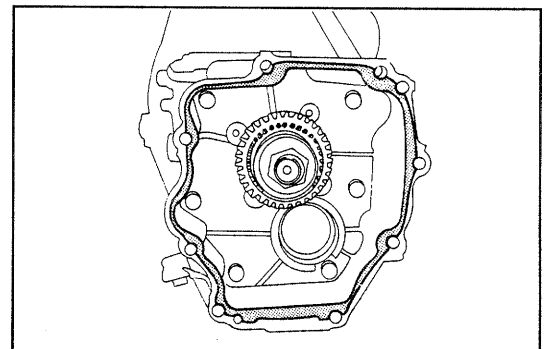
WRU90-MT237

32. Apply the following bond to the mating surface between the transfer adapter and the transfer front case subassembly:

Bond: THREE BOND 1216 (made by THREE BOND)

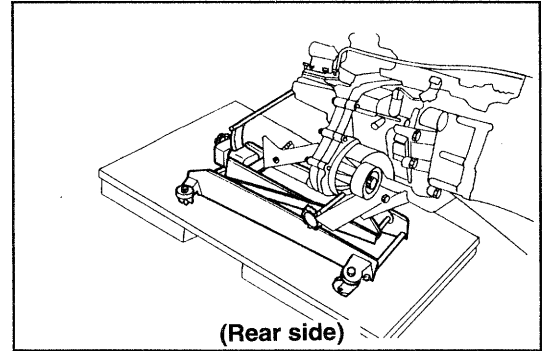
NOTE:

- Apply the bond to the inside of the bolt hole.
- Overlap the bond joints.



WRU90-MT238

33. Support the transfer front case subassembly and transfer rear case subassembly with a transmission jack.

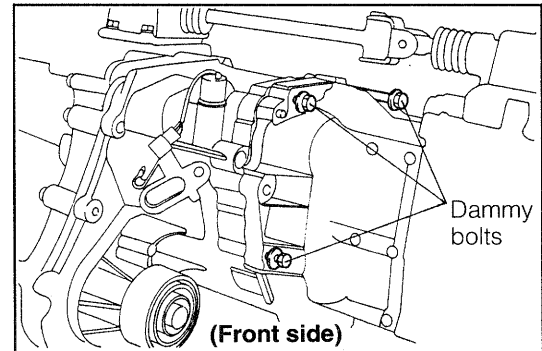


WRU90-MT239

34. Press and hold down the transfer front case subassembly against the transfer adapter, and temporarily connect them using three to four dummy bolts.

CAUTION:

- The case of the transfer front case subassembly and that of the transfer adapter must be matched by slowly rotating the rear output shaft by hand until both sides have come into firm contact. Failure to observe the caution may bend the subgears, thus causing gear noise from the transmission.



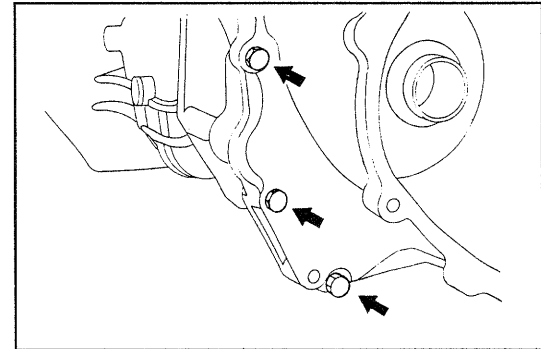
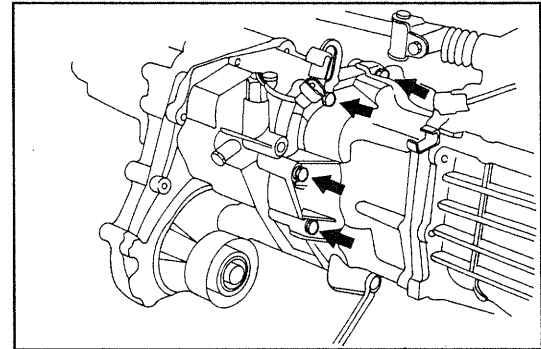
WRU90-MT240

35. Tighten the transfer front case subassembly with the eight bolts.

Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N-m)

NOTE:

- Apply the THREE BOND 1324 (made by THREE BOND) to the threaded sections of the bolts before tightening the transfer front case subassembly.

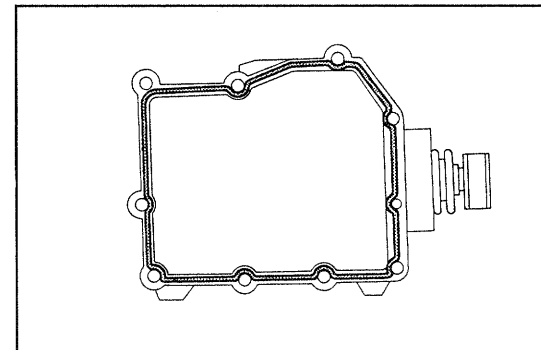


WRU90-MT241

36. Apply Three bond 1104 (Three bond made) to the transmission case cover attaching surface of the transmission case. Proceed to install the transmission case cover subassembly.

NOTE:

- Apply the bond to the inside of each bolt as shown in the diagram at right.



WRU90-MT242

37. Install the transmission case cover subassembly, and tighten the bolts.

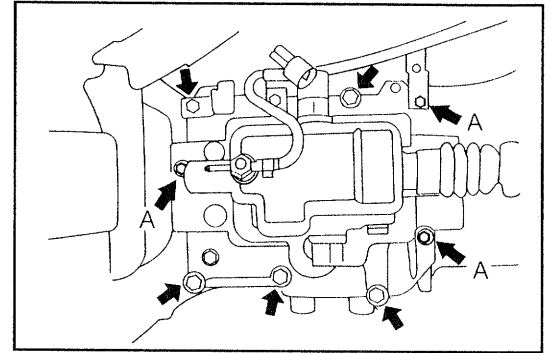
NOTE:

- Apply the **THREE BOND 1324** (made by **THREE BOND**) to the threaded section of each bolt.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

A-section

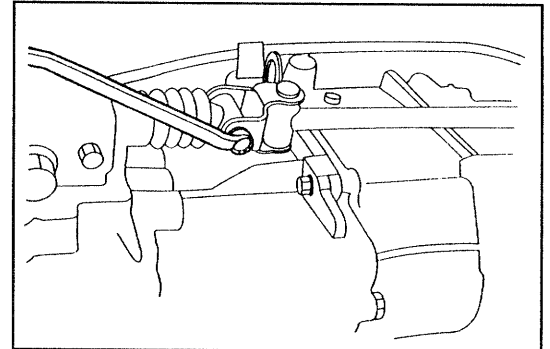
0.7 - 1.0 kg-m (5.7 - 7.2 ft-lb, 6.9 - 9.8 N·m)



WRU90-MT243

38. Install the shift lever retainer subassembly and the control shaft with a hexagon bolt (Use new hexagon bolt).

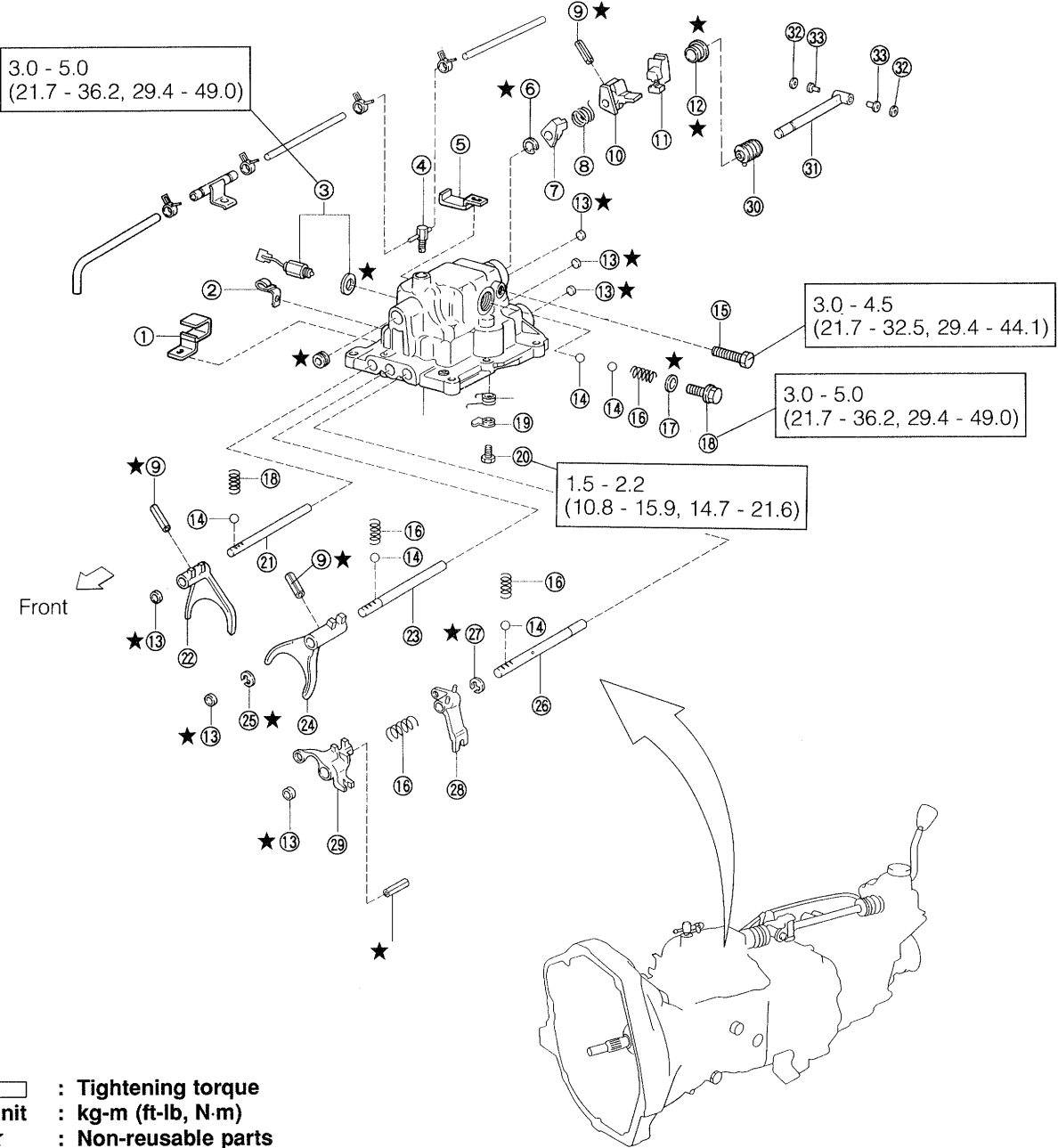
Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)



WRU90-MT244

39. Install the transmission assy with transfer to the vehicle (As for the installation procedures, see page MT-121 to MT-125).

TRANSMISSION CASE COVER COMPONENTS



- ① Harness clamp
- ② Clamp
- ③ Backup lamp switch
- ④ Union
- ⑤ Harness clamp
- ⑥ Snap ring
- ⑦ Reverse restrict pin No. 2
- ⑧ Torsion spring
- ⑨ Slotted pin
- ⑩ Shift inner lever
- ⑪ Detent sleeve
- ⑫ Oil seal

- ⑬ Tight plug
- ⑭ Ball
- ⑮ Set bolt
- ⑯ Spring
- ⑰ Gasket
- ⑱ Reverse restrict pin holder
- ⑲ Shift fork lock plate
- ⑳ Bolt
- ㉑ 1st & 2nd shift fork shaft
- ㉒ 1st & 2nd shift fork
- ㉓ 3rd & 4th shift fork shaft
- ㉔ 3rd & 4th shift fork

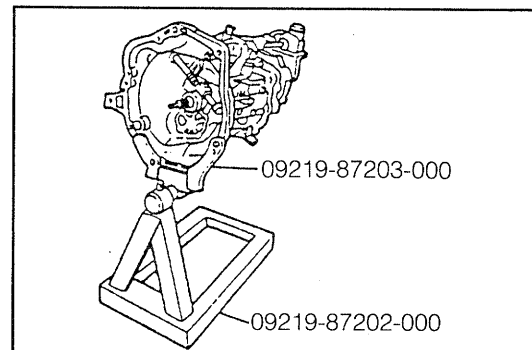
- ㉕ "E" ring
- ㉖ 5th & reverse shift fork shaft
- ㉗ "E" ring
- ㉘ Reverse shift fork
- ㉙ Gear shift head No. 1
- ㉚ Control shaft boot
- ㉛ Shift & select shaft S/A
- ㉜ "O" ring
- ㉝ Bush
- ㉞ T/M case cover

REMOVAL

1. Remove the transmission assembly with transfer from the vehicle.
2. Install the transmission assembly with transfer on the over-haul stand, using the following SSTs.

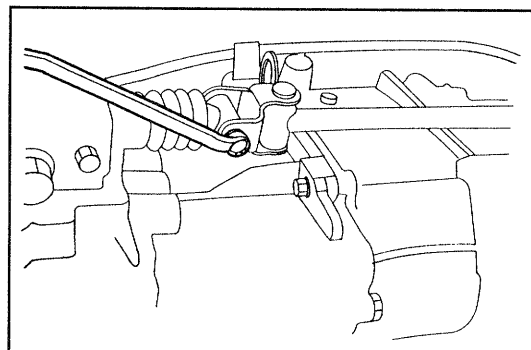
SST: 09219-87202-000

SST: 09219-87203-000



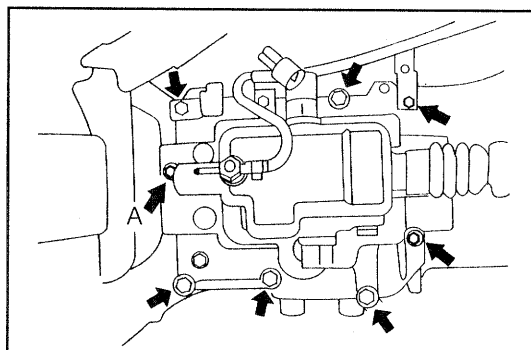
WRU92-MT490

3. Remove the shift lever retainer subassembly and the control shaft by removing the hexagon bolt.



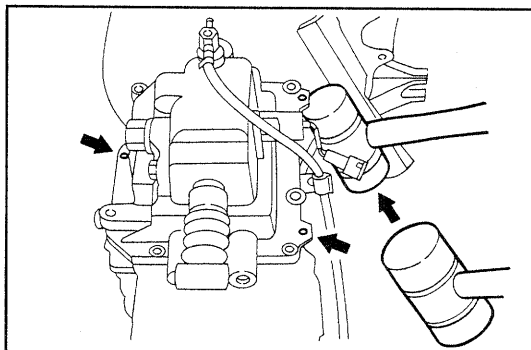
WRU90-MT247

4. Remove the transmission case cover subassembly by removing the seven bolts and a reamer bolt.



WRU90-MT248

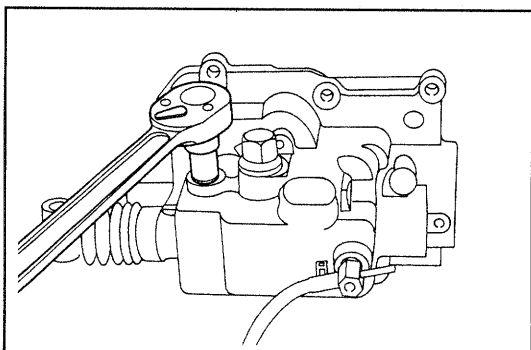
5. Remove the transmission case cover subassembly by lightly tapping each of the ribs evenly toward the upper side of the transmission case.



WRU90-MT249

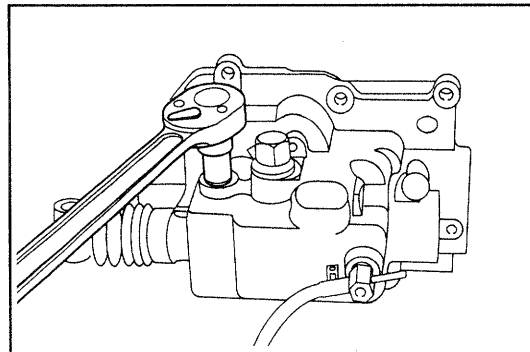
DISASSEMBLY

1. Set the transmission case cover subassembly in a vice.



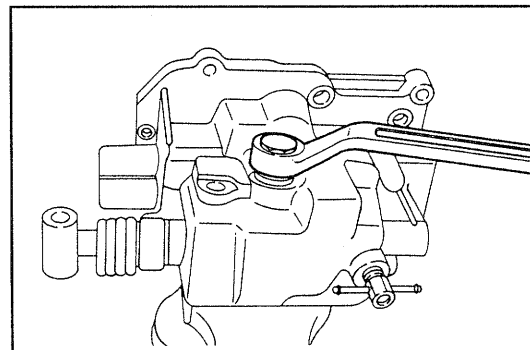
WRU90-MT250

2. Remove the set bolt and the spring lock washer.



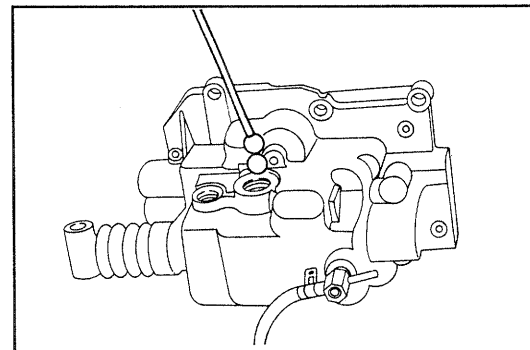
WRU90-MT251

3. Remove the reverse restrict pin holder, gasket and compression spring.



WRU90-MT252

4. Remove the two balls from the transmission case subassembly using a standard tool or magnet hand.

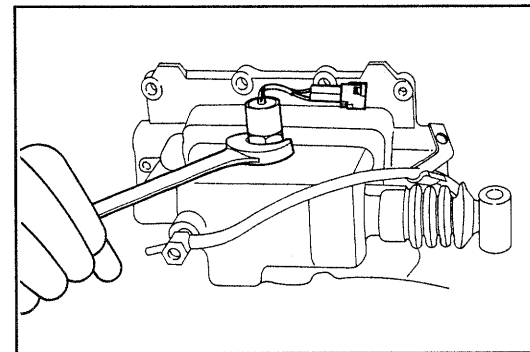


WRU90-MT253

5. Turn the transmission case cover subassembly through 180 degrees.
6. Remove the backup lamp switch assembly and the gasket.

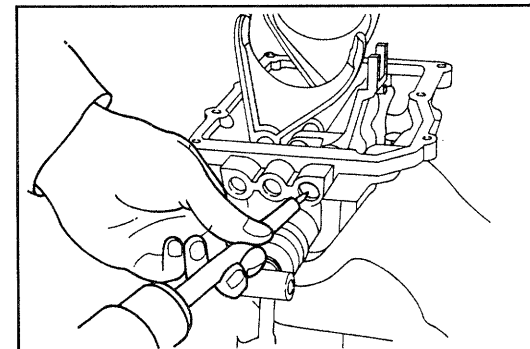
NOTE:

- Never reuse the removed gasket.



WRU90-MT254

7. Remove the tight plugs in this sequence.
 - (1) Set a sharp-edged rod to the end of each tight plug, and lightly tap the rod with a hammer.

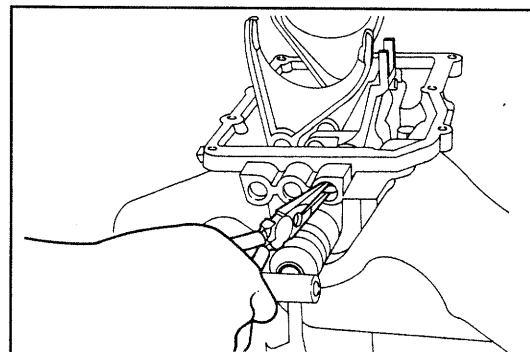


WRU90-MT255

- (2) Rotate each tight plug through about 90 degrees, and pull them toward you with nose pliers or any other suitable tools.

NOTE:

- Never reuse the removed tight plugs.



WRU90-MT256

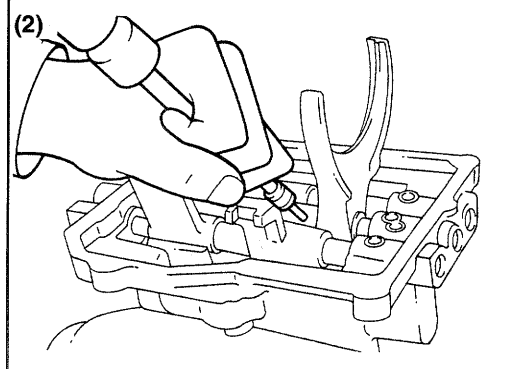
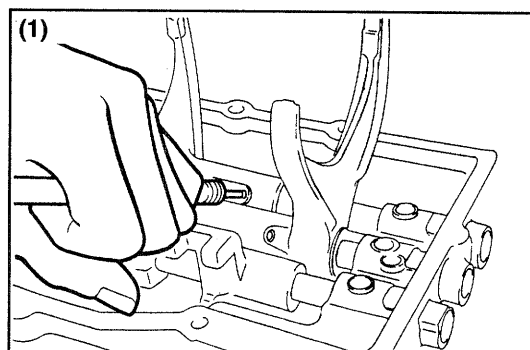
8. Drive off the slotted pin of the following parts, using the pin punch.

(1) 1st & 2nd shift fork

(2) 3rd & 4th shift fork

NOTE:

- Never reuse the removed slotted pin.

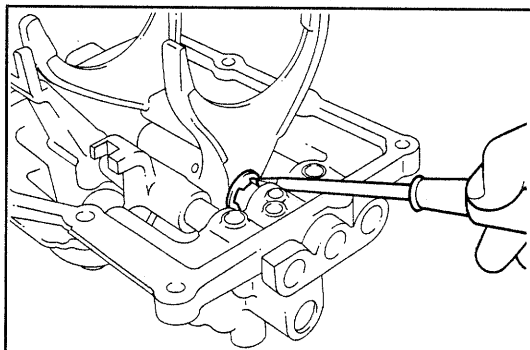


WRU90-MT257

9. Remove the E-ring of the 3rd & 4th shift fork shaft, using the standard tool of minus driver.

NOTE:

- Never reuse the removed E-ring.



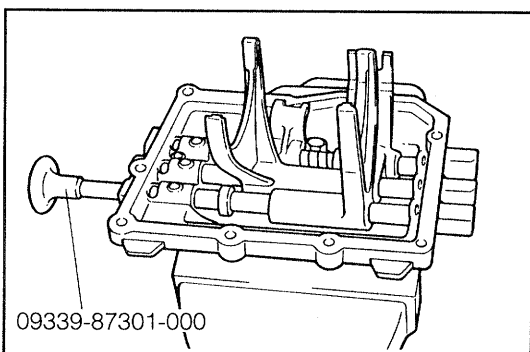
WRU90-MT258

10. Remove the 1st & 2nd shift fork shaft by inserting the following SST into the 1st & 2nd shift fork shaft hole of the transmission case cover subassembly and pushing those SST to the rear side.

SST: 09339-87301-000

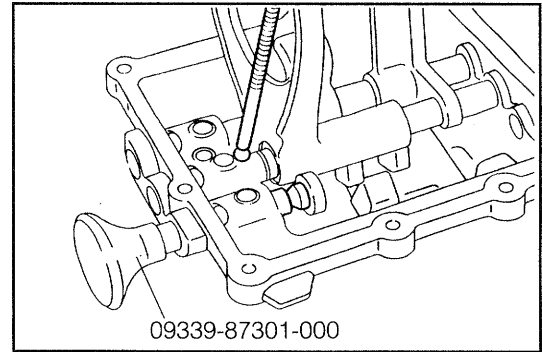
NOTE:

- (1) Remove the shaft on both 3rd & 4th shift fork shaft and the 5th & reverse shift fork shaft in the same manner.

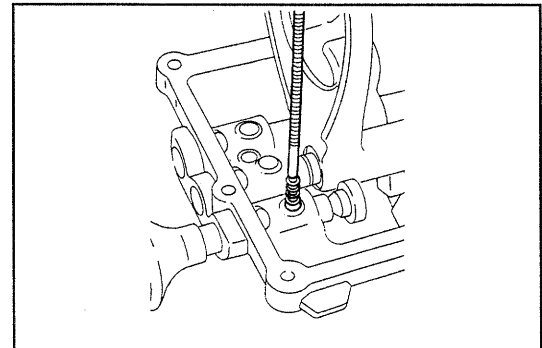


WRU90-MT259

- (2) Remove the 1st & 2nd shift fork.
- (3) Compress the ball and compression spring by inserting a small size SST to the shift fork shaft hole in the transmission case cover subassembly.
- (4) Remove the shift fork shaft.
- (5) Depress the small SST by inserting the large SST. remove the ball and compression spring, using the standard tool of magnet hand by rotating the SST either clockwise or couterclockwise.



WRU90-MT260



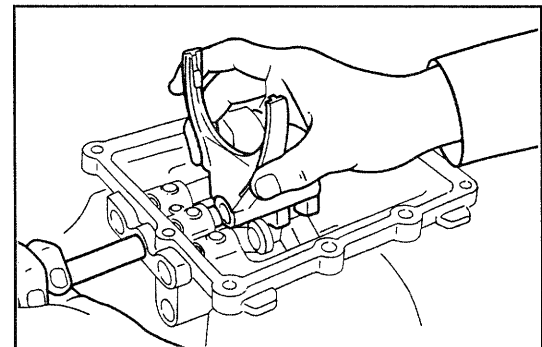
WRU90-MT261

11. Remove the 3rd & 4th shift fork shaft, using the following SST:

SST: 09339-87301-000

NOTE:

- Removal of shift fork shaft is same manner with the 1st & 2nd shift fork shaft.

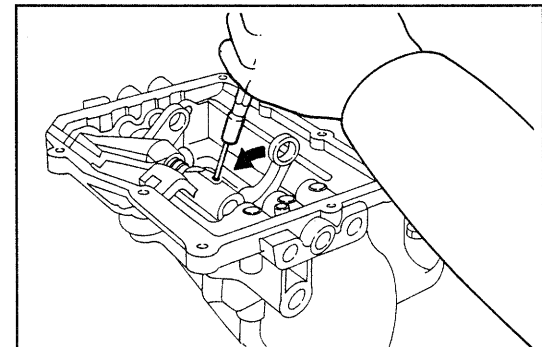


WRU90-MT262

12. Drive off the slotted pin using the pin panch, while the gear shift No. 1 head is being tilted.
13. Remove the gear shift No. 1 head with the slotted pin intalled from the 5th & reverse shift fork shaft.

NOTE:

- Never reuse the removed slotted pin.

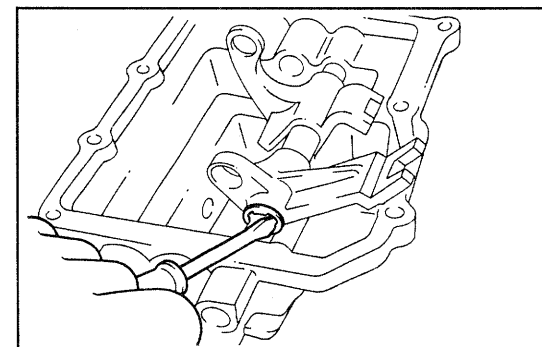


WRU90-MT263

14. Remove the E-ring of the 5th & reverse shift fork shaft, using the standard tool of minus driver.

NOTE:

- Never reuse the removed E-ring.



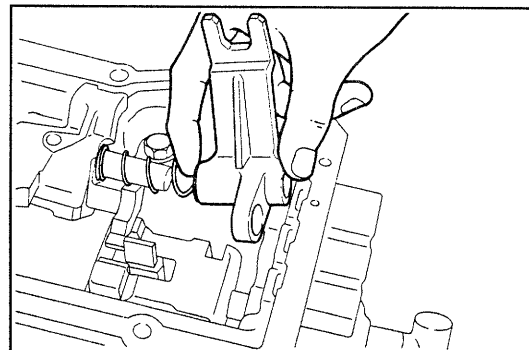
WRU90-MT264

15. Remove the 5th & reverse shift fork shaft, using the following SST.

SST: 09339-87301-000

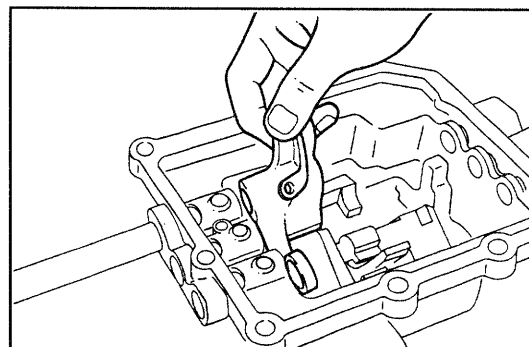
NOTE:

- Removal of shift fork shaft is same manner with the 1st & 2nd shift fork shaft.



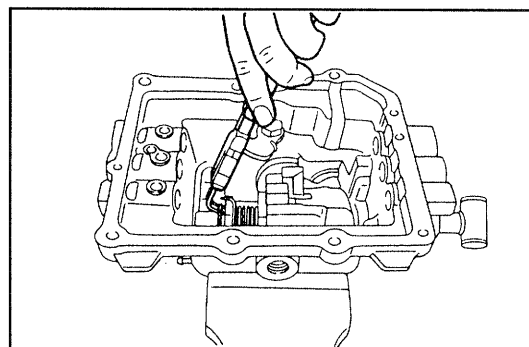
WRU90-MT265

16. Remove the gear shift No. 1 head and the compression spring, while pulling out the 5th & reverse shift fork shaft to ward you.
17. With the same manner to that of the above operation, remove the reverse shift fork.



WRU90-MT266

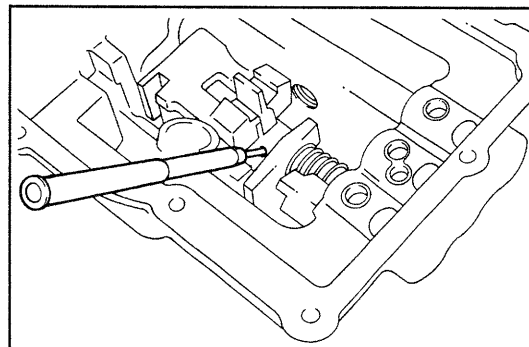
18. Detach the snap ring of the shift & select shaft No. 1 and slightly move to toward the and of transmission case cover subassembly.



WRU90-MT267

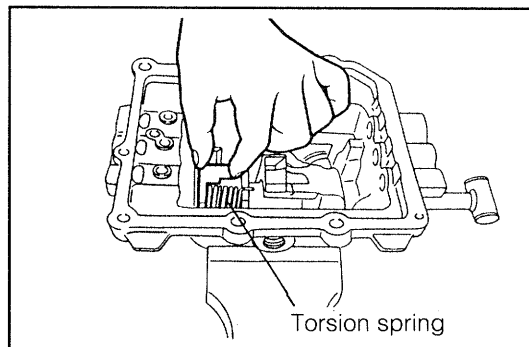
19. Drive off the slotted pin of the shift inner lever.
When driving off the slotted pin, tilt the shift inner lever as large angle as possible, while enabling the knock pin to be used.

If the slotted pin is driven off vertically, the movement of the gear shift head NO.1 may be prevented due to contact of the slotted pin with the transmission case cover.



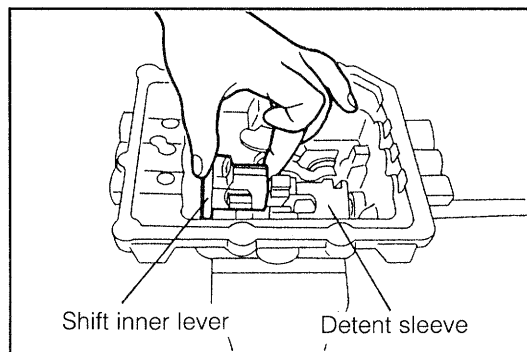
WRU90-MT268

20. Remove the reverse restrict pin and torsion spring.



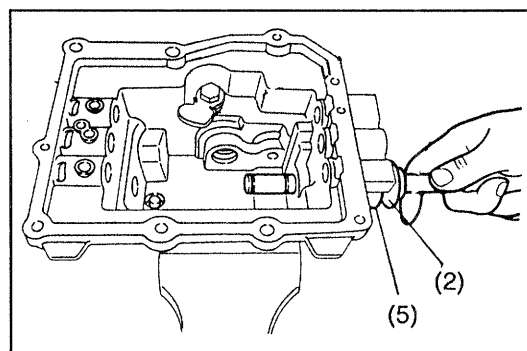
WRU90-MT269

21. Remove the shift inner lever and detent sleeve.



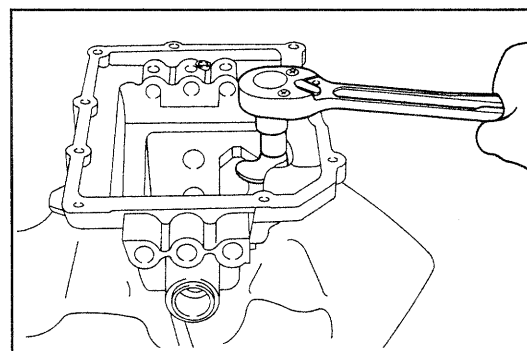
WRU90-MT270

22. Remove the shift & select shaft No. 1 with control shaft boot installed.



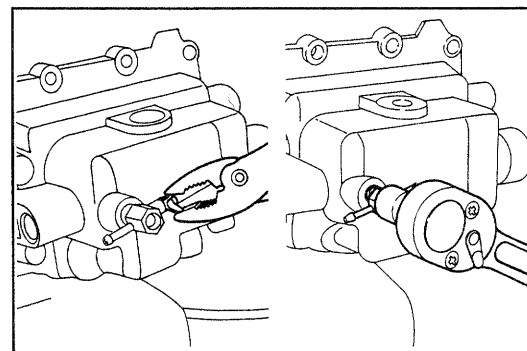
WRU90-MT271

23. Remove the shift fork lock plate and torsion spring by removing the hexagon bolt.



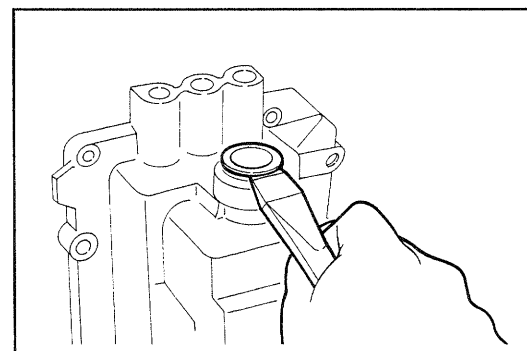
WRU90-MT272

24. Disconnect clamp of the breather hose.
25. Remove the union.



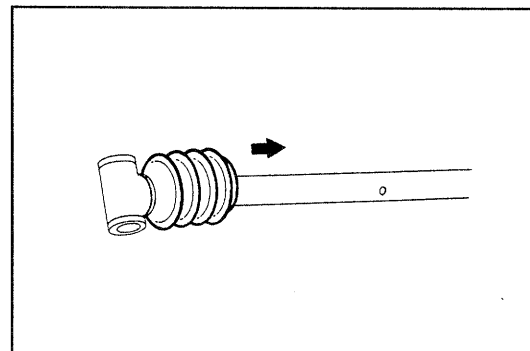
WRU90-MT273

26. Remove the oil seal, using the chisel or the like.
NOTE:
• Never reuse the removed oil seal.



WRU90-MT274

27. Remove the control shaft No. 2 boots from the shift & select shaft subassembly.



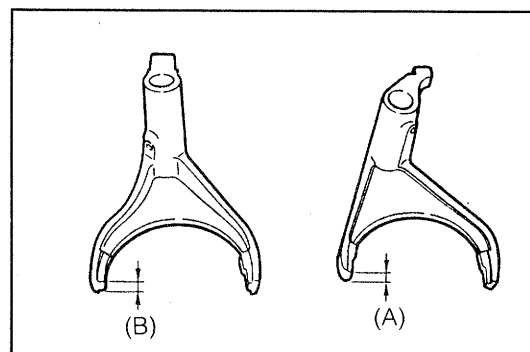
WRU90-MT275

INSPECTION

1. Measure the contact width of each shift fork with the hub sleeve, using vernier calipers.

mm (inch)

Part name / Item	Specified value	Allowable limit
1st & 2nd shift fork Dimension (A) in right figure	6.80 - 7.00 (0.2677 - 0.2756)	6.3 (0.2480)
3rd & 4th shift fork dimension (B) in right figure	6.80 - 7.00 (0.2677 - 0.2756)	

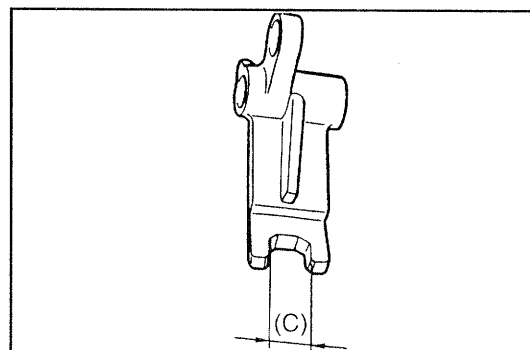


WRU90-MT276

2. Measure the contact width of the reverse shift fork with the reverse shift arm, using vernier calipers.

mm (inch)

Part name / Item	Specified value	Allowable limit
Reverse shift fork Dimension (C) in right figure	15.000 - 15.043 (0.5906 - 0.5922)	15.1 (0.5945)

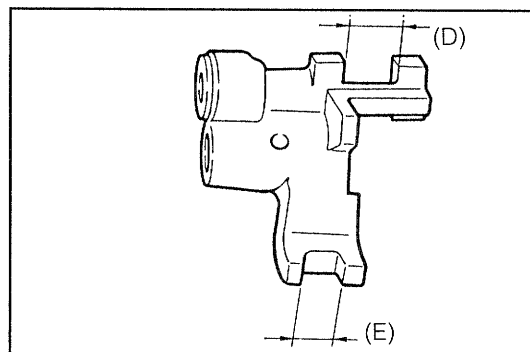


WRU90-MT277

3. Measure the contact width of the gear shift head No. 1 with 5th shift arm, using vernier calipers.

mm (inch)

Part name / Item	Specified value	Allowable limit
Gear shift head No. 1 Dimension (D) in right figure	16.1 - 16.2 (0.6339 - 0.6378)	16.7 (0.6575)
Gear shift head No. 1 Dimension (E) in right figure	12.1 - 12.2 (0.4764 - 0.4803)	12.7 (0.5000)

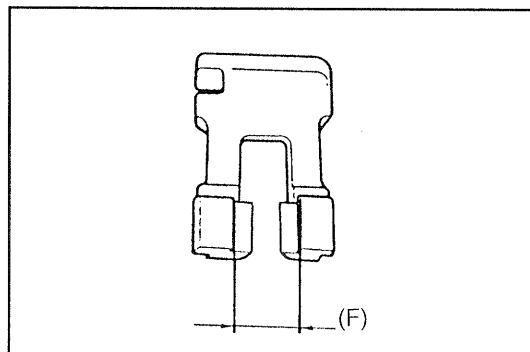


WRU90-MT278

4. Measure the dimension (F) of the detent sleeve shown in the right figure, using vernier calipers.

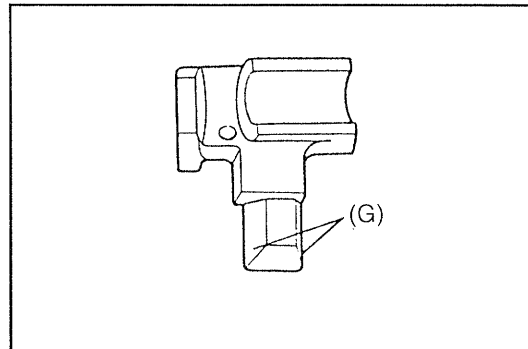
mm (inch)

Part name / Item	Specified value	Allowable limit
Detent sleeve Dimension (F) in right figure	18.8 - 19.2 (0.7402 - 0.7559)	19.5 (0.7677)



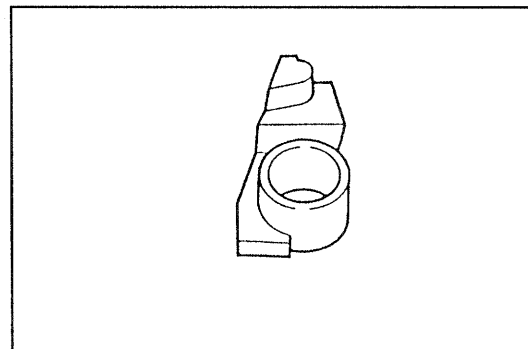
WRU90-MT279

5. Visually inspect the shift inner lever (G) for wear or damage.



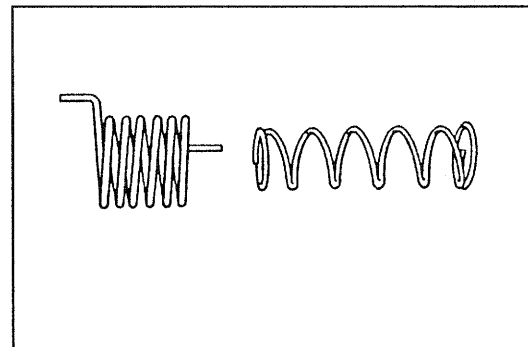
WRU90-MT280

6. Visually inspect the reverse restrict pin No. 2 for wear or damage.



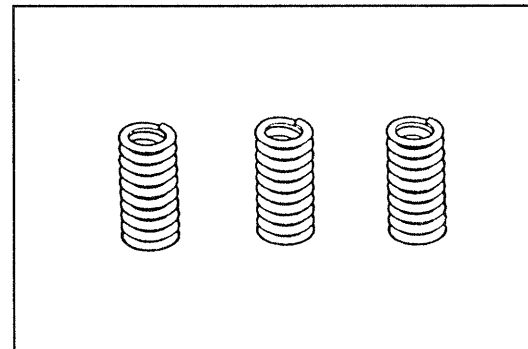
WRU90-MT281

7. Check the spring for damage.



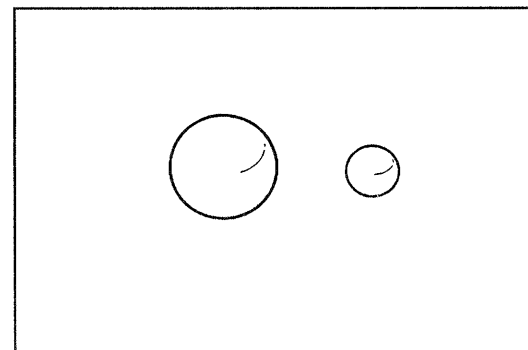
WRU90-MT282

8. Check the spring of the shift fork shaft for damage.



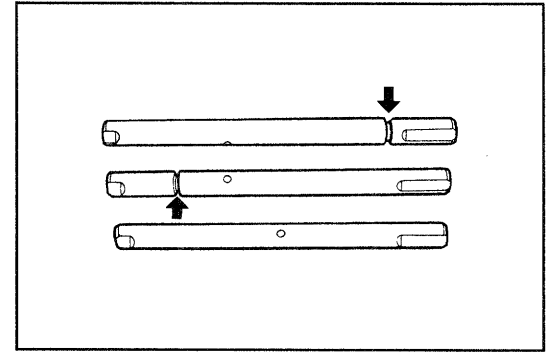
WRU90-MT283

9. Check the balls of the reverse restrict pin holder and shift fork shaft for wear or damage.



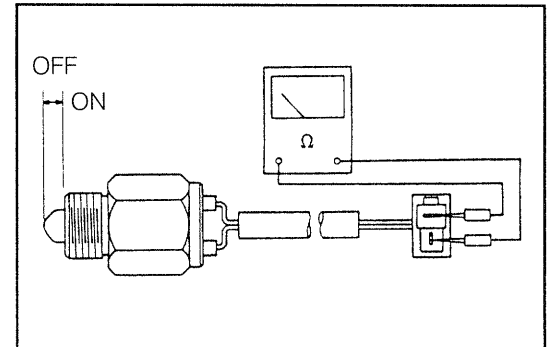
WRU90-MT284

10. Visually inspect the outer periphery of the shift fork shaft for wear, or damage.



WRU90-MT285

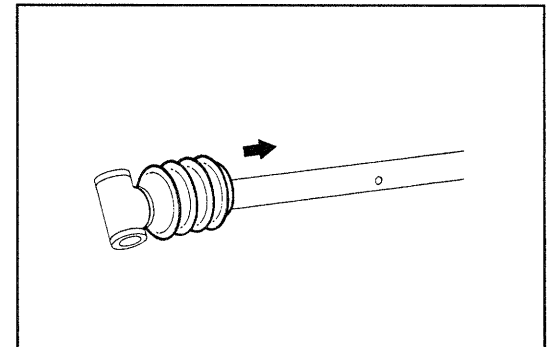
11. Turn ON and OFF the switch section of the backup lamp switch assembly. Ensure that continuity exists when the switch is turned ON. Also, ensure that no continuity exists when the switch is turned OFF.



WRU90-MT400

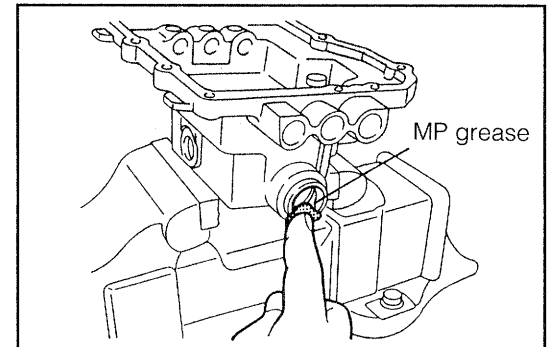
ASSEMBLY

1. Insert the control shaft No. 2 boots to the shift & select shaft subassembly.



WRU90-MT286

2. Apply Lithium base multi purpose grease to the lip section of the oil seal and then, drive the oil seal into the transmission case cover, using a hammer in combination with a wooden block interposed.

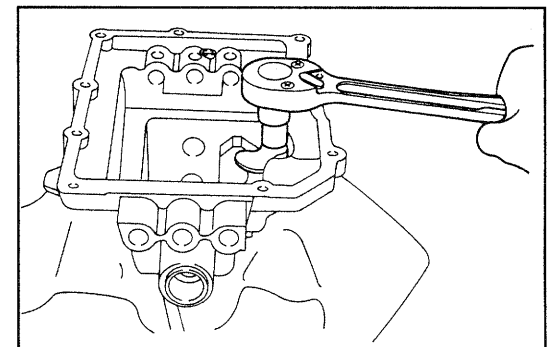


WRU90-MT287

3. Apply the Three bond 1324 to the threaded section of the hexagon bolt.
4. Install the torsion spring and shift fork lock plate and then, tighten the hexagon bolt.

Tightening Torque:

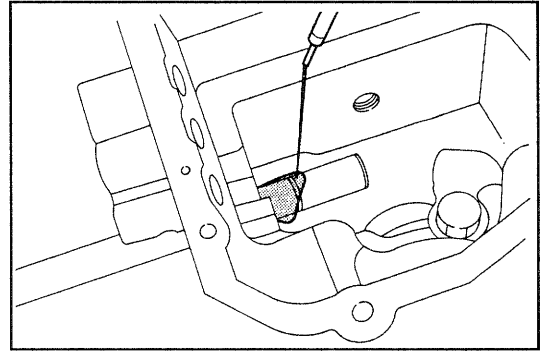
1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)



WRU90-MT288

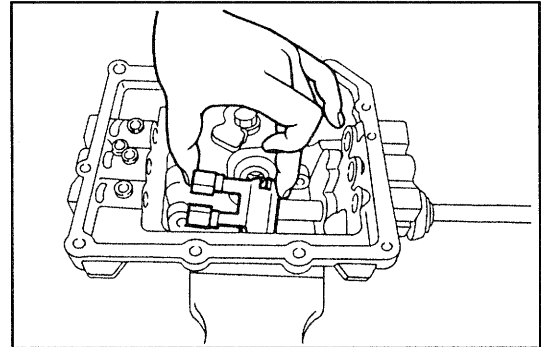
MANUAL TRANSMISSION

5. Apply the gear oil to the outer periphery of the shift & select shaft No. 1.



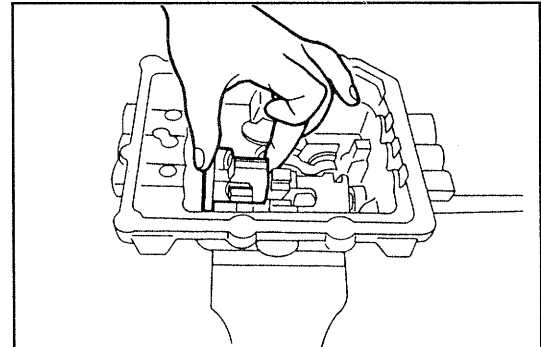
WRU90-MT289

6. Install the detent sleeve to the shift & select shaft No. 1.



WRU90-MT290

7. Install the shift inner lever to the shift & select shaft No. 1.

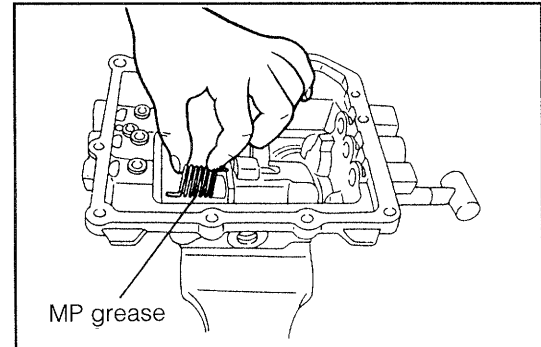


WRU90-MT291

8. Install the torsion spring to the shift & select shaft No. 1.

NOTE:

- Apply Lithium base multi purpose grease to the torsion spring installation section of the shift & select shaft No. 1.

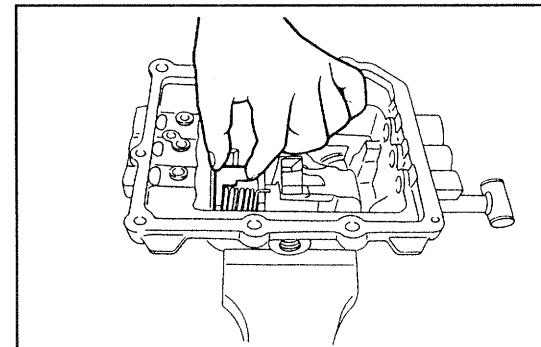


WRU90-MT292

9. Install the reverse restrict pin to the shift & select shaft No. 1. Temporarily attach the new snap ring.

NOTE:

- Never reuse the removed snap ring.

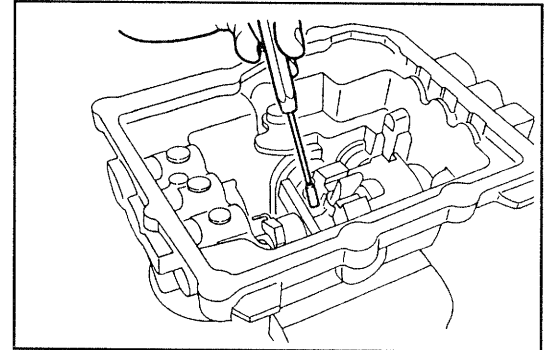


WRU90-MT293

10. Secure the shift inner lever by driving the new slotted pin into position.

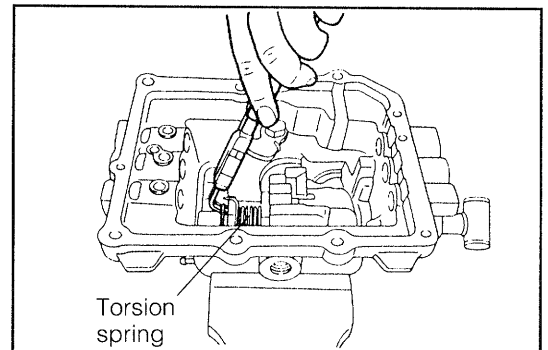
NOTE:

- Never reuse the removed slotted pin.



WRU90-MT294

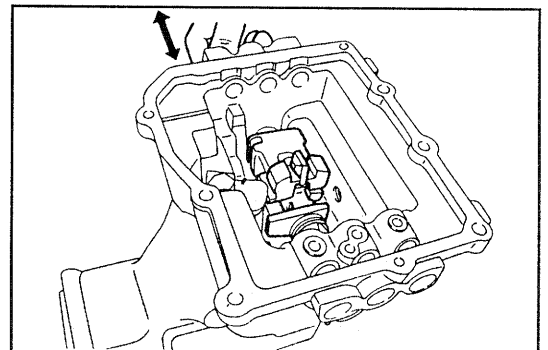
11. Attach the snap ring into the groove section of the shift & select shaft No. 1 securely, while the torsion spring is being compressed with your fingers.



WRU90-MT295

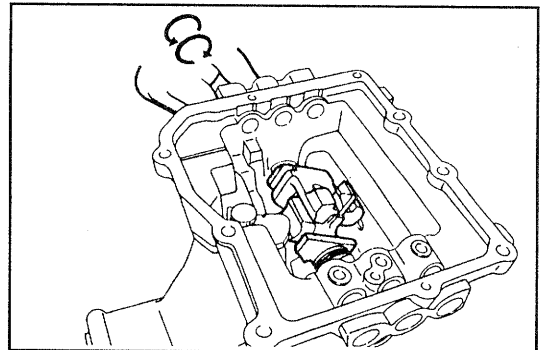
12. Inspection of operation

- (1) Move the shift & select shaft No. 1 in the shifting direction. Ensure that it operates smoothly.



WRU90-MT296

- (2) Move the shift & select shaft No. 1 in the selecting direction. Ensure that it operates smoothly.



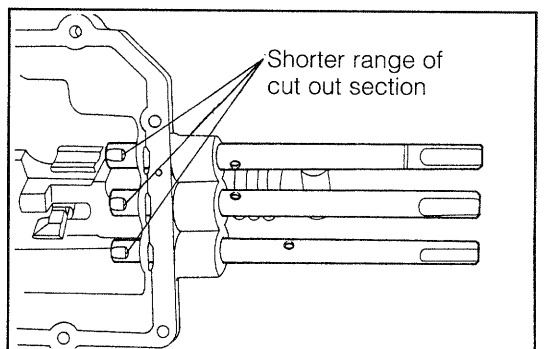
WRU90-MT297

13. Install the following shift fork shaft.

- (1) 1st & 2nd shift fork shaft
- (2) 3rd & 4th shift fork shaft
- (3) 5th & reverse shift fork shaft

NOTE:

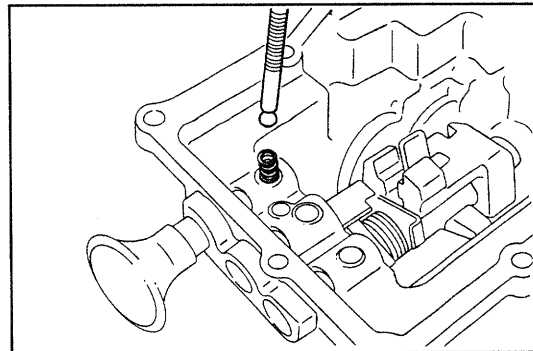
- Make sure that the shorter range of cut out section faces toward the front side as shown in the right figure illustration.



WRU90-MT298

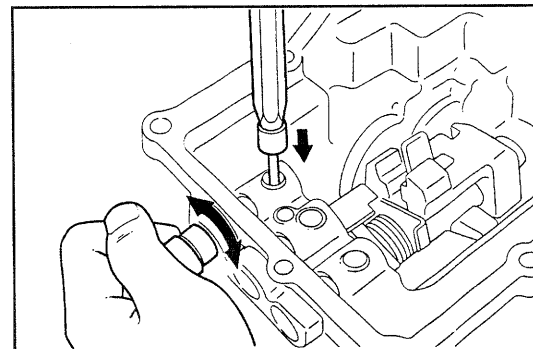
14.

- (1) Insert the large-sized SST into the shift fork shaft of the transmission case cover.
- (2) Install the compression spring and ball in this sequence.



WRU90-MT299

- (3) Turn the SST 90 degrees while pushing down the ball by means of a pin punch or the like.

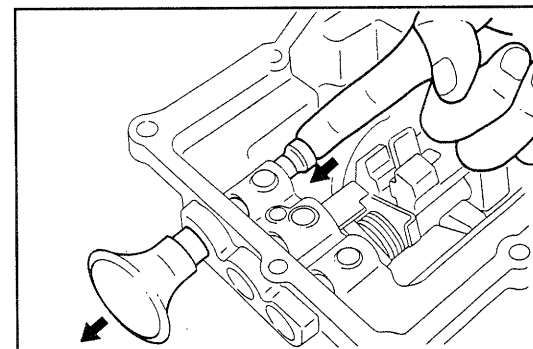


WRU90-MT300

- (4) Insert the small-sized SST into position from the transmission case cover.
- (5) Remove the large-sized SST by pushing the small-sized SST with your fingers.
- (6) Install the 5th & reverse shift fork shaft by pushing the small-sized SST.

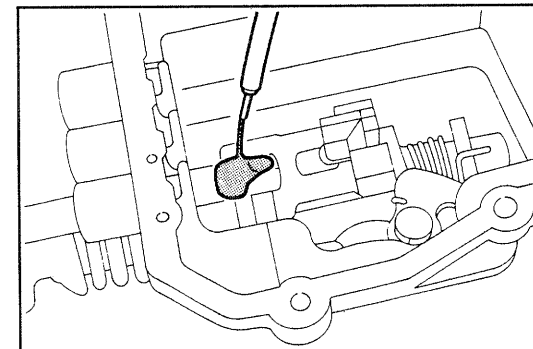
NOTE:

- At this stage, install the compression springs and balls for the 1st & 2nd and 3rd & 4th shift fork shafts in the transmission case cover subassembly, following the aforesaid procedure.



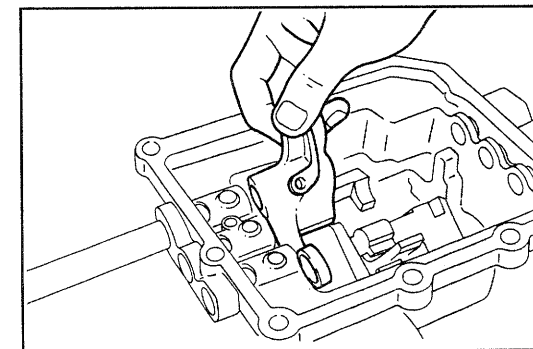
WRU90-MT301

15. Apply the gear oil to the 5th & reverse shift fork shaft and then, insert them into the position.



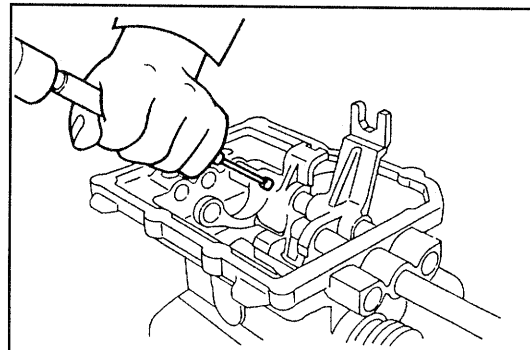
WRU90-MT302

16. Install the reverse shift fork to the 5th & reverse shift fork shaft.
17. Install the gear shift No. 1 head in the 5th & reverse shift fork shaft.



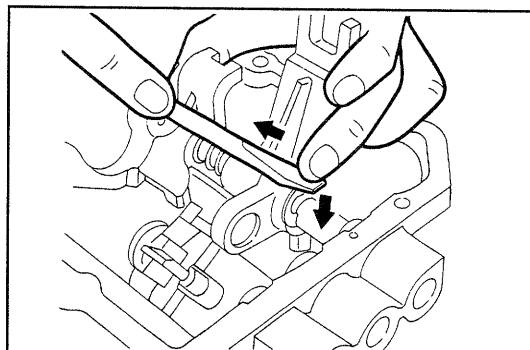
WRU90-MT303

18. Drive the new slotted pin into the gear shift No. 1 head securely.



WRU90-MT304

19. Attach the new "E" ring, while the reverse shift fork is being compressed with your fingers.

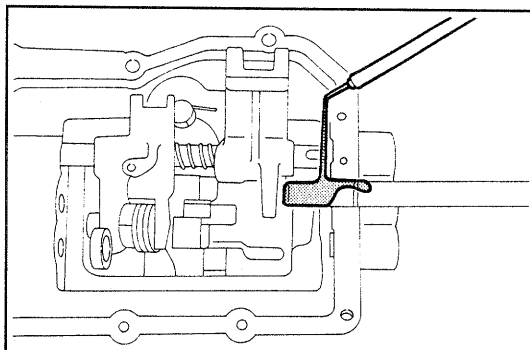


WRU90-MT305

20. Install the 3rd & 4th shift fork shaft to the transmission case cover subassembly.

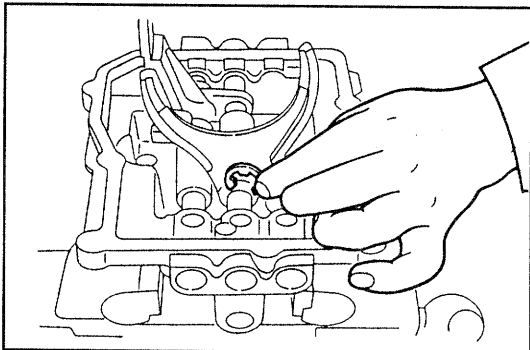
NOTE:

- Apply the gear oil to the outer periphery of the 3rd & 4th shift fork shaft, prior to install.



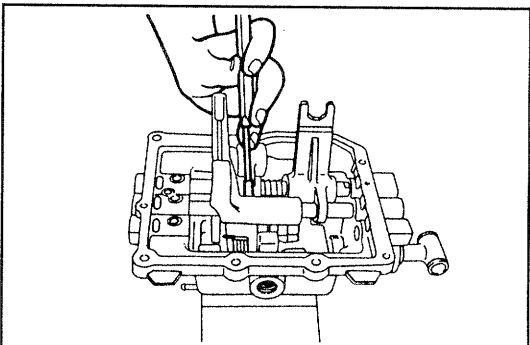
WRU90-MT306

21. Attach the new "E" ring to the 3rd & 4th shift fork.



WRU90-MT307

22. Secure the 3rd & 4th shift fork shaft and 3rd & 4th shift fork by driving the new slotted pins.

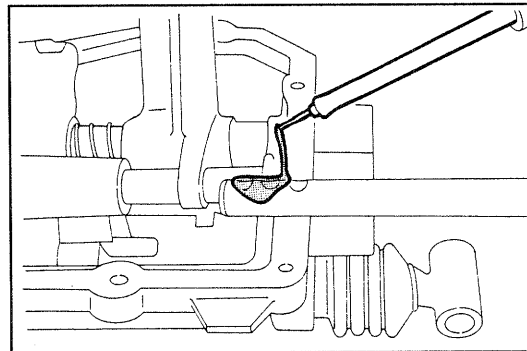


WRU90-MT308

23. Install the 1st & 2nd shift fork shaft to the transmission case cover subassembly.

NOTE:

- Apply the gear oil to the outer periphery of the 1st & 2nd shift fork shaft prior to install.

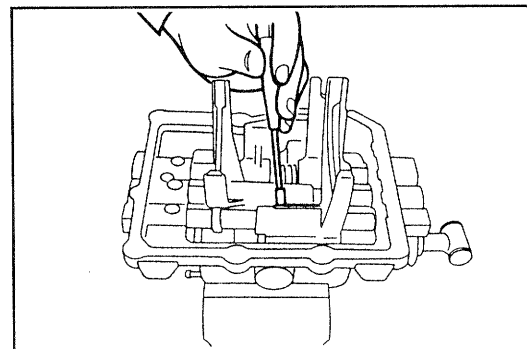


WRU90-MT309

24. Secure the 1st & 2nd shift fork shaft and 1st & 2nd shift fork by driving the new slotted pins.

NOTE:

- Never reuse the removed slotted pin.

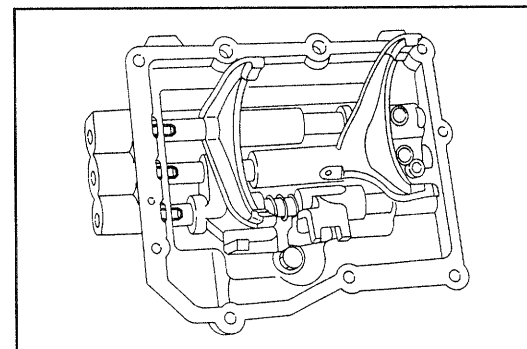


WRU90-MT310

25. Move the shift fork shafts to put the gear into the neutral position.

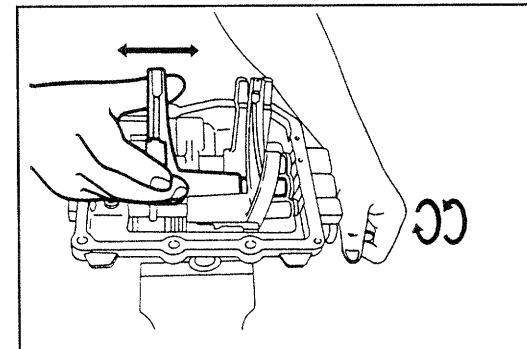
NOTE:

- Make sure that the long notch sections of the shift fork shafts are arranged uniformly.



WRU90-MT311

26. Inspection of operation
Select the shift & select shaft No. 1 to each control shaft.
Move the shift & select shaft No. 1 in the shifting direction.
Ensure that the shift & select shaft No. 1 operates smoothly without any binding.



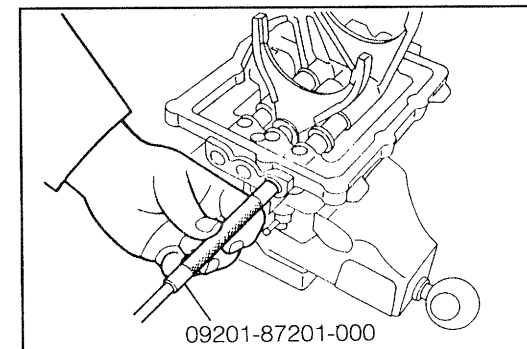
WRU90-MT312

27. Apply the Three bond 1104 (Three bond made) to the new tight plug. Press all tight plugs into position, using the following SST.

SST: 09201-87201-000

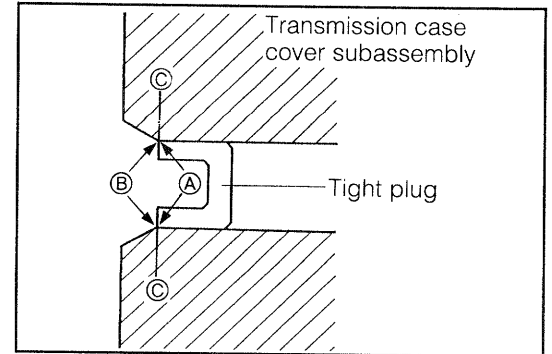
NOTE:

- Never reuse the removed tight plug.



WRU90-MT313

- Visually inspect that the both edge in the tight plugs ① and chamber in the transmission case cover ② should be well matched with the vertical line ③ as shown in the right figure illustration.

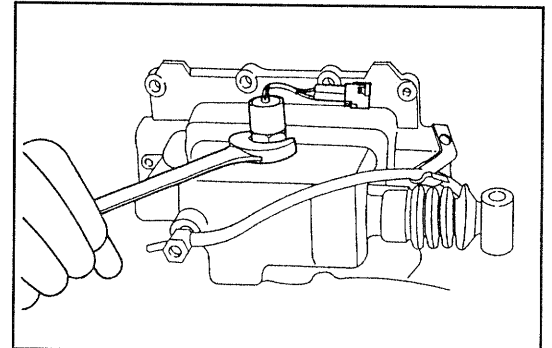


WRU90-MT314

- Turn the transmission case cover subassembly upside down, and then tighten the backup lamp switch assembly (use a new gasket).

Tightening Torque:

3.0 - 5.0 kg-m (21.7 - 36.0 ft-lb, 29.4 - 49.0 N-m)

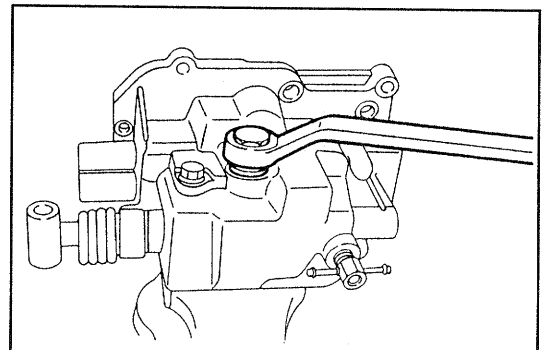


WRU90-MT315

- Tighten the reverse restrict pin with the two balls and compression spring (use new gasket).

Tightening Torque:

3.0 - 5.0 kg-m (21.7 - 36.0 ft-lb, 29.4 - 49.0 N-m)

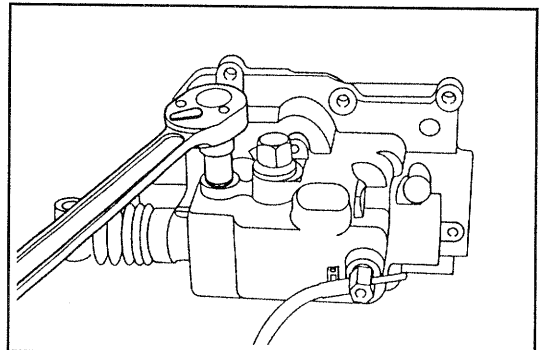


WRU90-MT316

- Tighten the set bolt with a spring washer.

Tightening Torque:

3.0 - 4.5 kg-m (21.7 - 32.5 ft-lb, 29.4 - 44.1 N-m)



WRU90-MT317

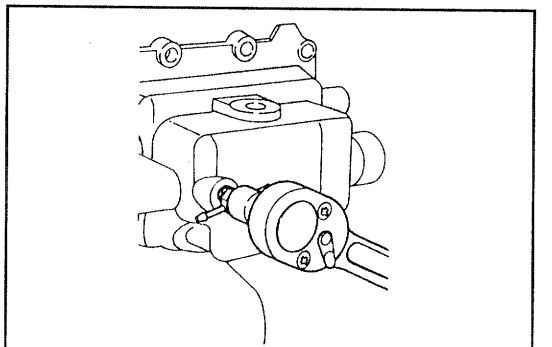
- Apply the THREE BOND 1214 (made by THREE BOND) to the threaded sections of the union, and tighten the union.

Tightening Torque:

1.3 - 1.6 kg-m (9.4 - 11.6 ft-lb, 12.7 - 15.7 N-m)

NOTE:

- The unions must be parallel in their longitudinal directions.

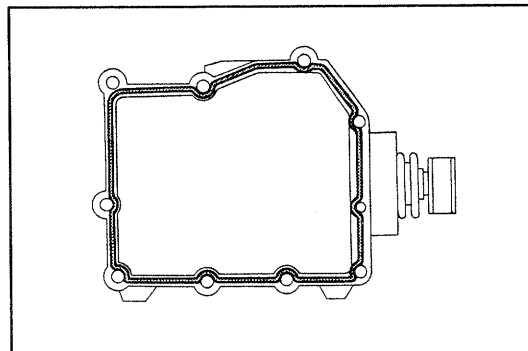


WRU90-MT318

32. Connect the breather hose to the union with a clamp.
33. Apply the Three bond 1216 (Three bond made) to the transmission case cover attaching surface of the transmission case.

NOTE:

- Apply the bond to the inside of the bolt hole, as shown in the right figure illustration.



WRU90-MT319

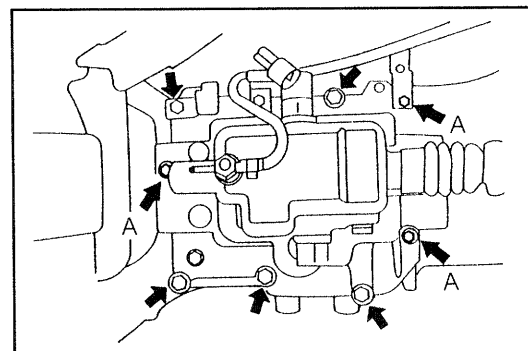
34. Install the transmission case cover subassembly, and tighten the mounting bolts.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

A-section

0.7 - 1.0 kg-m (5.7 - 7.2 ft-lb, 6.9 - 9.8 N·m)

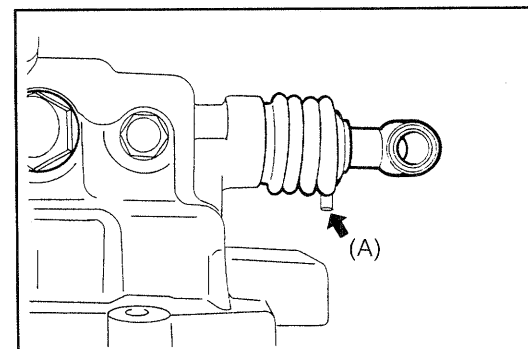


WRU90-MT320

35. Install fit the control shaft No. 2 boot to the oil seal groove section securely.

NOTE:

- Air breeding holl (A) in the control shaft No. 2 faces toward with the transmission A/y.



WRU90-MT321

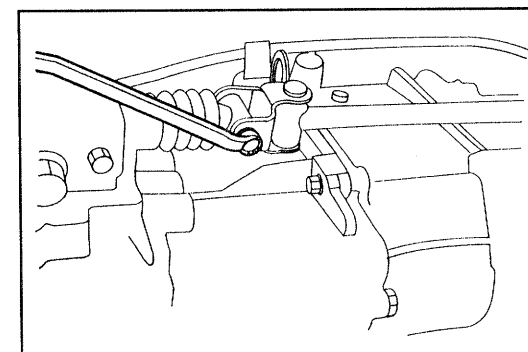
36. Bolt down and tighten the shift lever retainer assembly and the control shaft.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

NOTE:

- Apply the THREE BOND 1324 (made by THREE BOND) to the threaded sections of the bolts.

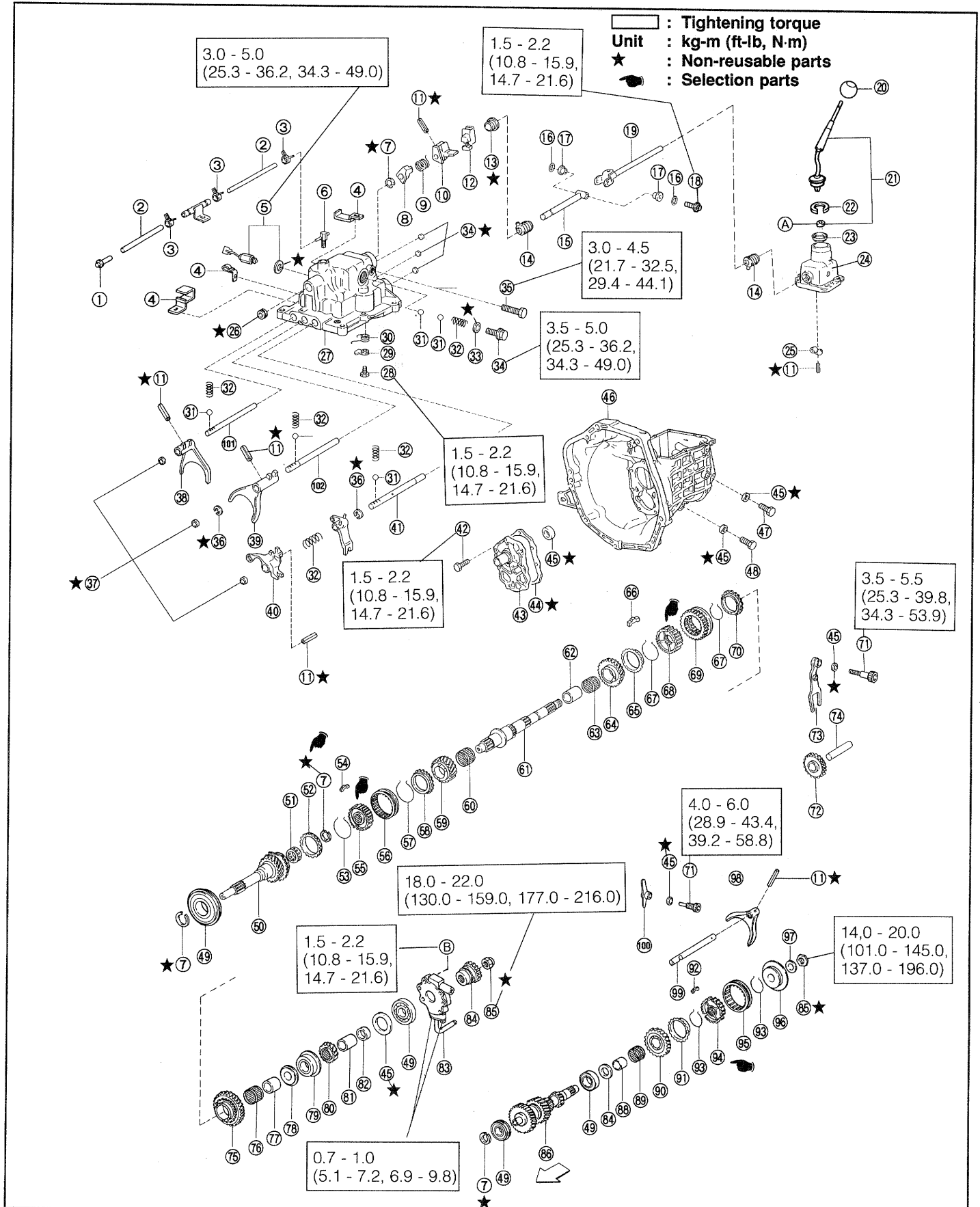


WRU90-MT322

37. Install the transmission assembly with transfer to the vehicle (As for the installation procedure, see page MT-105 to MT-109).

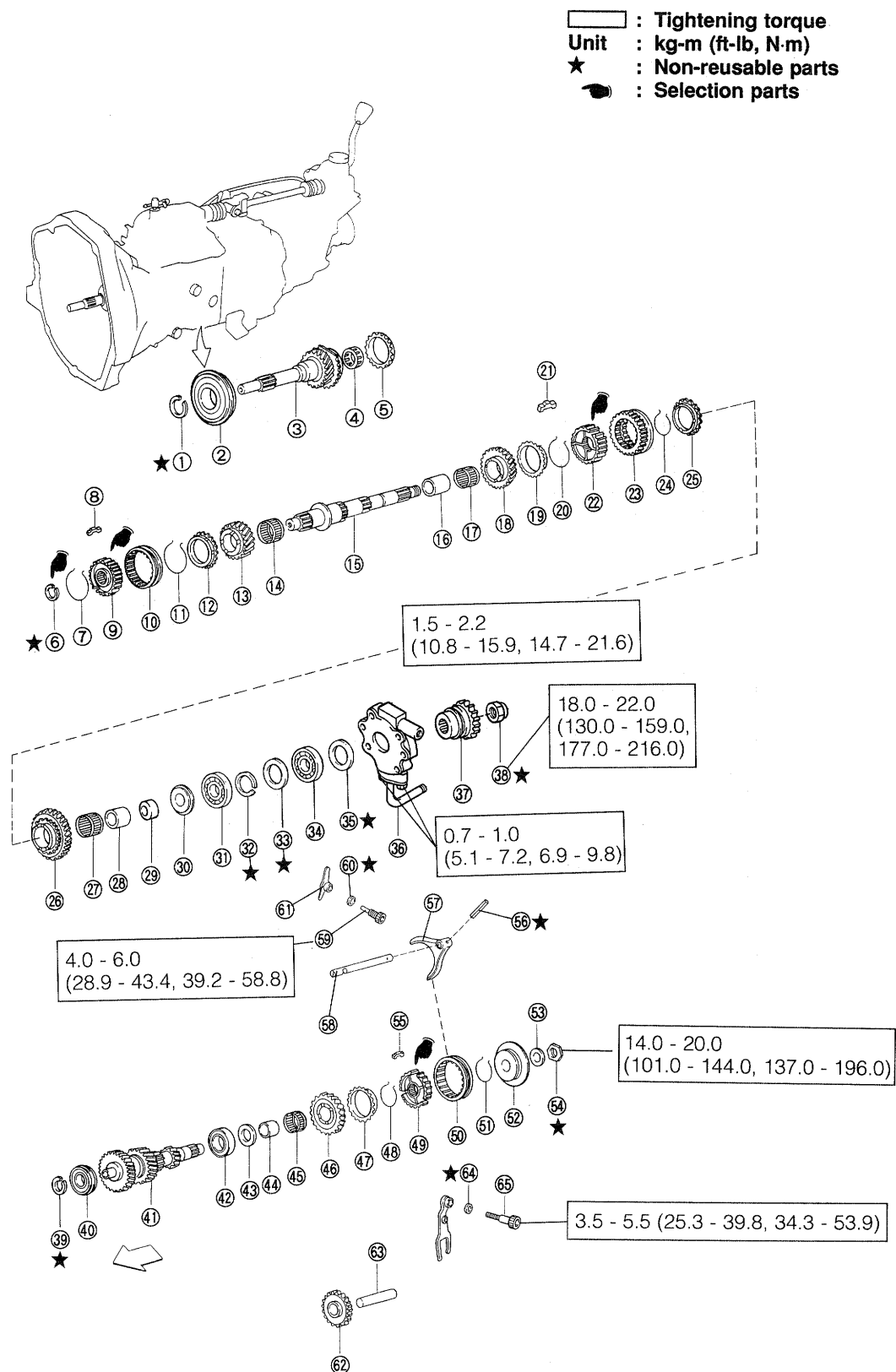
WRU92-MT500

TRANSMISSION COMPONENTS



- | | |
|-----------------------------------|------------------------------------|
| ① 2 way | ⑤② Synchronizer ring No. 3 |
| ② Breather hose | ⑤③ Synchromesh shifting key spring |
| ③ Clip | ⑤④ Synchromesh shifting key No. 2 |
| ④ Clamp | ⑤⑤ T/M clutch hub No. 2 |
| ⑤ Back up lamp switch | ⑤⑥ Hub sleeve No. 1 |
| ⑥ Union | ⑤⑦ Synchromesh shifting key spring |
| ⑦ Snap ring | ⑤⑧ Synchronizer ring No. 3 |
| ⑧ Reverse restrict pin No. 2 | ⑤⑨ 3rd gear |
| ⑨ Torsion spring | ⑥① Needle roller bearing |
| ⑩ Shift inner lever | ⑥② Output shaft |
| ⑪ Slotted pin | ⑥③ 1st gear bearing inner race |
| ⑫ Detent sleeve | ⑥④ Needle roller bearing |
| ⑬ Oil seal | ⑥⑤ 2nd gear |
| ⑭ Shift & select shaft No. 1 boot | ⑥⑥ Synchronizer ring No. 3 |
| ⑮ Shift & select shaft | ⑥⑦ Synchromesh shifting key |
| ⑯ "O" ring | ⑥⑧ Synchromesh shifting key spring |
| ⑰ Bush | ⑥⑨ T/M clutch hub No. 1 |
| ⑱ Bolt | ⑥⑩ Reverse gear |
| ⑲ Control shaft | ⑦① Synchronizer ring No. 2 |
| ⑳ T/M control shift knob | ⑦② Bolt |
| ㉑ T/M shift lever assy (A: Bush) | ⑦③ Reverse idle gear S/A |
| ㉒ Snap ring | ⑦④ Reverse shift arm |
| ㉓ T/M shift lever ball seat | ⑦⑤ Reverse idle gear shaft |
| ㉔ Shift lever retainer S/A | ⑦⑥ 1st gear |
| ㉕ Shift lever outer | ⑦⑦ Needle roller bearing |
| ㉖ Tight plug | ⑦⑧ 1st gear bearing inner race |
| ㉗ T/M case cover | ⑦⑨ 1st gear thrust washer |
| ㉘ Bolt | ⑦⑩ Radial ball bearing |
| ㉙ Shift lock plate | ⑧① 5th gear |
| ㉚ Torsion spring | ⑧② Output shaft gear spacer No. 1 |
| ㉛ Ball | ⑧③ Output shaft gear spacer No. 2 |
| ㉜ Spring | ⑧④ Transfer oil pump body S/A |
| ㉝ Gasket | ⑧⑤ Transfer input hub |
| ㉞ Bolt | ⑧⑥ Lock nut |
| ㉟ Bolt | ⑧⑦ Counter gear |
| ㊱ "E" ring | ⑧⑧ 5th gear thrust washer |
| ㊲ Tight plug | ⑧⑨ 5th gear bearing inner race |
| ㊳ 1st & 2nd shift fork | ⑧⑩ Needle roller bearing |
| ㊴ 3rd & 4th shift fork | ⑧⑪ Counter shaft 5th gear |
| ㊵ Gear shift head No. 1 | ⑧⑫ Synchronizer ring No. 3 |
| ㊶ 5th & reverse shift fork shaft | ⑧⑬ Synchromesh shifting key No. 2 |
| ㊷ Bolt | ⑧⑭ Synchromesh shifting key spring |
| ㊸ Bearing front retainer | ⑧⑮ Synchronizer hub No. 1 |
| ㊹ Gasket | ⑧⑯ T/M hub sleeve |
| ㊺ Oil seal | ⑧⑰ Shifting key retainer |
| ㊻ T/M case assy | ⑧⑱ Conical washer spring |
| ㊼ Bolt | ⑧⑲ 5th shift fork |
| ㊽ Bolt | ⑧⑳ Gear shifting lever shaft |
| ㊾ Radial ball bearing | ⑧㉑ 5th shift arm |
| ㊿ Input shaft | ⑧㉒ 1st & 2nd shift fork shaft |
| ① Needle roller bearing | ⑧㉓ 3rd & 4th shift fork shaft |

INPUT SHAFT-, OUTPUT SHAFT- & TRANSFER INPUT HUB COMPONENTS



- | | |
|---|------------------------------------|
| ① Snap ring | ③③ Oil seal |
| ② Radial ball bearing | ③④ Bearing |
| ③ Input shaft | ③⑤ O ring |
| ④ Needle roller bearing | ③⑥ Transfer oil pump body S/A |
| ⑤ Synchronizer ring No. 3 | ③⑦ Transfer input hub |
| ⑥ Snap ring | ③⑧ Lock nut |
| ⑦ Synchromesh shifting key spring | ③⑨ Snap ring |
| ⑧ Synchromesh shifting key No. 2 (3 pieces) | ④① Radial ball bearing |
| ⑨ Transmission clutch hub No. 2 | ④② Counter gear |
| ⑩ Transmission hub sleeve No. 1 | ④③ Radial ball bearing |
| ⑪ Synchromesh shifting key spring | ④④ 5th gear thrust washer |
| ⑫ Synchronizer ring No. 3 | ④⑤ 5th gear bearing inner race |
| ⑬ 3rd gear | ④⑥ Needle roller bearing |
| ⑭ Needle roller bearing | ④⑦ Counter shaft 5th gear |
| ⑮ Output shaft | ④⑧ Synchronizer ring No. 3 |
| ⑯ 1st gear bearing inner race | ④⑨ Synchromesh shifting key spring |
| ⑰ Needle roller bearing | ④⑩ Synchronizer No. 1 hub |
| ⑱ 2nd gear | ⑤① Transmission hub sleeve No. 2 |
| ⑲ Synchronizer ring No. 3 | ⑤② Synchromesh shifting key spring |
| ⑳ Synchromesh shifting key spring | ⑤③ 5th shifting key retainer |
| ㉑ Synchromesh shifting key No. 1 (3 pieces) | ⑤④ Conical spring washer |
| ㉒ Transmission clutch hub No. 1 | ⑤⑤ Lock nut |
| ㉓ Reverse gear | ⑤⑥ Synchromesh shifting key No. 2 |
| ㉔ Synchromesh shifting key spring | ⑤⑦ Slotted pin |
| ㉕ Synchronizer ring No. 2 | ⑤⑧ 5th shift fork |
| ㉖ 1st gear | ⑤⑨ Gear shifting lever shaft |
| ㉗ Needle roller bearing | ⑤⑩ Bolt |
| ㉘ 1st gear bearing inner race | ⑥① Gasket |
| ㉙ 1st gear bearing inner race No. 2 | ⑥② 5th shift arm |
| ㉚ 1st gear thrust washer | ⑥③ Reverse idle gear S/A |
| ㉛ Radial ball bearing | ⑥④ Reverse idle gear shaft |
| ㉜ O ring | |

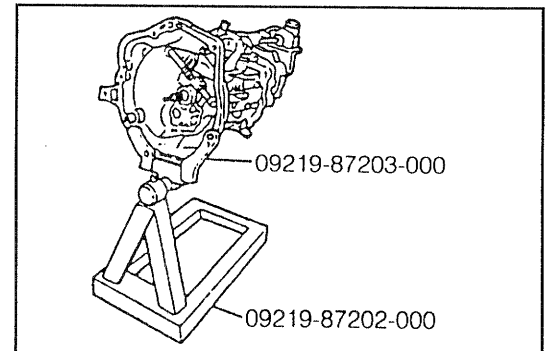
DISASSEMBLY

1. Install the transmission assembly with transfer on the over-haul stand, using the following SST.

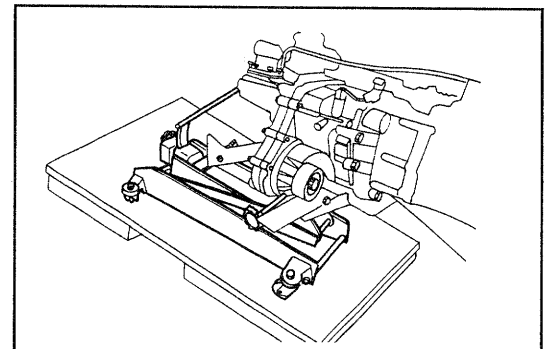
SST: 09219-87202-000
09219-87203-000

(As for the removal of transmission assembly with transfer, see page MT-16 to MT-20.)

2. Place a wooden plate(s) or any other suitable materials on the overhauling stand, as shown in the diagram at right.
3. Support the transfer front and transfer rear case with a transmission jack.

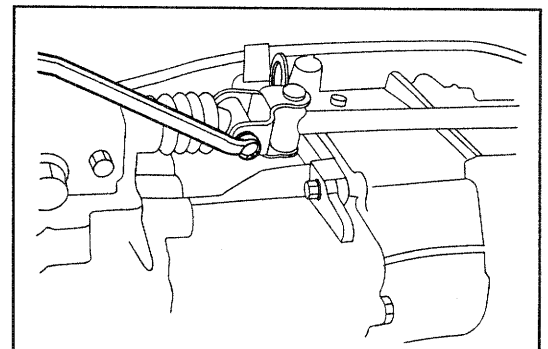


WRU92-MT501



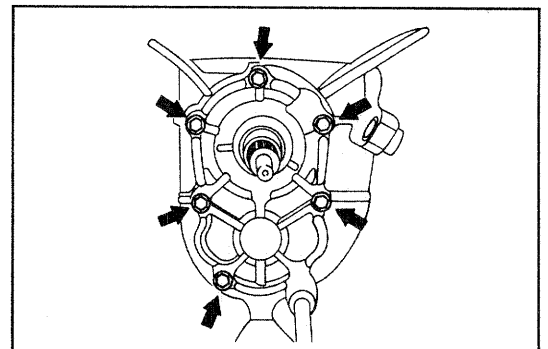
WRU90-MT326

4. Remove the control shaft with installed the shift lever retainer subassembly by removing the hexagon bolt.



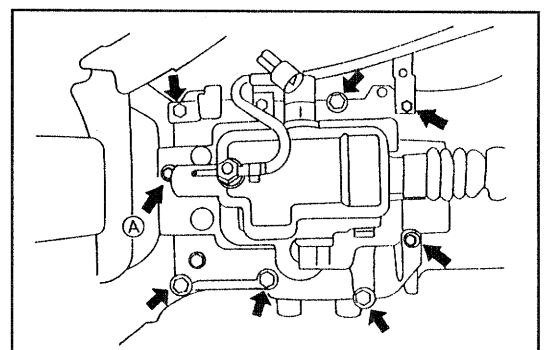
WRU90-MT327

5. Remove the clutch release bearing and related parts (see page CL-sections).
6. Remove the front bearing retainer by removing the seven bolts.



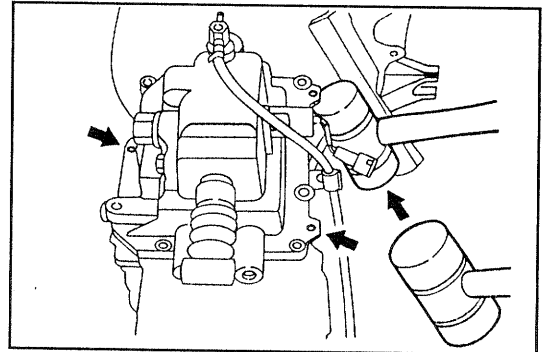
WRU90-MT328

7. Remove the transmission case cover subassembly by removing the seven bolts and a reamer bolt (A).

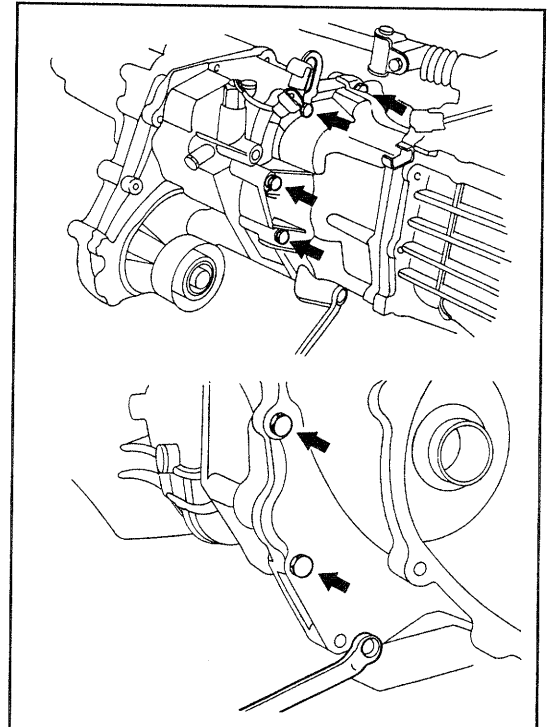


WRU90-MT329

8. Disconnect the breather hose by detaching a clip.
9. Remove the transmission case cover subassembly by lightly tapping each of the ribs evenly toward the upper side of the transmission case.
10. Remove the transfer front case by removing the eight bolts from the transfer adapter and pull them toward you carefully.



WRU90-MT330



WRU90-MT331

11. Interlock the 1st gear and the 3rd gear.

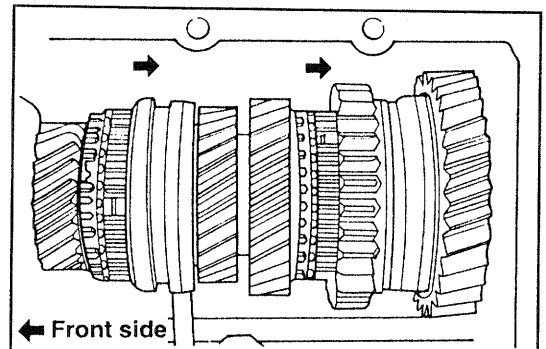
NOTE:

- Measure the following sections, prior to an interlock.

Specified Value:

Unit: mm (inch)

	1st	2nd	3rd	4th
Gear backlash	0.05 - 0.18 (0.0019 - 0.0070)	0.05 - 0.16 (0.0019 - 0.0062)	0.05 - 0.14 (0.0019 - 0.0055)	0.05 - 0.13 (0.0019 - 0.0051)
Thrust clearance	0.17 - 0.30 (0.0067 - 0.011)	0.10 - 0.37 (0.0039 - 0.014)	0.10 - 0.33 (0.0039 - 0.013)	



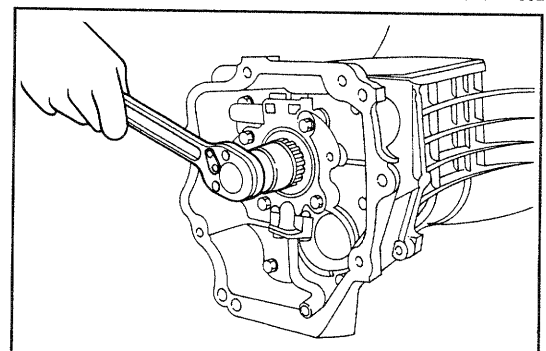
WRU90-MT332

12. Raise the lock section of the lock nut, using the chisel or the like.

CAUTION:

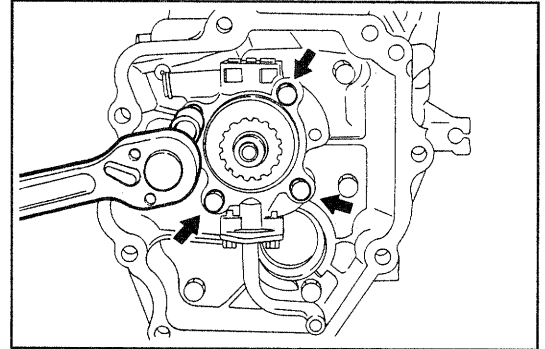
- Never reuse the removed lock nut.

13. Remove the lock nut, using the 32 mm socket wrench box.



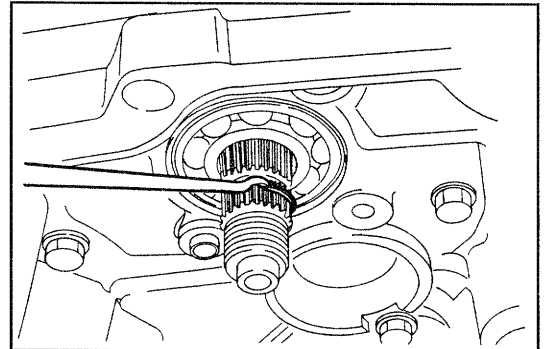
WRU90-MT333

14. Remove the transfer oil pump body subassembly with the transfer oil strainer tube and transfer input hub installed by removing the four bolts.



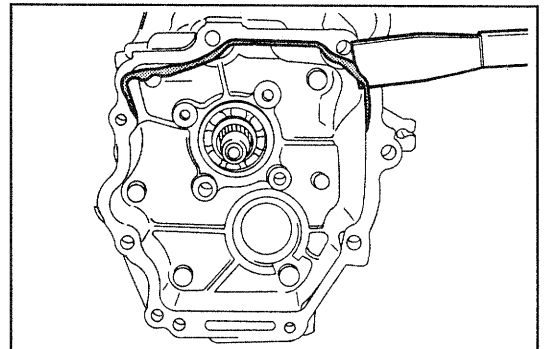
WRU90-MT334

15. Remove the "O" ring from the transmission output shaft.
CAUTION:
 - Never reuse the removed "O" ring.



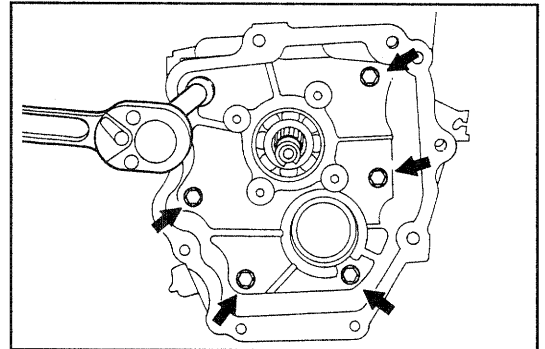
WRU90-MT335

16. Remove the liquid gasket in the attaching surface of the transfer adapter, using the standard tool of gasket scraper.
NOTE:
 - Be careful not to damage the mating surface.



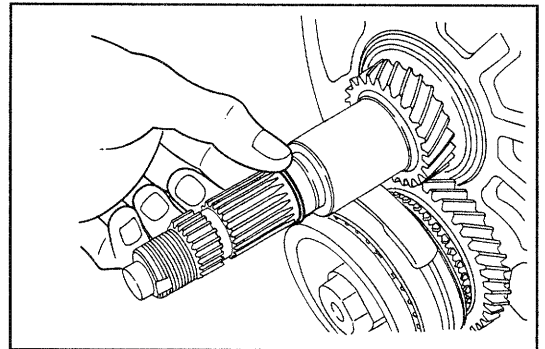
WRU90-MT336

17. Remove the transfer adapter with installed the bearing and output gear spacer No. 2 by removing the six bolts.



WRU90-MT337

18. Remove the "O" ring from the transmission output shaft.
CAUTION:
 - Never reuse the removed "O" ring.



WRU90-MT338

19. Remove the output gear spacer No. 1 from the transmission output shaft.

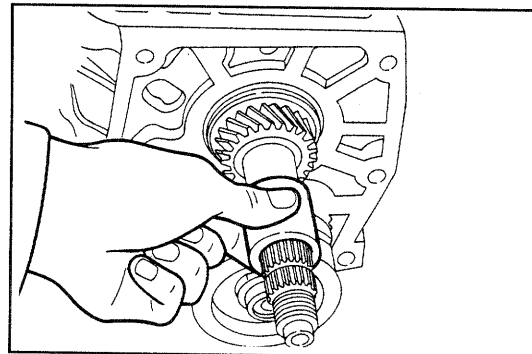
NOTE:

- Measure the backlash and the thrust clearance of the 5th gear.

Specified Value:

Unit: mm (inch)

Backlash	0.05 - 0.13 (0.0019 - 0.0051)
Thrust clearance	0.11 - 0.30 (0.0039 - 0.011)



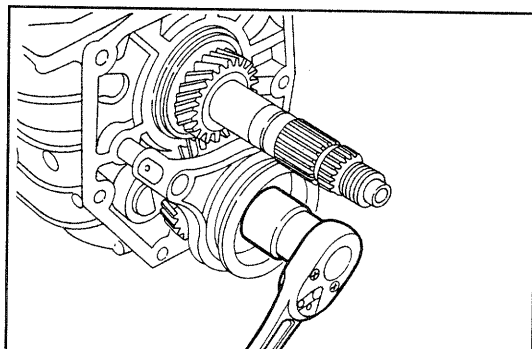
WRU90-MT339

20. Raise the lock section of the lock nut, using the chisel or the like.

CAUTION:

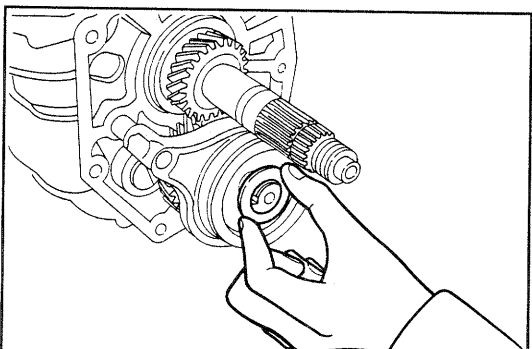
- Never reuse the removed lock nut.

21. Remove the lock nut of the counter shaft 5th gear.



WRU90-MT340

22. Remove the conical spring washer and shifting key retainer.

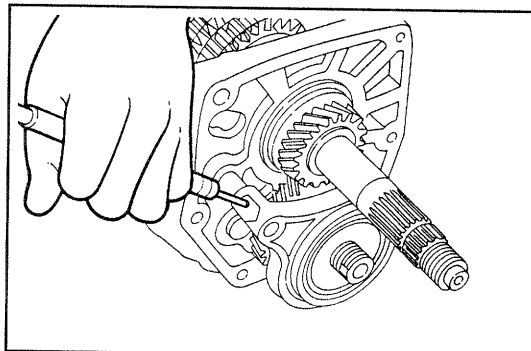


WRU90-MT341

23. Drive off the slotted pin of the 5th shift fork.

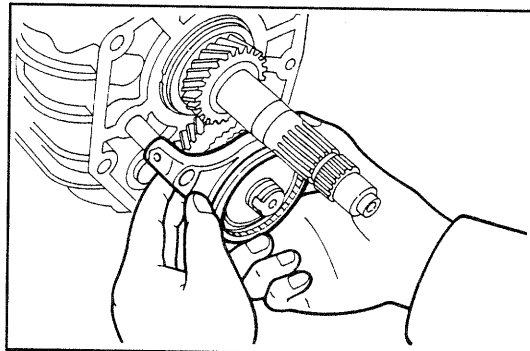
CAUTION:

- Never reuse the removed slotted pin.



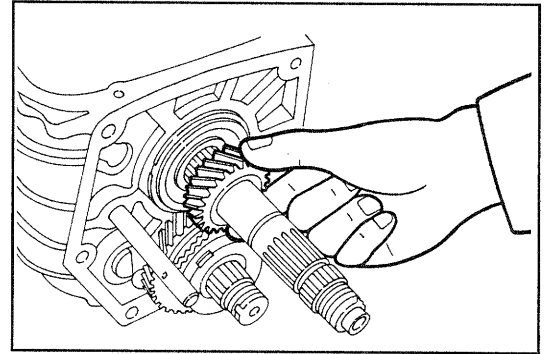
WRU90-MT342

24. Remove the 5th shift fork together with synchronizer hub sleeve in a set.



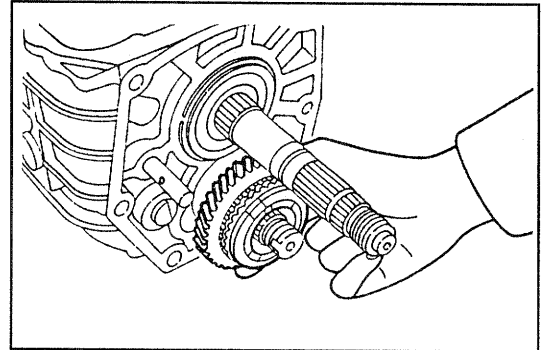
WRU90-MT343

25. Remove the 5th gear of the transmission output shaft.



WRU90-MT344

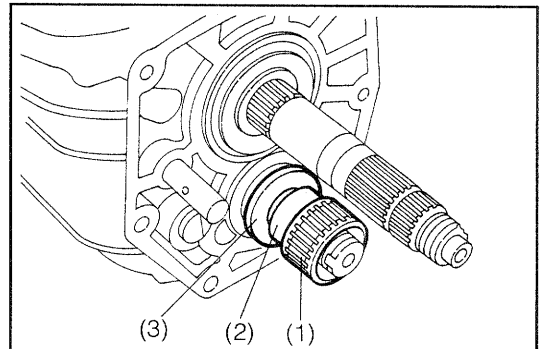
26. Remove the synchronizer ring No. 3 and 5th gear of the countershaft.



WRU90-MT345

27. Remove the following parts from the countershaft.

- (1) Needle roller bearing
- (2) 5th gear bearing inner race
- (3) 5th gear thrust washer

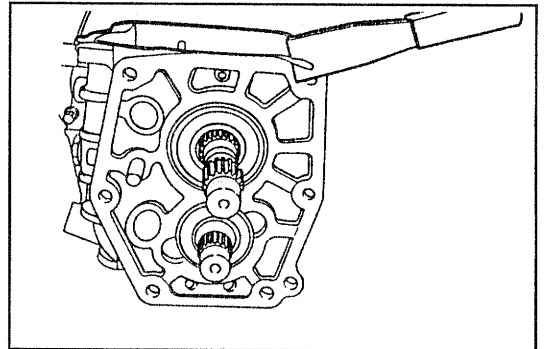


WRU90-MT346

28. Remove the liquid gasket from the transmission case, using the standard tool of gasket scraper.

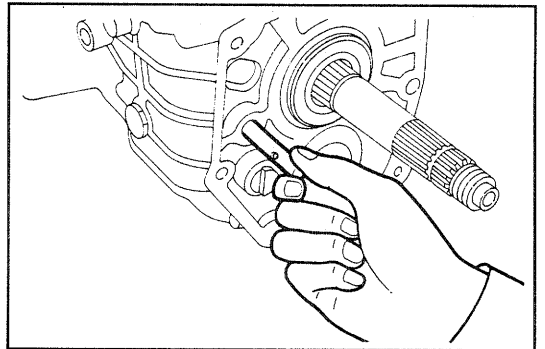
CAUTION:

- Be very careful not to scratch the transmission case.



WRU90-MT347

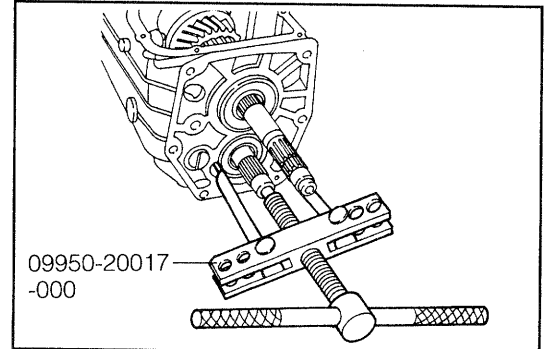
29. Remove the gear shifting lever shaft.



WRU90-MT348

30. Remove the countershaft rear bearing, using the following SST.

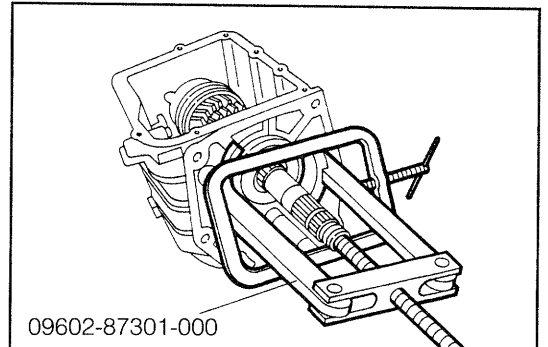
SST: 09950-20017-000



WRU90-MT349

31. Detach the snap ring of the output shaft bearing. Remove the output shaft bearing, using the following SST.

SST: 09602-87301-000



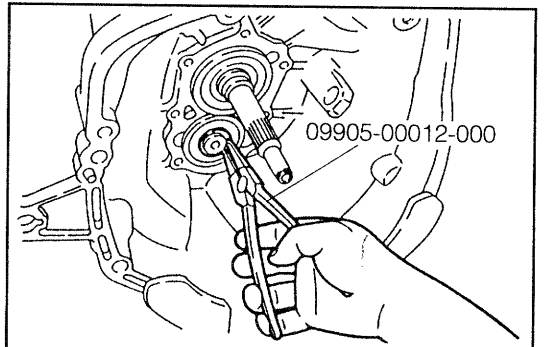
WRU90-MT350

32. Detach the snap ring of the countershaft, using the following SST.

SST: 09905-00012-000

NOTE:

- Never reuse the snap ring.



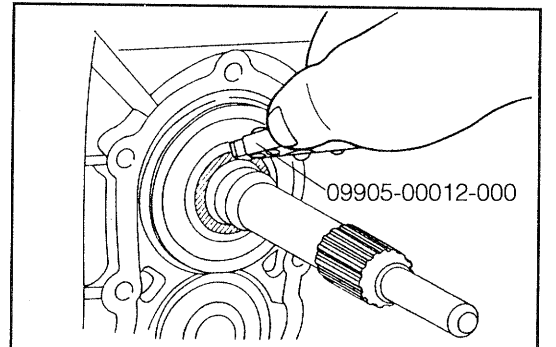
WRU90-MT351

33. Detach the snap ring of the input shaft, using the following SST.

SST: 09905-00012-000

NOTE:

- Never reuse the removed snap ring.



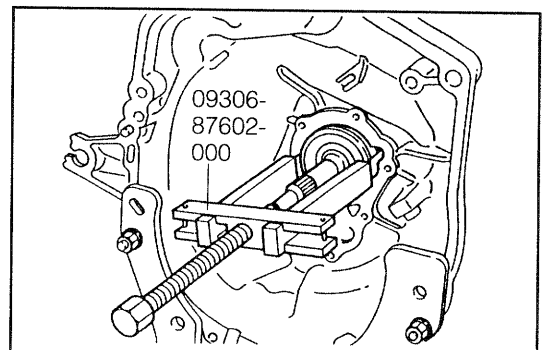
WRU90-MT352

34. Remove the input shaft bearing, using the following SST.

SST: 09306-87602-000

NOTE:

- Detach the stop ring, prior to remove the bearing.



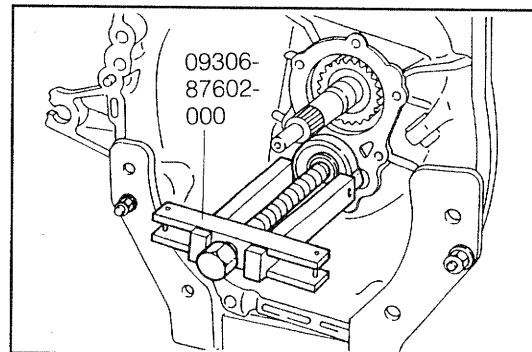
WRU90-MT353

35. Remove the bearing of the countershaft at the clutch side, using the following SST.

SST: 09306-87602-000

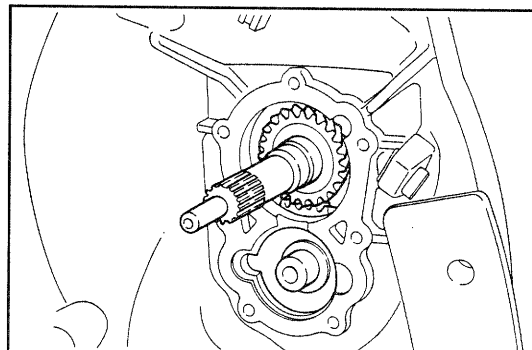
NOTE:

- Push out the bearing by tapping the countershaft at the output shaft side, using a plastic hammer.
- Detach the stop ring, prior to remove the bearing.



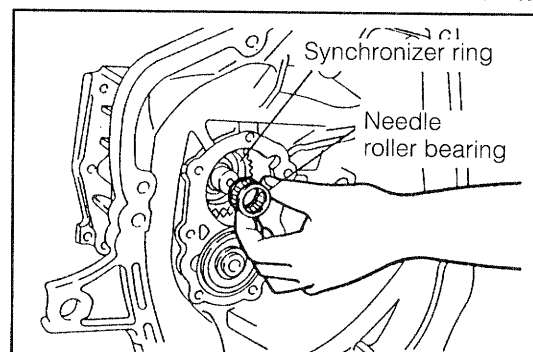
WRU90-MT354

36. Remove the input shaft.



WRU90-MT355

37. Remove the needle roller bearing and synchronizer ring No. 3.

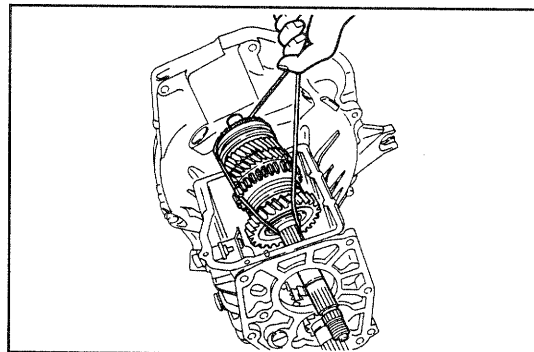


WRU90-MT356

38. Remove the output shaft assembly.
(As for the disassembly, inspection and assembly for the removed parts, see page MT-83.)

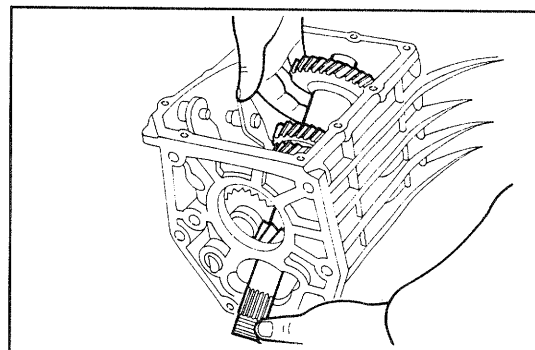
NOTE:

- It is recommended that as shown in the diagram at right, an operation rope (about 3 mm in outside diameter) be used to remove the output shaft assembly from the transmission case.



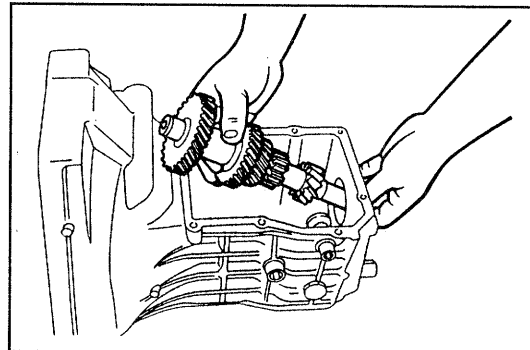
WRU92-MT502

39. Remove the countershaft from the transmission case.



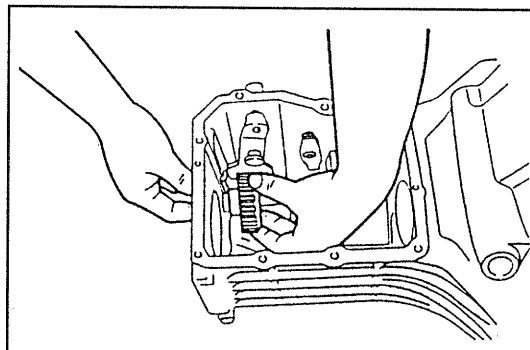
WRU90-MT358

40. Remove the countershaft from the transmission case.



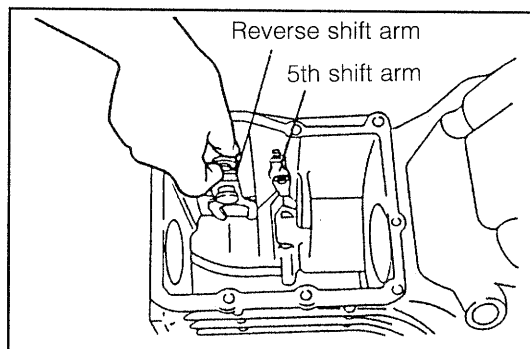
WRU90-MT359

41. Remove the reverse idler gear and reverse idler gear shaft.



WRU90-MT360

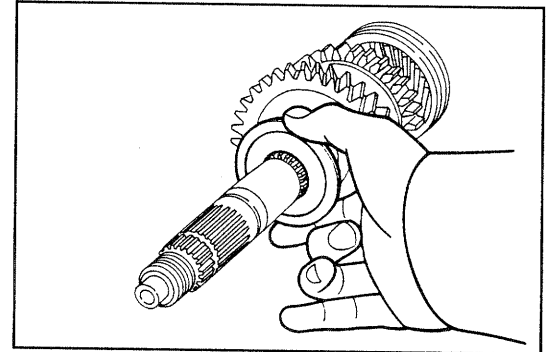
42. Remove the reverse shift arm and 5th shift arm.



WRU90-MT361

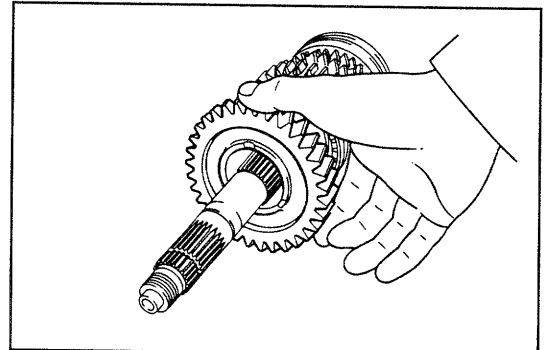
TRANSMISSION OUTPUT SHAFT DISASSEMBLY

1. Remove the 1st gear thrust washer.



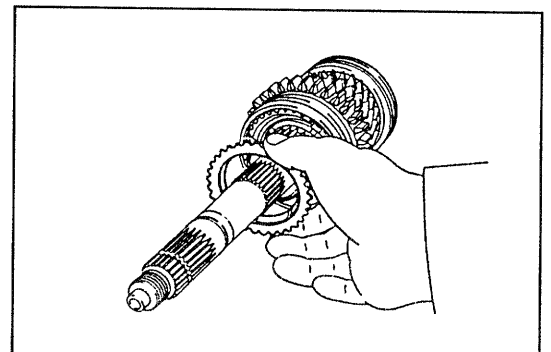
WRU90-MT362

2. Remove the 1st gear.



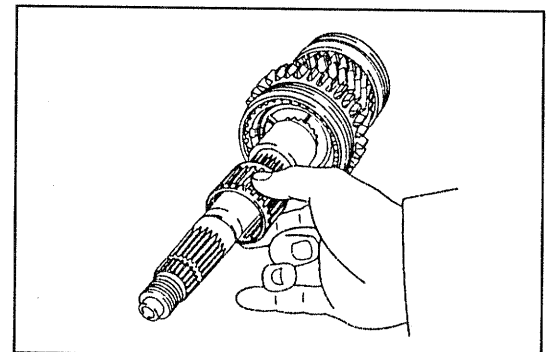
WRU90-MT363

3. Remove the synchronizer ring No. 2



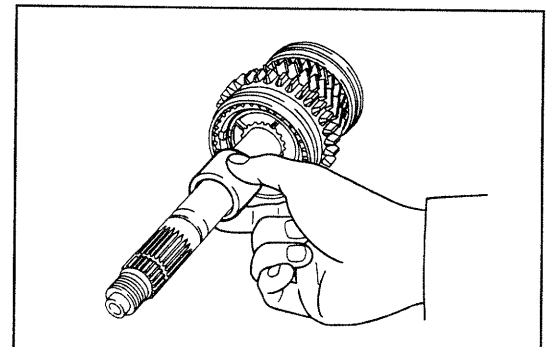
WRU90-MT364

4. Remove the needle roller bearing



WRU90-MT365

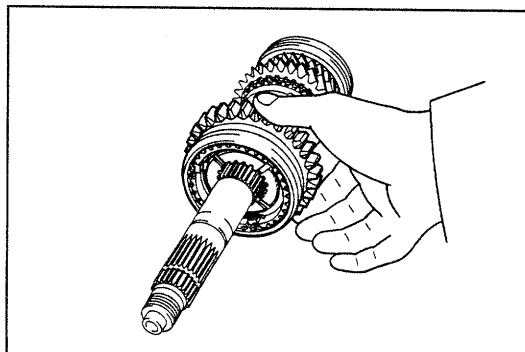
5. Remove the 1st gear bearing inner race.



WRU90-MT366

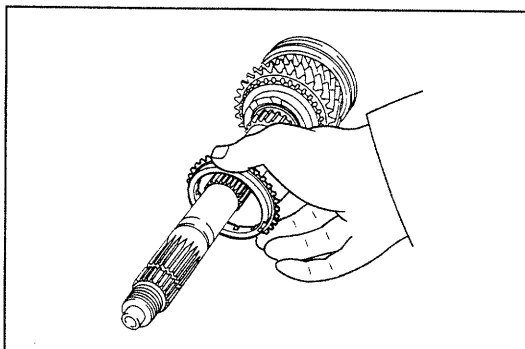
6. Remove the reverse gear with installed the following parts in a set.

- (1) Transmission clutch hub No. 1
- (2) Synchromesh shifting key spring (1 piece)
- (3) Synchromesh shifting key (3 pieces)



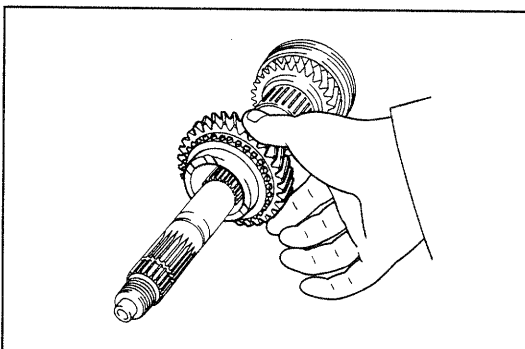
WRU90-MT367

7. Remove the synchronizer ring No. 2.



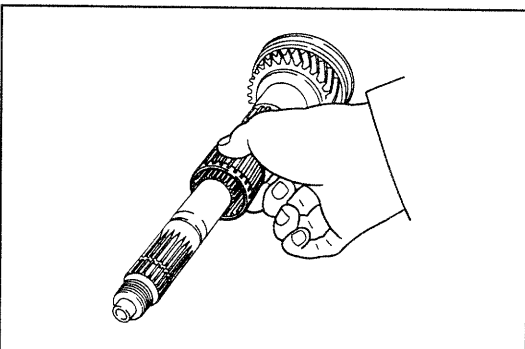
WRU90-MT368

8. Remove the 2nd gear.



WRU90-MT369

9. Remove the needle roller bearing.



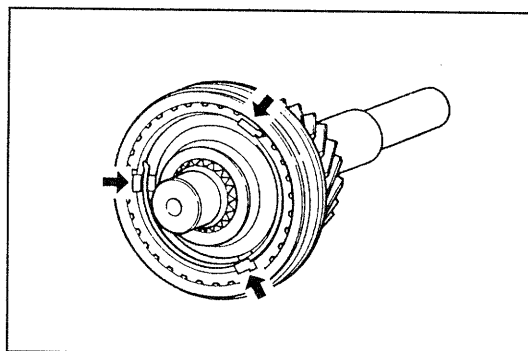
WRU90-MT370

10. Remove the following parts.

- (1) Transmission hub sleeve No. 1
- (2) Synchromesh shifting key spring (1 piece)
- (3) Synchromesh shifting key (3 pieces)

NOTE:

- Measurement of the clearance (in the direction of the output shaft) of transmission clutch hub No. 2 must be performed with the above-listed parts removed. See page MT-89 for the measurement procedure.

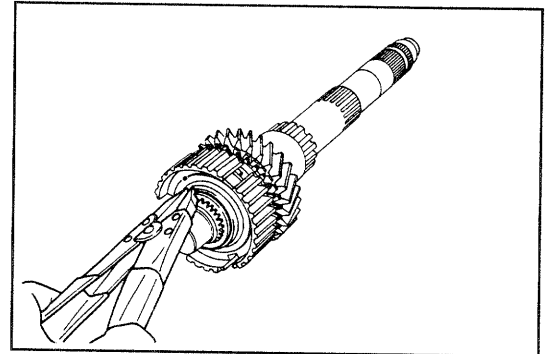


WRU92-MT505

11. Detach the snap ring.

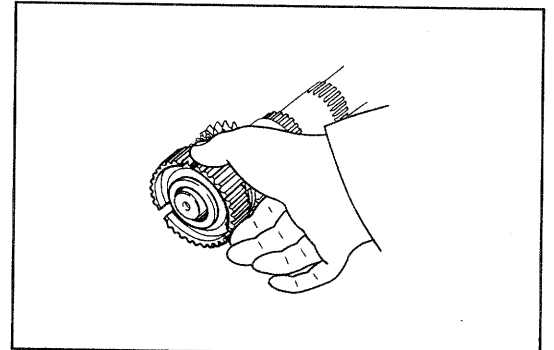
NOTE:

- Never reuse the removed snap ring.



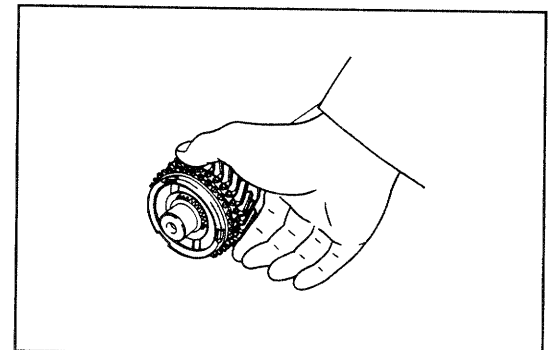
WRU90-MT372

12. Remove the following parts in a set.
 - (1) Transmission clutch hub No. 2
 - (2) Synchromesh shifting key spring (1 piece)



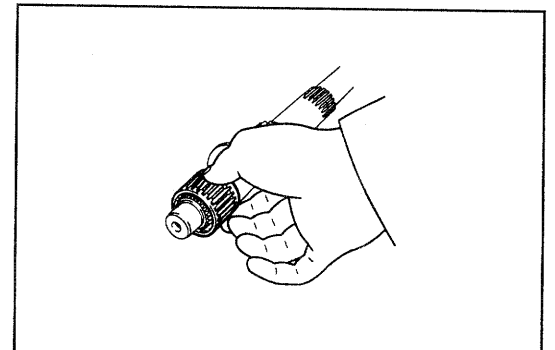
WRU90-MT373

13. Remove the 3rd gear together with synchronizer ring No. 3.



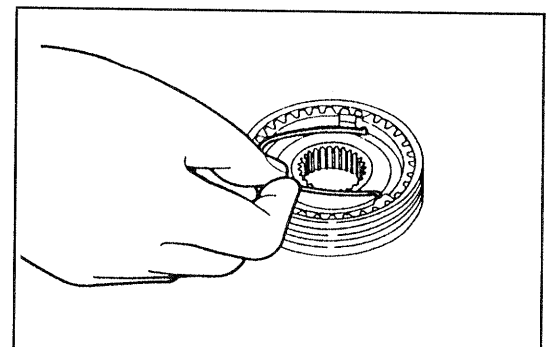
WRU90-MT374

14. Remove the needle roller bearing.



WRU90-MT375

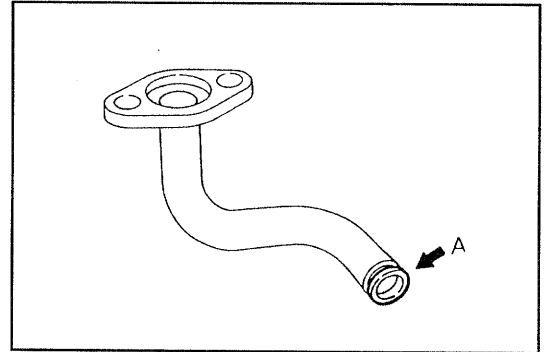
15. Remove the synchromesh shifting key spring. Remove the transmission hub sleeve and synchromesh shifting key of the reverse gear and transmission hub sleeve No. 2.



WRU90-MT376

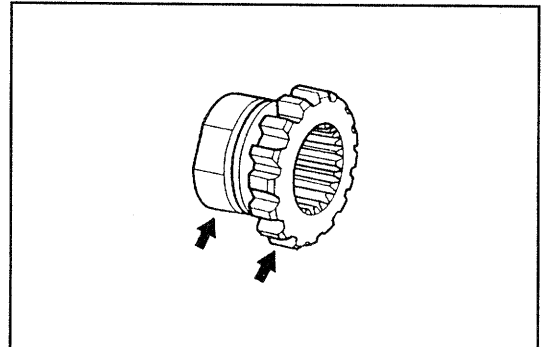
INSPECTION

1. Touch the end (section A) of the transfer oil strainer suction tube to check for burrs or other defects.



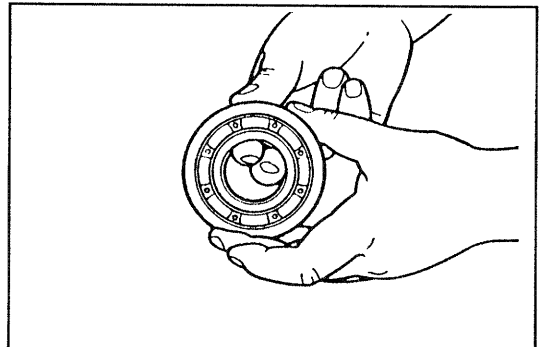
WRU90-MT404

2. Visually check the gear and spline sections of the transfer input hub for damage, or wear.



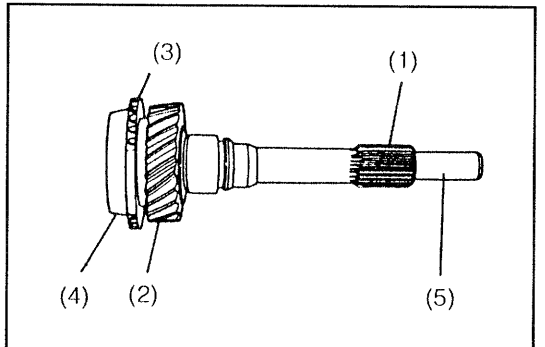
WRU90-MT405

3. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any binding and sticking.



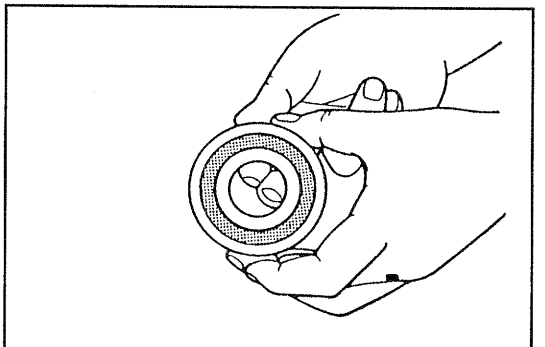
WRU90-MT406

4. Input shaft
Check the input shaft for the following items.
 - (1) Spline section for damage
 - (2) Gear for damage and wear
 - (3) Engaging section of hub sleeve for damage
 - (4) Tapered section for wear or damage
 - (5) Race section of roller bearing for wear or damage



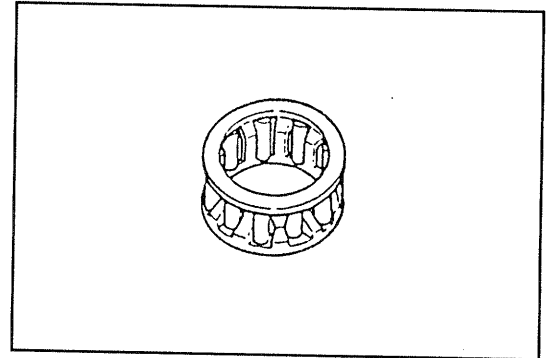
WRU90-MT407

5. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any sticking.



WRU90-MT408

6. Check the needle roller bearing for wear or damage.



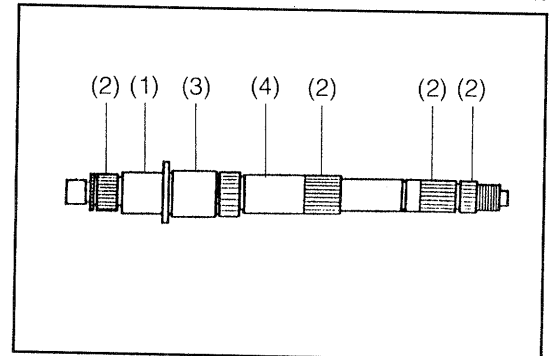
WRU90-MT409

7. Output shaft

Check the output shaft for the following items.

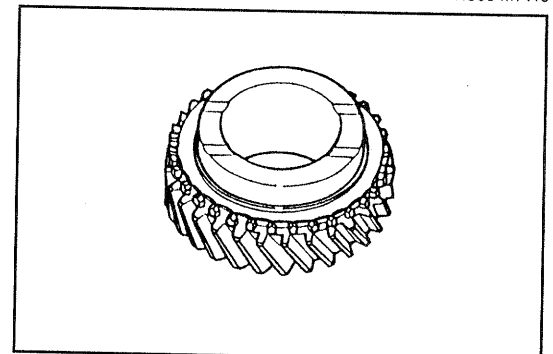
- (1) Needle roller bearing race section for wear or damage
- (2) Spline section for damage
- (3) Fitting section of bearing inner race for wear
- (4) Measure the runout of the output shaft, using a dial gauge and V-block.

Allowable Runout Limit: 0.05 mm (0.0020 inch)



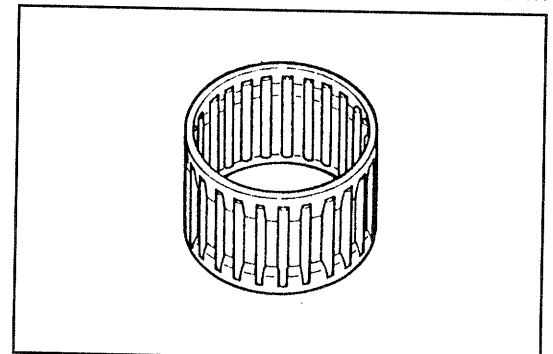
WRU90-MT410

8. Check the gear section of each gear for damage or abnormal wear.



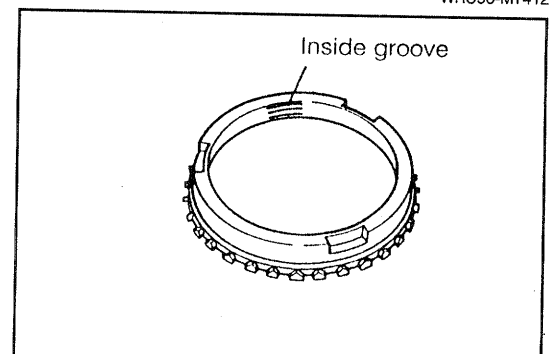
WRU90-MT411

9. Check each needle roller bearing for damage.



WRU90-MT412

10. Check the inside groove of the synchronizer ring for wear or damage.

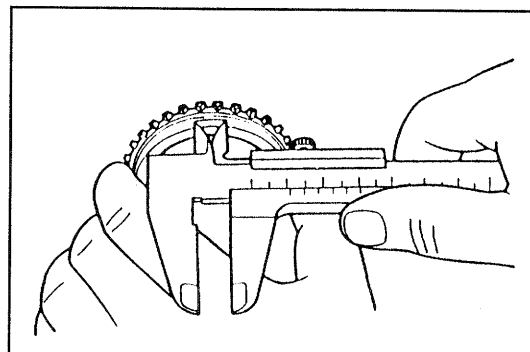


WRU90-MT413

11. Measure the contact width of each synchronizer ring with the synchromesh shifting key, using vernier calipers. Replace the synchronizer ring which does not conform to the specifications with a new one.

mm (inch)

Measuring point \ Item	Specified value
1st gear	9.9 - 10.1 (0.3898 - 0.3976)
2nd gear 3rd gear 4th gear 5th gear	11.3 - 11.5 (0.4449 - 0.4528)



WRU90-MT414

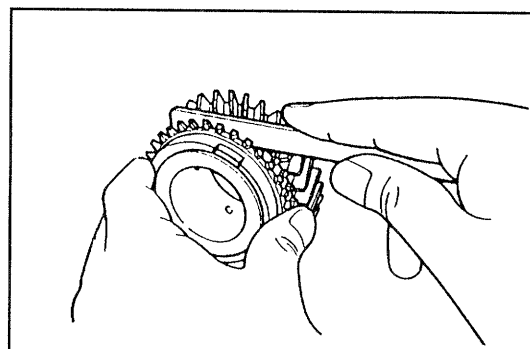
NOTE:

- The measurement should be performed at three points for each synchronizer ring. The maximum value is regarded as the contact width for the said ring.

12. Measure the clearance between each gear and the synchronizer ring, using a thickness gauge.

mm (inch)

Measuring point \ Item	Specified value	Allowable limit
1st gear 2nd gear 3rd gear 4th gear 5th gear	0.85 - 1.45 (0.0335 - 0.571)	0.5 (0.0197)



WRU90-MT415

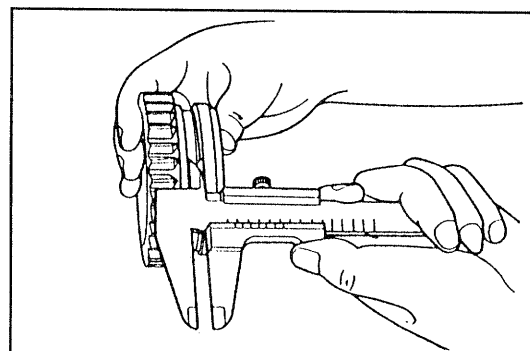
NOTE:

- The measurement should be performed at several points for each gear. The minimum value is regarded as the clearance for the said gear.

13. Measure the contact width of the reverse gear with the shift fork.

mm (inch)

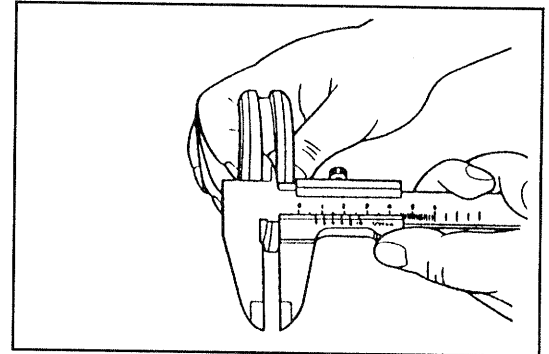
Part name \ Item	Specified value	Allowable limit
Reverse gear	7.05 - 7.12 (0.278 - 0.280)	7.3 (0.287)



WRU90-MT416

14. Measure the contact width of the transmission hub sleeve with the shift fork.

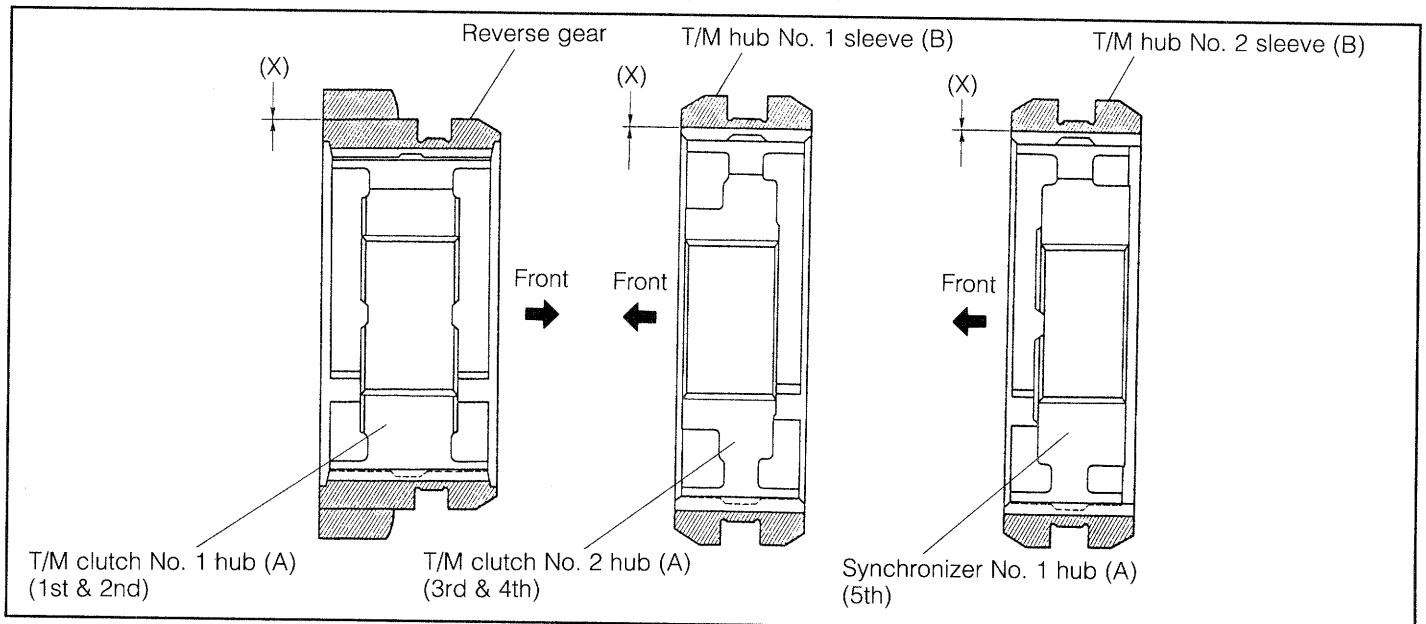
mm (inch)		
Part name	Specified value	Allowable limit
Transmission hub sleeve	7.05 - 7.12 (0.278 - 0.280)	7.3 (0.287)



WRU90-MT417

15. Measure the dimension (A) and (B) of the followings parts. Make sure that the clearance (X) between this hubs and sleeves may confirm to the specification.

Specified Valve: 0.03 - 0.19 mm (0.0012 - 0.0075 inch)



WRU90-MT418

16. The outer diameter dimension of the (A) above parts has been machined in accordance with the bore dimension of the (B) parts. If either part exceeds the specified value above, be certain to replace them as a set.

CAUTION:

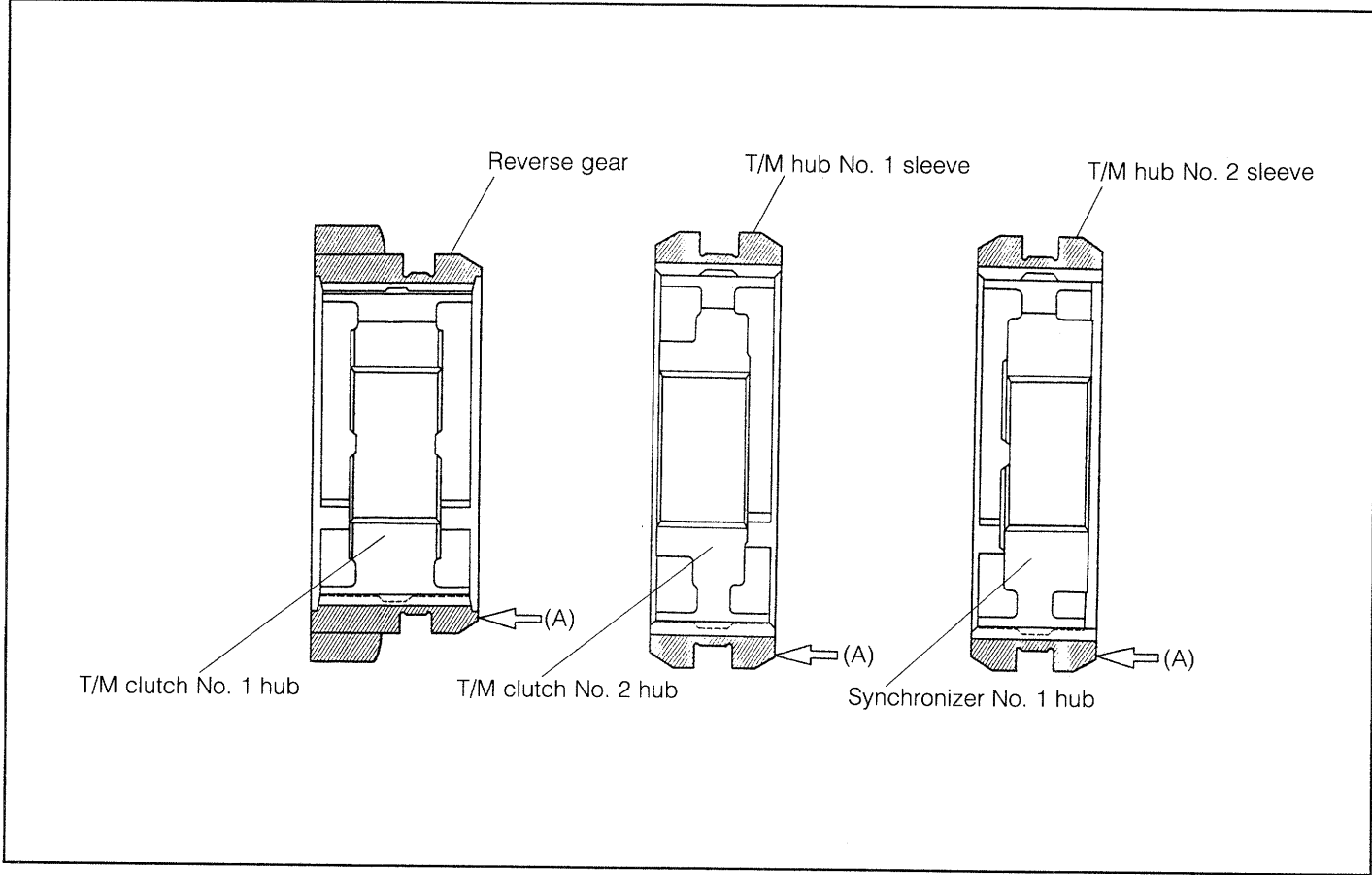
- If either part which has been exceed the the specified value should be used against this caution, it would cause sllipping-out of gear and or emanation of abnormal noise.

Units: mm (inch)

	Outer dimension	Classification No.		Bore dimension
T/M clutch No. 1 hub	69.78 - 69.84 (2.747 - 2.749)	2	Reverse gear	69.871 - 69.97 (2.750 - 2.754)
T/M clutch No. 2 hub	69.68 - 69.74 (2.743 - 2.745)	1	T/M hub No. 1 sleeve	69.971 - 69.87 (2.754 - 2.750)
Synchronizer No. 1 hub	69.58 - 69.64 (2.739 - 2.741)	3	T/M hub No. 2 sleeve	69.67 - 69.77 (2.742 - 2.746)

WRU90-MT419

17. With the sleeves assembled to the hubs, measure the tilt width at the section (A) of the sleeves.
Specified Value: Not to exceed 0.5 mm (0.0197 inch)

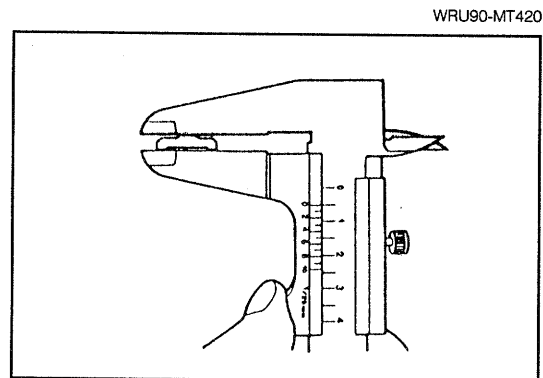


NOTE:

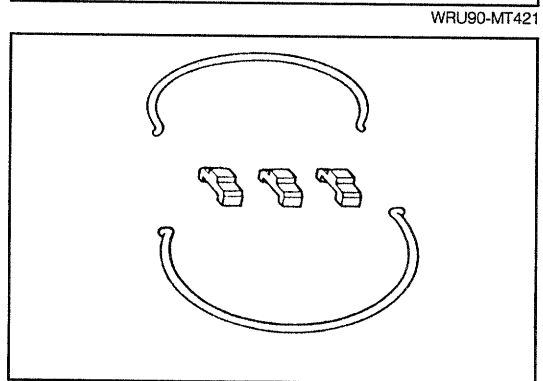
- If the tilt width of the sleeves exceeds the above specified value, be certain to replace those parts as a set.

18. Measure the height of each synchromesh shifting key, using vernier calipers.

mm (inch)			
Measuring point	Item	Specified value	Allowable limit
1st & 2nd gears		5.0 - 5.2 (0.1969 - 0.2047)	4.7 (0.1850)
3rd & 4th gears			
5th gear			



19. Check the synchromesh shifting key and synchromesh shifting key spring for evidence of wear or damage.

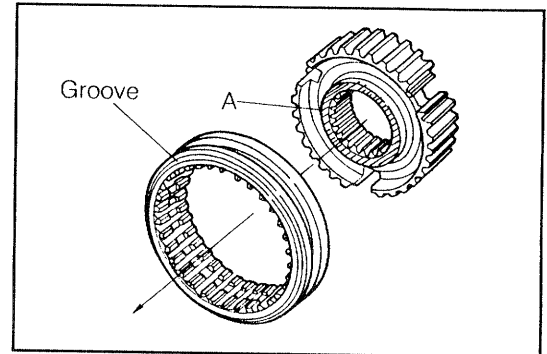


ASSEMBLY

1. The front ends of transmission clutch hub No. 2 and transmission hub sleeve No. 1, which is the sleeve for 3rd-4th speed selection, are as shown in the diagram at right.

NOTES:

- (1) The outer groove in hub sleeve No. 1 is present at the front end.
- (2) Clutch hub sleeve No. 2 (section A) is present at the front end.

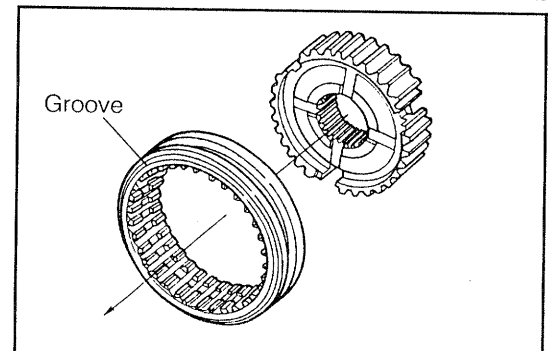


WRU90-MT423

2. The front ends of transmission synchronizer hub assembly No. 1 and transmission hub sleeve No. 2 (5th speed selection) are as shown in the diagram at right.

NOTES:

- (1) The outer groove in hub sleeve No. 2 is present at the front end.
- (2) The notch in the crisscross direction of synchronizer hub assembly No. 1 is present at the front end.



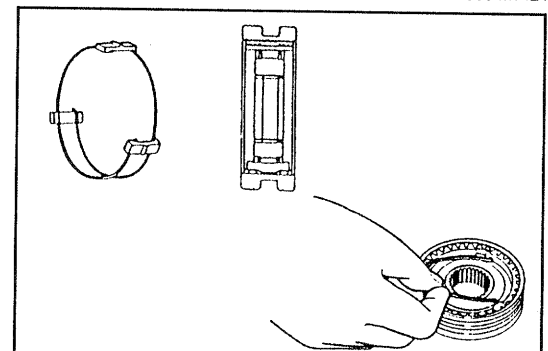
WRU90-MT424

3. Assemble the selected transmission clutch hub to the following parts, using the synchromesh shifting key and synchromesh shifting key spring.

- (1) Reverse gear
- (2) Transmission hub sleeve (5th)

NOTE:

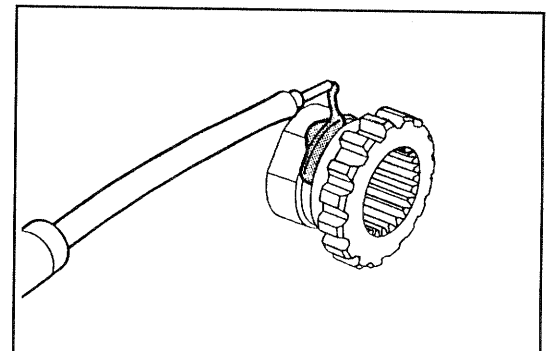
- As for the synchromesh shifting key spring, the bent sections at the front and rear should not come at the same direction, as shown in the right figure.



WRU90-MT425

ASSEMBLY OF TRANSFER OIL PUMP BODY SUBASSEMBLY

1. Apply gear oil to the outer periphery of the transfer input hub.

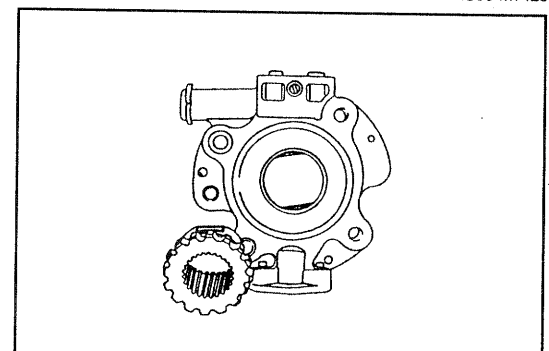


WRU90-MT426

2. Insert the transfer input hub into the transfer oil pump body subassembly lightly pushing with your finger.

NOTE:

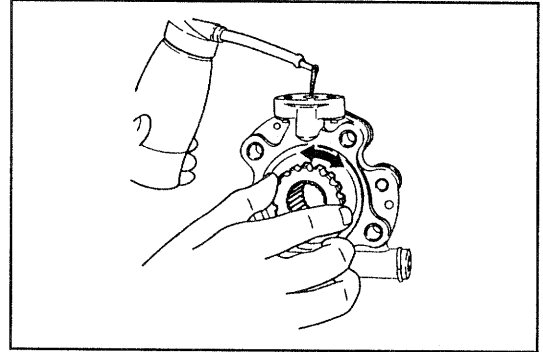
- Apply the gear oil to the outer periphery of the transfer input hub, prior to install.



WRU90-MT427

MANUAL TRANSMISSION

3. Turn the transfer oil pump body subassembly upside down, and then rotating the transfer input hub by hand, apply gear oil into the transfer oil pump body subassembly.

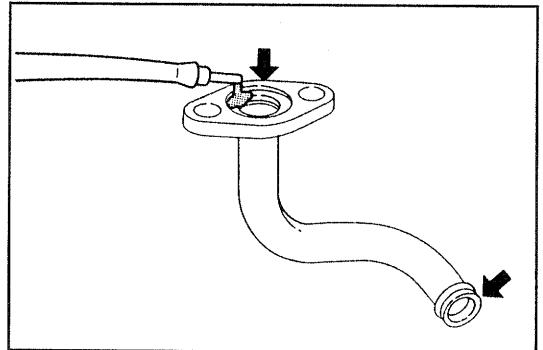


WRU90-MT428

4. Install the two new O-rings to the transfer oil strainer suction tube and apply the gear oil to the O-rings.

NOTE:

- Be careful not to damage the O-rings while installing on the transfer oil strainer suction tube.



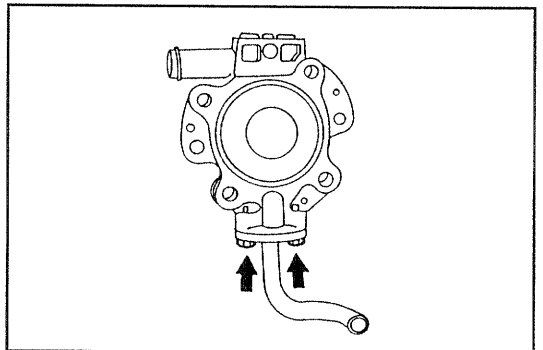
WRU90-MT429

5. Connect the transfer oil strainer suction tube to the transfer oil pump body subassembly using two bolts, and tighten the bolts.

Tightening Torque: 0.7 - 1.0 kg-m
(5.1 - 7.2 ft-lb, 6.9 - 9.8 N·m)

CAUTION:

- The bend section in the transfer oil strainer tube faces toward right side.



WRU90-MT430

ASSEMBLY OF TRANSFER ADAPTER

1. Press a new oil seal from the bearing side of the transmission output shaft, using the following SST.

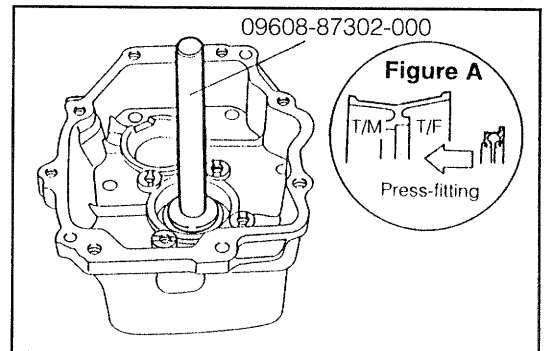
SST: 09608-87302-000

CAUTION:

- Be sure to install the oil seal in the correct direction, as indicated in the right figure A.

NOTE:

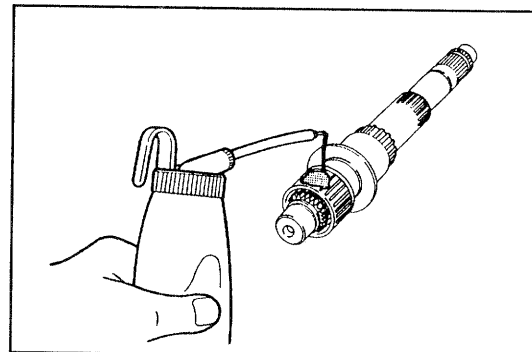
- Make sure that the oil seal exhibits no tilt and the garter spring of the oil seal is not disengaged.



WRU90-MT431

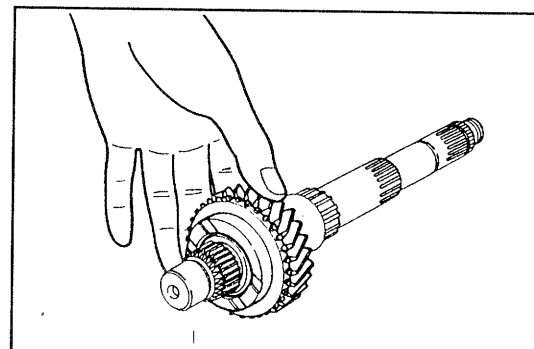
ASSEMBLY OF OUTPUT SHAFT

1. Apply gear oil to the needle roller bearing.



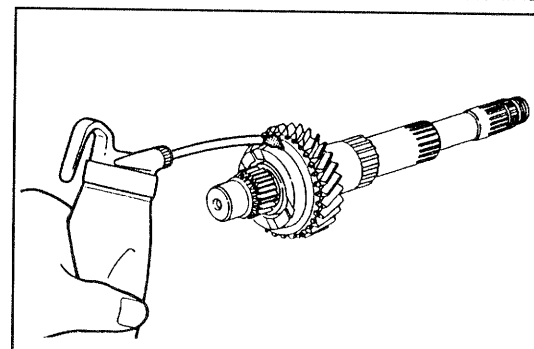
WRU90-MT432

2. Install the 3rd gear to the output shaft.



WRU90-MT433

3. Apply gear oil to the tapered section of the 3rd gear.

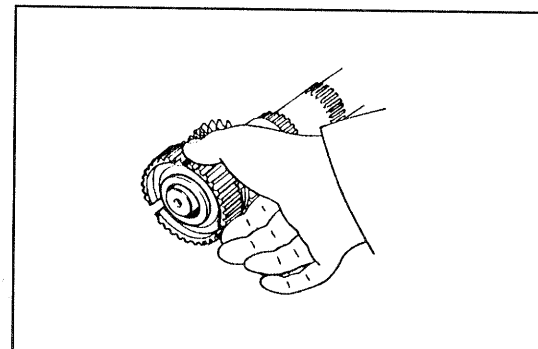


WRU90-MT434

4. Install the transmission clutch hub No. 2 to the output shaft with the synchromesh shifting key (1 piece) and synchronizer ring No. 3 installed.

NOTE:

- For easier installation of the synchromesh shifting key spring, put mark in the surface of clutch hub No. 2 so that the bent sections at the front and rear should not come at the same direction.



WRU90-MT435

MANUAL TRANSMISSION

5. Attach the new snap ring. Ensure that the clearance (A) in the right figure conforms to the specification. If it does not conform to the specification, select a suitable snap ring.

NOTE:

- Never reuse the snap ring.

Specification:

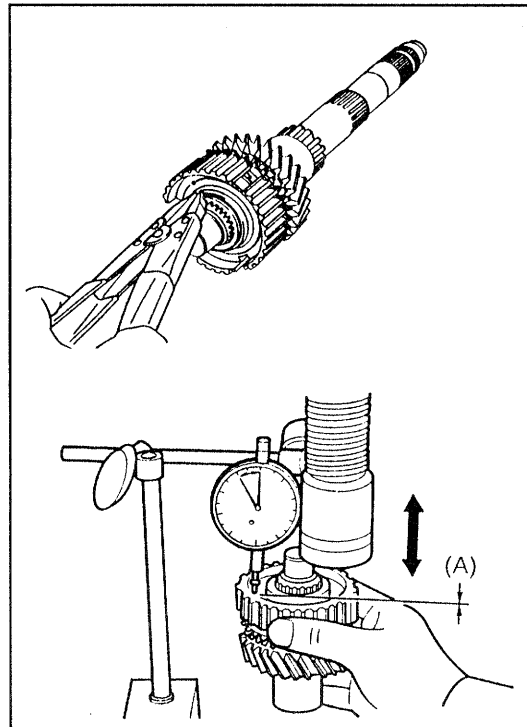
Not to exceed 0.1 mm (Not to exceed 0.0039 inch)

Snap Ring Availability mm (inch)

Snap ring thickness: 2.0 (0.0787)

2.1 (0.0827)

2.2 (0.0866)



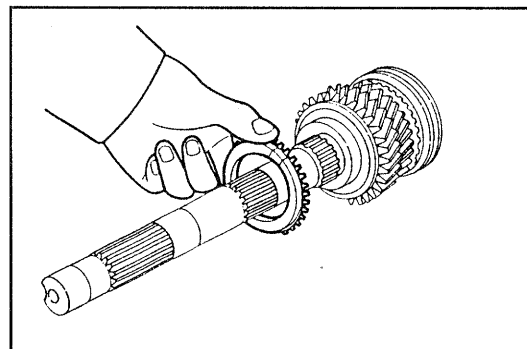
WRU90-MT436

6. Install the following parts to the clutch hub No. 2, and then, install them to the output shaft.

- (1) Synchromesh shifting key (3 pieces)
- (2) Transmission hub sleeve No. 1
- (3) Synchromesh shifting key spring (1 piece)

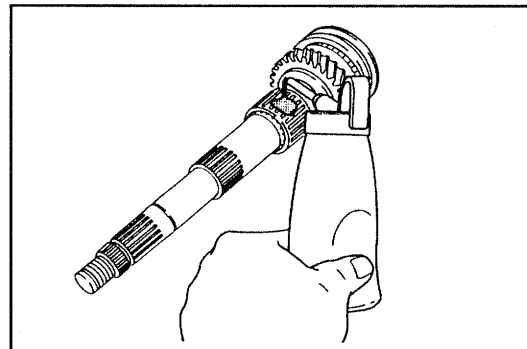
NOTE:

- Ensure that the bent sections at the front and rear of the synchromesh shifting key spring, should not come at the same direction.



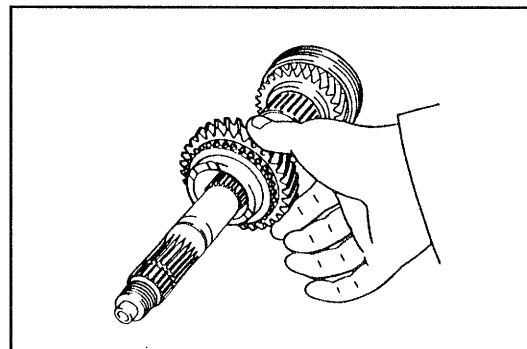
WRU90-MT437

7. Apply gear oil to the needle roller bearing and install to the output shaft.



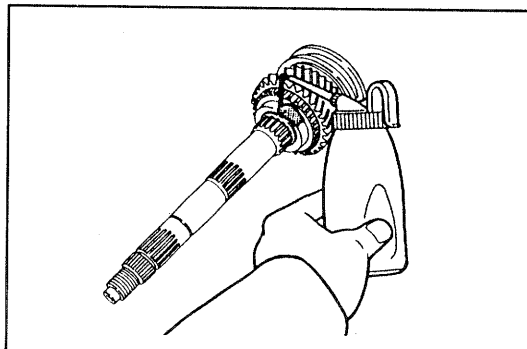
WRU90-MT438

8. Install the 2nd gear.



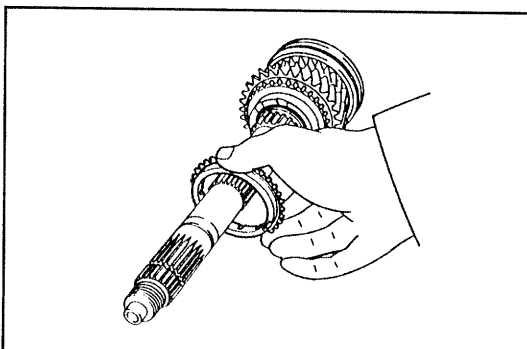
WRU90-MT439

9. Apply gear oil to the tapered section of the 2nd gear.



WRU90-MT440

10. Install the synchronizer ring No. 2.

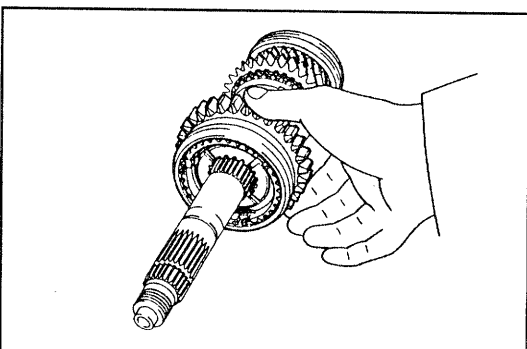


WRU90-MT441

11. Install the reverse gear with the following parts installed.
 (1) Synchromesh shifting key spring (2 pieces)
 (2) Synchromesh shifting key (3 pieces)
 (3) Transmission clutch hub No. 1

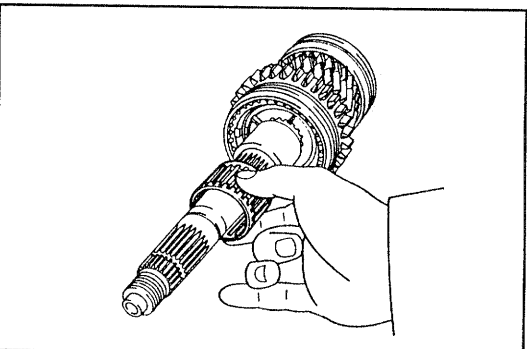
NOTE:

- Ensure that the bent sections at the front and rear of the synchromesh shifting key spring should not come at the same direction.



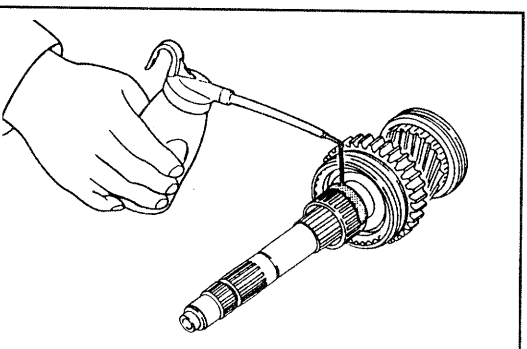
WRU90-MT442

12. Install the 1st gear inner race.



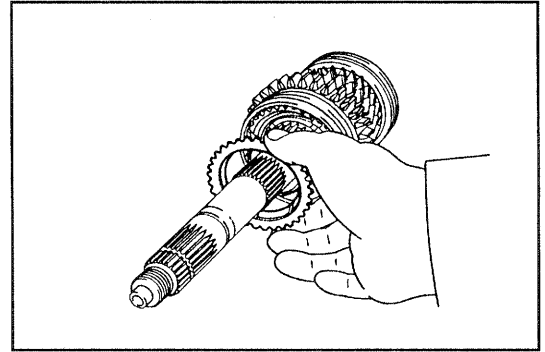
WRU90-MT443

13. Apply gear oil to the outer periphery of the 1st gear inner race and the needle roller bearing.



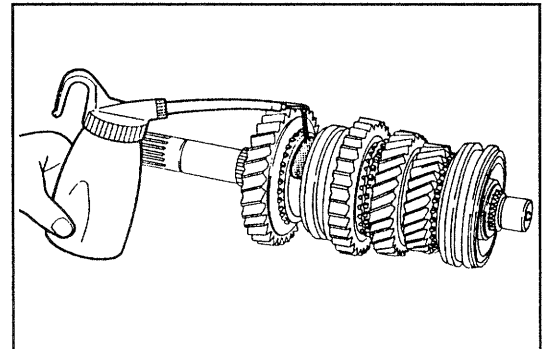
WRU90-MT444

14. Install the synchronizer ring No. 2.



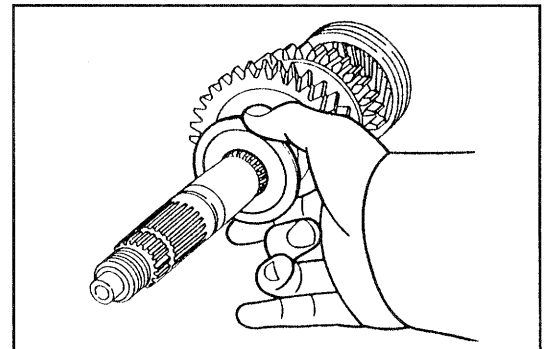
WRU90-MT445

15. Apply gear oil to the tapered section of the 1st gear, and install it.



WRU90-MT446

16. Install the 1st gear thrust washer.

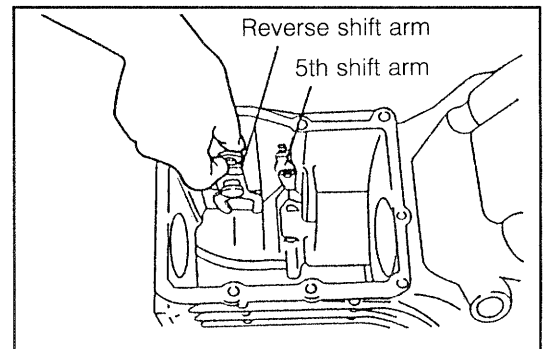


WRU90-MT447

TRANSMISSION ASSEMBLY

Prior to assembling the transmission case, clean the transmission case by removing any dirt, gasket materials or the like.

1. Install the reverse shift arm and 5th shift arm.

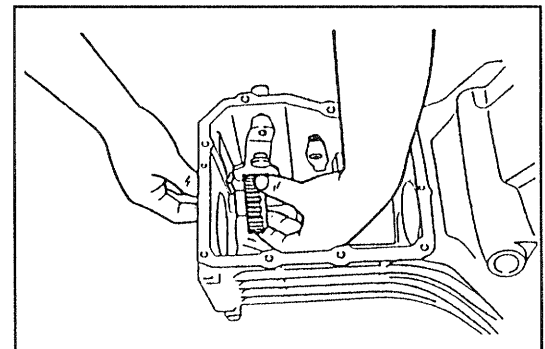


WRU92-MT487

2. Install the reverse idler gear shaft and reverse idler gear.

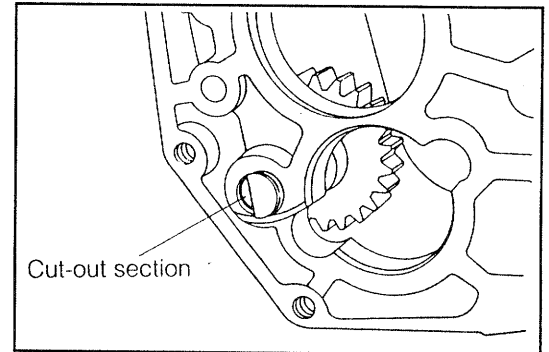
NOTE:

- Be sure to install the reverse idler gear shaft in such a way that the cut-out section of the shaft faces toward the opposite side of the countershaft.
If this operation should fail to be observed correctly, there may be a case where the transfer adaptor can not be installed.



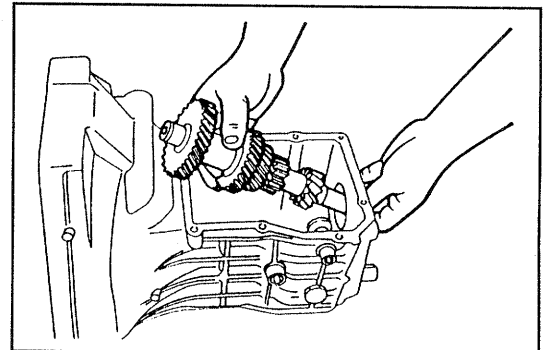
WRU90-MT449

3. Insert the transmission countershaft into the transmission case.



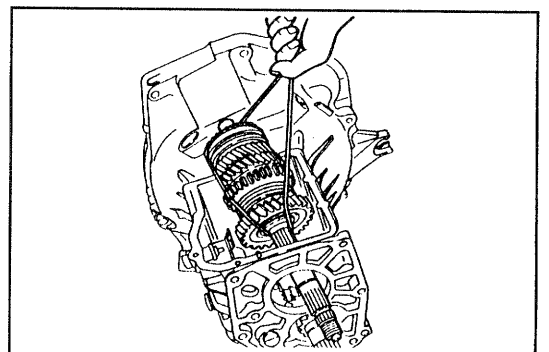
WRU90-MT450

4. Place the output shaft in the transmission case.



WRU90-MT451

5. Apply the gear oil to the needle roller bearing and then, install to the output shaft.
6. Install the synchronizer ring No. 3.



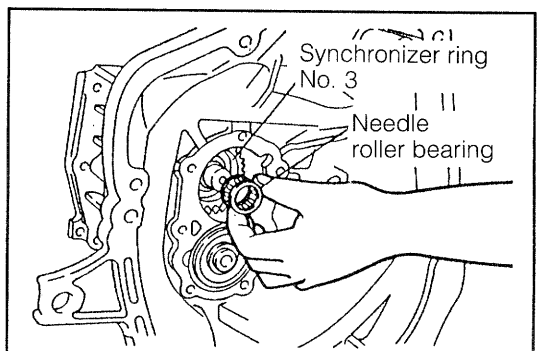
WRU90-MT452

7. Press the input shaft bearing into position, using the following SSTs.

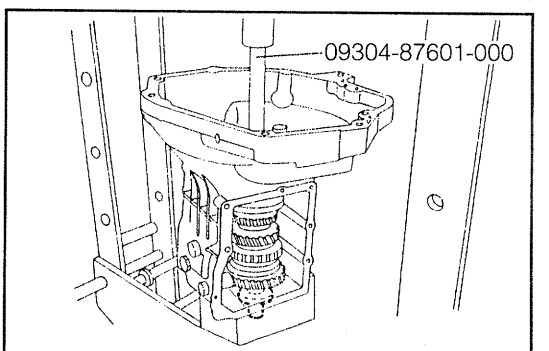
SST: 09304-87601-000

NOTE:

- Prior to install the above bearing, remove the stop ring.



WRU90-MT453



WRU90-MT454

8. Press the bearings provided at the front and rear of the transmission countershaft, using the following SSTs at the same time.

SSTs: 09304-87601-000
09309-87201-000

9. Install a new snap ring to the countershaft, using the following SST:

SST: 09306-87601-000

NOTE:

- Make sure that the snap ring is securely installed into the groove section of the countershaft.

10. Install the stop ring of the countershaft front bearing.

NOTE:

- Lightly tapping the countershaft from the rear side of transmission case with the plastic hammer or the like so that the bearing comes toward front side, prior to install the stop ring.

11. Install a new snap ring to the input shaft, using the following SST:

SST: 09304-87601-000

12. Install the stop ring to the input shaft.

13. With a new gasket used, install the front bearing retainer.

NOTE:

- (1) Apply gear oil to the oil seal lip section.
- (2) Molybdenum disulphide lithium base grease to the clutch hub sliding section of the front bearing retainer.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

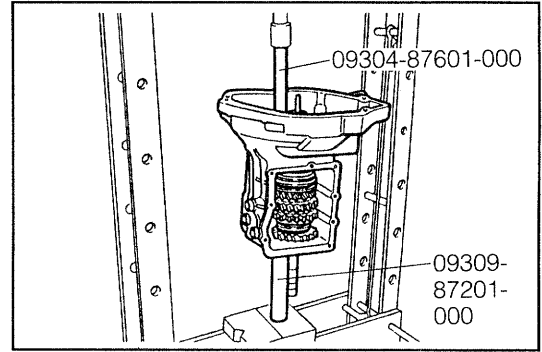
- (3) Be sure to tighten the bolts alternately and diagonally (the right figure illustration indicates a typical example of the tightening sequence.)

14. Install the clutch related parts (see page CL-sections).

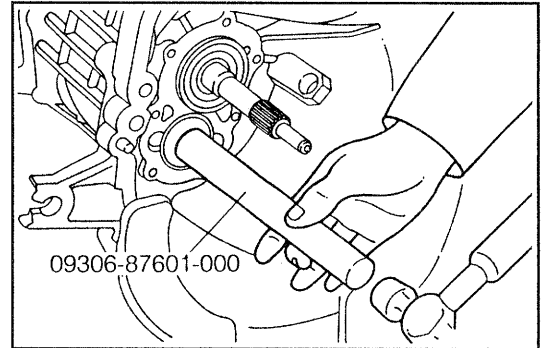
15. Remove any remaining gasket material from the transmission, using a gasket scraper.

NOTE:

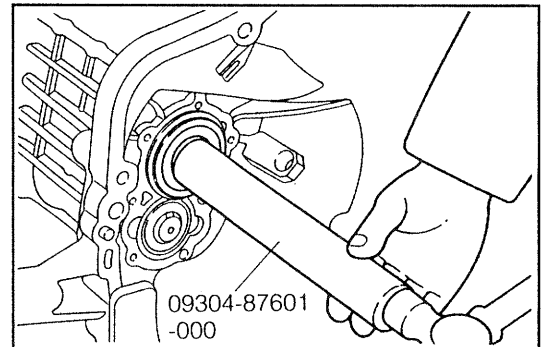
- Be very careful not to scratch the attaching surface.



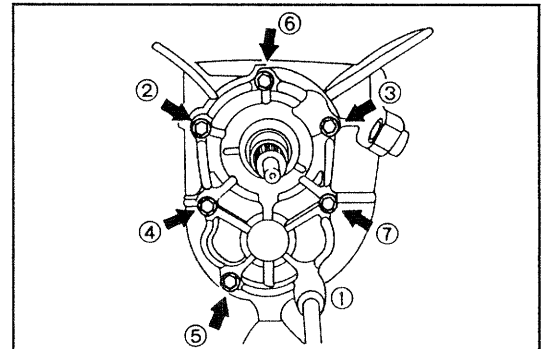
WRU90-MT455



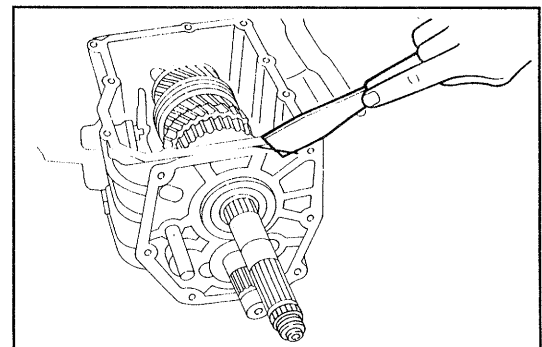
WRU90-MT456



WRU90-MT457

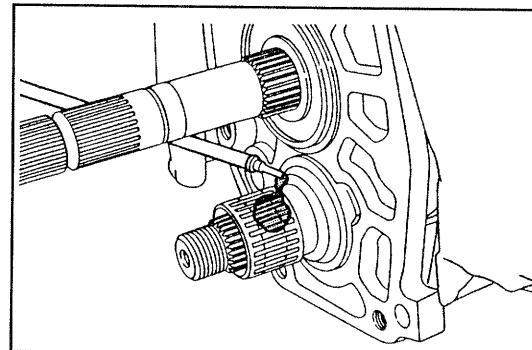


WRU90-MT458



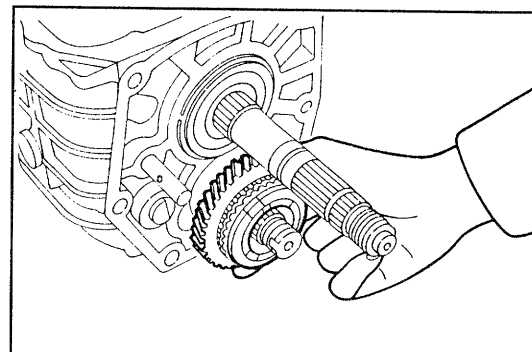
WRU90-MT459

16. Install the 5th gear thrust washer.
17. Install the 5th gear inner race and needle roller bearing to the output shaft and then apply the gear oil to the outer periphery of these parts.



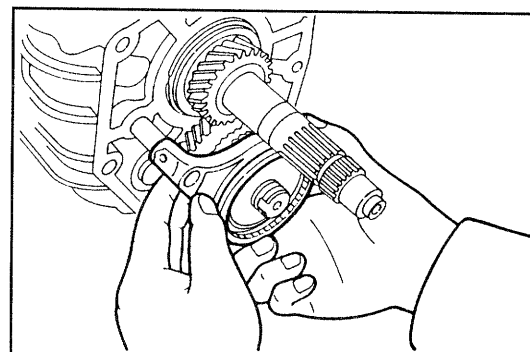
WRU90-MT460

18. Apply gear oil to the tapered section of the 5th gear, and install the 5th gear and the synchronizer ring No. 3 to the counter shaft.



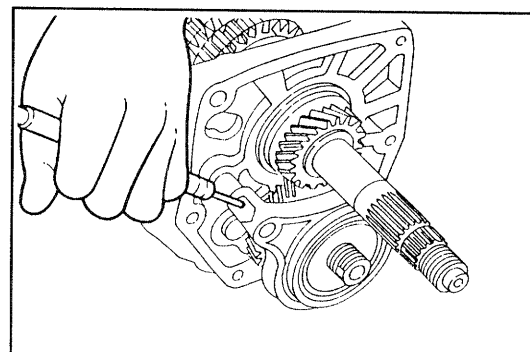
WRU90-MT461

19. Install the 5th gear shift fork and the synchronizer hub sleeve together.



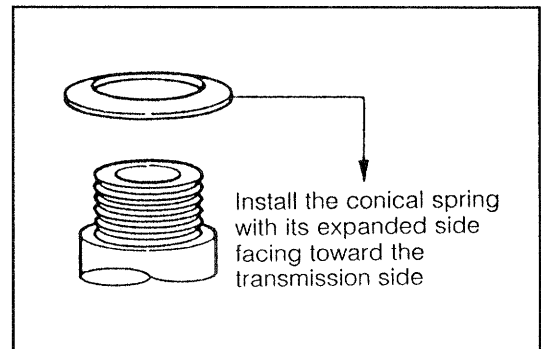
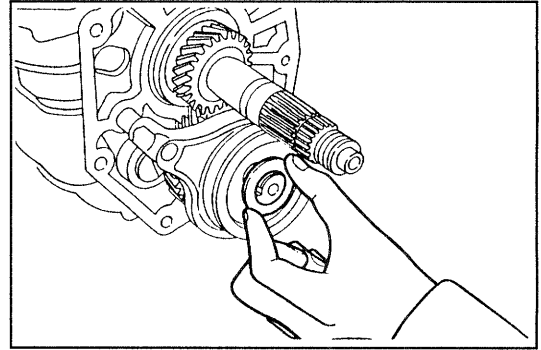
WRU90-MT462

20. Drive the new slotted pin of the 5th shift fork.
NOTE:
 - Never reuse the removed slotted pin.



WRU90-MT463

21. Install the shifting key retainers and conical spring washer in this sequence.

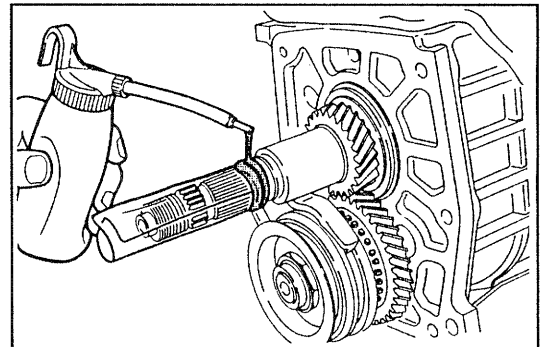


WRU90-MT464

22. Interlock the 1st gear and the 3rd gear.
 23. Install the output gear spacer No. 1 to the output shaft.
 24. Protect the spline section of the output shaft with the suitable vinyl sheets or the like.
 25. Install the O-ring in a place and apply the gear oil to the O-ring.

NOTE:

- Be very careful not to damage the new O-ring during installation.



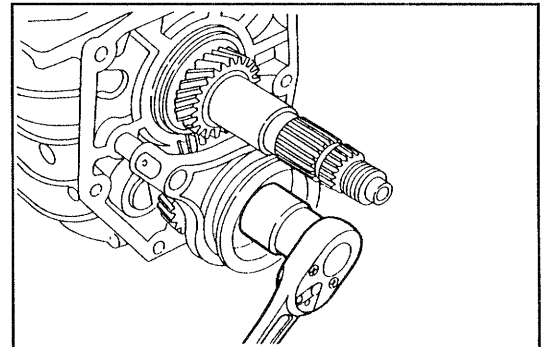
WRU90-MT465

26. Install the new lock nut of the 5th gear countershaft and then, tighten them.

Tightening Torque:

18.0 - 22.0 kg-m

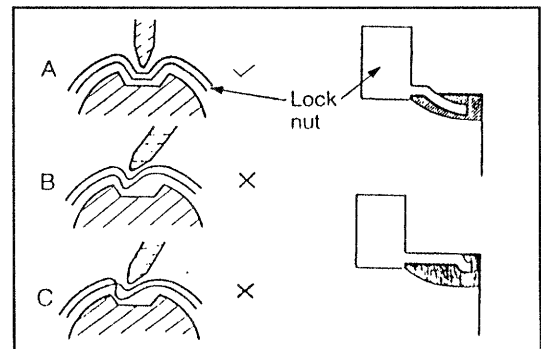
(130.0 - 159.0 ft-lb, 177.0 - 216.0 N-m)



WRU90-MT466

NOTE:

- When staking the lock nut, point a suitable staking tool toward the counter shaft axis center and stake to lock nut securely as shown in the right figure A.
- Poor staking may cause abnormal noise as shown in the right figure B and C.

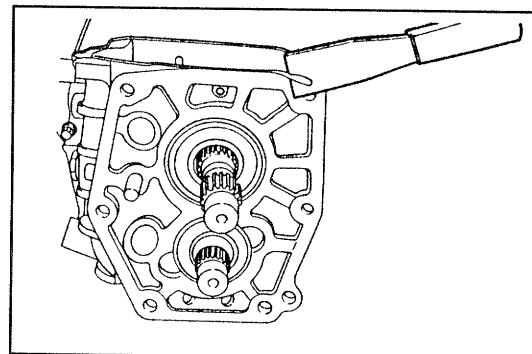


WRU90-MT467

27. Remove any remaining gasket material from the transmission, using a gasket scraper.

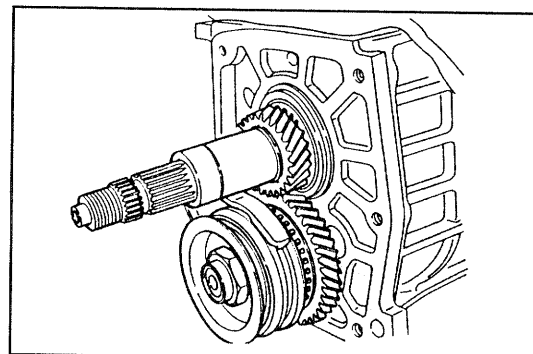
CAUTION:

- Be very careful not to scratch the attaching surface.



WRU90-MT468

28. Place output gear spacer No. 2 on the transmission output shaft.

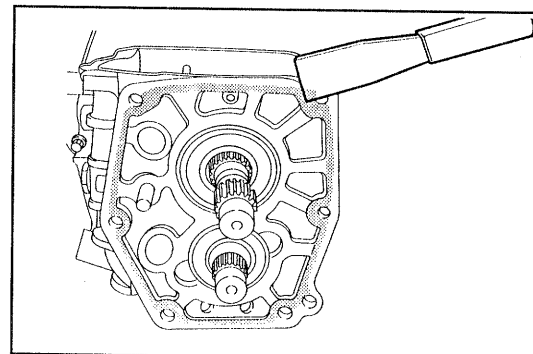


WRU90-MT469

29. Apply the THREE BOND 1216 (made by THREE BOND) to the mating surface between the transfer case and the transmission case.

NOTE:

- Apply the bond to the inside of the bolt hole, as shown in the diagram at right.

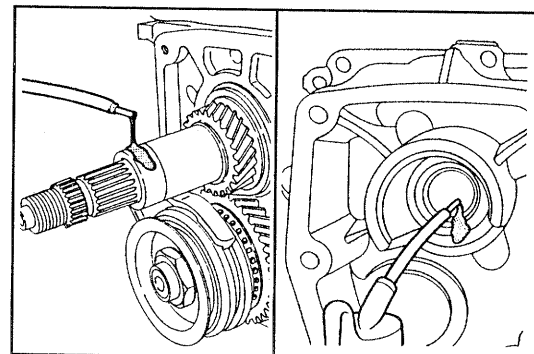


WRU90-MT470

30. Apply gear oil to the outer periphery of the output gear spacer No. 2 and to the lip section of the oil seal, and push the transfer adapter until it has come into firm contact with the transmission case.

NOTE:

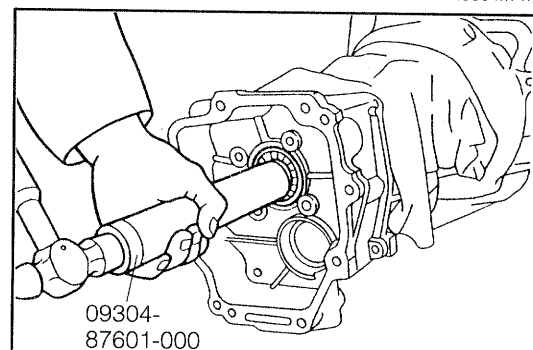
- Be very careful not to turned over the lip section of the oil seal during installation.



WRU90-MT471

31. Install the bearing of the transmission output shaft using the following SST:

SST: 09304-87601-000



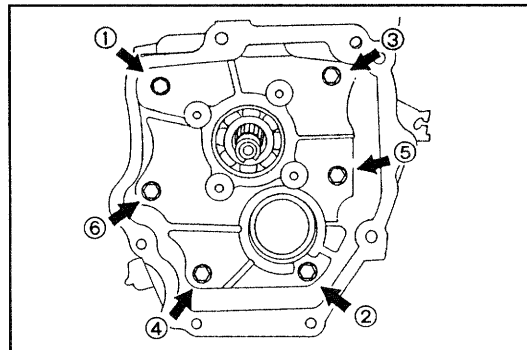
WRU90-MT472

32. Apply the THREE BOND 1216 (made by THREE BOND) to the thread sections of the bolts, and tighten those bolts.

Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N-m)

NOTE:

- Be sure to tighten the bolts alternately and diagonally (the right figure illustration indicates a typical example of tightening sequence)



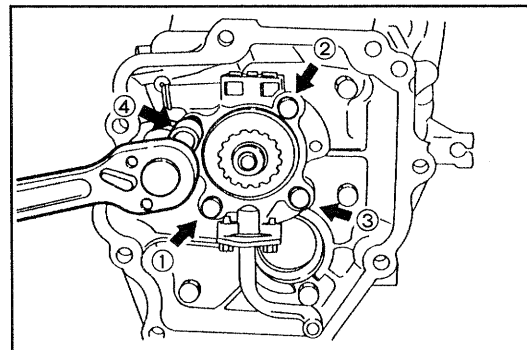
WRU90-MT473

33. Install the transfer oil pump body subassembly to the transfer adapter and then tighten the adapter with four bolts.

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)

NOTE:

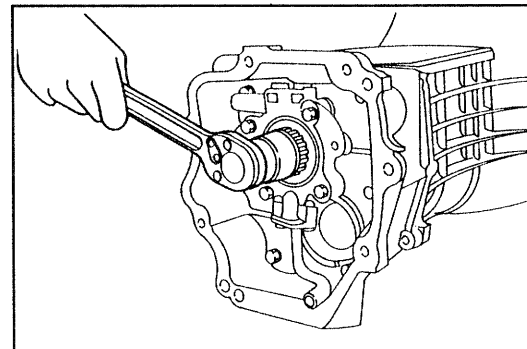
- Be sure to tighten the bolts alternately and diagonally (the right figure illustration is a typical example of tightening sequence)



WRU90-MT474

34. Install the new lock nut of the transmission output shaft and then, tighten it.

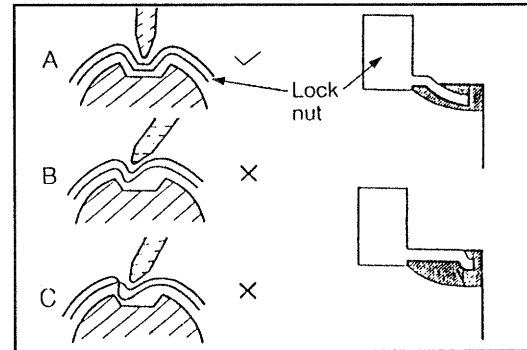
Tightening Torque:
18.0 - 22.0 kg-m
(130.0 - 159.0 ft-lb, 177.0 - 216.0 N-m)



WRU90-MT475

NOTE:

- When staking the lock nut, point a suitable staking tool toward the transfer output rear shaft axis center and stake to lock nut securely, as shown in the right figure A.
- Poor staking may cause abnormal noise as shown in the right figure B and C.

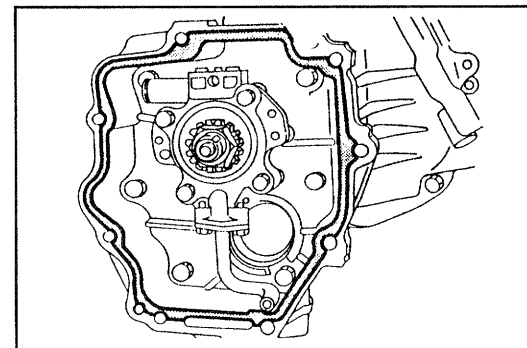


WRU90-MT476

35. Apply the liquid-gasket-use THREE BOND 1216 (made by THREE BOND) to the mating surface between the transfer adapter and the transfer front case.

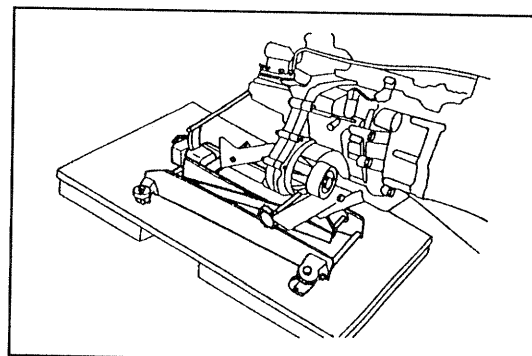
NOTE:

- Apply the bond to the attaching surface of the inside bolt hole.



WRU90-MT477

36. Support the transfer front and rear cases with transmission jacks or the like.

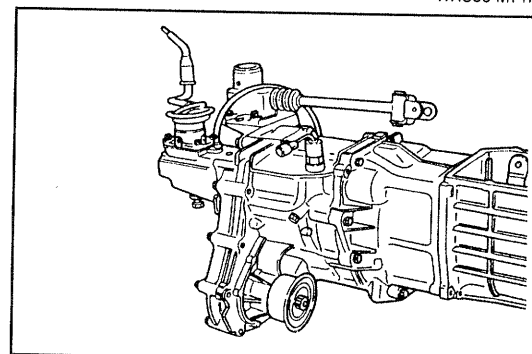


WRU90-MT478

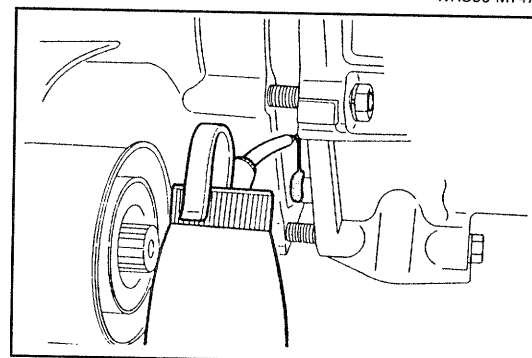
37. Temporarily install the transfer front case to the transfer adapter, using the eight dummy bolts.

NOTE:

- Apply the gear oil to the O-ring section of the transfer oil strainer tube.



WRU90-MT479

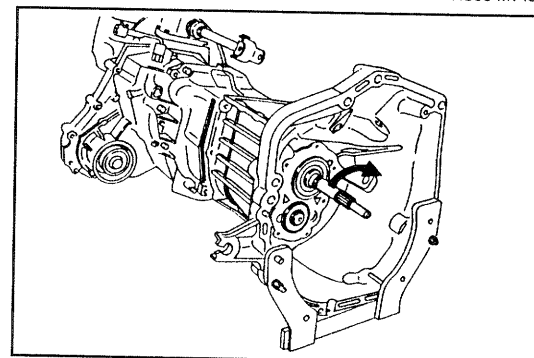


WRU90-MT480

38. Shift the 1st gear into position.
39. Tighten the transfer front case with the eight dummy bolts with rotating the input shaft clockwise.

CAUTION:

- Be careful to tighten the dummy bolts alternately, evenly and diagonally.
- If this operation should fail to be performed, failure to observe this caution may disengagement of gear.



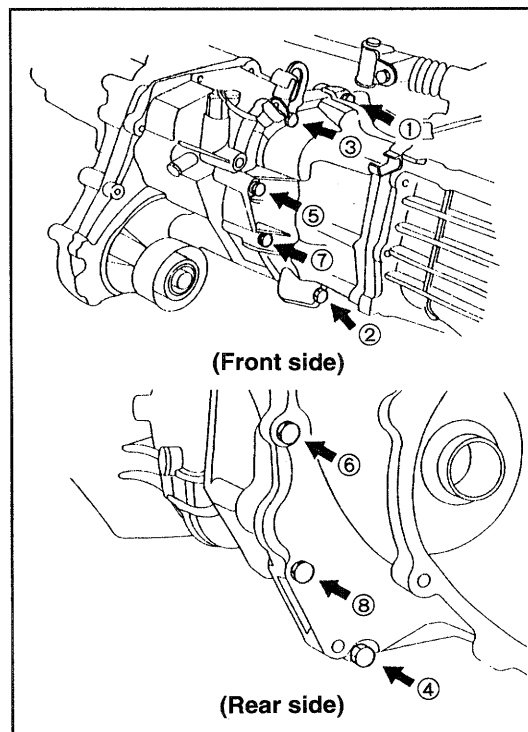
WRU90-MT481

40. Remove the eight dummy bolts.
41. Apply the THREE BOND 1216 (made by THREE BOND) to the thread section of the bolts, and tighten them.

Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)

NOTE:

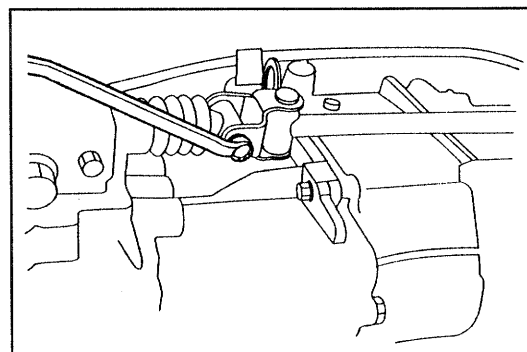
- Be sure to tighten the bolts alternately and diagonally.
(The illustration at the right figure indicates a typical example of tightening sequence.)



WRU90-MT482

42. Install the shift lever retainer subassembly and the control shaft with a hexagon bolt (Use new hexagon bolt).

Tightening Torque: 1.5 - 2.2 kg-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)



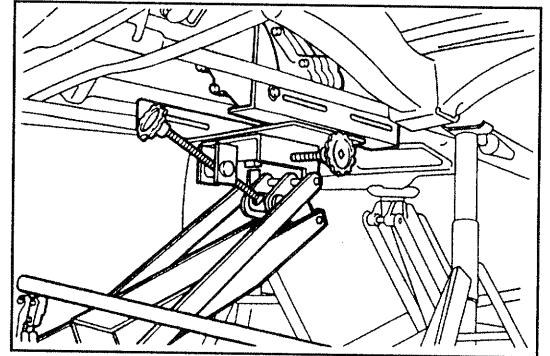
WRU90-MT483

43. Install the transmission case cover subassembly (see page MT-68).
44. Install the transmission and transfer assembly to the vehicle (see pages MT-105 to MT-109).

WRU92-MT503

INSTALLATION

1. Working from the under vehicle
 - (1) Support the transmission with a transmission jack.

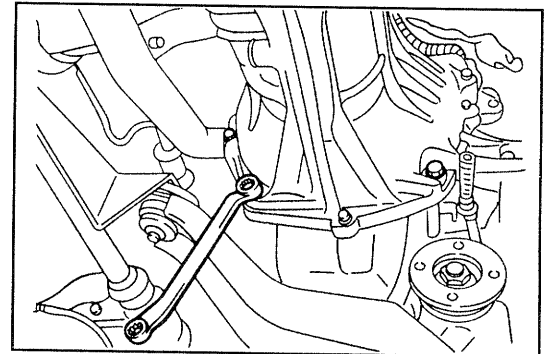


WRU90-MT086

- (2) While supporting the transmission assembly with a transmission jack, push in the transmission assembly into the engine.

Tightening Torque:

5.0 - 7.0 kg-m (36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)

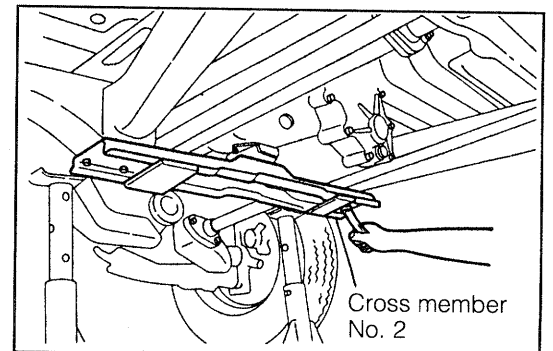


WRU90-MT087

- (3) Tighten the cross member No. 2 with the four bolts on both left and right sides bolts.

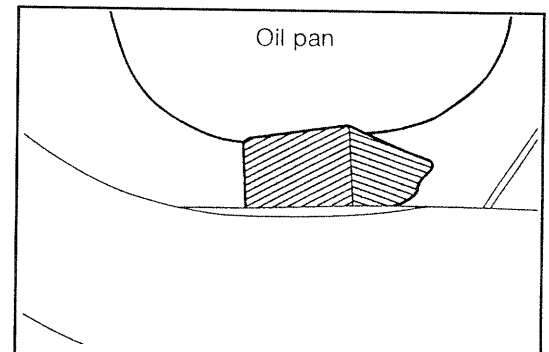
Tightening Torque:

4.0 - 5.5 kg-m (29.0 - 39.7 ft-lb, 39.2 - 53.9 N·m)



WRU90-MT088

- (4) Remove the wooden pieces between oil pan and differential carrier support front bracket.

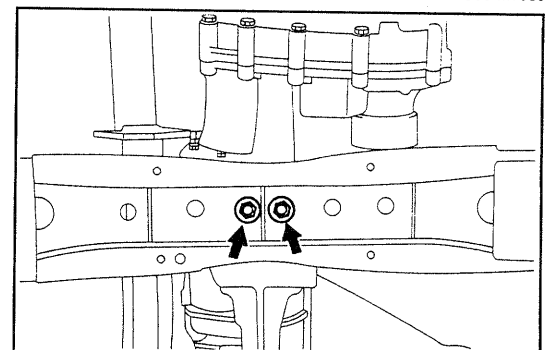


WRU90-MT089

- (5) Install the transmission mounting to the crossmember No. 2 with the two nuts and tighten them.

Tightening Torque:

6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

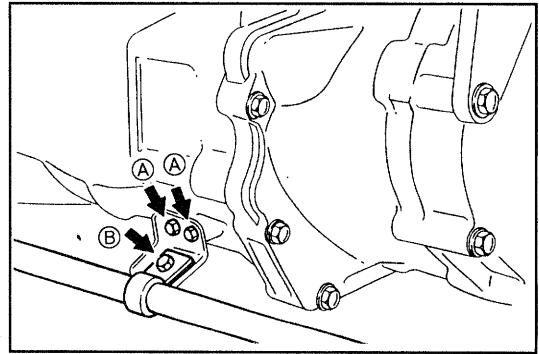


WRU90-MT090

- (6) Tighten the exhaust pipe support bracket with the three bolts.

Tightening Torque:

- Ⓐ 1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N-m)
Bracket × Transmission
- Ⓑ 3.0 - 4.5 kg-m (21.7 - 37.6 ft-lb, 29.4 - 44.1 N-m)
Bracket × Exhaust pipe



WRU90-MT091

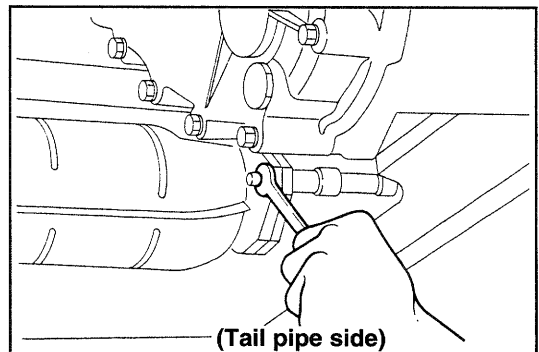
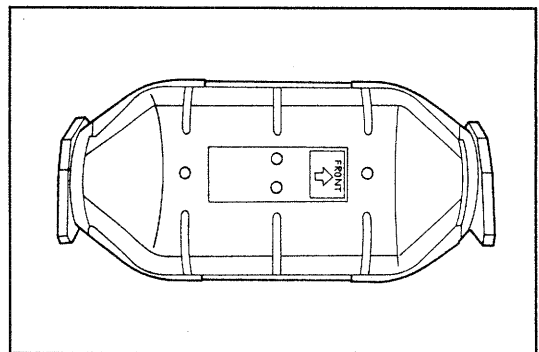
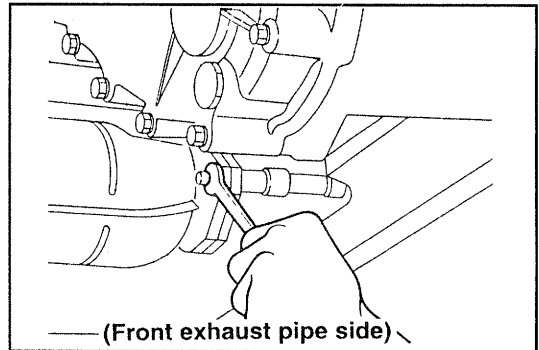
- (7) Tighten the catalyst converter assembly with the two nuts on both front and rear side, using the new gaskets.

Tightening Torque:

- 3.7 - 5.2 kg-m (26.8 - 37.6 ft-lb, 36.3 - 51.0 N-m)

NOTE:

- Install the converter in such a way that.
- Arrow marking facing with ground.
- Toward the front exhaust pipe.

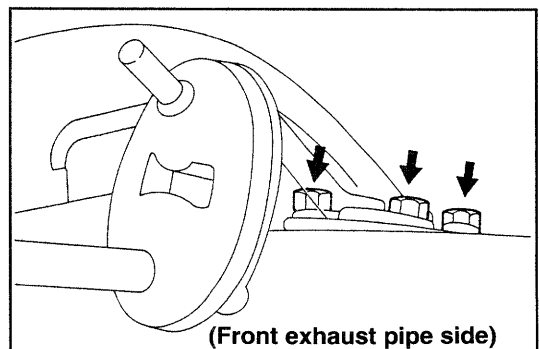


WRU90-MT092

- (8) Tighten the bracket to the crossmember No. 3 with the three bolts.

Tightening Torque:

- 3.0 - 4.5 kg-m (21.7 - 37.6 ft-lb, 29.4 - 44.1 N-m)



WRU90-MT093

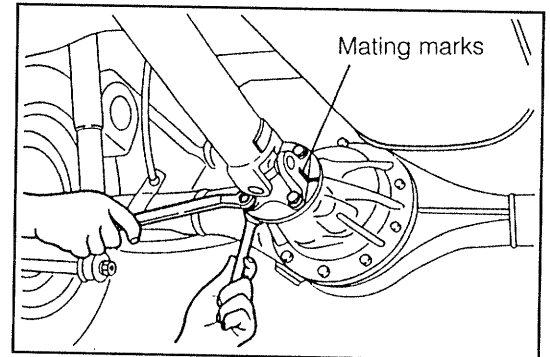
- (9) Install the front propeller shaft and rear propeller shaft and tighten with the bolts, spring washer and nuts.

CAUTION:

- Align the mating marks put during the removal with each others. If this operation should fail to be performed correctly, the propeller shaft may emit abnormal noise or vibration during the running.

Tightening Torque:

6.0 - 8.0 kg-m (43.4 - 57.8 ft-lb, 58.8 - 78.5 N·m)

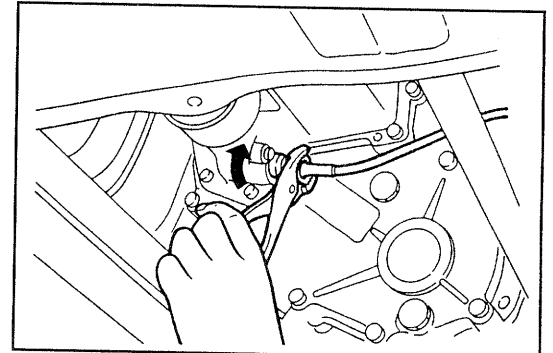


WRU90-MT094

- (10) Connect the speedometer cable with oil seal to the transmission case, using the common tool of plier.

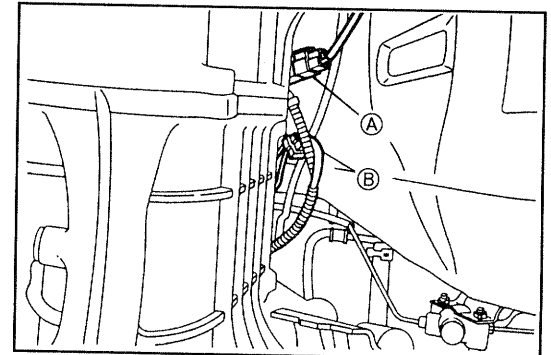
NOTE:

- Make sure that the forward end of the speedometer cable has positively entered into the sleeve.



WRU90-MT095

- (11) Connect the coupler of back up lamp and transmission position detect switch.

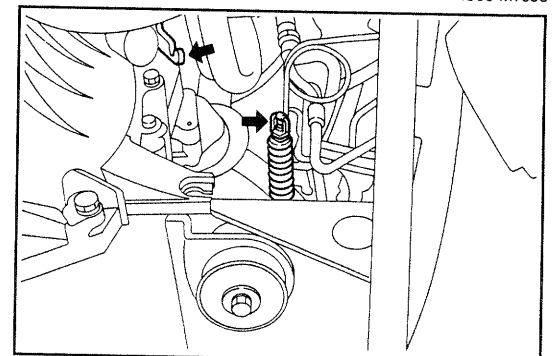


WRU90-MT096

- (12) Connect the clutch release cable subassembly to the release fork.

NOTE:

- Apply the Lithium base multi purpose grease to the connecting sections.



WRU90-MT097

- (13) Fill in the transmission and transfer oil through the oil filler plug holes.

TRANSFER

Oil: API GL-3 or GL-4

SAE 75W-85 or 75W-90

Oil Capacity: 1.4 liters (0.36 US gal, 1.48 USA qts)

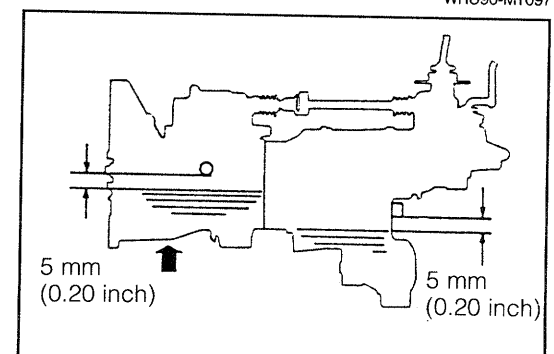
TRANSMISSION

Oil: API GL-3 or GL-4

SAE 75W-85 or 75W-90

Oil Capacity: 1.7 liters (0.44 US gal, 1.79 USA qts)

- (14) Check of transmission and transfer checking of oil level and leakage oil should be up to the filler plug hole. Add oil if low and inspect for oil leakage.



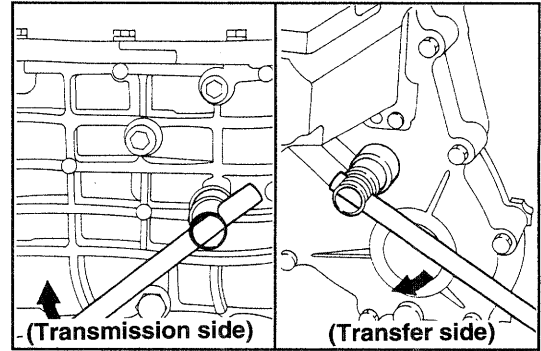
WRU90-MT098

MANUAL TRANSMISSION

- (15) Tighten the filler plugs with new gasket.

Tightening Torque:

3.0 - 5.0 kg-m (21.7 - 36.2 ft-lb, 29.4 - 49.0 N·m)

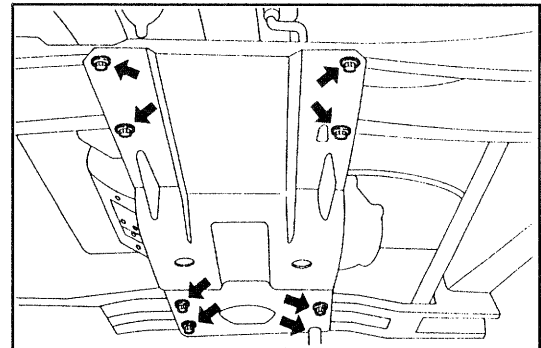


WRU90-MT099

- (16) Tighten the transmission under cover with the eight bolts.

Tightening Torque:

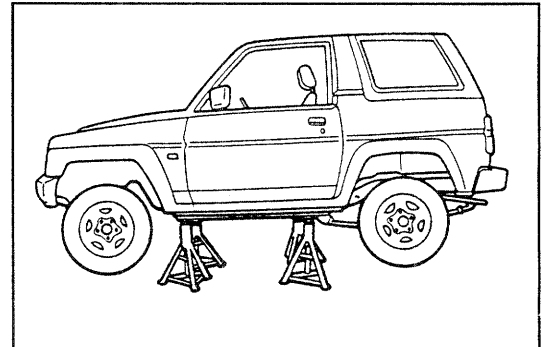
4.0 - 6.0 kg-m (28.9 - 43.4 ft-lb, 39.2 - 58.8 N·m)



WRU90-MT100

2. Working from the vehicle outside

- (1) Jack down the vehicle.



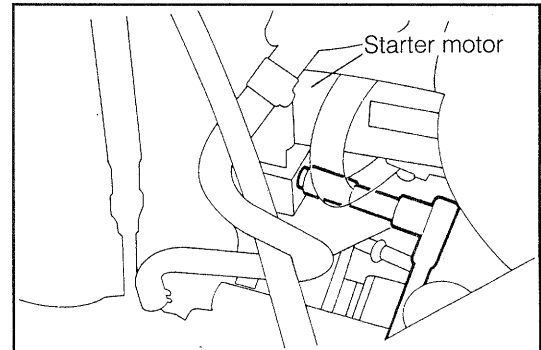
WRU90-MT101

3. Working from the engine compartment room

- (1) Install the direct-connecting a bolt and tighten it.

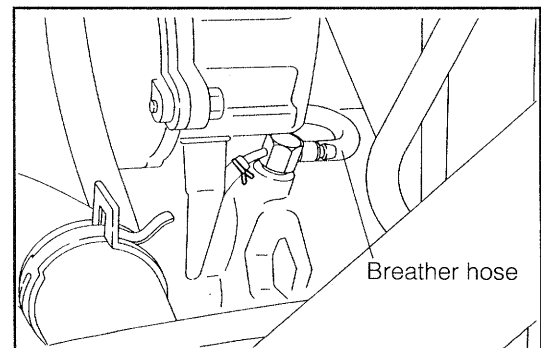
Tightening Torque:

5.0 - 7.0 kg-m (36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)



WRU90-MT102

- (2) Install the transmission breather hose with a clip.

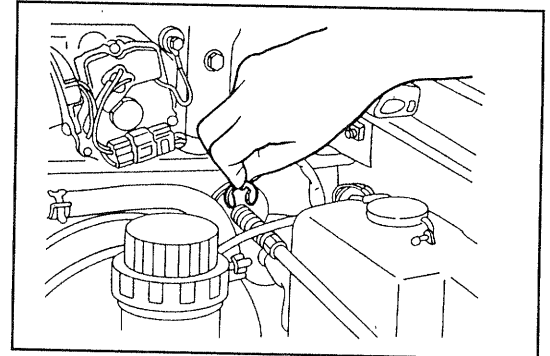


WRU90-MT103

- (3) Install the clutch cable to the clutch release fork. Adjust the free travel by means of the E-ring.

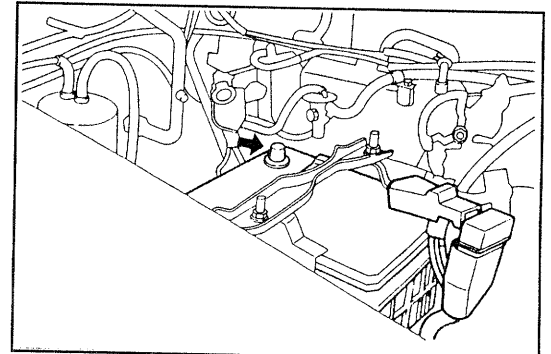
Free Travel of Clutch Pedal:

18 - 27 mm (0.709 - 1.063 inches)



WRU90-MT104

- (4) Connect the battery ground cable to the negative (-) terminal of the battery.



WRU90-MT105

4. Working from the vehicle interior

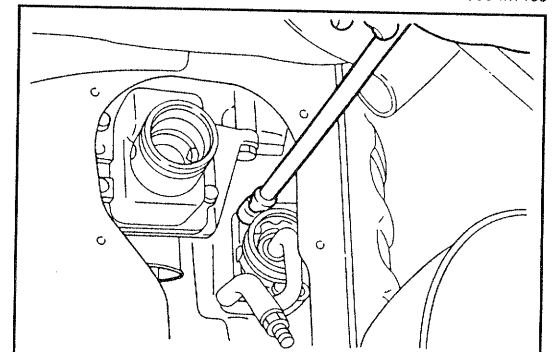
- (1) Install the transfer control lever with the four bolts, using the new gasket.

Tightening Torque:

1.5 - 2.2 kg-m (10.9 - 15.9 ft-lb, 14.7 - 21.6 N-m)

NOTE:

- Apply the Lithium base multi purpose grease to the forward end of the transfer control lever.



WRU90-MT106

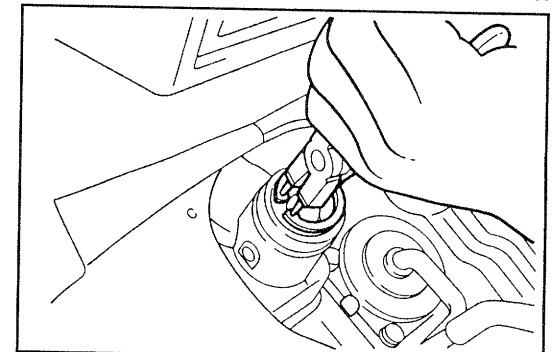
- (2) Install the transmission control lever with a snap ring, using the common tool of snap ring plier.

CAUTION:

- Ensure that the snap ring must be inserted in the groove section of control shift lever retainer.

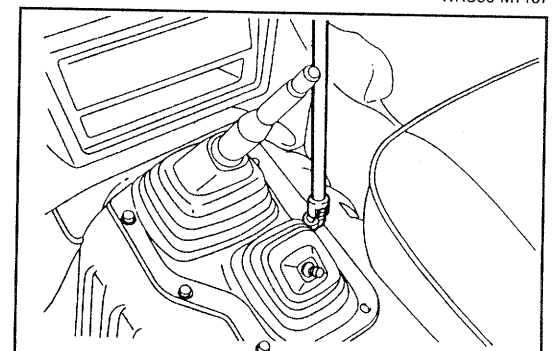
NOTE:

- Apply the Lithium base multi purpose grease to the forward end of the transfer control lever.



WRU90-MT107

- (3) Install the shift lever boot with the six bolts.
- (4) Install the floor carpet in a place.
- (5) Install the transmission and transfer shift lever knobs.



WRU90-MT108

DAIHATSU

ROCKY

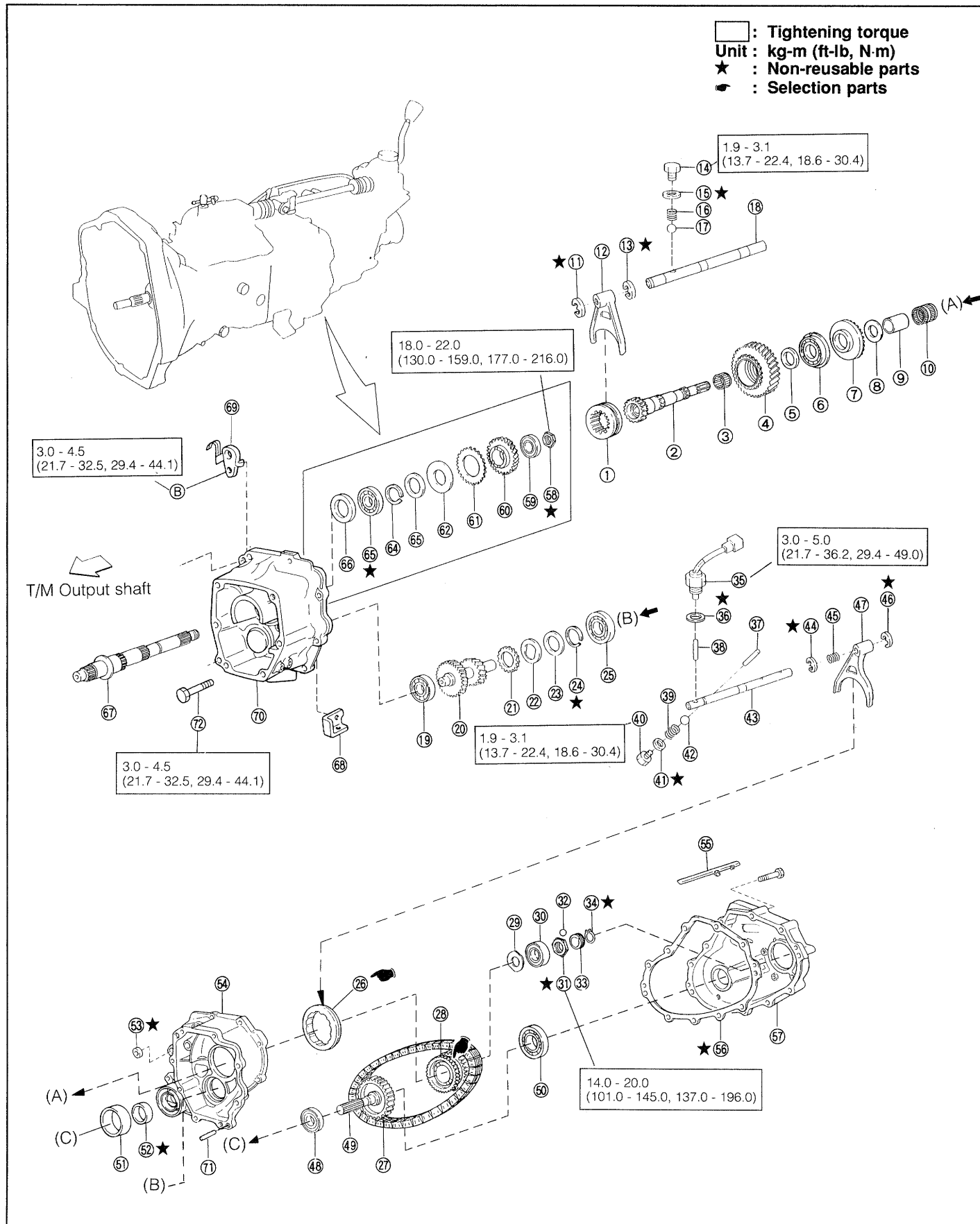
TRANSMISSION & TRANSFER

TRANSFER	TR- 2	CONTROL LEVER-RELATED	TR-35
COMPONENTS	TR- 2	COMPONENTS	TR-35
TRANSFER DISASSEMBLY	TR- 4	REMOVAL	TR-36
DISASSEMBLY OF TRANSFER		INSPECTION	TR-36
OUTPUT FRONT SHAFT	TR-13	INSTALLATION	TR-36
DISASSEMBLY OF TRANSFER		DISASSEMBLY OF SHIFT & SELECT	
OUTPUT REAR SHAFT	TR-13	SHAFT No. 1	TR-37
INSPECTION (FRONT DRIVE CHAIN) ...	TR-15	ASSEMBLY	TR-38
INSPECTION (TRANSFER HIGH &			
LOW CLUTCH SLEEVE)	TR-16		
ASSEMBLY (TRANSFER OUTPUT			
FRONT SHAFT BEARING)	TR-20		
ASSEMBLY	TR-22		

TR

WRU92-TR409

TRANSFER COMPONENTS



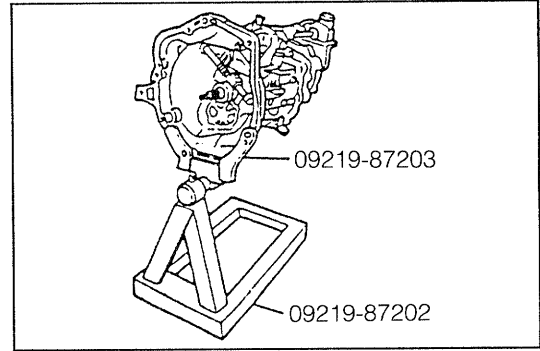
- | | |
|--|--|
| ① Transfer high & low clutch sleeve | ③⑦ Roller |
| ② Transfer output rear shaft | ③⑧ Roller |
| ③ Needle roller bearing | ③⑨ Spring |
| ④ Transfer low speed output gear | ④⑩ Bolt |
| ⑤ Transfer output gear thrust washer | ④⑪ Gasket |
| ⑥ Radial ball bearing | ④⑫ Ball |
| ⑦ Front drive clutch hub | ④⑬ Transfer front drive shift fork shaft |
| ⑧ Transfer output shaft spacer No. 2 | ④⑭ "E" ring |
| ⑨ Transfer front drive gear bearing inner race | ④⑮ Spring |
| ⑩ Needle roller bearing | ④⑯ "E" ring |
| ⑪ "E" ring | ④⑰ Transfer front drive shift fork |
| ⑫ Transfer high & low shift fork | ④⑱ Radial ball bearing |
| ⑬ "E" ring | ④⑲ Transfer output front shaft |
| ⑭ Bolt | ④⑳ Radial ball bearing |
| ⑮ Gasket | ④㉑ Extension housing dust deflector |
| ⑯ Spring | ④㉒ Oil seal |
| ⑰ Ball | ④㉓ Tight plug |
| ⑱ Transfer high & low shift fork shaft | ④㉔ Transfer front case subassembly |
| ⑲ Radial ball bearing | ④㉕ Transfer oil supply pipe |
| ⑳ Transfer counter gear | ④㉖ Transfer case gasket |
| ㉑ Sub-gear No. 2 | ④㉗ Transfer rear case |
| ㉒ Washer plate | ④㉘ Lock nut |
| ㉓ Conical spring washer | ④㉙ Bearing |
| ㉔ Snap ring | ④㉚ Transfer low speed input gear |
| ㉕ Radial ball bearing | ④㉛ Sub-gear No. 1 |
| ㉖ Transfer front drive gear sleeve | ④㉜ Washer plate |
| ㉗ Transfer front drive chain | ④㉝ Conical spring washer |
| ㉘ Transfer front drive gear | ④㉞ Snap ring |
| ㉙ Transfer output gear thrust washer | ④㉟ Radial ball bearing |
| ㉚ Radial ball bearing | ④㊱ Oil seal |
| ㉛ Lock nut | ④㊲ Transmission output shaft |
| ㉜ Ball | ④㊳ Exhaust pipe support bracket |
| ㉝ Speedometer drive gear | ④㊴ Engine hanger |
| ㉞ Snap ring | ④㊵ Transfer adapter subassembly |
| ㉟ Transmission position detecting switch | ④㊶ Straight pin |
| ㊱ Gasket | ④㊷ Hexagon bolt |

TRANSFER DISASSEMBLY

1. Install the transmission with transfer on the overhaul stand, using the following SSTs.

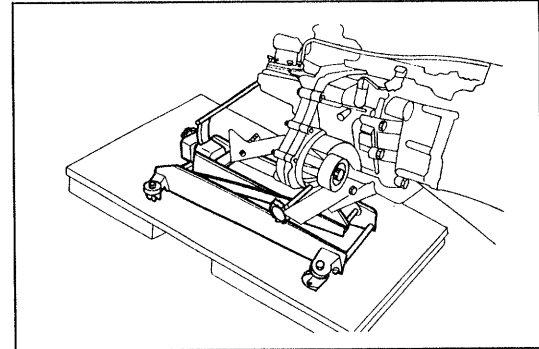
SST: 09219-87202-000
09219-87203-000

(As for the removal of transmission assembly with transfer, see page MT-16 to MT-20.)



WRU92-TR409

2. Place a wooden plate(s) or any other suitable materials on the overhauling stand, as shown in the diagram at right.
3. Support the transfer front case and transfer rear case with a transmission jack.

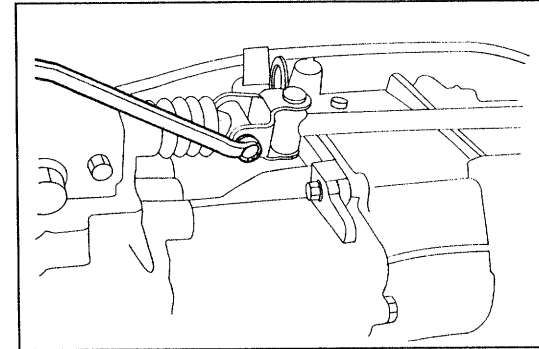


WRU90-TR005

4. Remove the control shaft with installed the shift lever retainer subassembly by removing the hexagon bolt.

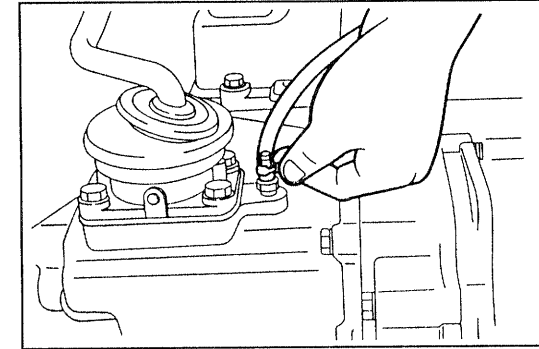
NOTE:

- When disconnecting the control shaft from the shift & select No. 1 shaft, care must be exercised as to the "O" ring which may be detached during the removal.



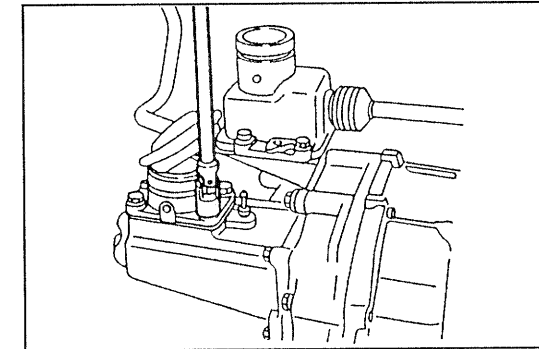
WRU90-TR006

5. Remove the breather hose by detaching a clip.



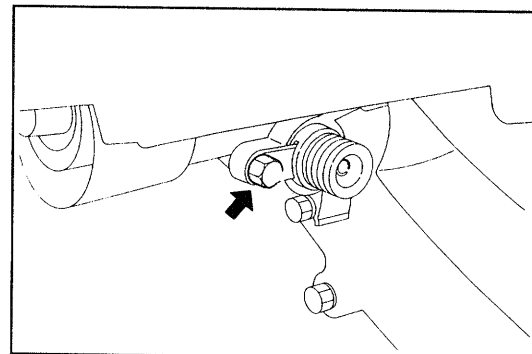
WRU90-TR007

6. Remove the transfer shift lever retainer and gasket by removing the four bolts.
(As for the disassembly/assembly and inspection for the removed parts, see page TR-36.)



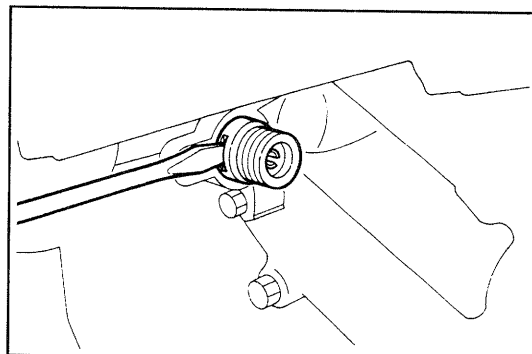
WRU92-TR410

7. Remove the speedometer sleeve lock plate by removing the bolt.



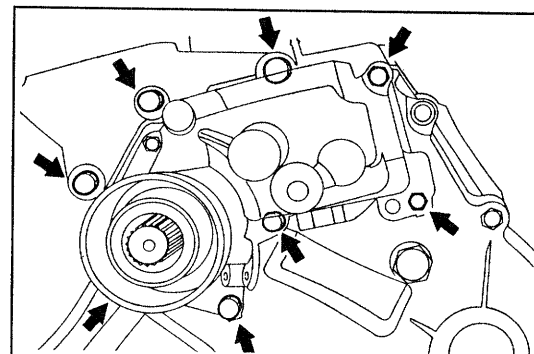
WRU90-TR009

8. Remove the speedometer sleeve, using the standard tool of flat driver arrow to remove the speedometer sleeve.



WRU90-TR010

9. Removal of transfer output shaft bearing retainer
 - (1) Remove the eight bolts.

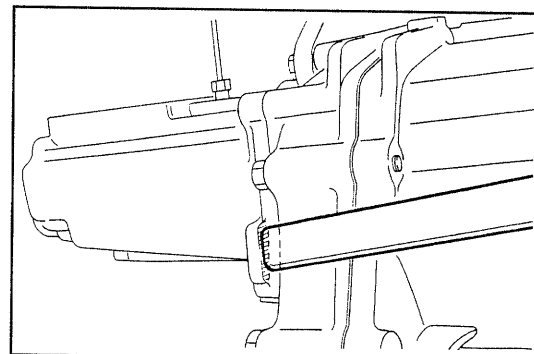


WRU90-TR011

- (2) Remove the transfer output shaft bearing retainer by tapping the both right and left ribs section, using the wooden bar with plastic hammer lightly.
 - (3) Remove the gasket.

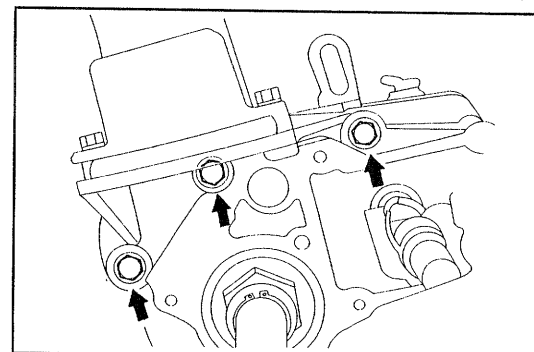
NOTE:

- Never reuse the removed gasket.



WRU90-TR012

10. Remove the control shaft lower No. 1 bracket with installed the shift & select shaft and control shaft by removing the two hexagon bolts and the bolt.



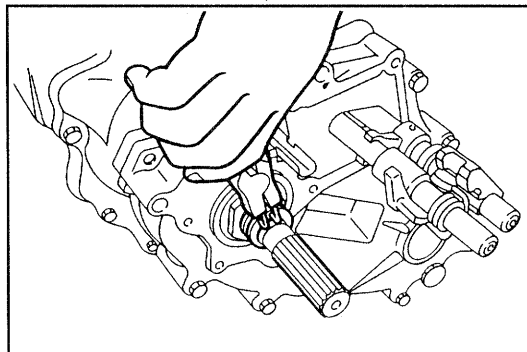
WRU90-TR013

TRANSMISSION & TRANSFER

11. Detach the snap ring. Remove the speedometer driven gear and ball.

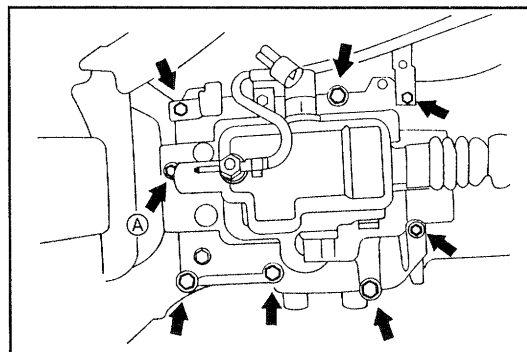
NOTE:

- Never reuse the removed snap ring.



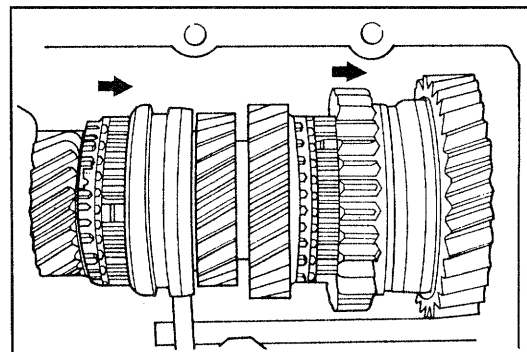
WRU90-TR014

12. Remove the transmission case cover subassembly by removing the seven bolts and the reamer bolt (A).



WRU90-TR015

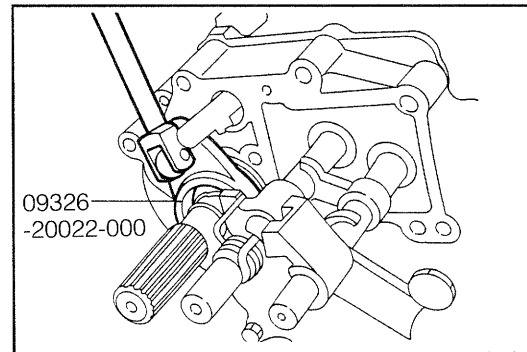
13. Interlock the 1st gear and the 3rd gear.



WRU90-TR016

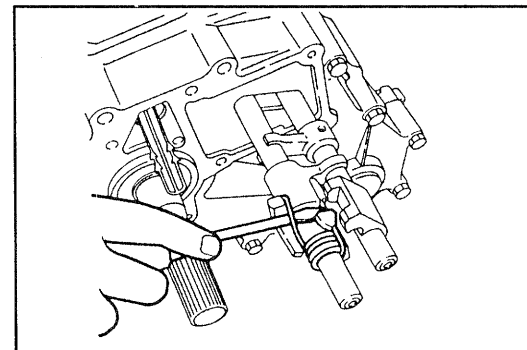
14. Raise the lock section of the lock nut.
15. Remove the lock nut from the transfer output rear shaft, using the following SST.

SST: 09326-20022-000



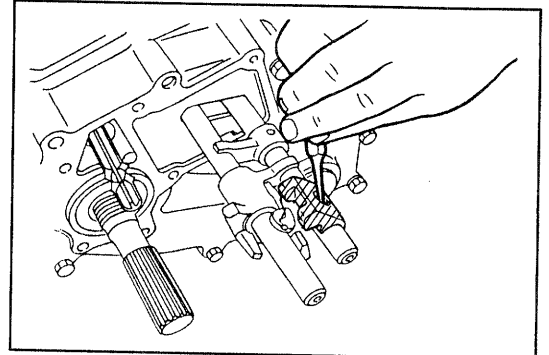
WRU90-TR017

16. Remove the torsion bar spring, using the standard tool of flat driver.



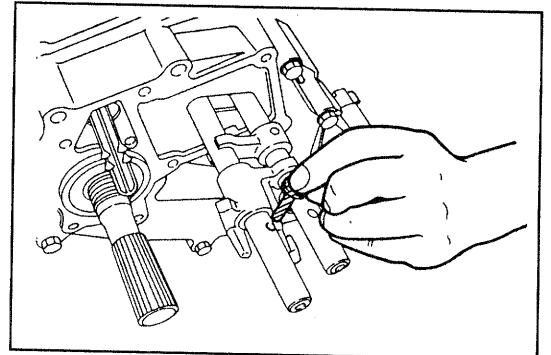
WRU90-TR018

17. Drive out the slotted pin of the transfer front drive shift head. Remove the transfer front drive shift head. (As for the inspection for the removed parts, see page TR-19.)



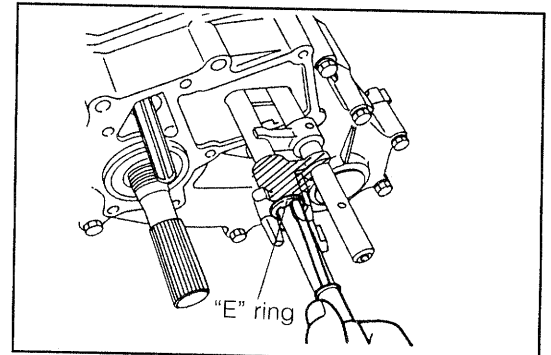
WRU90-TR019

18. Remove the transfer fork shaft pin. (As for the inspection for the removed parts, see page TR-19.)



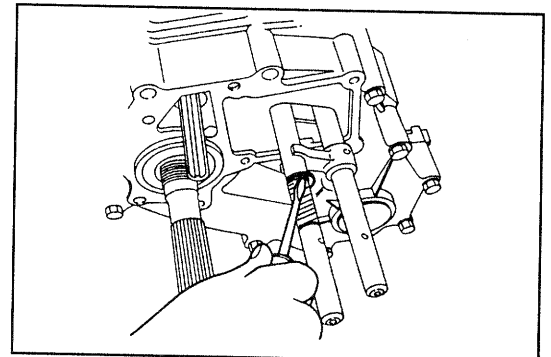
WRU90-TR020

19. Remove the "E" ring. Remove the transfer high & low shift head. (As for the inspection for the removed parts, see page TR-19.)



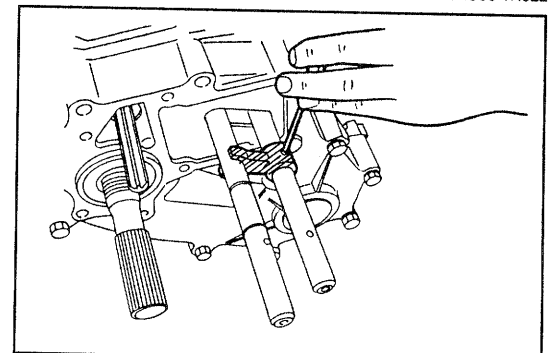
WRU90-TR021

20. Remove the "E" ring.



WRU90-TR022

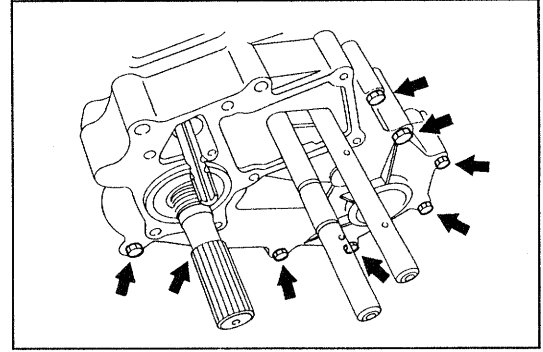
21. Drive out the slotted pin of the transfer front drive shift head No. 2. Remove the transfer front drive shift head No. 2. (As for the inspection for the removed parts, see page TR-19.)



WRU90-TR023

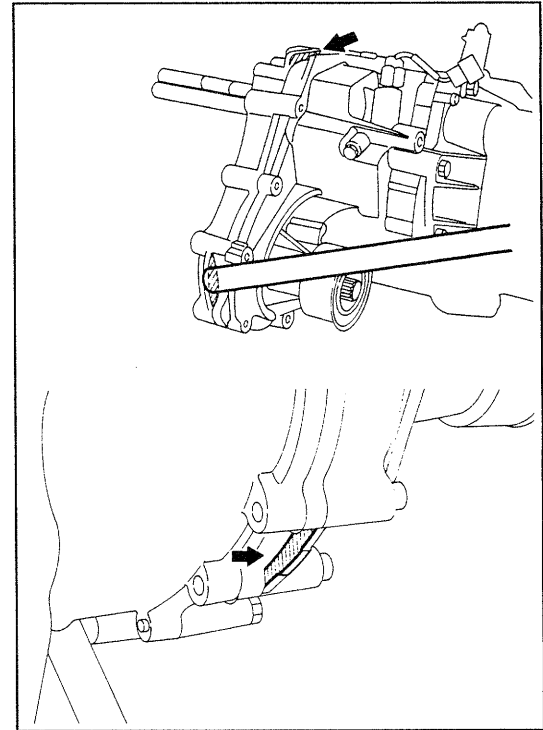
TRANSMISSION & TRANSFER

22. Remove the transfer rear case by removing the eight bolts.



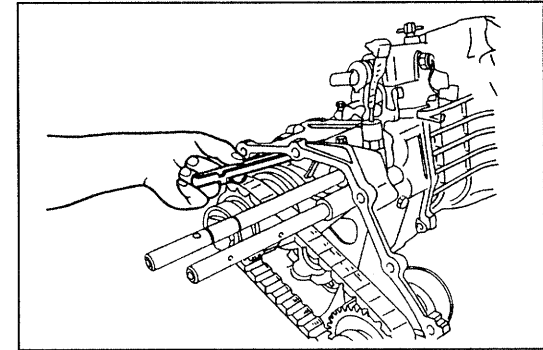
WRU90-TR024

23. Remove the transfer rear case by lightly tapping the ribs section using the wooden bar with plastic hammer.



WRU90-TR025

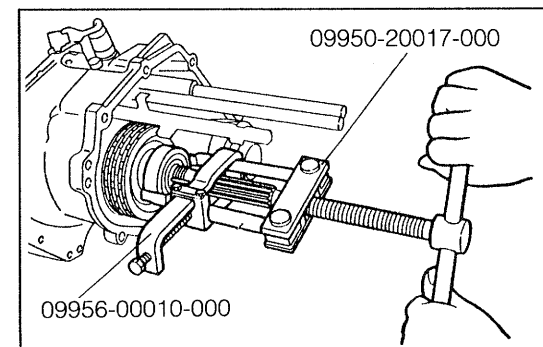
24. Remove the gasket and transfer oil supply pipe.



WRU90-TR026

25. Remove the bearing, using the following SSTs.
(As for the inspection for the removed parts, see page TR-17.)

SST: 09950-20017-000
09956-00010-000

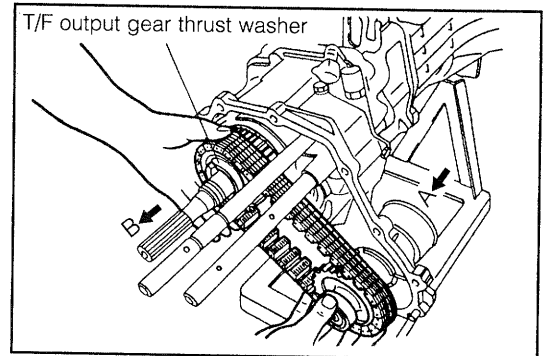


WRU92-TR411

26. Remove the transfer output gear thrust washer.
27. Remove the transfer front drive chain and transfer output gear together with the transfer output front shaft.
(As for the inspection for the removed parts, see page TR-15.)

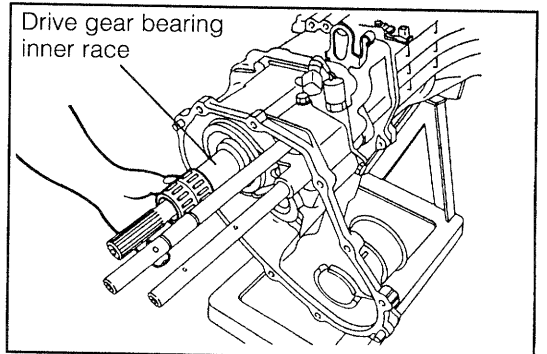
NOTE:

- Lightly tapping the transfer front shaft A with a plastic hammer.
- Pull out the transfer output rear shaft and transfer front shaft with installed the transfer front drive chain toward you B.



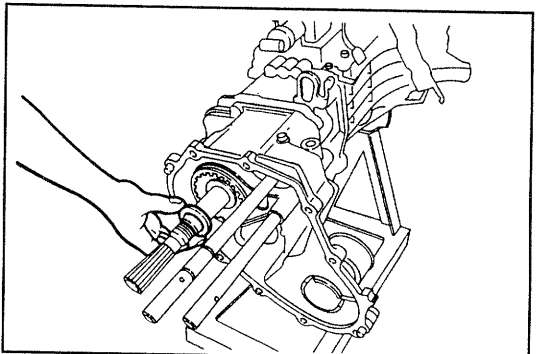
WRU90-TR028

28. Remove the needle roller bearing and transfer front drive gear bearing inner race.
(As for the inspection for the removed parts, see page TR-19.)



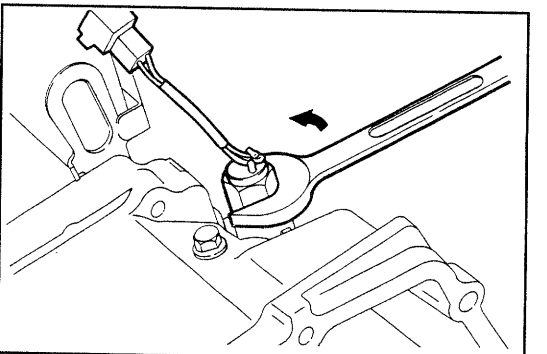
WRU90-TR029

29. Remove the transfer output gear thrust washer.



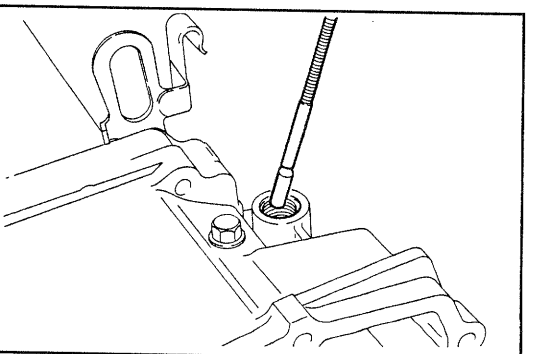
WRU90-TR030

30. Remove the transmission position detect switch and gasket.
NOTE:
 - Never reuse the removed gasket.



WRU90-TR031

31. Remove the roller, using the standard tool of magnet hand.



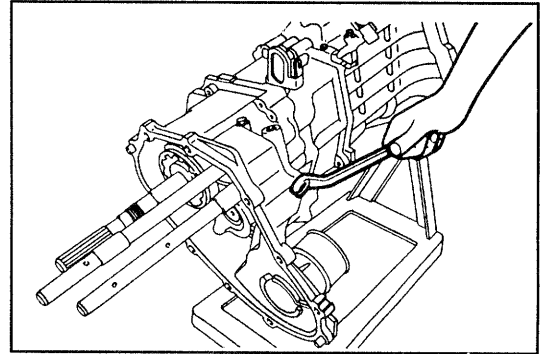
WRU90-TR032

TRANSMISSION & TRANSFER

32. Remove the lock bolt of the transfer front drive shift fork shaft and gasket.

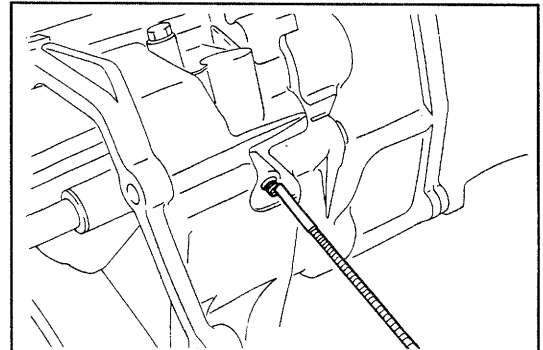
NOTE:

- Never reuse the removed gasket.



WRU90-TR033

33. Remove the compression spring and ball, using the standard tool of magnet hand.

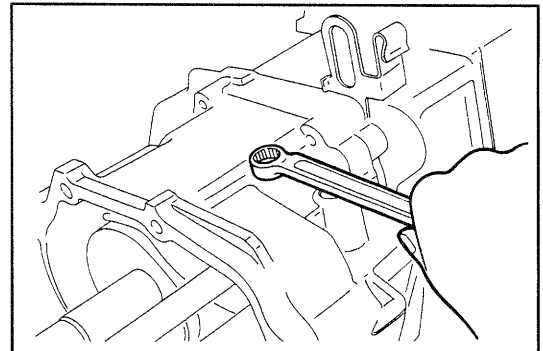


WRU90-TR034

34. Remove the lock bolt of the transfer high & low shift fork shaft and gasket.

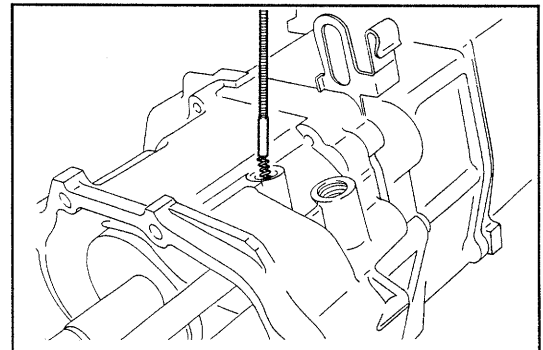
NOTE:

- Never reuse the removed gasket.



WRU90-TR035

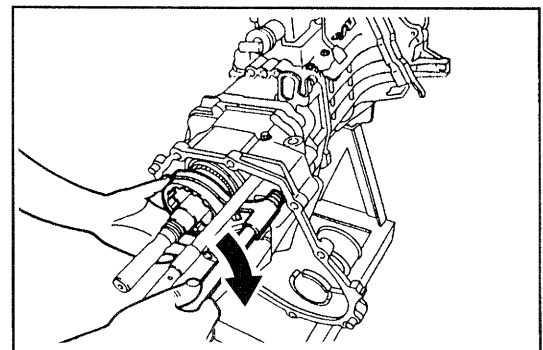
35. Remove the compression spring and ball, using the standard tool of magnet hand.



WRU90-TR036

36. Turn the transfer front drive shift fork shaft 180 degree and then, remove the following parts in a set.

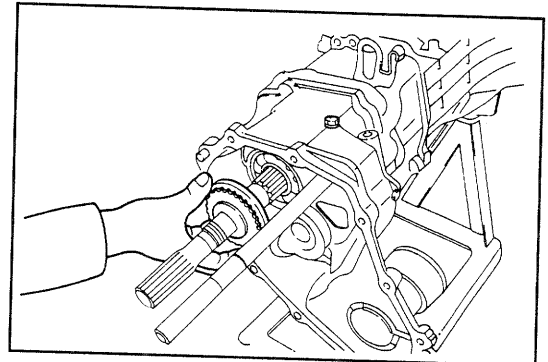
- Transfer front drive gear sleeve
- Transfer front drive shift fork
- Transfer front drive shift fork shaft
- Needle roller bearing
- Transfer front drive gear bearing inner race



WRU90-TR037

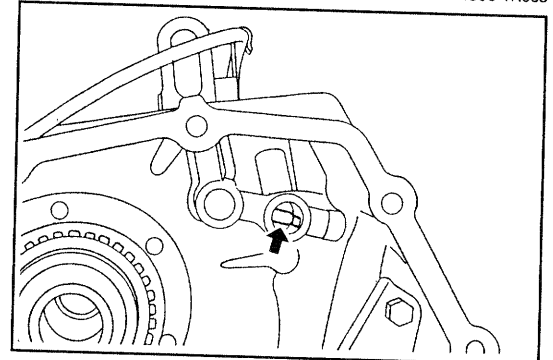
37. Remove the transfer front drive clutch hub and transfer output shaft spacer.

(As for the inspection for the removed parts, see page TR-18.)



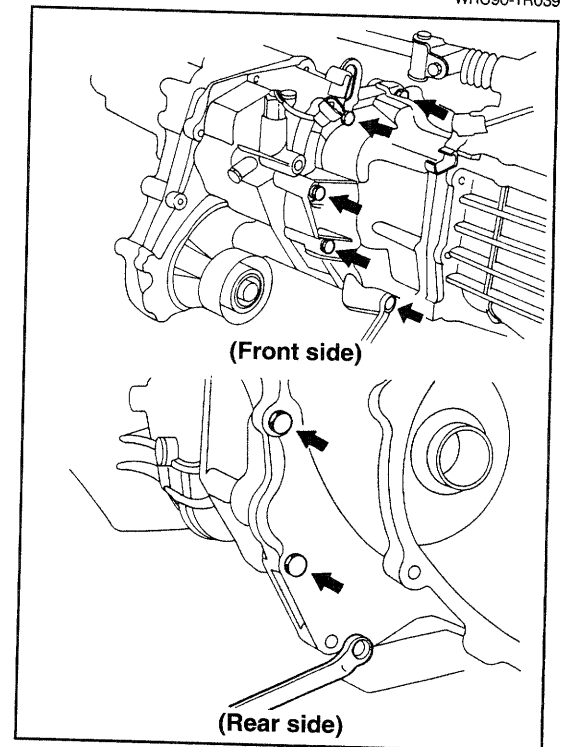
WRU90-TR038

38. Remove the roller, using the common tool of magnet hand.



WRU90-TR039

39. Remove the transfer front case by removing the seven bolts.

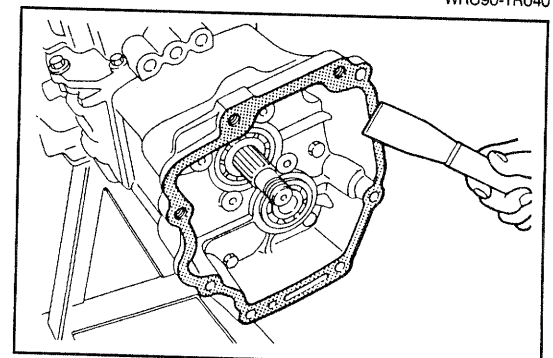


WRU90-TR040

40. Remove the gasket on the transfer adapter, using the gasket scraper.

NOTE:

- Be very careful not to scratch the attaching surface.



WRU90-TR041

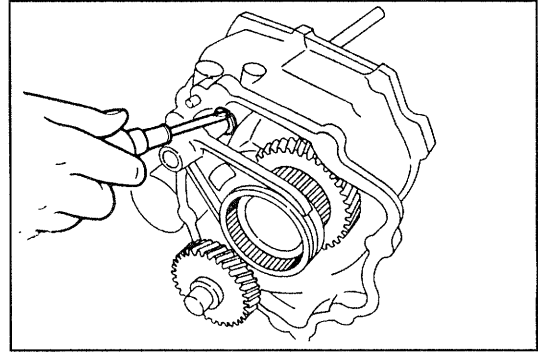
TRANSMISSION & TRANSFER

41. Remove the two “E” rings at the front and rear that retain the transfer high & low shift fork in the thrust direction.

NOTE:

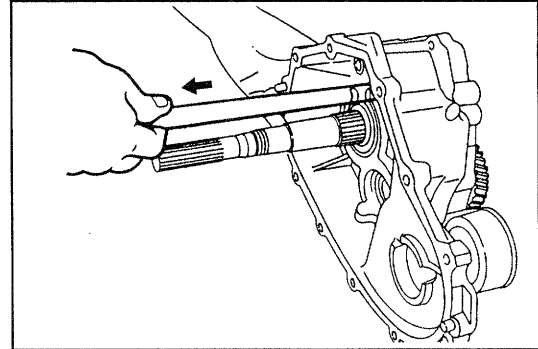
- Never reuse the removed “E” rings.

42. Remove the transfer high & low shift fork.



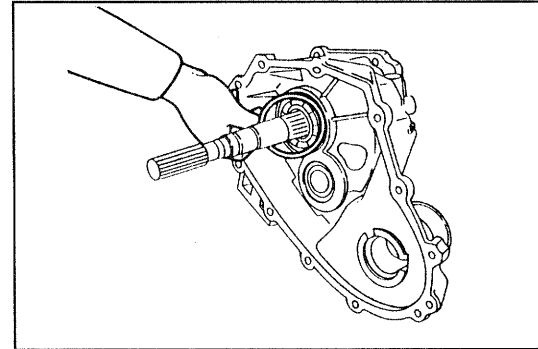
WRU90-TR042

43. Pull out the transfer high & low shift fork shaft toward you.



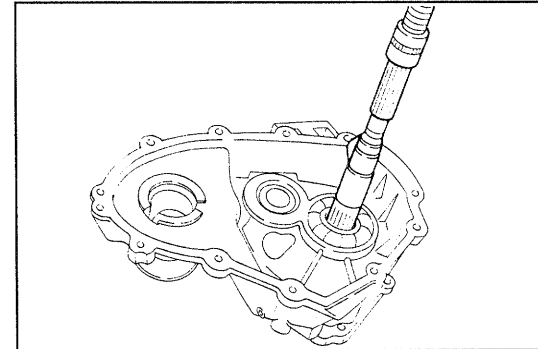
WRU90-TR043

44. Detach the stop ring of the transfer output rear shaft bearing.



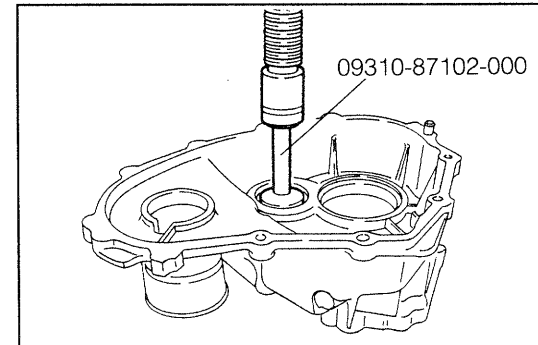
WRU90-TR044

45. Remove the transfer output rear shaft, using a press.



WRU90-TR045

46. Press the transfer counter shaft, using the following SST.
SST: 09310-87102-000



WRU90-TR046

47. Set the disc-shaped plate (C) on the oil seal, using the following SST. Remove the dust deflector.

SST: 09950-20017-000

(Disc-shaped plate (C) that is a part of 09950-20017-000)

48. Remove the oil seal with a screwdriver.

CAUTION:

- Never reuse the removed oil seal.

DISASSEMBLY OF TRANSFER OUTPUT FRONT SHAFT

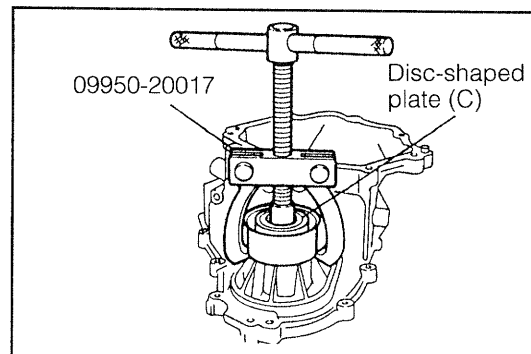
1. Set the following SST in a vice with transfer output front shaft installed.

Remove the bearing at the rear side of the transfer output front shaft, using the following SST.

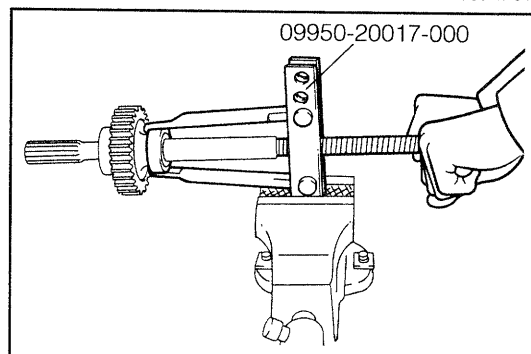
SST: 09950-20017-000

Remove the bearing at the front side of the transfer output front shaft.

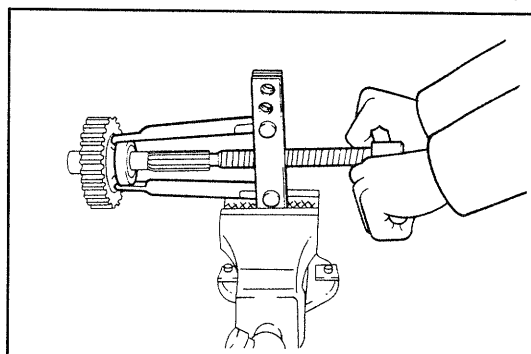
SST: 09950-20017-000



WRU90-TR047



WRU90-TR048



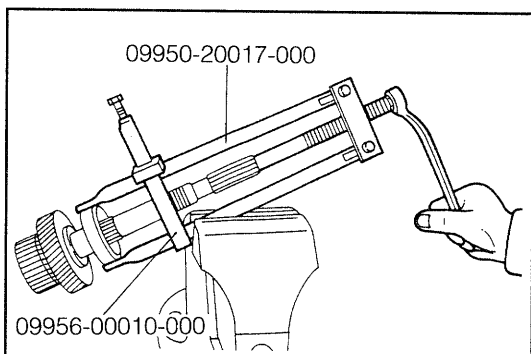
WRU90-TR049

DISASSEMBLY OF TRANSFER OUTPUT REAR SHAFT

1. Remove the bearing from the transfer output rear shaft, using the following SSTs.

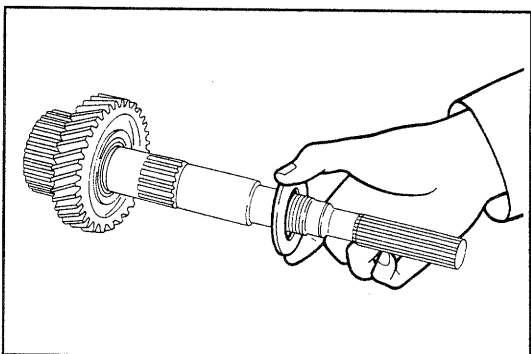
SST: 09950-20017-000

09956-00010-000



WRU90-TR050

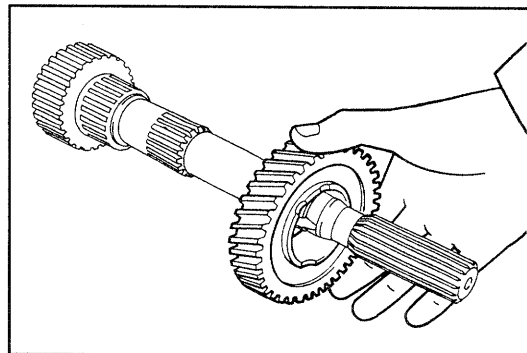
2. Remove the transfer output gear thrust washer from the transfer output rear shaft.



WRU90-TR051

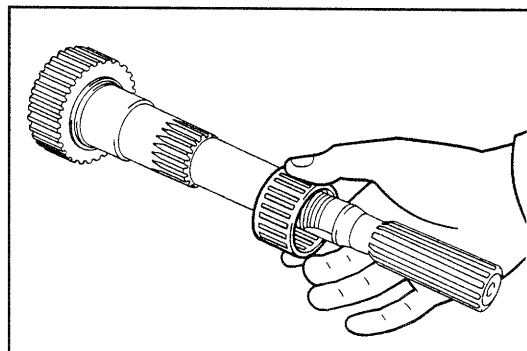
TRANSMISSION & TRANSFER

3. Remove the transfer low speed output gear from the transfer output rear shaft.



WRU90-TR052

4. Remove the needle roller bearing from the transfer output rear shaft.

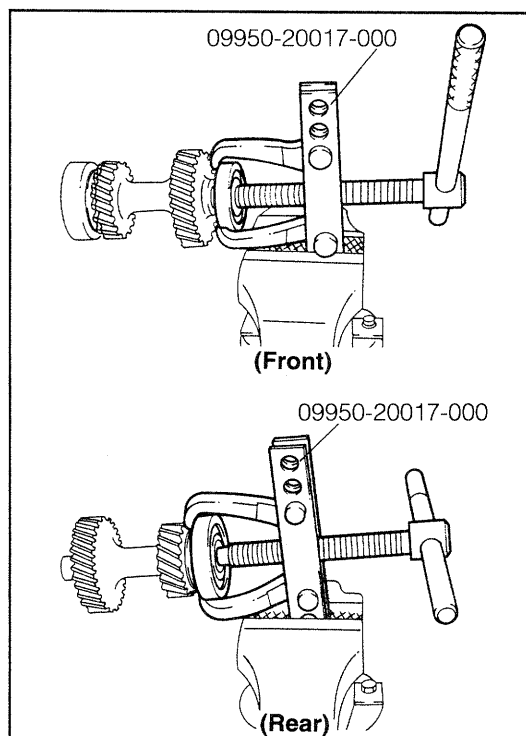


WRU90-TR053

DISASSEMBLY OF TRANSFER COUNTER GEAR

1. Set the SST in a vice with the transfer counter gear installed. Remove the front and rear bearings.

SST: 09950-20017-000

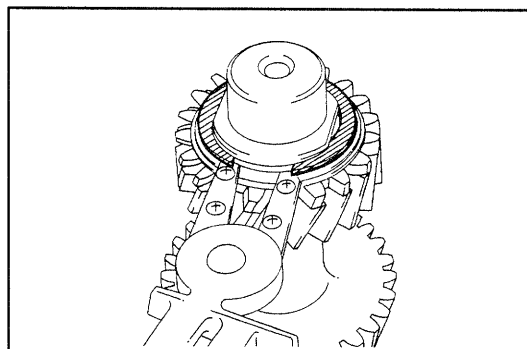


WRU90-TR054

2. Remove the snap ring, using the standard tool of snap ring plier.

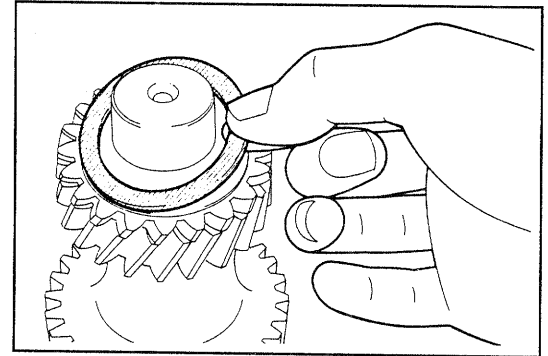
NOTE:

- Never reuse the removed snap ring.



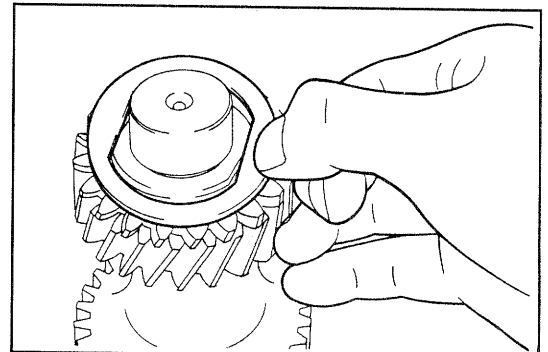
WRU90-TR055

3. Remove the conical spring washer.



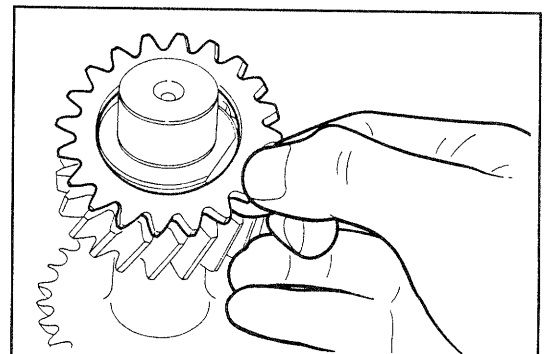
WRU90-TR056

4. Remove the washer plate.



WRU90-TR057

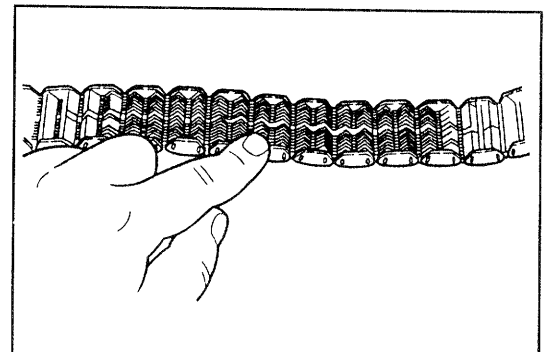
5. Remove the sub gear No. 2.



WRU90-TR058

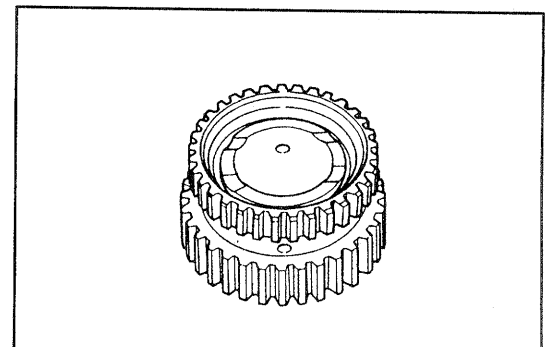
INSPECTION (FRONT DRIVE CHAIN)

1. Check the contacting surface of the transfer front drive chain with each gear for damage.



WRU90-TR059

2. Transfer front drive gear
 - (1) Check the contacting surface of the transfer front drive gear with the transfer front drive chain for damage.



WRU90-TR060

TRANSMISSION & TRANSFER

3. Measure the dimension of the transfer front drive gear and the differential lock sleeve shown in the right figure. Make sure that the clearance (A) between this gear and the differential lock sleeve may conform to the specification.

Specified Value: 0.03 - 0.19 mm
(0.0012 - 0.0075 inch)

- (1) The outer diameter dimension of the transfer front drive gear has been machined in accordance with the bore dimension of the differential lock sleeve. If either part exceeds the specified value above, be certain to replace them as a set.

CAUTION:

- If either part which has exceeded the specified value should be used against this caution, it would cause slipping-out-of-gear and or emanation of abnormal noise.
- (2) With the differential lock sleeve assembled to the transfer front drive gear, measure the tilt width at the section (B) of the differential lock sleeve.

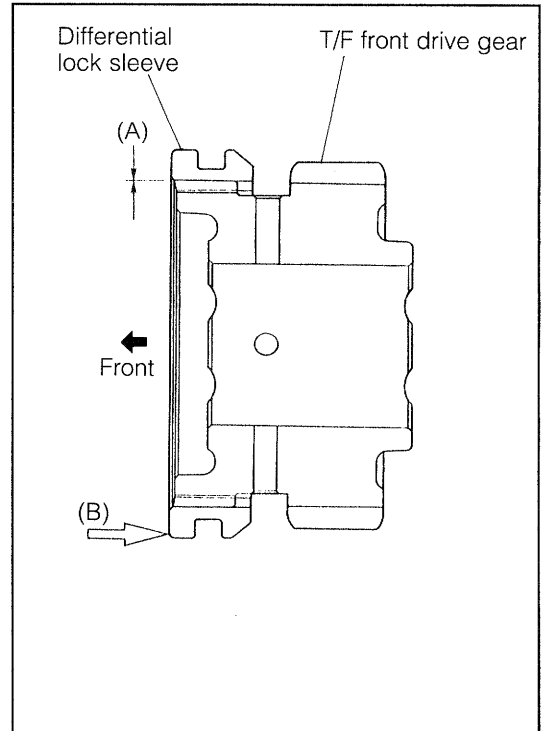
Specified Value: Not to exceed 0.5 mm (0.0197 inch)

NOTE:

- If the tilt width of the differential lock sleeve exceeds the above specified value, be certain to replace those parts of the transfer front drive gear and differential lock sleeve as a set.

Unit: mm (inch)

Classification /No.	Bore dimension	Outer dimension
	Differential lock sleeve	T/F front drive gear
2	87.371 - 87.47 (3.439 - 3.443)	87.28 - 87.34 (3.437 - 3.438)
1	82.71 - 87.37 (3.435 - 3.439)	87.18 - 87.24 (3.432 - 3.434)
3	87.17 - 87.27 (3.431 - 3.435)	87.08 - 87.14 (3.428 - 3.430)



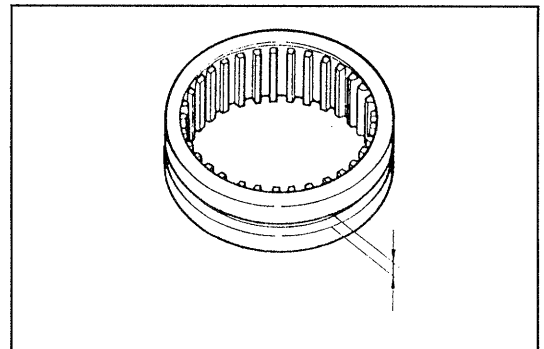
WRU92-TR404

INSPECTION (TRANSFER HIGH & LOW CLUTCH SLEEVE)

1. Using vernier calipers, measure the installation width of the transfer high & low clutch sleeve with the transfer high & low shift fork.

mm (inch)

Item Part name	Specified value	Allowable limit
Transfer high & low clutch sleeve	7.05 - 7.12 (0.2776 - 0.2803)	7.3 (0.2874)



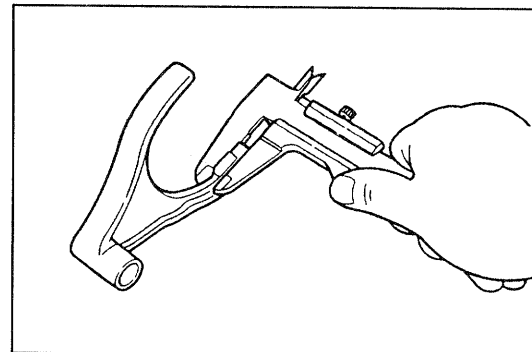
WRU90-TR063

2. Transfer high & low shift fork

Using vernier calipers, measure the contact width of the transfer high & low shift fork with the transfer high & low sleeve.

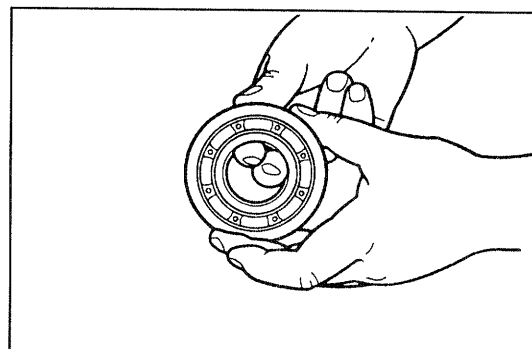
mm (inch)

Item	Specified value	Allowable limit
Part name		
Transfer high & low shift fork	6.80 - 7.00 (0.2677 - 0.2756)	6.3 (0.2480)



WRU90-TR064

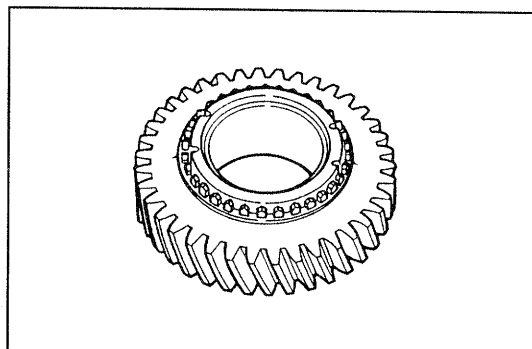
3. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any binding.



WRU90-TR065

4. Transfer low speed output gear

Check transfer low speed output gear for wear or damage.



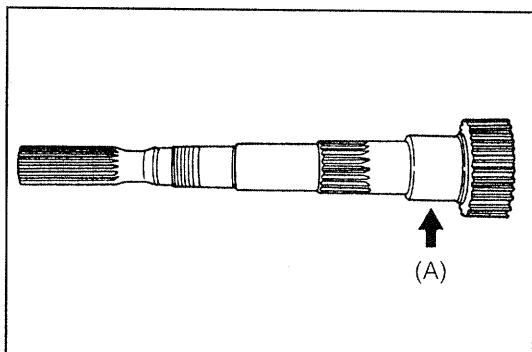
WRU90-TR066

5. Transfer output rear shaft

Measure the (A) section, transfer output rear shaft, using the micrometer.

mm (inch)

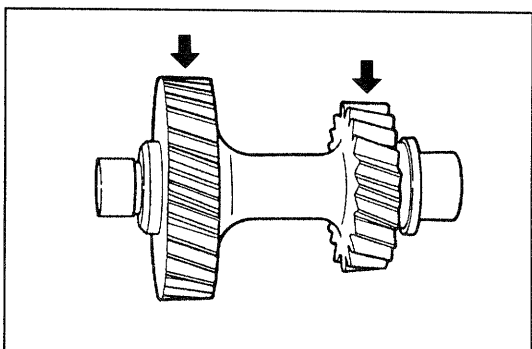
Item	Specified value	Allowable limit
Measuring point		
Section (A) in right figure	41.975 - 41.991 (1.6525 - 1.6532)	41.960 (1.6520)



WRU90-TR067

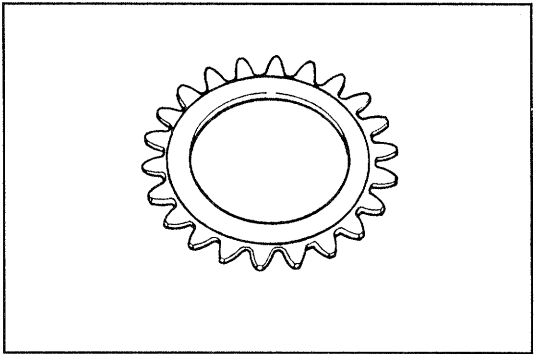
6. Transfer counter gear

Check transfer counter gear for wear or damage.



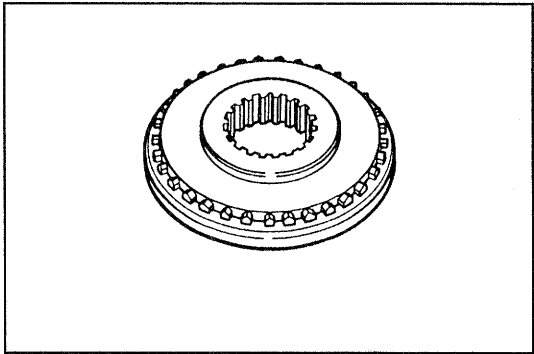
WRU90-TR068

7. Sub gear No. 2
Check sub gear No. 2 for wear or damage and deformation.



WRU90-TR069

8. Transfer front drive clutch hub
Check transfer front drive clutch hub for damage.

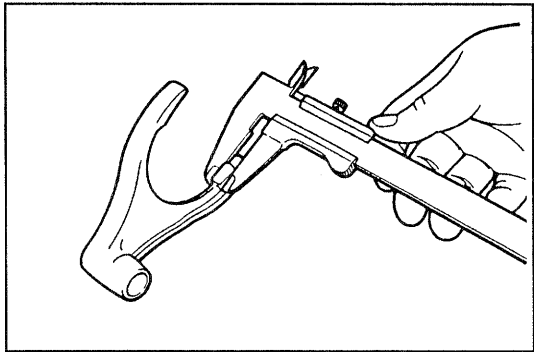


WRU90-TR070

9. Transfer front drive shift fork
Check the contact width transfer front drive shift fork with the transfer front drive gear sleeve.

mm (inch)

Item		
Nomenclature	Specified value	Allowable limit
Dimension of transfer front drive shift fork, as shown in right figure	6.8 - 6.9 (0.2677 - 0.2717)	6.3 (0.2480)



WRU90-TR071

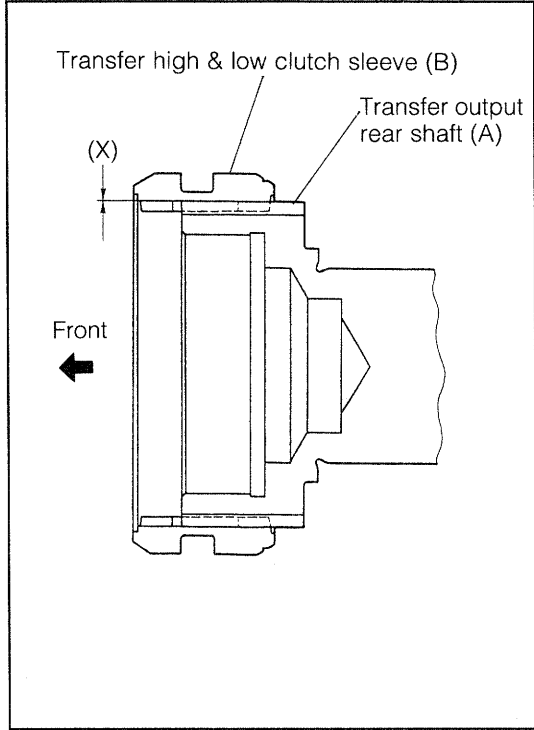
10. Measure the dimension (A) of the transfer output and (B) of the transfer high & low clutch sleeve as shown in the right figure. Make sure that the clearance (X) between this shaft and the sleeve may confirm to the specification.

Specified Valve: 0.03 - 0.19 mm
(0.0012 - 0.0075 inch)

- (1) The outer diameter dimension of the transfer output rear shaft has been machined in accordance with the bore dimension of the transfer high & low clutch sleeve. If either part exceeds the specified value above, be certain to replace them as a set.

CAUTION:

- If either part which has exceed the specified value should be used against this caution, it would cause slipping-out of gear and or emanation of abnormal noise.



WRU90-TR072

- (2) With the transfer high & low clutch sleeve assembled to the transfer output rear shaft, measure the tilt width at the section (Y) of the transfer high & low clutch sleeve.

Specified Value:

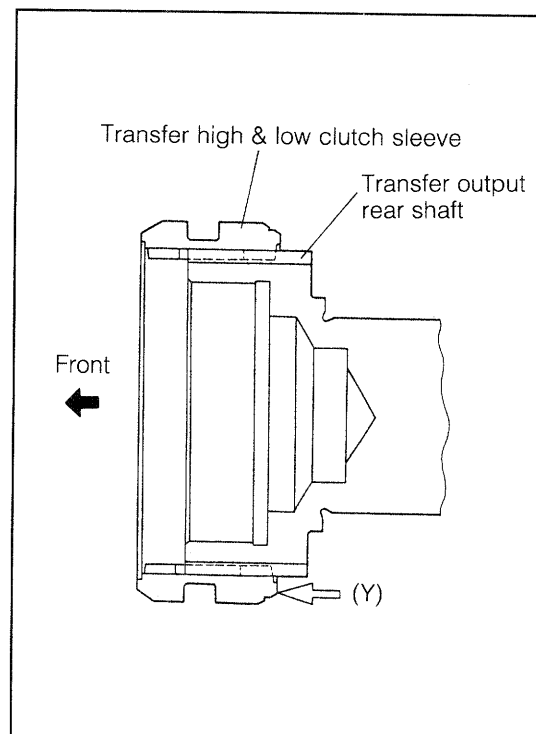
Not to exceed 0.5 mm (0.0197 inch)

NOTE:

- If the tilt width of the transfer high & low clutch sleeve exceeds the above specified value, be certain to replace those parts of the transfer output rear shaft and transfer high & low clutch sleeve as a set.

Unit: mm (inch)

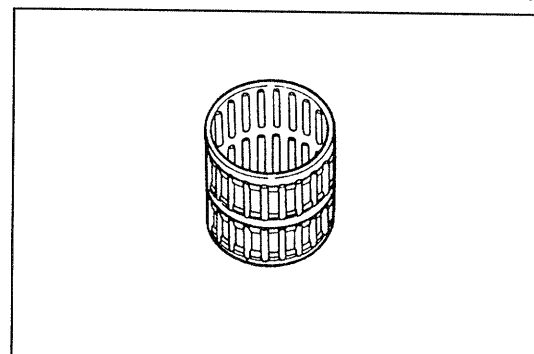
Classification /No.	Bore dimension	Outer dimension
	T/F high & low clutch sleeve	T/F output rear shaft
2	69.871 - 69.97 (2.751 - 2.755)	69.78 - 69.84 (2.747 - 2.750)
1	69.771 - 69.87 (2.747 - 2.751)	69.68 - 69.74 (2.743 - 2.746)
3	69.67 - 69.77 (2.743 - 2.747)	69.58 - 69.64 (2.739 - 2.742)



WRU90-TR400

11. Needle roller bearing

Check to see if any foreign matter is caught needle roller bearing and that the bearing exhibits any damage.

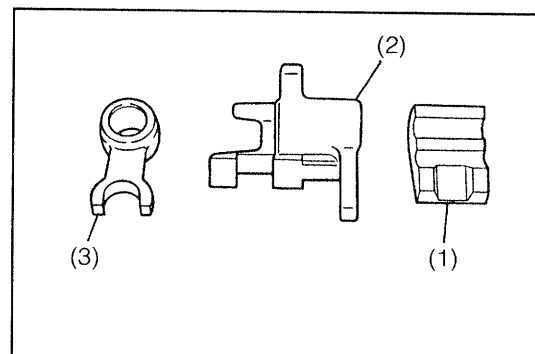


WRU90-TR073

12. Inspection (Transfer shift head-related parts)

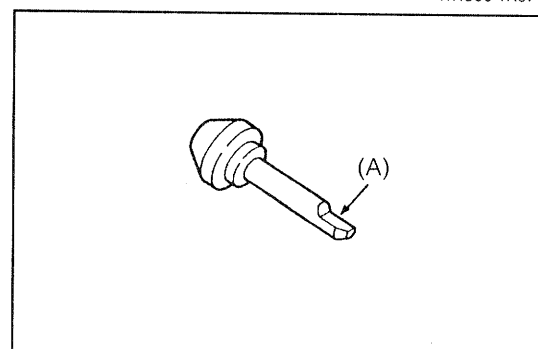
- (1) Check the following parts for damage.

- (1) Transfer front drive shift head No. 2
- (2) Transfer high & low shift head
- (3) Transfer front drive shift head



WRU90-TR074

- (2) Check the section (A) of the transfer fork shaft pin shown in the right figure for wear.



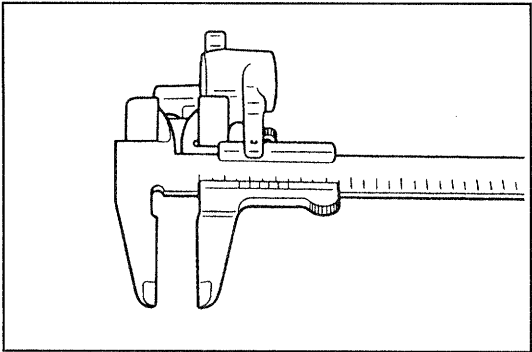
WRU90-TR075

TRANSMISSION & TRANSFER

- (3) Measure the contact width of the transfer high & low shift head with the transfer control shaft, using vernier calipers.

mm (inch)

Part name \ Item	Specified value	Allowable limit
Transfer high & low shift head	16.000 - 16.070 (0.6299 - 0.6327)	16.2 (0.6378)

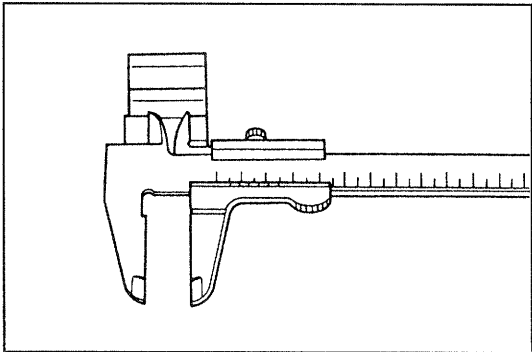


WRU90-TR076

- (4) Measure the contact width of the transfer front drive shift head with the transfer control shaft, using vernier caliper.

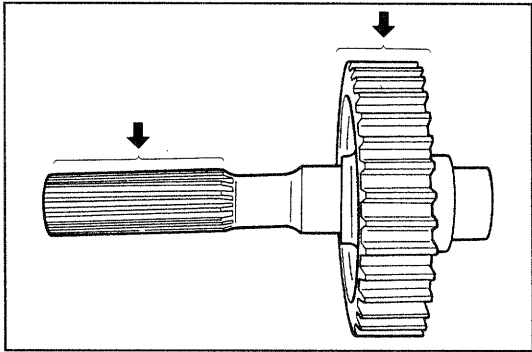
mm (inch)

Part name \ Item	Specified value	Allowable limit
Transfer front drive shift head	16.000 - 16.070 (0.6299 - 0.6327)	16.2 (0.6378)



WRU90-TR077

13. Transfer output front shaft
Check for wear or damage.

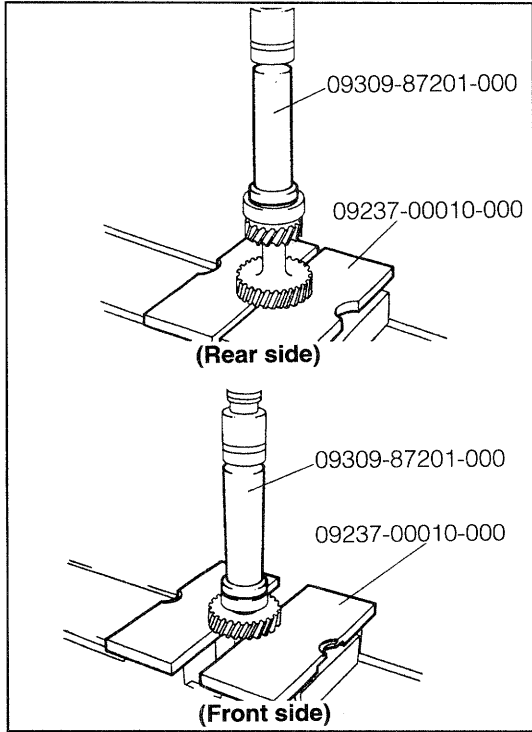


WRU90-TR078

ASSEMBLY
(TRANSFER OUTPUT FRONT SHAFT BEARING)

1. Press the radial bearing into the transfer output front shaft, using the following SSTs.

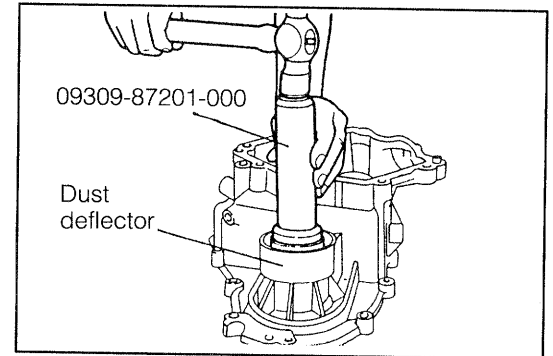
SST: 09309-87201-000
09237-00010-000



WRU90-TR079

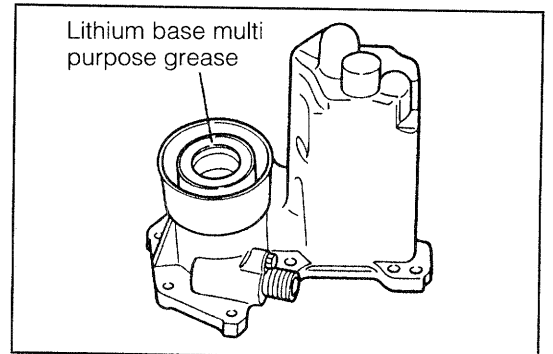
ASSEMBLY

1. Drive a new dust deflector into position, using a hammer.
For this installation, place a wooden block on the dust deflector so that the deflector may not be deformed.
2. Press a new oil seal, using the following SST.
SST: 09309-87201-000



WRU90-TR080

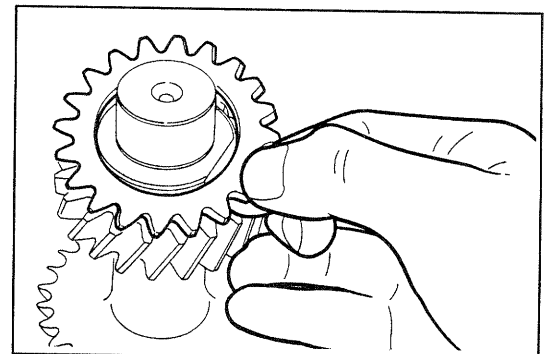
3. Apply lithium base multi purpose grease to the lip section of the oil seal.



WRU90-TR081

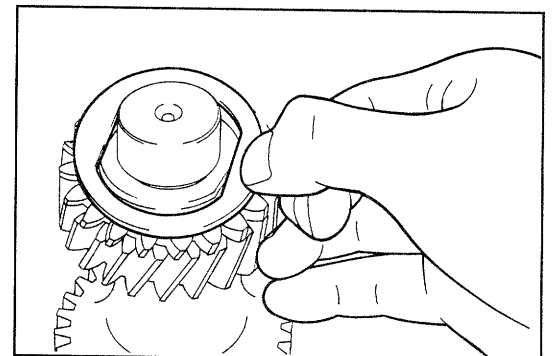
ASSEMBLY OF TRANSFER COUNTER GEAR

1. Install the sub gear No. 2.



WRU90-TR082

2. Install the washer plate.

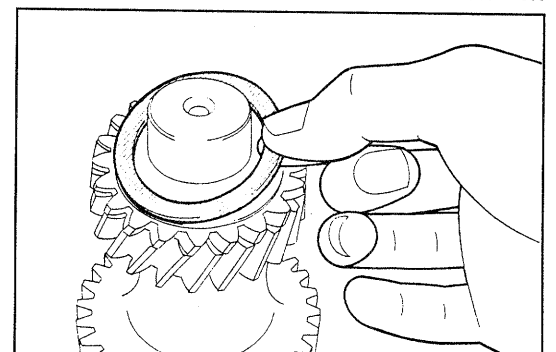


WRU90-TR083

3. Install the conical spring washer.

CAUTION:

- Ensure that the conical spring washer must be installed with in expanded side facing toward the sub gear No. 2.



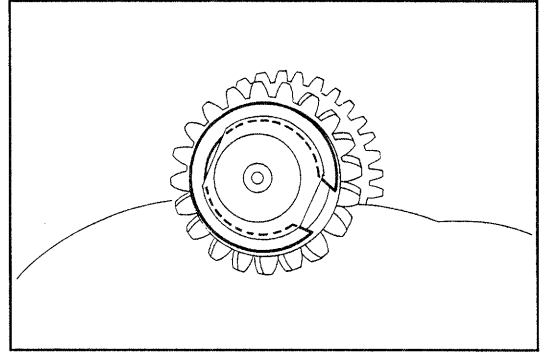
WRU90-TR084

TRANSMISSION & TRANSFER

4. Install the new snap ring, using the standard tool of snap ring plier.

NOTE:

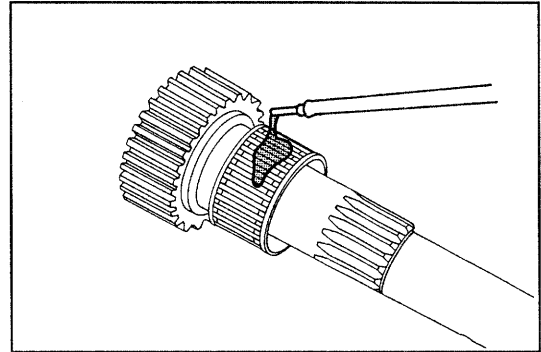
- Ensure that the snap ring should be installed to the groove section of the transfer counter gear securely.



WRU90-TR085

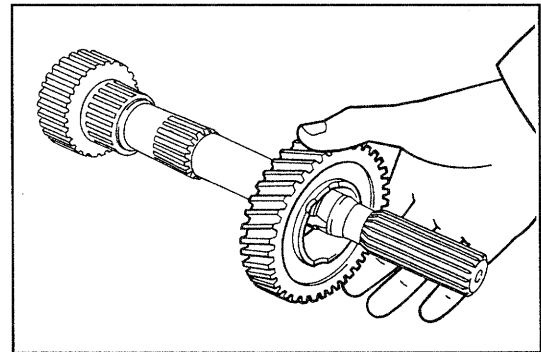
ASSEMBLY OF TRANSFER OUTPUT REAR SHAFT

1. Apply the gear oil to the needle roller bearing and then, install to the transfer output rear shaft.



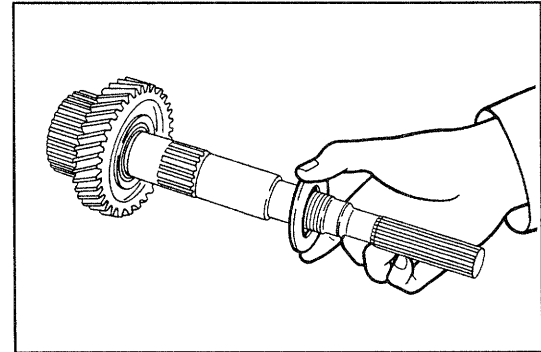
WRU90-TR086

2. Install the transfer low speed output gear as shown in the right figure illustration.



WRU90-TR087

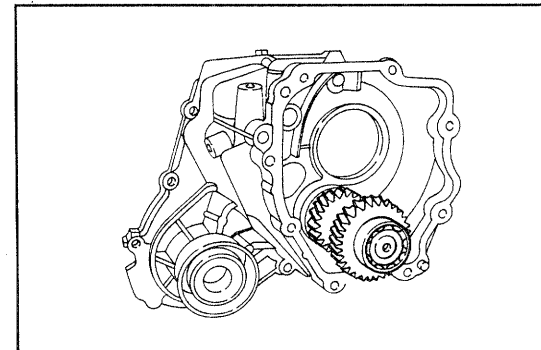
3. Install the transfer output gear thrust washer to the transfer output rear shaft.



WRU90-TR088

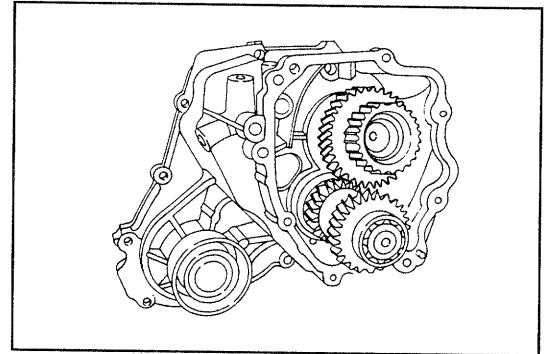
TRANSFER ASSEMBLY

1. Temporarily install the transfer counter gear to the transfer front case.



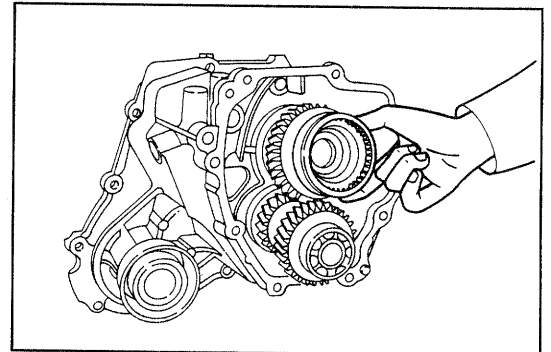
WRU90-TR089

2. Install the transfer output rear shaft to the transfer front case.



WRU90-TR090

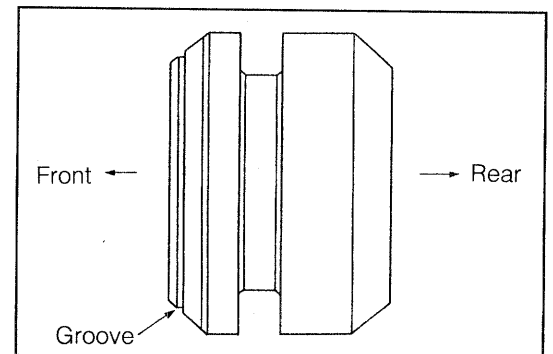
3. Install the transfer high & low clutch sleeve to the transfer output rear shaft.



WRU90-TR091

NOTE:

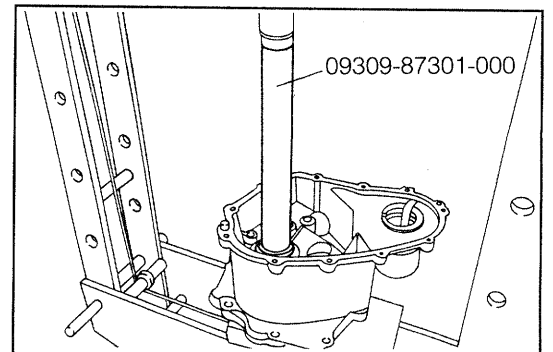
- Be sure to install the sleeve in such a direction that the grooved section, as indicated in the right figure, comes at the front side (transfer low speed output gear side).



WRU90-TR092

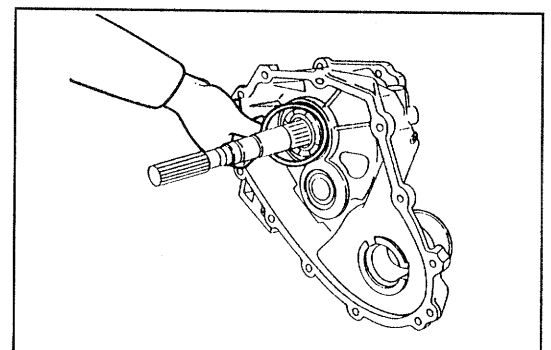
4. Rotate the transfer front case through 180 degrees.
5. Temporarily press the transfer output rear shaft bearing into position using the following SST:

SST: 09309-87301-000



WRU90-TR093

6. Attach the stop ring of the transfer output rear shaft bearing.



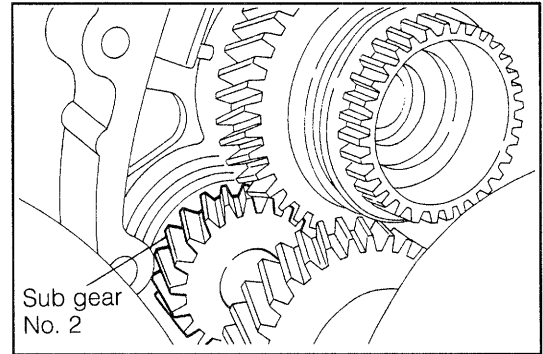
WRU90-TR094

TRANSMISSION & TRANSFER

7. Turn over the transfer front case.

CAUTION:

- Ensure that the gear must be engaged between subgear No. 2 of the transfer counter shaft and transfer low speed output gear.
- If the above operation should fail to be performed, failure to observe this caution may cause deformation of the transfer counter shaft subgear No. 2.

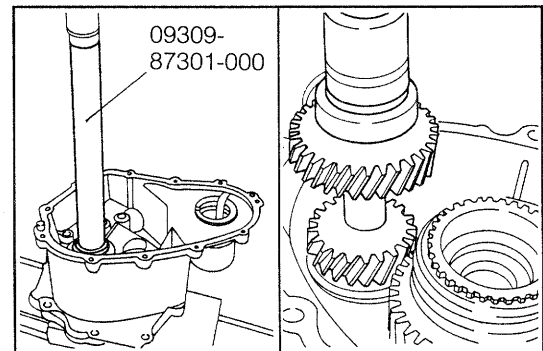


WRU90-TR095

8. Press the transfer output shaft rear bearings into position using the following SST:

SST: 09309-87301-000

9. Press the transfer counter gear.

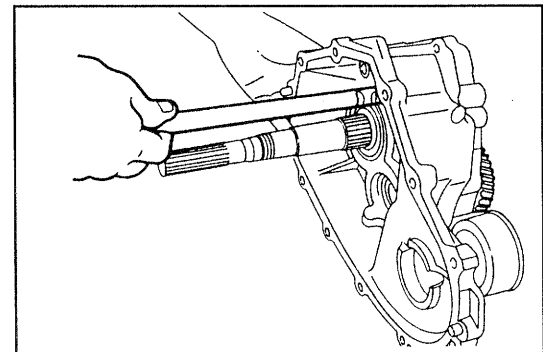


WRU90-TR096

10. Insert the transfer high & low shift fork shaft into the transfer front case.

CAUTION:

- Ensure that the transfer high & low shift fork shaft is longer than the transfer front drive shift fork shaft, prior to install the shaft.

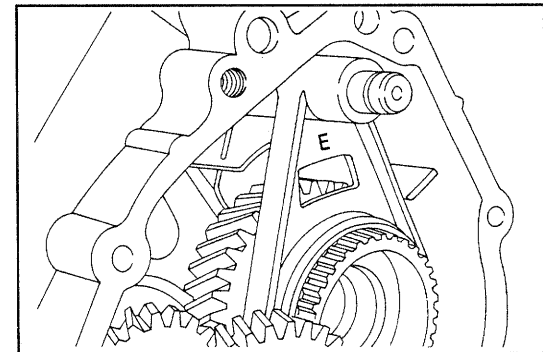


WRU90-TR097

11. Installation of the transfer high & low shift fork
(1) Insert the transfer high & low shift fork shaft into the hole of the transfer high & low shift fork.

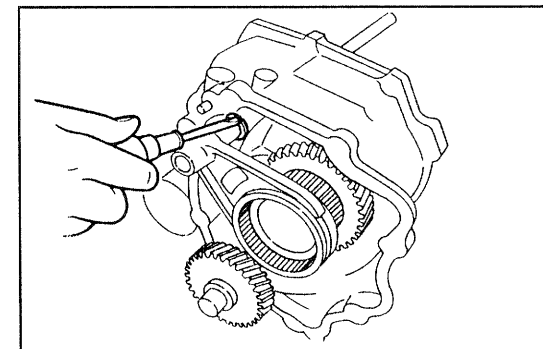
CAUTION:

- Ensure that the E-marking on the transfer high & low shift fork must face toward the front side.



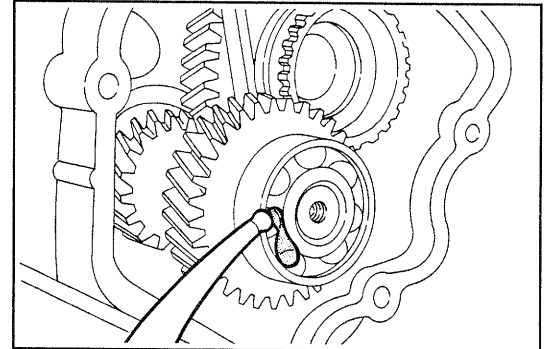
WRU90-TR098

- (2) Install the new two "E" rings on both rear and front of the transfer high & low shift fork.



WRU90-TR099

12. Apply the gear oil to the radial ball bearing of the transfer counter shaft.



WRU90-TR100

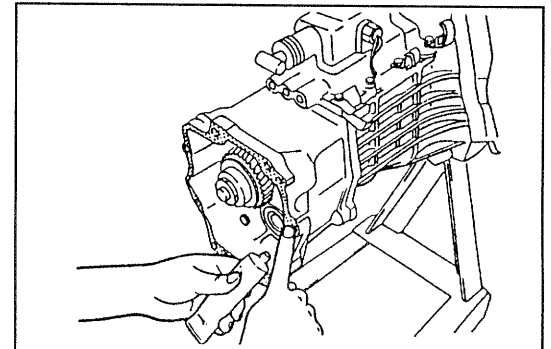
13. Remove the remaining gasket on the transfer adapter with gasket scraper.

NOTE:

- Be very careful not to scratch the attaching surface.

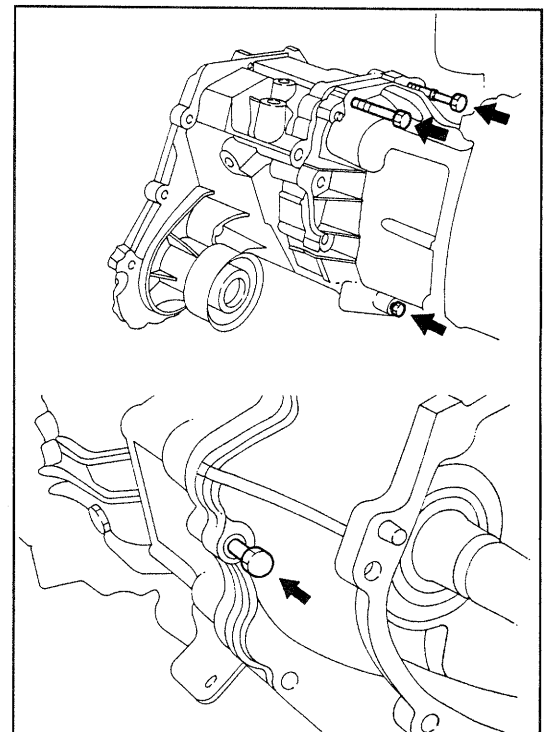
Apply the following bond to the transfer front case attaching surface of the transfer adapter and the threaded portion of the attaching screw.

Bond: Three Bond 1216 (Three Bond made)



WRU90-TR101

14. Installation of the transfer front case
 - (1) With using the two to four dummy bolts, temporarily install the transfer front case to the transfer adapter.

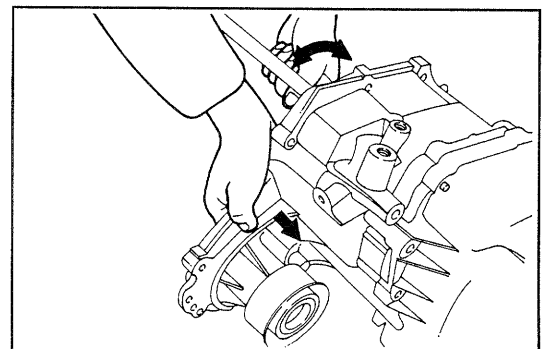


WRU90-TR102

- (2) Brought the transfer front case into carefully/slowly contact with the transfer adapter, while rotating the transfer rear output shaft with clockwise or counterclockwise directions.

CAUTION:

- Be carefully to proceed this jos.
- If this operation should fail to be performed, failure to observe this caution may cause deformation of subgear No. 1.



WRU90-TR103

- (3) Remove the dummy bolts.

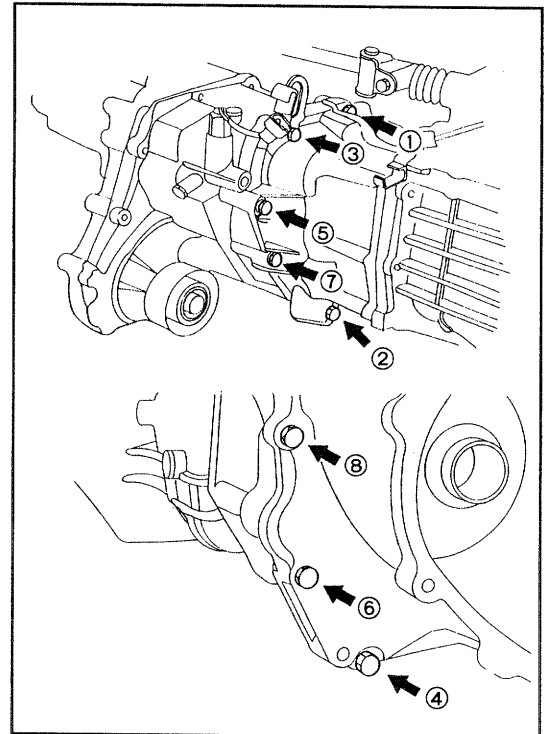
Apply the following bond to the threaded section of the attaching bolts and then tighten the transfer front case subassembly with the eight bolts.

Bond: Three Bond 1216 (Three Bond made)

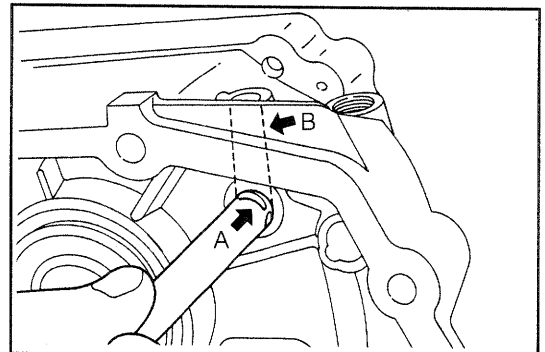
Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N-m)

NOTE:

- Be sure to tighten the bolts alternately and diagonally.
(The illustration at the right figure indicates a typical example of the tightening sequence.)



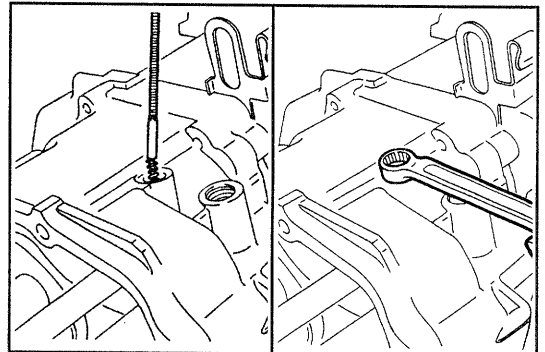
15. Pull the transfer high & low shift fork shaft until the cut-out section A meet with swelling section of the transfer front case B.



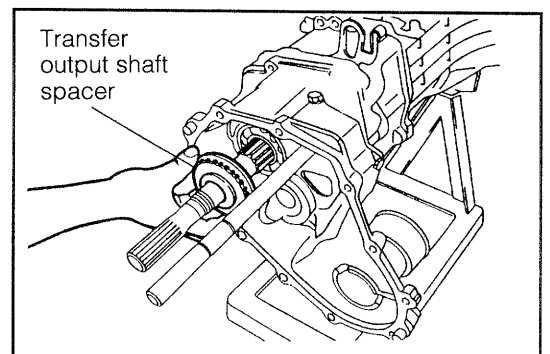
16. Insert the transfer high & low shift fork shaft with the present condition to the transfer front case.
17. Install the ball and compression spring in this sequence.
18. Tighten the bolts, using a new gasket.

Tightening Torque: 1.9 - 3.1 kg-m
(13.7 - 22.4 ft-lb, 18.6 - 30.4 N-m)

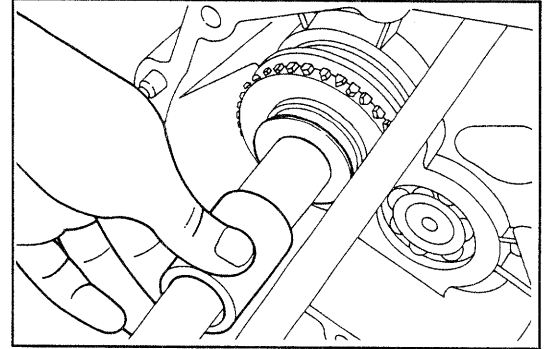
19. Insert the roller, using the standard tool of magnet hand.



20. Install the transfer front drive clutch hub and transfer output shaft spacer.

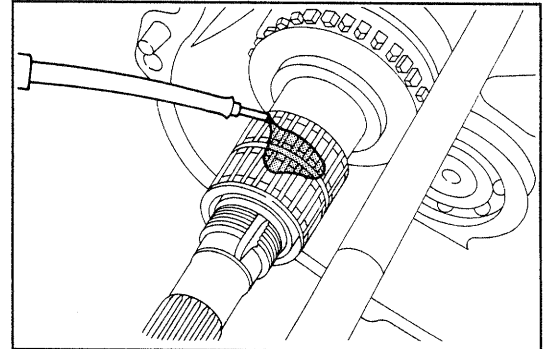


21. Install the transfer output shaft space No. 2 (A) and transfer front drive gear bearing inner race (B) to the transfer output rear shaft.



WRU90-TR108

22. Apply the gear oil to the outer periphery of the transfer front drive gear bearing inner race and needle roller bearing.
23. Install the needle roller bearing to the transfer output rear shaft.

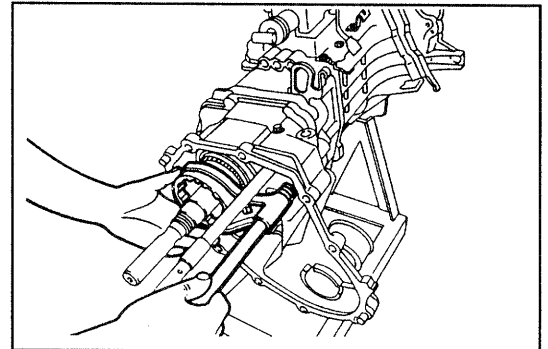


WRU90-TR109

24. Install the transfer front drive gear sleeve, transfer front drive shift fork and transfer front drive shift fork shaft in a set.

CAUTION:

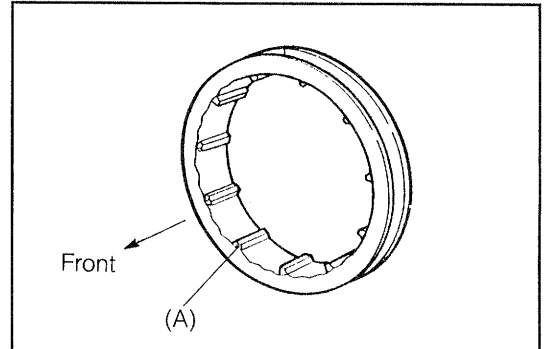
- Use the new two "E" rings.



WRU90-TR110

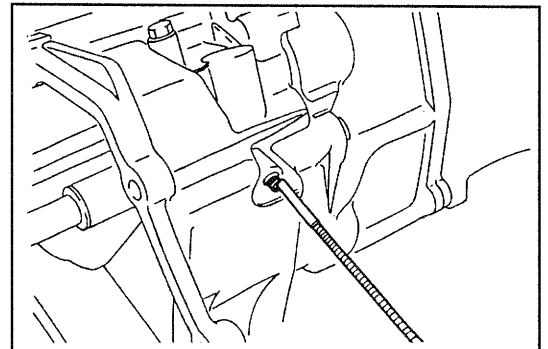
NOTE:

- The transfer front drive gear sleeve should be installed in the correct direction as indicated in the right figure.
- Be sure to install the sleeve in such a direction that the gear chamfered section (A) as indicated in the right figure, comes at the front side (transmission case side).



WRU90-TR111

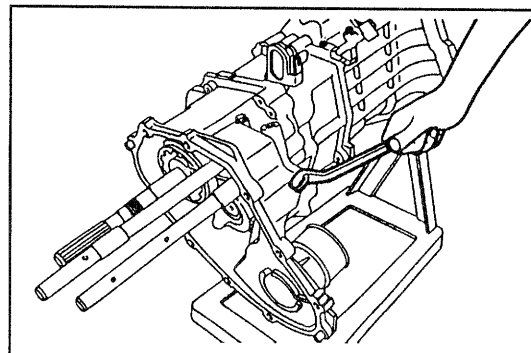
25. Install the ball and compression spring to the transfer front case in this sequence.



WRU90-TR112

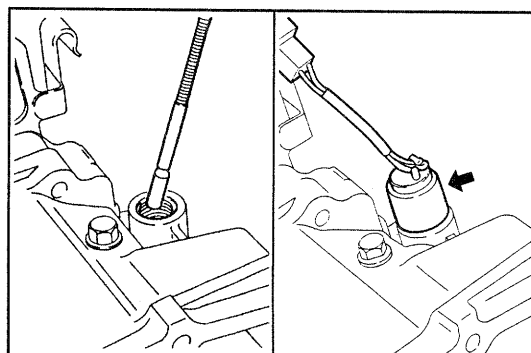
TRANSMISSION & TRANSFER

26. Tighten the bolt with a new gasket.
Tightening Torque: 1.9 - 3.1 kg-m
(13.7 - 22.4 ft-lb, 18.6 - 30.4 N·m)



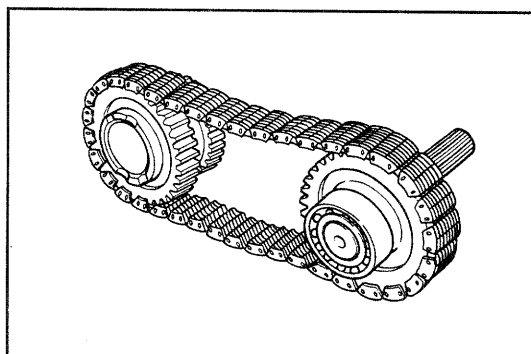
WRU90-TR113

27. Install the roller.
28. Tighten the transmission position detect switch with a new gasket.
Tightening Torque: 3.0 - 5.0 kg-m
(21.7 - 36.2 ft-lb, 29.4 - 49.0 N·m)



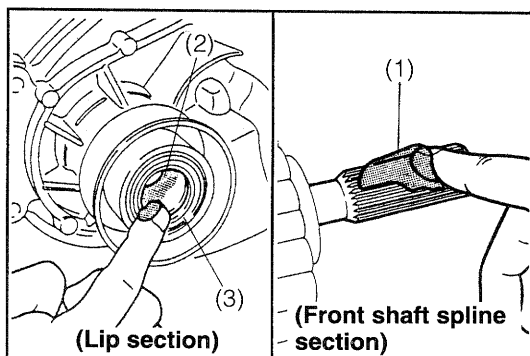
WRU90-TR114

29. Install the front drive chain to the following parts.
(1) Transfer output gear
(2) Transfer output front shaft



WRU90-TR115

30. Apply the lithium based multi purpose grease to the following sections.
(1) Outer periphery of the spline section in the transfer output shaft
(2) Inner periphery of the bush
(3) Lip section of the oil seal



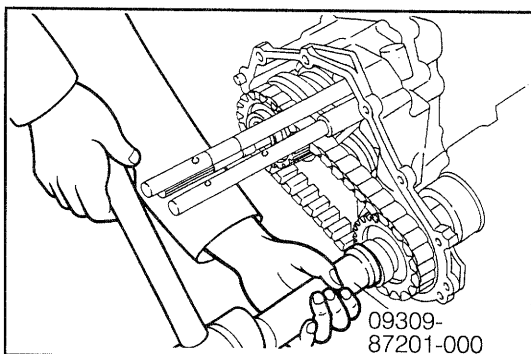
WRU90-TR116

31. Install the front drive chain with the related parts to the transfer front case, using following SST with a plastic hammer.

SST: 09309-87201-000

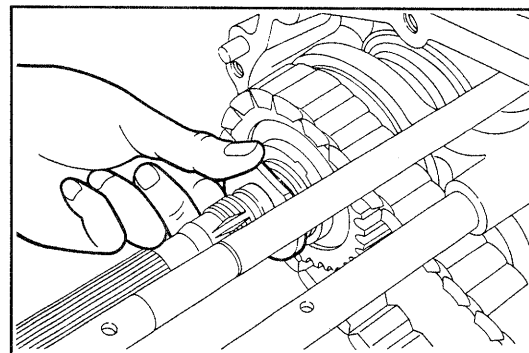
NOTE:

- Be very careful to not damage the lip section of the oil seal during the installation.



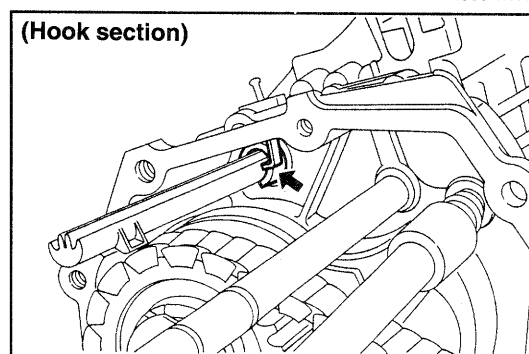
WRU90-TR117

32. Apply the gear oil to the attaching surface of the transfer front drive gear.
33. Install the transfer output gear thrust washer.



WRU90-TR118

34. Install the oil supply pipe to the transfer front case.
CAUTION:
 - Be sure to securely insert the transfer oil supply pipe as far as it will go. Failure to observe this caution may cause seizure of the transfer.

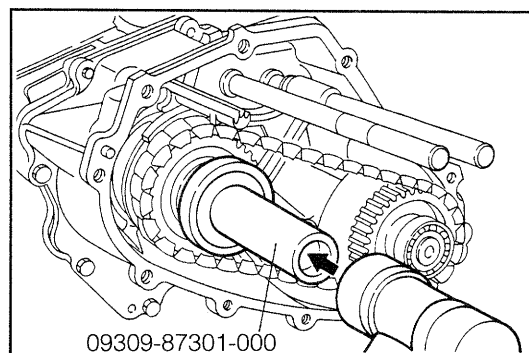


WRU90-TR119

35. Install the bearing to the transfer output shaft and rear shaft with a plastic hammer alternately, using the following SST.
SST: 09309-87301-000

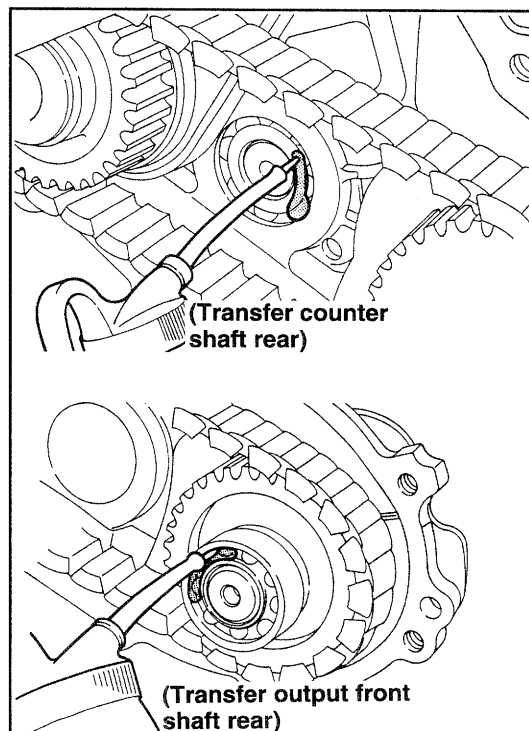
CAUTION:

- Ensure that the seal surface of the bearing comes in the transfer rear case. Failure to observe this caution may cause seizure of the bearing.



WRU90-TR120

36. Apply the gear oil to the following bearings at the rear side.
 - Transfer counter gear
 - Transfer output front shaft



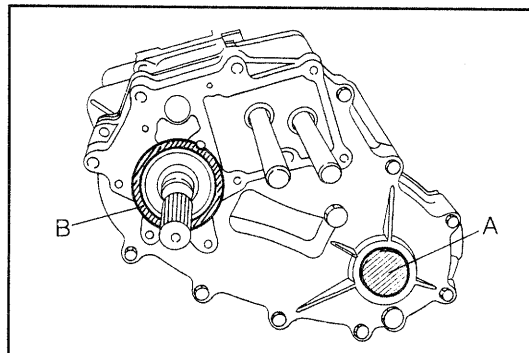
WRU90-TR121

TRANSMISSION & TRANSFER

37. Install the transfer rear case with a new gasket interposed.

NOTE:

- Be sure to securely install the transfer rear case alternately and evenly in the A and B sections with a plastic hammer.



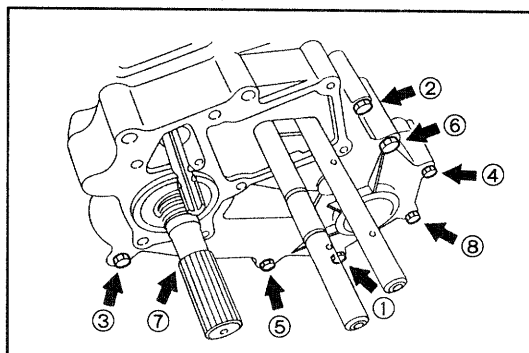
WRU90-TR122

38. Tighten the transfer rear case with the eight bolts.

Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)

NOTE:

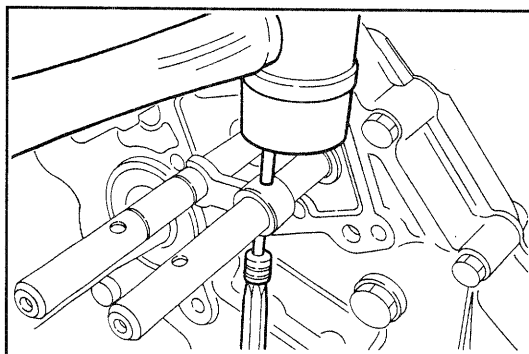
- Be sure to tighten the bolts alternately and diagonally (the right figure illustration indicates a typical example of tightening sequence)



WRU90-TR123

39. Lightly drive a new slotted pin into transfer front drive shift head No. 2 in advance.

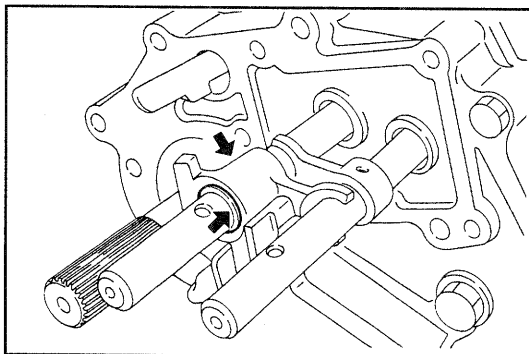
40. Insert transfer front drive shift head No. 2 into the transfer front drive shift fork shaft, then insert a pin punch, as a guide, and install the slotted pin lightly tapping it with a hammer.



WRU90-TR124

41. Attach the new E-ring to the transfer high & low shift fork shaft.

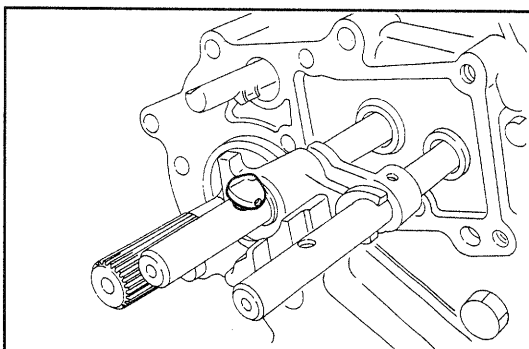
42. Install the transfer high & low shift head to the shaft.



WRU90-TR125

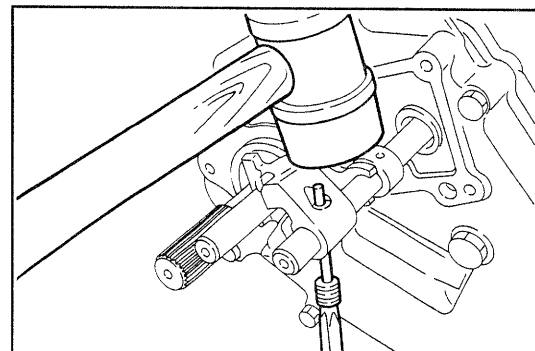
43. Attach the new E-ring on the transfer high & low shift fork shaft.

44. Insert the transfer fork shaft pin into the transfer high & low shift fork shaft.



WRU90-TR126

45. Lightly drive the new slotted pin into the front drive shift head in advance slotted pin.
46. Insert the transfer front drive shift head into the transfer front drive shift fork shaft, then insert a pin punch, as a guide, and install the slotted pin lightly tapping it from above with a plastic hammer.

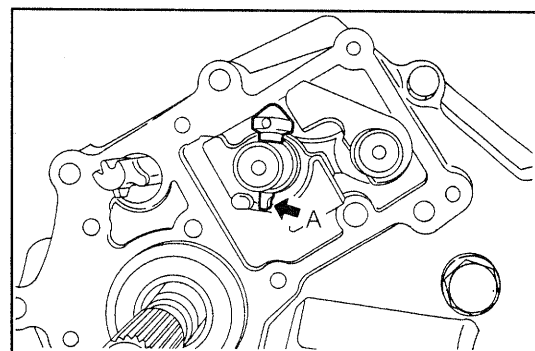


WRU90-TR127

47. Install the transfer fork shift pin.

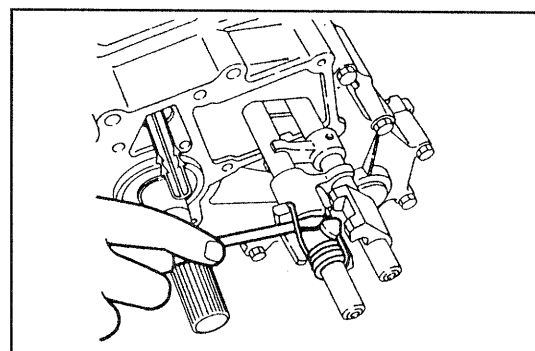
CAUTION:

- The cut section (A) of the transfer fork shaft pin should be faced toward the transfer front drive shift head during the installation, as shown in the right figure.
- Failure to observe this caution may cause trouble in the transfer operation.



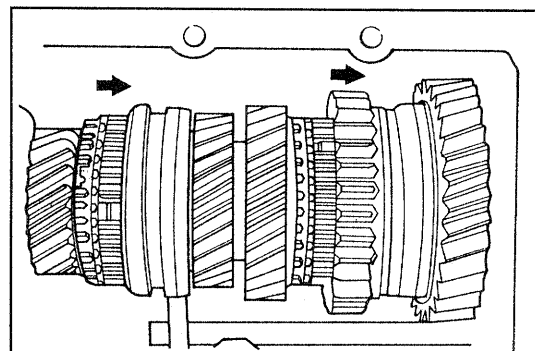
WRU90-TR128

48. Install the torsion spring.



WRU90-TR129

49. Interlock the 1st and 3rd gears.



WRU90-TR130

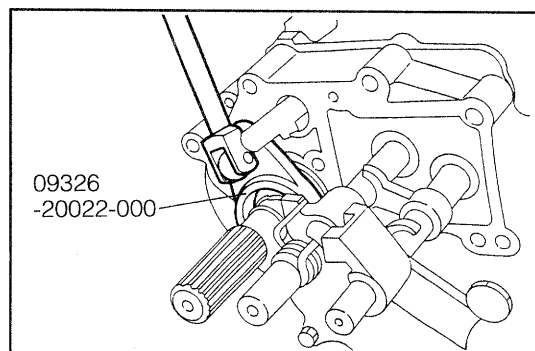
50. Tighten the transfer output rear shaft by means of the lock nut. Proceed to stake the lock nut with a chisel or the like, using the following SST.

SST: 09326-20022-000

Tightening Torque:

14.0 - 20.0 kg-m

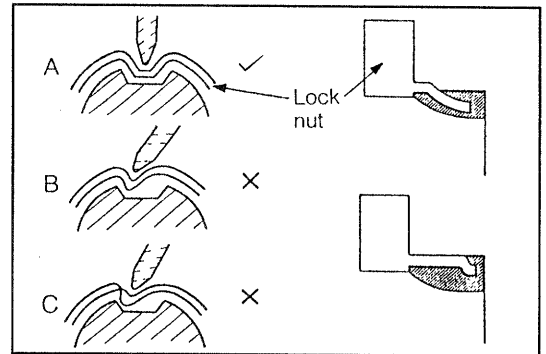
(101.0 - 145.0 ft-lb, 137.0 - 196.0 N-m)



WRU90-TR131

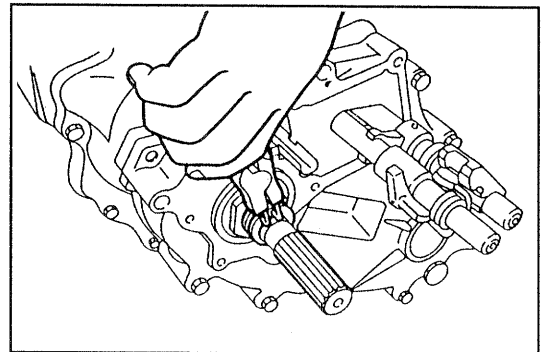
NOTE:

- When staking the lock nut, point a suitable staking tool toward the transfer output rear shaft axis center and stake to lock nut securely, as shown in the right figure A.
- Poor staking may cause abnormal noise or gear disengagement as shown in the right figure B and C.



WRU90-TR132

51. Install the ball and speedometer drive gear onto the transfer output rear shaft. Secure them with the new snap ring.

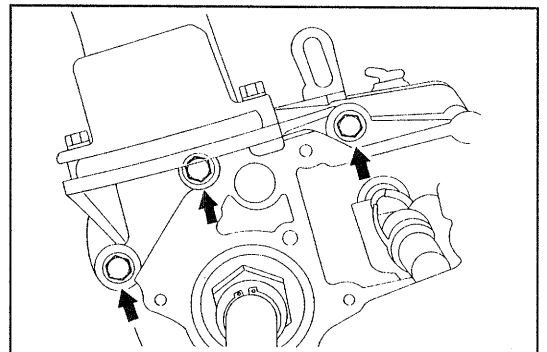


WRU90-TR133

52. Install control shaft lower No. 1 bracket with installed the shift & select shaft and control shaft with the two hexagon bolts and the bolt.

Tightening Torque:

3.0 - 4.5 kg-m (21,7 - 32.5 ft-lb, 29.4 - 44.1 N·m)



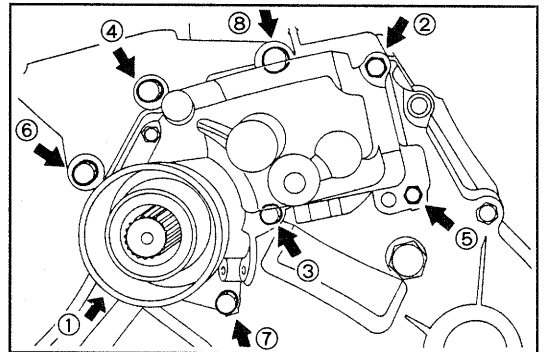
WRU90-TR134

53. Install the transfer rear output bearing retainer with the new gasket interposed.

Tighten the eight bolts.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)



WRU90-TR135

NOTE:

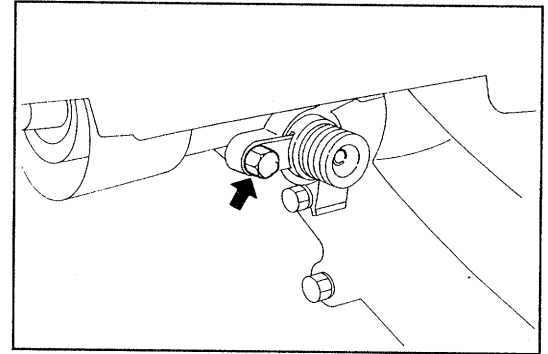
- Apply gear oil to the contact sections of the transfer rear output shaft bearing retainer with the transfer high & low shift fork shaft and the transfer front drive shift fork shaft.
- Be sure to tighten the bolts alternately and diagonally (The illustration at the right figure indicates a typical example of the tightening sequence).
- Apply the following bond to the threaded section of the bolts.

Three band 1324 (three bond made)

54. Apply the gear oil to the outer periphery of the O-ring and the speedometer sleeve, prior to install.
55. Install the speedometer sleeve with the speedometer sleeve lock plate and a bolt.

Tightening Torque:

0.7 - 1.0 kg-m (5.1 - 7.2 ft-lb, 6.9 - 9.8 N·m)



WRU90-TR137

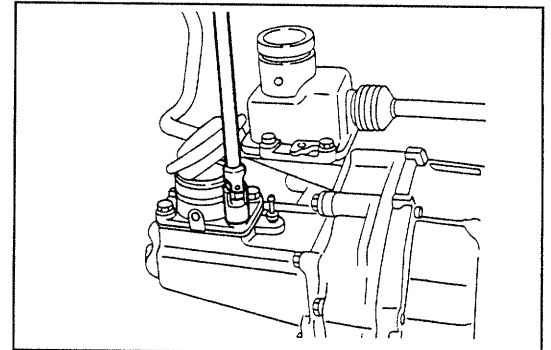
56. With a new gasket used, install the transfer shift lever retainer with the four bolts and, tighten them.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

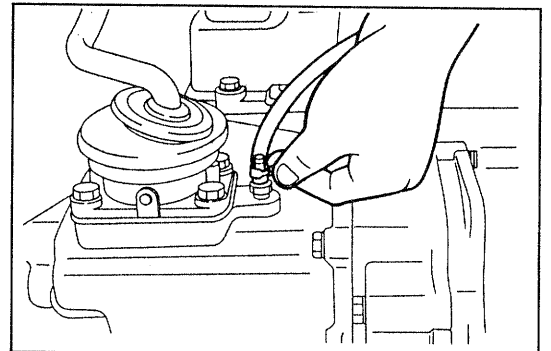
NOTE:

- Apply the 1324 bond (three bond made) to the thread sections of the bolt, prior to install.



WRU90-TR138

57. Install the breather hose by attaching a clip.



WRU90-TR139

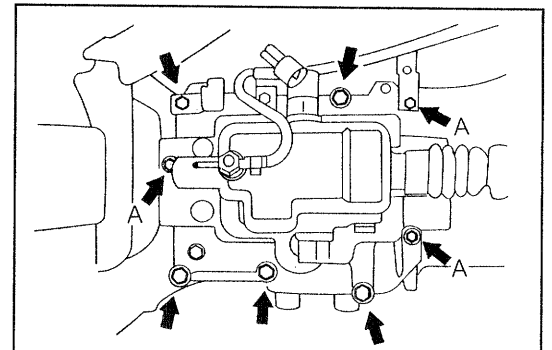
58. Install the transmission case cover subassembly (see page TR-00 to TR-00) and tighten them.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

A-section

0.7 - 1.0 kg-m (5.1 - 7.2 ft-lb, 6.9 - 9.8 N·m)

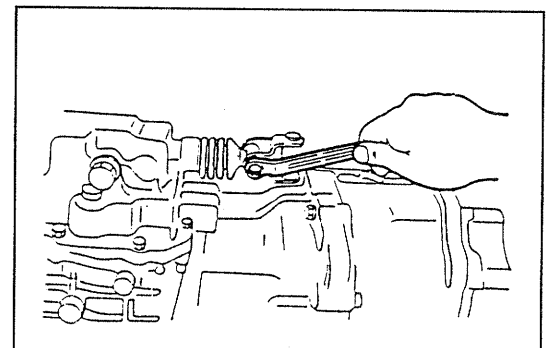


WRU92-TR405

59. Apply lithium base multi purpose grease to the shift & select No. 1 shaft installing hole of the control shaft. Install the control shaft and the shift & select No. 1 shaft with the new hexagon bolt.

Tightening Torque:

1.5 - 2.2 kg-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)



WRU90-TR141

TRANSMISSION & TRANSFER

60. Remove the transmission assy with transfer from the over-haul stand and then, install them to the vehicle (see page MT-105 to MT-109).
61. Fill in the transmission and transfer oil through the oil filler plugs, when the transmission assy with transfer installed completely.

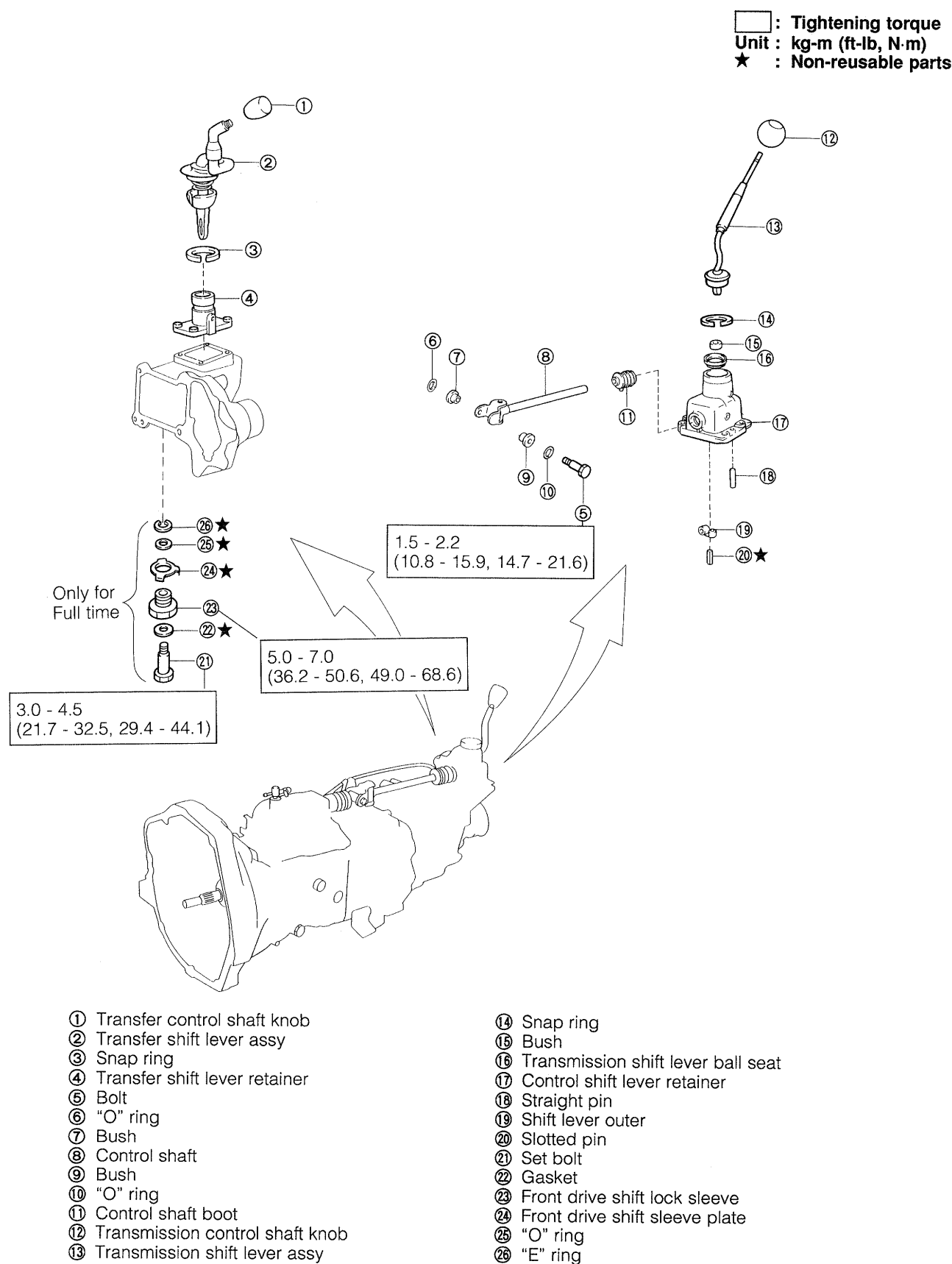
Oil: API GL-3 or GL-4

SAE75W-85 or 75W-90

Oil Capacity: 1.4 liters (0.36 USA gal)
(1.48 US qts)

WRU92-TR412

CONTROL LEVER-RELATED COMPONENTS

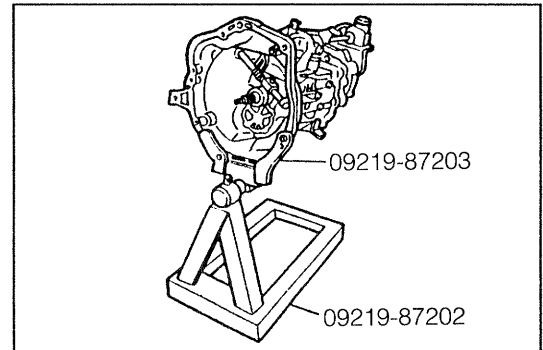


TRANSMISSION & TRANSFER

REMOVAL

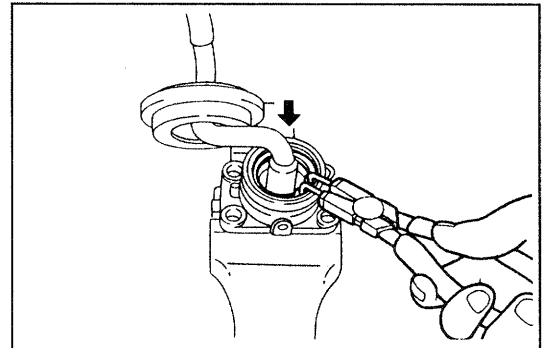
1. Remove the transmission assembly with transfer from the vehicle (see page MT-16 to MT-20).
2. Install the transmission with transfer on the overhaul stand, using the following.

SST: 09219-87202-000
09219-87203-000



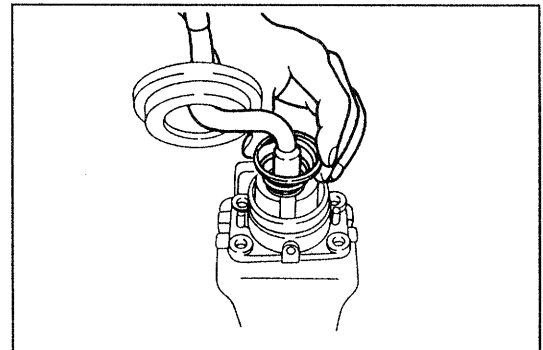
WRU92-TR413

3. Detach the hole snap ring, while the transfer shift lever is being lowered.



WRU90-TR145

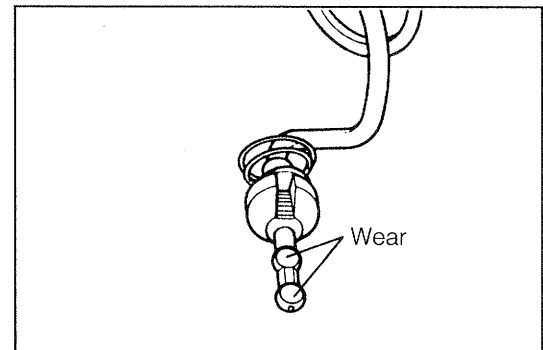
4. Remove the transfer shift lever with the conical spring installed.



WRU90-TR146

INSPECTION

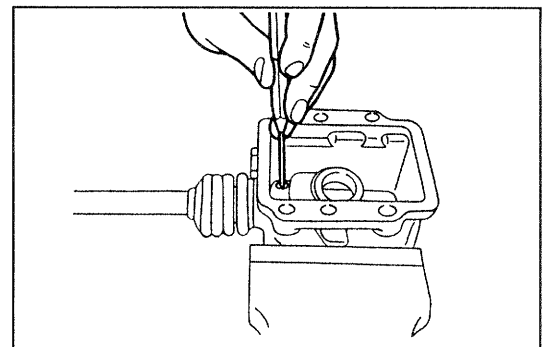
1. Check the forward end of the transfer shift lever for wear.



WRU90-TR147

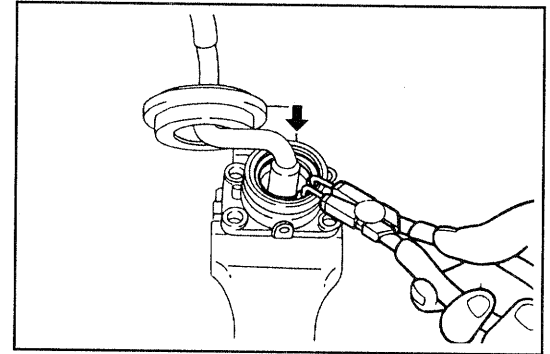
INSTALLATION

1. Apply lithium base multi purpose grease of the transfer shift lever.



WRU90-TR148

2. Install the transfer shift lever with the hole snap ring to the transfer shift lever retainer subassembly, while the conical spring is being lowered.
3. Visually check that the hole snap ring must be installed securely into the groove section of the transfer shift lever retainer subassembly.



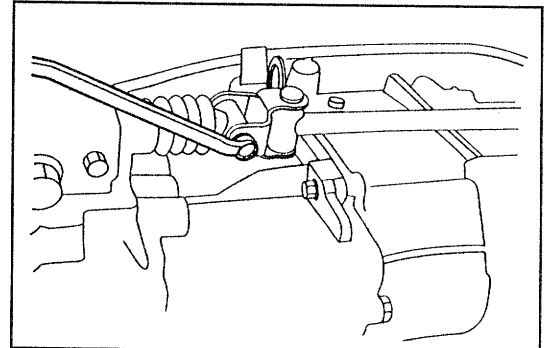
WRU90-TR149

DISASSEMBLY OF SHIFT & SELECT SHAFT No. 1

1. Remove the control shaft with installed the shift lever retainer subassembly by removing the hexagon bolt.

NOTE:

- When disconnecting the control shaft from the shift & select No.1 shaft, care must be exercised as to the "O" ring which may be detached during the removal.

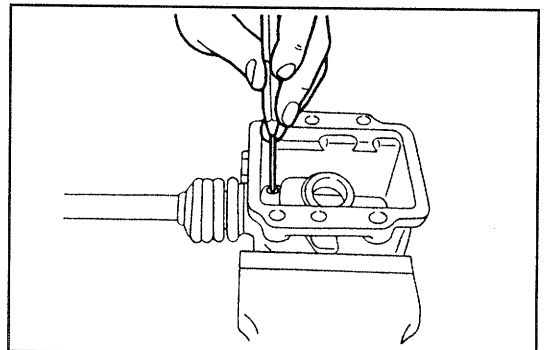


WRU90-TR157

2. Drive off the slotted pin of the shift outer lever.

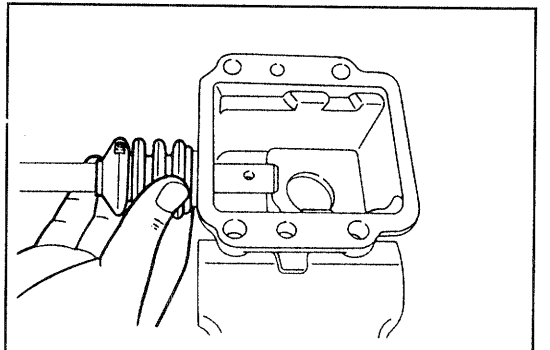
CAUTION:

- Never reuse the removed slotted pin.



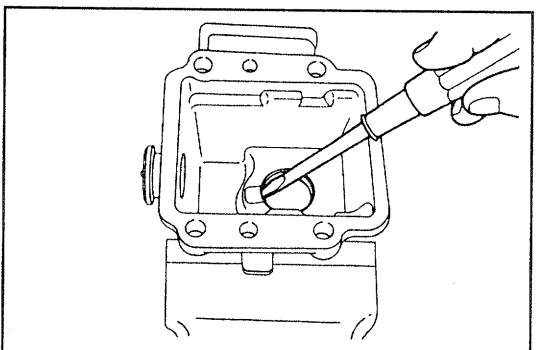
WRU90-TR158

3. Remove the control shaft and control shaft boot.



WRU90-TR159

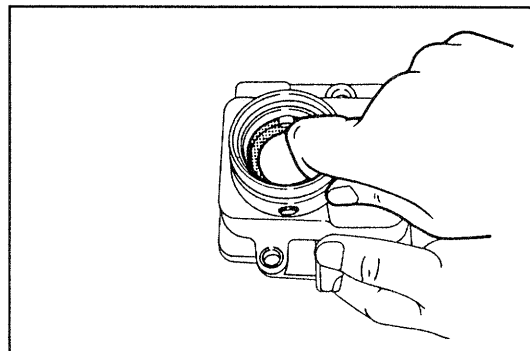
4. Remove the T/M shift lever ball seat.



WRU90-TR160

ASSEMBLY

1. Install the T/M shift lever ball seat with your fingers.
2. Apply lithium-based multi-purpose grease to the inner surface of the seat.

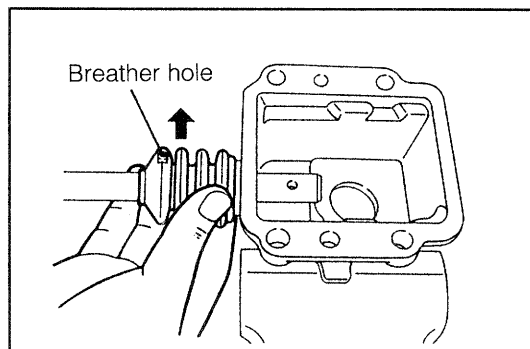


WRU90-TR161

3. Install the control shaft and control shaft boot.

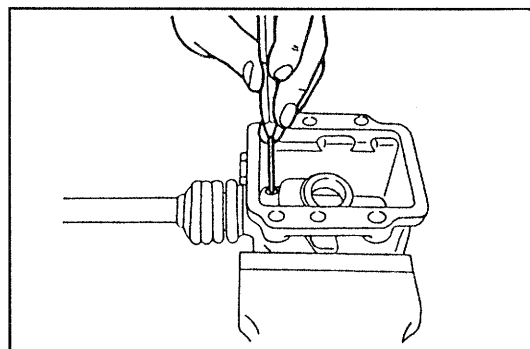
NOTE:

- Install the control shaft boot in such a way that the breather hole of the control shaft boot may face toward the transmission case side (lower side).



WRU90-TR162

4. Drive the new slotted pin of the shift outer lever into position.
5. Connect the shift a select No. 1 shaft and control shift.



WRU90-TR163

DAIHATSU

ROCKY

PROPELLER SHAFTS

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WRU90-PR001

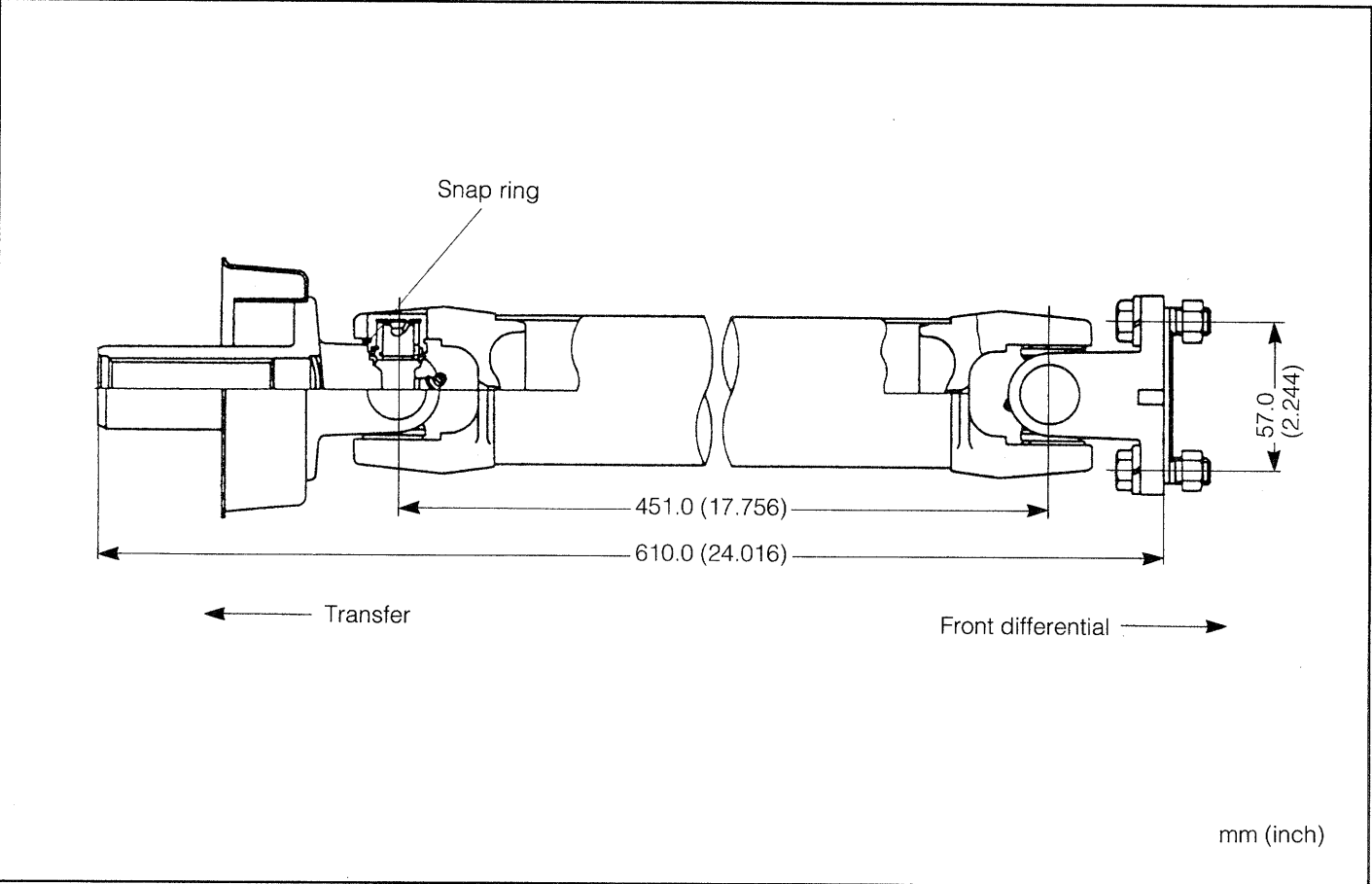
PR

PROPELLER SHAFTS

FRONT PROPELLER SHAFT

The front propeller shaft employs a two-joint type.
Furthermore, the universal joint spiders adopt an inner snap ring as its securing method.

SECTIONAL VIEW



WRU90-PR084

Propeller shaft specification

mm (inch)

Kind	Item	Dimensions of propeller shaft (Length × outer dia.)
Front propeller shaft		610.0 × 57.0 (24.016 × 2.244)

WRU90-PR085

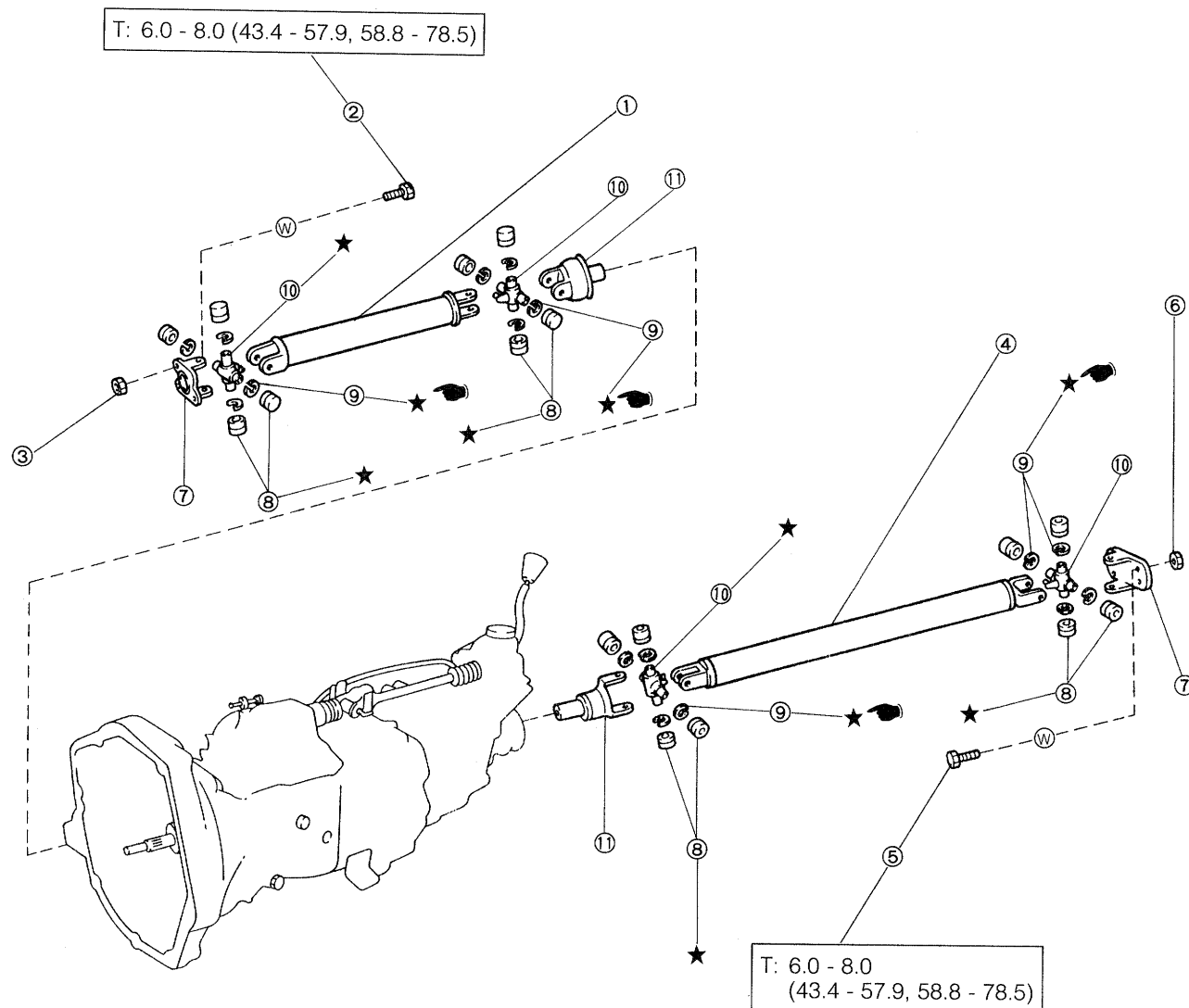
TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Abnormal noise Vibration	<ul style="list-style-type: none">• Universal joint improperly lubricated• Universal joint spider section damaged• Runout or damage of propeller shaft	<ul style="list-style-type: none">• Lubrication to grease nipple• Check universal joint.• Check propeller shaft for runout.

WRU90-PR086

PROPELLER SHAFT (FRONT & REAR) COMPONENTS

T : Tightening Torque
Unit : Kg-m (ft-lb, N-m)
★ : Non-reusable parts
☞ : Selection parts
⑧+⑨+⑩ : Supply the parts as a set



- ① Front propeller shaft assembly
- ② Bolt (4 pieces)
- ③ Nut (4 pieces)
- ④ Rear propeller shaft assembly
- ⑤ Bolt (4 pieces)
- ⑥ Nut (4 pieces)

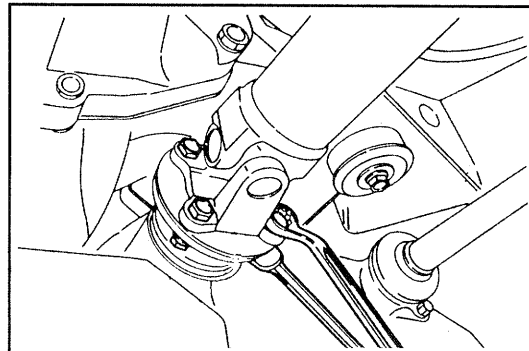
- ⑦ Universal joint w/flange yoke
- ⑧ Universal joint spider bearing cup (4 pieces)
- ⑨ Snap ring (4 pieces)
- ⑩ Universal joint spider
- ⑪ Universal joint sleeve yoke S/A

PROPELLER SHAFTS

REPLACEMENT OF PROPELLER SHAFT WITH NEW ONE (FRONT)

REMOVAL

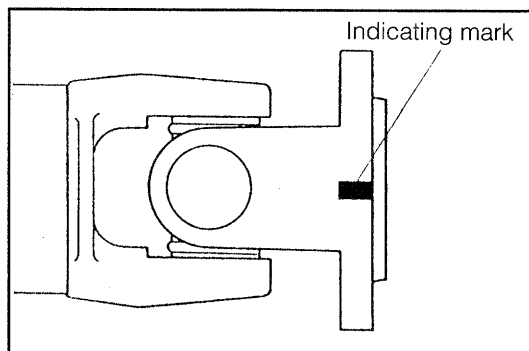
1. Remove the front propeller shaft assembly by removing the four bolts.



WRU90-PR003

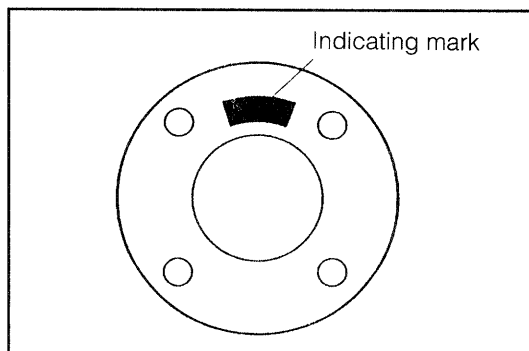
INSTALLATION

1. Confirm the installation indicating mark on the front differential attaching surface of the front propeller shaft.



WRU90-PR004

2. Confirm the installation indicating mark on (painted with pink) the front propeller shaft attaching surface of the front differential companion flange.

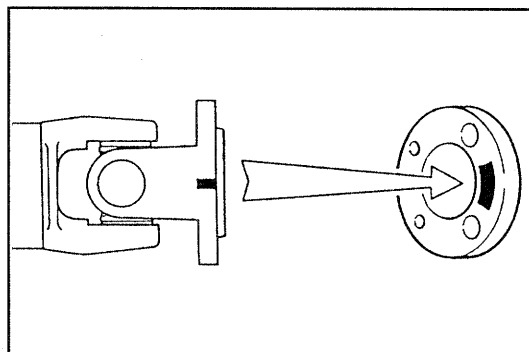


WRU90-PR005

3. Install the propeller shaft in such a way that the installation indicating mark of the front propeller shaft may be lined up with the installation indicating mark of the front differential companion flange.

CAUTION:

- If this operation should fail to be performed correctly, the propeller shaft may emit abnormal noise or vibration.

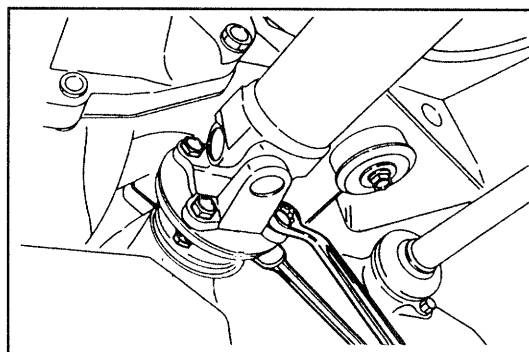


WRU90-PR006

4. Install the front propeller shaft assembly with the four bolts, four spring washers, four nuts and then, tighten the nuts.

Tightening Torque:

6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N-m)



WRU90-PR007

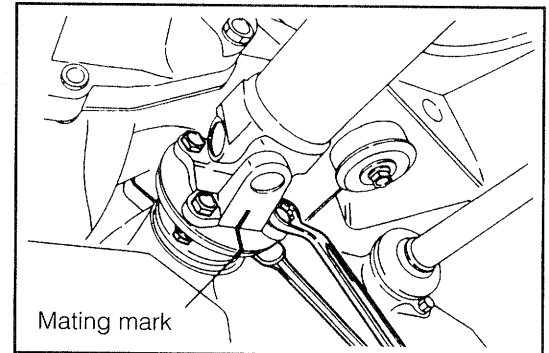
Case where propeller shaft is reused

REMOVAL

1. Remove the front propeller shaft by removing the four bolts.

CAUTION:

- Prior to the removal, mating marks should be put on each of the flange yoke and companion flange of the front differential.
- If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.



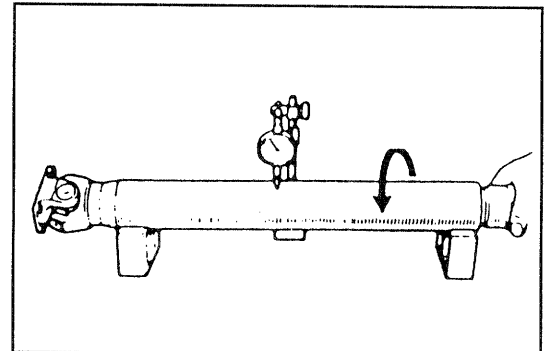
WRU90-PR008

INSPECTION

1. With a dial gauge placed at the center of the propeller shaft, measure the runout.

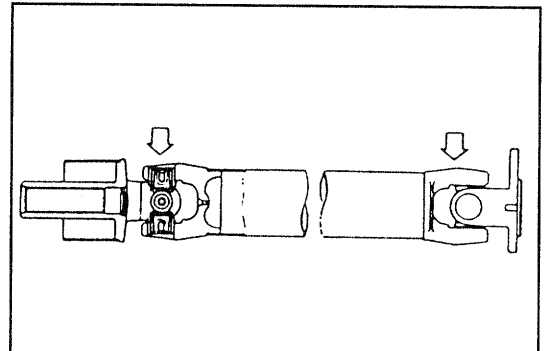
Allowable Runout Limit: 0.5 mm (0.020 inch)

Replace to the new front propeller shaft, if the runout is exceed than 0.5 mm (0.020 inch)



WRU90-PR009

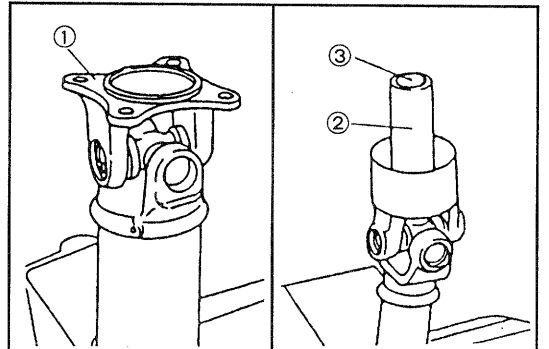
2. Check to see if any damage is present at the seal of the spider section of the universal joint.



WRU90-PR100

3. Check the flange yoke and sleeve yoke.
 - (1) Inspect to see if any damage is present at the differential drive pinion companion flange-contact section ①.
 - (2) Check the oil seal sliding section ② for damage or wear.
 - (3) Check the spline ③ for damage or wear.
 - (4) Fit the sleeve yoke onto the sliding spline of the transmission output shaft.

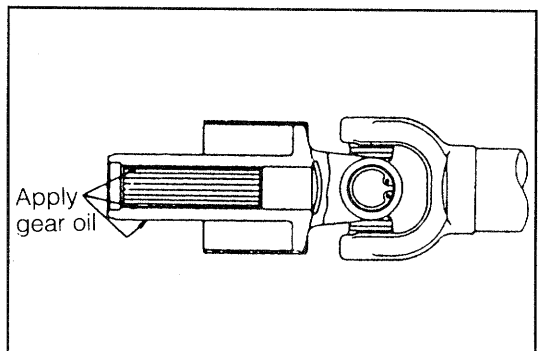
Ensure that the spline exhibits no looseness in the rotation direction and the sleeve can slide freely in the axial direction on the spline.



WRU90-PR101

INSTALLATION

1. Apply gear oil to both the inner and outer sides of the propeller shaft sleeve.



WRU90-PR102

PROPELLER SHAFTS

2. Install the propeller shaft with the mating marks that were put during the removal of the propeller shaft aligned with each other.

Tightening Torque:

6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

CAUTION:

- Make sure to line up those mating marks that were put during the removal of the front propeller shaft. If this caution should fail to be observed, the propeller shaft may emit abnormal noise or vibration.

REPLACEMENT OF UNIVERSAL JOINT SPIDER SUBASSEMBLY (FRONT)

1. Move the center of the propeller shaft in up-&-down and right-&-left directions so as to check the universal joint spider for excessive play by hand feeling.

NOTE:

- The removal procedure for the universal joint spider subassembly is the same both at the sleeve yoke side and at the flange yoke side. Therefore, the procedure for the sleeve yoke (at the differential side) only is described here.

2. Remove the front propeller shaft by removing the four bolts.

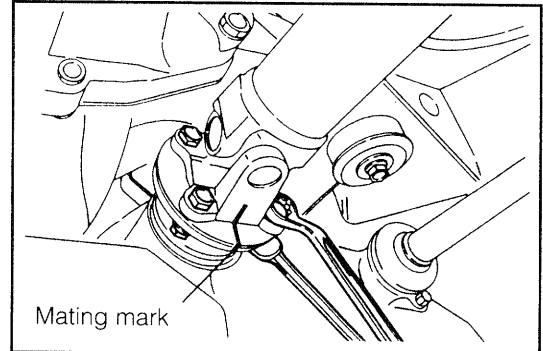
CAUTION:

- Prior to the removal, mating marks should be put on each of the flange yoke and companion flange of the front differential.
- If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.

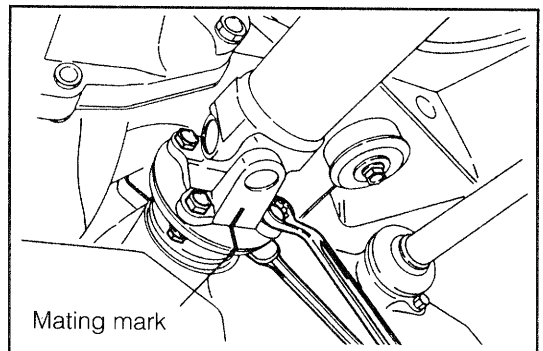
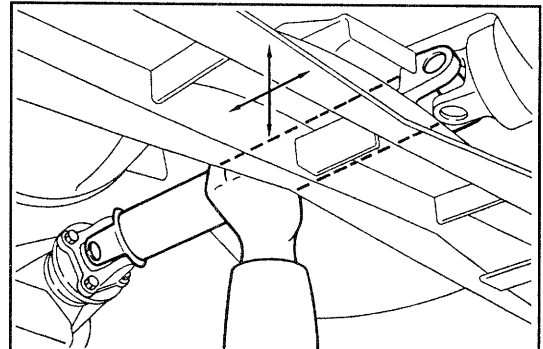
3. Put different paint mating marks on the propeller shaft and each of the yoke side sections (universal joint sleeve yoke subassembly and universal joint with flange yoke). (The illustration in the right figure indicates an example of mating marks.)

CAUTION:

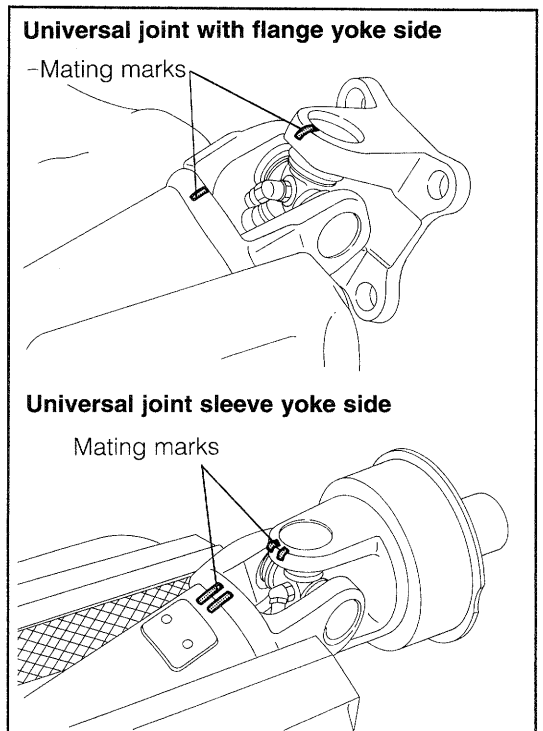
- If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.



WRU90-PR010



WRU90-PR012

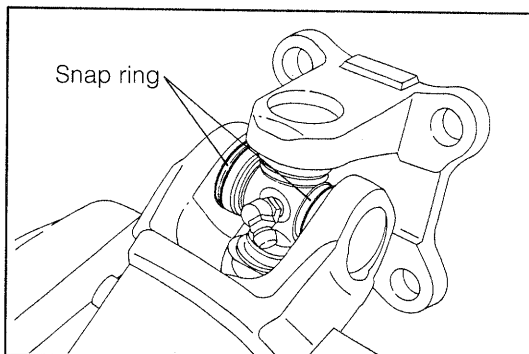


WRU90-PR013

4. Set the propeller shaft on a vise. Remove the snap ring, using a hammer and a standard screwdriver. (Arrow-headed section in the right figure)

CAUTION:

- Never clamp the balancer weight section of the propeller shaft in a vise.
- Never reuse the snap ring.



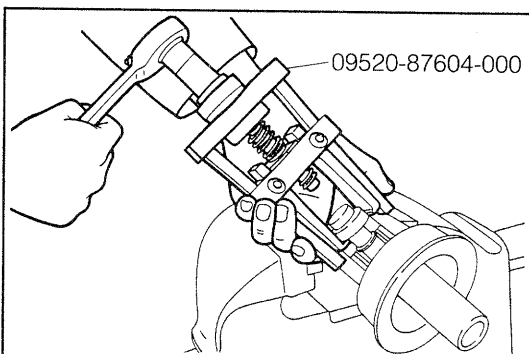
WRU90-PR014

5. Push down the right and left universal joint spider bearing cups, using the following SST.

SST: 09520-87604-000

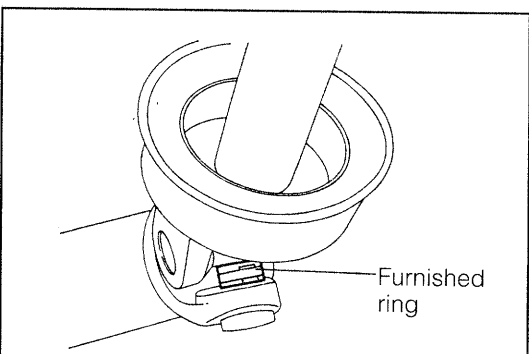
NOTE:

- At this stage, the universal joint spider bearing cups can not be removed completely.



WRU90-PR015

6. Lift the sleeve yoke. Install a furnished ring to the shaft section of the universal joint spider.



WRU90-PR016

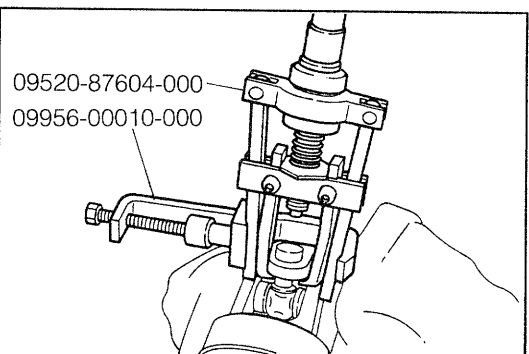
7. Remove the universal joint spider bearing cup at one side, using the suitable socket wrench and the following SSTs.

SST: 09520-87604-000

09956-00010-000

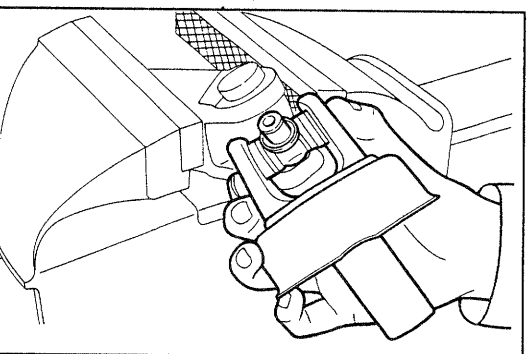
CAUTION:

- Never reuse the removed universal joint spider bearing cup.



WRU90-PR017

8. Remove the universal joint sleeve yoke from the propeller shaft.



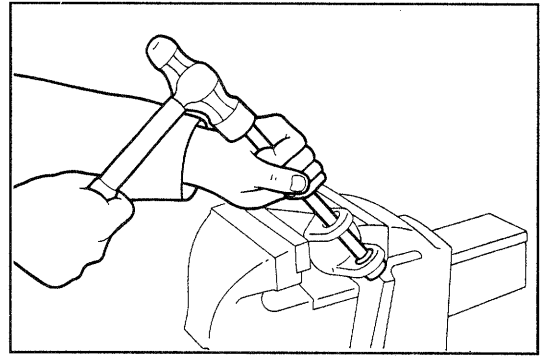
WRU90-PR018

PROPELLER SHAFTS

9. Remove the universal joint spider bearing cup by lightly tapping it, using a hammer in combination with a suitable metal rod.

CAUTION:

- Never reuse the removed universal joint spider bearing cup.

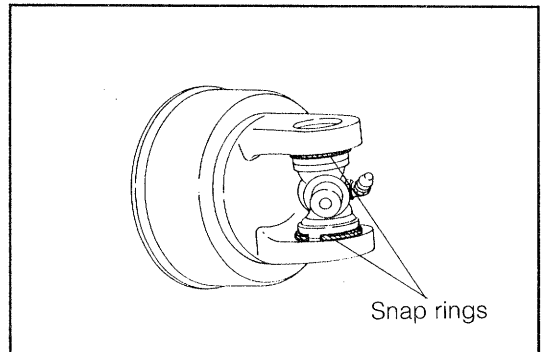


WRU90-PR019

10. Remove the snap ring of the universal joint sleeve yoke.

CAUTION:

- Never reuse the removed snap ring.



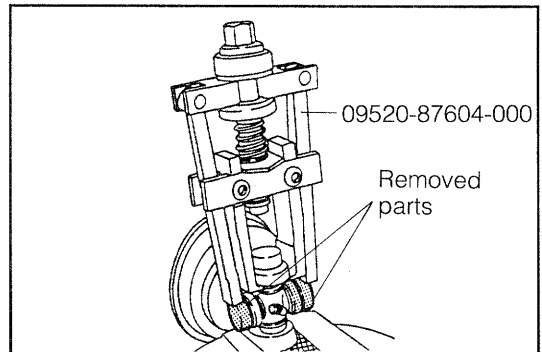
WRU90-PR020

11. Install the two removed universal joint spider bearing cups to the universal joint spider. Then, push down the universal joint spider, using the following SST.

SST: 09520-87604-000

NOTE:

- At this stage, the universal joint spider bearing cups can not be removed completely.



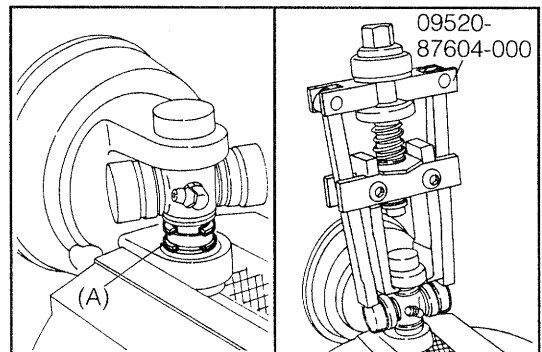
WRU90-PR021

12. Install a furnished ring (A) to the shaft section of the universal joint spider. Then, remove the universal joint spider bearing cup at one side, using the following SST.

SST: 09520-87604-000

CAUTION:

- Never reuse the removed universal joint spider bearing cup.

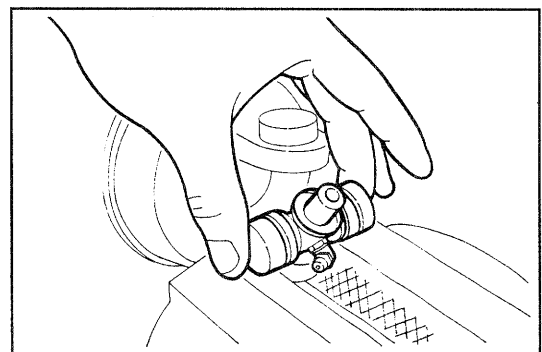


WRU90-PR022

13. Remove the universal joint spider.

CAUTION:

- Never reuse the removed universal joint spider.

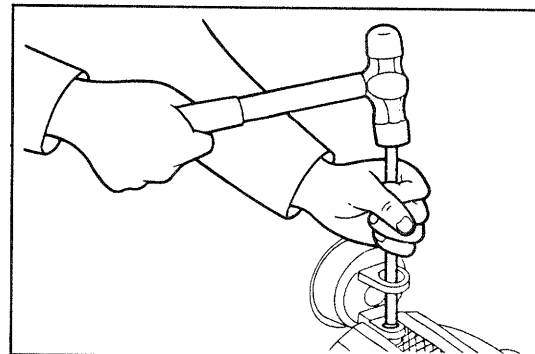


WRU90-PR023

14. Remove the universal joint spider bearing cup by lightly tapping it, using a hammer in combination with a suitable metal rod.

CAUTION:

- Never reuse the removed universal joint spider bearing cup.



WRU90-PR024

INSPECTION

1. Conduct measurement at the two sections of A and B (cross direction) indicated in the right figure, using an inner dial gauge.

Specified Value:

Propeller Shaft

22.50^{+0.008 mm}_{+0.021 mm} (0.886^{+0.00031 inch}_{+0.00083 inch})

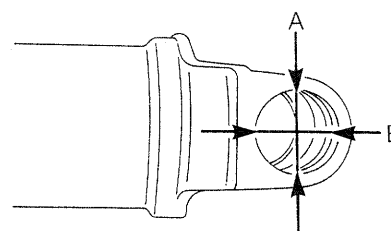
Sleeve and Flange Yoke

22.50^{+0 mm}_{+0.021 mm} (0.886^{+0 inch}_{+0.00083 inch})

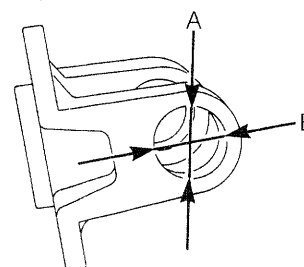
CAUTION:

- If the inner diameters of the sections A and B exceed the specified value above, replace the propeller shaft assembly with a new one.

Propeller shaft side



Sleeve and flange yoke side



WRU90-PR025

INSTALLATION

1. The following parts are supplied in one set in the replacement parts for the universal joint spider subassembly.

(1) Universal joint spider 1 piece

(2) Universal joint spider bearing cup 4 pcs.

(3) Four kinds of snap ring

T = 1.20 mm (0.0472 inch)

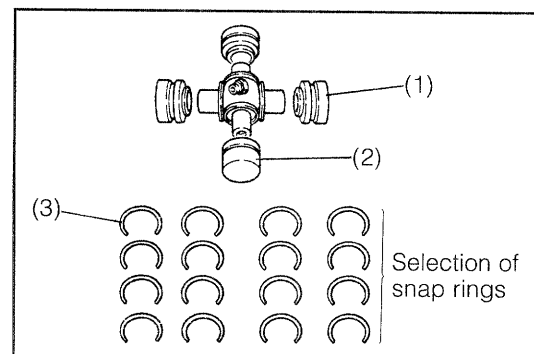
T = 1.25 mm (0.0492 inch)

T = 1.30 mm (0.0512 inch)

T = 1.35 mm (0.0531 inch)

NOTE:

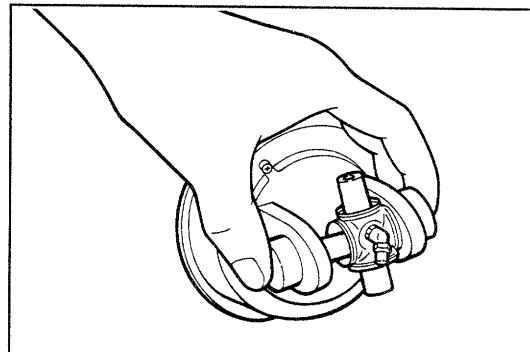
- Prior to using snap rings, be sure to measure the thickness of the snap rings by means of vernier calipers. Arrange the snap rings in order according to their thickness.



WRU90-PR026

PROPELLER SHAFTS

2. Set a new universal joint spider to the universal joint sleeve yoke.
3. Temporarily install new universal joint spider bearing cups (two pcs.) to the universal joint with flange yoke, by pushing them with fingers.



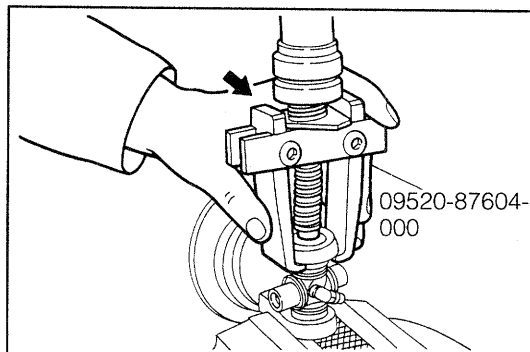
WRU90-PR027

4. Install the right and left universal joint spider bearing cups, using the following SST.

SST: 09520-87604-000

NOTE:

- Be sure to evenly press the right and left cups, until you can see the snap ring attaching groove provided on the outer periphery surface of the universal joint spider bearing cup.

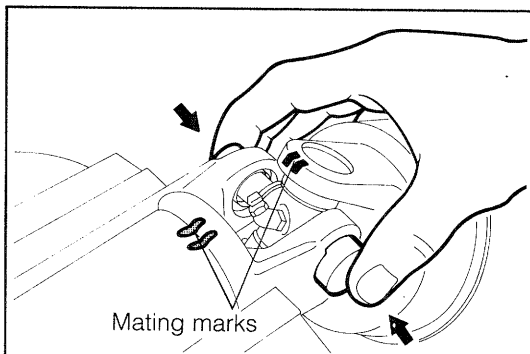


WRU90-PR028

5. Temporarily install the universal joint sleeve yoke subassembly to the propeller shaft.

CAUTION:

- Be sure to align the paint marks (at the propeller shaft and sleeve yoke sides) which were put before the removal with each other.
If the mating marks described above are not aligned with each other, it may cause abnormal vibration or abnormal noise of the propeller shaft.
- Make sure that the grease nipple faces toward the propeller shaft side.



WRU90-PR029

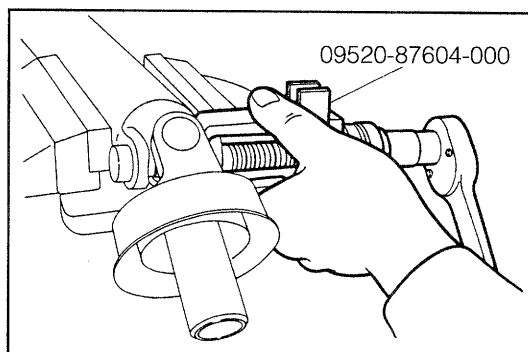
6. Temporarily install new universal joint spider bearing cups (right and left) to the propeller shaft by pushing them with finger.

7. Install the right and left universal joint spider bearing cups, using the following SST.

SST: 09520-87604-000

NOTE:

- Be sure to evenly press the right and left cups, until you can see the snap ring attaching groove provided on the outer periphery surface of the universal joint spider bearing cup.



WRU90-PR030

8. Measurement of universal joint starting torque

- (1) Using a spring scale, install the selected snap ring so that the starting torque may fall within the specified range given below.

Specified Value:

0.003 - 0.15 kg-m (0.022 - 1.08 ft-lb, 0.029 - 1.47 N-m)

- (2) Turn the propeller shaft 90 degrees. Measure the starting torque.

CAUTION:

- As regards the snap rings positioned symmetrically relative to the universal joint spider, in principle, it is required to use the snap rings having the same thickness.
- However, if the starting torque does not reach or exceeds the specified range despite the fact that the snap rings having the same thickness have been used, use a snap ring having one class higher or lower thickness.

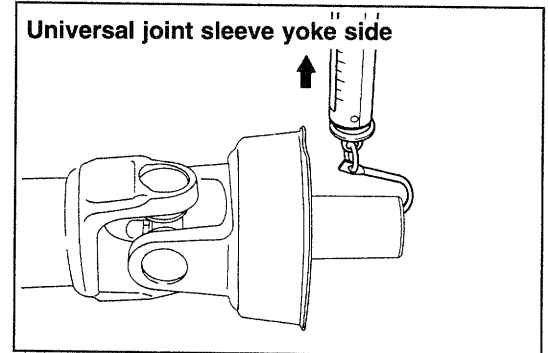
- (3) Measure the starting torque, following the same procedure described above.

- (4) Turn the propeller shaft 90 degrees. Measure the starting torque.

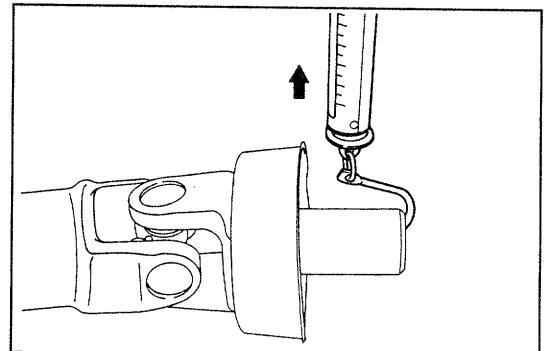
9. With a dial gauge placed at the center of the propeller shaft, measure the runout.

Allowable Runout Limit: 0.5 mm (0.020 inch)

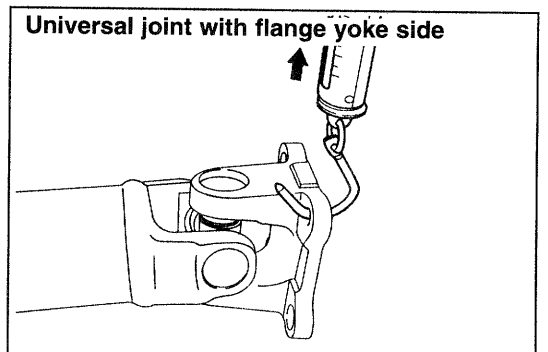
Replace to the new front propeller shaft, if the runout is exceed than 0.5 mm (0.020 inch)



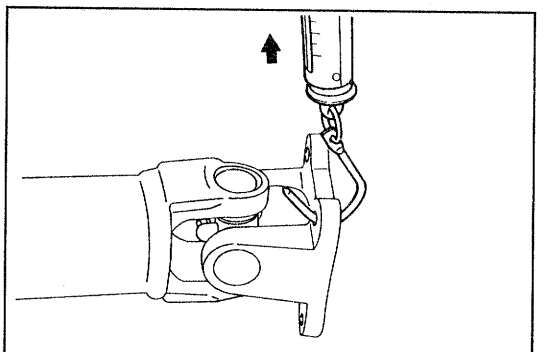
WRU92-PR103



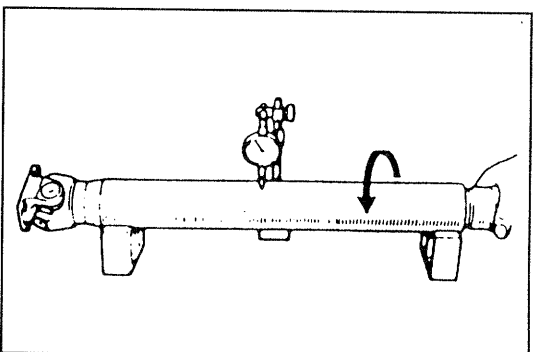
WRU90-PR032



WRU90-PR033



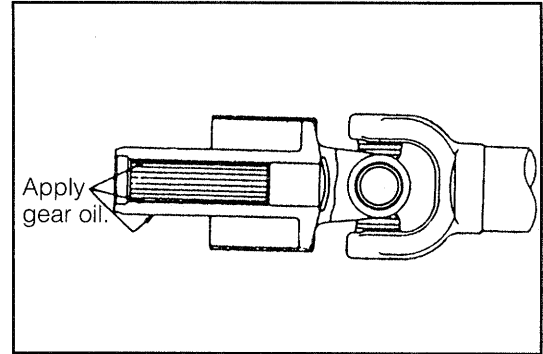
WRU90-PR034



WRU90-PR035

PROPELLER SHAFTS

10. Apply gear oil to both the inner and outer sides of the propeller shaft.



WNU89-RS036

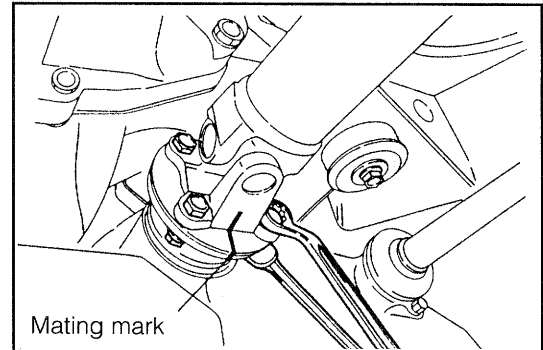
11. Install the propeller shaft with the mating marks that were put during the removal of the propeller shaft aligned with each other.

Tightening Torque:

6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N-m)

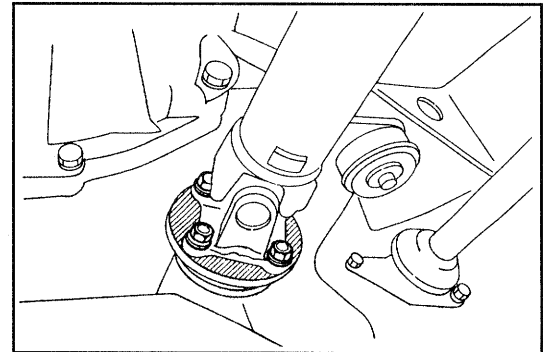
CAUTION:

- Make sure to line up those mating marks that were put during the removal of the front propeller shaft. If this caution should fail to be observed, the propeller shaft may emit abnormal noise or vibration.



WRU90-PR037

12. After installing the propeller shaft, apply black paint to the exposed machined surface of the differential (slant line section in the right figure) as a rust preventive measure.
13. Apply lithium base multi-purpose grease to the grease nipples.



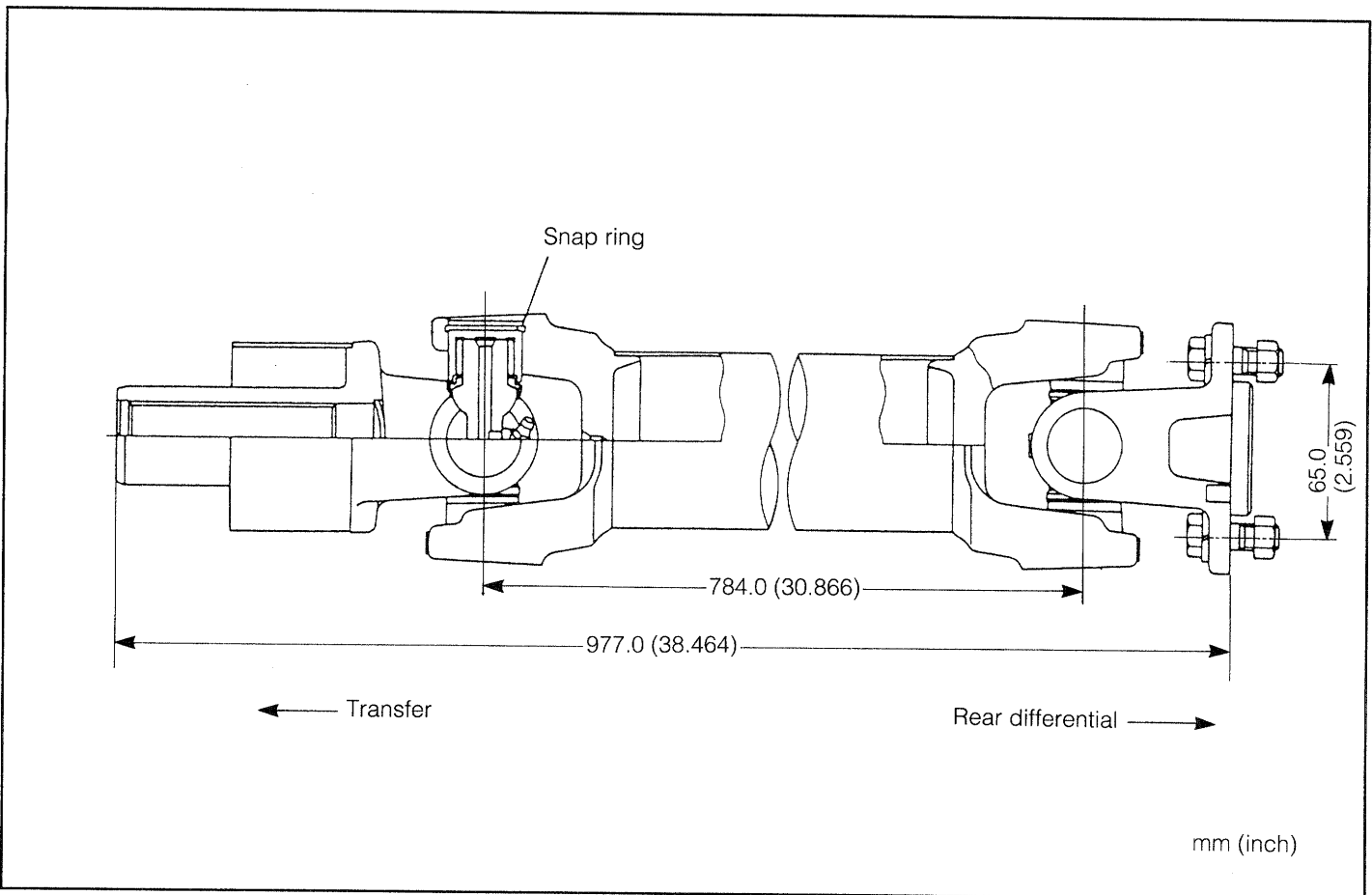
WRU90-PR038

REAR PROPELLER SHAFT

The rear propeller shaft employs a two-joint type. Furthermore, the universal joint spiders adopt an outer snap ring as its securing method.

SECTIONAL VIEW

WRU90-PR039



WRU90-PR040

Propeller shaft specifications

mm (inch)

Kind	Item	Dimensions of propeller shaft (Length × outer dia.)
Rear propeller shaft		977.0 × 65.0 (38.464 × 2.559)

WRU90-PR041

TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Abnormal noise Vibration	<ul style="list-style-type: none"> • Universal joint improperly lubricated • Damage of universal joint spider section • Runout or damage of propeller shaft • Imbalance of propeller shaft 	<ul style="list-style-type: none"> • Lubrication to grease nipples • Check universal joints. • Check propeller shaft for runout. • Check mating marks that were put during installation or removal.

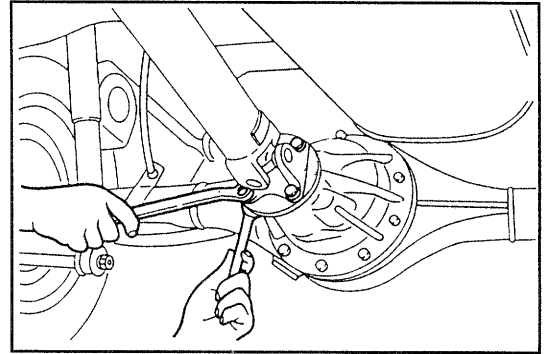
WRU90-PR042

PROPELLER SHAFTS

REPLACEMENT OF PROPELLER SHAFT WITH NEW ONE (REAR)

REMOVAL

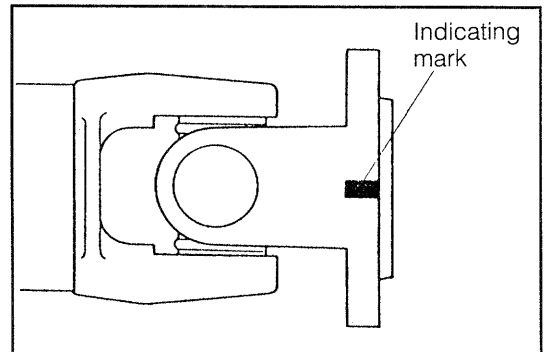
1. Remove the rear propeller shaft assembly by removing the four bolts.



WRU90-PR043

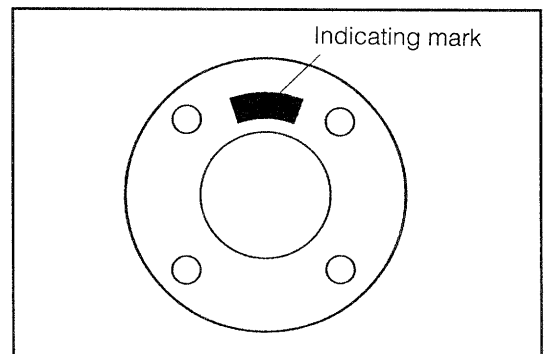
INSTALLATION

1. Confirm the installation indicating mark on the front differential attaching surface of the front propeller shaft.



WRU90-PR044

2. Confirm the installation indicating mark on the front propeller shaft attaching surface of the front differential companion flange.

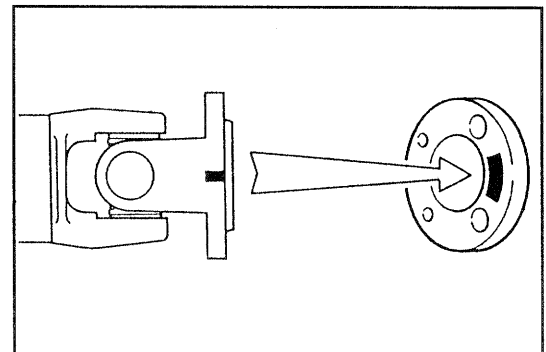


WRU90-PR045

3. Install the propeller shaft in such a way that the installation indicating mark of the front propeller shaft may be lined up with the installation indicating mark of the front differential companion flange.

CAUTION:

- Prior to the removal, mating marks should be put on each of the flange yoke and companion flange of the rear differential.
- If this operation should fail to be performed correctly, the propeller shaft may emit abnormal noise or vibration.

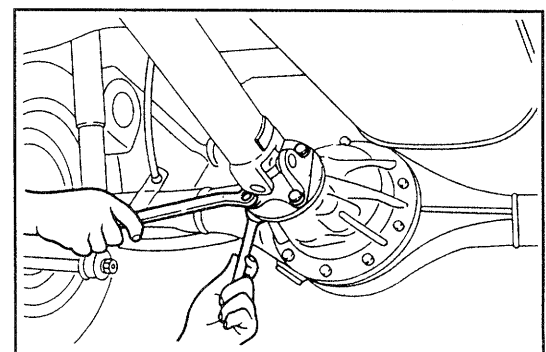


WRU90-PR046

4. Install the rear propeller shaft assembly with the four bolts, four spring washers, four nuts and then, tighten the bolts.

Tightening Torque:

6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)



WRU90-PR047

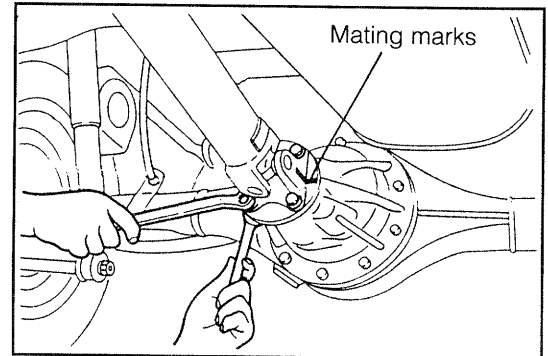
Case where propeller shaft is reused

REMOVAL

1. Remove the rear propeller shaft assembly by removing the four bolts.

CAUTION:

- Prior to the removal, mating marks should be put on each of the flange yoke and companion flange of the rear differential.
- If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.



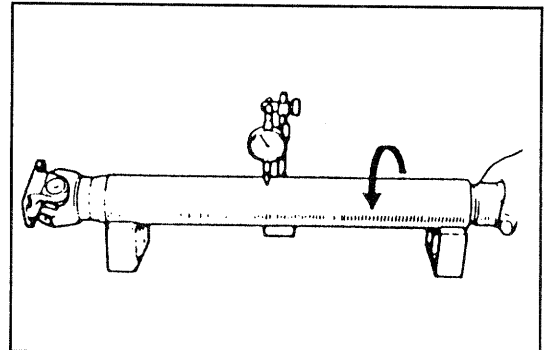
WRU90-PR048

INSPECTION

1. Measure the runout with a dial gauge set to the center of the propeller shaft.

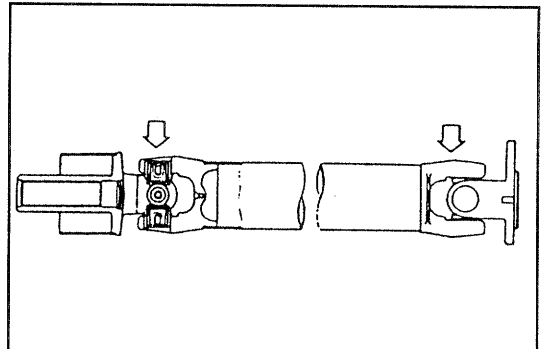
Allowable Runout: 0.5 mm (0.020 inch)

Replace to the new propeller shaft, if the runout is exceed than 0.5 mm (0.020 inch)



WRU90-PR049

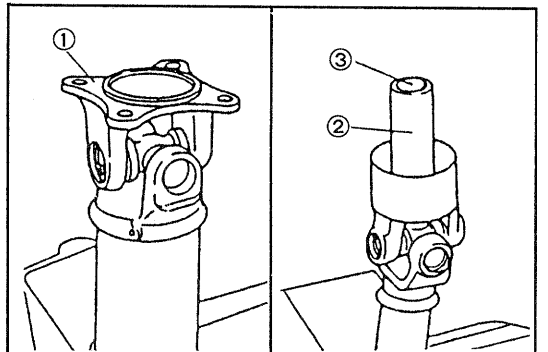
2. Check the oil seal of the universal joint spider section for damage.



WRU90-PR050

3. Check the flange yoke and sleeve yoke.
 - (1) Inspect to see if any damage is present at the differential drive pinion companion flange-contact section ①.
 - (2) Check the oil seal sliding section ② for damage or wear.
 - (3) Check the spline ③ for damage or wear.
 - (4) Fit the sleeve yoke onto the sliding spline of the transmission output shaft.

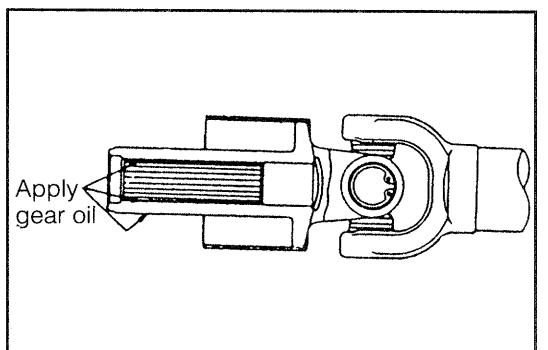
Ensure that the spline exhibits no looseness in the rotation direction and the sleeve can slide freely in the axial direction on the spline.



WRU90-PR051

INSTALLATION

1. Apply gear oil to both the inner and outer sides of the propeller shaft.



WRU90-PR052

PROPELLER SHAFTS

2. Install the rear propeller shaft assembly with the four bolts, four spring washers, four nuts then, tighten the nuts.

Tightening Torque:

6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

CAUTION:

- Make sure to line up those scribing lines that were put during the removal of the rear propeller shaft. If this caution should fail to be observed, the propeller shaft may emit abnormal noise or vibration.

REPLACEMENT OF UNIVERSAL JOINT SPIDER SUBASSEMBLY (REAR)

1. Move the center of the propeller shaft in up-&-down and right-&-left directions so as to check the universal joint spider for excessive play by hand feeling.

NOTE:

- The removal procedure for the universal joint spider subassembly is the same both at the sleeve yoke side and at the flange yoke side. Therefore, the procedure for the flange yoke (at the differential side) only is described here.

2. Remove the rear propeller shaft assembly by removing the four bolts.

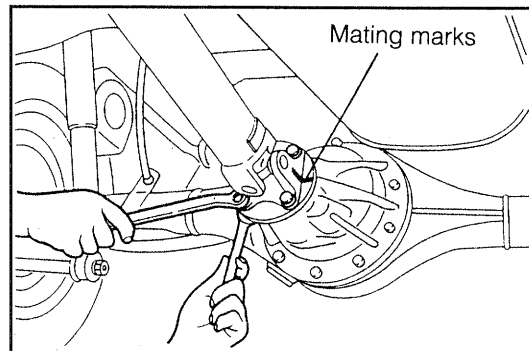
CAUTION:

- Prior to the removal, mating marks should be put on each of the flange yoke and companion flange of the rear differential.
- If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.

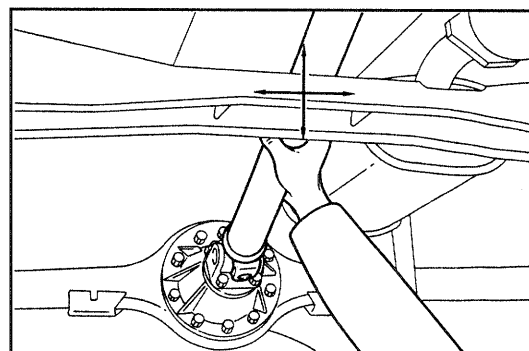
3. Put different paint mating marks on the propeller shaft and each of the yoke side sections (universal joint sleeve yoke subassembly and universal joint with flange yoke). (The illustration in the right figure indicates an example of mating marks.)

CAUTION:

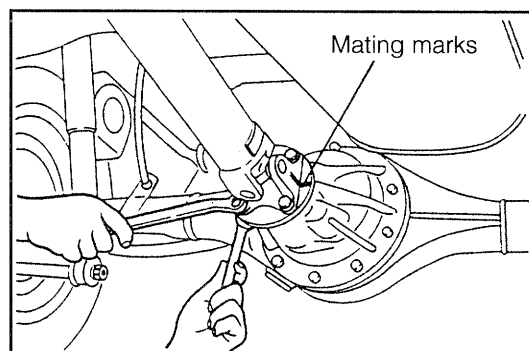
- If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.



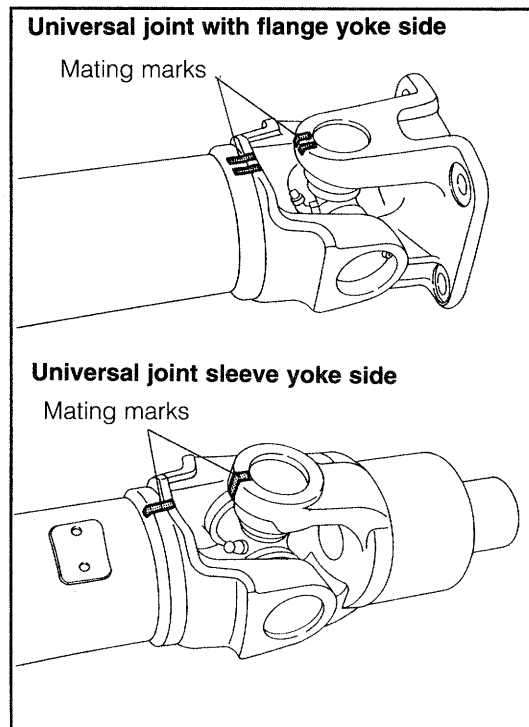
WRU90-PR053



WRU90-PR054



WRU90-PR055

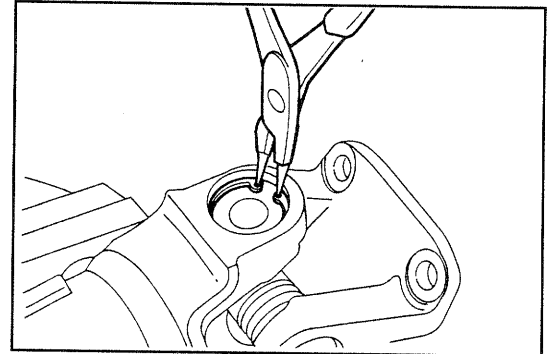


WRU90-PR056

4. Clamp the cut-out section of the propeller shaft in a vise.
5. Remove the right and left snap rings with snap ring pliers.

CAUTION:

- Never reuse the removed snap rings.



WRU90-PR057

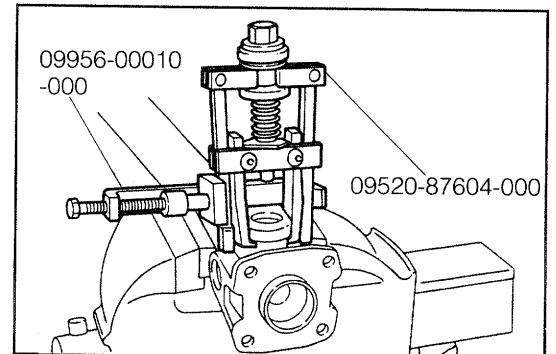
6. Push down the right and left universal joint spider bearing cups, using the suitable wrench box and the following SSTs.

SST: 09520-87604-000

09956-00010-000

NOTE:

- At this stage, the universal joint spider bearing cups can not be removed completely.



WRU90-PR058

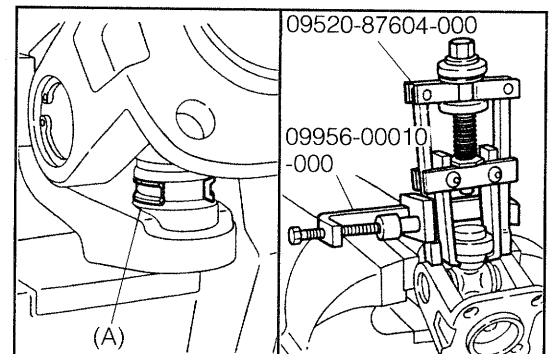
7. Install a furnished ring (A) to the shaft section of the universal joint spider. Remove the universal joint spider bearing cup at one side, using the following SST.

SST: 09520-87604-000

09956-00010-000

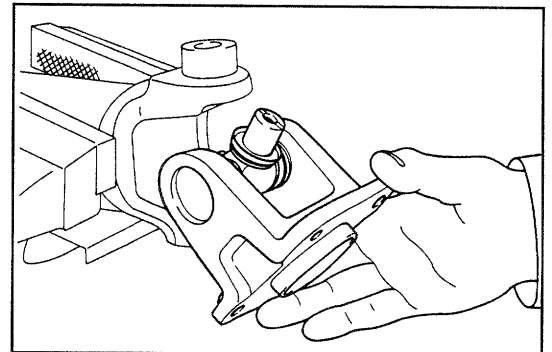
CAUTION:

- Never reuse the removed universal joint spider bearing cups.



WRU90-PR059

8. Remove the universal joint with flange yoke from the propeller shaft.

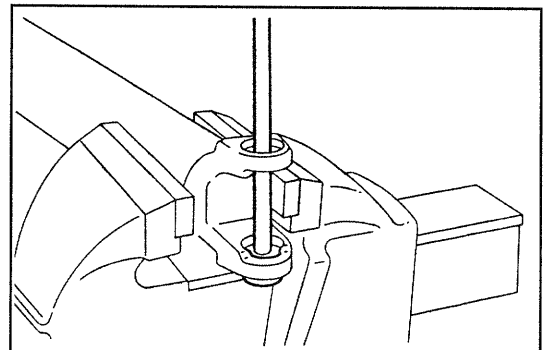


WRU90-PR060

9. Remove the universal joint spider bearing cup by lightly tapping it, using a hammer in combination with a suitable metal rod.

CAUTION:

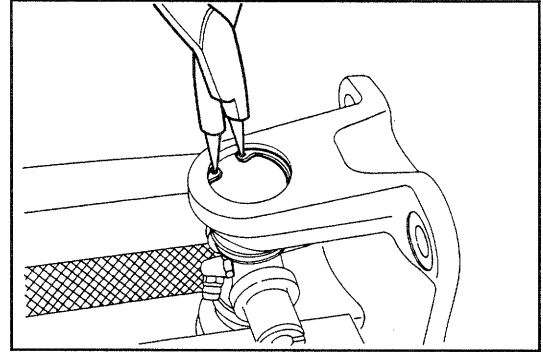
- Never reuse the removed universal joint spider bearing cup.



WRU90-PR061

PROPELLER SHAFTS

10. Remove the right and left snap rings with snap ring pliers.
CAUTION:
- Never reuse the removed snap rings.

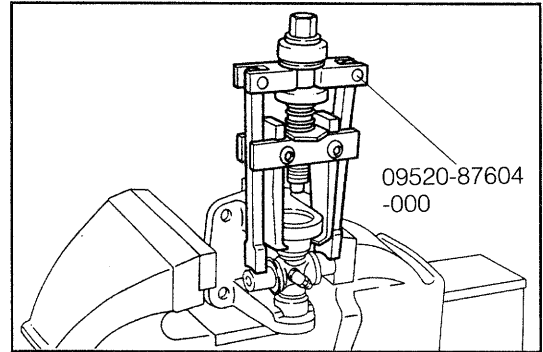


WRU90-PR063

11. Push the universal joint spider bearing cup, using the following SST.
SST: 09520-87604-000

NOTE:

- At this stage, the universal joint spider bearing cups can not be removed completely.

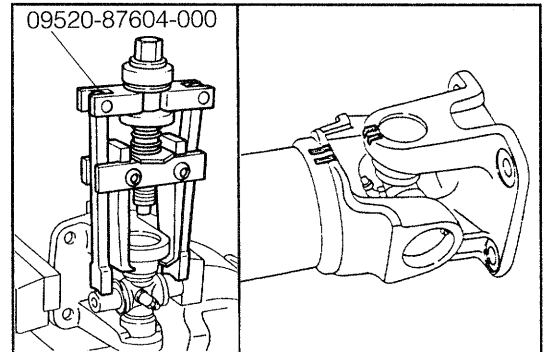


WRU90-PR064

12. Install a furnished ring to the shaft section of the universal joint spider. Then, remove the universal joint spider bearing cup at one side, using the following SST.
SST: 09520-87604-000

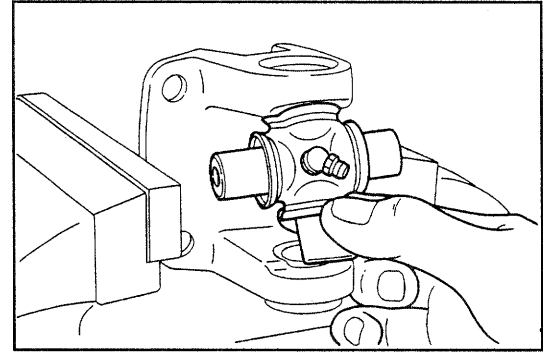
CAUTION:

- Never reuse the removed universal joint spider bearing cup.



WRU90-PR065

13. Remove the universal joint spider.

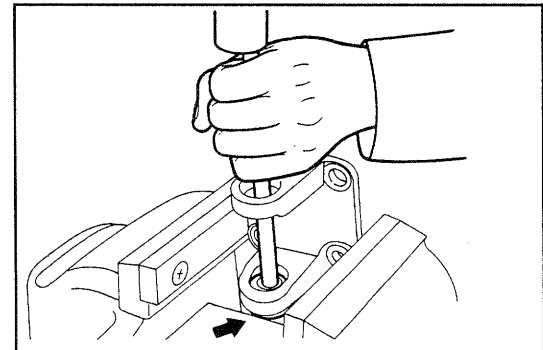


WRU90-PR066

14. Remove the universal joint spider bearing cup by lightly tapping it, using a hammer in combination with a suitable metal rod.

CAUTION:

- Never reuse the removed universal joint spider bearing cup.



WRU90-PR067

INSPECTION

- Conduct measurement at the two points of A and B (cross direction) indicated in the right figure, using an inner dial gauge.

Specified Value:

Propeller Shaft

28.0 ^{+0.015 mm}_{+0.0025 mm} (1.102 ^{+0.00059 inch}_{+0.00098 inch})

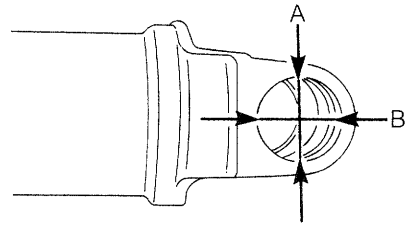
Sleeve and Flange Yoke

28.0 ^{+0.05 mm}_{+0.15 mm} (1.102 ^{+0.00197 inch}_{+0.00591 inch})

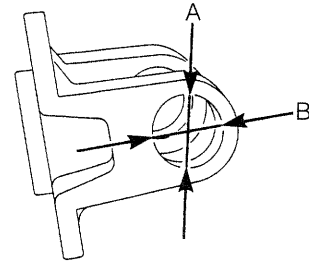
CAUTION:

- If the inner diameters of A and B (cross sections) exceed the specified value above, replace the parts with a new one.

Propeller shaft



Sleeve and flange yoke



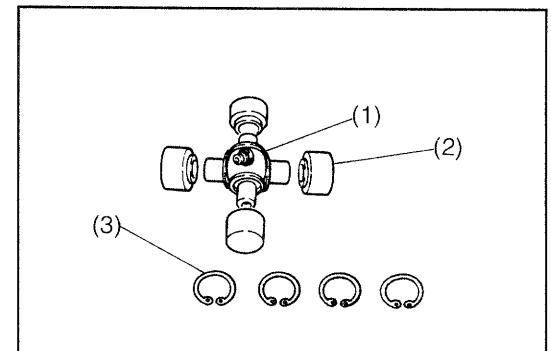
WRU90-PR068

INSTALLATION

- The following parts (1), (2), (3) are supplied in one set in the replacement parts for the universal joint spider subassembly.

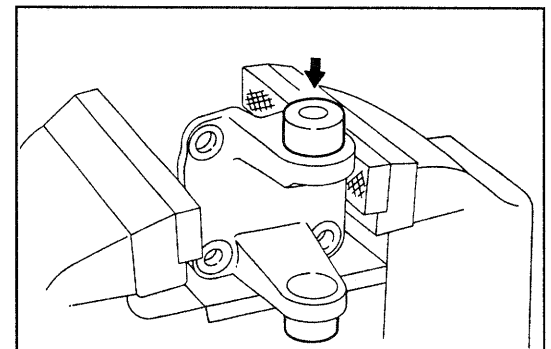
- (1) Universal joint spider 1 piece
- (2) Universal joint spider bearing cup 4 pcs.
- (3) Snap rings 4 pcs.

Parts availability	Identification
T = 1.45 mm (0.0571 inch)	None
T = 1.50 mm (0.0591 inch)	Yellow paint applied on ring outer periphery
T = 1.55 mm (0.0610 inch)	White paint applied on ring outer periphery



WRU90-PR069

- Temporarily install new universal joint spider bearing cups (two pcs.) to the universal joint with flange yoke by pushing them with finger.



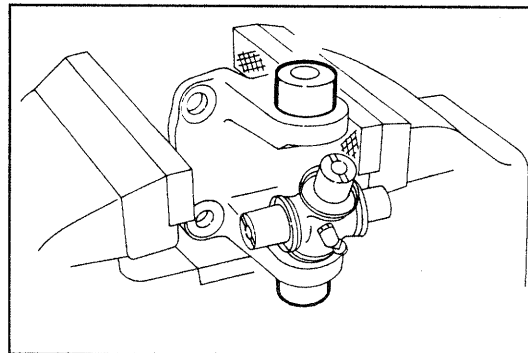
WRU90-PR070

PROPELLER SHAFTS

3. Temporarily install a new universal joint spider to the universal joint with flange yoke.

NOTE:

- Make sure that the grease nipple faces toward the propeller shaft side.



WRU90-PR071

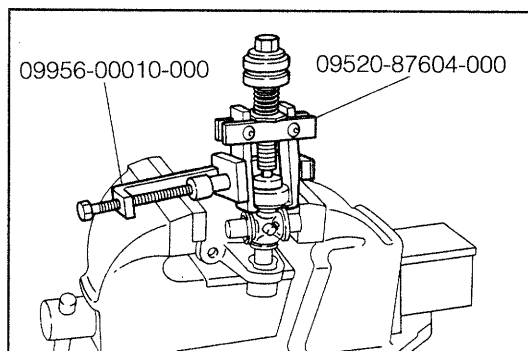
4. Install the right and left universal joint spider bearing cups, using the suitable wrench box with the following SSTs.

SST: 09520-87604-000

09956-00010-000

NOTE:

- Be sure to evenly press the right and left universal joint spider bearing cups, until you can see the snap ring attaching groove provided on the inner periphery surface of the universal joint with flange yoke.

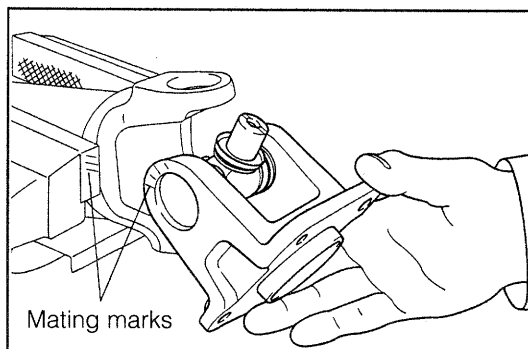


WRU90-PR072

5. Temporarily install the universal joint with flange yoke to the propeller shaft.

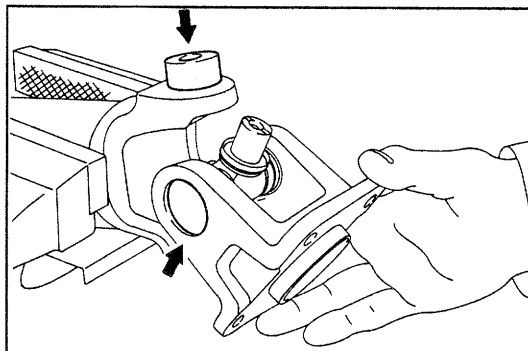
CAUTION:

- Be sure to align the paint marks (at the propeller shaft and flange yoke sides) which were put before the removal with each other.
If the mating marks described above are not aligned with each other, it may cause abnormal vibration or abnormal noise of the propeller shaft.
- Make sure that the grease nipple faces toward the propeller shaft side.



WRU92-PR105

6. Temporarily install new universal joint spider bearing cups (two pcs.) to the propeller shaft by pushing them with finger.

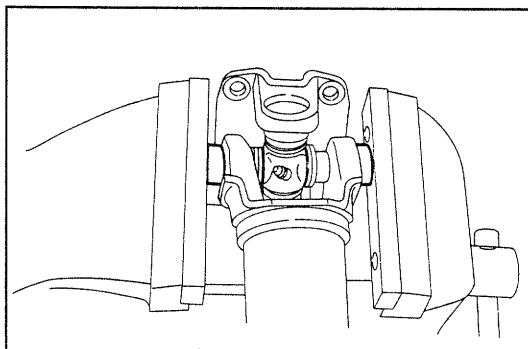


WRU90-PR074

7. While applying suitable box wrenches to both edge surfaces of the universal joint spider bearing cup, set the bearing cup in a vise.
8. After tightening the vise, press the right and left universal joint spider bearing cups.

NOTE:

- Be sure to evenly press the right and left cups, until you can see the snap ring attaching groove provided on the inner periphery surface of the universal joint with flange yoke.



WRU90-PR075

9. Measurement of universal joint starting torque

- (1) Using a spring scale, install the selected snap ring so that the starting torque may fall within the specified range given below.

Specified Value:

0.005 - 0.15 kg-m (0.036 - 1.08 ft-lb, 0.049 - 1.47 N-m)

- (2) Turn the propeller shaft 90 degrees. Measure the starting torque.

CAUTION:

- As regards the snap rings positioned symmetrically relative to the universal joint spider, in principle, it is required to use the snap rings having the same thickness.
- However, if the starting torque does not reach or exceeds the specified range despite the fact that the snap rings having the same thickness have been used, use a snap ring having one class higher or lower thickness.

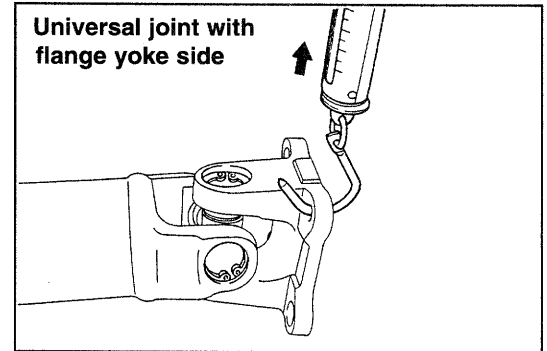
- (3) Measure the starting torque, following the same procedure described above.

- (4) Turn the propeller shaft 90 degrees. Measure the starting torque.

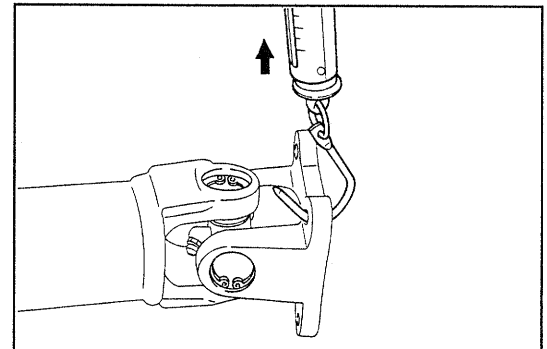
10. With a dial gauge set to the center of the propeller shaft.

Allowable Runout: 0.5 mm (0.020 inch)

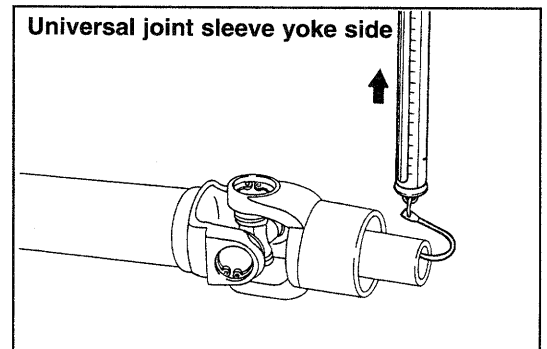
Replace to the new propeller shaft, if the runout is exceed than 0.5 mm (0.020 inch)



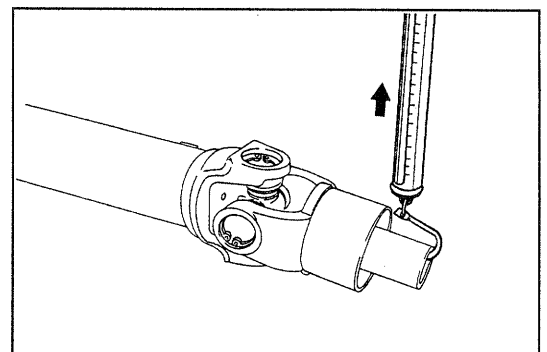
WRU92-PR104



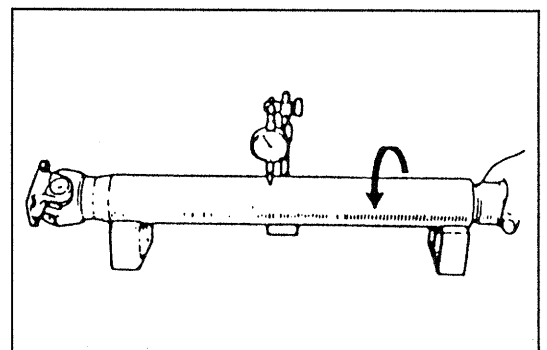
WRU90-PR077



WRU90-PR078



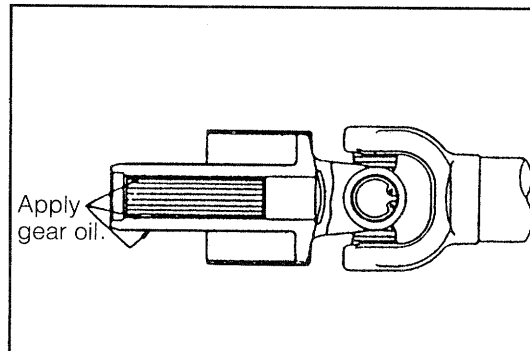
WRU90-PR079



WRU90-PR080

PROPELLER SHAFTS

11. Apply gear oil to both the inner and outer sides of the propeller shaft sleeve.



WRU90-PR081

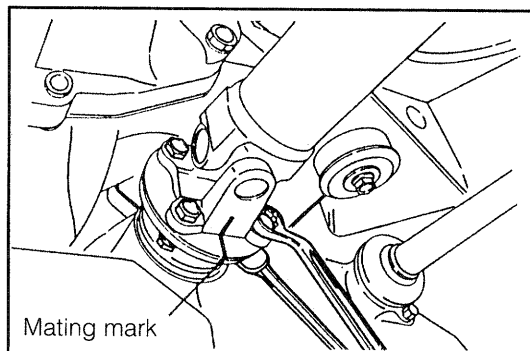
12. Install the propeller shaft with the mating marks that were put during the removal of the propeller shaft aligned with each other.

Tightening Torque:

6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

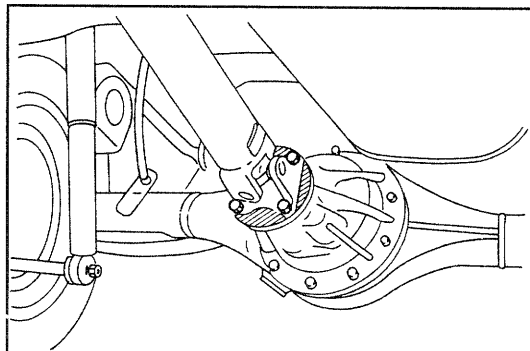
CAUTION:

- Make sure to line up those mating marks that were put during the removal of the front propeller shaft. If this caution should fail to be observed, the propeller shaft may emit abnormal noise or vibration.



WRU90-PR082

13. After installing the propeller shaft, apply black paint to the exposed machined surface of the differential companion flange (Slant line section in the right figure) as a rust preventive measure.
14. Apply some amount of the lithium base multi-purpose grease to the grease nipples.



WRU90-PR083

DAIHATSU

Rocky

FRONT/REAR DIFFERENTIAL

GENERAL DESCRIPTION	DF -2
IN-VEHICLE REPLACEMENT PROCEDURES	
FOR OIL SEAL (FRONT)	DF -3
TROUBLE SHOOTING	DF -6
FRONT DIFFERENTIAL	
COMPONENTS	DF -7
REMOVAL	DF -8
PRE-INSPECTION	DF-10
DISASSEMBLY	DF-12
INSPECTION	DF-15
ASSEMBLY	DF-16
INSTALLATION	DF-26
IN-VEHICLE REPLACEMENT PROCEDURES	
FOR OIL SEAL (REAR)	DF-29
REAR DIFFERENTIAL COMPONENTS	DF-32
REMOVAL	DF-33
PRE-INSPECTION	DF-34
DISASSEMBLY	DF-35
INSPECTION	DF-38
ASSEMBLY	DF-39
INSTALLATION	DF-49
L.S.D. (Limited Slip Differential)	
COMPONENTS	DF-51
REMOVAL	DF-52
DISASSEMBLY	DF-52
INSPECTION	DF-55
ASSEMBLY	DF-55
INSTALLATION	DF-61

DF

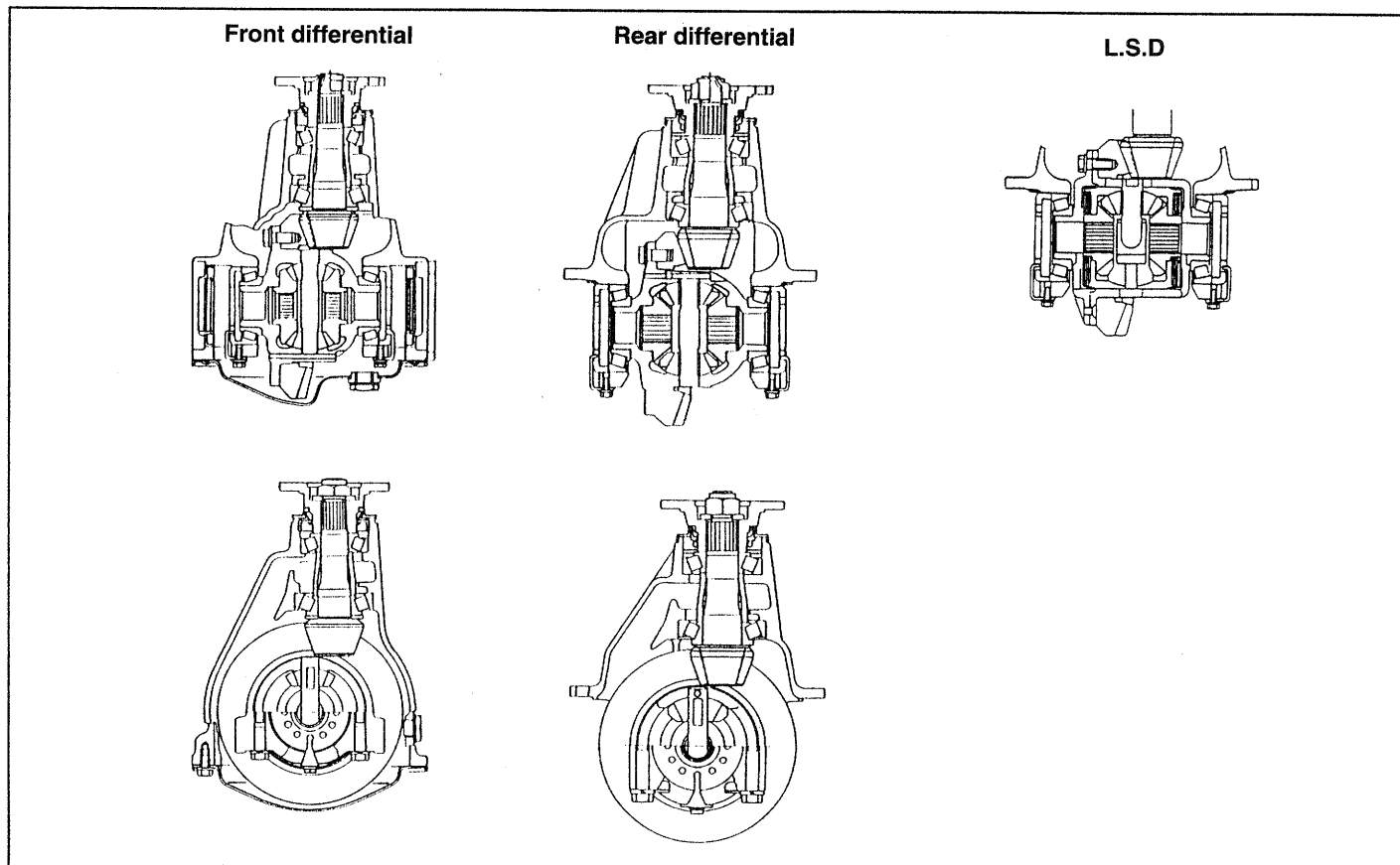
WRU90-DF001

GENERAL DESCRIPTION

DIFFERENTIALS

The differential at both the front and rear employs a hypoid gear type.

In the case of ordinary differentials, there will be cases where the traction is lost when the wheel at one side is rotating idly on muddy roads or during a rapid cornering. To solve those problems, an L.S.D. (Limited Slip Differential) is available as optional equipment on the rear differential.



WRU90-DF002

Differential specifications

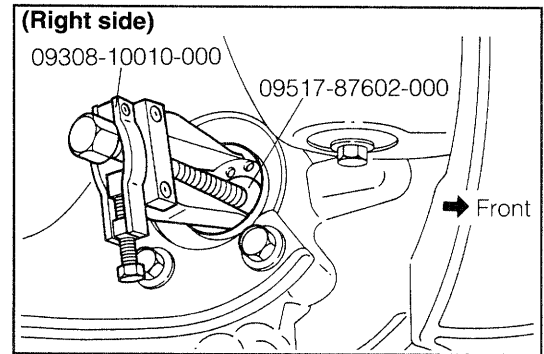
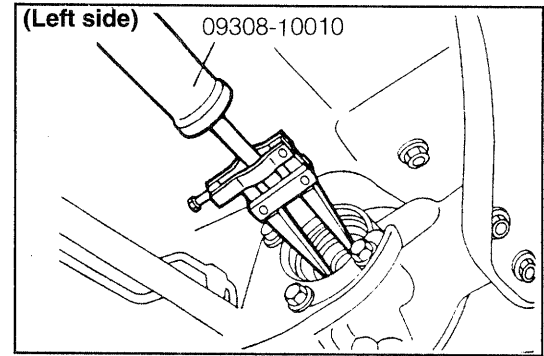
Item		Kind	Front	Rear	Rear (LSD)
Final reduction gear ration			5.285	5.285	5.285
Differential ring gear	Number of teeth		37	37	37
	Outer diameter	mm (inch)	170 (6.69)	180 (7.09)	180 (7.09)
	Gear type		Hypoid gear	Hypoid gear	Hypoid gear
Final reduction gear	Number of teeth		7	7	7
	Outer diameter	mm (inch)	55 (2.17)	57 (2.24)	57 (2.24)
	Gear type		Hypoid pinion	Hypoid pinion	Hypoid pinion
Differential side gear	Number of teeth		18	14	14
	Number of inner spline teeth		25	27	27
Number of differential pinion teeth			10	10	10
Pinion shaft outer diameter		mm (inch)	φ16 (0.63)	φ18 (0.71)	φ18 (0.71)

WRU90-DF003

IN-VEHICLE REPLACEMENT PROCEDURES FOR OIL SEAL FRONT FRONT DIFFERENTIAL (Drive Shaft Oil Seal) REMOVAL

1. Remove the drive shaft from the front differential. (Refer front axle and suspension section).
2. Remove the oil seal at the drive shaft installation section, in conjunction with the following SSTs.

SST: 09308-10010-000
09517-87602-000



WRU90-DF004

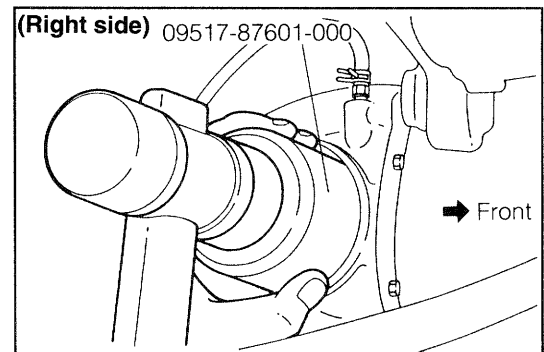
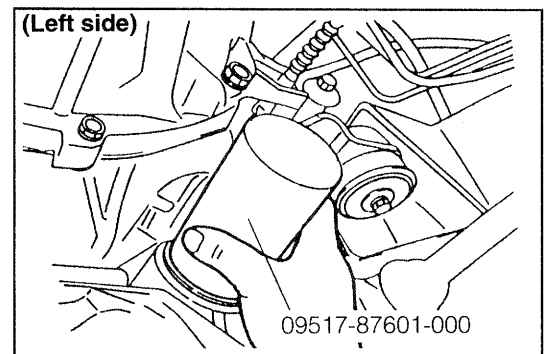
INSTALLATION

1. Drive the oil seal at the drive shaft installation section into position, using the following SST.

SST: 09517-87601-000

NOTE:

- Apply the lithium base multi purpose grease to the oil seal lip section, prior to install.
2. Install the drive shaft to the front differential. (Refer front axle and suspension section).



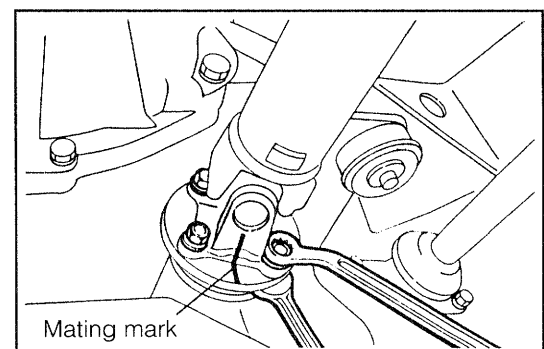
WRU90-DF005

FRONT DIFFERENTIAL (Drive Pinion Oil Seal) REMOVAL

1. Remove the propeller shaft.

CAUTION:

- Prior to the removal, be sure to put a mating mark. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.



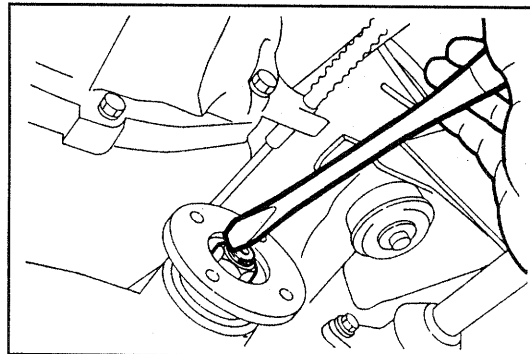
WRU90-DF006

FRONT/REAR DIFFERENTIAL

2. Release the staking of the lock nut of the drive pinion.

NOTE:

- Insufficient releasing of the staking of the lock nut may cause the threaded portion of the drive pinion to be damaged.



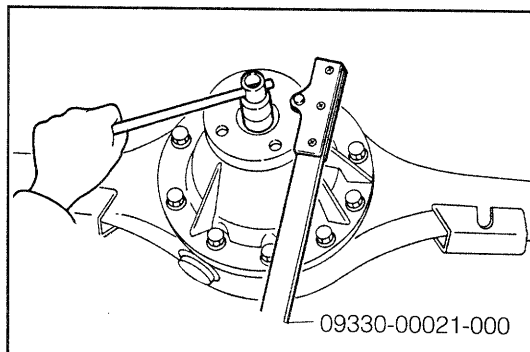
WRU90-DF007

3. Remove the lock nut and plate washer using the following SST.

SST: 09330-00021-000

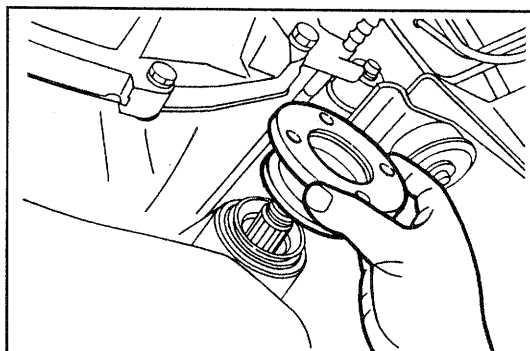
NOTE:

- Never reuse the removed lock nut.



WRU90-DF008

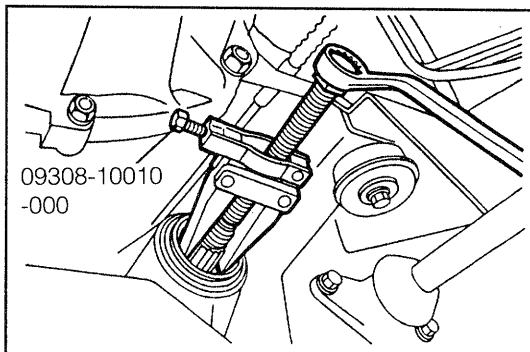
4. Remove the companion flange.



WRU90-DF009

5. Remove the oil seal, using the following SST.

SST: 09308-10010-000



WRU90-DF010

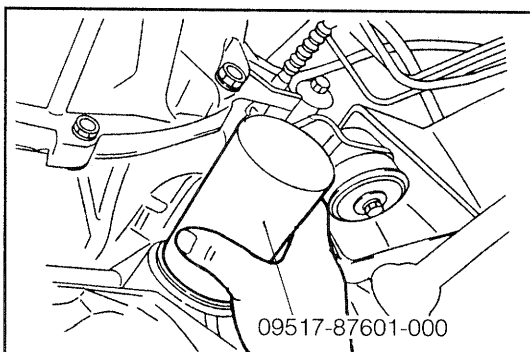
INSTALLATION

1. Drive the oil seal into position, using the following SST.

SST: 09517-87601-000

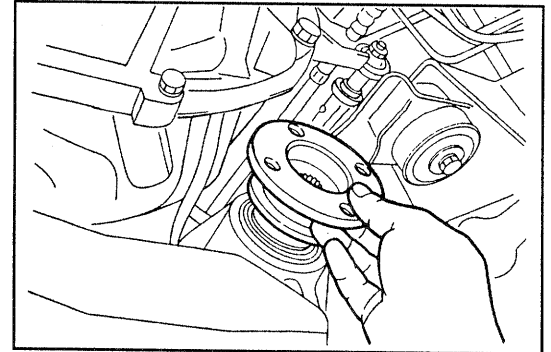
NOTE:

- Apply the lithium base multi purpose grease to the oil seal lip section, prior to install.



WRU90-DF011

2. Install the companion flange.

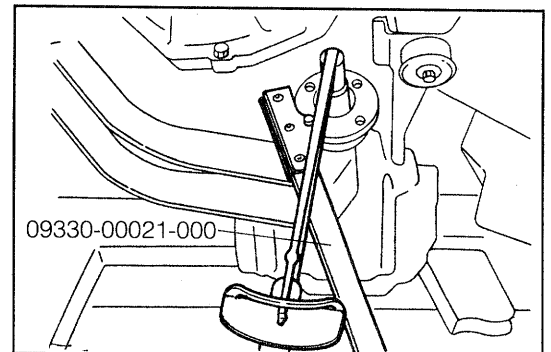


WRU90-DF012

3. Install the plate washer and a new lock nut. Tighten the nut, using the following SST.

SST: 09330-00021-000

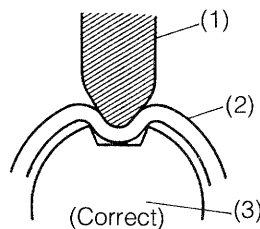
Tightening Torque: 16.0 - 20.0 kg-m
(116.0 - 145.0 ft-lb,
157.0 - 196.0 N·m)



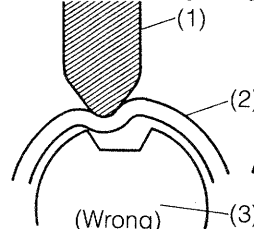
NOTE:

- When staking the lock nut, point a suitable staking tool toward the drive pinion axis center and stake the lock nut securely, as shown in the figure below. (Poor staking may cause abnormal noise.)

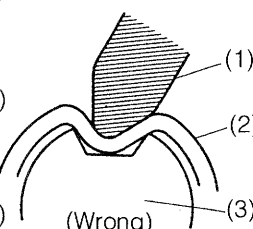
- (1) Suitable staking tool
- (2) New nut
- (3) Drive pinion



(Correct)



(Wrong)



(Wrong)

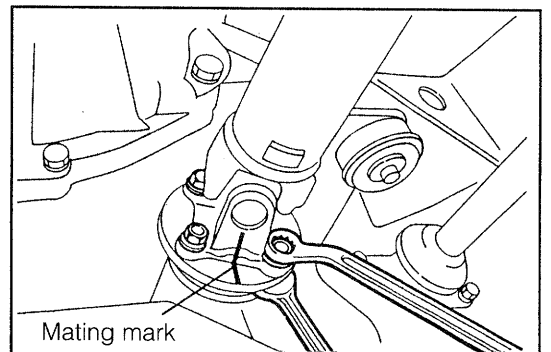
WRU90-DF013

4. Install the propeller shaft.

CAUTION:

- While installing the propeller shaft, align the mating marks put during the removal with each other. If this operation should fail to be performed correctly, the propeller shaft may emit abnormal noise or vibration during the running.

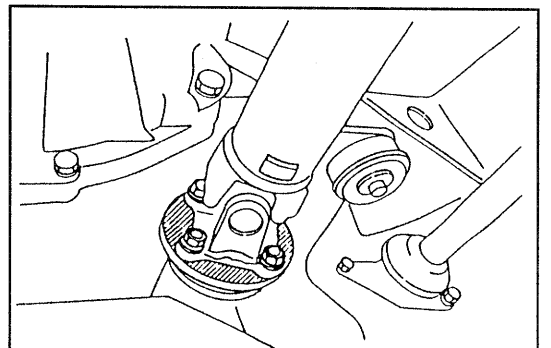
Tightening Torque: 6.0 - 8.0 kg-m
(43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)



Mating mark

WRU90-DF014

5. After the propeller shaft has been installed, apply black paint to the exposed machined surface (slant line section in the right figure).



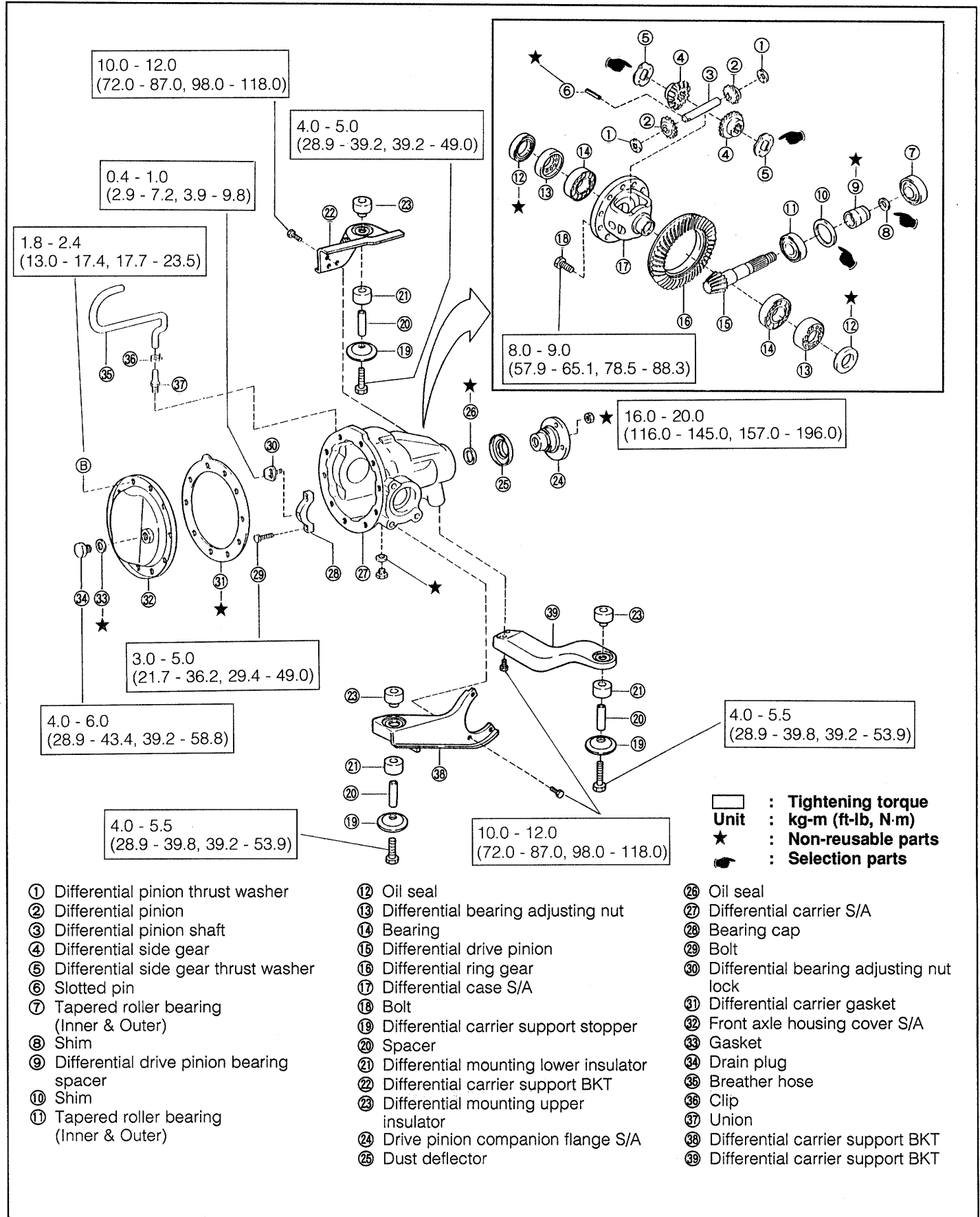
WRU90-DF244

TROUBLE SHOOTING

Symptoms		Possible causes	Checking points
Abnormal noise	Differential tapping noise	Improper backlash of hypoid gear	Check backlash between drive pinion and ring gear.
	Differential clunk noise	The same above	The same above
	Differential clonking noise	Drive pinion improperly adjusted	Check preload. Check backlash.
	Differential chuckle noise	Abnormal wear in side gear and differential case	Check side gear. Check differential case.
	Differential noise	Improper tooth contact at hypoid gear	Check tooth contact between drive pinion and ring gear.
Oil leakage		Faulty oil seal	Check each oil seal.
		Oil leakage at differential carrier installation section	Check installation surface with rear axle housing.

WRU90-DF015

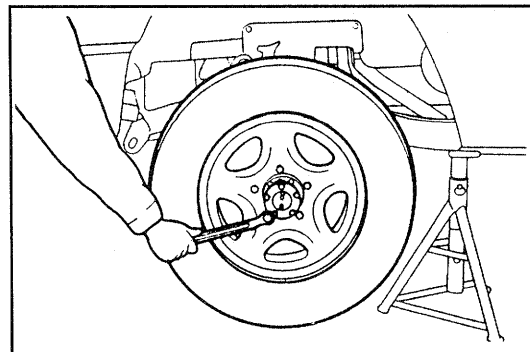
FRONT DIFFERENTIAL COMPONENTS



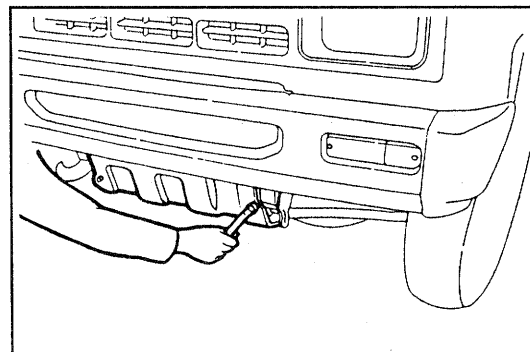
FRONT/REAR DIFFERENTIAL

REMOVAL

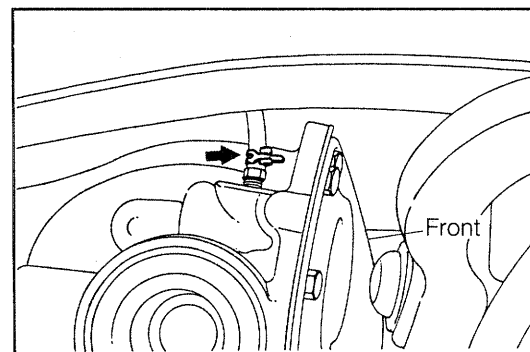
1. Jack up the vehicle and support it with safety stands. (As for the jacking-up points and support points for safety stands, refer GI-section.)
2. Remove the front wheel.
3. Drain the oil from the differential.
4. Remove the engine undercover by removing the four bolts.
5. Remove the front drive shafts and stabilizer.
(Refer Front Axle & Suspension section.)
6. Disconnect the breather hose by removing the clamp.
7. Remove the propeller shaft.
NOTE:
 - Before the propeller shaft is removed, be sure to put a mating mark as a guide during the installation.
8. Hold the propeller shaft in a suspended state.
9. Remove the differential mounting.
Temporarily loosen the three bolts of the differential mounting brackets.



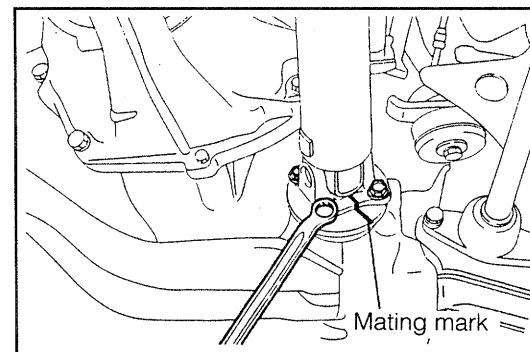
WRU90-DF017



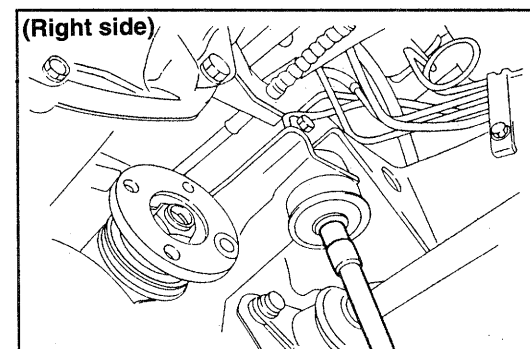
WRU90-DF018



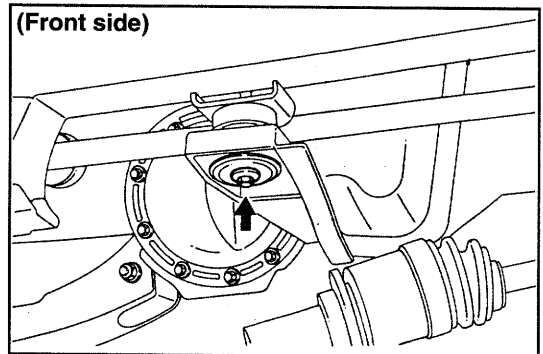
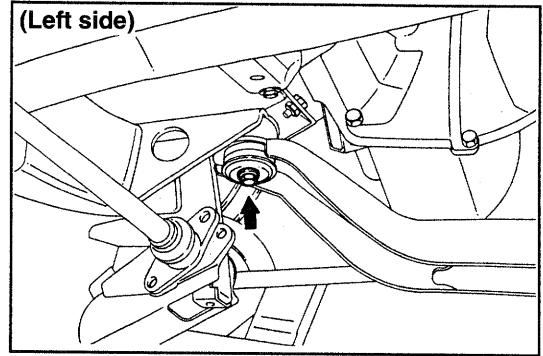
WRU90-DF019



WRU90-DF020



WRU90-DF021

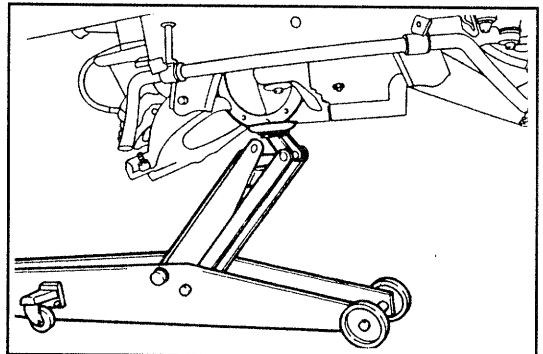


WRU90-DF022

10. Support the differential with a transmission jack or the like.
11. Remove the differential from the chassis frame by removing the three bolts of the differential mounting brackets.
12. Remove the differential from the vehicle, while supporting the differential with a jack.

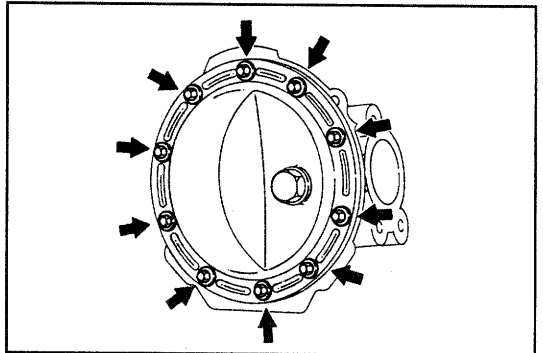
WARNING:

Be sure to slowly lower the differential, while holding it by your hands, for the differential is in an unstable state.



WRU90-DF023

13. Remove the ten bolts of the front axle housing cover sub-assembly.

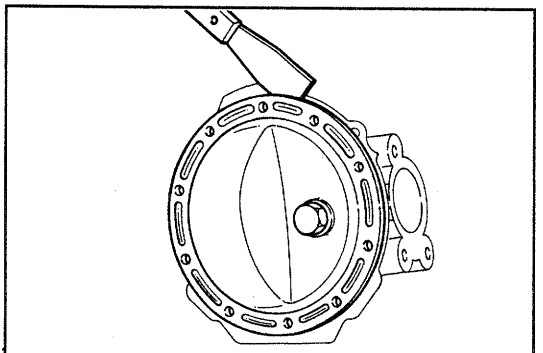


WRU90-DF024

14. Remove the front axle housing cover subassembly, using the standard tool of the scraper.

NOTE:

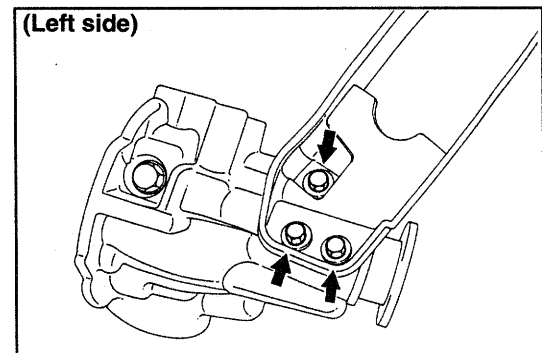
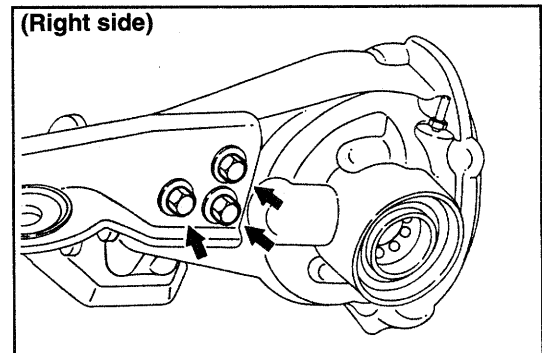
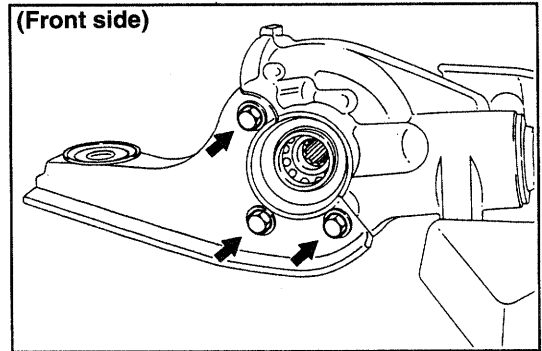
- Never reuse the removed gasket.



WRU90-DF025

FRONT/REAR DIFFERENTIAL

15. Remove the three differential carrier support brackets from the differential by removing the three bolts.



WRU90-DF026

16. Install the differential assembly removed from the vehicle on the following SSTs.

SSTs: 09219-87202-000
09548-87201-000

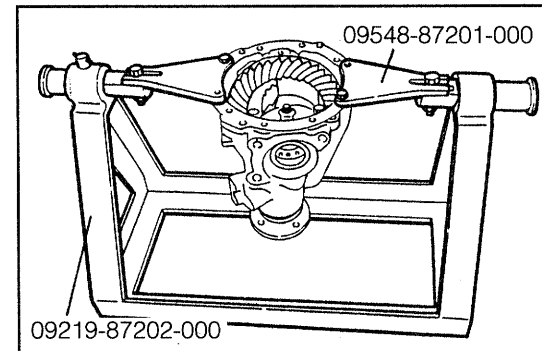
PRE-INSPECTION

NOTE:

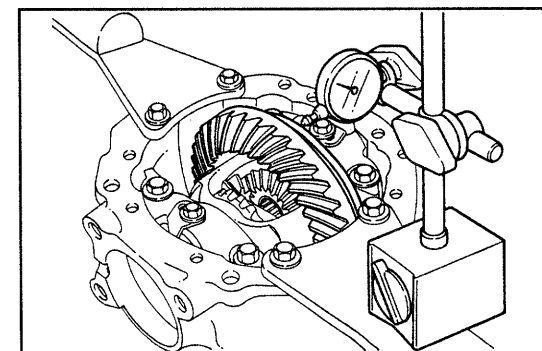
- Prior to the disassembling of the differential, be sure to check the following items and record the values. (These values are used as reference which assures the correct assembling.)

1. Ring gear runout check
Measure the runout at the back surface of the ring gear, using a dial gauge.
Allowable Limit: 0.1 mm (0.004 inch)

If the runout exceeds the allowable limit, replace the final gear as a set.



WRU90-DF027

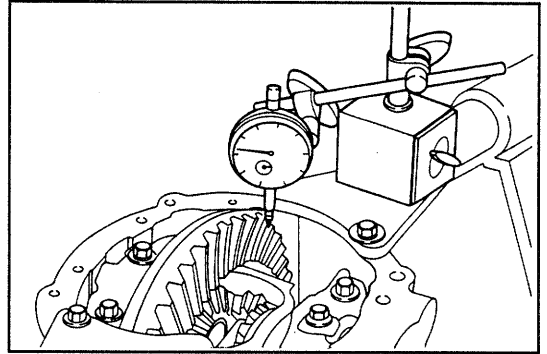


WRU90-DF028

2. Ring gear backlash check

Secure the drive pinion in such a way that a dial gauge may make contact with the forward end of the tooth surface of the ring gear at right angles. Measure the backlash by moving the ring gear.

Specified Value: 0.07 - 0.17 mm
(0.0028 - 0.0067 inch)

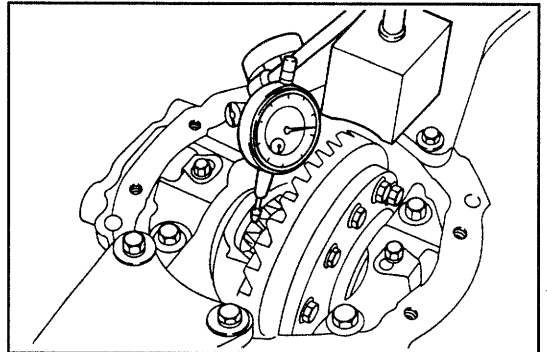


WRU90-DF029

3. Side gear backlash check

Measure the backlash with the pinion gear pushed against the differential case side.

Specified Value: 0.03 - 0.15 mm
(0.0012 - 0.0059 inch)

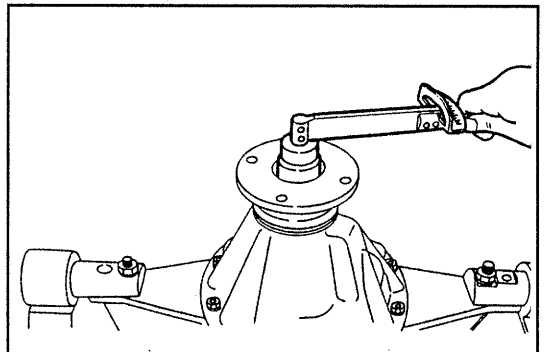


WRU90-DF030

4. Total preload measurement

Measure the starting torque with the drive pinion brought into contact with the tooth surface of the ring gear, using a torque gauge.

Specified Value: 6 - 31 kg-cm (5.3 - 26.9 inch-lb)



WRU90-DF031

5. Check of tooth contact between ring gear and drive pinion

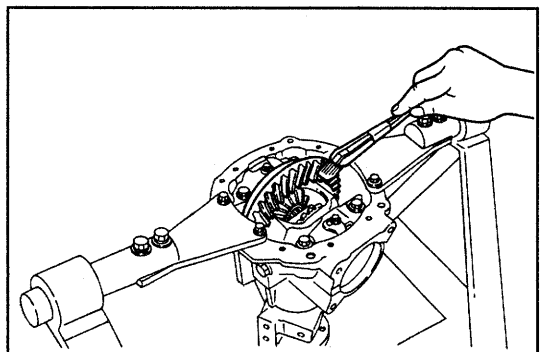
Apply a thin film of blue lead or the like evenly to both sides of five or six teeth of the ring gear.

NOTE:

- Perform the tooth contact check at four points of the ring gear.

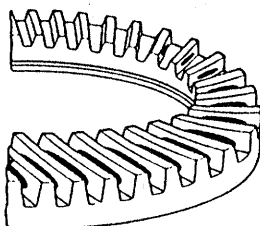
Apply braking to the drive pinion and turn the ring gear several times. Check the tooth contact between the ring gear and the drive pinion.

Ensure that correct tooth contact has been attained, as shown in the figure below.

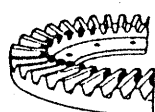


WRU90-DF032

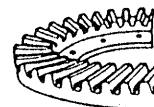
Correct tooth contact



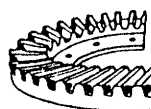
Toe contact



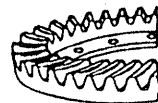
Flank contact



Heel contact



Face contact



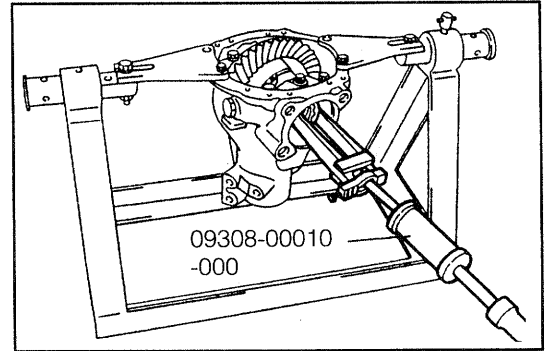
WRU90-DF033

FRONT/REAR DIFFERENTIAL

DISASSEMBLY

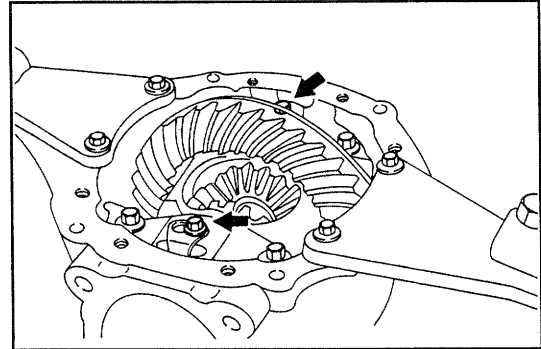
1. Remove the oil seal at the drive shaft side, using the following SST.

SST: 09308-00010-000



WRU90-DF034

2. Remove the adjusting lock nut.

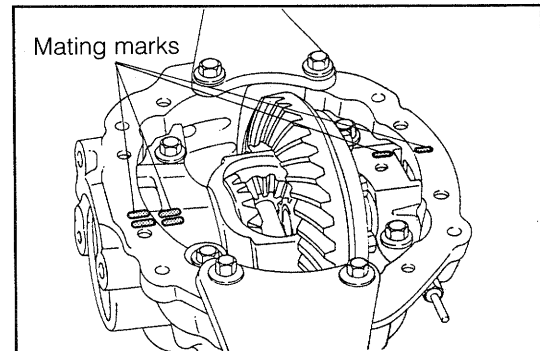


WRU90-DF035

3. Put mating marks (Painted with white or the like) on the bearing cap and differential carrier.

NOTE:

- Since the bearing cap has been manufactured integrally with the differential carrier, never disturb the combination of these components.

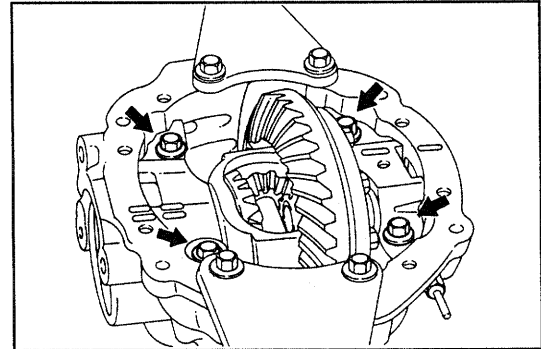


WRU90-DF036

4. Remove the bearing cap by removing the two bolts on both left and right sides.

NOTE:

- Arrange the removed bearing caps in order, separating the right cap from the left cap.

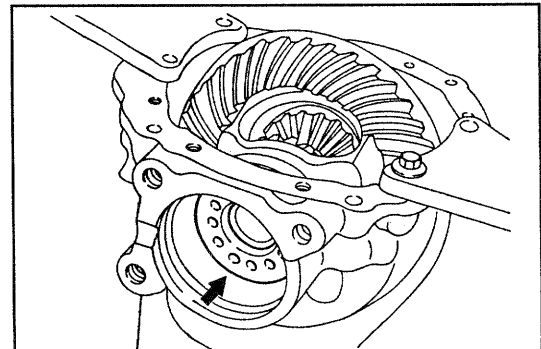


WRU90-DF037

5. Remove the differential bearing adjusting nut on bolt left and right sides.

NOTE:

- Arrange the removed bearing caps in order, separating the right cap from the left cap.

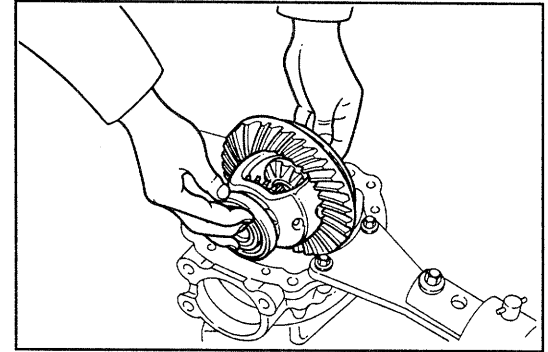


WRU90-DF038

6. Remove the differential case from the carrier.

NOTE:

- The drive pinion preload should be measured after the differential case has been removed.
- After completion of measurement, perform disassembly, following the removal procedures given below.



WRU90-DF039

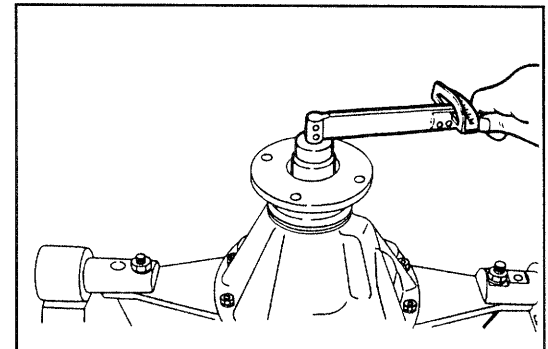
7. Drive pinion preload measurement

Measure the starting torque within the range of the backlash between the drive pinion and the ring gear, using torque gauge.

Specified Value: 4 - 25 kg-cm (3.5 - 21.7 inch-lb)

NOTE:

- This step should be performed after the differential case has been removed from the carrier.

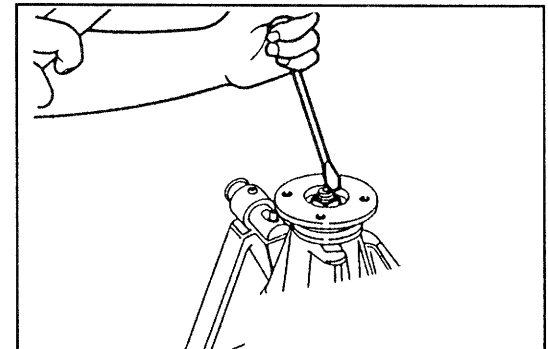


WRU90-DF040

8. Release the staking of the lock nut, using a chisel and a hammer.

NOTE:

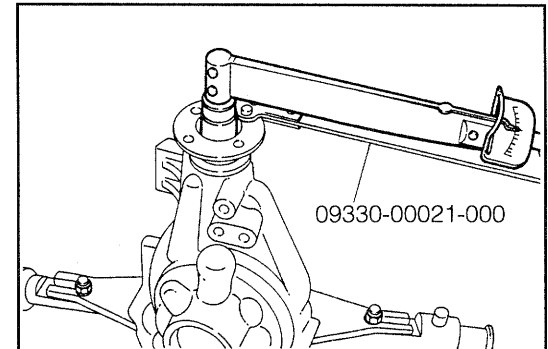
- Never reuse the removed lock nut.



WRU90-DF041

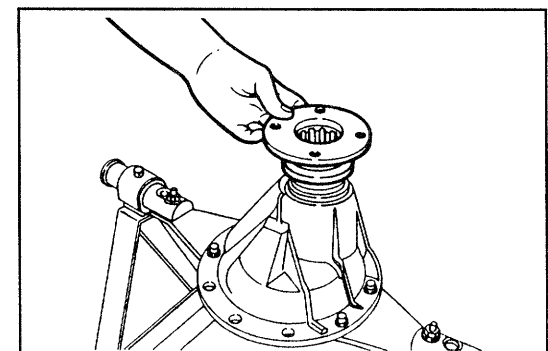
9. Secure the companion flange, using the following SST. Proceed to the remove the lock nut.

SST: 09330-00021-000



WRU90-DF042

10. Remove the companion flange.



WRU90-DF043

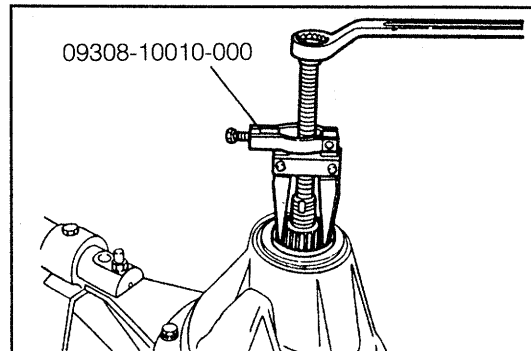
FRONT/REAR DIFFERENTIAL

11. Remove the oil seal of the drive pinion, using the following SST.

SST: 09308-10010-000

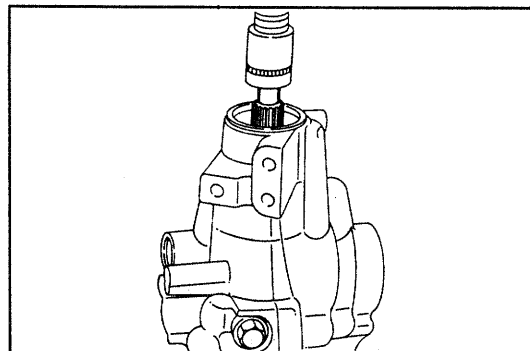
NOTE:

- Never reuse the removed oil seal.



WRU90-DF044

12. Remove the rear bearing by pressing the drive pinion in the press.



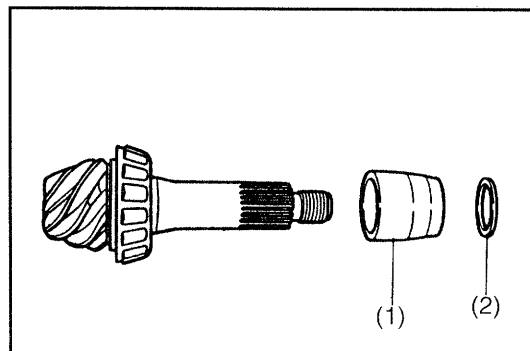
WRU90-DF045

13. Remove the following parts from the drive pinion.

- (1) Spacer
- (2) Shim for drive pinion preload

NOTE:

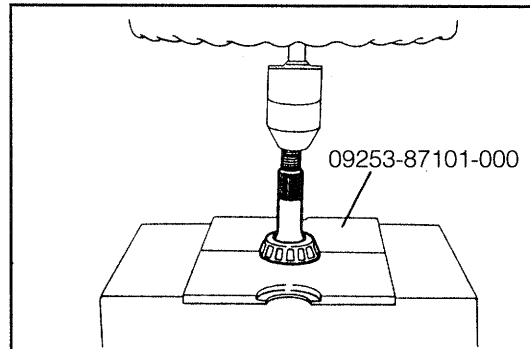
- Never reuse the removed spacer as it's crash type



WRU90-DF046

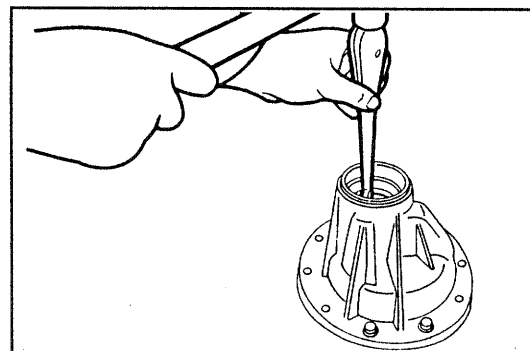
14. Remove the rear bearing and the drive pinion mounting distance adjusting shim from the drive pinion, in conjunction with a press and the following SST.

SST: 09253-87101-000



WRU90-DF047

15. Remove the front and rear bearing outer races, using a brass bar.

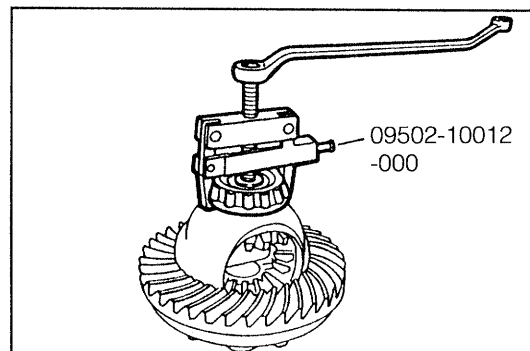


WRU90-DF048

16. Set the differential case into the vice.
17. Remove the side bearings from the differential case, using the following SST.
SST: 09502-10012-000

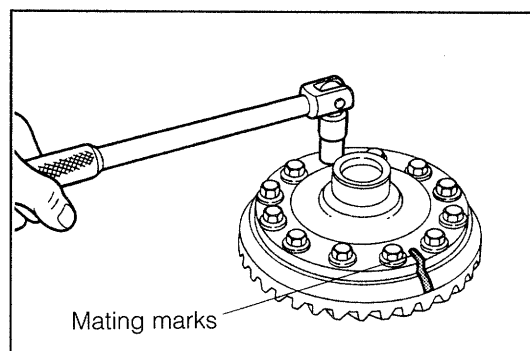
NOTE:

- Insert the pawl of the SST into the groove of the differential carrier.



WRU90-DF049

18. Stamp mating marks (painted with white or the like) on the differential case and ring gear. Proceed to remove the ring gear.

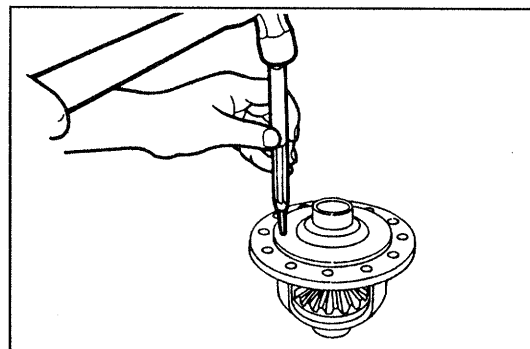


WRU90-DF050

19. Pull out the slotted spring pins of the pinion gear. Remove the following parts from the differential case.
 - (1) Differential side gear
 - (2) Differential side gear thrust washer
 - (3) Differential pinion shaft
 - (4) Differential pinion
 - (5) Differential pinion thrust washer

NOTE:

- Never reuse the removed slotted spring pin.

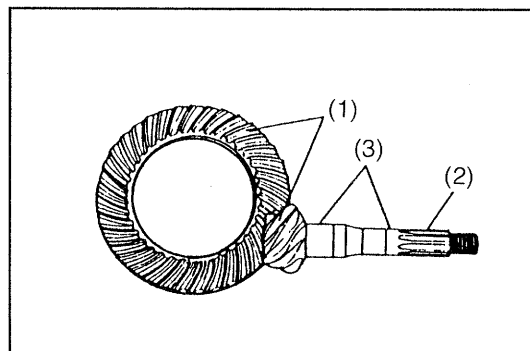


WRU90-DF051

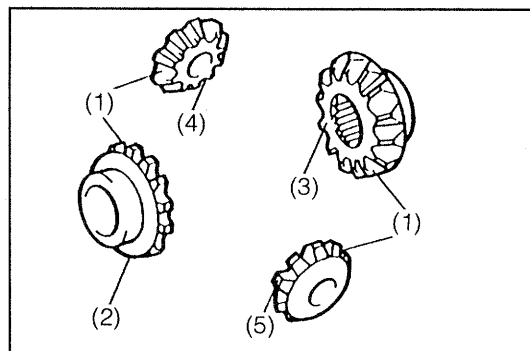
INSPECTION

Inspect each section of the following parts for any sign of damage, wear or excessive looseness. Replace any parts which exhibit defects.

1. Drive pinion & ring gear
 - (1) Gear teeth (1)
 - (2) Spline portion (2) of drive pinion
 - (3) Bearing fitting section (3)
2. Side gear & pinion
 - (1) Gear teeth
 - (2) Side gear boss section
 - (3) Side gear serrated section
 - (4) Pinion shaft fitting hole
 - (5) Differential case contact section



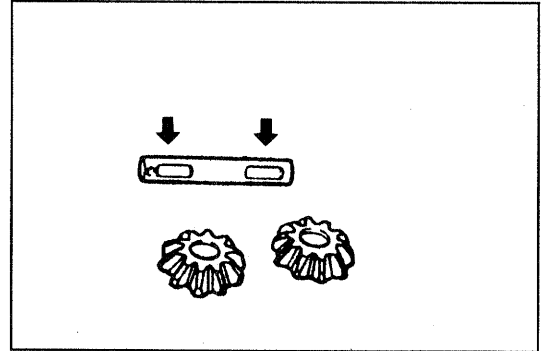
WRU90-DF052



WRU92-DF245

FRONT/REAR DIFFERENTIAL

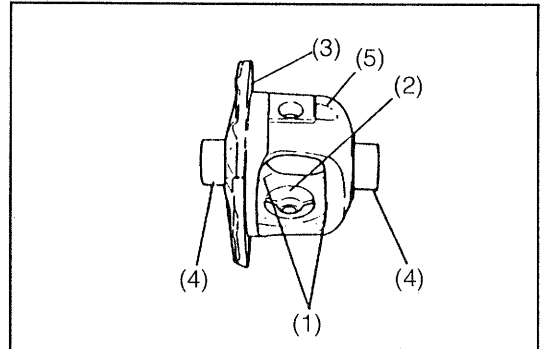
3. Visually inspect the rotational sliding section between the differential pinion and the differential pinion shaft for damage and wear.



WRU90-DF054

4. Inspection of differential case for wear or damage

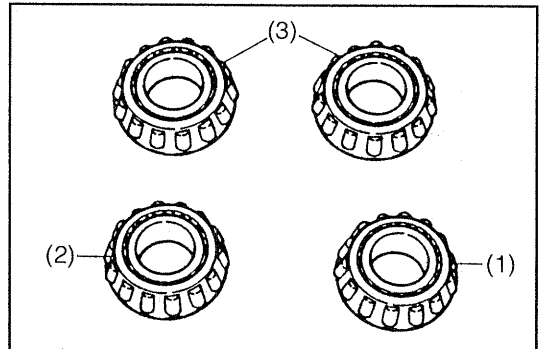
- (1) Side gear boss contact sections
- (2) Pinion contact section
- (3) Ring gear attaching section
- (4) Side bearing press-fitting section
- (5) The differential case proper



WRU92-DF246

5. Bearings

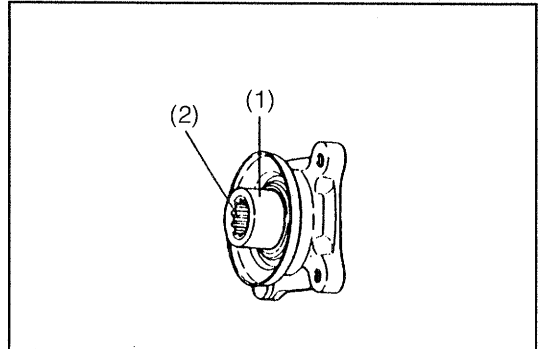
- (1) Front bearing
- (2) Rear bearing
- (3) Side bearings
 - Turn the bearings lightly. Ensure that they rotate smoothly without any binding or abnormal noise.
 - While tracing the outer peripheral section of the taper roller with your nails, check to see if any binding exists there.



WRU92-DF247

6. Companion flange

- (1) Oil seal contact section
- (2) Spline section



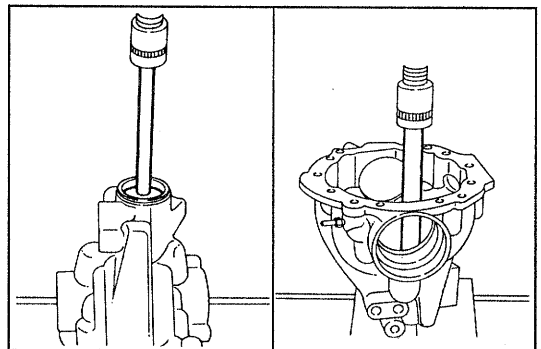
WRU92-DF248

ASSEMBLY

1. Press the front and rear outer races into the differential carriers, using the following SSTs.

- SSTs: (1) Front...09608-87302-800
(2) Rear...09608-87302-7

Both above SSTs are included in the 09608-87302-000.



WRU90-DF058

2. Selecting procedures for drive pinion mounting distance adjusting shims

(1) Assemble the SST and following parts on the front differential. Tighten the bolt to the tightening torque shown in the figure right.

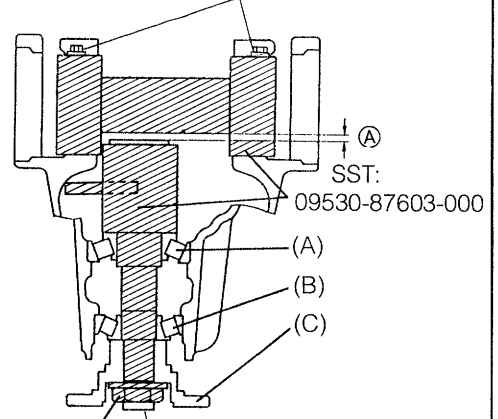
SST: 09530-87603-000

- (A)...Rear bearing
- (B)...Front bearing
- (C)...Companion flange

NOTE:

- Do not install the oil seal at this stage.

Tightening Torque: 3.0 - 5.0 kg-m
(21.7 - 36.1 ft-lb,
29.4 - 49.0 N-m)



SST: 09530-87603-000

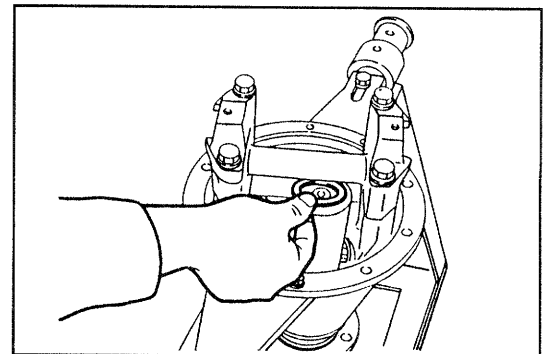
Tightening Torque:
(116.0 - 145.0 ft-lb, 157.0 - 196.0 N-m)
16.0 - 20.0 kg-m

WRU90-DF059

- (2) Measure the dimension A shown in the figure above. Select a suitable shim from the table below.

Adjusting Shim Availability Unit: mm (inch)

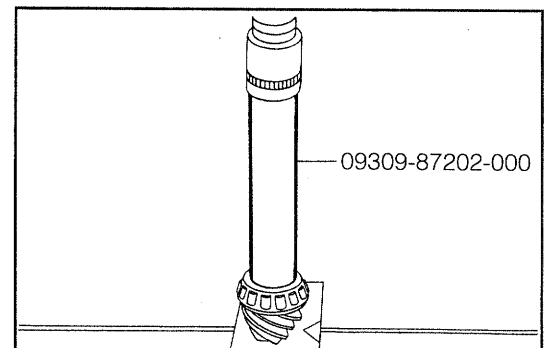
Front differential
3.60 (0.142)
3.65 (0.144)
3.70 (0.146)
3.75 (0.148)
3.80 (0.150)
3.85 (0.152)
0.30 (0.012)



WRU90-DF060

- (3) Place the drive pinion mounting distance adjusting shim that was selected in the previous step in the drive pinion. Press the rear bearing, using the following SST.

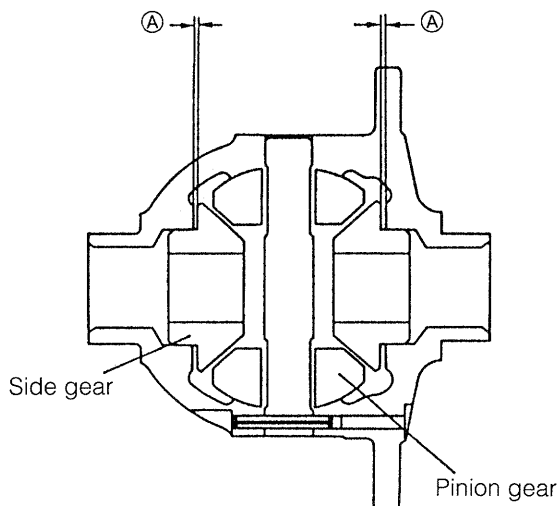
SST: 09309-87202-000



WRU90-DF061

FRONT/REAR DIFFERENTIAL

3. Selecting procedures for side gear backlash thrust washer



Availability of Adjusting Thrust Washer for Section A

Units: mm (inch)

1.00 (0.0394)
1.05 (0.0413)
1.10 (0.0433)
1.15 (0.0453)
1.20 (0.0472)

WRU90-DF062

(1) Prior to assembling, apply the gear oil to the following rotating sections.

- Outer periphery (side and pinion gear)
- Inner periphery of side and pinion gear in differential case

(2) Assemble the following parts in the differential case.

- (1) Differential side gear
- (2) Differential side gear thrust washer
- (3) Differential pinion shaft
- (4) Differential pinion
- (5) Differential pinion thrust washer

(3) Measure the backlash with the pinion gear pushed against the differential case side. Select a thrust washer in such a way that the backlash between the differential pinion and the differential side gear may conform to the specified value given below. Here, the backlash is the mean value of measurements over four teeth. Place the selected thrust washer.

Specified Value: 0.03 - 0.15 mm (0.012 - 0.059 inch)

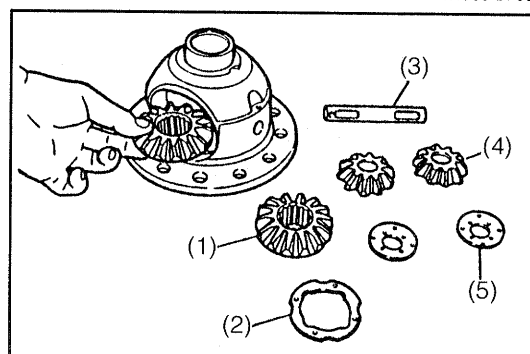
NOTE:

- The same size of the thrust washer should be installed at both the right and left sides.

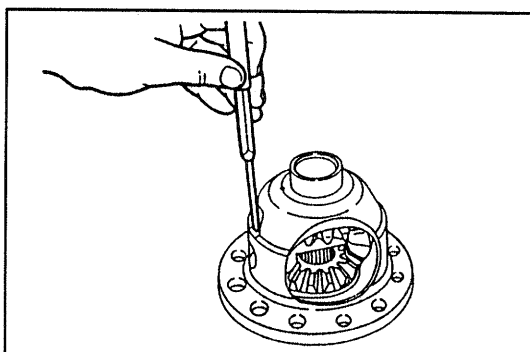
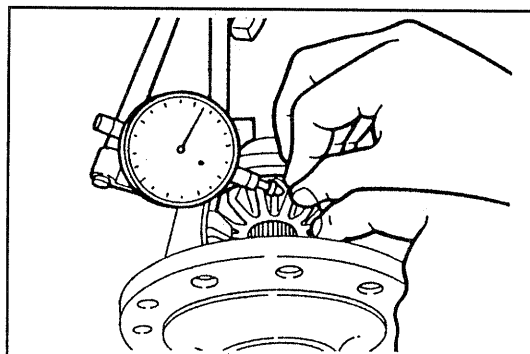
4. Drive the new slotted spring pin into position, after completion of the backlash measurement.

NOTE:

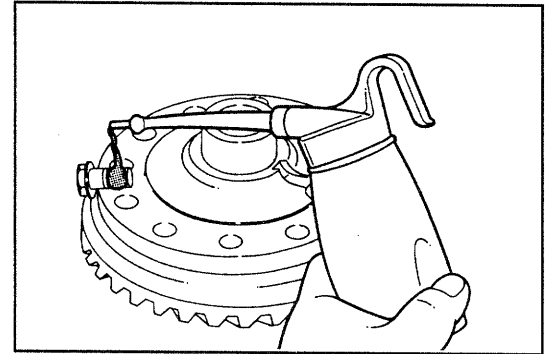
- Stake the differential case with a chisel or the like so as to secure the slotted spring pin.



WRU90-DF063



5. Align the mating marks put during the disassembly with each other.
6. Apply gear oil to the threaded portions of the tightening bolts and the ring gear.



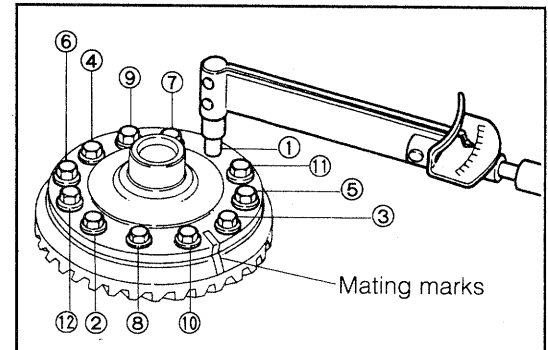
WRU90-DF066

7. Install the ring gear in the differential case and tighten the bolts.

Tightening Torque: 8.0 - 9.0 kg-m
(57.9 - 65.1 ft-lb, 78.5 - 88.3 N·m)

NOTE:

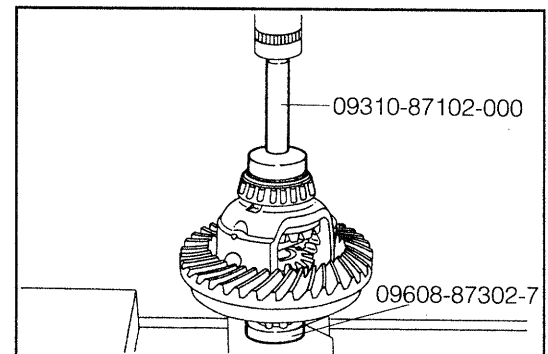
- Be sure to tighten the bolts alternately and diagonally.



WRU90-DF067

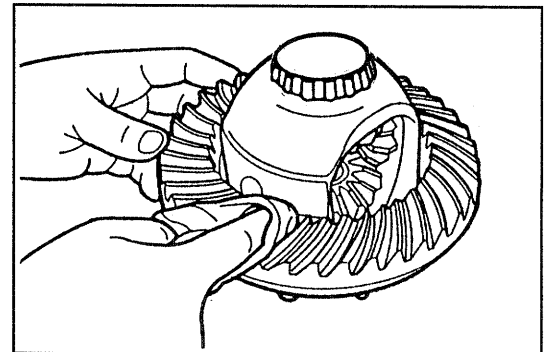
8. Press the side bearing into the differential case, using the following SSTs.

SST: 09310-87102-000
09608-87302-7 ...
... that is a part of 09608-87302-000 set



WRU90-DF068

9. Clean the ring gear tooth surfaces.

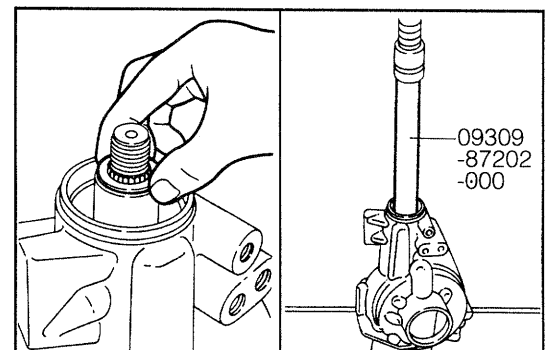


WRU90-DF069

10. Install the drive pinion, new drive pinion bearing spacer and shim (one that was measured at time of selection) to the differential carrier.

11. Press the rear bearing, using the following SST.

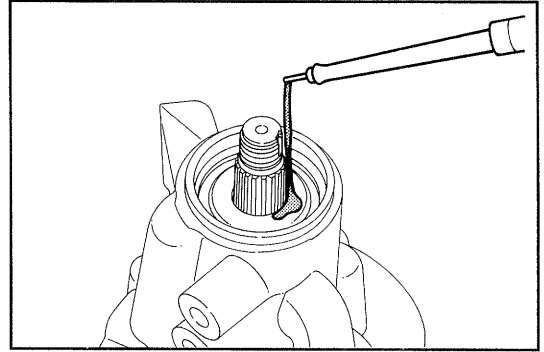
SST: 09309-87202-000



WRU90-DF070

FRONT/REAR DIFFERENTIAL

12. Apply the gear oil to the rear bearing tapered roller sections.



WRU90-DF071

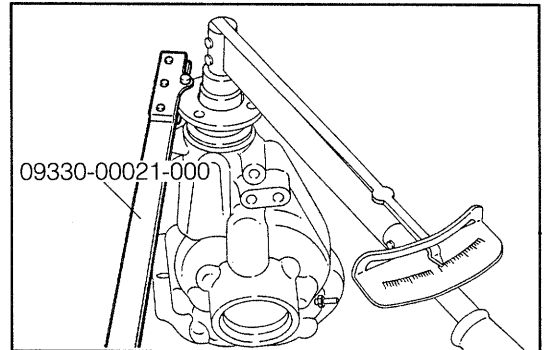
13. Install the companion flange.
14. Tighten the nut (use for 09530-87603-000), using the following SST.

SST: 09330-00021-000

Tightening Torque:

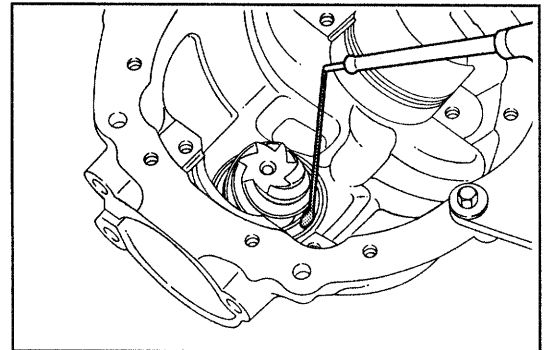
16.0 - 20.0 kg-m

(116.0 - 145.0 ft-lb, 157.0 - 196.0 N·m)



WRU90-DF072

15. Apply the gear oil to the front bearing tapered roller sections.



WRU90-DF073

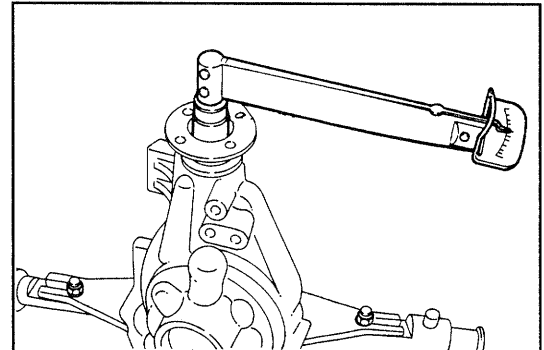
16. Rotated the companion flange for several times in clock and counter clockwise.
17. Measure the preload of the drive pinion, using a torque gauge.

Specified Value:

New Bearing: 4 - 25 kg-cm (3.47 - 21.70 inch-lb)

Bearing Reused: 4 - 13 kg-cm

(3.47 - 11.28 inch-lb)

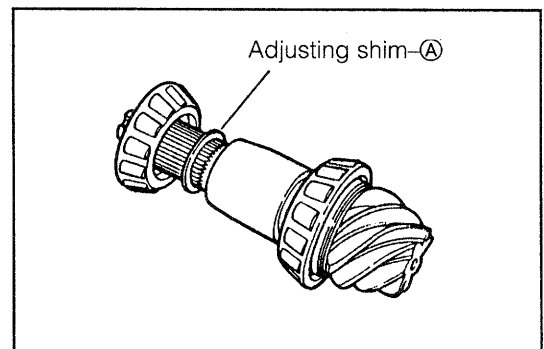


WRU90-DF074

18. When the preload is greater than the specified value, increase the adjusting shim thickness. Conversely, when the preload is less than the specified value, decrease the adjusting shim thickness.

NOTE:

- Refer the table for availability of adjusting shim ① on the item of 19.



WRU90-DF075

19. Availability of adjusting shim for section ①

Units: mm (inch)

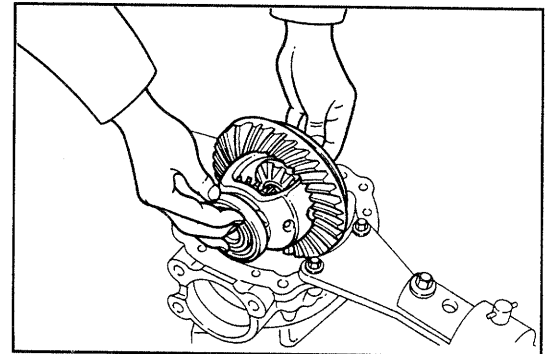
1.600 (0.0630)	1.850 (0.0728)	2.100 (0.0827)
1.625 (0.0640)	1.875 (0.0738)	2.125 (0.0837)
1.650 (0.0650)	1.900 (0.0748)	2.150 (0.0846)
1.675 (0.0659)	1.925 (0.0758)	2.175 (0.0856)
1.700 (0.0669)	1.950 (0.0768)	2.200 (0.0866)
1.725 (0.0679)	1.975 (0.0778)	2.225 (0.0876)
1.750 (0.0689)	2.000 (0.0787)	2.250 (0.0886)
1.775 (0.0699)	2.025 (0.0797)	2.275 (0.0896)
1.800 (0.0709)	2.050 (0.0807)	2.300 (0.0906)
1.825 (0.0719)	2.075 (0.0817)	2.325 (0.0915)

WRU90-DF076

20. Install the differential case on the differential carrier.

NOTE:

- Make sure that the outer races of the side bearings are assembled correctly in the respective original positions.

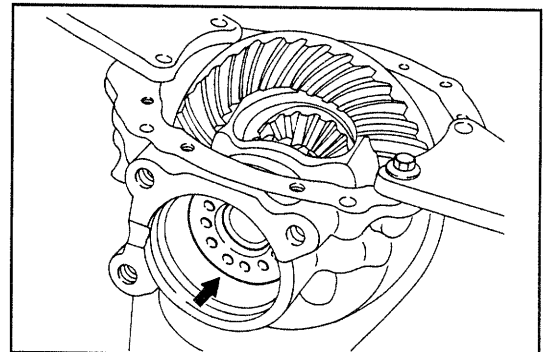


WRU90-DF077

21. Install the adjusting nut in such a way that it is aligned with the threaded portion of the differential carrier.

NOTE:

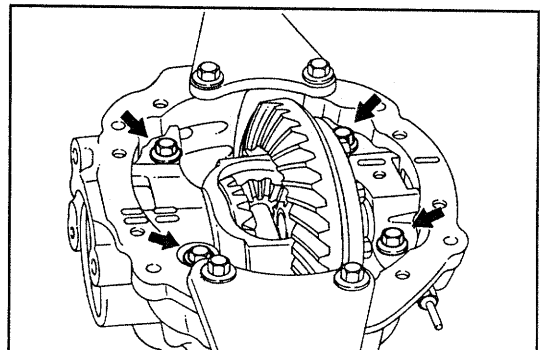
- Apply gear oil to the bearing and adjusting nut.



WRU90-DF078

22. Temporarily tighten the bearing cap to the following specified torque.

Tightening Torque: 2.0 kg-m (14.5 ft-lb, 19.6 N-m)

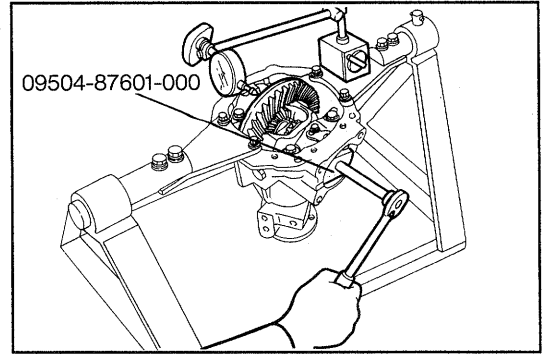


WRU90-DF079

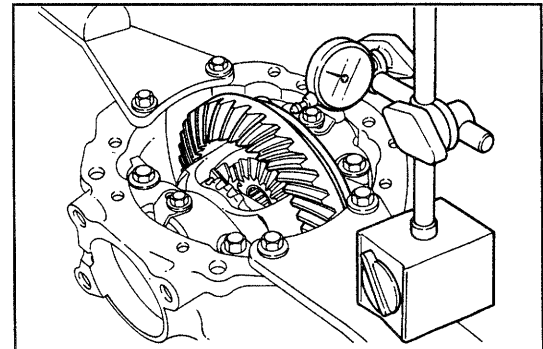
FRONT/REAR DIFFERENTIAL

23. Lightly tighten the right and left adjusting nuts, using the SST, until the backlash between the drive pinion and the ring gear becomes about 0.2 mm (0.0079 inch).

SST: 09504-87601-000



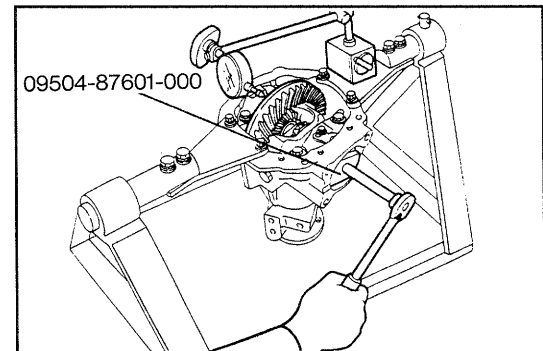
24. Ring gear preload adjusting procedure
(1) Install a dial gauge normally to the back surface of the ring gear.



- (2) Using the SST, tighten the adjusting nut at the tooth surface side of the ring gear, until the dial gauge registers no fluctuation in the reading.

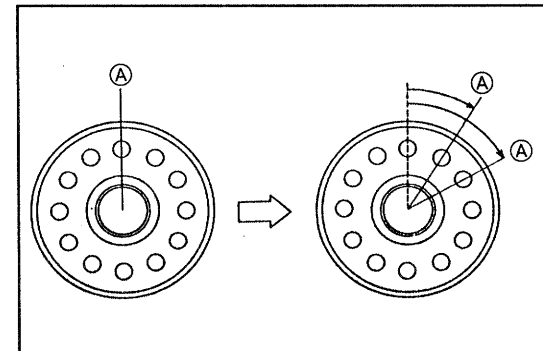
NOTE:

- The side bearing preload becomes zero when the dial gauge no longer registers fluctuation.



- (3) Tighten further the adjusting nut at the ring gear tooth surface side to the specified preload.

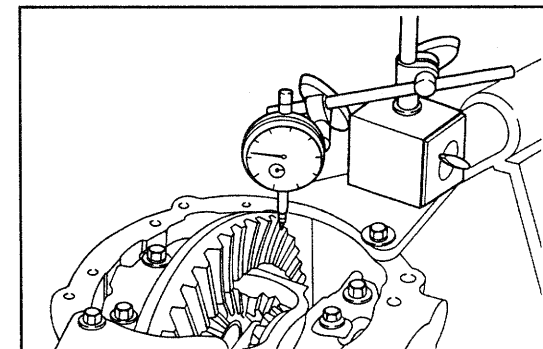
Specified Side Bearing Preload: 1 - 2 notches



25. Adjusting procedure for backlash between ring gear and drive pinion

- (1) Install a dial gauge at right angles with the ring gear tooth surface. Measure the backlash.

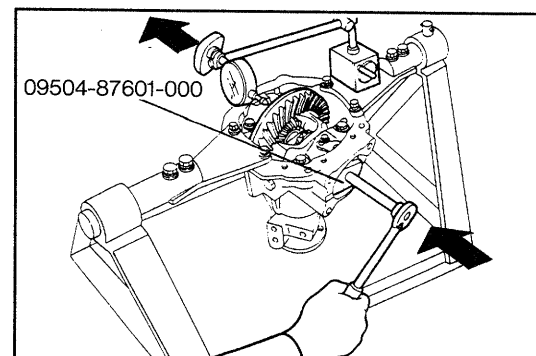
Specified Value: 0.07 - 0.17 mm
(0.0028 - 0.0067 inch)



- (2) If the backlash does not conform to the specification, adjust the backlash by moving the bearing by means of the right and left adjusting nuts, using the following SST.
SST: 09504-87601-000

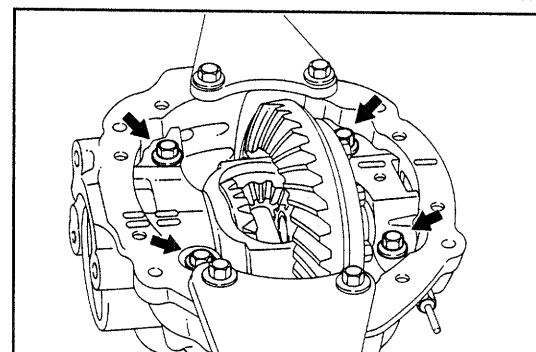
NOTE:

- The right and left bearings should be moved in the same direction and by the same amount. For example, if the left bearing is loosen one notch, the right bearing should be tightened one notch.



WRU90-DF085

26. Tighten the bearing cap to the specified torque.
Tightening Torque: 3.0 - 5.0 kg-m
(21.7 - 36.2 ft-lb, 29.4 - 49.0 N·m)

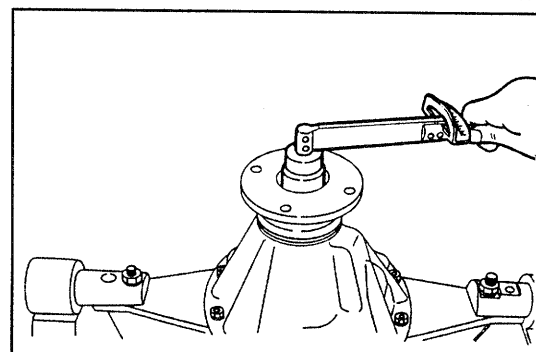


WRU90-DF086

27. Total preload:
With the drive pinion brought in contact with the ring gear, measure the total preload, using a torque gauge.
New Bearing: 6 - 31 kg-cm (5.21 - 26.91 inch-lb)
Bearing Reused: 6 - 19 kg-cm (5.21 - 16.50 inch-lb)

NOTE:

- If the total preload does not conform to the specification, adjust the total preload by means of the adjusting nut at the ring gear tooth surface side.

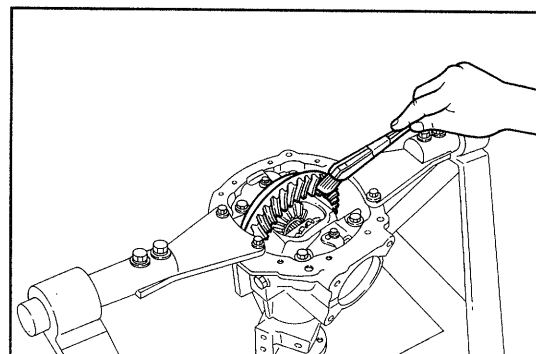


WRU90-DF087

28. Checking procedure for tooth contact between ring gear and drive pinion
(1) Apply a thin film of blue lead or the like evenly to both sides of five or six teeth of the ring gear.
(2) Turn the ring gear several times by applying a load to the drive pinion by one hand.

NOTE:

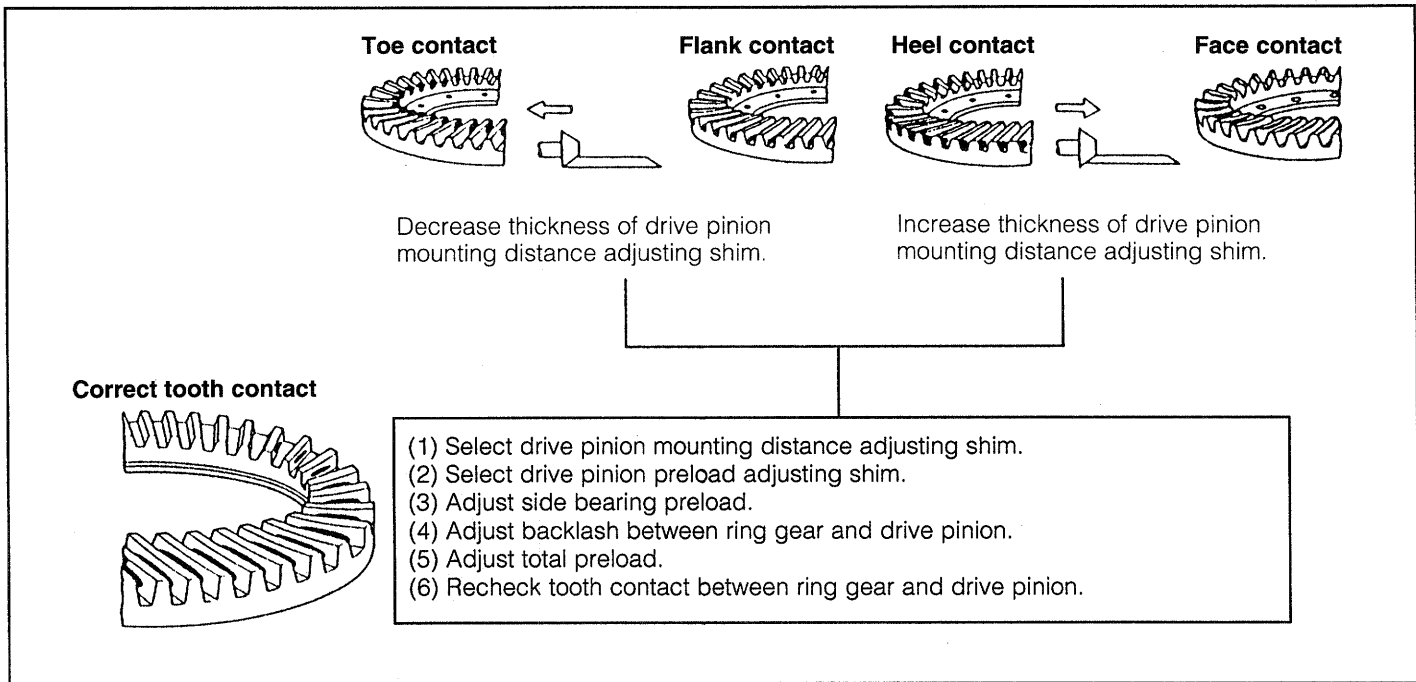
- Perform the tooth contact check at four points of the ring gear.



WRU90-DF088

FRONT/REAR DIFFERENTIAL

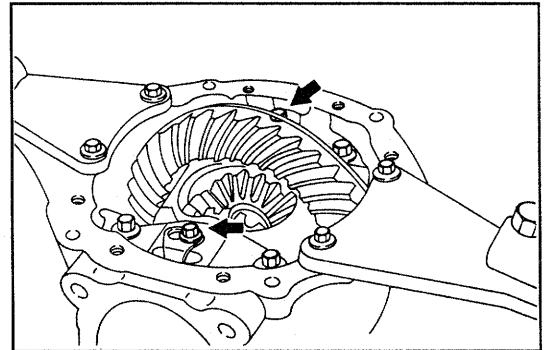
(3) Ensure that the correct tooth contact has been attained, as shown in the figure below.



WRU90-DF089

29. Install the adjusting nut lock to the bearing cap and tighten the bolts.

Tightening Torque: 0.4 - 1.0 kg-m
(2.9 - 7.2 ft-lb, 3.9 - 9.8 N·m)



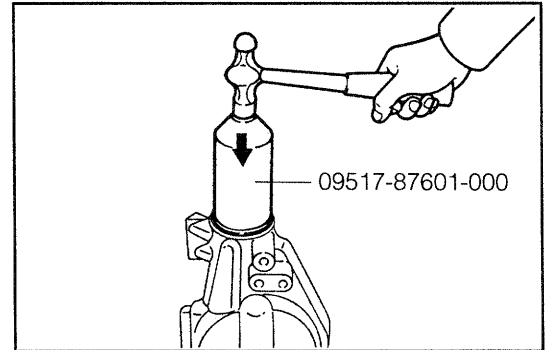
WRU90-DF090

30. Remove the companion flange by removing the nut for 09530-87603-000
31. Drive a new oil seal up to the edge surface of the differential carrier, using the following SST.

SST: 09517-87601-000

NOTE:

- Apply gear oil to the oil seal lip section.



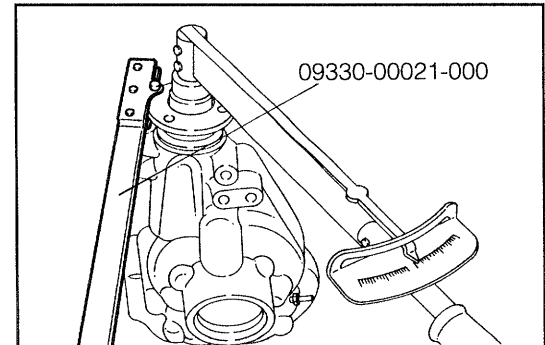
WRU90-DF091

32. Install the companion flange, plate washer and new lock nut and tighten the companion flange by means of a new lock nut, using the following SST.

SST: 09330-00021-000

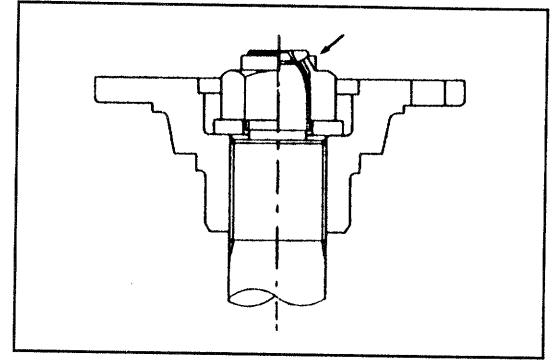
Tightening Torque:

16.0 - 20.0 kg-m
(116.0 - 145.0 ft-lb, 157.0 - 196.0 N·m)



WRU90-DF092

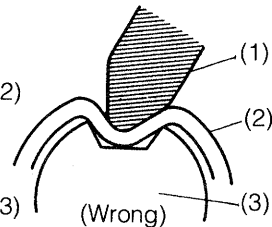
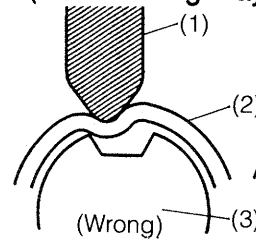
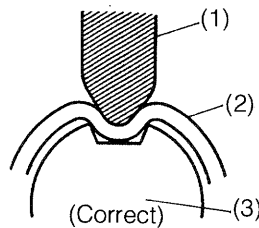
33. Stake the lock section of nut securely, using a chisel or the like.



NOTE:

- When staking the lock nut, point a suitable staking tool toward the drive pinion axis center and stake the lock nut securely, as shown in the figure below. (Poor staking may cause abnormal noise.)

- (1) Suitable staking tool
(2) New nut
(3) Drive pinion

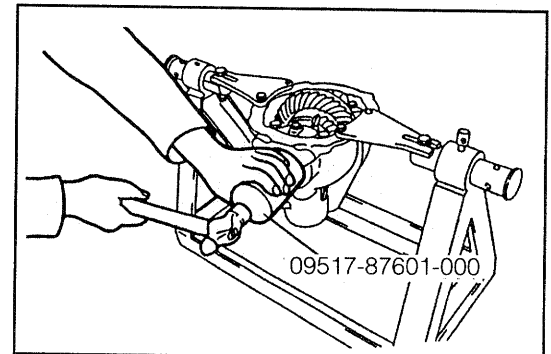


WRU90-DF093

34. Drive a new oil seal into the drive shaft side up to the edge surface, using the following SST.

NOTE:

- Apply gear oil to the oil seal lip section.
SST: 09517-87601-000

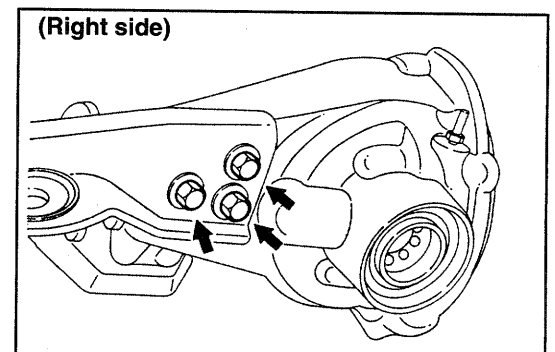
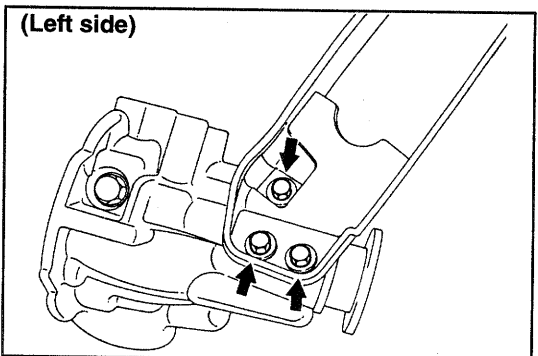


WRU90-DF094

35. Remove the differential assembly from the overhaul stand.
36. Tighten the three differential carrier support brackets by means of the bolts.

Tightening Torque:

10.0 - 12.0 kg-m
(72.0 - 87.0 ft-lb, 98.0 - 118.0 N·m)



37. With a new gasket interposed, tighten the front axle housing cover subassembly by means of the bolts.

Tightening Torque: 1.8 - 2.4 kg-m
(13.0 - 17.4 ft-lb, 17.7 - 23.5 N·m)

NOTE:

- Be sure to tighten the bolts alternately and diagonally. (The illustration at the right indicates a typical example of the tightening sequence.)

INSTALLATION

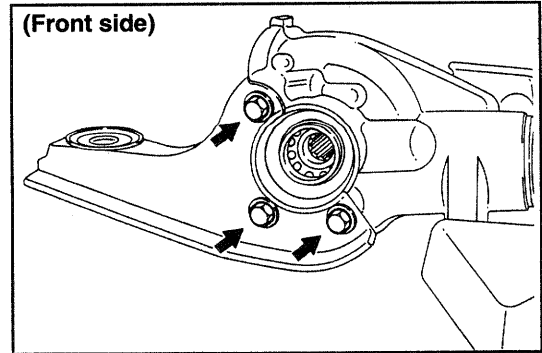
1. Install the differential assembly, while supporting with a transmission jack or the like.

WARNING:

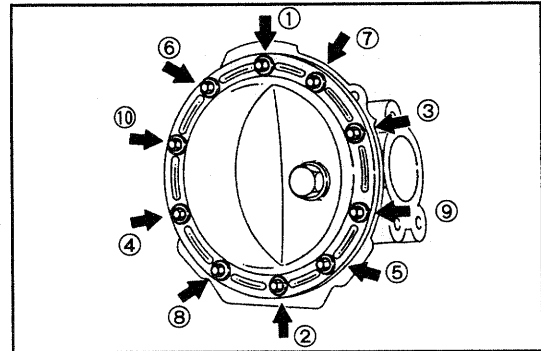
Be sure to slowly lower the differential, while holding it by your hands, for the differential is in an unstable state.

2. Temporarily tighten the three bolts of the differential mounting brackets to the chassis frame.
3. Proceed to tighten the bolts.

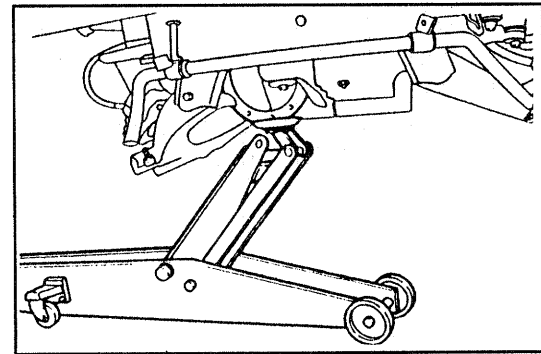
Tightening Torque:
4.0 - 5.5 kg-m (28.9 - 39.8 ft-lb, 39.2 - 53.9 N·m)



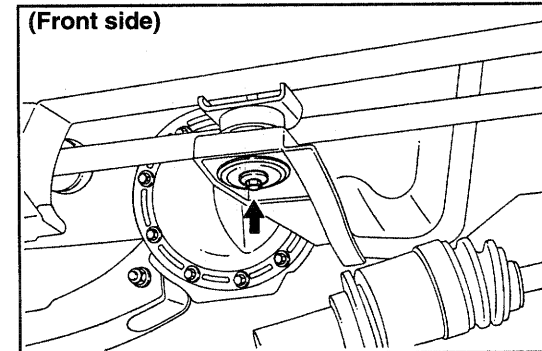
WRU90-DF095



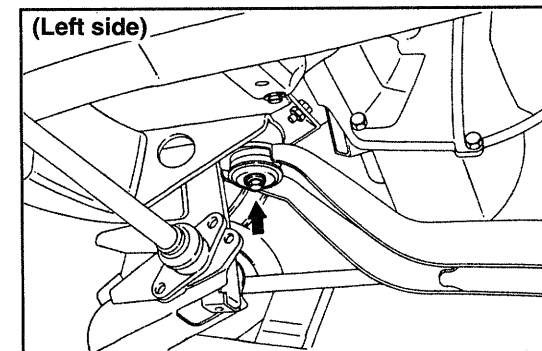
WRU90-DF096



WRU90-DF097



WRU90-DF098



WRU90-DF099

Tightening Torque: 4.0 - 5.0 kg-m
(28.9 - 39.2 ft-lb, 39.2 - 49.0 N·m)

4. Remove the jack from the vehicle.

5. Install the propeller shaft.

CAUTION:

- While installing the propeller shaft, align the mating marks put during the removal with each other. If this operation should fail to be performed correctly, the propeller shaft may emit abnormal noise or vibration during the running.

Tightening Torque: 6.0 - 8.0 kg-m
(43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

6. After the propeller shaft has been installed, apply black paint to the exposed machined surface (slant line section in the right figure) of the differential companion flange.

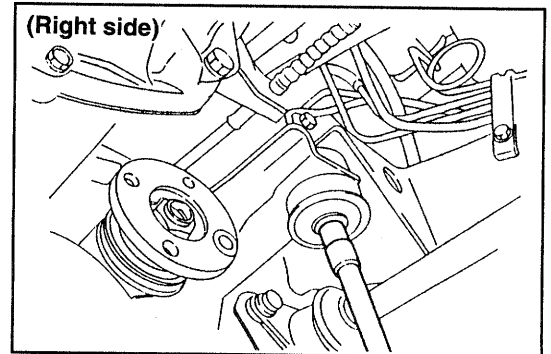
7. Connect the breather hose with the clamp.

8. Install the front drive shaft (Refer front axle and suspension).
9. Tighten the front wheel by means of a hub nuts.

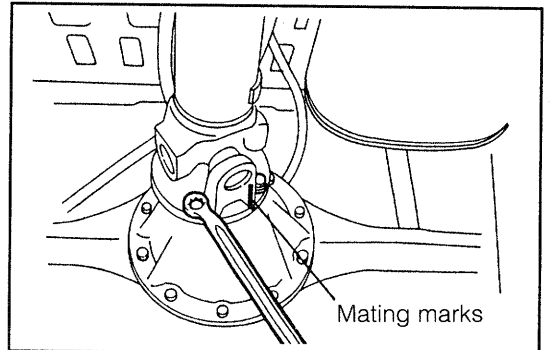
Tightening Torque:
9.0 - 12.0 kg-m (65.1 - 87.0 ft-lb, 88.3 - 118.0 N·m)

NOTE:

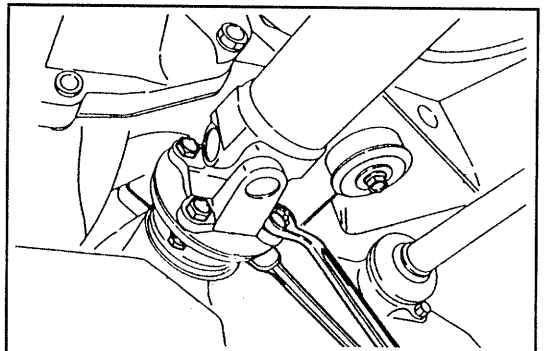
- Be sure to tighten the hub nut alternately and diagonally.



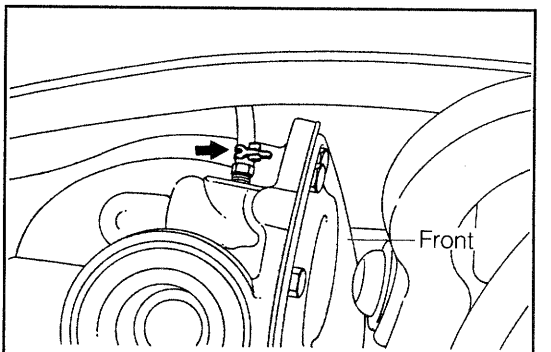
WRU90-DF100



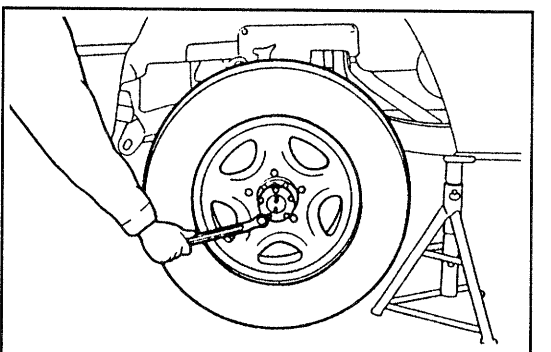
WRU90-DF101



WRU90-DF102



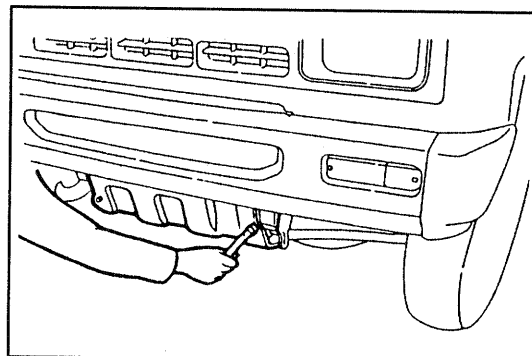
WRU90-DF103



WRU90-DF104

FRONT/REAR DIFFERENTIAL

10. Jack down the vehicle.
11. Install the front stabilizer (Refer front axle and suspension section).
12. Fill the differential oil.
 Oil to be Used: API GL-5, SAE 90 or 80W-90
 Oil Capacity: 0.9 liter (0.95 US qts)
13. Install the engine undercover with the four bolts.



WRU90-DF105

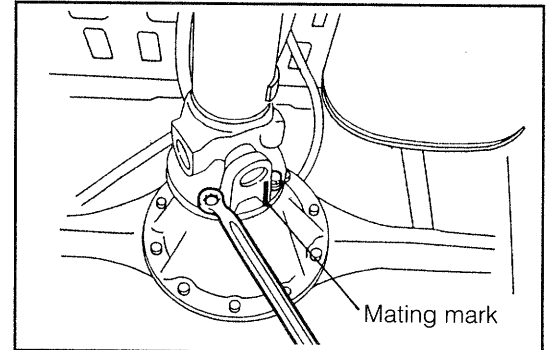
IN-VEHICLE REPLACEMENT PROCEDURES FOR OIL SEAL (REAR)

REMOVAL

1. Remove the drive shaft.

CAUTION:

- Prior to the removal, be sure to put a mating mark. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.

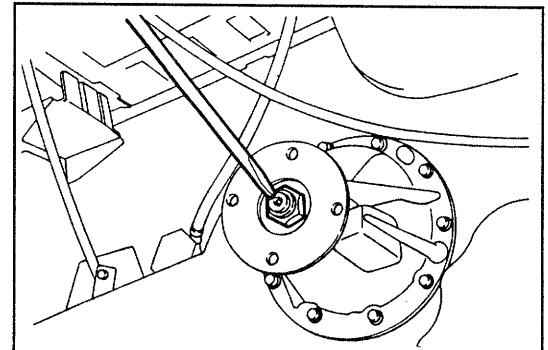


WRU90-DF107

2. Release staking of the lock nut of the drive pinion.

NOTE:

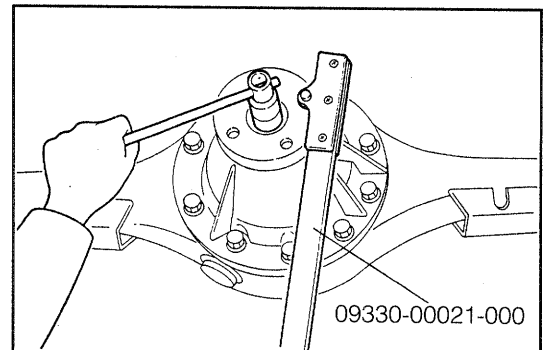
- Insufficient releasing of the staking of the lock nut may cause the threaded portion of the drive pinion to be damaged.



WRU90-DF108

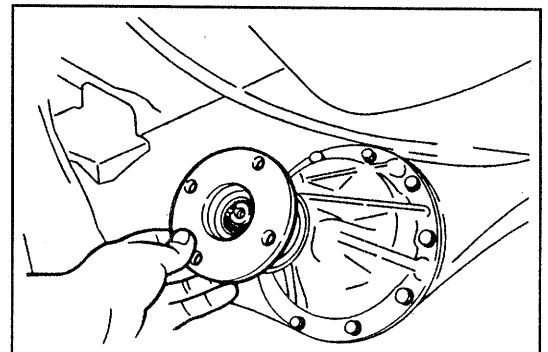
3. Remove the lock nut and plate washer, using the following SST.

SST: 09330-00021-000



WRU90-DF109

4. Remove the companion flange.



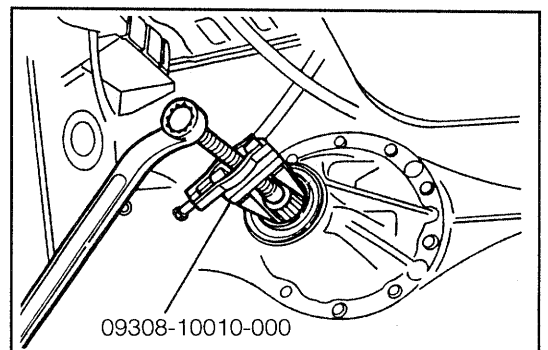
WRU90-DF110

5. Remove the oil seal, using the following SST.

SST: 09308-10010-000

NOTE:

- Never reuse the removed oil seal.



WRU90-DF111

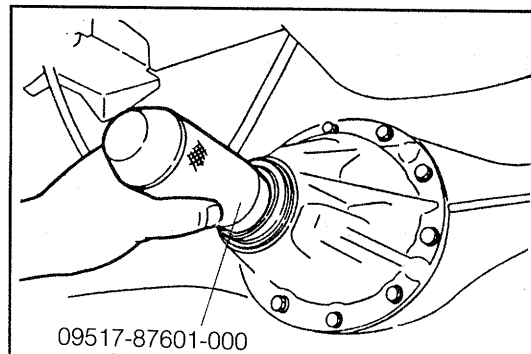
FRONT/REAR DIFFERENTIAL

INSTALLATION

1. Drive a new oil seal into position, using the following SST.
SST: 09517-87601-000

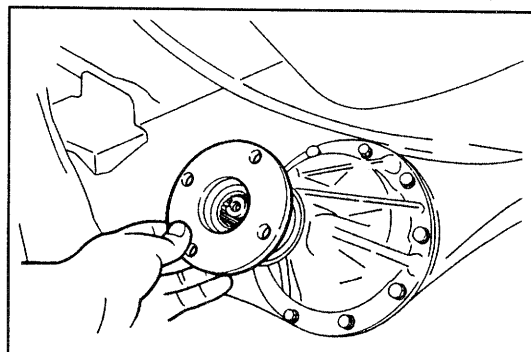
NOTE:

- Apply the gear oil to the oil seal lip section, prior to install.



WRU90-DF112

2. Install the companion flange.



WRU90-DF113

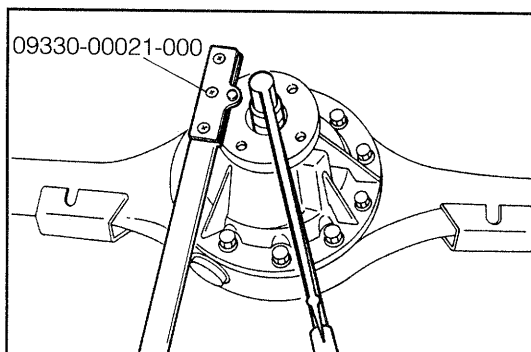
3. Install the plate washer and new lock nut, using the following SST.

SST: 09330-00021-000

Tightening Torque:

19.0 - 23.0 kg-m

(137.0 - 166.0 ft-lb, 186.0 - 226.0 N-m)

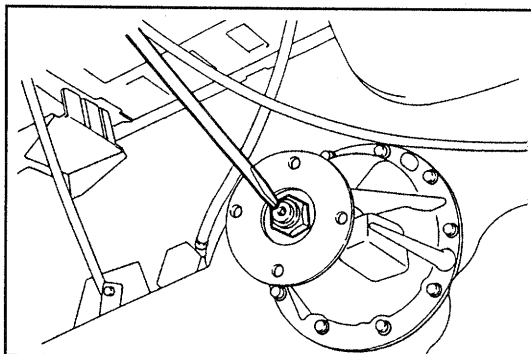


WRU90-DF114

4. Stake the lock nut of the drive pinion.

NOTE:

- Never reuse the removed lock nut.



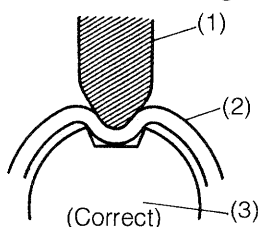
NOTE:

- When staking the lock nut, point a suitable staking tool toward the drive pinion axis center and stake the lock nut securely, as shown in the figure below. (Poor staking may cause abnormal noise.)

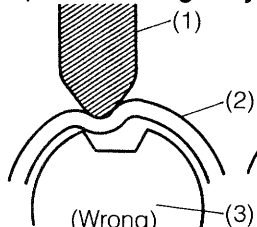
(1) Suitable staking tool

(2) New nut

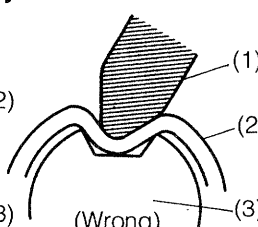
(3) Drive pinion



(Correct)



(Wrong)



(Wrong)

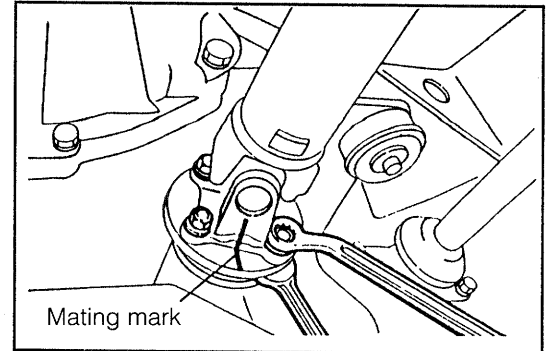
WRU90-DF115

5. Install the propeller shaft.

CAUTION:

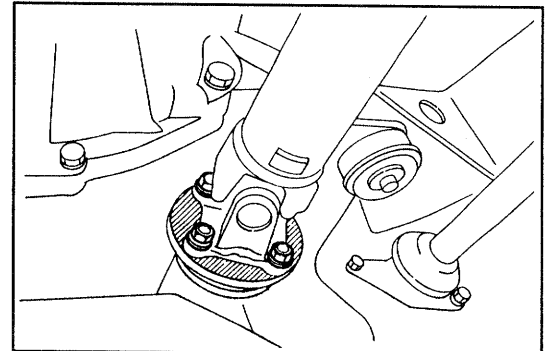
- While installing the propeller shaft, align the mating marks put during the removal with each other. If this operation should fail to be performed correctly, the propeller shaft may emit abnormal noise or vibration during the running.

Tightening Torque: 6.0 - 8.0 kg-m
(43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)



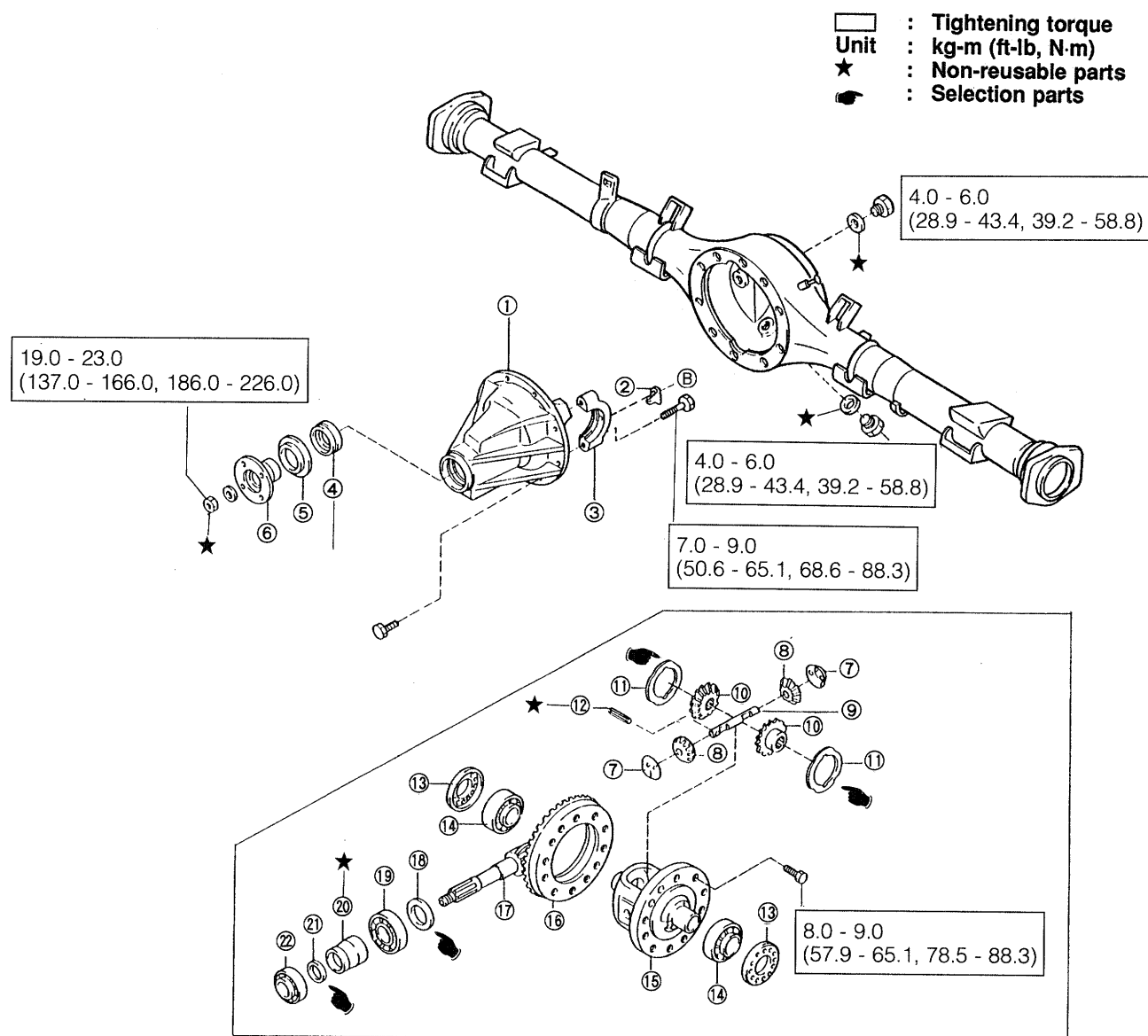
WRU90-DF116

6. After the propeller shaft has been installed, apply black paint to the exposed machined surface (slant line section in the right figure) of the differential companion flange.



WRU90-DF117

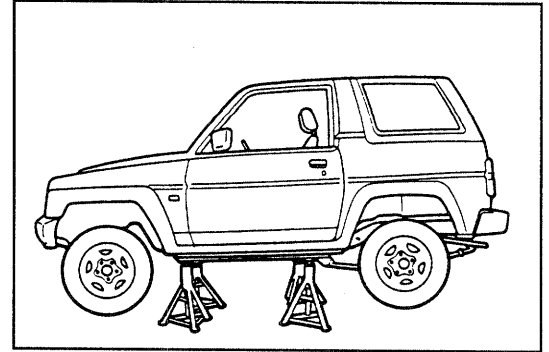
REAR DIFFERENTIAL COMPONENTS



- | | |
|--|---|
| ① Differential carrier assy | ⑫ Slotted pin |
| ② Differential bearing adjusting nut | ⑬ Differential bearing adjusting nut |
| ③ Bearing cap | ⑭ Bearing |
| ④ Oil seal | ⑮ Differential case S/A |
| ⑤ Dust deflector | ⑯ Differential ring gear |
| ⑥ Drive pinion companion flange S/A | ⑰ Differential pinion gear |
| ⑦ Washer | ⑱ Shim No. 3 |
| ⑧ Differential pinion | ⑲ Differential drive pinion bearing (For rear) |
| ⑨ Differential pinion shaftdrive pinion bearing spacer | ⑳ Differential drive pinion bearing spacer |
| ⑩ Differential side gearShim | ㉑ Shim No. 4 |
| ⑪ Differential side gear thrust washer No. 1 | ㉒ Differential drive pinion bearing (For front) |

REMOVAL

1. Jack up the vehicle and support it with safety stands (As for the jacking-up points and support points for safety stands, refer GI-section).



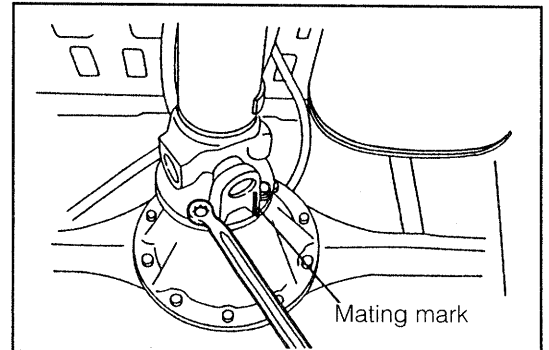
WRU90-DF119

2. Remove the propeller shaft.

CAUTION:

- Prior to the removal, be sure to put a mating mark. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.

3. Rock the rear wheel by pulling up the parking brake lever.
4. Drain the oil from the differential.



WRU90-DF120

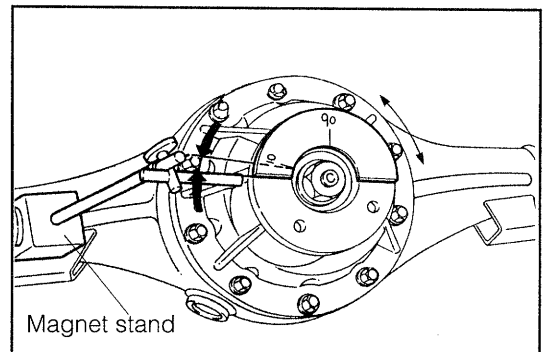
5. Remove the speed sensor only for rear A.B.S equipped vehicle (Refer BR-section).
6. Measurement of total backlash of rear axle assembly
 - (1) Install a protractor and a magnet stand equipped with a pointer on the differential companion flange surface.
 - (2) Move the differential companion flange to the right or to the left by the backlash.

Specified Value: Less than 5.5°

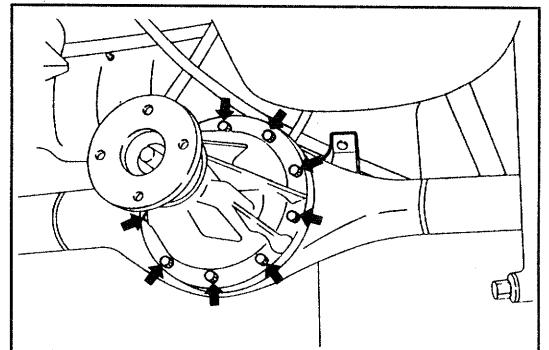
NOTE:

- If the total backlash exceeds the specified value, adjust the ring gear-to-drive pinion backlash and side gear-to-pinion gear backlash to the minimum value, respectively.

7. Remove the differential carrier assembly by removing the ten bolts.



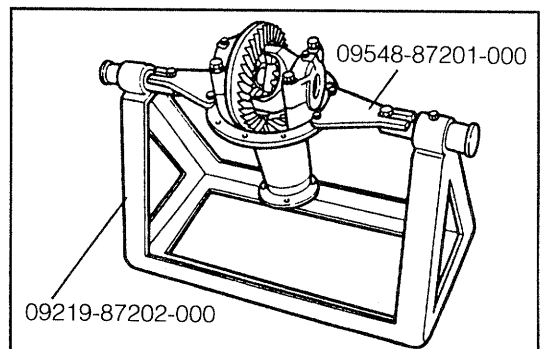
WRU90-DF121



WRU90-DF122

8. Install the differential assembly removed from the vehicle on the following SSTs.

SSTs: 09219-87202-000
09548-87201-000



WRU90-DF123

FRONT/REAR DIFFERENTIAL

PRE-INSPECTION

NOTE:

- Prior to the disassembling of the differential, be sure to check the following items and record the values. (These values are used as reference which assures the correct assembling.)

1. Ring gear runout check

Measure the runout on the several points at the back surface of the ring gear, using a dial gauge.

Allowable Limit: 0.1 mm (0.004 inch)

If the runout exceeds the allowable limit, replace the final gear as a set.

2. Ring gear backlash check

Secure the drive pinion in such a way that a dial gauge may make contact with the forward end of the tooth surface of the ring gear at right angles. Measure the backlash by moving the ring gear.

Specified Value: 0.07 - 0.17 mm
(0.0028 - 0.067 inch)

3. Side gear backlash check (Except for L.S.D.)

Measure the backlash with the pinion gear pushed against the differential case side.

Specified Value: 0.03 - 0.15 mm
(0.0012 - 0.0059 inch)

4. Total preload measurement

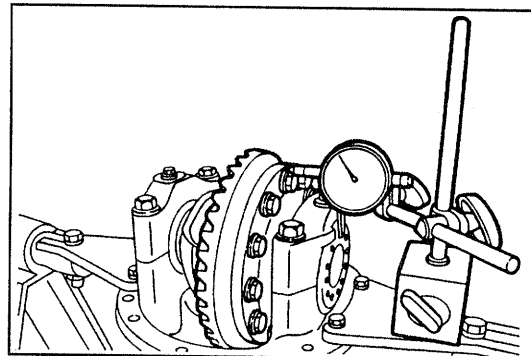
Measure the starting torque with the drive pinion brought into contact with the tooth surface of the ring gear, using a torque gauge.

Specified Value: 6 - 33 kg-cm (5.3 - 28.6 inch-lb)

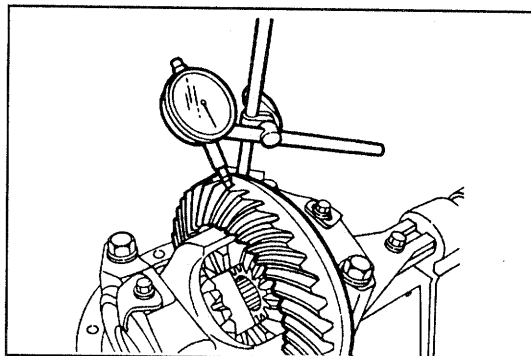
- #### 5. Check of tooth contact between ring gear and drive pinion
- Apply a thin film of blue lead or the like evenly to both sides of five or six teeth of the ring gear.

NOTE:

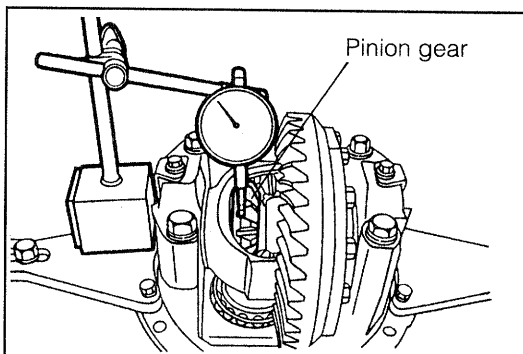
- Perform the tooth contact check at four points of the ring gear.
- Apply braking to the drive pinion and turn the ring gear several times. Check the tooth contact between the ring gear and the drive pinion.



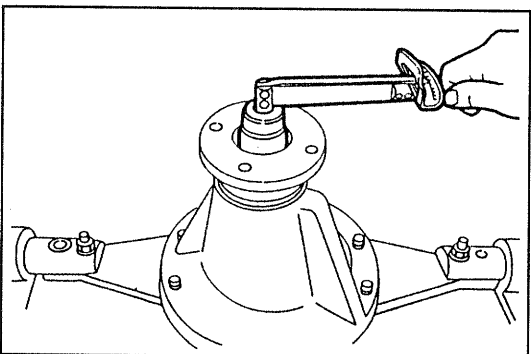
WRU90-DF124



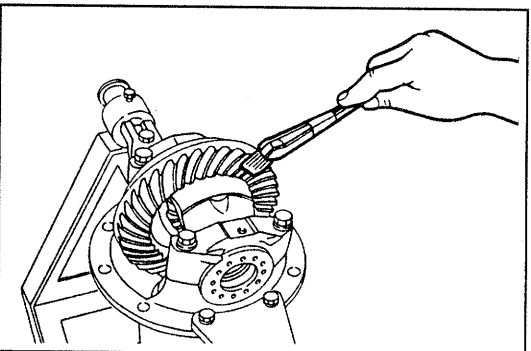
WRU90-DF125



WRU90-DF126



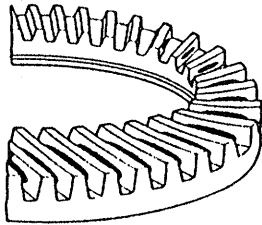
WRU90-DF127



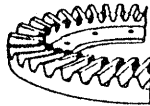
WRU90-DF128

— Ensure that correct tooth contact has been attained, as shown in the figure below.

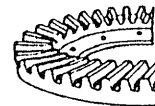
Correct tooth contact



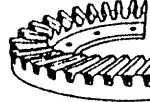
Toe contact



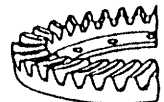
Flank contact



Heel contact



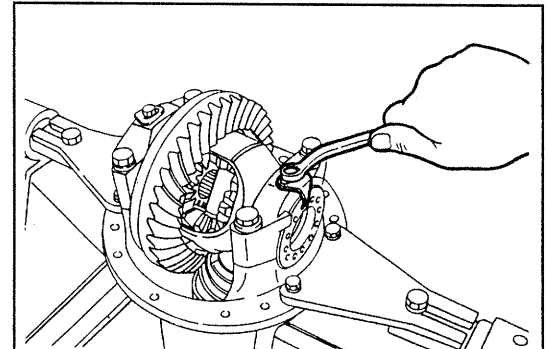
Face contact



WRU90-DF129

DISASSEMBLY

1. Remove the adjusting lock nut.

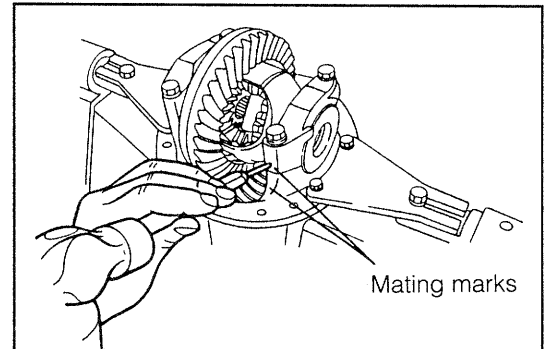


WRU90-DF130

2. Put mating marks on the bearing cap and differential carrier.

NOTE:

- Since the bearing cap has been manufactured integrally with the differential carrier, never disturb the combination of these components.

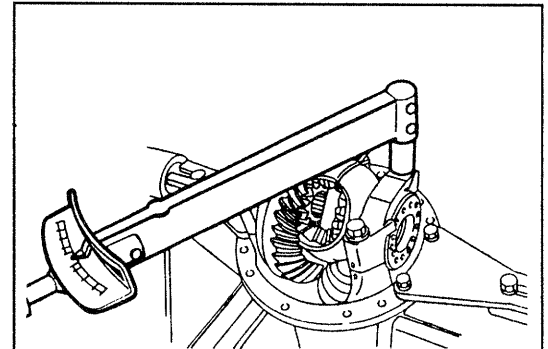


WRU90-DF131

3. Remove the bearing cap.

NOTE:

- Arrange the removed bearing caps in order, separating the right cap from the left cap.
- The drive pinion preload should be measured after the differential case has been removed.
- After completion of measurement, perform disassembly, following the removal procedures given below.

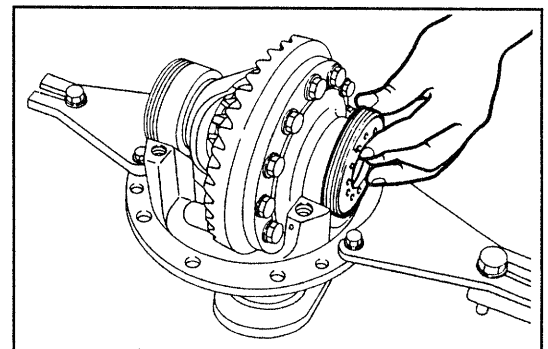


WRU90-DF132

4. Remove the adjusting nut.

NOTE:

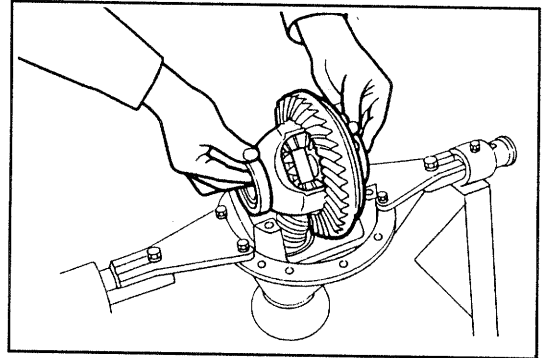
- Arrange the removed adjusting nut in order, separating the right nut from the left nut.



WRU90-DF133

FRONT/REAR DIFFERENTIAL

5. Remove the differential case from the carrier.

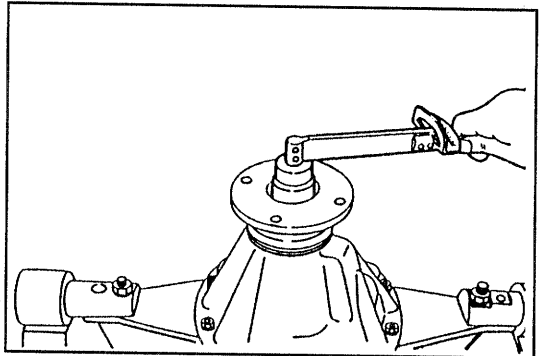


WRU90-DF134

6. Drive pinion preload measurement
Measure the starting torque using a torque gauge.
Specified Value: 5 - 30 kg-cm (4.3 - 26.0 inch-lb)

NOTE:

- This step should be performed after the differential case has been removed from the carrier.

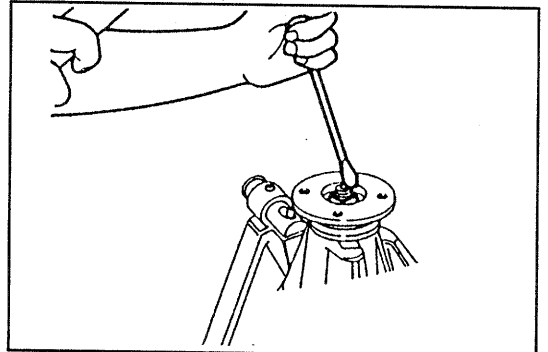


WRU90-DF135

7. Release the staking of the lock nut, using a chisel and a hammer.

NOTE:

- Never reuse the removed lock nut.

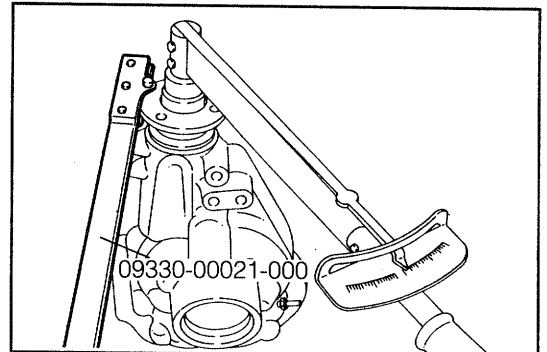


WRU90-DF136

8. Secure the companion flange, using the following SST.
Proceed to the remove the lock nut.
SST: 09330-00021-000

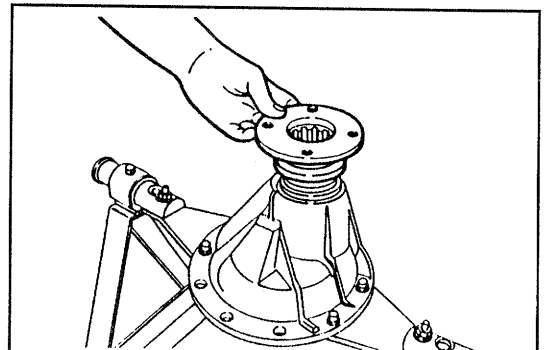
NOTE:

- Never reuse the removed lock nut.



WRU90-DF165

9. Remove the companion flange and plate washer



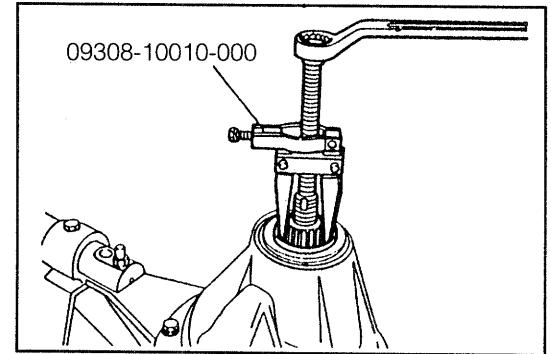
WRU90-DF137

10. Remove the oil seal of the drive pinion, using the following SST.

SST: 09308-10010-000

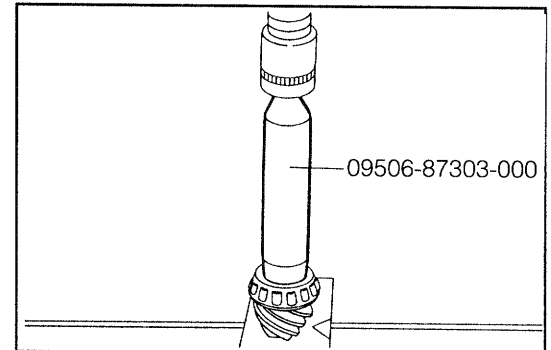
NOTE:

- Never reuse the removed oil seal



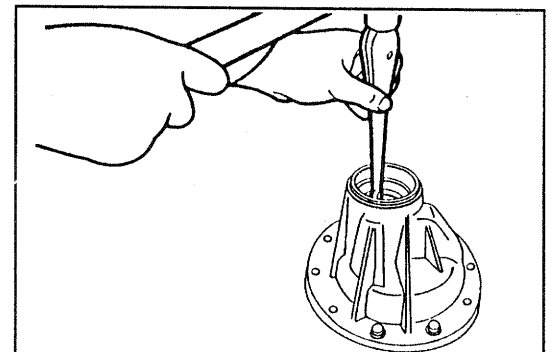
WRU90-DF138

11. Remove the drive pinion, using a press.



WRU90-DF139

12. Remove the front and rear bearing outer races, using a brass bar.

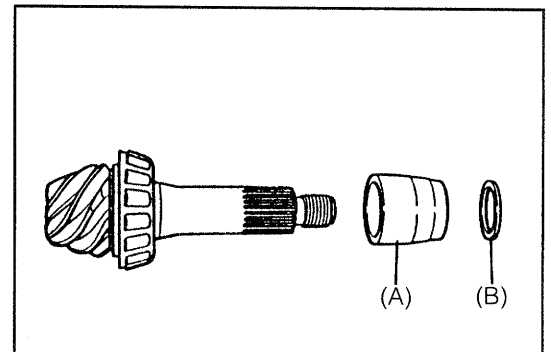


WRU90-DF140

13. Remove the following parts from the drive pinion.
(A) Spacer
(B) Shim for drive pinion preload

NOTE:

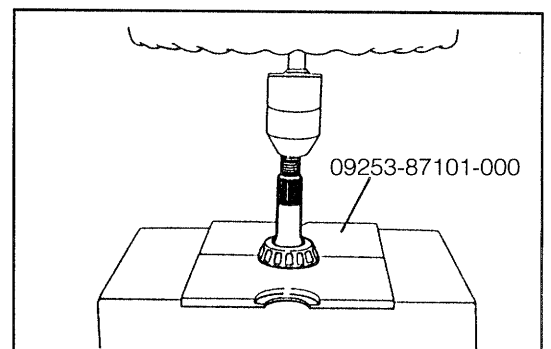
- Never reuse the spacer as it's crush type



WRU90-DF141

14. Remove the rear bearing and the drive pinion mounting distance adjusting shim from the drive pinion, using the following SST.

SST: 09253-87101-000



WRU90-DF142

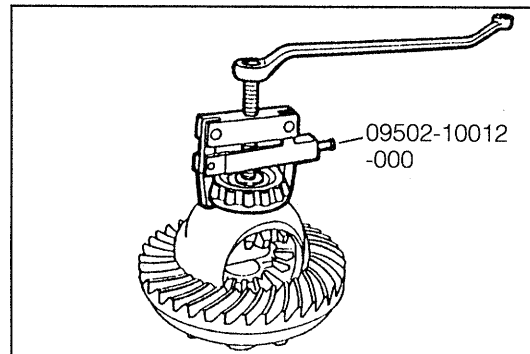
FRONT/REAR DIFFERENTIAL

15. Set the differential case in a vice.
16. Remove the side bearing from the differential case, using the following SST.

NOTE:

- Insert the pawl of the SST into the groove of the differential carrier.

SST: 09502-10012-000

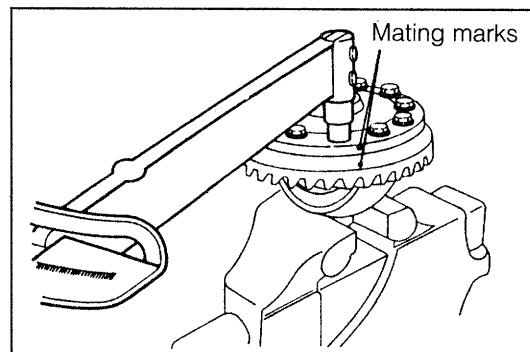


WRU90-DF143

17. Stamp mating marks on the differential case and ring gear. Proceed to remove the ring gear.

NOTE:

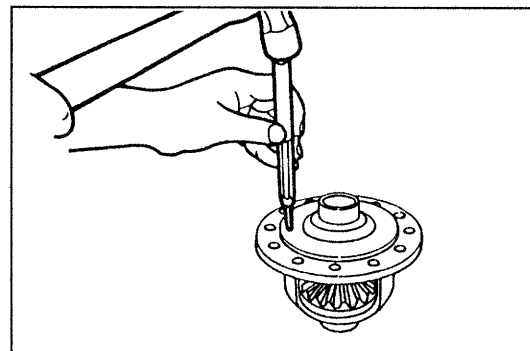
- For easier removal, lightly tap the ring gear at its back surface, using a plastic hammer.



WRU90-DF144

18. Pull out the slotted spring pins of the pinion gear. Remove the following parts from the differential case.

- (1) Differential side gear
- (2) Differential side gear thrust washer
- (3) Differential pinion shaft
- (4) Differential pinion
- (5) Differential pinion thrust washer

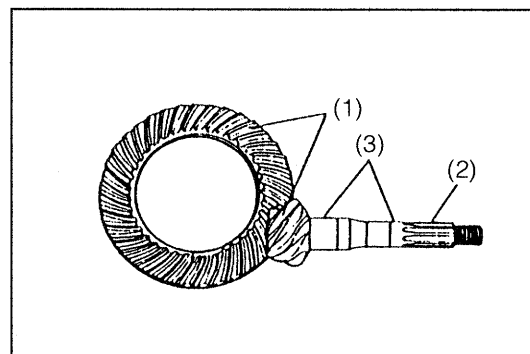


WRU90-DF145

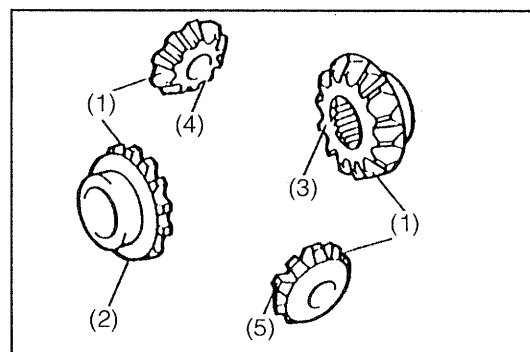
INSPECTION

Inspect each section of the following parts for any sign of damage, wear or excessive looseness. Replace any parts which exhibit defects.

1. Drive pinion & ring gear
 - (1) Gear teeth
 - (2) Spline portion of drive pinion
 - (3) Bearing fitting section
2. Side gear & pinion
 - (1) Gear teeth
 - (2) Side gear boss section
 - (3) Side gear serrated section
 - (4) Pinion shaft fitting hole
 - (5) Differential case contact section

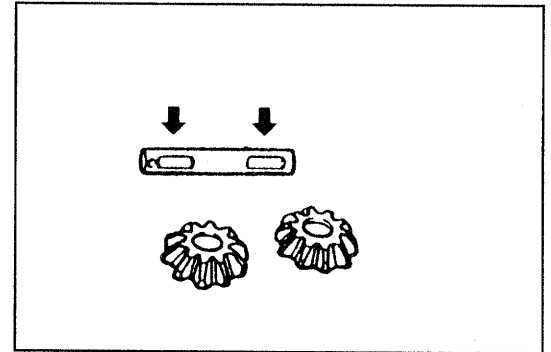


WRU92-DF249



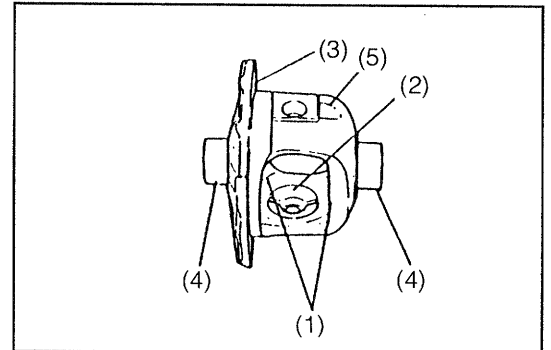
WRU92-DF250

3. Visually inspect the rotational sliding section between the differential pinion and the differential pinion shaft for damage and wear



WRU90-DF148

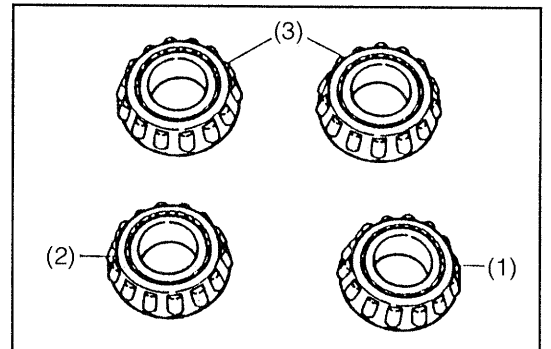
4. Differential case
 - (1) Side gear boss contact sections
 - (2) Pinion contact section
 - (3) Ring gear attaching section
 - (4) Side bearing press-fitting section
 - (5) The differential case proper



WRU92-DF251

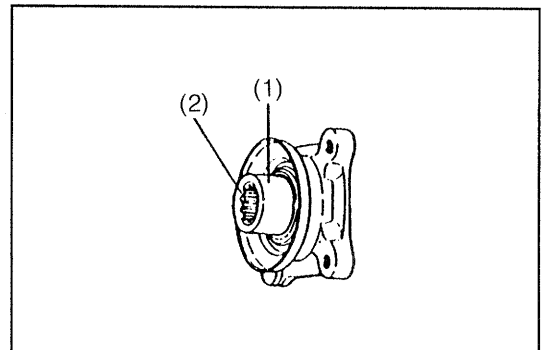
5. Bearings
 - (1) Front bearing
 - (2) Rear bearing
 - (3) Side bearings

Turn the bearings lightly. Ensure that they rotate smoothly without any binding or abnormal noise.



WRU92-DF252

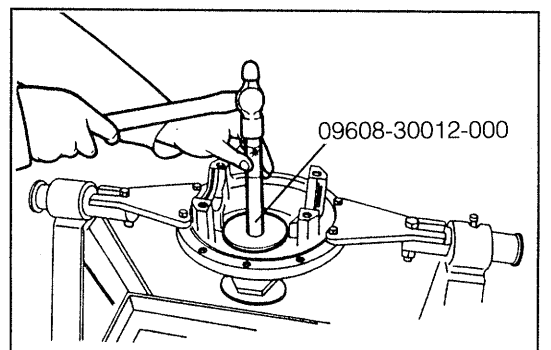
6. Companion flange
 - (1) Oil seal contact section
 - (2) Spline section



WRU92-DF253

ASSEMBLY

1. Drive the front and rear outer races into the differential carriers.
SST: 09608-30012-000



WRU90-DF152

FRONT/REAR DIFFERENTIAL

2. Selecting procedures for drive pinion mounting distance adjusting shims

(1) Assemble the SST and following parts on the front differential. Tighten the bolt to the tightening torque shown in the figure above.

SST: 09530-87602-000

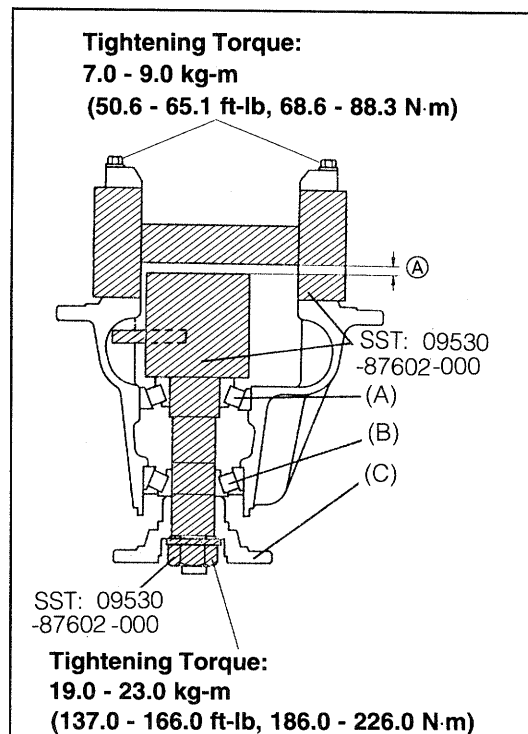
(A)...Rear bearing

(B)...Front bearing

(C)...Companion flange

NOTE:

- Do not install the oil seal at this stage.

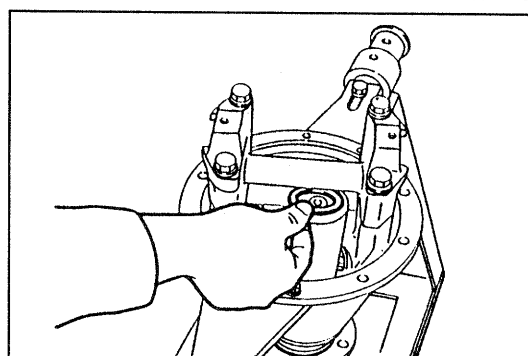


WRU90-DF153

- (2) Measure the dimension A shown in the figure above. Select a suitable shim from the table below.

Adjusting Shim Availability Unit: mm (inch)

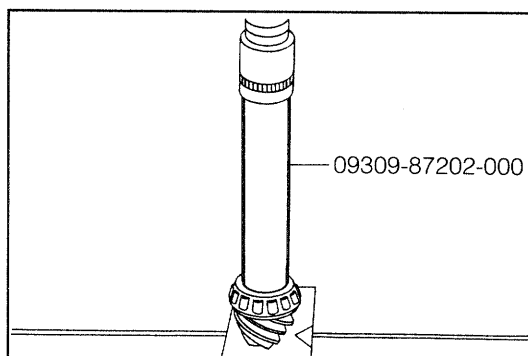
2.10 (0.083)
2.15 (0.085)
2.20 (0.087)
2.25 (0.089)
2.30 (0.091)
2.35 (0.093)
0.30 (0.012)



WRU90-DF154

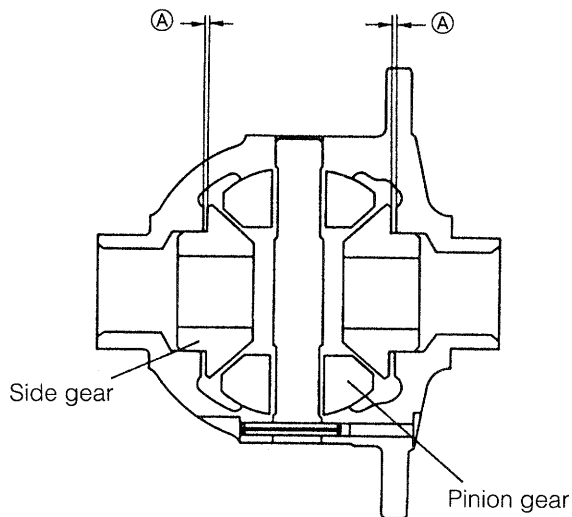
3. Place the drive pinion mounting distance adjusting shim that was selected in the previous step in the drive pinion. Press the rear bearing, using the following SST.

SST: 09309-87202-000



WRU90-DF155

4. Selecting procedures for side gear backlash thrust washer

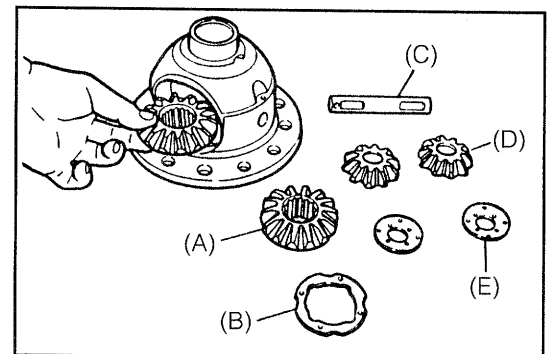


Availability of Adjusting Thrust Washer for Section (A)

Units: mm (inch)

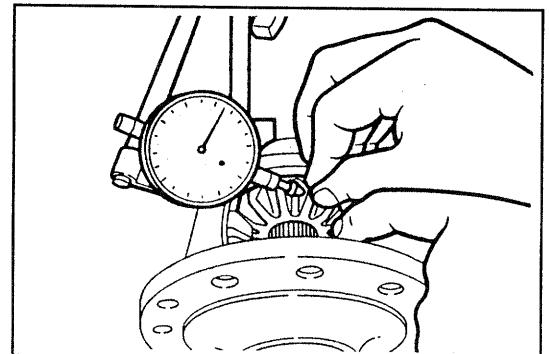
1.00 (0.0394)
1.05 (0.0413)
1.10 (0.0433)
1.15 (0.0453)
1.20 (0.0472)

- (1) Prior to assembling, apply the gear oil to the following rotating sections.
 - Outer periphery (side and pinion gear)
 - Inner periphery of side and pinion gear in differential case
- (2) Assemble the following parts in the differential case.
 - (A) Differential side gear
 - (B) Differential side gear thrust washer
 - (C) Differential pinion shaft
 - (D) Differential pinion
 - (E) Differential pinion thrust washer



- (3) Measure the backlash with the pinion gear pushed against the differential case side. Select the thrust washer in such a way that the backlash between the differential pinion and the differential side gear may conform to the specified value given below. Here, the backlash is the mean value of measurements over four teeth. Place the selected thrust washer.

Specified Value: 0.03 - 0.15 mm
(0.0012 - 0.059 inch)



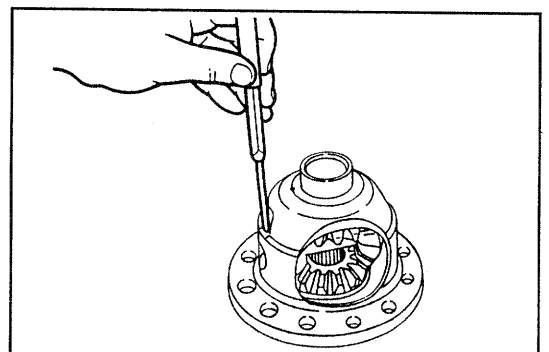
NOTE:

- The same size of the thrust washer should be installed at both the right and left sides.

- (4) Drive the slotted spring pin into position after completion of the backlash measurement.

NOTE:

- Stake the differential case so as to secure the slotted spring pin.



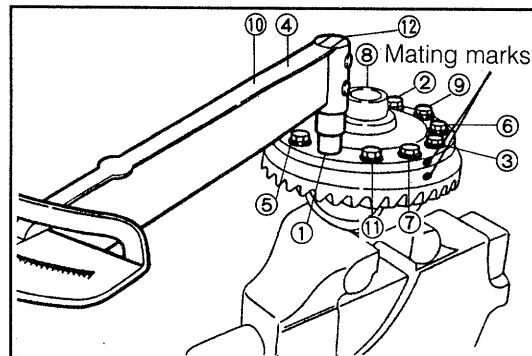
FRONT/REAR DIFFERENTIAL

5. Apply the gear oil to the threaded portions of the tightening bolts and ring gear.
6. Align the matching marks put during the disassembly with each other.
7. Install the ring gear in the differential case and tighten the bolts.

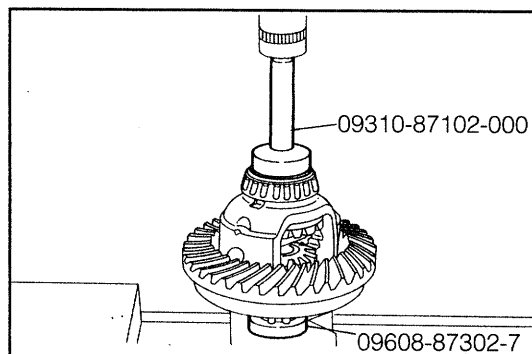
Tightening Torque: 8.0 - 9.0 kg-m
(57.9 - 65.1 ft-lb, 78.5 - 88.3 N-m)

NOTE:

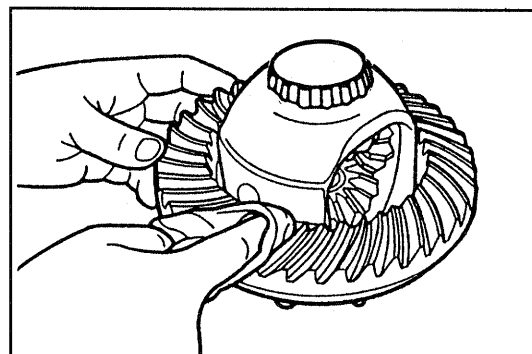
- Be sure to tighten the bolts alternately and diagonally.
 - The illustration at the right indicates a typical example of the tightening sequence.
8. Press the side bearing into the differential case, using the following SSTs.
SST: 09310-87102-000
09608-87302-7
that is a part of 09608-87302-000
 9. Clean the ring gear tooth surfaces.



WRU90-DF160

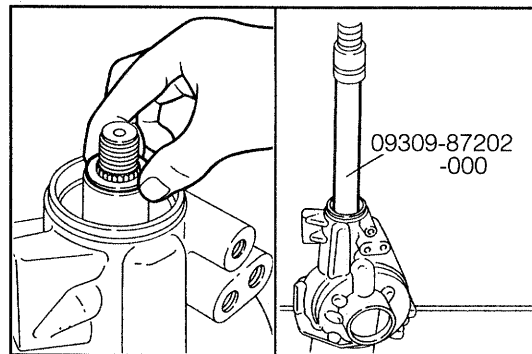


WRU90-DF161



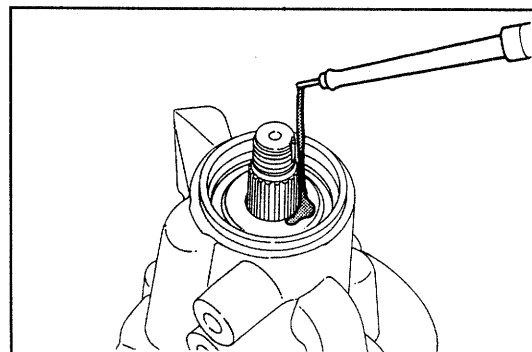
WRU90-DF162

10. Install the drive pinion, new drive pinion bearing spacer and shim (one that was measured at time of selection) to the differential carrier.
11. Press the rear bearing, using the following SST.
SST: 09309-87202-000



WRU90-DF163

12. Apply the gear oil to the rear bearing tapered roller sections.



WRU90-DF164

13. Install the companion flange.
14. Tighten the nut (use for 09530-87603-000), using the following SST.

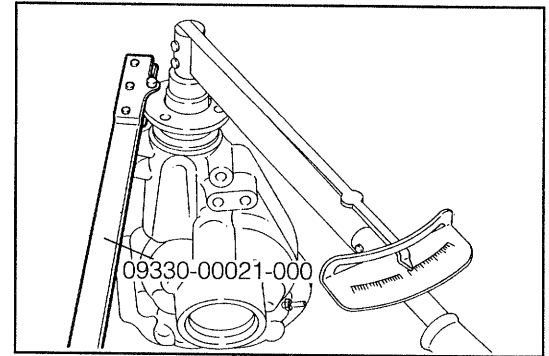
SST: 09330-00021-000

Tightening Torque:

19.0 - 23.0 kg-m

(137.0 - 166.0 ft-lb, 186.0 - 226.0 N-m)

15. Apply the gear oil to the front bearing tapered roller sections.



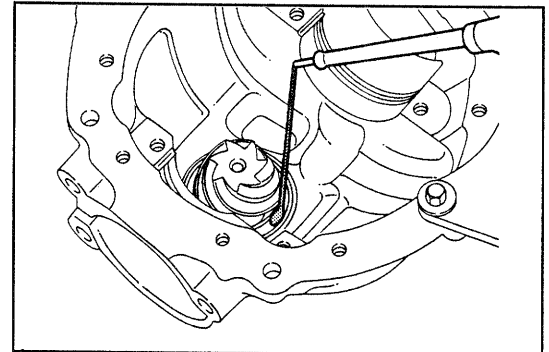
WRU90-DF165

16. Rotates the companion flange for several times in clock and counter clockwise.
17. Measure the preload of the drive pinion, using a torque gauge.

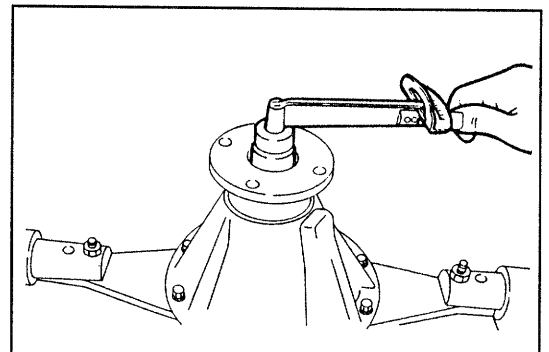
Specified Value:

New Bearing: 5 - 30 kg-cm (4.34 - 26.04 inch-lb)

Bearing Reused: 5 - 17 kg-cm (4.34 - 14.76 inch-lb)



WRU90-DF166

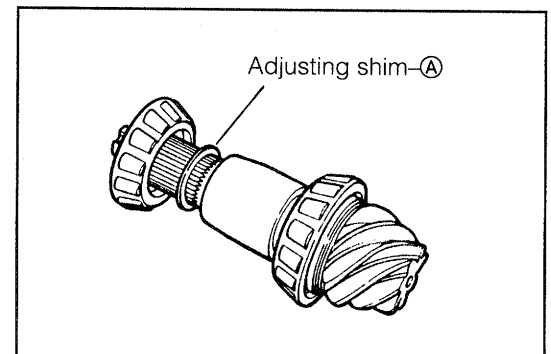


WRU90-DF167

18. When the preload is greater than the specified value, increase the adjusting shim thickness. Conversely, when the preload is less than the specified value, decrease the adjusting shim thickness.

NOTE:

- Refer the table for availability of adjusting shim ① on the item of 19.



WRU90-DF168

FRONT/REAR DIFFERENTIAL

19. Availability of adjusting shim for section ㉑

Units: mm (inch)

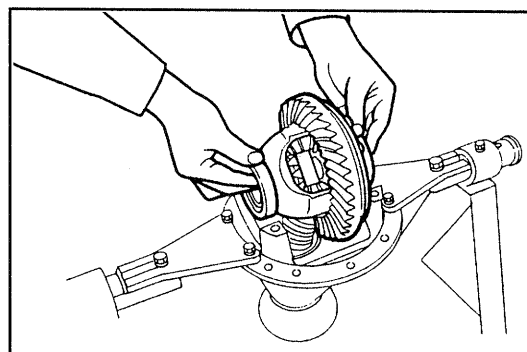
1.600 (0.0630)	1.850 (0.0728)	2.100 (0.0827)
1.625 (0.0640)	1.875 (0.0738)	2.125 (0.0837)
1.650 (0.0650)	1.900 (0.0748)	2.150 (0.0846)
1.675 (0.0659)	1.925 (0.0758)	2.175 (0.0856)
1.700 (0.0669)	1.950 (0.0768)	2.200 (0.0866)
1.725 (0.0679)	1.975 (0.0778)	2.225 (0.0876)
1.750 (0.0689)	2.000 (0.0787)	2.250 (0.0886)
1.775 (0.0699)	2.025 (0.0797)	2.275 (0.0896)
1.800 (0.0709)	2.050 (0.0807)	2.300 (0.0906)
1.825 (0.0719)	2.075 (0.0817)	2.325 (0.0915)

WRU90-DF169

20. Install the differential case on the differential carrier.

NOTE:

- Make sure that the outer races of the side bearings are assembled correctly in the respective original positions.

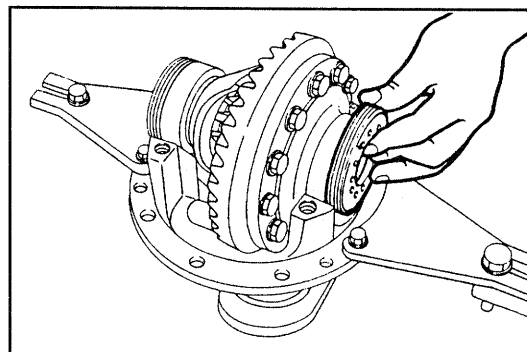


WRU90-DF170

21. Install the adjusting nut in such a way that it is aligned with the threaded portion of the differential carrier.

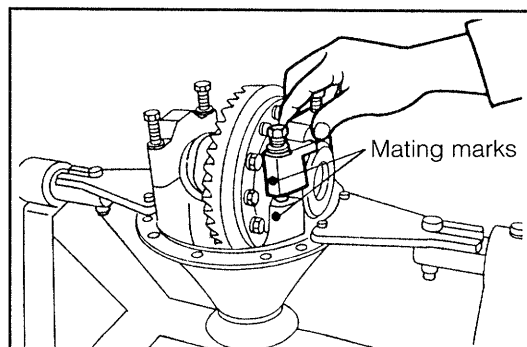
NOTE:

- Apply gear oil to the bearing and adjusting nut.



WRU90-DF171

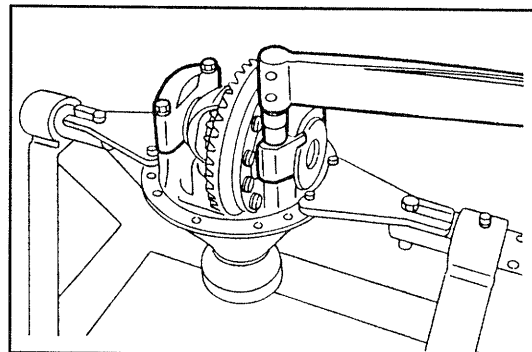
22. Install the bearing cap to the differential carrier, while aligning the mating marks put during the disassembly with each other.



WRU90-DF172

23. Temporarily tighten the bearing cap to the following specified torque. Then, loosen the bearing cap to such an extent that the adjusting nut can be turned with the SST.

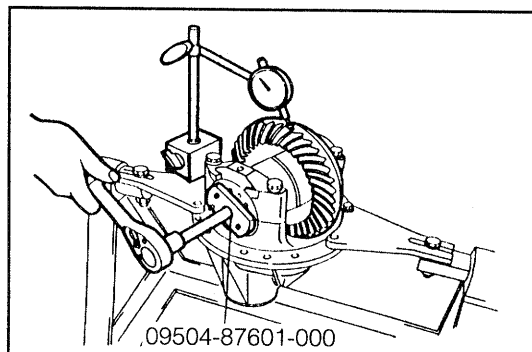
Tightening Torque: 2.0 kg-m (14.5 ft-lb, 19.6 N-m)



WRU90-DF173

24. Lightly tighten the right and left adjusting nuts, using the SST, until the backlash between the drive pinion and the ring gear becomes about 0.2 mm (0.0079 inch).

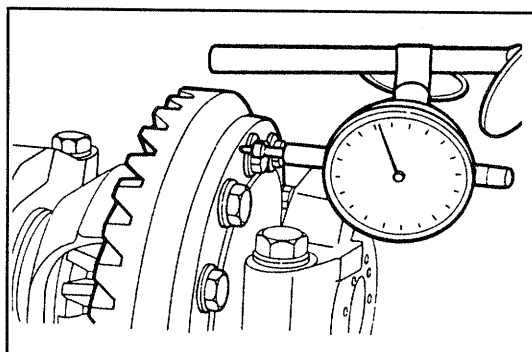
SST: 09504-87601-000



WRU90-DF174

25. Ring gear preload adjusting procedure

- (1) Install a dial gauge normally to the back surface of the ring gear.

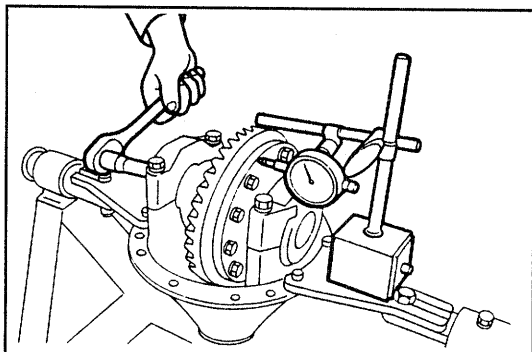


WRU90-DF175

- (2) Using the SST, tighten the adjusting nut at the tooth surface side of the ring gear, until the dial gauge registers no fluctuation in the reading.

NOTE:

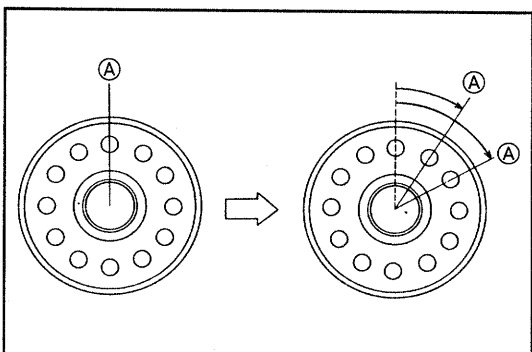
- The side bearing preload becomes zero when the dial gauge no longer registers fluctuation.



WRU90-DF176

- (3) Tighten further the adjusting nut at the ring gear tooth surface side to the specified preload.

Specified Side Bearing Preload: 1 - 2 notches

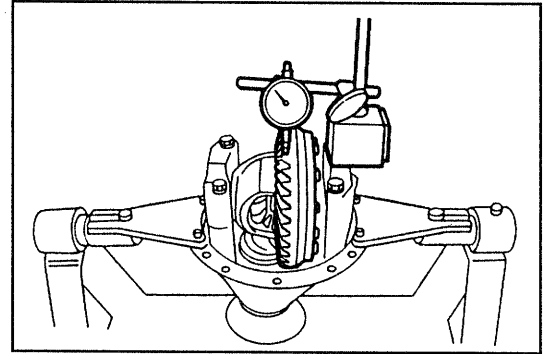


WRU90-DF177

FRONT/REAR DIFFERENTIAL

26. Adjusting procedure for backlash between ring gear and drive pinion

(1) Install a dial gauge at right angles with the ring gear tooth surface. Measure the backlash.
Specified Value: 0.07 - 0.17 mm (0.028 - 0.067 inch)

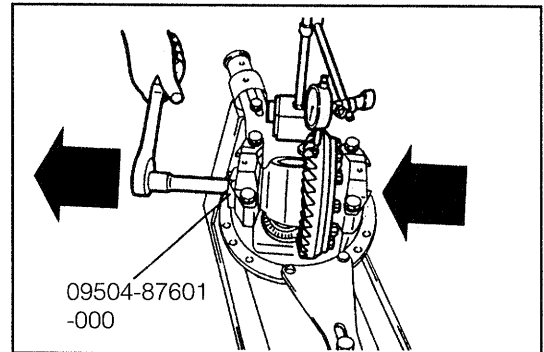


WRU90-DF178

(2) If the backlash does not conform to the specification, adjust the backlash by moving the bearing by means of the right and left adjusting nuts, using the following SST.
SST: 09504-87601-000

NOTE:

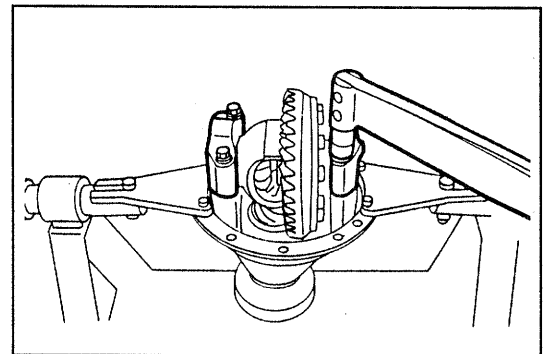
- The right and left bearings should be moved in the same direction and by the same amount. For example, if the left bearing is loosen one notch, the right bearing should be tightened one notch.



WRU90-DF179

27. Tighten the bearing cap to the specified torque.

Tightening Torque: 7.0 - 9.0 kg-m
(50.6 - 65.1 ft-lb, 68.6 - 88.3 N·m)



WRU90-DF180

28. Total Preload

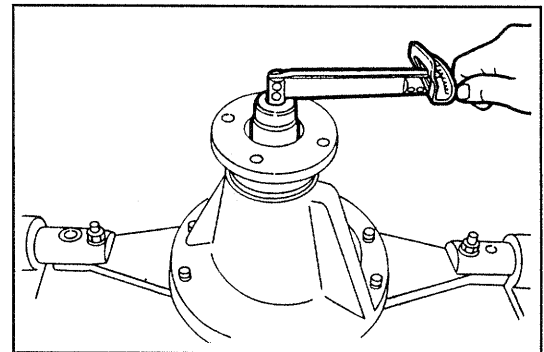
With the drive pinion brought in contact with the ring gear, measure the total preload, using a torque gauge.

New Bearing: 6 - 33 kg-cm (5.21 - 28.64 inch-lb)

Bearing Reused: 6 - 20 kg-cm (5.21 - 17.36 inch-lb)

NOTE:

- If the total preload does not conform to the specification, adjust the total preload by means of the adjusting nut at the ring gear tooth surface side.



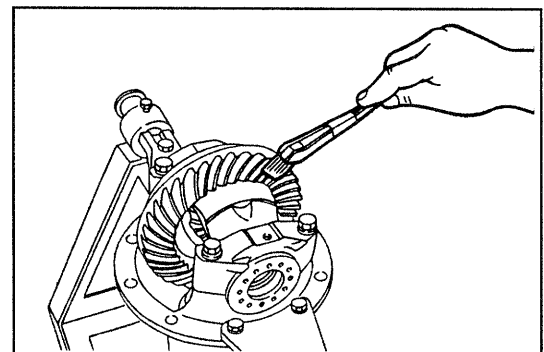
WRU90-DF181

29. Checking procedure for tooth contact between ring gear and drive pinion

(1) Apply a thin film of blue lead or the like evenly to both sides of five or six teeth of the ring gear.
(2) Turn the ring gear several times by applying a load to the drive pinion by one hand.

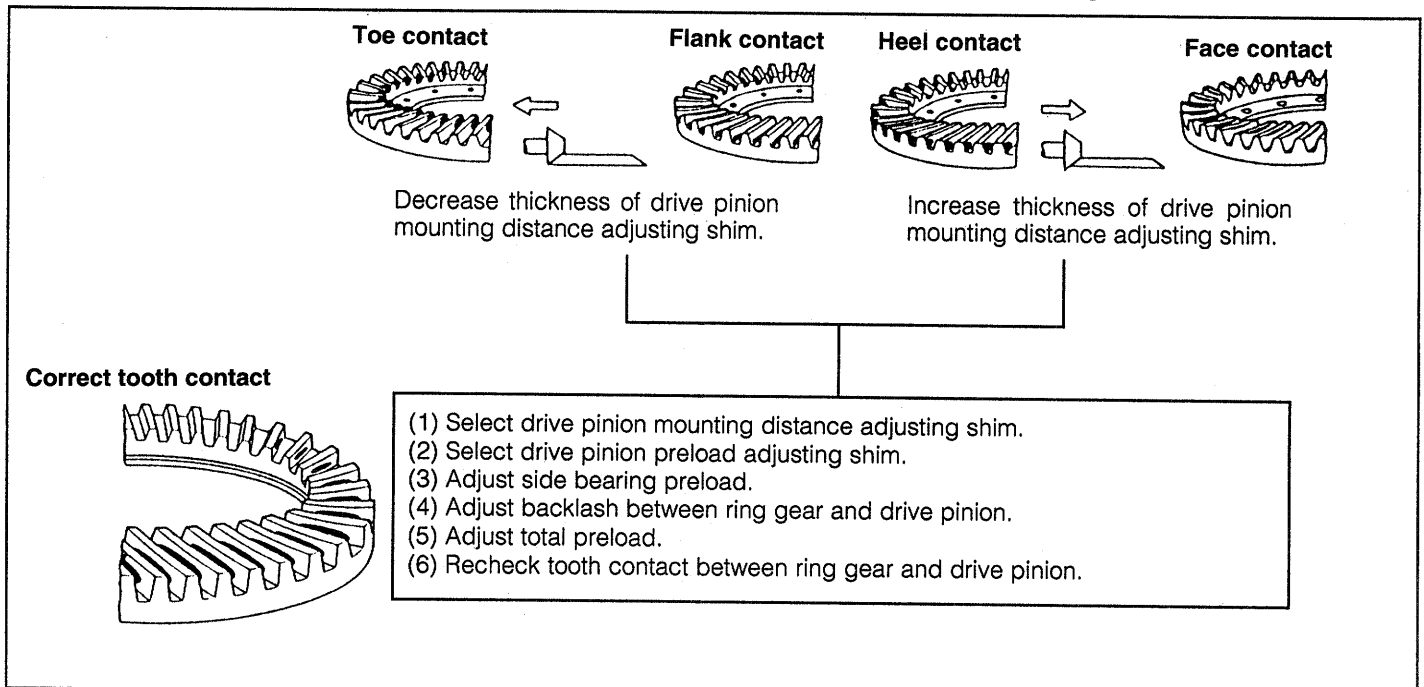
NOTE:

- Perform the tooth contact check at four points of the ring gear.



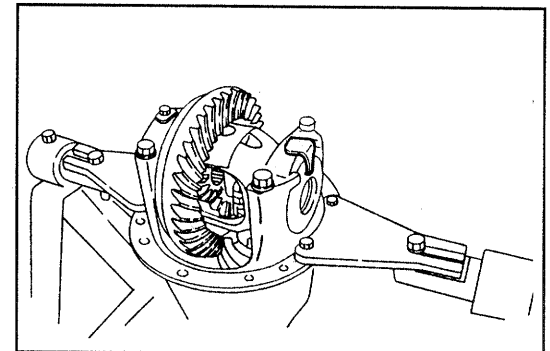
WRU90-DF182

(3) Ensure that the correct tooth contact has been attained, as shown in the figure below.



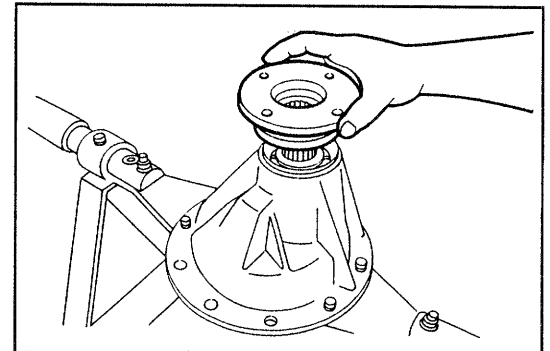
WRU90-DF183

30. Install the adjusting nut lock to the bearing cap.
Tightening Torque: 0.4 - 1.0 kg-m
 (2.9 - 7.2 ft-lb, 3.9 - 9.8 N·m)



WRU90-DF184

31. Remove the companion flange by removing the lock nut for 09530-87602-000.

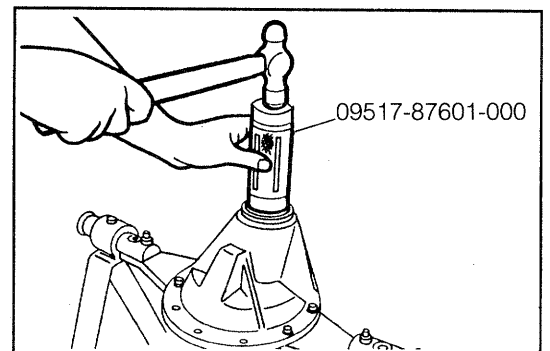


WRU90-DF185

32. Drive a new oil seal up to the edge surface of the differential carrier, using the following SST.
SST: 09517-87601-000

NOTE:

- Apply gear oil to the oil seal lip section.



WRU90-DF186

FRONT/REAR DIFFERENTIAL

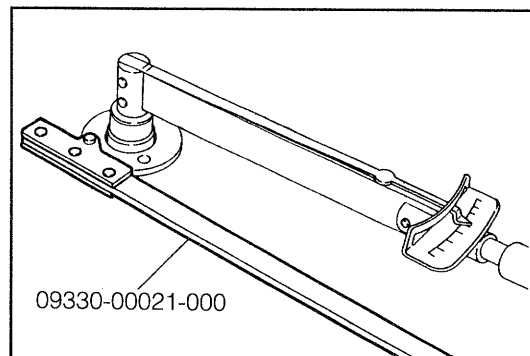
33. Tighten the companion flange by means of a new lock nut, using the following SST.

SST: 09330-00021-000

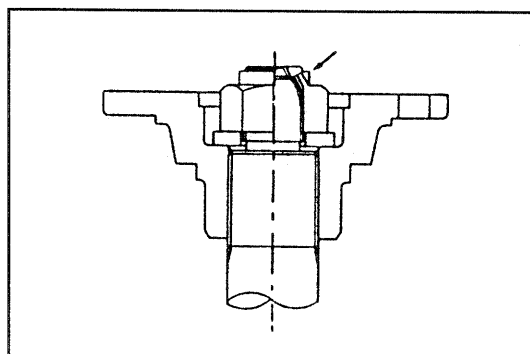
Tightening Torque:

19.0 - 23.0 kg-m

(137.0 - 166.0 ft-lb, 186.0 - 226.0 N-m)



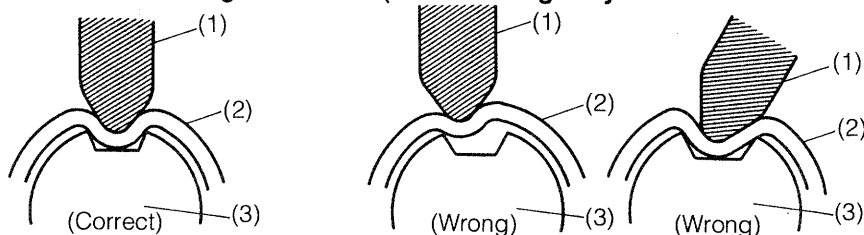
34. Stake lock section of the nut securely, using a chisel or the like.



NOTE:

- When staking the lock nut, point a suitable staking tool toward the drive pinion axis center and stake the lock nut securely, as shown in the figure below. (Poor staking may cause abnormal noise.)

- (1) Suitable staking tool
(2) New nut
(3) Drive pinion

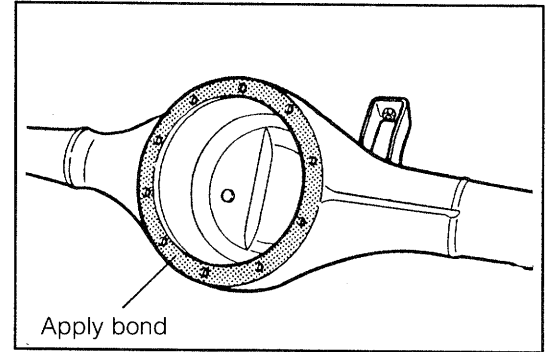


WRU90-DF189

INSTALLATION

1. Apply the following bond to the differential installation surface of the rear axle housing.

Bond to Be Used: Three bond 1104
(Three bond made)

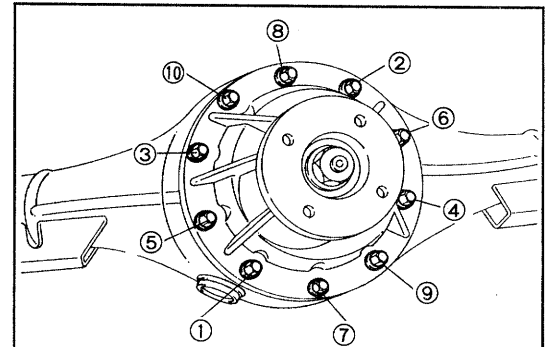


WRU90-DF190

2. Remove the differential carrier from the SSTs
3. Tighten the differential carrier by means of the bolts.
Tightening Torque: 5.5 - 8.0 kg-m
(39.8 - 57.9 ft-lb, 53.9 - 78.5 N·m)

NOTE:

- Be sure to tighten the bolts alternately and diagonally.
- The illustration at the right indicates a typical example of the tightening sequence.

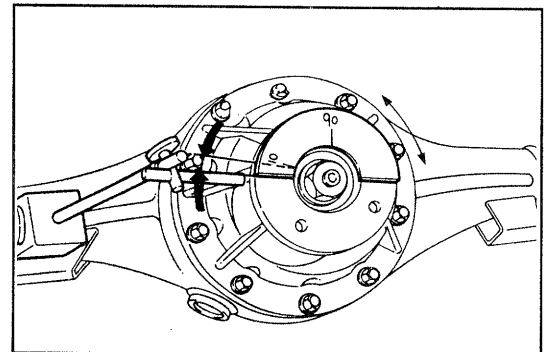


WRU90-DF191

4. Install the rear axle shaft (Refer RS-section)
5. Measurement of total backlash of rear axle assembly
 - (1) Install a protractor and a magnet stand equipped with a pointer on the differential companion flange surface.
 - (2) Move the differential companion flange to the right or to the left by the backlash.
Specified Value: Less than 5.5°

NOTE:

- If the total backlash exceeds the specified value, adjust the ring gear-to-drive pinion backlash and side gear-to-pinion gear backlash to the minimum value, respectively.
- If the total backlash exceeds the specified value even if the respective backlashes (ring gear-to-drive pinion backlash and side gear-to-pinion gear backlash) are set to the minimum values, replace the rear axle shaft and side gear with new ones.



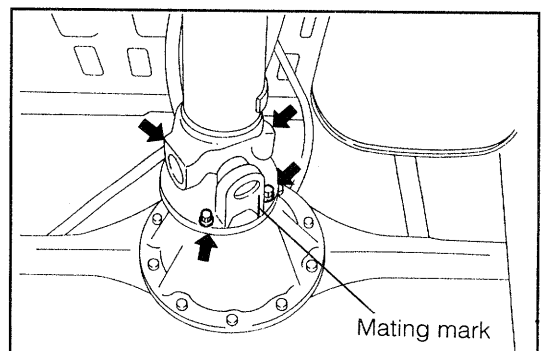
WRU90-DF192

6. Install the propeller shaft.

CAUTION:

- Align the mating marks put during the removal with each other.
- If this operation should fail to be performed correctly, the propeller shaft may emit abnormal noise or vibration during the running.

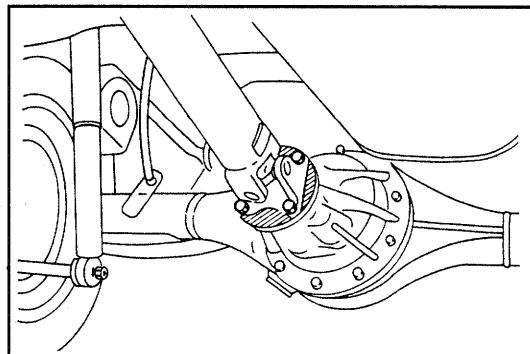
Tightening Torque: 6.0 - 8.0 kg-m
(43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)



WRU90-DF193

FRONT/REAR DIFFERENTIAL

7. On the rear ABS-equipped vehicle only, install the speed sensor. (Refer to RS section.)
8. Apply black paint to the exposed machined surface (slant line section in the right figure) of the differential companion flange.



WRU90-DF194

9. Fill the differential oil.

Oil to Be Used:

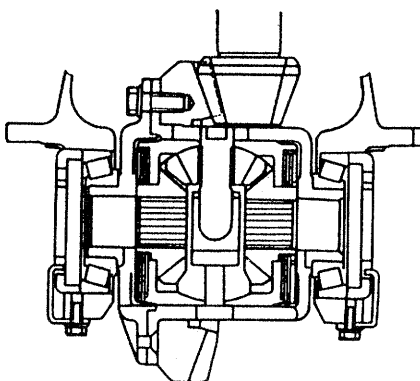
Standard	API GL-5, SAE 90 or 80W-90
L.S.D.	API GL-5 (Oil exclusively used for L.S.D. SAE 90 or 80W-90)

Oil Capacity: 1.95 liters (2.06 US qts, 0.515 usa. gal)

10. Jack down the vehicle.

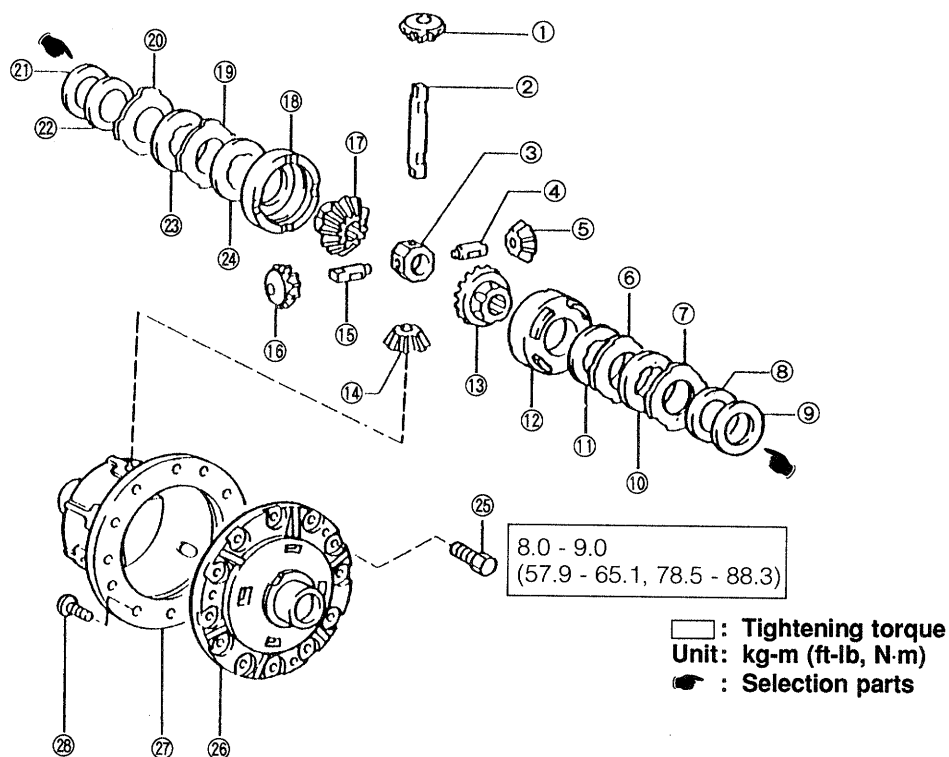
WRU90-DF195

L.S.D. (Limited Slip Differential) SECTIONAL VIEW



WRU90-DF196

COMPONENTS



- | | |
|--------------------------|---|
| ① Differential pinion | ⑮ Pinion shaft No. 2 |
| ② Pinion shaft No. 1 | ⑯ Differential pinion |
| ③ Pinion shaft holder | ⑰ Differential side gear |
| ④ Pinion shaft No. 2 | ⑱ Clutch pressure ring |
| ⑤ Differential pinion | ⑲ Clutch outer plate |
| ⑥ Clutch outer plate | ⑳ Clutch outer plate |
| ⑦ Clutch outer plate | ㉑ Clutch plate shim |
| ⑧ Preload spring | ㉒ Preload spring |
| ⑨ Clutch plate shim | ㉓ Clutch inner plate |
| ⑩ Clutch inner plate | ㉔ Clutch inner plate |
| ⑪ Clutch inner plate | ㉕ Bolt (Different case cover & Ring gear) |
| ⑫ Clutch pressure ring | ㉖ Differential case cover |
| ⑬ Differential side gear | ㉗ Differential case assy |
| ⑭ Differential pinion | ㉘ Screw (Differential case & cover) |

WRU90-DF197

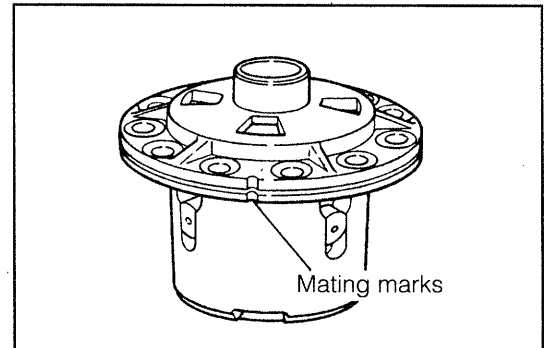
REMOVAL

1. Remove the rear differential carrier assembly.
(See pages DF-32 through DF-34.)
2. Remove the differential case assembly from the differential carrier.
(See pages DF-34 through DF-37.)

WRU90-DF198

DISASSEMBLY

1. Ensure that the mating marks on the differential case sub-assembly and the differential case cover are aligned with each other.

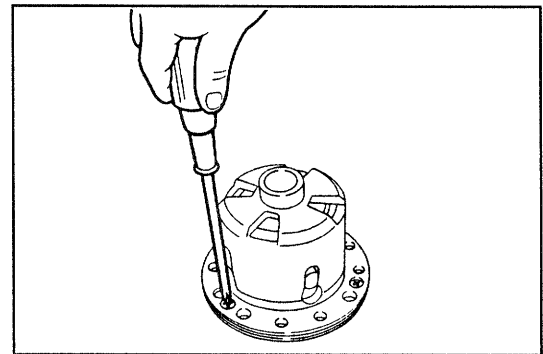


WRU90-DF199

2. Separate the differential case subassembly from the differential case cover by removing the screws.

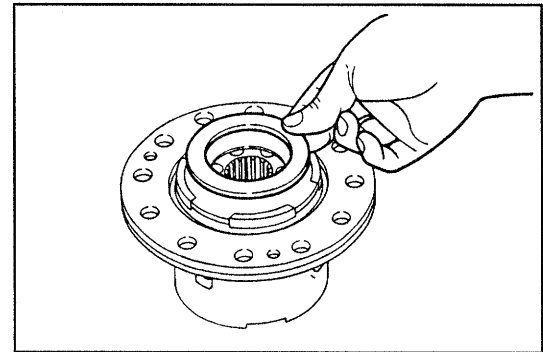
NOTE:

- When removing the three screws, loosen them evenly over several stages.



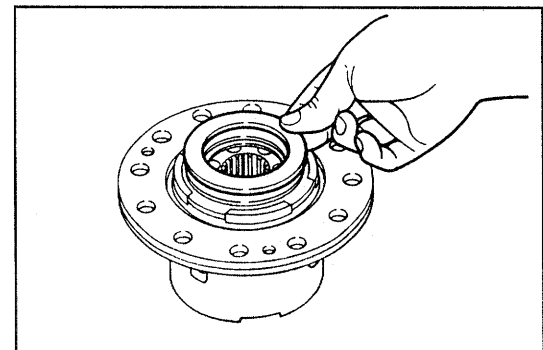
WRU90-DF200

3. Remove the clutch plate shim



WRU90-DF201

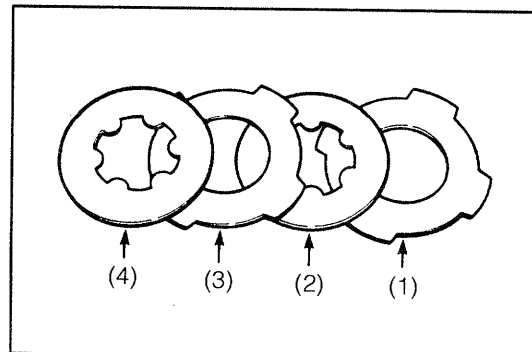
4. Remove the preload spring.



WRU90-DF202

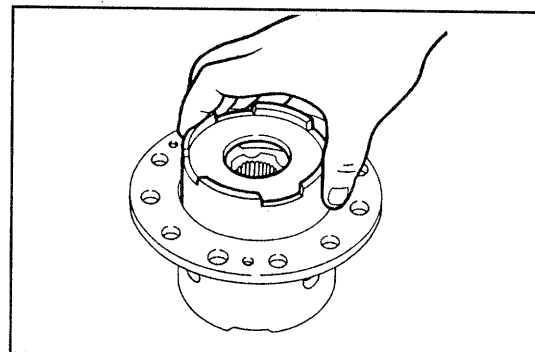
5. Remove the following parts in this sequence from the differential case.

- (1) Clutch outer plate
- (2) Clutch inner plate
- (3) Clutch outer plate
- (4) Clutch inner plate



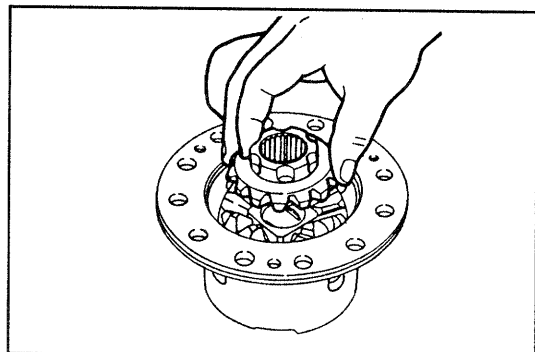
WRU90-DF203

6. Remove the clutch pressure ring.



WRU90-DF204

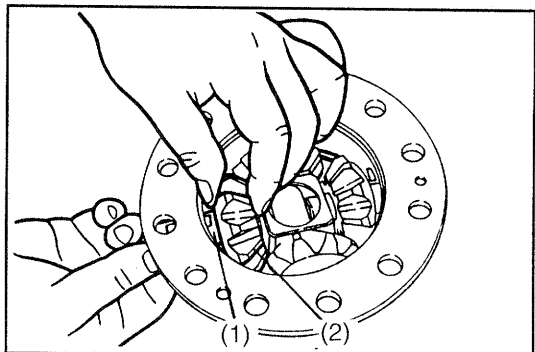
7. Remove the side gear.



WRU90-DF205

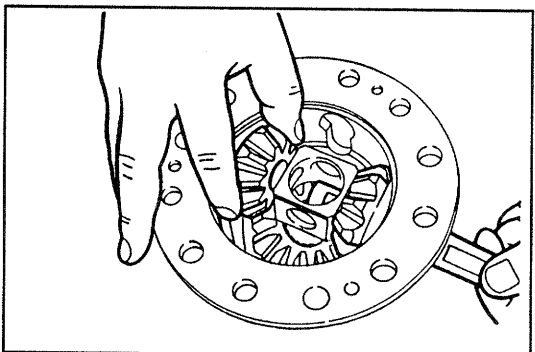
8. Remove the following parts, while floating the pinion shaft No. 1.

- (1) Pinion shaft No. 2 (2 pcs.)
- (2) Differential pinion (2 pcs.)



WRU90-DF206

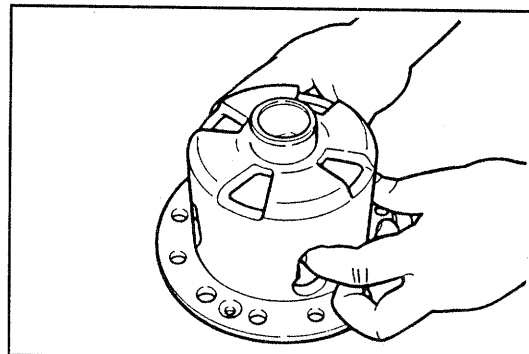
9. Remove the pinion No. 1 and two differential pinions.



WRU90-DF207

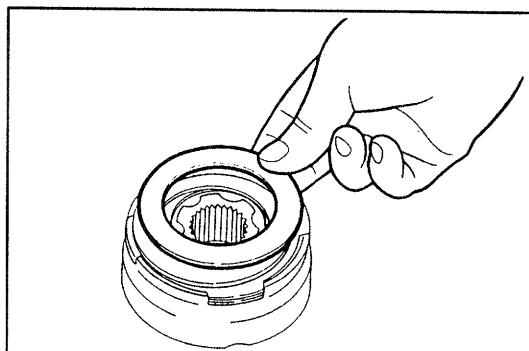
FRONT/REAR DIFFERENTIAL

10. Remove each inner part from the differential case.



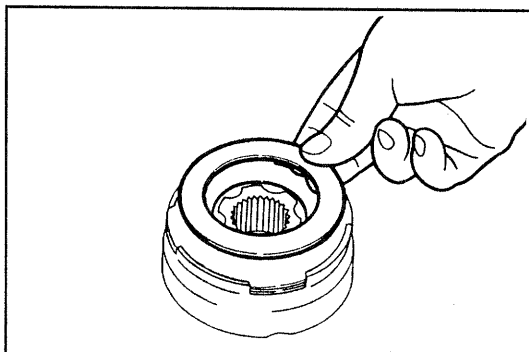
WRU90-DF208

11. Remove the clutch plate shim.



WRU90-DF209

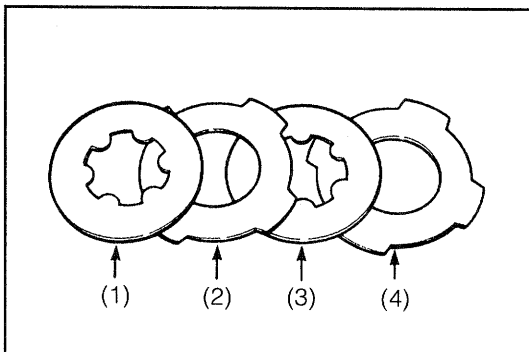
12. Remove the preload spring.



WRU90-DF210

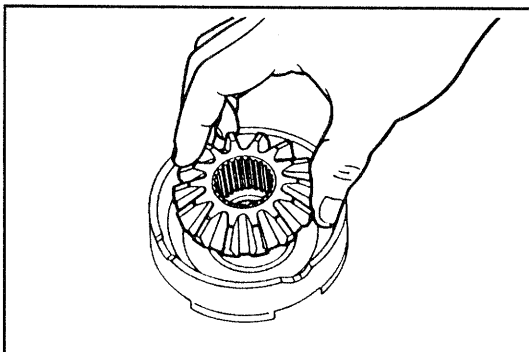
13. Remove the following parts in this sequence from the differential side gear.

- (1) Clutch inner plate
- (2) Clutch outer plate
- (3) Clutch inner plate
- (4) Clutch outer plate



WRU90-DF211

14. Remove the differential side gear.



WRU90-DF212

INSPECTION

NOTE:

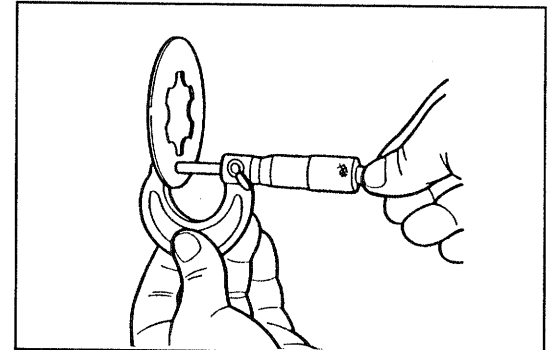
- (1) Clean each of the disassembled parts. Check each part for cracks, wear at fitting sections, damage, deformation or seizure. Replace any faulty part.
- (2) When the side gear and clutch inner plate are to be replaced, also replace the clutch outer plate and preload spring that are in contact with the replaced parts.

WRU90-DF213

1. Check of clutch inner plate
 - (1) Ensure that the clutch inner plate exhibits no excessive uneven wear.
 - (2) Measure the clutch inner plate thickness.
 Specified Value: 1.6 mm (0.00630 inch)
 Allowable Limit: 1.4 mm (0.00551 inch)

NOTE:

- The allowable wear limit for the clutch inner plate at one side is 0.1 mm (0.0039 inch).

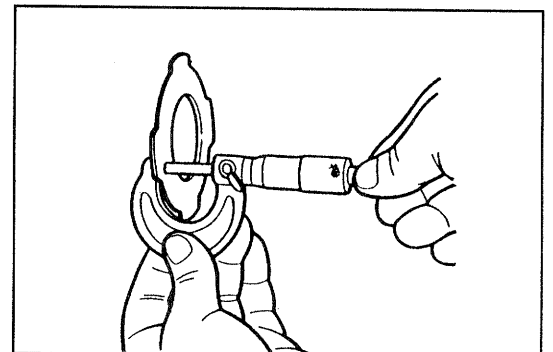


WRU90-DF214

2. Check of clutch outer plate
 - (1) Ensure that the clutch outer plate exhibits no excessive uneven wear.
 - (2) Measure the clutch outer plate thickness.
 Specified Value: 1.6 mm (0.00630 inch)
 Allowable Limit: 1.4 mm (0.00551 inch)

NOTE:

- The allowable wear limit for the clutch outer plate at one side is 0.1 mm (0.0039 inch).

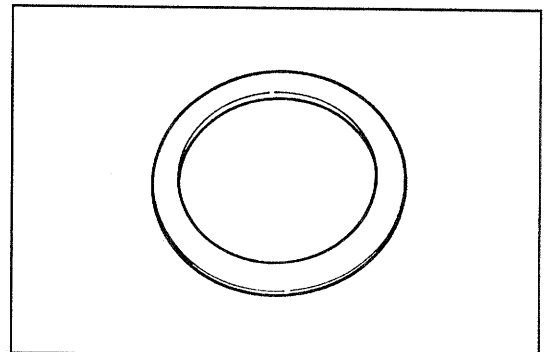


WRU90-DF215

3. Preload spring check
 - (1) Ensure that the preload spring exhibits no excessive wear.

REFERENCE:

- The spring load should be 480 - 580 kg as assembled.



WRU90-DF216

ASSEMBLY

NOTE:

- (1) When assembling each part, make sure that no dust nor chip gets to the part.
- (2) Liberally apply the designated oil to each of the sliding and rotating sections.
 Designated Oil: SAE 90 L.S.D. Oil

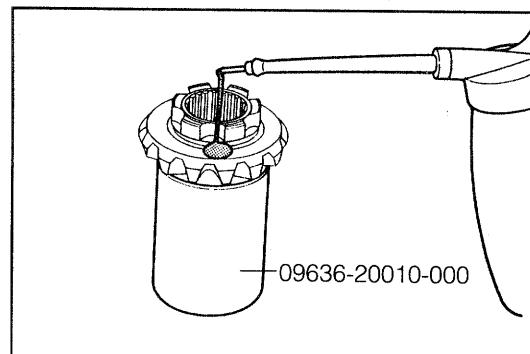
WRU90-DF217

FRONT/REAR DIFFERENTIAL

1. Install the clutch pressure ring to the differential gear, using the following SST or a cylindrical base.

SST: 09636-20010-000

2. Apply the L.S.D. oil, as shown in the right figure.



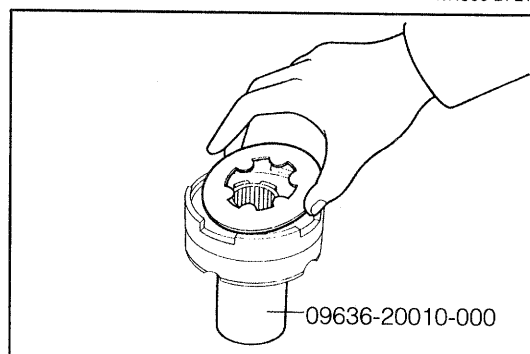
WRU90-DF218

3. Install the clutch inner plate.

NOTE:

- There is no specific installation direction for the clutch inner plate.

4. Apply the L.S.D. oil to the upper periphery of the clutch inner plate.



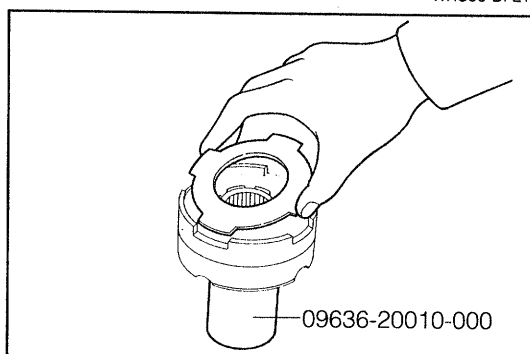
WRU90-DF219

5. Install the clutch outer plate.

NOTE:

- There is no specific installation direction for the clutch outer plate.

6. Apply the L.S.D. oil to the upper periphery of the clutch outer plate.



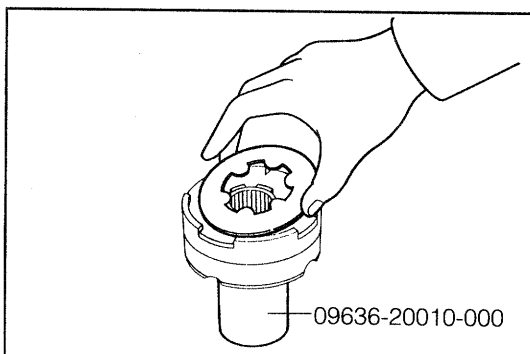
WRU90-DF220

7. Install the clutch inner plate.

NOTE:

- There is no specific installation direction for the clutch inner plate.

8. Apply the L.S.D. oil to the upper periphery of the clutch inner plate.



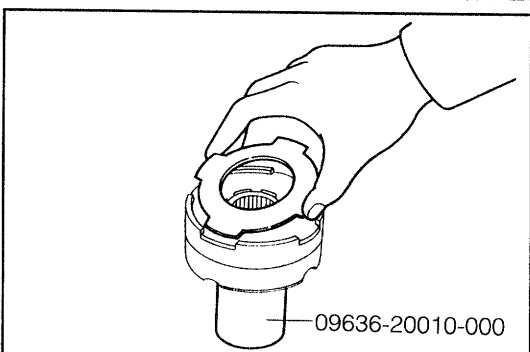
WRU90-DF221

9. Install the clutch outer plate.

NOTE:

- There is no specific installation direction for the clutch outer plate.

10. Apply the L.S.D. oil to the upper periphery of the clutch outer plate.

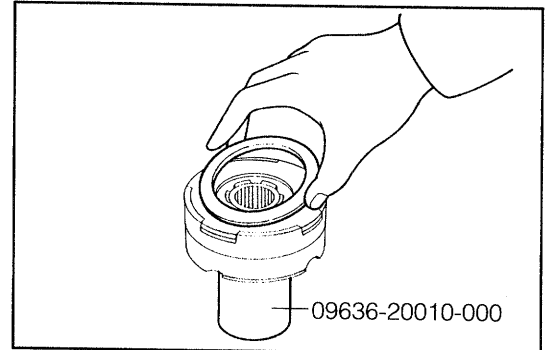


WRU90-DF222

11. Install the preload spring.

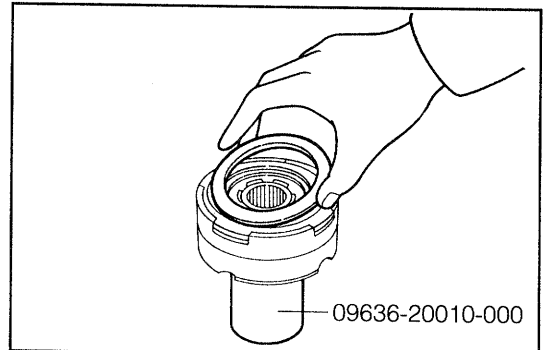
NOTE:

- The preload spring should be installed in such a direction that the enlarged section of the preload spring may come at the clutch plate side.



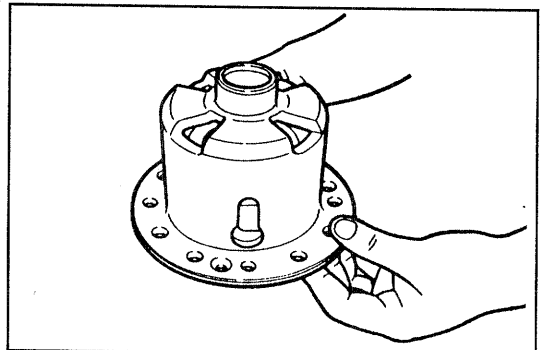
WRU90-DF223

12. Install the 0.5 mm (0.00197 inch) thick plate shim.



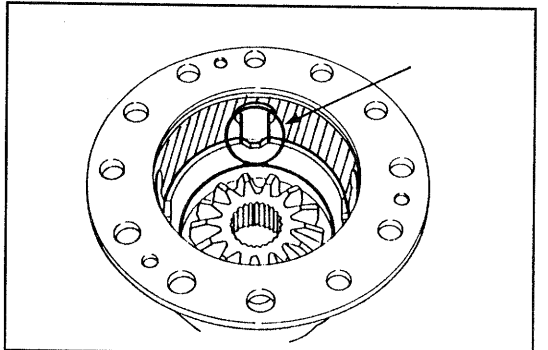
WRU90-DF224

13. Install the differential case subassembly.



WRU90-DF225

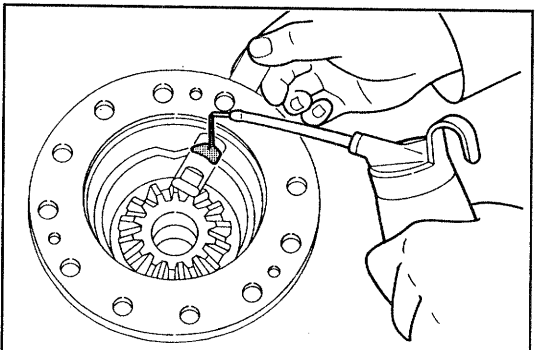
14. Align the groove of the clutch pressure ring with that of the differential case.



WRU90-DF226

15. Apply the L.S.D. oil to the outer periphery of the differential pinion shaft.

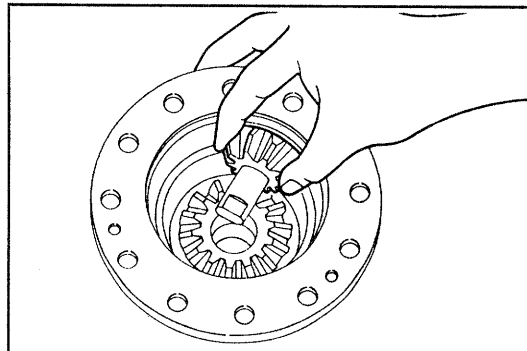
16. Insert the differential pinion shaft to the differential case.



WRU90-DF227

FRONT/REAR DIFFERENTIAL

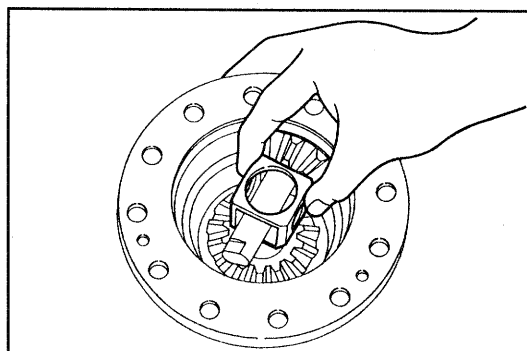
17. Install the pinion gear in the differential pinion shaft.



WRU90-DF228

18. Install the differential pinion shaft No. 1 in the differential pinion shaft.

19. Install the pinion gear in the differential pinion shaft.

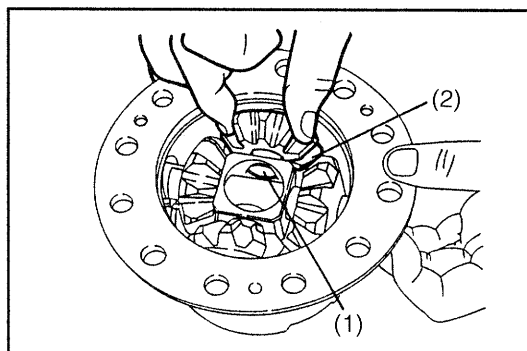


WRU90-DF229

20. Apply the L.S.D. oil to the outer periphery of the pinion shaft No. 2 and then, install the following parts in differential case, while floating the pinion shaft No. 1.

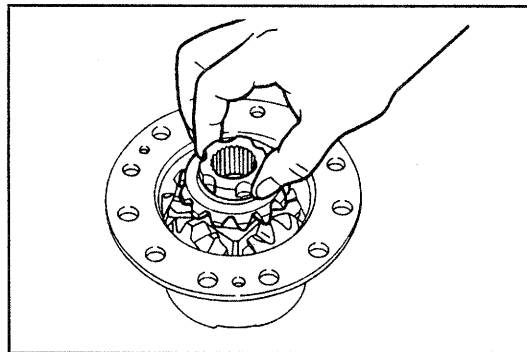
(1) Pinion shaft No. 2 (2 pcs.)

(2) Differential pinion (2 pcs.)



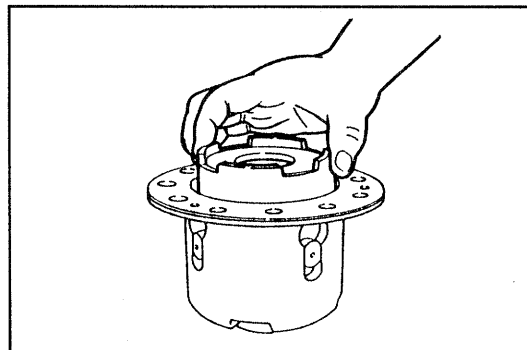
WRU90-DF230

21. Assemble the differential side gear in the clutch pressure ring.



WRU90-DF231

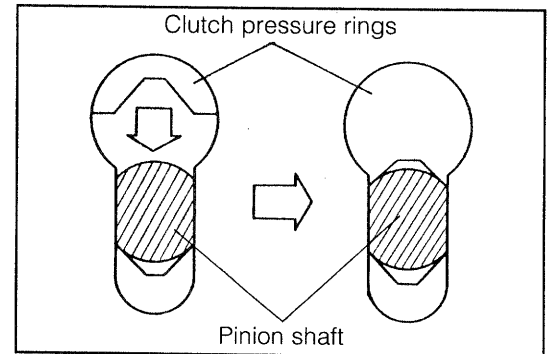
22. Assemble the clutch pressure ring in the differential case.



WRU90-DF232

NOTE:

- The pinion shaft should be aligned with the groove section of the clutch pressure ring during the assembly, as shown in the right figure.



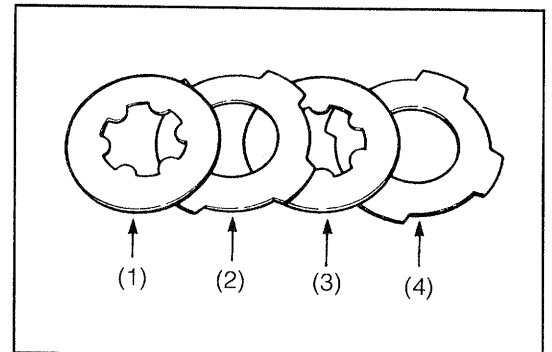
WRU90-DF233

23. Assemble the following parts in this sequence in the clutch pressure ring.

- (1) Clutch inner plate
- (2) Clutch outer plate
- (3) Clutch inner plate
- (4) Clutch outer plate

NOTE:

- Each clutch plate should be aligned with the grooves of the clutch pressure ring and side gear during the assembly.

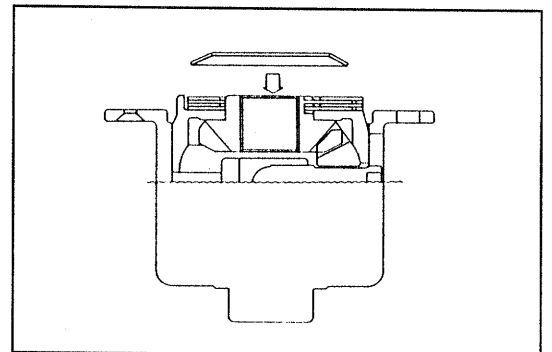


WRU90-DF234

24. Assemble the preload spring in the differential case.

NOTE:

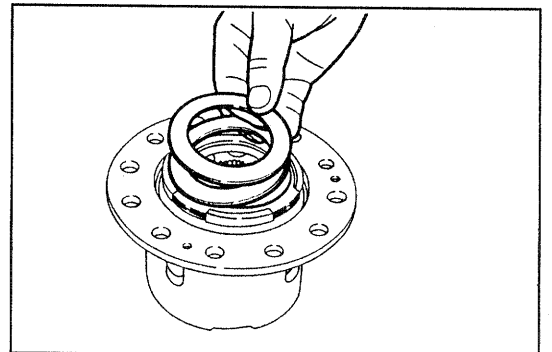
- The preload spring should be installed in such a direction that the enlarged section of the preload spring may come at the clutch plate side.



WRU90-DF235

25. Selecting procedure for clutch plate shim

- (1) Install the two 0.5 mm (0.00197 inch) thick clutch plate shims in the differential case.

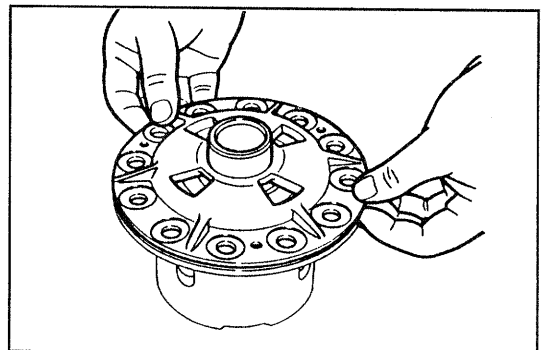


WRU90-DF236

- (2) Install the differential case cover on the differential case subassembly.

NOTE:

- Do not install the screws at this stage.

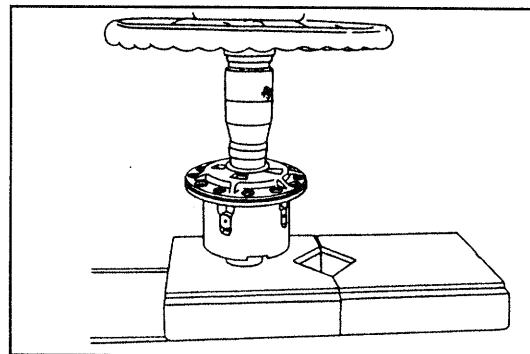


WRU90-DF237

FRONT/REAR DIFFERENTIAL

- (3) Apply the following specified load to the differential case cover, using a press.

Specified Load: 1000 kg (2205 lb)

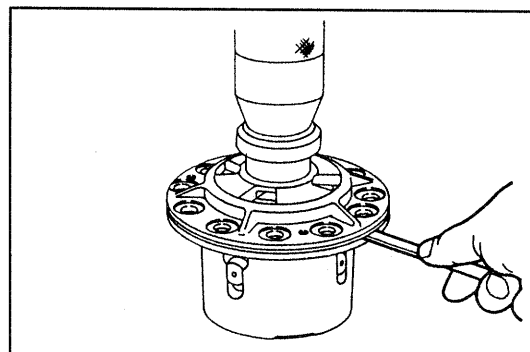


WRU90-DF238

- (4) Measure the clearance between the differential case subassembly and the differential cover, using a thickness gauge.

NOTE:

- Perform this clearance check at three points.
Specified Load: 0.05 - 0.2 mm (0.0020 - 0.0079 inch)



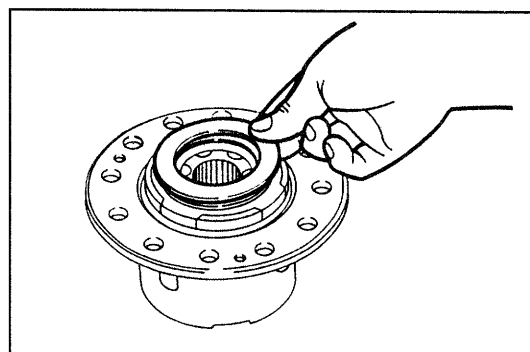
WRU90-DF239

If the clearance exceeds the specified value, decrease the thickness of the clutch plate shim. Conversely, if the clearance is less than the specified value, increase the shim thickness.

Select a suitable clutch plate shim from the table below.

Clutch Plate Shim Availability: mm (inch)

0.2 (0.0079)
0.3 (0.0118)
0.5 (0.0197)

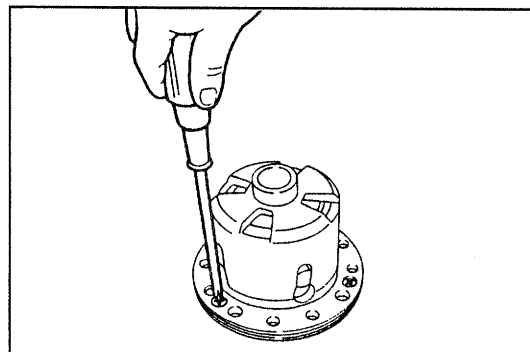


WRU90-DF240

26. Install the differential case cover, while aligning it with the mating mark of the differential case subassembly.

NOTE:

- Tighten the screws evenly.



WRU90-DF241

27. Assemble the differential case assembly.
(See page DF-41 through DF-47.)

WRU90-DF242

INSTALLATION

1. Install the differential carrier to the rear axle housing (See page DF-47 through DF-48.)

WRU90-DF243

DAIHATSU

Rocky

FRONT AXLE & SUSPENSION

OUTLINE OF FRONT AXLE &	
SUSPENSION	FS- 2
WHEELS & TIRES	FS- 17
FRONT WHEEL ALIGNMENT	FS- 21
FRONT SUSPENSION COMPONENTS ...	FS- 28
FRONT AXLE HUB	FS- 29
STABILIZER BAR	FS- 55
TORSION BAR SPRINGS	FS- 60
FRONT SHOCK ABSORBERS	FS- 68
UPPER ARMS	FS- 72
STEERING KNUCKLES	FS- 79
DRIVE SHAFTS	FS- 88
LOWER ARMS	FS- 97
UPPER & LOWER BALL JOINTS	FS-102

WRU90-FS001

FS

OUTLINE OF FRONT AXLE & SUSPENSION

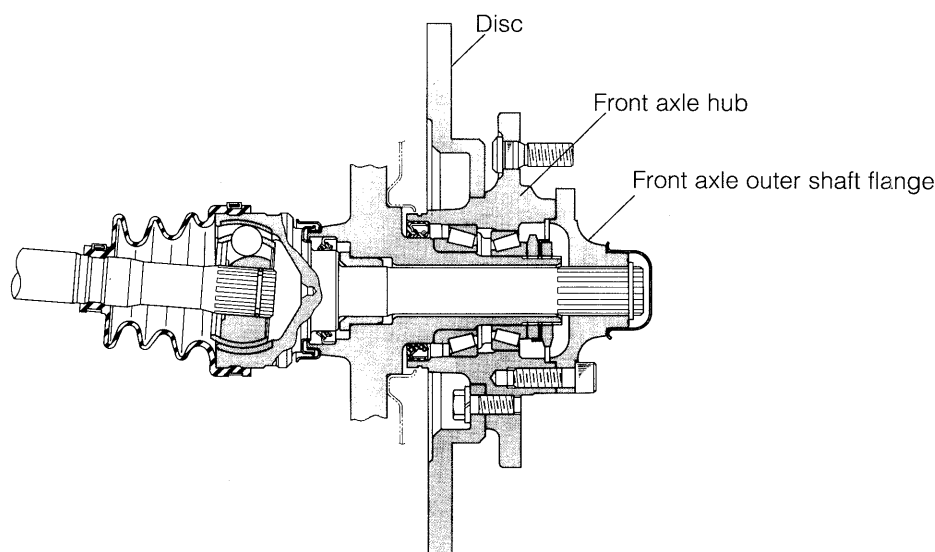
FRONT AXLE

- The driving force from the engine is transmitted to the drive shafts at the right and left sides via the transmission, transfer, front propeller shaft and front differential, finally reaching the front hub meshed with the spline provided at the forward end of each drive shaft. Consequently, the tires are driven.
- The drive shaft employs a full floating type in which the vehicle weight is sustained by means of two tapered roller bearings located between the front axle hub and the steering knuckle. Hence, no vehicle weight is applied to the drive shaft.
- The forward section of the front axle hub adopts two types, depending upon the vehicle type: the rigid type and the locking hub type.
Furthermore, the locking hub comes in two kinds: the manual locking hub mechanism and the automatic locking hub mechanism.
This mechanism makes it possible to reduce a mechanical loss which will be generated when the power from the front wheel drives the front differential and transfer during two wheel drive.

WRU90-FS002

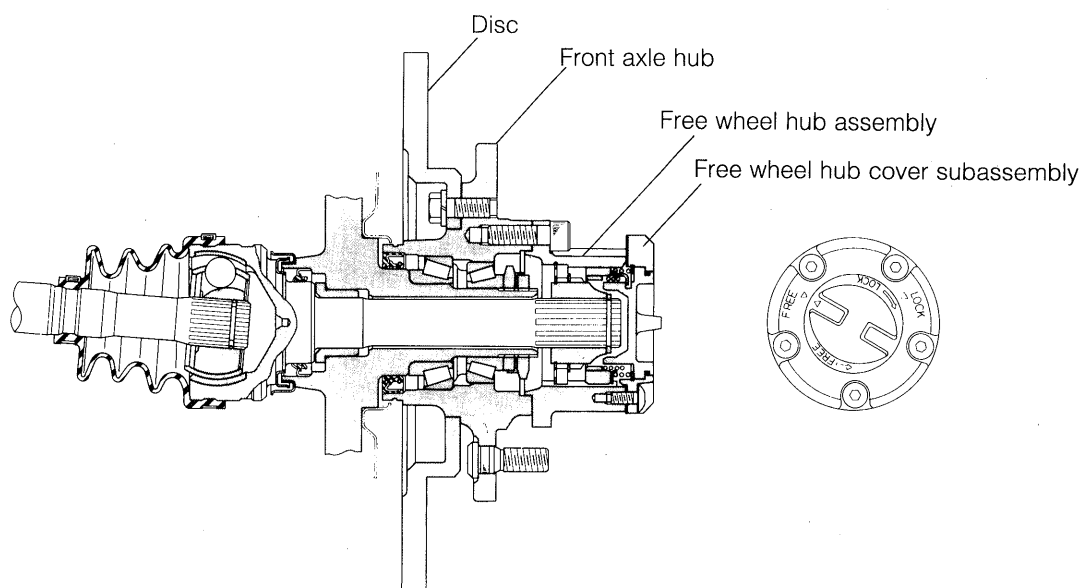
Table of front axle hubs

	Rigid (Full-time)	Manual locking hub	Automatic locking hub
F300LG-BMDEA2		○	
F300LG-BMHEA2	○		○
F300LC-FMDEA2		○	
F300LC-FMHEA2	○		○

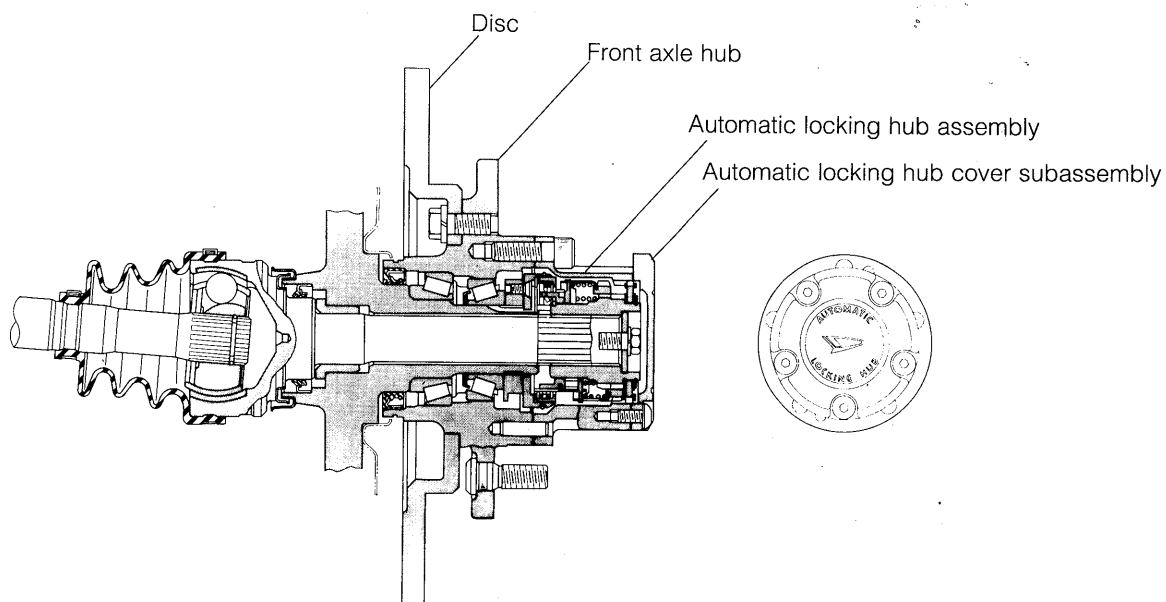


Rigid type

WRU90-FS003



Manual locking hub-equipped vehicle



Automatic locking hub-equipped vehicle

FRONT AXLE & SUSPENSION

1. MANUAL LOCKING HUB

The manual locking hub is a mechanism whereby the switching of power flow is made so that the driving force from the front drive shaft can be transmitted to the front wheel or the torque from the front wheel can not be transmitted to the front drive shaft, etc. and this switching is performed through the operation of the handle provided at the front wheel hub.

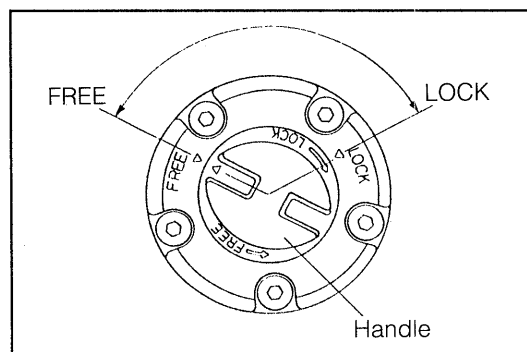
WRU90-FS005

How to operate

- When the transfer shift lever is shifted to the [2H] position, set the locking hub handle to the [FREE] position at both the right and left wheels.
- When the transfer shift lever is shifted to the [4H] or [4L] position, set the locking hub handle to the [LOCK] position at both the right and left wheels.

CAUTION:

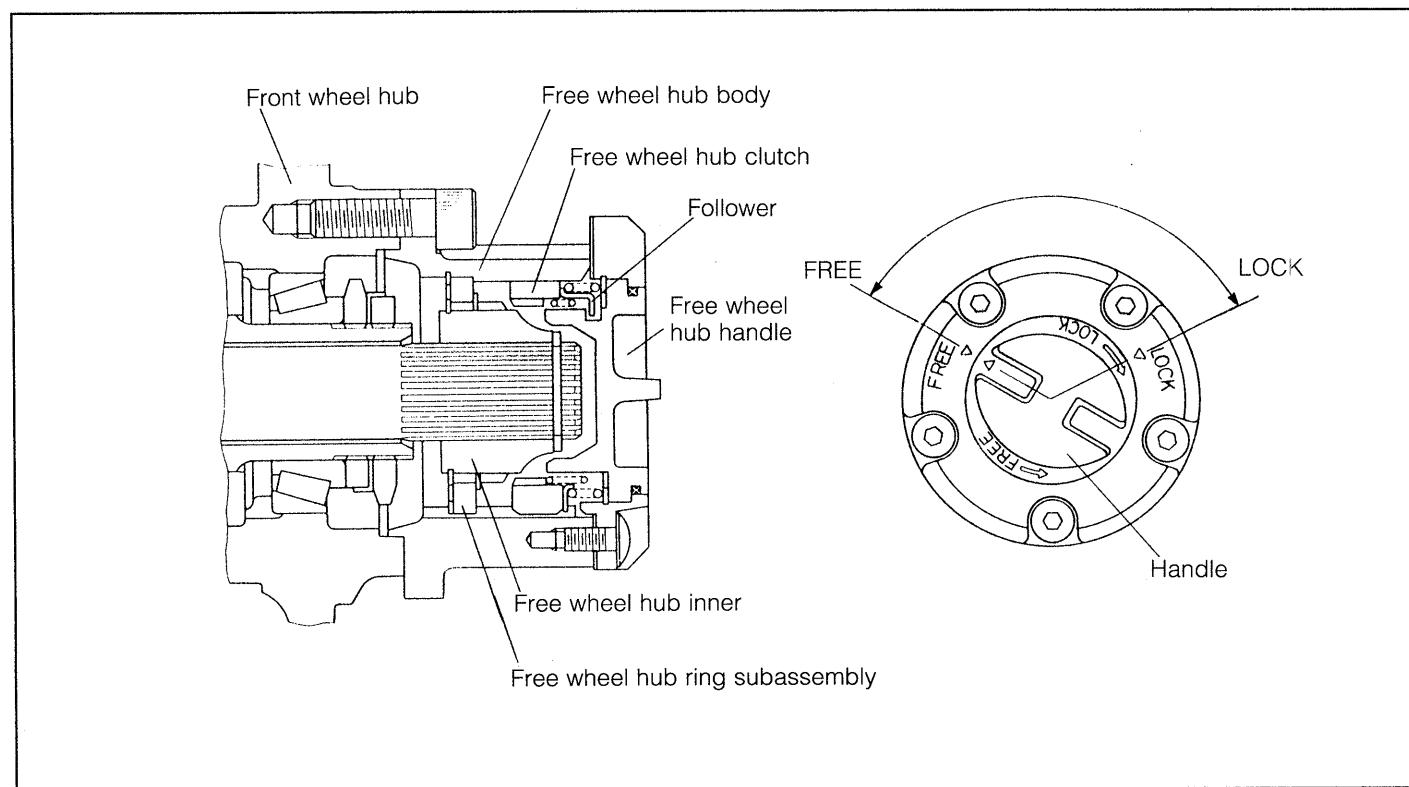
1. Do not move the vehicle if the handle (Δ mark) is not aligned exactly with the ∇ mark at the "Free" or "Lock" position on the cover.
2. Do not operate the vehicle in 4L or 4H when the hub handle is set at the "Free" position.
3. Make save to set the handle (Δ mark on the both the right and left wheels at the same position.



WRU90-FS006

Construction

- The manual locking hub (manual free wheel hub assembly) consists of the free wheel hub body, free wheel hub inner, free wheel hub ring sub assembly, free wheel hub clutch, free wheel hub handle, follower and so forth.
- The free wheel hub inner is spline-connected to the drive shaft. On the other hand, the free wheel hub body is mounted on the front wheel hub. Furthermore, its inside is spline-connected to the free wheel hub clutch.
- The free wheel hub clutch is attached to the free wheel hub handle by means of the follower and two springs.

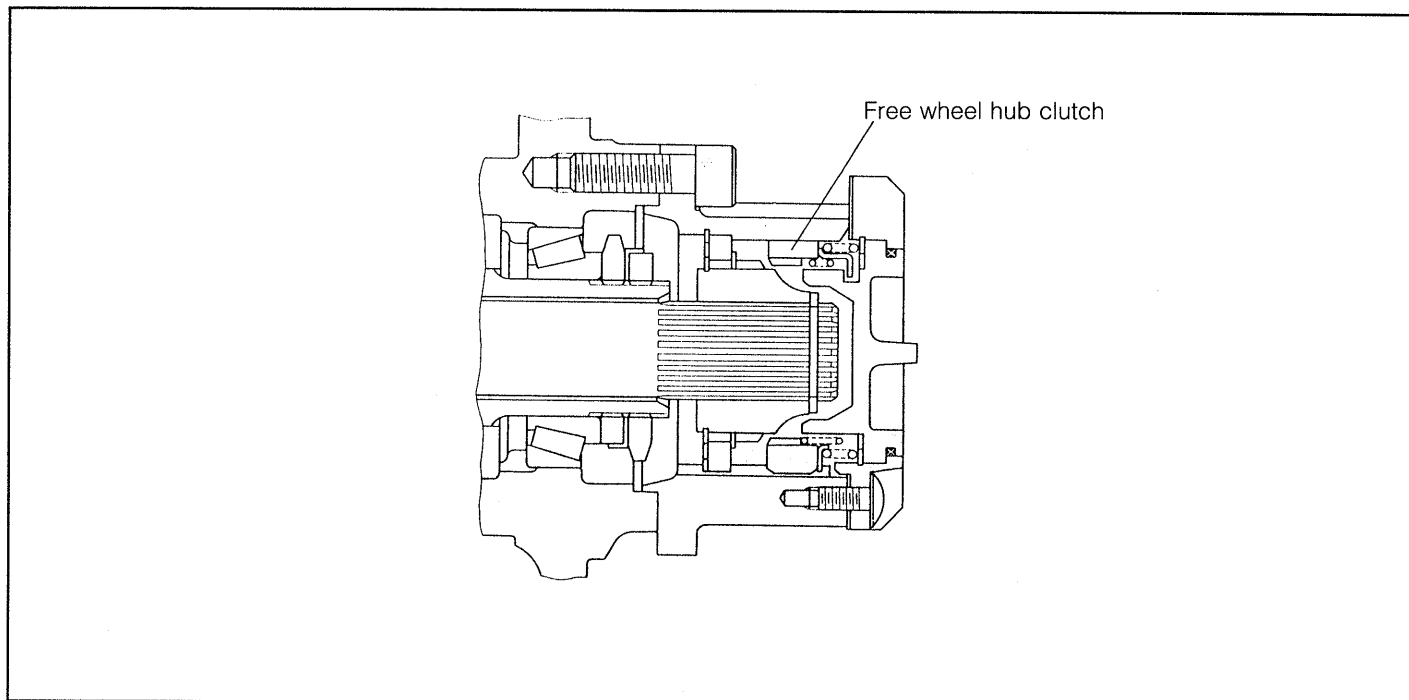


WRU90-FS007

Operation

- LOCKING HUB HANDLE (FREE WHEEL HUB HANDLE) WHEN SET TO [FREE] POSITION

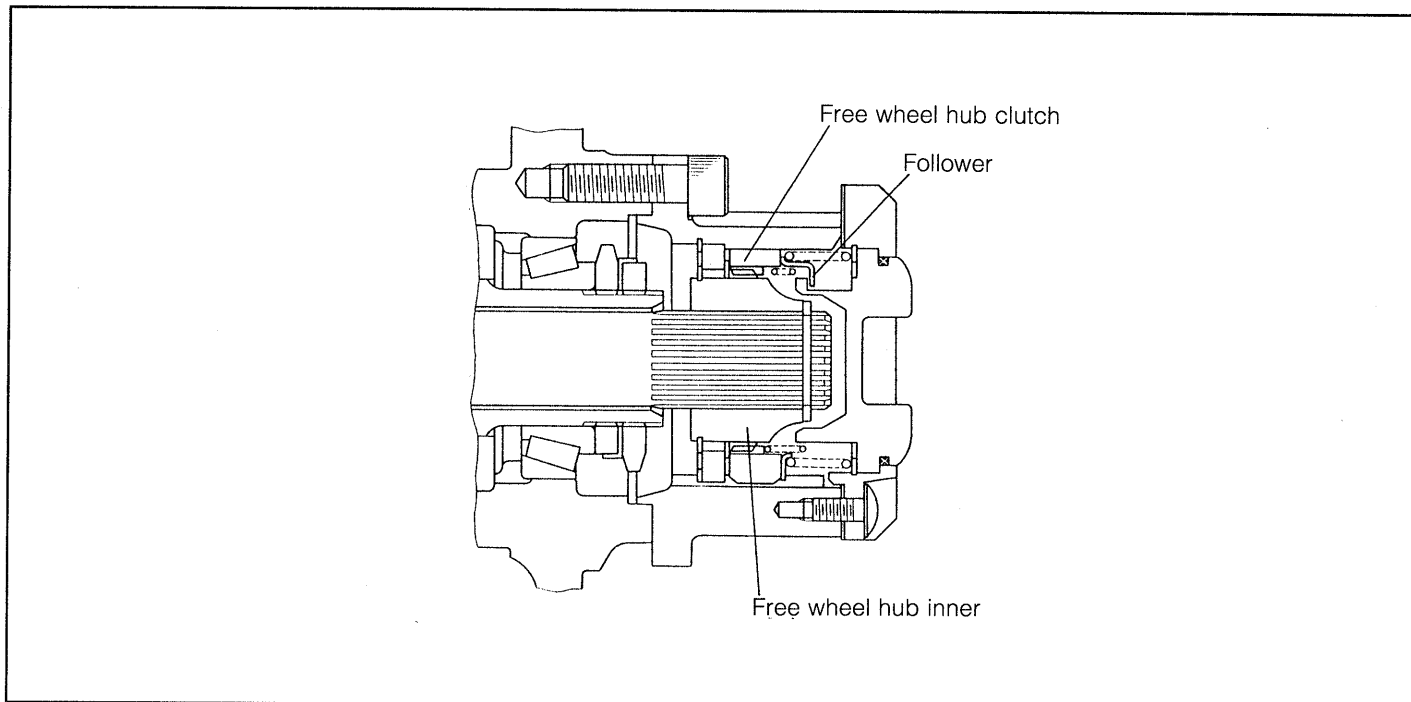
When the free wheel hub handle is set to the [FREE] position, the free wheel hub clutch comes at the outermost position on the spline of the free wheel hub body (at the extremely right position in the figure below), where no driving force from the drive shaft is transmitted to the front wheel hub.



WRU90-FS008

- LOCKING HUB HANDLE (FREE WHEEL HUB HANDLE) WHEN SET TO [LOCK] POSITION

When the free wheel hub handle is turned from the [FREE] position to the [LOCK] position, the follower moves toward the inside (toward the left side in this figure) along the diagonal groove provided inside the free wheel hub handle. As a result, the free wheel hub clutch which is attached to the follower by means of springs will move toward the inside along the spline of the free wheel hub body. This operation causes the free wheel hub clutch to mesh with the spline of the free wheel hub inner. Consequently, the driving force from the drive shaft is transmitted to the front wheel hub.



WRU90-FS009

2. AUTOMATIC LOCKING HUB

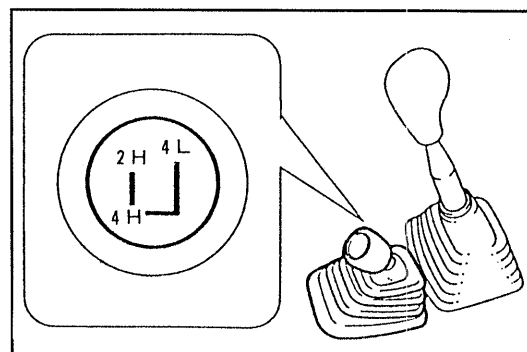
The automatic locking hub is a mechanism whereby the switching of power flow is made automatically so that the driving force from the front drive shaft can be transmitted to the front wheel or no driving force can not be transmitted to the front wheel when the transfer lever is shifted from the [2H] position to the [4H] position or the [4L] position and the vehicle is run.

WRU90-FS010

How to operate

1. [FREE] STATE TO [LOCK] STATE

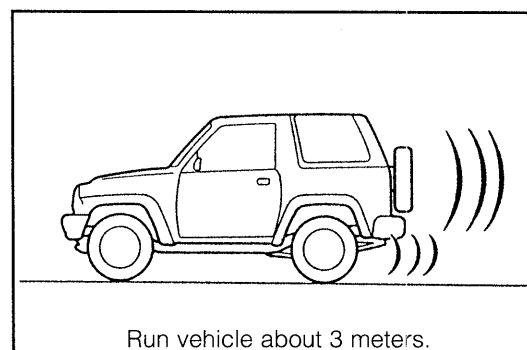
- (1) With the vehicle in a stationary state, shift the transfer shift lever from the [2H] position to the [4H] position or the [4L] position.
- (2) With the steering wheel set to a straight-ahead position, slowly move off the vehicle and run it approximately more than 3 meters. Then, the vehicle is put automatically under the [LOCK] condition.



WRU90-FS011

NOTE:

- When the vehicle runs in a direction opposite to the former direction before stopping (forward movement ↔ backward movement) after the vehicle has been run with the transfer shift lever placed in the [4H] or [4L] position and with the automatic locking hub set to the [LOCK] state and the vehicle has been stopped, the automatic locking hub will be switched from the [LOCK] state to the [FREE] state and will become the [LOCK] state again.

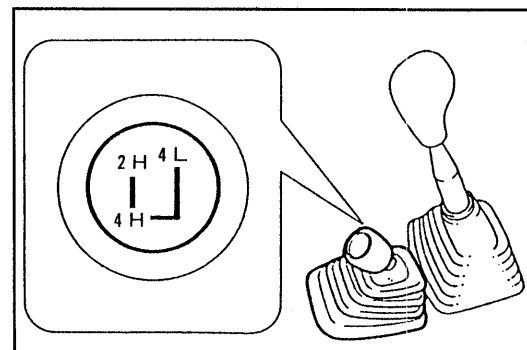


Run vehicle about 3 meters.

WRU90-FS012

2. [LOCK] STATE TO [FREE] STATE

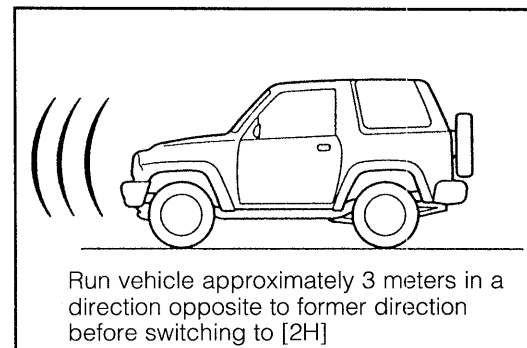
- (1) With the vehicle in a stationary state, shift the transfer shift lever from the [4H] or [4L] position to the [2H] position.
- (2) With the steering wheel set to a straight-ahead position, slowly move off the vehicle in a direction opposite to the former direction before the switching to [2H] position and run the vehicle approximately more than 3 meters. Then, the vehicle is put automatically under the [FREE] condition.



WRU90-FS013

NOTE:

- If the vehicle is moved off in the same direction as the former direction before the switching to the [2H] position in the operation described in Step (2) above, the vehicle will run under the [LOCK] lock state continually.



Run vehicle approximately 3 meters in a direction opposite to former direction before switching to [2H]

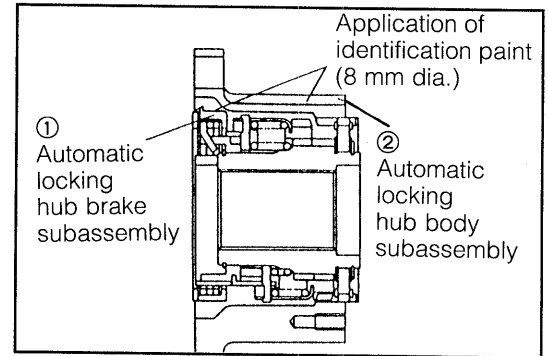
WRU90-FS014

Handling Instructions on Automatic Locking Hub

- Avoidance of Ratcheting Phenomenon

The ratcheting phenomenon means a gear clashing noise which occurs when the automatic locking hub clutch meshes with the automatic locking hub body if there exists a difference in rotational speed between these two components.

When such phenomenon occurs, first stop the vehicle. Again place the transfer in the 4WD position. Slowly move off the vehicle straight. Then, proceed to drive the vehicle normally.



WRU90-FS400

1. Prohibition of shifting operation of transfer during running

If the transfer should be shifted from the 2WD to the 4WD during the running, the aforesaid ratcheting phenomenon would occur. Hence, do not shift the transfer during the running.

2. Observance of driving straight immediately after transfer shifting When the automatic locking hub is shifted from the Free position to the Lock position, first stop the vehicle. Then, be certain to move off the vehicle with the steering wheel held in a straight-ahead state and run the vehicle at least 3 meters under this state.

If the steering wheel should be turned before the vehicle has been run at least 3 meters, one hub of the automatic locking hubs at the right and left sides may be locked and the other hub may become free, thereby causing the ratcheting phenomenon to occur.

3. Avoidance of sudden moving off

If the vehicle should be moved off suddenly after the transfer has been shifted from the 2WD to the 4WD, the ratcheting phenomenon might occur. Hence, make sure to avoid moving the vehicle suddenly.

4. Shifting of transfer during running on muddy terrain

If you want to get the vehicle out from a muddy terrain or on snowy roads or the like by shifting the transfer from the 2WD to the 4WD while the rear wheels are slipping on these roads, perform the locking slowly, using the half clutch so as to prevent the occurrence of ratcheting phenomenon.

5. Observance of driving vehicle under 4WD mode during extremely cold climate [below – 15°C (5°F)]

If the vehicle should be run under the 2WD mode with the automatic locking hub in the free state, the vehicle may assume the 4WD mode owing to high viscosity of the transfer oil. Consequently, the ratcheting phenomenon may occur. Therefore, during extremely cold climate, drive the vehicle under the 4WD mode until the warming-up is completed.

WRU90-FS401

6. Handling during extremely cold climate [below – 15°C (5°F)]

There are many instances where the automatic locking hub fails to become free when the automatic locking hub is in the locked state and you try to unlock it by shifting the transfer shift lever to the 2WD position and by driving the vehicle reversely. This is because the viscosity of the transfer oil is too high. Hence, be certain to drive the vehicle under the 4WD mode until the warming-up is completed.

In this case, after completion of the warming-up operation, shift the transfer from the 4WD to the 2WD.

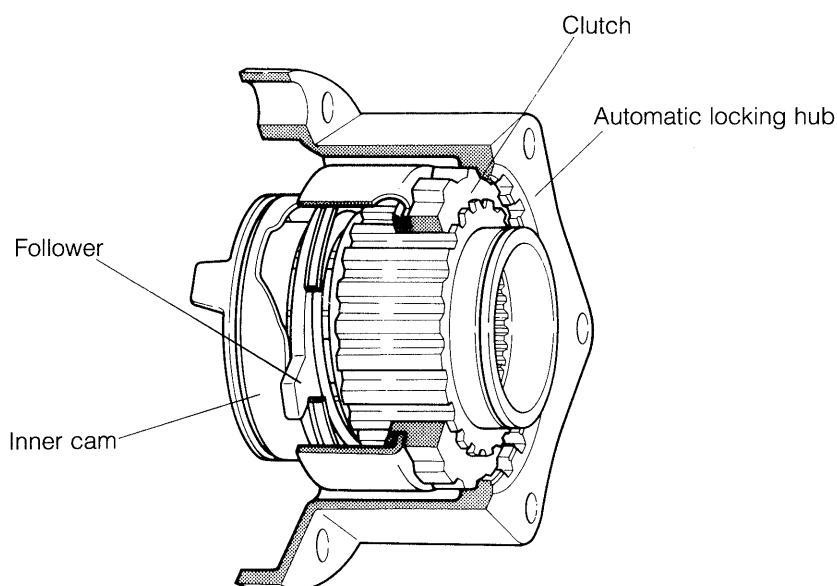
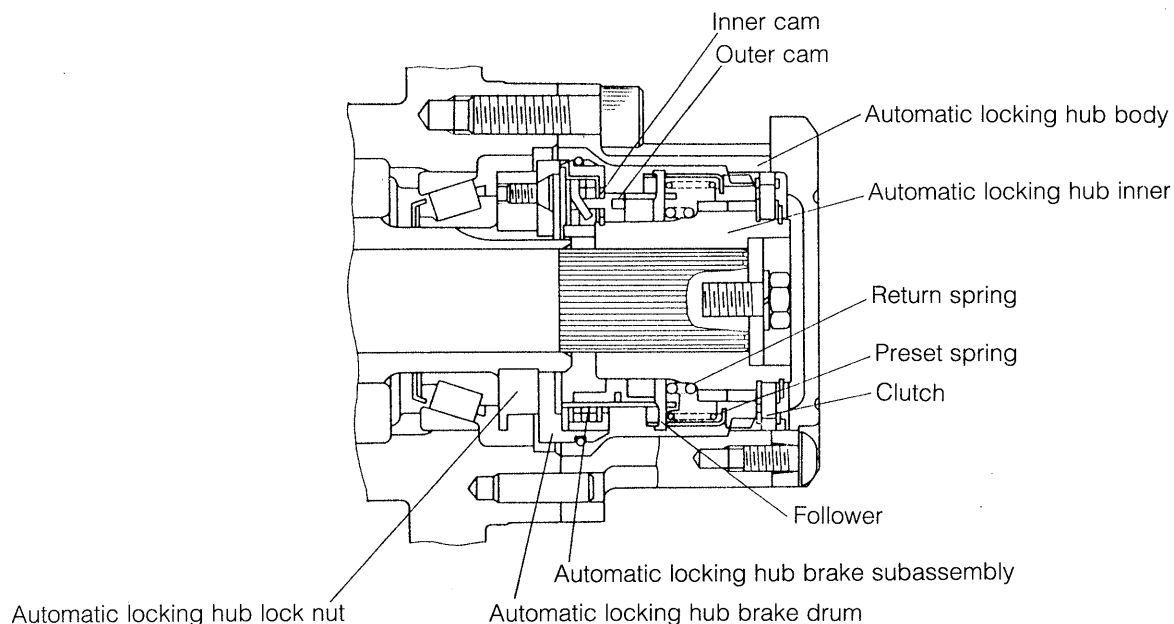
7. Do not soil or wipe off the grease that has been applied to the automatic locking hub brake subassembly. Failure to observe this caution makes it impossible to reuse the brake subassembly.

WRU90-FS402

FRONT AXLE & SUSPENSION

Construction

- The automatic locking hub assembly consists of the automatic locking hub lock nut, automatic locking hub brake drum, automatic locking hub brake subassembly, outer cam, inner cam, automatic locking hub body, clutch and so forth.
- The inside of the automatic locking hub inner is spline- connected to the front drive shaft. On its outside are mounted the clutch and so forth. On the other hand, the automatic locking hub body is mounted on the front wheel hub. Furthermore, the inside of the automatic locking hub body is provided with spline so that it may connected with the clutch.
- On the clutch are attached the follower, two springs, inner cam and outer cam.
- The automatic locking hub brake drum is attached to the hub lock nut with screws.



Operation

• AUTOMATIC LOCKING HUB [FREE] STATE TO [LOCK] STATE

When the drive shaft turns after the transfer shift lever has been shifted to the [4H] or [4L] position and the vehicle has been moved off, the automatic locking hub inner and follower which are connected with each other through spline will turn as an integral unit. (The follower is connected by means of the outer spline of the automatic locking hub inner.)

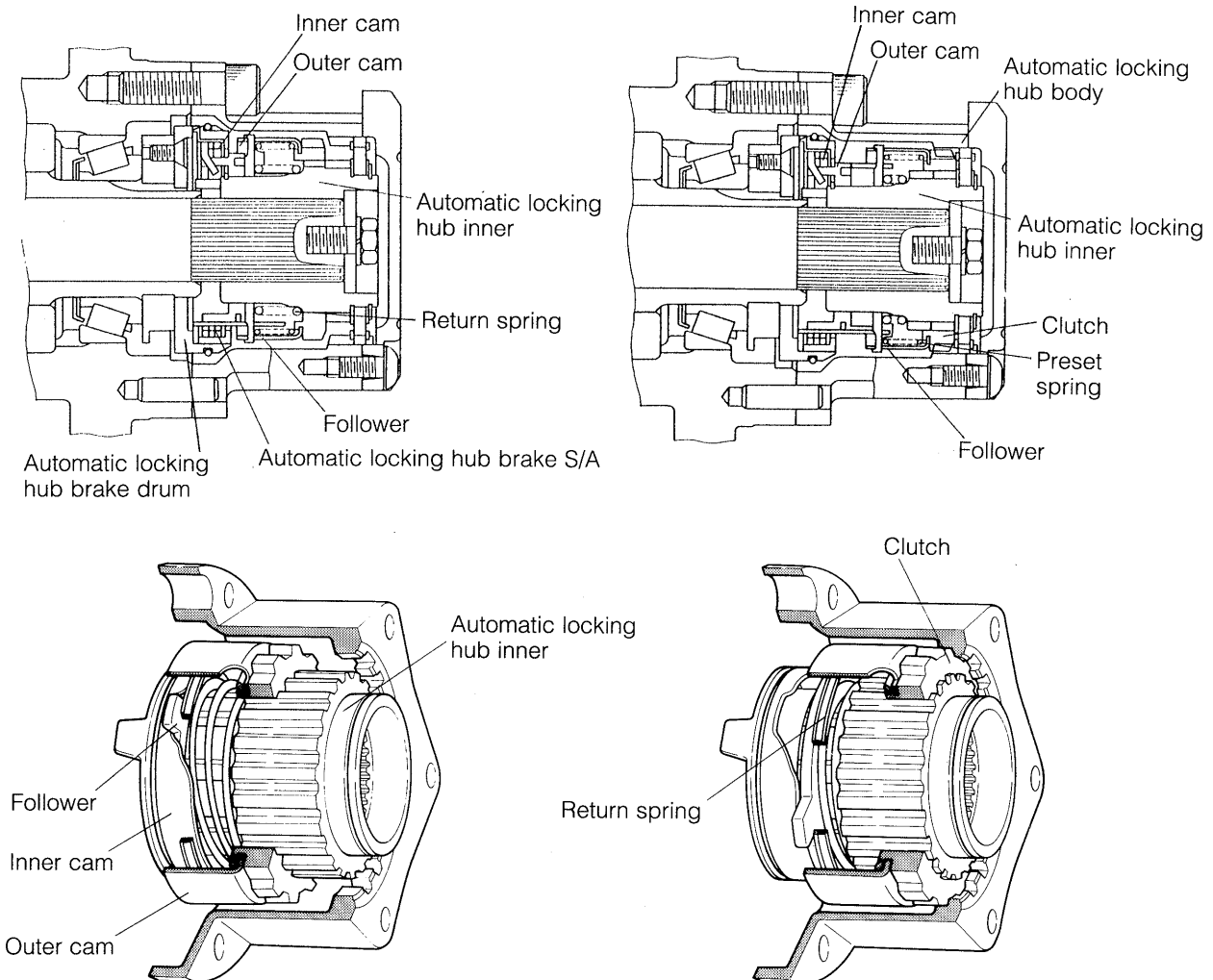
On the other hand, the inner and outer cams tend to remain in their position because of the operation of the automatic locking hub brake subassembly. As a result, the follower moves toward the outside while turning along with the diagonal surface of the inner cam. (The follower moves toward the right side in the figure below.) Refer to Reference 1 in the following pages.

When the follower moves toward the outside, the clutch, too, which is pushed by the spring tension, will move toward the outside. Thus, the clutch meshes with the inner spline of the automatic locking hub body, thereby transmitting the driving force from the drive shaft to the front tire via the front wheel hub.

Moreover, the point where the automatic locking hub is locked corresponds to the point where the rotation of the follower is prevented by means of the outer cam (i.e. a point where the movement toward the outside is completed). Refer to Reference 2 in the following pages.

[Reference]

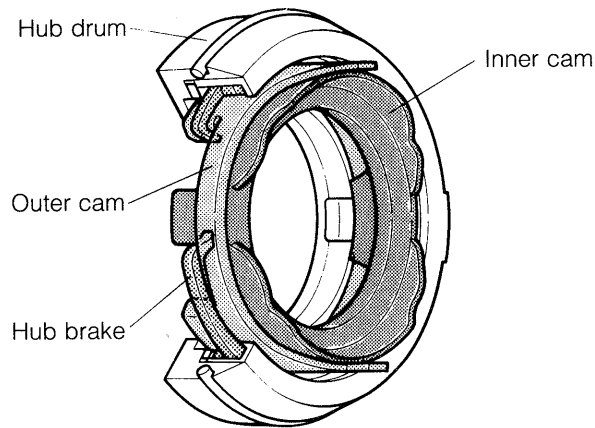
When the locking of the automatic locking hub is completed, the outer cam rotates in the automatic locking hub brake drum, while sliding together with the automatic locking hub brake subassembly.



FRONT AXLE & SUSPENSION

[Reference 1]

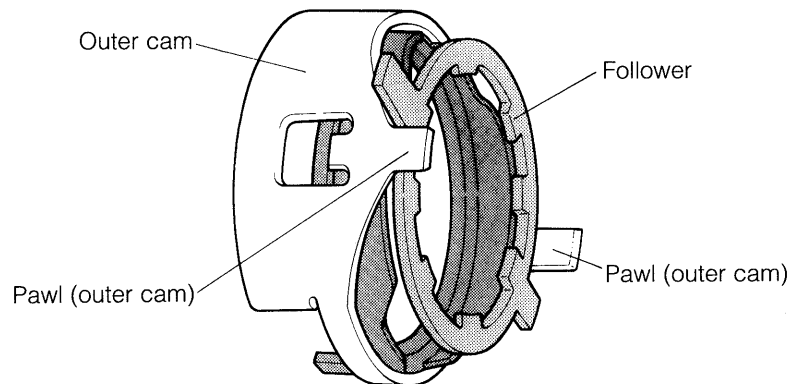
- ① The inner and outer cams have a pawl, respectively. Also, the automatic locking hub brake has an involute- shaped pawl.
- ② In the beginning of the [LOCK] phase, both the inner and inner cams are turning. Thus, their respective pawls are contacting with the pawl of the automatic locking hub brake. At this stage, the hub brake expands because of its involute shape. Consequently, the friction relative to the automatic locking hub brake drum is on the increase, finally stopping the rotation of the inner and outer cams.



WRU90-FS017

[Reference 2]

The outer cam has two pawls; One pawl which functions relative to the automatic locking hub brake and the other pawl which is located at the opposite side. When the follower makes contact with the latter pawl, the rotation of the follower is stopped.



WRU90-FS018

• AUTOMATIC LOCKING HUB [LOCK] STATE TO [FREE] STATE

When the transfer shift lever is shifted to the [2H] position and the vehicle is run approximately 3 meters in a direction opposite to former direction before switching to [2H], the automatic locking hub body and the automatic locking hub inner as well as the follower start to rotate as a unit, for power is transmitted from the tires. (The drive shaft and clutch, too, rotate as a unit, until the lock is released.)

Since the follower is connected by means of the outer spline of the automatic locking hub inner and it is pushed against the diagonal surface of the inner cam by the spring tension, the follower rotates as an integral unit as the automatic locking hub inner. As a result, the follower moves toward the inside while turning along with the diagonal surface of the inner cam. (The follower moves toward the left side in the figure below.)

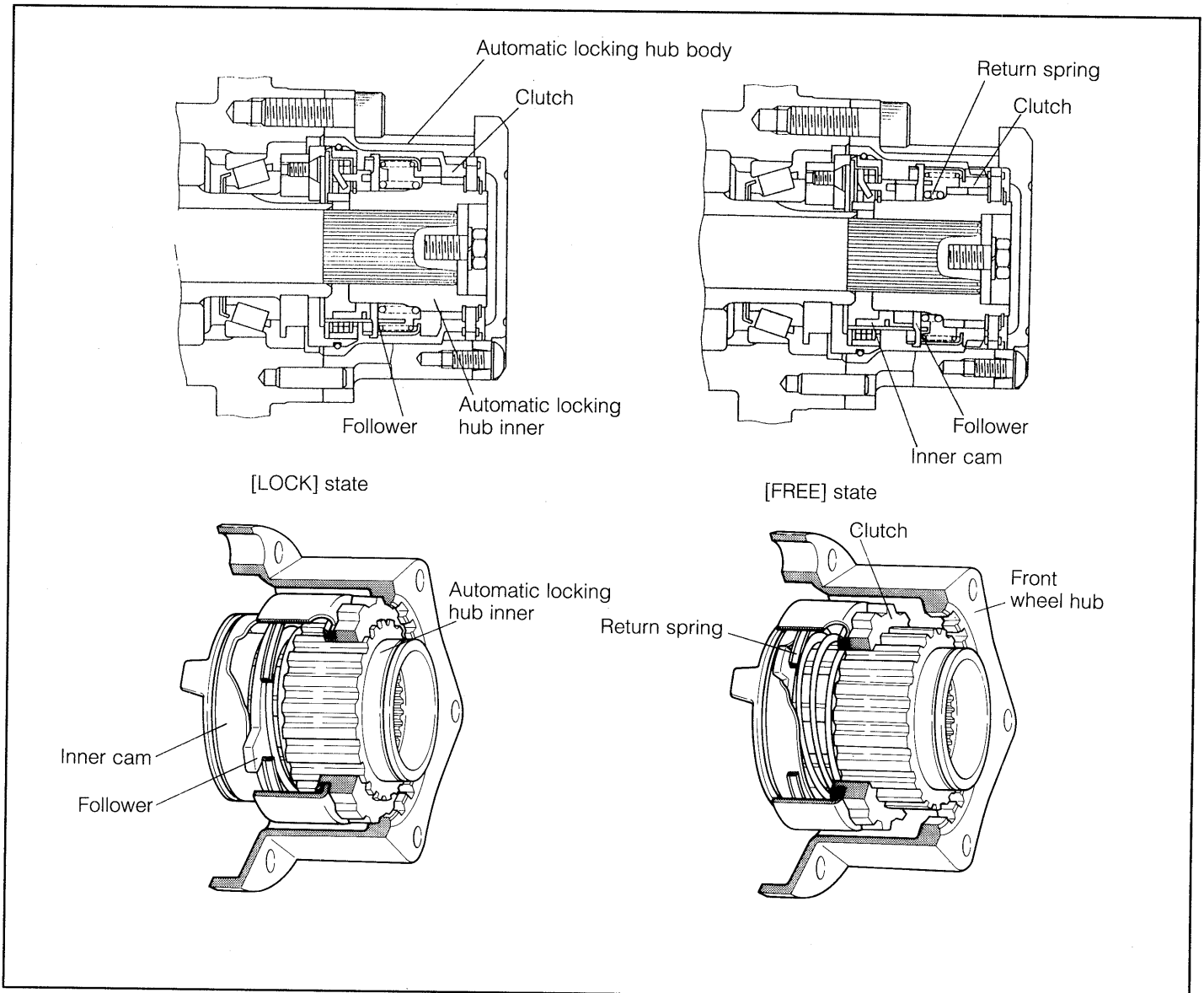
At this stage, the inner and outer cams tend to remain at their position, for their rotation is restricted by the automatic locking brake subassembly.

When the follower moves toward the inside, the clutch, too, will move because of the spring tension. Therefore, the meshing of the clutch with the inner spline of the front wheel hub will be disengaged.

Consequently, the driving force from the tire side will no longer be transmitted. Moreover, the point where the automatic locking hub is freed corresponds to the point where the rotation of the follower is prevented by means of the outer cam (i.e. a point where the movement toward the inside is completed).

[Reference]

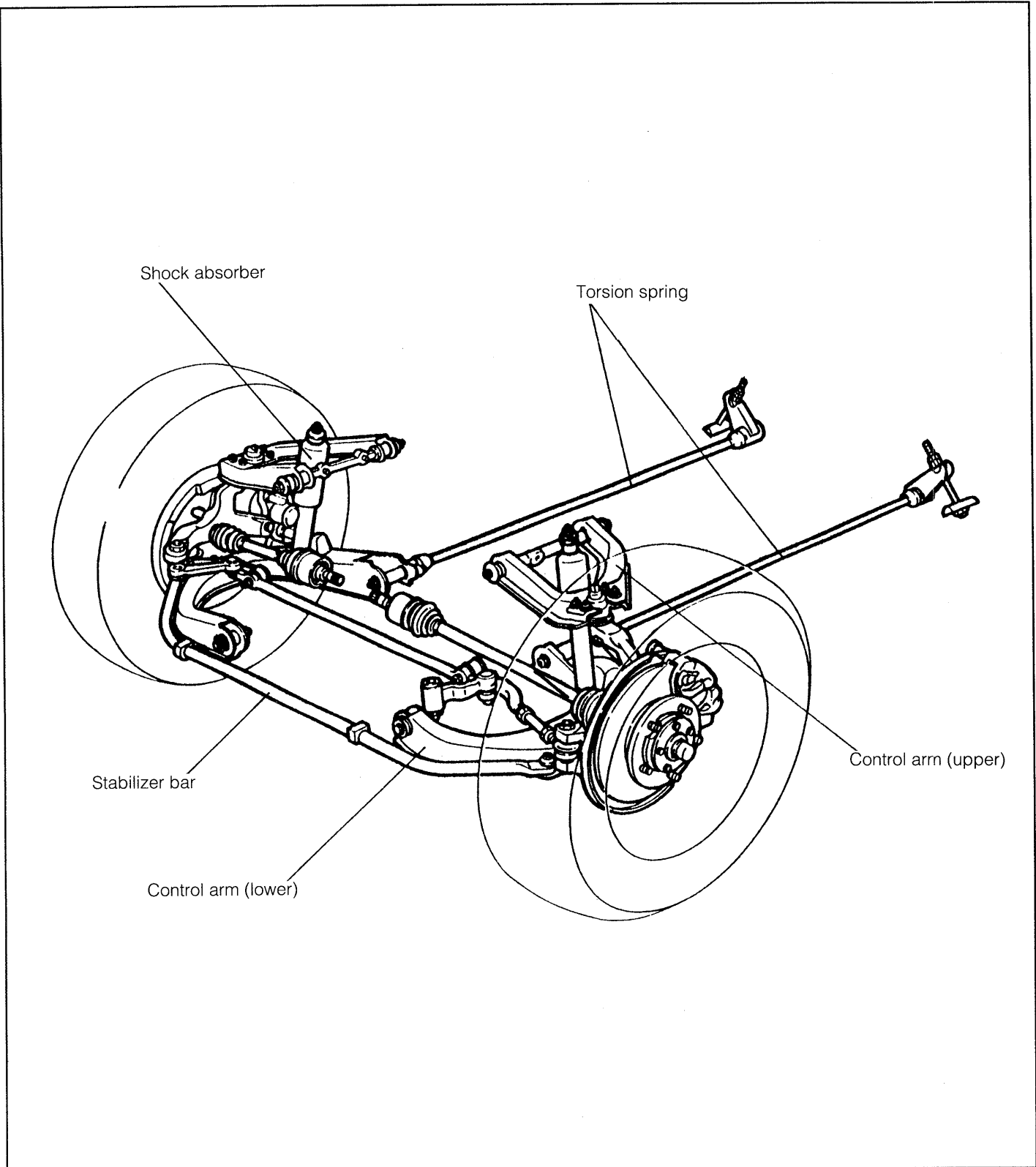
To change the mode from the [LOCK] state to the [FREE] state, refer to the "How to Operate" under Section "Automatic Locking Hub," 2.



FRONT AXLE & SUSPENSION

FRONT SUSPENSION

- The front suspension employs a double wishbone type where the vehicle body weight is sustained by two control arms.
- The springs adopt a torsion bar spring featuring light weight and a comparatively great energy absorption rate per unit weight.
- The shock absorbers employ a nitrogen-sealed type shock absorber.
- For improved running stability, a stabilizer bar is provided.

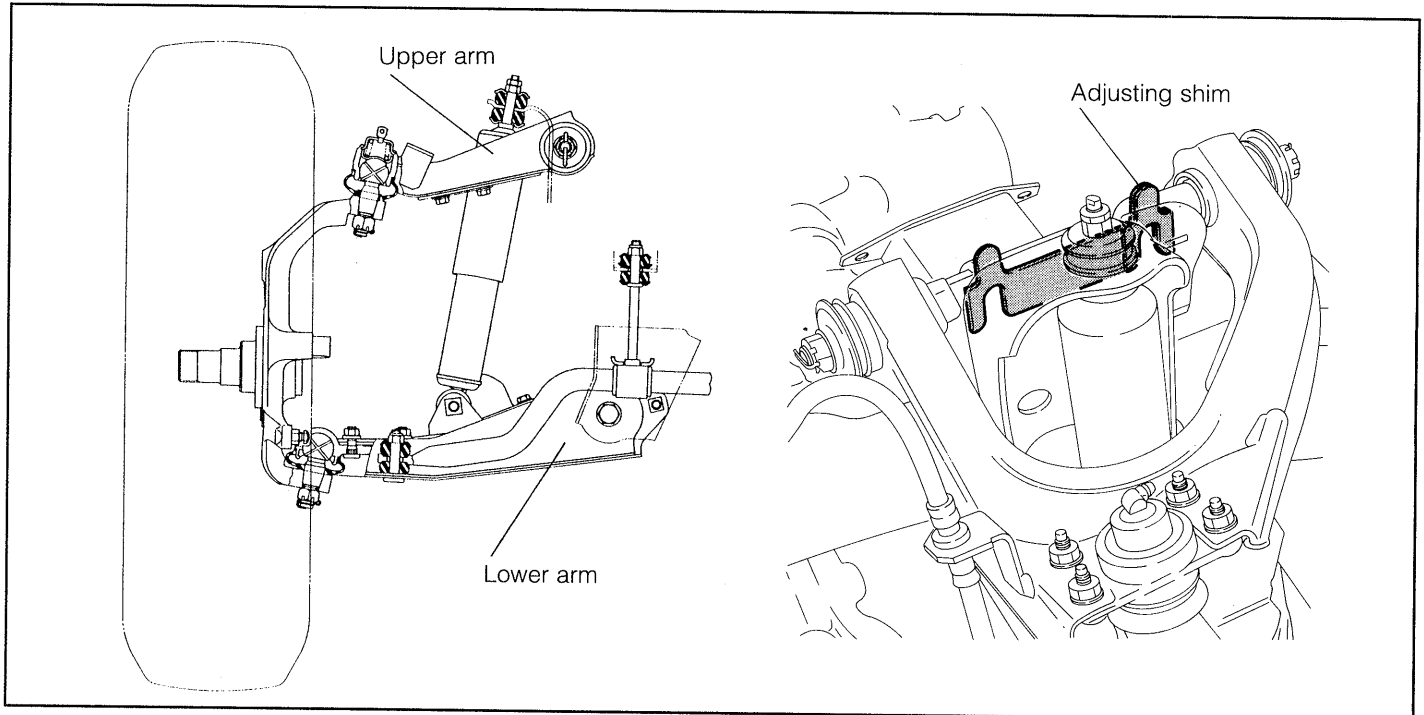


WRU90-FS020

Upper arms & lower arms

The front suspension employs a double wishbone type. In the suspension of this type, the driving, braking, lateral forces and so forth of the front wheels are supported by means of the upper and lower control arms. The camber and caster angles can be altered by changing the thickness of the adjusting shims for the upper arm.

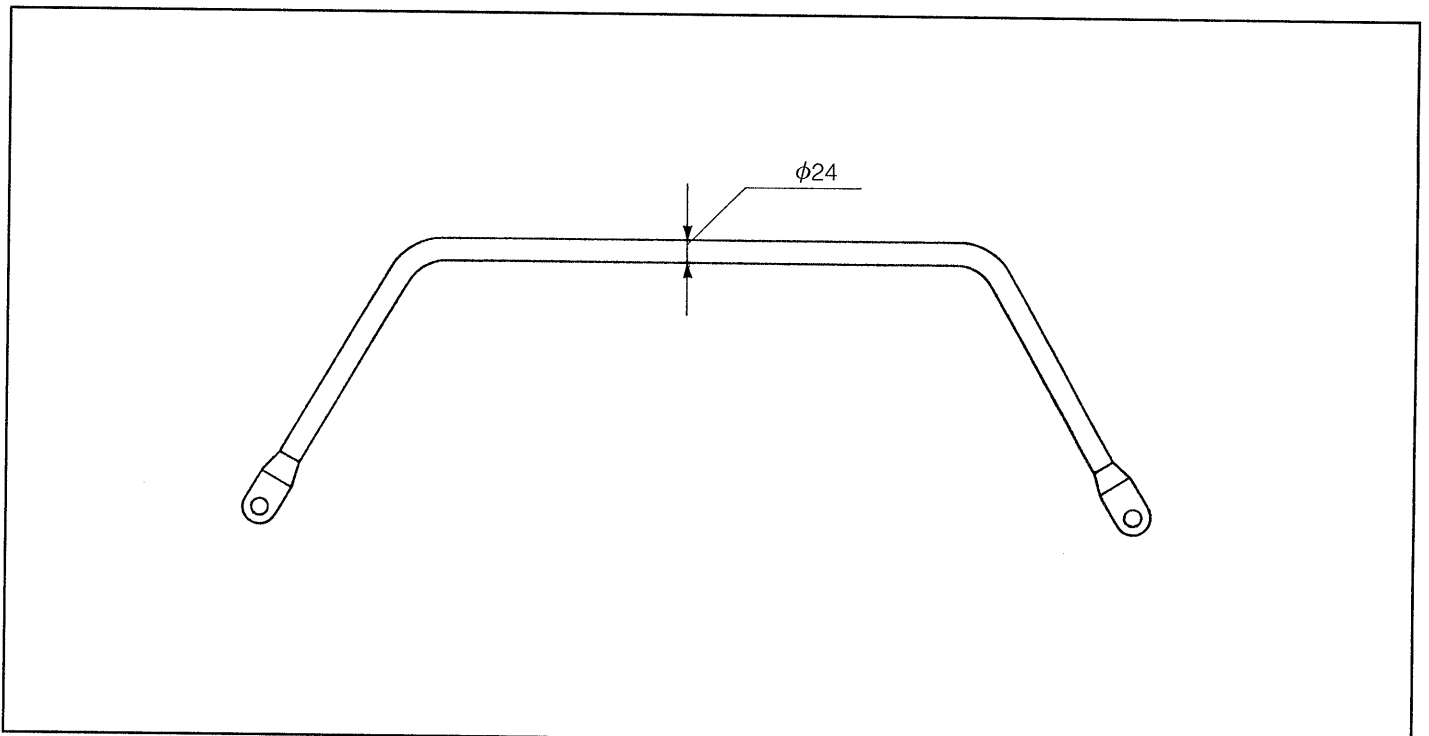
The camber angle decreases when the thickness of adjusting shims for the upper arm is increased. Furthermore, the caster angle can be altered by changing the thickness of adjusting shims for the upper arm at the forward side or the backward side.



WRU90-FS021

Stabilizer bar

For improved running stability, the stabilizer bar is standard equipment on all vehicle models. It is provided between the lower arms at the right and left sides.

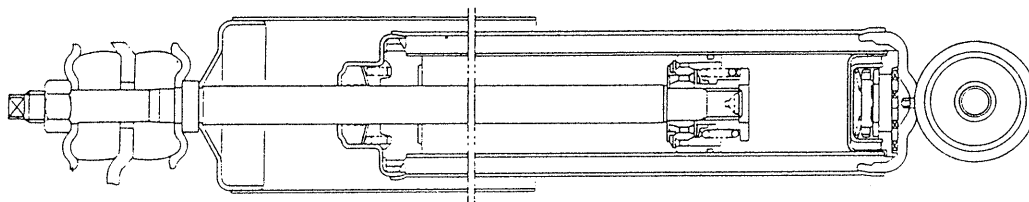


WRU90-FS022

FRONT AXLE & SUSPENSION

Front shock absorbers

The front shock absorbers employ a nitrogen-sealed type shock absorber.

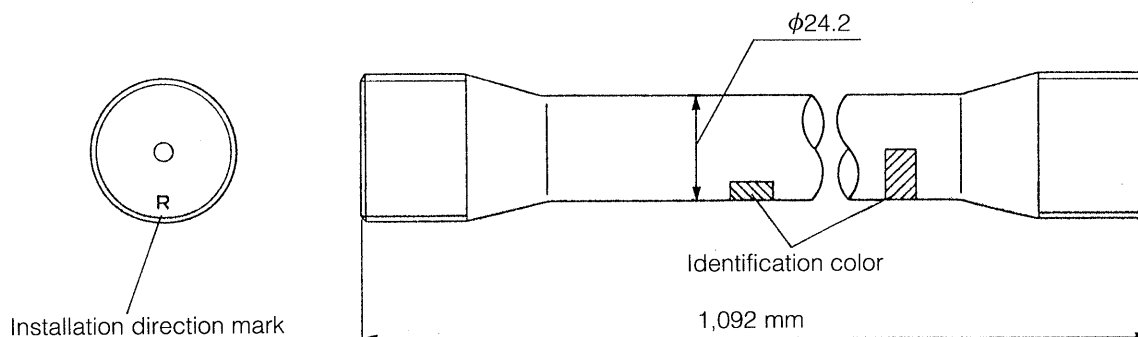


WRU90-FS023

Front springs

The front springs adopt a torsion bar spring that features light weight and a comparatively great energy absorption rate per unit weight.

The torsion bar springs come in two kinds; One for the right side and the other for the left side. Hence, make sure that the respective springs are installed at the correct side. If the springs should be installed at a wrong side, the durability will drop.



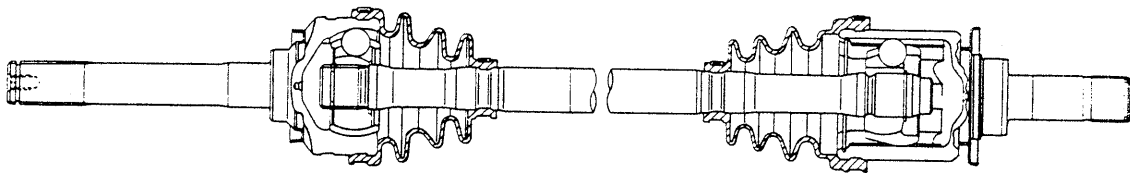
WRU90-FS024

DRIVE SHAFTS

The drive shafts are used to drive the front wheels. Their outboard joint employs a birfield type constant-velocity joint, whereas their inboard joint adopts a double offset type constant-velocity type joint.

The outboard joint at the tire side compensates for the angle change of the steering tire, while the inboard joint at the differential side compensates for the wheel movement in an up-and-down direction as well as in an axial direction.

Consequently, the power from the engine can be transmitted smoothly under various running conditions.



WRU90-FS025

FRONT AXLE & SUSPENSION

Front suspension specifications

Vehicle model			All models
Item			
Wheel alignment	Toe-in mm (inch)		$4 \begin{smallmatrix} -1 \\ -3 \end{smallmatrix}$ (0.16 $\begin{smallmatrix} -0.04 \\ -0.12 \end{smallmatrix}$)
	Camber degree		$1^{\circ} \begin{smallmatrix} +0 \\ -1 \end{smallmatrix}$
	Caster degree		$2^{\circ} \pm 30$
	Kingpin inclination angle degree		$9^{\circ}30'$
	Tire turning angle (degree)	Inside degree	$27^{\circ}05' \begin{smallmatrix} +0 \\ -3 \end{smallmatrix}$
		Outside degree	$23^{\circ}55'$
Torsion bar spring	Overall length mm (inch)		1,092 (42.99) [1,048 (41.26) effective length]
	Outer diameter mm (inch)		23.5 (0.93)
	Spring constant kg/mm (lb/inch)		2.29 (128.23) [As installed]
	Identification color	Right side	Orange (marking RH)
		Left side	Light blue (marking LH)
Shock absorber	Damping force (at piston speed of 0.3 m/sec)	Rebound stroke kg (lb)	200 (440.9)
		Compression stroke kg (lb)	37 (81.57)
Stabi-lizer	Outer diameter mm (inch)		24 (0.94)
	Spring constant kg/mm (lb/inch)		2.83 (158.47)
Drive shaft	Manufacturer		Toyota Koki
	Shaft overall length	Left side mm (inch)	956.3 (37.65)
		Right side mm (inch)	671.7 (26.44)
	Shaft diameter mm (inch)		25.5 (1.01)
	Joint type	Wheel side	Birfield type
		Differential side	Double offset type
	Grease to be used	Wheel side	Morilex S No. 2
		Amount to be applied g (oz)	90 ± 10 (3.18 \pm 0.35)
		Differential side	Morilex S No. 2
		Amount to be applied g (oz)	170 ± 10 (6.00 \pm 0.35)

WRU92-FS411

WHEELS & TIRES

NOTE:

- The tires should exhibit no damage, such as excessive wear, uneven wear and scratches.
- Any foreign matter, such as grit caught in the groove of the tire, should be removed in advance.
- The tires should not be so worn that slip signs appear on their tread surfaces.

WRU90-FS028

1. Check of tire size

Confirm the following points.

- (1) Ensure that the tires having the designated tire size are mounted.

Designated Tire Size:

P205/75 R15

P225/70 R15

- (2) Ensure that the four tires have the same size and they are ones made by the same manufacturer.

- (3) There is no significant difference in wear between the right and left tires.

WRU90-FS029

2. Tire inflation pressure

Ensure that the tires are inflated to the specified air pressure.

Specified Value

kgf/cm²(psi)

	FRONT	REAR
P205/75 R15	1.8 (26)	2.4 (35)
P225/70 R15	1.8 (26)	2.4 (35)

NOTE:

- The tire inflation pressure should be adjusted when the tire temperature is at the ambient temperature (prior to the running).
- The tire inflation pressure should be adjusted under the unloaded state.

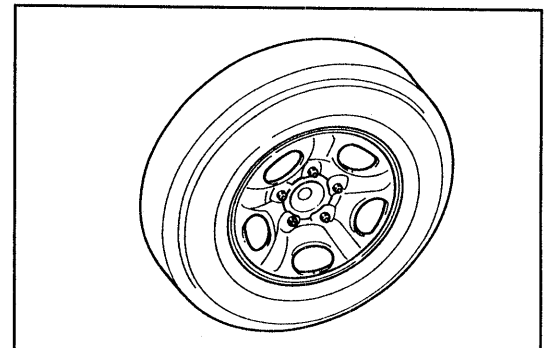
WRU90-FS030

3. Check of disc wheel and tire

- (1) Ensure that the disc wheel exhibits no damage, such as deformation and cracks.

If any damage is present, replace the disc wheel.

- (2) Jack up the vehicle and support it with safety stands. (See GI section.)



WRU90-FS031

FRONT AXLE & SUSPENSION

- (3) Check the wheel and tire for runout, using a dial gauge. Ensure that the runout is within the allowable limit.

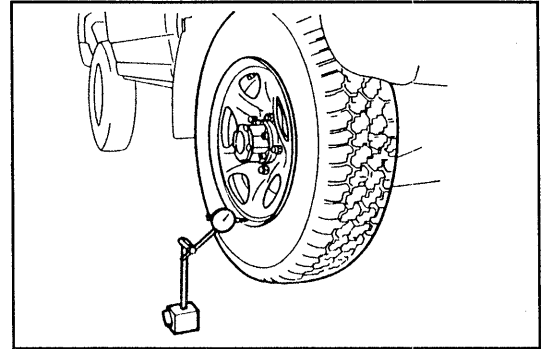
Wheel Maximum Runout:

Mean value of runouts at front and rear sides not to exceed 1.0 mm (0.04 inch)

Tire Maximum Runout:

Vertical Runout: Not to Exceed 1.4 mm
(Not to Exceed 0.0551 inch)

Lateral Runout: Not to Exceed 2.0 mm
(Not to Exceed 0.0787 inch)

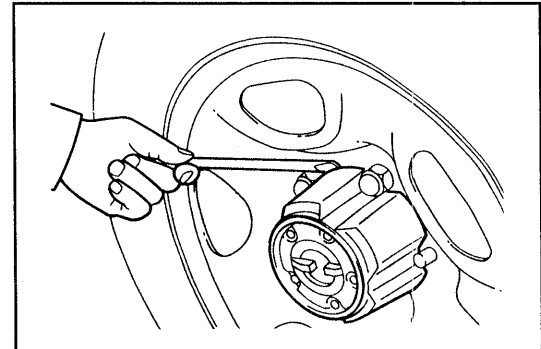


WRU90-FS032

- (4) Jack down the vehicle.

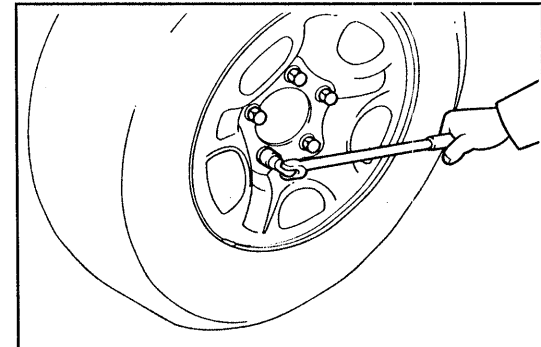
4. Removal and installation of tire

- (1) Pry off the center cap by inserting an L type handle into between the wheel and the center cap.



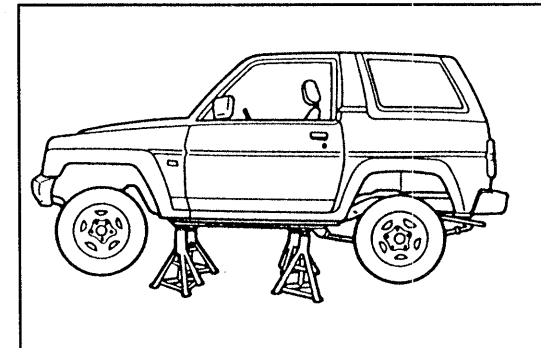
WRU90-FS033

- (2) Slightly loosen the wheel lug nuts in the sequence indicated in the right figure.



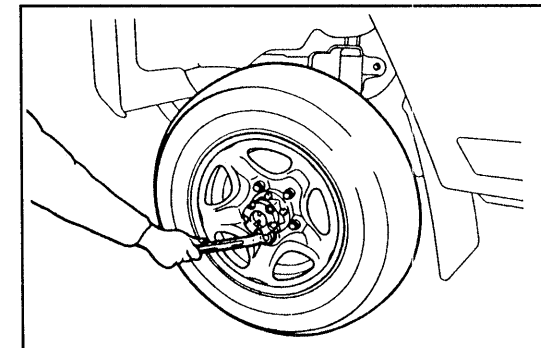
WRU90-FS403

- (3) Jack up the vehicle and support it with safety stands. (See GI section.)



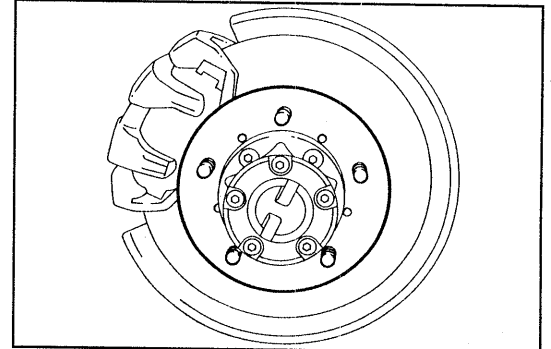
WRU90-FS034

- (4) Remove the wheel hub nuts. Remove the wheel from the vehicle.



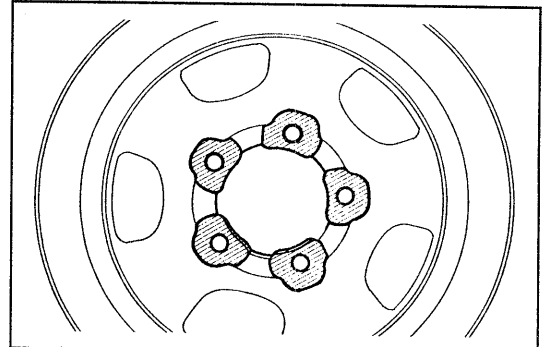
WRU90-FS035

- (5) Ensure that no foreign matter, such as dirt, is stuck on the wheel attaching surface at the vehicle side.



WRU90-FS036

- (6) Ensure that no foreign matter is stuck to the wheel attaching surface.

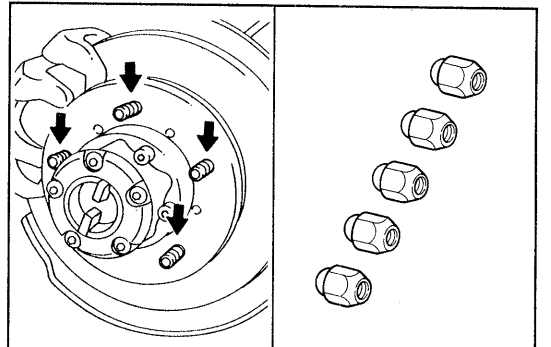


WRU90-FS037

- (7) Ensure that the hub bolts and hub nuts exhibit no damage.

If any hub bolt or hub nut exhibits damage, replace the damaged hub bolt and/or hub nut.

- (8) Attach the wheel to the vehicle. Temporarily tighten the hub nut, until the wheel can be secured.



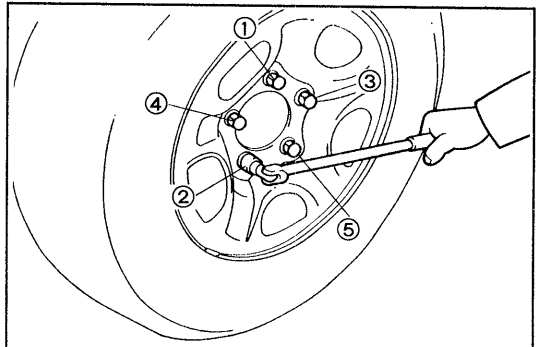
WRU90-FS038

- (9) Jack down the vehicle.

- (10) Evenly tighten the wheel lug nuts to the specified torque over two or three stages in the sequence indicated in the right figure.

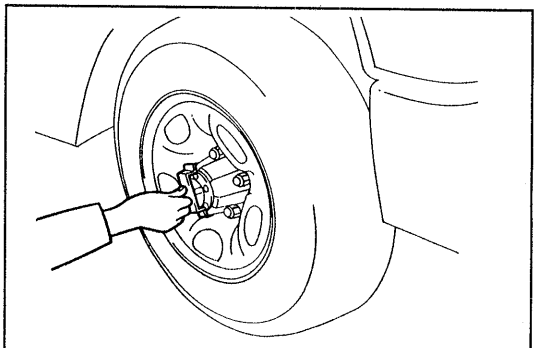
Tightening Torque:

9.0 - 12.0 kgf-m (65.1 - 87.0 ft-lb, 89.2 - 118 N·m)



WRU90-FS040

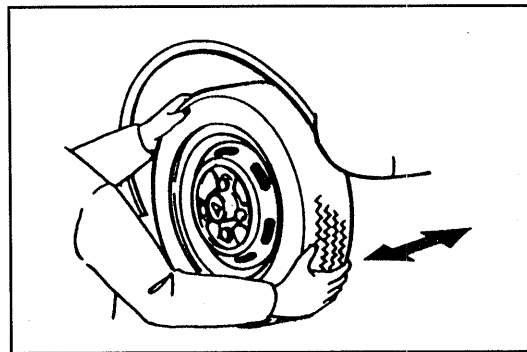
- (11) Attach the vehicle tool indicated in the right figure to the wheel cap. Press the wheel cap to the wheel.



WRU90-FS041

FRONT AXLE & SUSPENSION

5. Check of each related part for excessive play
 - (1) Front wheel bearing for excessive play
 - (2) Suspension ball joint for excessive play
 - (3) Steering linkage for excessive play and deformation
 - (4) Suspension-related parts for excessive play and deformationCheck the items above by rocking the tire in a fore-&-aft direction as well as in a right-&-left direction.



WRU90-FS042

FRONT WHEEL ALIGNMENT

TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Tire unevenly worn at inner side	Toe-in amount too small Camber amount too small	Check toe-in. Check camber.
Tire unevenly worn at outer side	Toe-in amount too large or camber amount too large	Check toe-in. Check camber.
Turning effort is too great when steering wheel is turned with vehicle in stationary state.	Caster angle too large Tire air inflation pressure too low	Check caster. Check tire air inflation pressure.
Vehicle pulls to one side continuously while straight-ahead driving.	Caster angle too small Excessive difference in camber angle between right and left sides	Check caster. Check camber.
Vehicle pulls to one side during braking.	Kingpin angle improperly set	Check upper arm bush. Check upper arm for damage or deformation. Check upper arm ball joint for excessive play. Check lower arm bush. Check lower arm for damage or deformation. Check lower arm ball joint for excessive play. Knuckle deformed Check frame dimensions at installation side of suspension upper arm and lower arm.

WRU90-FS043

PRELIMINARY CHECK ITEMS

1. Check of tire size and tire wear
Ensure that the tires having the designated size are mounted and that there is no significant difference in wear between the right and left tires.

Designated Tire Size:

P205/75 R15

P225/70 R15

WRU90-FS044

2. Check of tire inflation pressure
Set the tire inflation pressure to the specified value in accordance with the designated tires mounted.

Specified Value

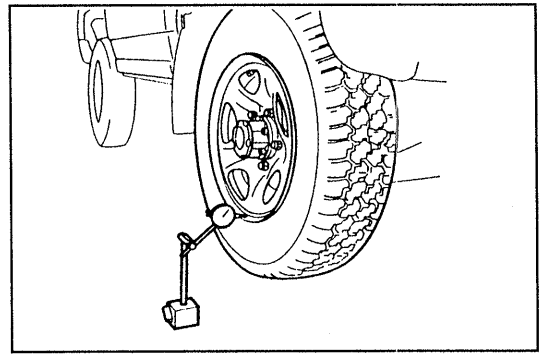
kgf/cm² (psi)

	FRONT	REAR
P205/75 R15	1.8 (26)	2.4 (35)
P225/70 R15	1.8 (26)	2.4 (35)

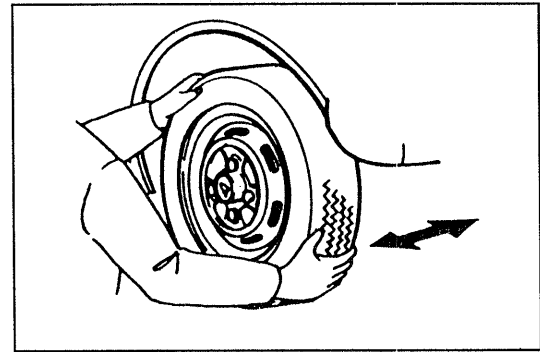
WRU90-FS045

FRONT AXLE & SUSPENSION

3. Check of disc wheel and tire runout
 - (1) Check the disc wheel for runout, using a dial gauge.
Allowable Limit: Mean value of runouts at front and rear sides not to exceed 1.0 mm (0.04 inch)
 - (2) Check the tire for runout, using a dial gauge.
Radial Runout: Not to Exceed 1.4 mm.
(Not to Exceed 0.0551 inch.)
Lateral Runout: Not to Exceed 2.0 mm.
(Not to Exceed 0.0787 inch.)
4. Check of suspension-related sections for bolt and nut tightness.
5. Check that the front shock absorber operates correctly while rocking the vehicle body.



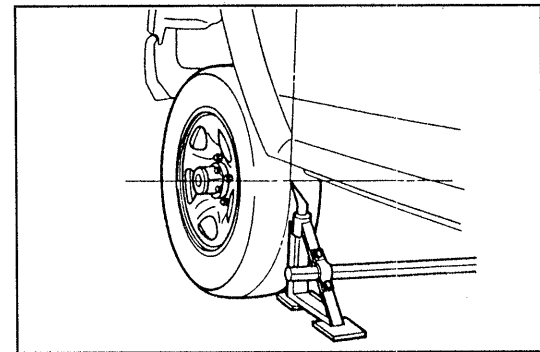
WRU90-FS046



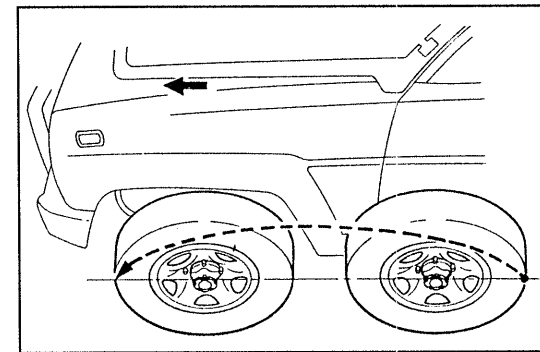
WRU90-FS047

Toe-in check

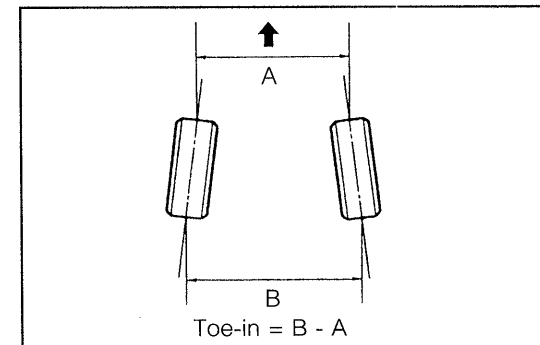
1. Move the vehicle forward so that the front wheels becomes straight.
2. Apply a toe-in gauge to the center point of the height at the rear side of each front wheel of the vehicle.
3. Mark the tread center at the rear side of each front tire. Measure the distance between the marks.
4. Move the vehicle slowly until the front wheels turn 180 degrees.
5. Measure the distance between the marks at the front side of each front wheel. Determine the toe-in amount by calculating the difference.
Specified Value: $4 \begin{smallmatrix} -1 \\ -3 \end{smallmatrix} \text{ mm } (0.16 \begin{smallmatrix} -0.04 \\ -0.12 \end{smallmatrix} \text{ inch})$



WRU90-FS048



WRU90-FS049



WRU92-FS412

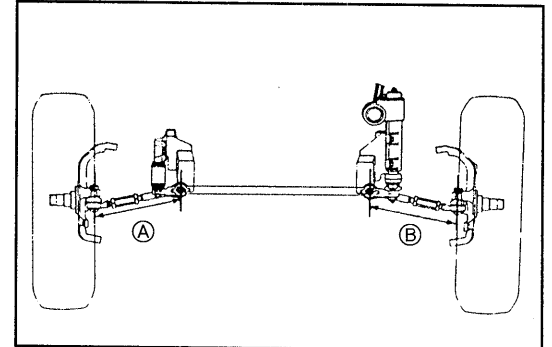
If the toe-in amount fails to conform to the specification, adjust the tie rod length by turning the tie rod adjusting tube the same amount at the right and left sides, until the difference in length between the right and left tie rods (A) and (B) shown in the right figure becomes within 3 mm (0.118 inch).

<Tie Rod Tightening Procedure>

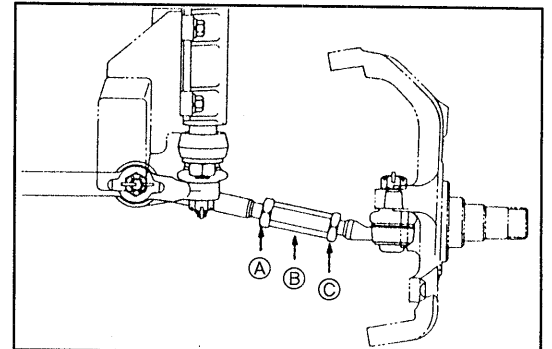
1. Tighten the tie rod by turning the nut (A), with a wrench applied to the section (B) shown in the right figure.
2. Tighten the tie rod by turning the nut (C), with a wrench applied to the section (B) shown in the right figure.

Tightening Torque:

12 - 17 kgf-m (87.0 - 123 ft-lb, 118 - 167 N·m)



WRU90-FS051

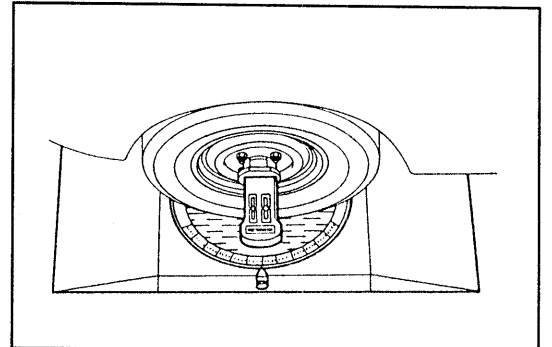


WRU90-FS052

Camber check and caster check

1. Place the wheel on a turning radius gauge.
2. Remove the free wheel hub cover.
3. Align the forward end of the center rod of the camber, caster and kingpin gauge with the center of the drive shaft section.

Proceed to make the forward end of the center rod closely contact with the hub body.



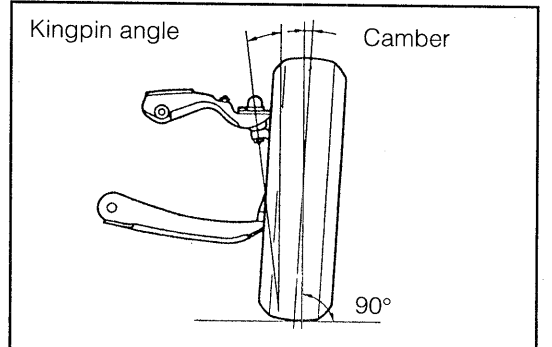
WRU90-FS53

4. Camber measurement

Specified Camber Amount: $1^{\circ} \begin{smallmatrix} +0^{\circ} \\ -1^{\circ} \end{smallmatrix}$

NOTE:

- The measurement should be performed in the same way at the right and left wheels.



WRU90-FS054

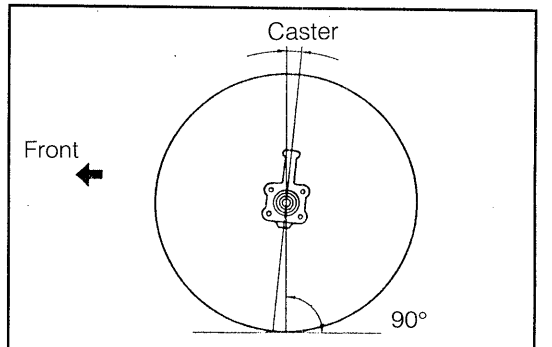
5. Caster measurement

Specified Caster Amount: $2^{\circ} \pm 30'$

Specified Kingpin Angle: $9^{\circ}30'$

NOTE:

- For the alignment checks, turn the steering wheel until the reading of the turning radius gauge becomes 20 degrees at the right wheel or the left wheel, respectively.

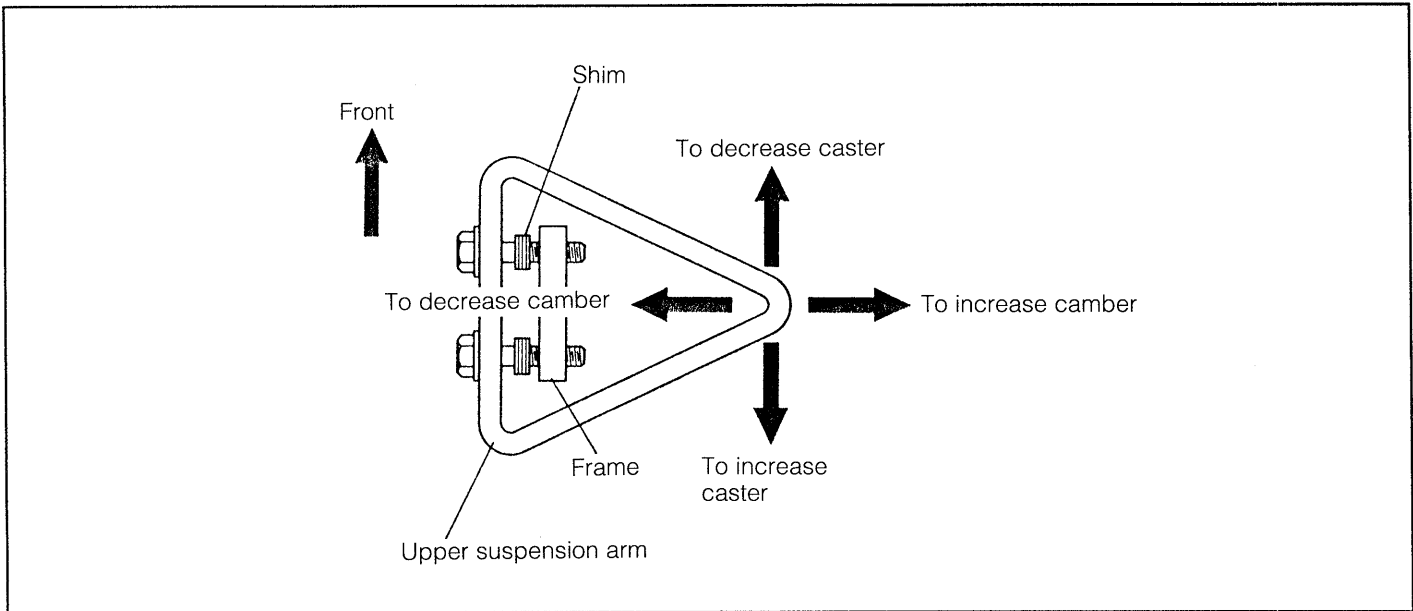


WRU90-FS055

FRONT AXLE & SUSPENSION

Adjusting procedure for camber and caster

The camber and caster vary by increasing/decreasing the number of the adjusting shims provided at the frame installation surface of the upper arm shaft.



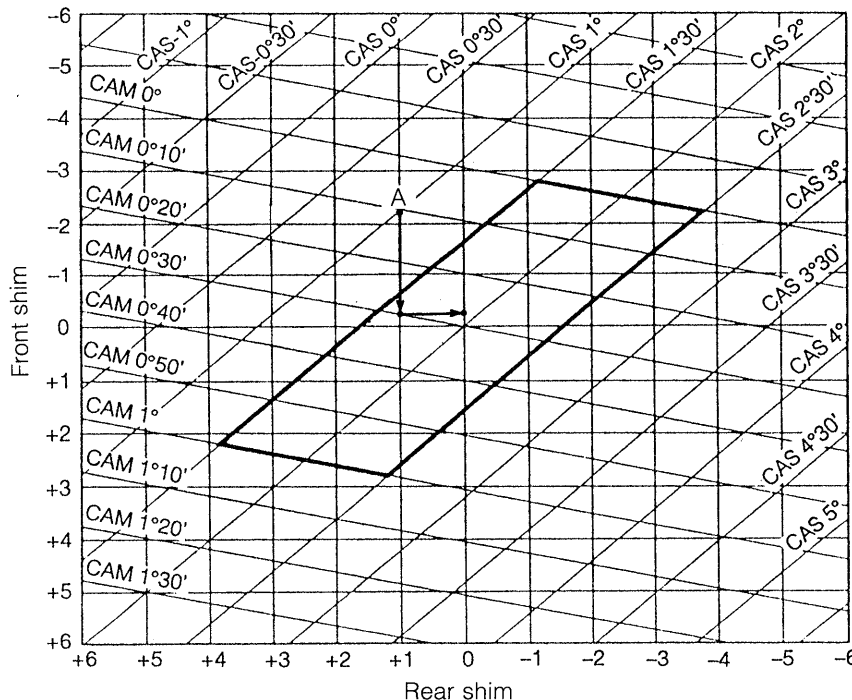
WRU90-FS056

Selecting method of adjusting shim

1. Select a suitable adjusting shim, using the diagram below.

<How to Read Diagram>

- (1) Suppose that the measurement on a vehicle reveals the following results:
Caster: 1° Camber: $0^{\circ}10'$
- (2) Plot the intersection of the caster line with camber line in the diagram below. The intersection is designated as the point A.
- (3) Decrease the front shim thickness by 2 mm (0.079 inch) and increase the rear shim thickness by 1 mm (0.039 inch). Thus, the point A enters into the specified range.



NOTE:
The area enclosed by heavy lines () in the left diagram denotes the permissible range for camber and caster angle.

WRU90-FS057

- Both the front and rear shim thickness should not exceed 8 mm (0.31 inch). The difference in thickness between the front shim and the rear shim should not exceed 4 mm (0.16 inch).
- After the adjusting shims have been installed, finally ensure that the front alignment conforms to the specifications.

WRU90-FS058

Check of steering wheel turning angle

- Place the wheel on the turning radius gauge. Check the wheel turning angle.

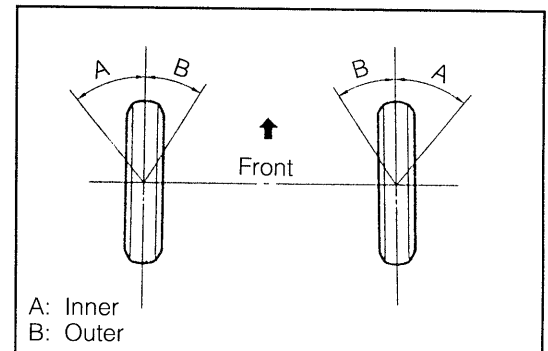
Specified Value:

Mounted tire	Inner turning (A)	Outer turning (B)
P205/75 R15	27°05' $^{+0}_{-3}$	23°55'
P225/70 R15	27°05' $^{+0}_{-3}$	23°55'

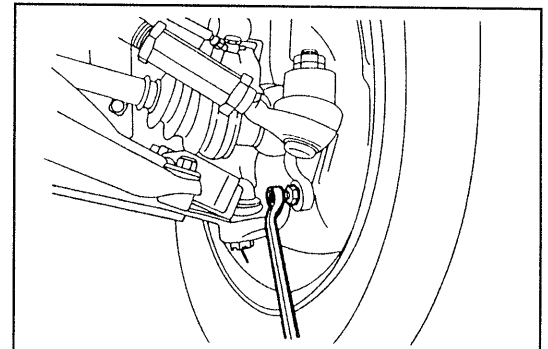
- If the measured turning angle fails to conform to the specifications, adjust the wheel turning angle by means of the knuckle stopper bolt.

Stopper Bolt Tightening Torque:

8.0 - 10.0 kgf-m (57.9 - 72.0 ft-lb, 78.5 - 98.0 N·m).



WRU90-FS059



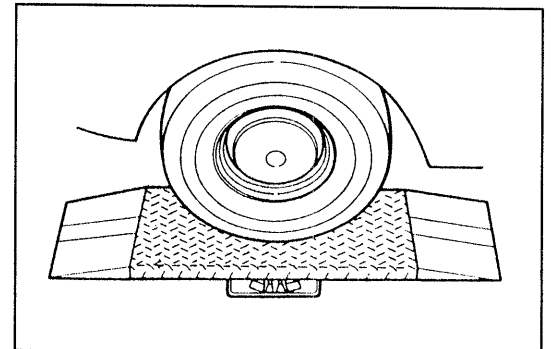
WRU90-FS060

Sideslip check

- Check the sideslip, using a sideslip tester.

Specified Value:

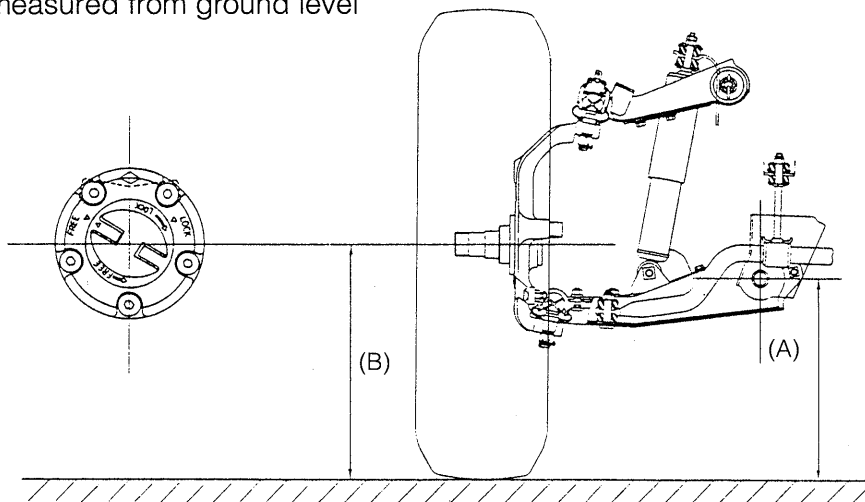
Within 3 mm (0.12 inch) per one meter



WRU90-FS061

<Checking and Adjusting Procedures for Vehicle Height>

- (A): Height of center of attaching bolt at front side of lower arm, measured from ground level
- (B): Height of center of wheel ornament or free wheel hub, measured from ground level



Care must be exercised as to the following points before the vehicle height check is carried out.

- (1) The designated tires are installed.
- (2) The tires are inflated to the specified value.
- (3) The vehicle is under no-loaded state.

NOTE:

- The measurement should be conducted with the vehicle under no-loaded state.

- (4) Rock the vehicle several times so as to settle the suspensions.
- (5) Move the vehicle about three meters (about 10 feet) twice in a fore-and-aft direction.

WRU90-FS062

Adjusting procedure

1. Adjust the anchor bolt so that the following specified value may be obtained.

Specified Value: $(B) - (A) = 36 \pm 10 \text{ mm}$
(1.42 \pm 0.39 inches)

NOTE:

1. As regards the vehicle height, the adjustment should be carried out so that any variation in the specified value between the right and left sides may become within 10 mm (0.4 inch).
2. With regard to the protrusion height of the anchor bolt, the adjustment should be carried out so that any variation between the right and left sides may become within 10 mm (0.4 inch).

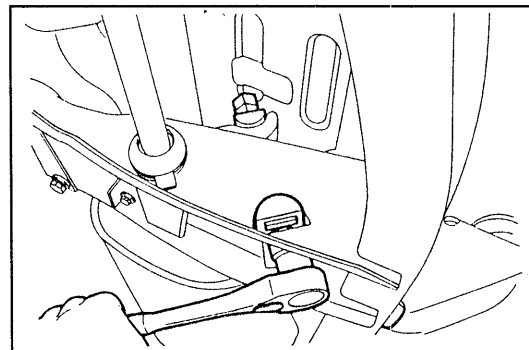
2. Secure the anchor bolt by means of the lock nut.

Tightening Torque:

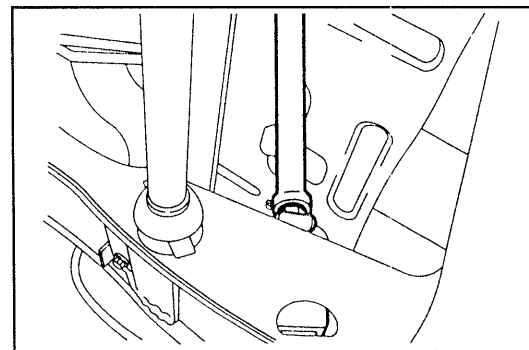
7.0 - 9.0 kgf-m (50.6 - 65.1 ft-lb, 68.6 - 88.3 N-m)

NOTE:

- Secure the lock nut by tightening the upper nut while preventing the lower nut from turning by means of a spanner.



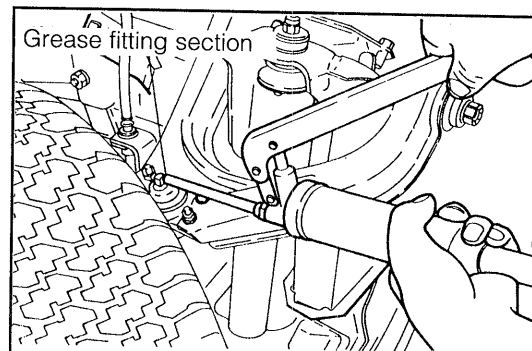
WRU90-FS063



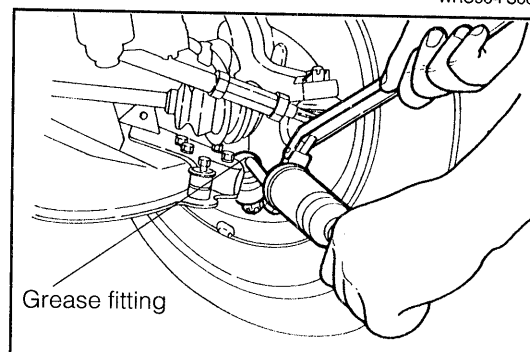
WRU90-FS064

GREASE LUBRICATION

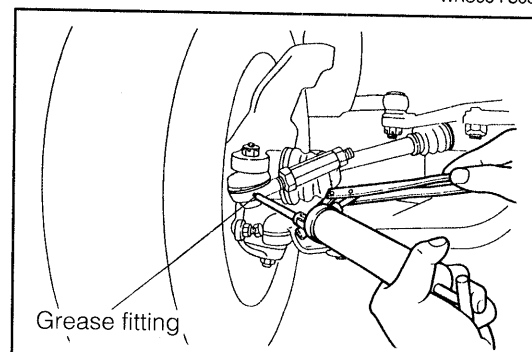
1. Upper arm ball joint
 - (1) Clean the grease fitting of the upper arm ball joint.
 - (2) Ensure that the grease fitting of the upper arm ball joint exhibits no damage.
If any damage is present, replace the damaged grease fitting.
 - (3) Fill grease from the grease fitting, using a grease gun.
Specified Grease: Lithium-based MP grease
Filling Amount: 27 grams (0.81 oz)
(In cases where a new part is installed)
2. Lower arm ball joint
 - (1) Clean the grease fitting of the lower arm ball joint.
 - (2) Ensure that the grease fitting of the upper arm ball joint exhibits no damage.
If any damage is present, replace the damaged grease fitting.
 - (3) Fill grease from the grease fitting, using a grease gun.
Specified Grease: Lithium-based MP grease
Filling Amount: 10 grams (0.3 oz)
(In cases where a new part is installed)
3. Tie rod end ball joint
(See the Steering section.)



WRU90-FS065



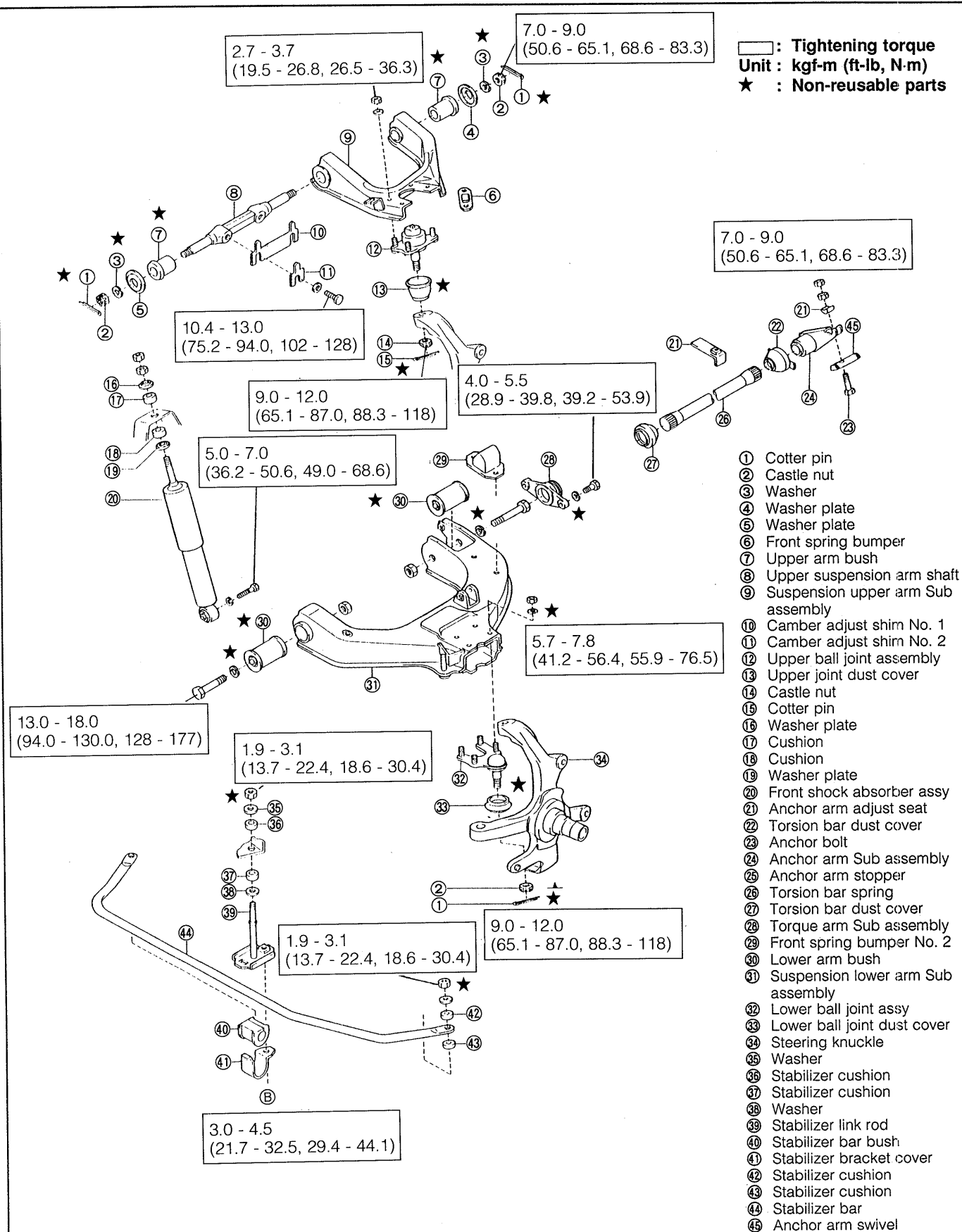
WRU90-FS066



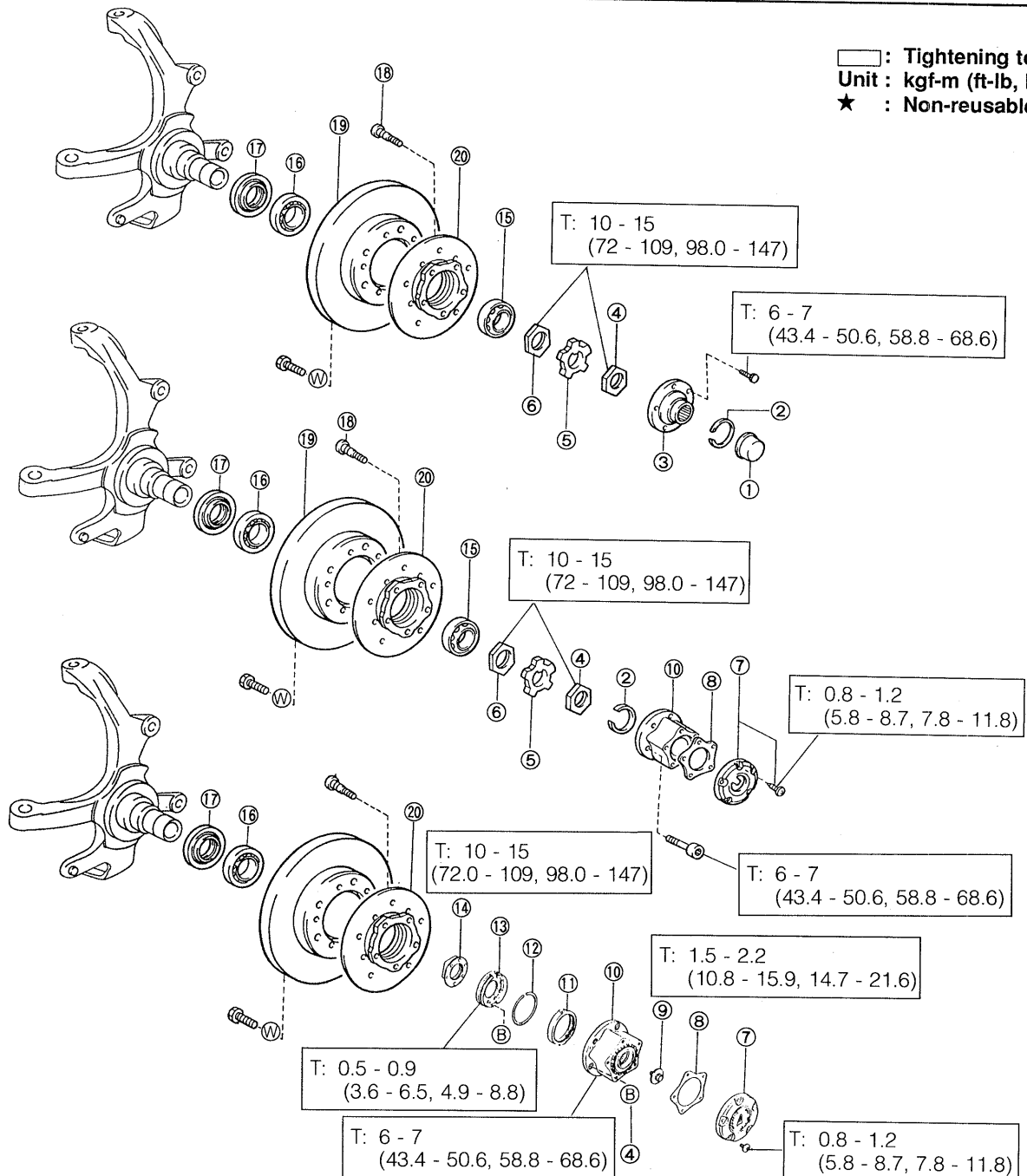
WRU90-FS067

FRONT SUSPENSION

COMPONENTS



FRONT AXLE HUB COMPONENTS



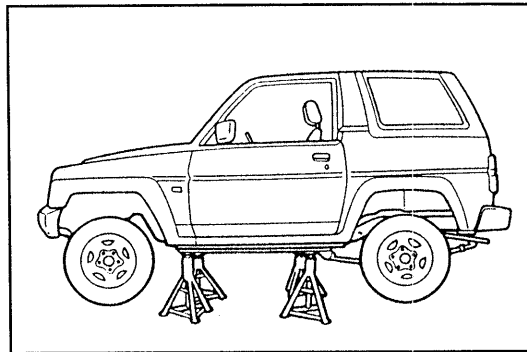
- ① Hub cap
- ② Snap ring
- ③ Hub cover
- ④ Lock nut
- ⑤ Lock washer
- ⑥ Lock nut
- ⑦ Hub cover
- ⑧ Gasket
- ⑨ Lock bolt (with washer)
- ⑩ Free wheel hub body

- ⑪ Brake shoe subassembly
- ⑫ Brake shoe snap ring
- ⑬ Brake drum
- ⑭ Lock nut
- ⑮ Tapered roller bearing (outer)
- ⑯ Tapered roller bearing (inner)
- ⑰ Oil seal
- ⑱ Hub bolt
- ⑲ Disc wheel
- ⑳ Axle hub

CHECK OF FREE WHEEL HUB OPERATION

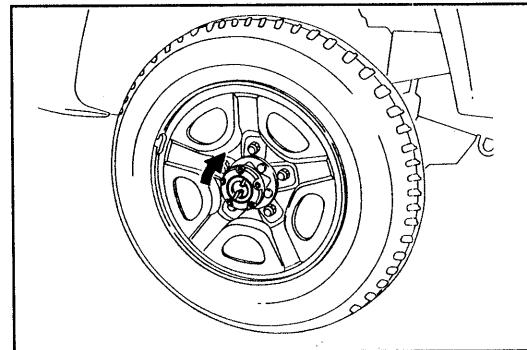
1. Check of manual free wheel hub

- (1) Jack up the vehicle and support it with safety stands.
(See GI section.)



WRU90-FS070

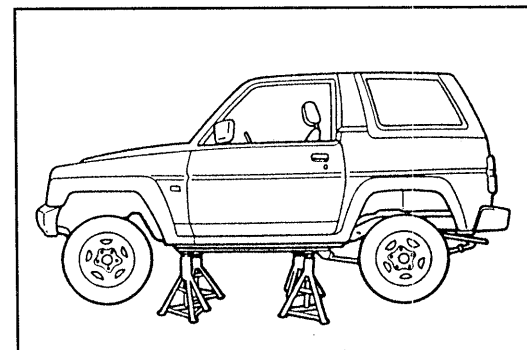
- (2) Set the handle of the free wheel hub to the "LOCK" position.
- (3) Turn the tire several times. At this time, ensure that the front drive shaft turns together with the tire.
If not, replace the free wheel hub.
- (4) Set the handle of the free wheel hub to the "FREE" position.
- (5) Turn the tire several times. At this time, ensure that the front drive shaft will not turn together with the tire.
If not, replace the free wheel hub.
- (6) Jack down the vehicle.



WRU90-FS071

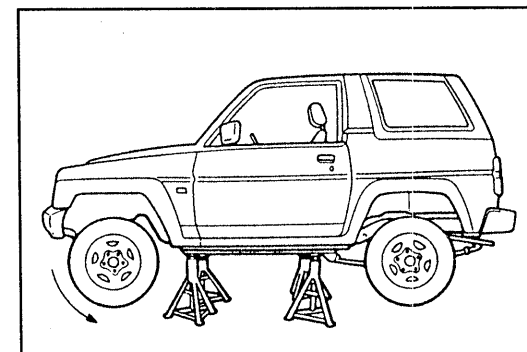
2. Check of automatic free wheel hub

- (1) Jack up the vehicle and support it with safety stands.
(See GI section.)



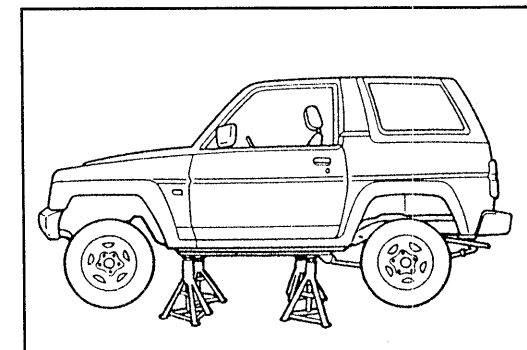
WRU90-FS072

- (2) Shift the shift lever to the 4H position.
- (3) Start the engine. When the driving force is applied to the wheel, ensure that the front wheels turn.
If not, replace the free wheel hub.



WRU90-FS073

- (4) Shift the shift lever to the 2H position.
- (5) While slightly applying the brake, apply the driving force to the wheel in a direction opposite to the former direction in the step (3). In this way, turn the wheel more than three times.

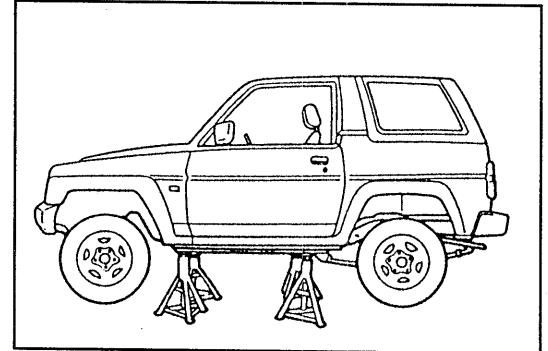


WRU90-FS074

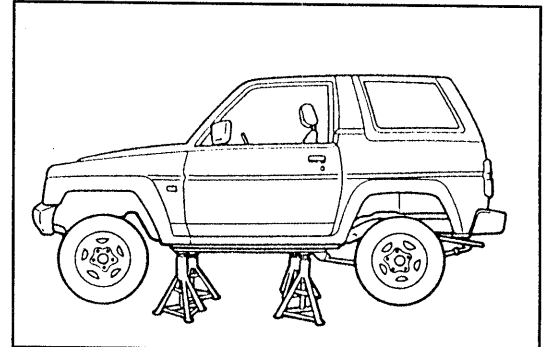
- (6) Stop the engine.
- (7) When turning the wheel by hands, ensure that the drive shaft will not turn together.
If not, replace the free wheel hub.
- (8) Jack down the vehicle.

REMOVAL/DISASSEMBLY OF FRONT AXLE HUB

1. Jack up the vehicle and support it with safety stands.
(See GI section.)

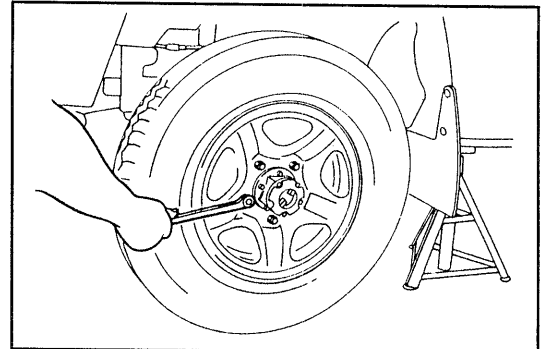


WRU90-FS075



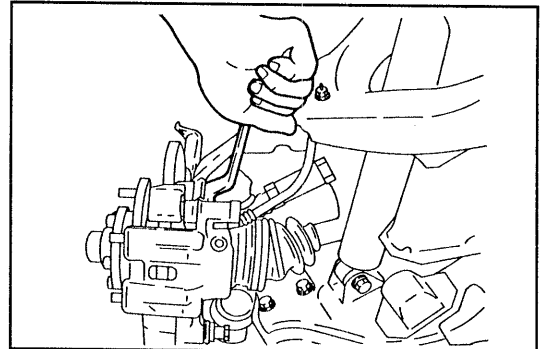
WRU90-FS076

2. Remove the front wheel.
(See page FS-18.)



WRU90-FS077

3. Remove the brake mounting support attaching bolts. Remove the brake mounting support together with calipers. Suspend the brake mounting support from the upper frame in such a way that no undue force is applied to the brake hose.

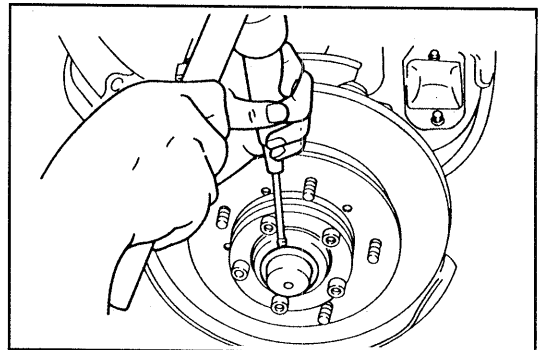


WRU90-FS078

4. Removal of hub cap (Full-time 4WD vehicle only)
 - (1) Remove the hub cap by lightly and evenly driving a chisel or the like into between the hub cap and the cover.

NOTE:

- Do not reuse the hub cap.
- Be very careful not to damage the hub cover during the removal.



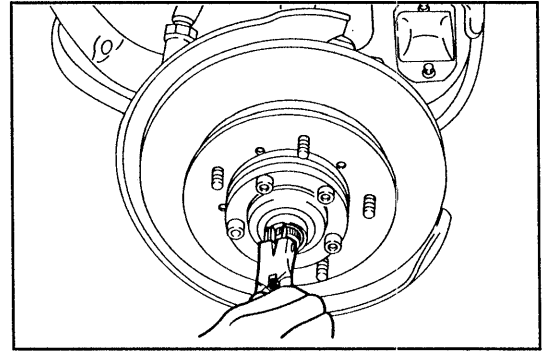
WRU90-FS079

FRONT AXLE & SUSPENSION

- (2) Remove the snap ring from the drive shaft, using a snap ring expander.

NOTE:

- Do not reuse the snap ring.



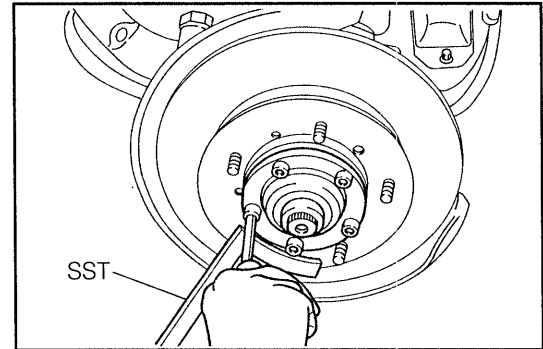
WRU90-080

- (3) Remove the hub cover attaching bolts by means of a hexagonal box wrench (8 mm).

NOTE:

- Prevent the hub from turning, using the following SST given below.

SST: 09511-87202-000

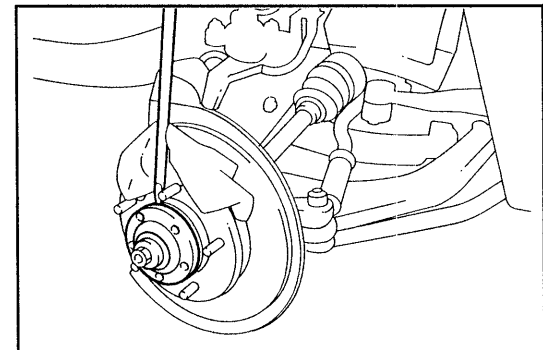


WRU90-FS081

- (4) Detach the hub cover from the hub by prying it off evenly by means of a tire lever or the like.

NOTE:

- Be sure to interpose an adequate cloth between the tire lever and the front axle hub so as not to damage the tire attaching surface of the front axle hub as well as the disc rotor.
- After the hub cover has been removed, completely remove any bond remaining trace from between the hub cover and the hub.

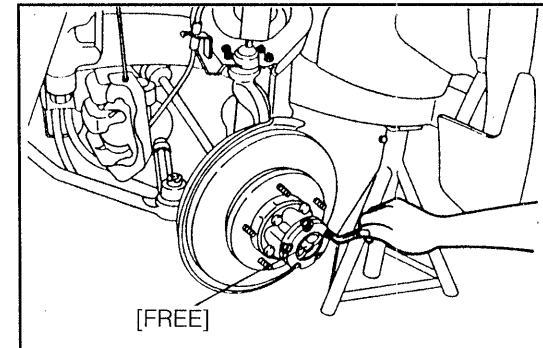


WRU90-FS082

5. Removal of free wheel hub

As for the manual locking hub, see page FS-43 to FS-45.

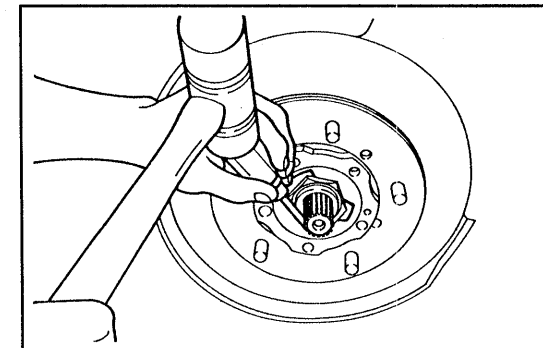
As for the automatic locking hub, see page FS-48 to FS-50.



WRU90-FS083

6. Removal of lock nut (Full-time 4WD vehicle and manual locking hub-equipped vehicle only)

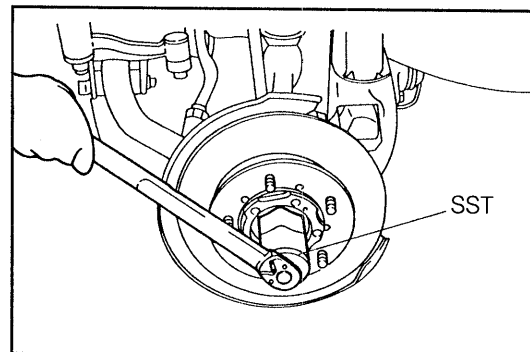
- (1) Raise the pawl of the lock washer by means of a chisel or the like.



WRU90-FS084

- (2) Remove the lock nut, using the following SSTs.

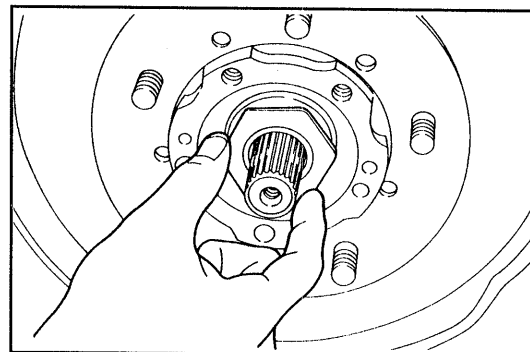
SST: 09607-87602-000



WRU90-FS085

- (3) Remove the lock washer.

- (4) Remove the lock nut, using the same SSTs as the step (2).

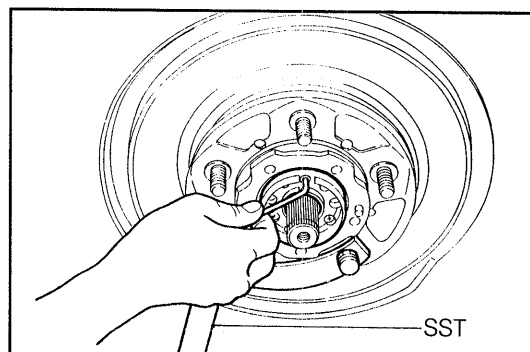


WRU90-FS086

7. Removal of lock nut (Automatic locking hub-equipped vehicle only)

- (1) While preventing the brake drum from turning, remove the brake drum by means of a torque wrench. For this operation, use the following SST.

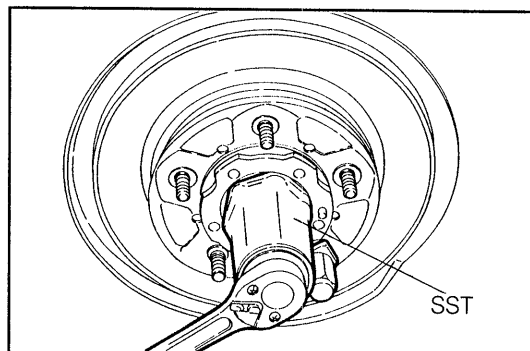
SST: 09511-87202-000



WRU90-FS087

- (2) Remove the lock nut, using the following SSTs.

SST: 09607-87603-000



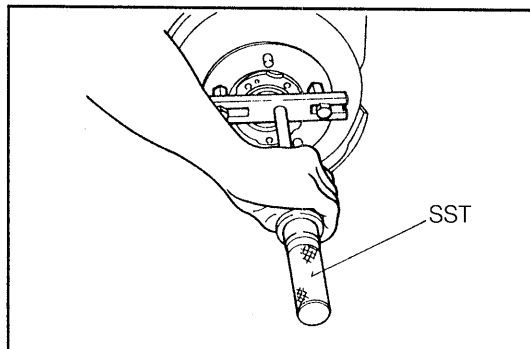
WRU90-FS088

8. Remove the front axle hub, using the following SST.

NOTE:

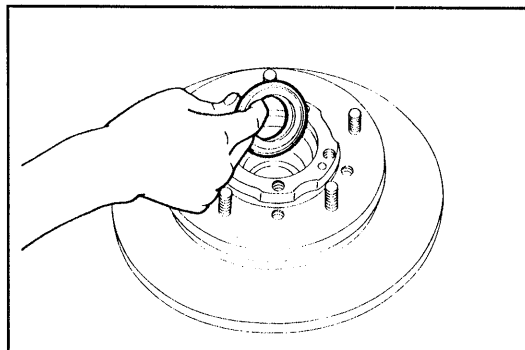
- Be very careful not to drop the outer bearing and hub during the removal.

SST: 09520-00031-000



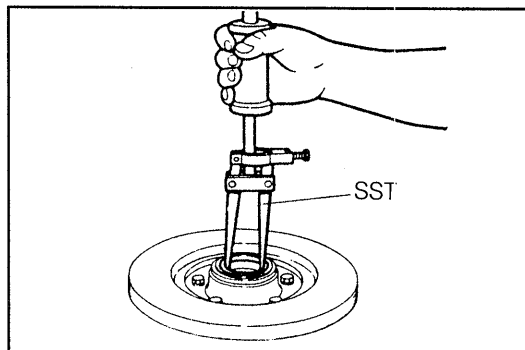
WRU90-FS089

9. Remove the tapered outer roller bearing (outer side) from the hub.



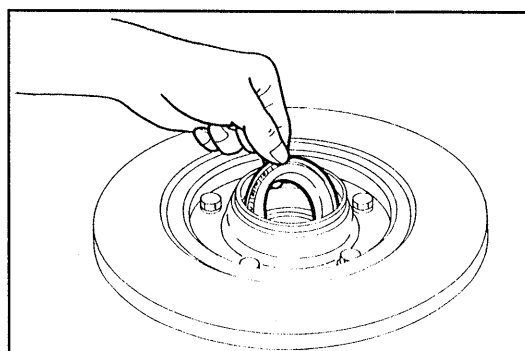
WRU90-FS090

10. Remove the type T oil seal, using the following SST.
SST: 09308-00010-000



WRU90-FS091

11. Remove the tapered roller bearing (inner side).

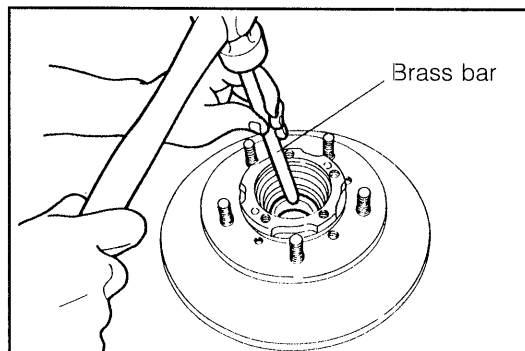


WRU90-FS092

12. Pull out the inner race (inner side) of the tapered roller bearing by evenly tapping it by means of a brass bar or the like.

NOTE:

- This operation is required only when the bearing is replaced.

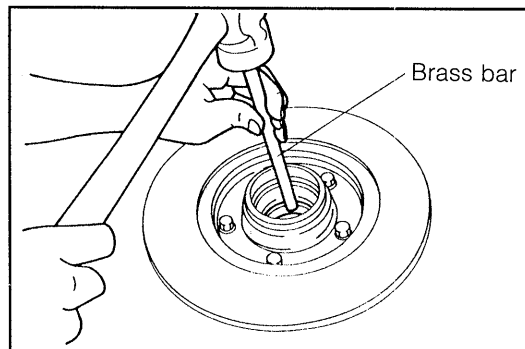


WRU90-FS093

13. Pull out the inner race (outer side) of the tapered roller bearing by evenly tapping a brass bar or the like.

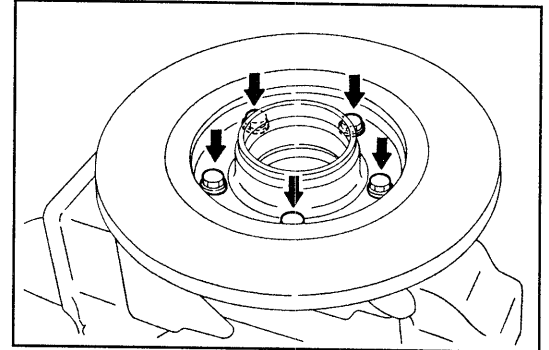
NOTE:

- This operation is required only when the bearing is replaced.



WRU90-FS094

14. Remove the brake disc by removing the brake disc attaching bolts from the front axle hub.

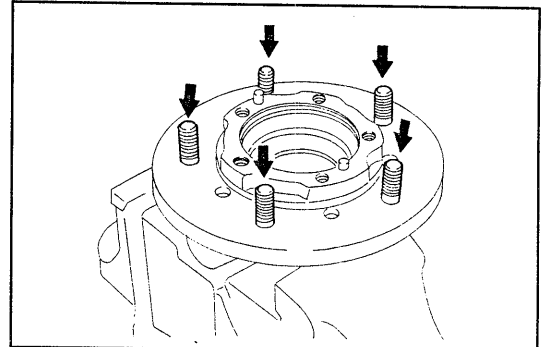


WRU90-FS095

15. Drive out the hub bolt from the front axle hub by means of a plastic hammer or the like.

NOTE:

- Attach the nut in place so that the threaded portion may not be damaged.



WRU90-FS096

INSPECTION

Wash the disassembled parts and dry them with compressed air, except for the free wheel hub.

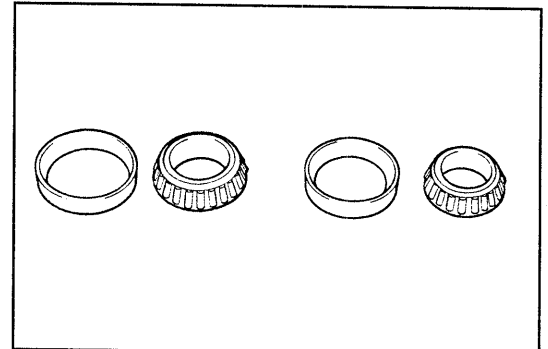
As for the brake discs, degrease them with cleaning solvent, such as alcohol.

WRU90-FS097

1. Ensure that the inner and outer tapered roller bearings exhibit no damage, such as wear and scratches. If they exhibit damage, replace the defective bearings.

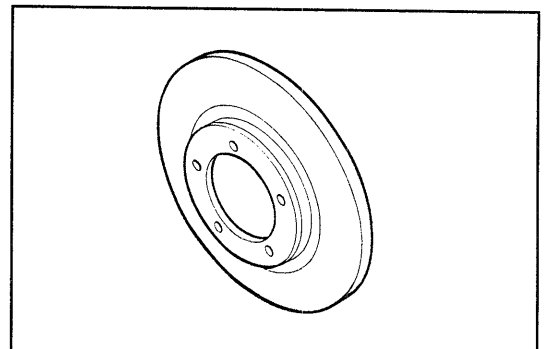
NOTE:

- Be sure to replace the outer race and/or inner race of the bearing as a set.



WRU90-FS098

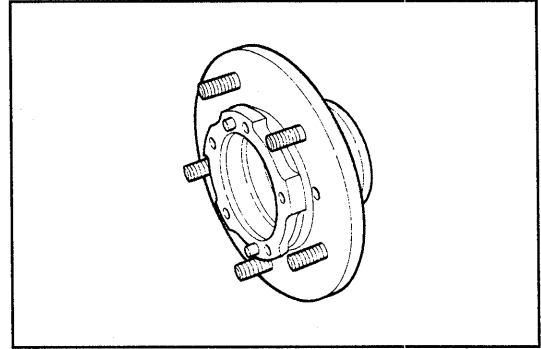
2. Ensure that the brake disc exhibits no damage, such as wear, cracks and scratches. If any damage is present, replace the brake disc.



WRU90-FS099

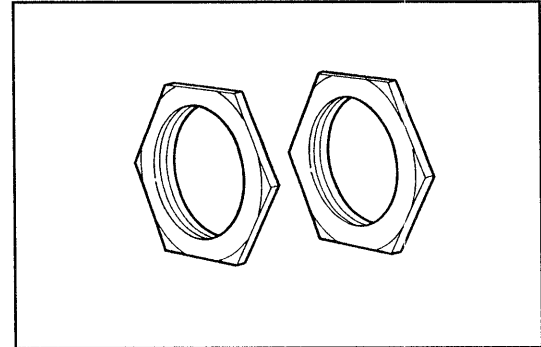
FRONT AXLE & SUSPENSION

3. Ensure that the front axle hub exhibits no damage, such as wear, cracks and scratches.
If any damage is present, replace the front axle hub.



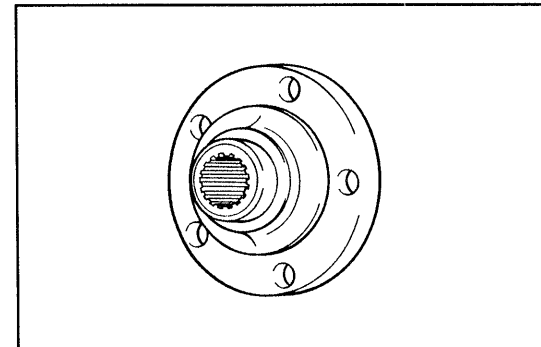
WRU90-FS100

4. Ensure that lock nut exhibits no damage.
If any damage is present, replace the lock nut.



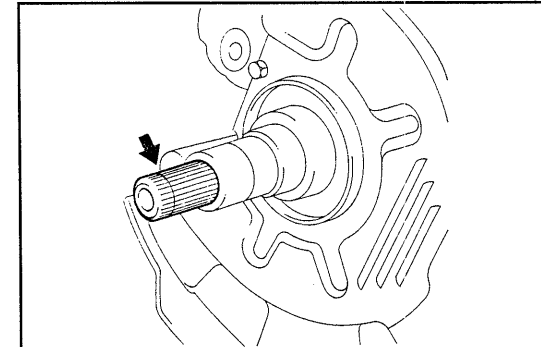
WRU90-FS101

5. Ensure that the hub cover exhibits no damage, such as wear and cracks.
If any damage is present, replace the hub cover.
If the spline section exhibits damage, check the spline at the drive shaft side.



WRU90-FS102

6. Ensure that the drive shaft spline section exhibits no damage, such as wear and cracks.
If any damage is present, replace the drive shaft.
(See page FS-89.)



WRU90-FS103

7. Check of free wheel hub
- As for the manual locking hub, see page FS-45.
 - As for the automatic locking hub, see page FS-51.

WRU90-FS104

ASSEMBLY OF FRONT AXLE HUB

1. Drive the hub bolt into the front axle hub by means of a plastic hammer.

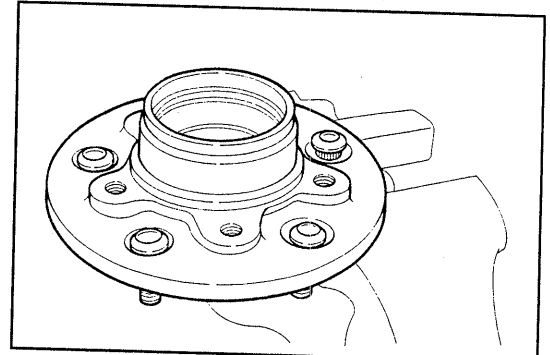
NOTE:

- Be sure to align the cut-out section of the hub bolt with the hub.

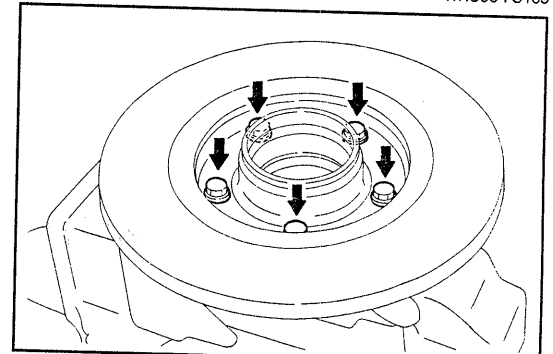
2. Install the brake disc to the front axle hub. Evenly tighten the attaching bolts to the specified torque over two or three stages.

Tightening Torque:

5.5 - 7.5 kgf-m (39.8 - 54.2 ft-lb, 53.9 - 73.5 N·m)



WRU90-FS105

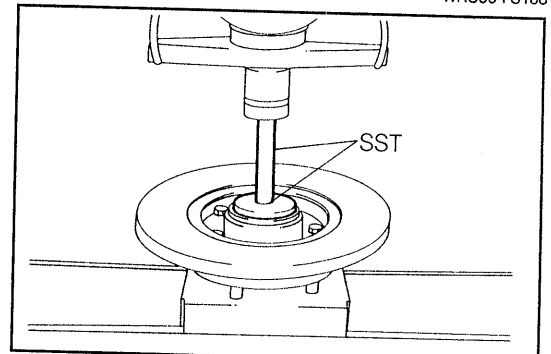


WRU90-FS106

3. Install the outer race (inner side) of the tapered roller bearing, using the following SST.

SST: 09608-87604-000

09611-87506-000

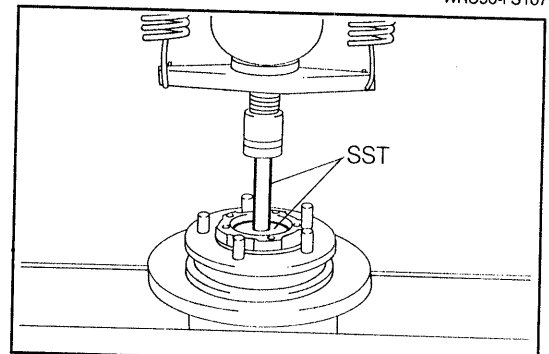


WRU90-FS107

4. Install the outer race (outer side) of the tapered roller bearing, using the following SST.

SST: 09608-87603-000

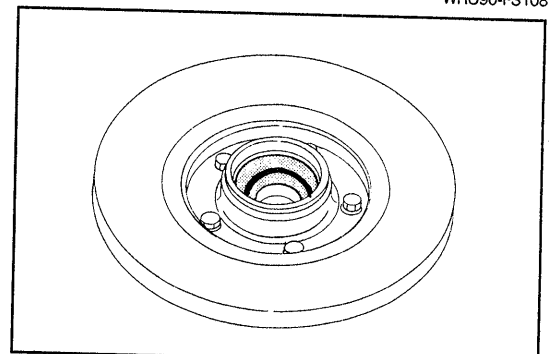
09611-87506-000



WRU90-FS108

5. Fill the specified amount of lithium based MP grease to a space between the outer races of the inner and outer bearings.

Filling Amount: 35 - 40 grams (1.24 - 1.4 oz)



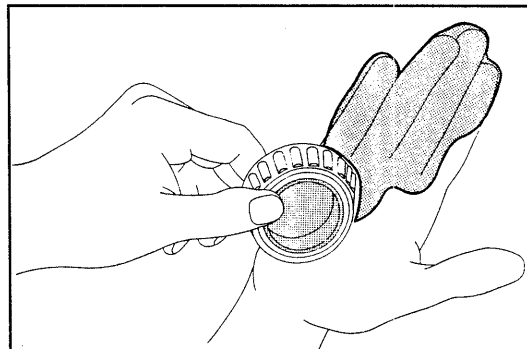
WRU90-FS109

FRONT AXLE & SUSPENSION

6. Fill MP grease to the inner and outer bearings.

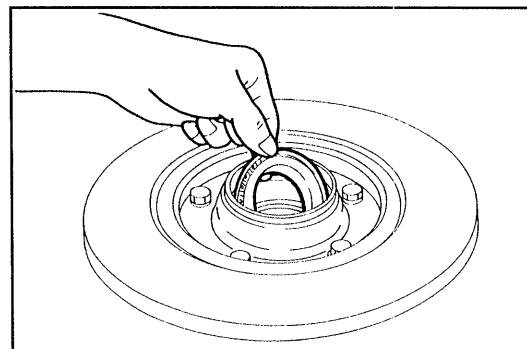
NOTE:

- Fill grease to a space between the inner race and the bearing guide, until the grease oozes from the inside of the bearing guide. Then, apply grease to the surface.



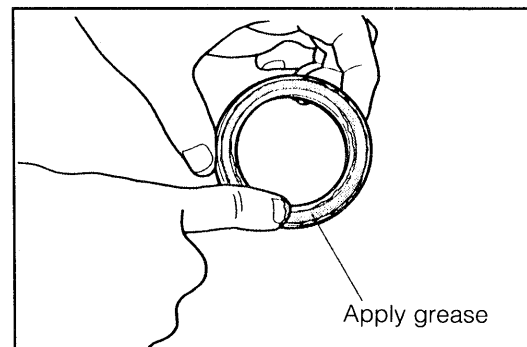
WRU90-FS110

7. Install the inner bearing to the hub.



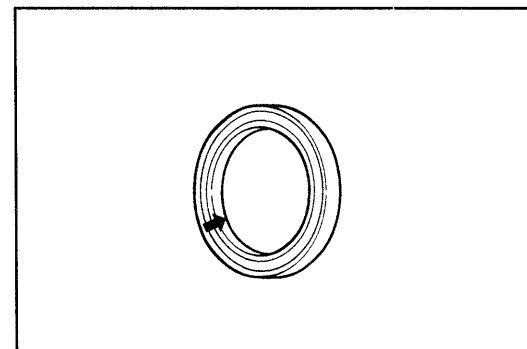
WRU90-FS111

8. Fill the specified amount of lithium based MP grease to the back side of the oil seal lip section.



WRU90-FS112

9. Apply lithium-based MP grease to the lip section of the oil seal.



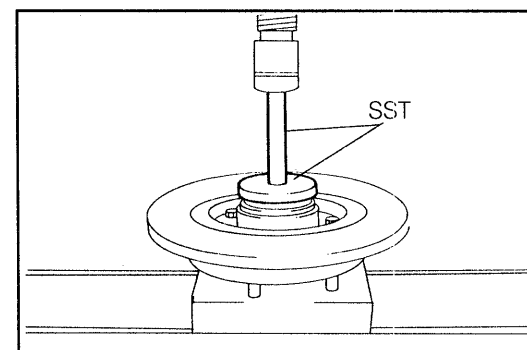
WRU90-FS113

10. Press the oil seal to the hub edge surface, using the following SST.

SST: 09608-87602-000
09611-87506-000

NOTE:

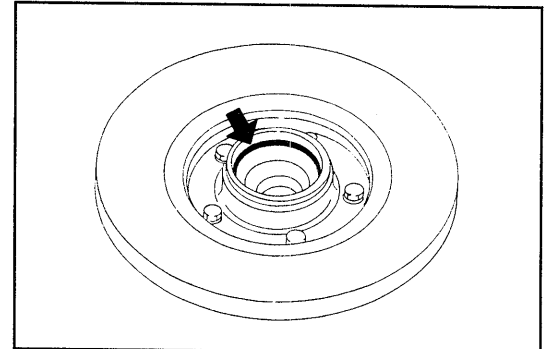
- Care must be exercised to ensure that the oil seal will not tilt during the press operation.



WRU90-FS114

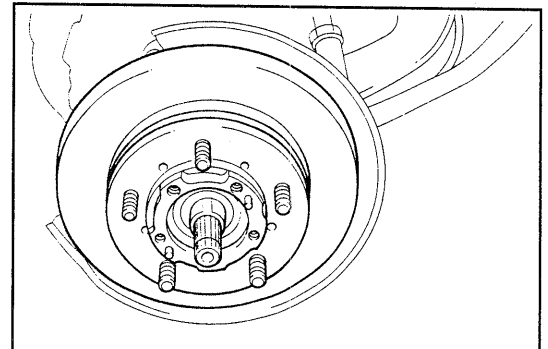
11. Fill lithium based MP grease between the oil seal and the bearing.

Filling amount: 25 - 30 grams (0.88 - 1.06 oz)



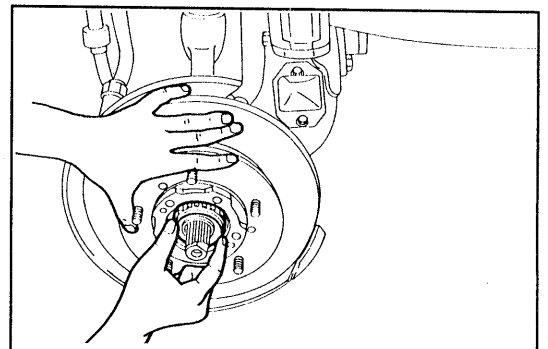
WRU90-FS115

12. Install the front axle hub to the steering knuckle.



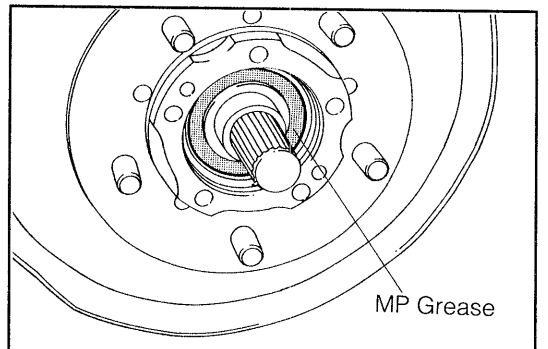
WRU90-FS116

13. Insert the outer bearing into the front axle hub.



WRU90-FS117

14. Fill lithium based MP grease to the outer bearing.



WRU90-FS124

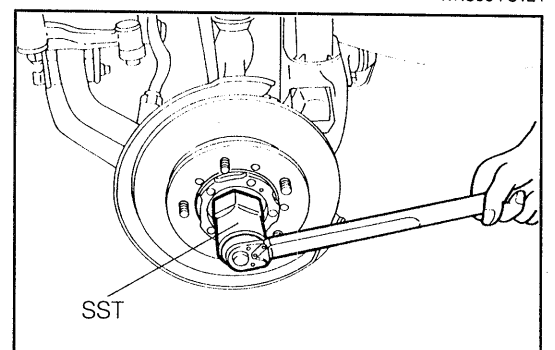
15. Tighten the lock nut to the specified torque, using the following SST. Then, back off the lock nut one sixth turn.

SST: Manual locking hub-equipped vehicle and full-time 4WD vehicle: 09607-87602-000

Automatic locking hub-equipped vehicle:
09607-87603-000

Tightening Torque:

10 - 15 kgf-m (72.0 - 109 ft-lb, 98.0 - 147 N-m)



WRU90-FS404

FRONT AXLE & SUSPENSION

16. Rotate the axle hub two or three turns so that the axle hub may be bedded in.

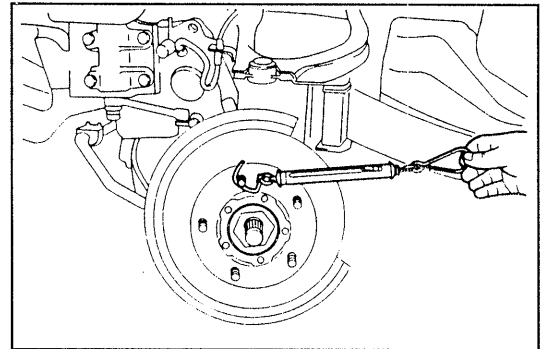
WRU90-FS118

17. Adjust the lock nut so that the starting torque may conform to the specified value.

Starting Load: 1.4 - 3.6 kgf (3.1 - 7.9 lb)

[Reference]

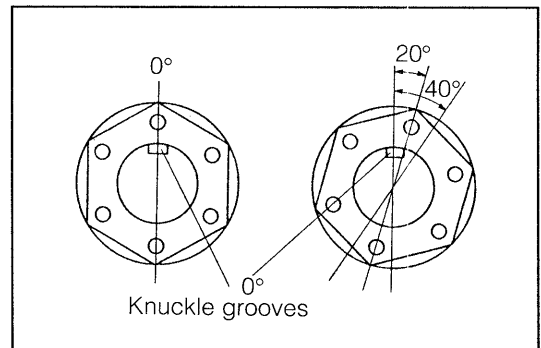
Starting Torque: 10 - 25 kgf-cm (8.7 - 21.7 inch-lb)



WRU92-FS415

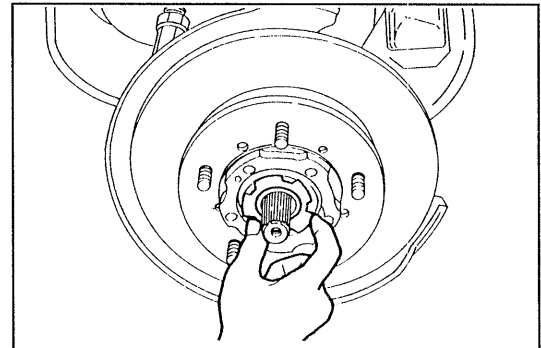
NOTE:

- Adjust the automatic locking hub nut in such a way that the hub nut position comes at the position indicated in the right figure after completion of the adjustment.



WRU90-FS120

18. Installation of lock washer and lock nut (Manual locking hub-equipped vehicle only)
- (1) Install the lock washer.



WRU92-FS416

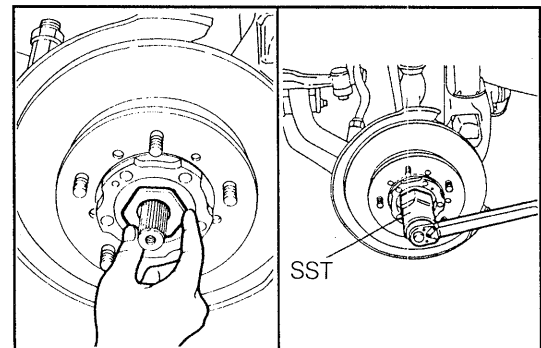
- (2) Tighten the lock nut to the specified torque, using the following SST.

Tightening Torque:

10 - 15 kgf-m (72.0 - 109 ft-lb, 98.0 - 147 N·m)

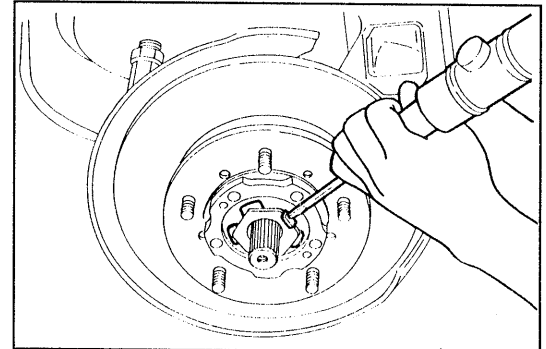
SST: 09607-87602-000

- (3) Ensure that the starting torque is within the specified range. (See the step 17.)
- If not, adjust the lock nut, backing off the amount described in the step 15. Again perform the operations from the step 15.



WRU90-FS122

- (4) Bend the tang of the lock washer toward the lock nut edge surface at the inner and outer side.

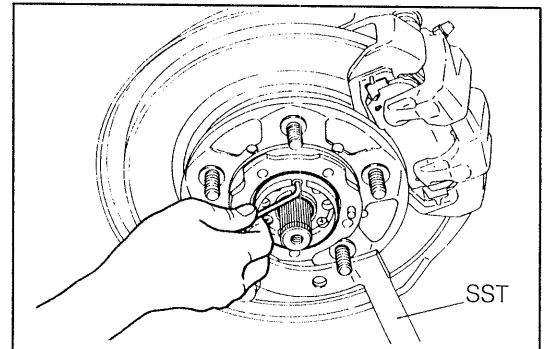


WRU90-FS123

19. Install the brake drum and tighten the attaching screws (torque screws) to the specified torque. (Automatic free wheel hub-equipped vehicle only)

Tightening Torque:

0.5 - 0.9 kgf-m (3.6 - 6.5 ft-lb, 4.9 - 8.8 N·m)



WRU90-FS125

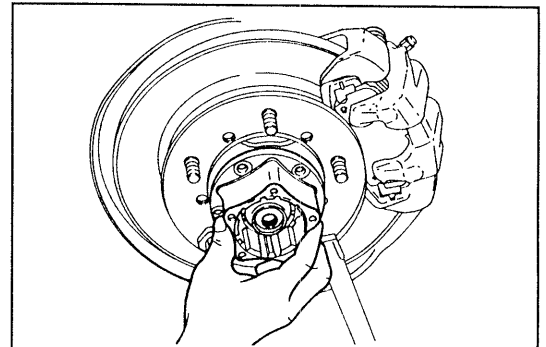
20. Installation of free wheel hub
(Free wheel hub-equipped vehicle only)

Manual locking hub

See page FS-46 to FS-48.

Automatic locking hub

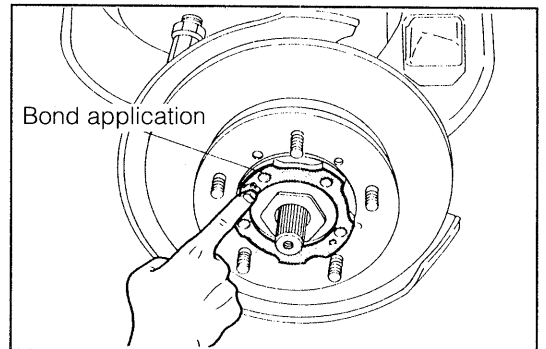
See page FS-51 to FS-54.



WRU90-FS126

21. Installation of hub cover

Thinly and evenly apply the Daihatsu Bond No.4 to the edge surface of the hub.



WRU92-FS417

22. Install the hub cover. Tighten the attaching bolts evenly to the specified torque over two or three stages.

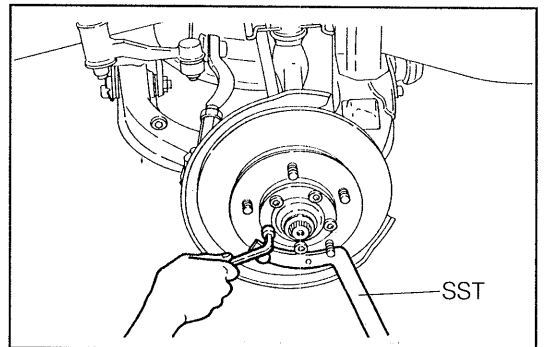
Tightening Torque:

6.0 - 7.0 kgf-m (43.4 - 50.6 ft-lb, 58.8 - 68.6 N·m)

NOTE:

- Use a hexagonal box wrench for the bolt tightening.
- Wipe off any oozed bond.
- Prevent the hub from turning, using the following SST.

SST: 09511-87202-000



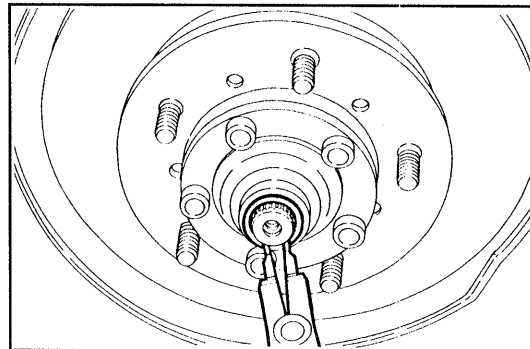
WRU92-FS418

FRONT AXLE & SUSPENSION

23. Install a new snap ring to the groove section of the drive shaft.

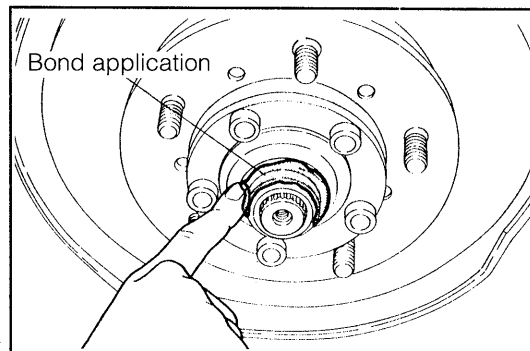
NOTE:

- Do not reuse the snap ring.



WRU90-FS129

24. Apply the Daihatsu Bond No.4 to the hub cap attaching surface of the hub cover.



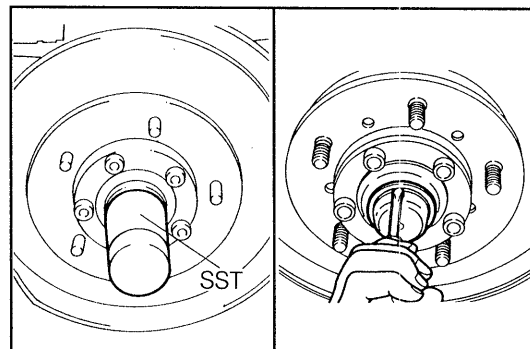
WRU90-FS130

25. Press the hub cap, using the following SST or a screwdriver or the like.

SST: 09608-87613-000

NOTE:

- Do not reuse the hub cap.
- Wipe off any bond that has oozed out.

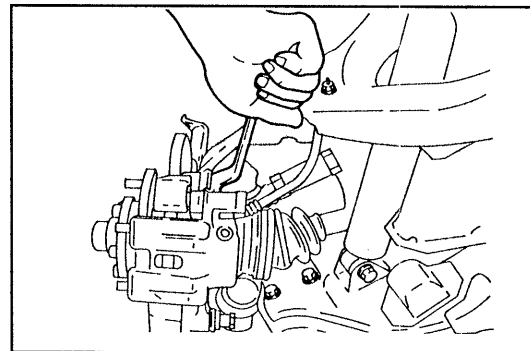


WRU90-FS131

26. Install the brake mounting support together with calipers to the steering knuckle.

Tightening Torque:

7.0 - 9.0 kgf-m (50.6 - 65.1 ft-lb 68.6 - 88.3 N·m)



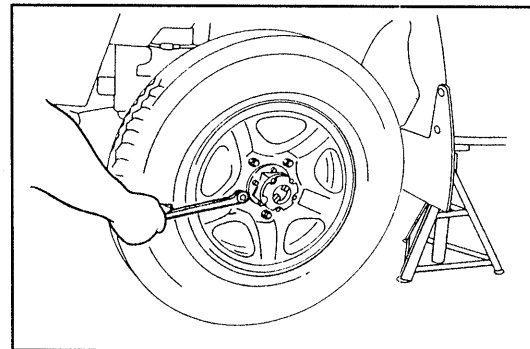
WRU90-FS132

27. Install the front wheel.

(See page FS-18)

28. Jack up the vehicle and remove the safety stands. Then, jack down the vehicle.

29. Tighten the front wheel attaching bolts to the specified torque. (See page FS-19.)

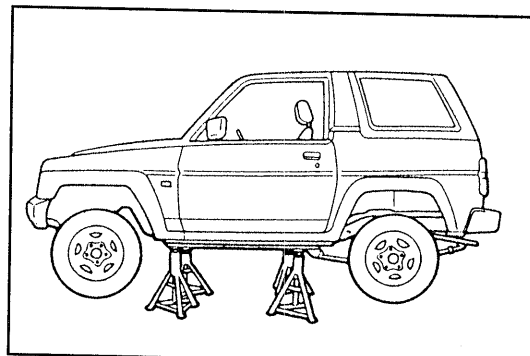


WRU90-FS133

MANUAL FREE WHEEL HUB

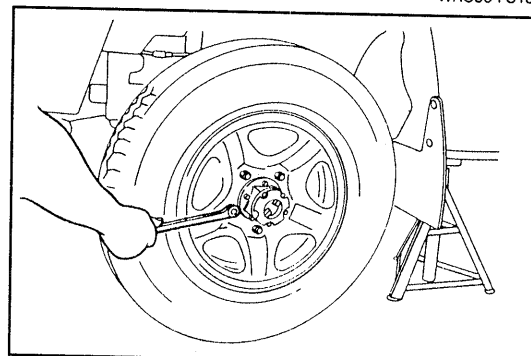
Disassembly

1. Jack up the vehicle and support it with safety stands.
(See GI section.)



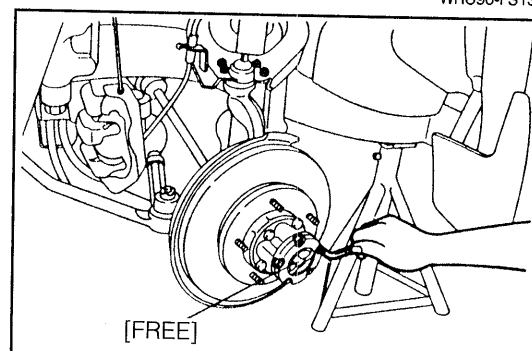
WRU90-FS134

2. Remove the front wheel.
(See page FS-18.)



WRU90-FS135

3. Removal of free wheel hub cover
 - (1) Set the handle of the free wheel hub cover to the "FREE" position.



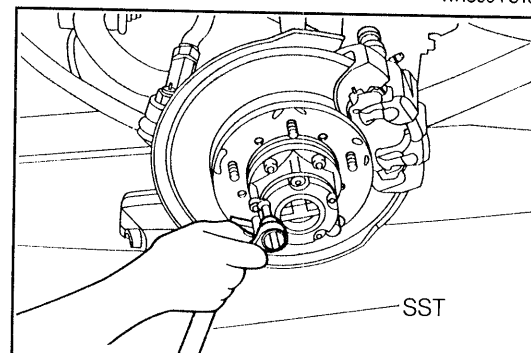
WRU90-FS136

- (2) Evenly loosen the free wheel cover attaching bolts and remove them.

NOTE:

- Prevent the hub bolt from turning, using the following SST.

SST: 09511-87202-000

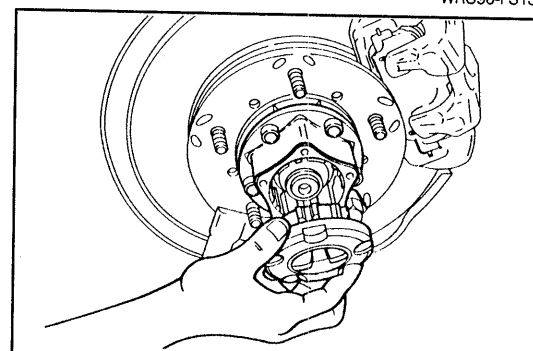


WRU90-FS137

- (3) Remove the hub cover from the hub body in a state that the hub cover is assembled to the clutch and spring.

NOTE:

- The handle of the free wheel cover should be at the "FREE" position.



WRU90-FS138

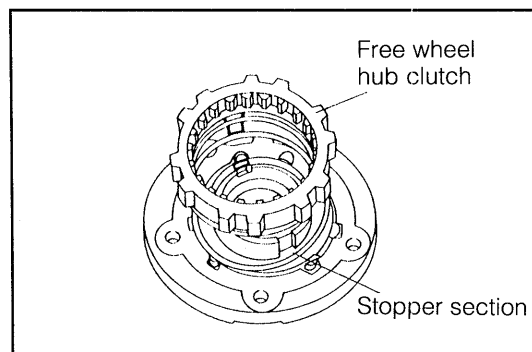
FRONT AXLE & SUSPENSION

4. Removal of clutch subassembly

- (1) With the handle of the hub cover set to the "FREE" position, turn the clutch subassembly, until the clutch stops, while pushing the clutch subassembly against the cover side.

NOTE:

- Be very careful not to damage the compression spring and follower by applying excessive force during this operation.

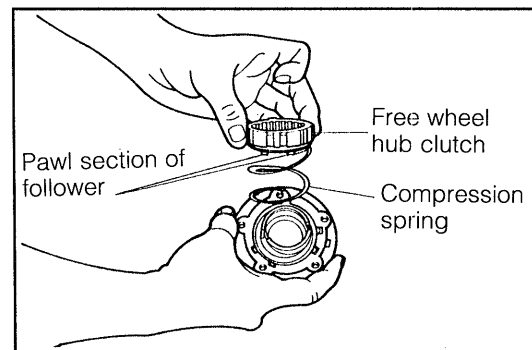


WRU90-FS139

- (2) Push the clutch toward the cover side further. Remove the pawl section of the follower from the stopper section of the hub cover handle. Then, remove the clutch subassembly from the cover.

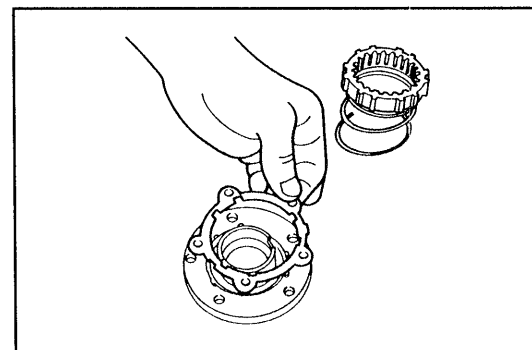
NOTE:

- Do not remove the compression spring from the follower.



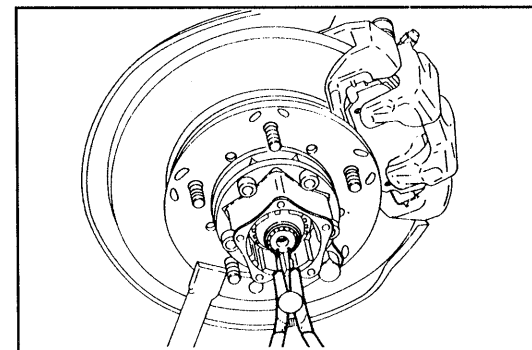
WRU90-FS140

- (3) Remove the gasket.



WRU90-FS141

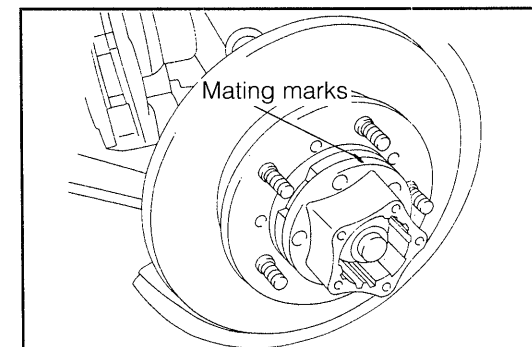
5. Remove the snap ring from the drive shaft.



WRU90-FS142

6. Removal of hub body

- (1) Put mating marks at a point between the hub body and the hub by means of a marker pen or the like.

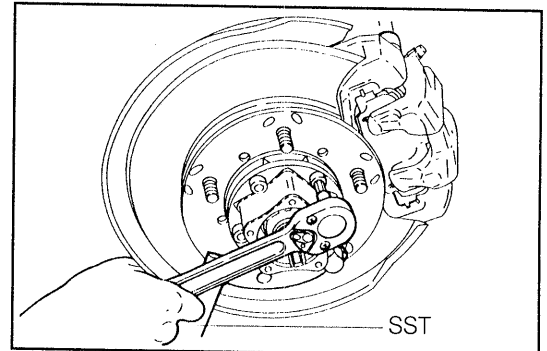


WRU90-FS143

- (2) Evenly loosen the hub body attaching bolts and remove them.

NOTE:

- Prevent the hub from turning, using the following SST.
SST: 09511-87202-000

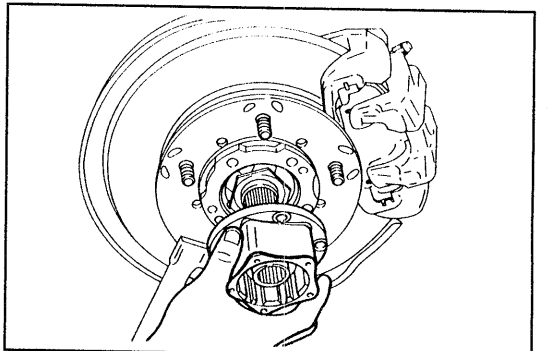
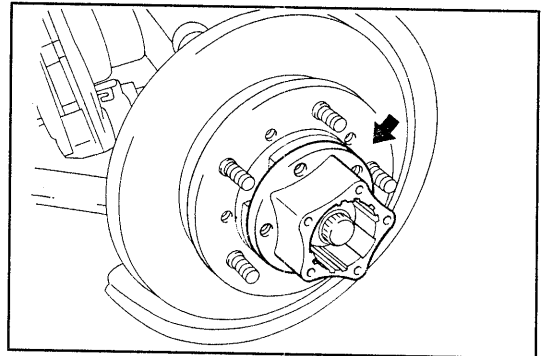


WRU90-FS144

- (3) Remove the hub body by lightly tapping it by means of a plastic hammer or the like.

NOTE:

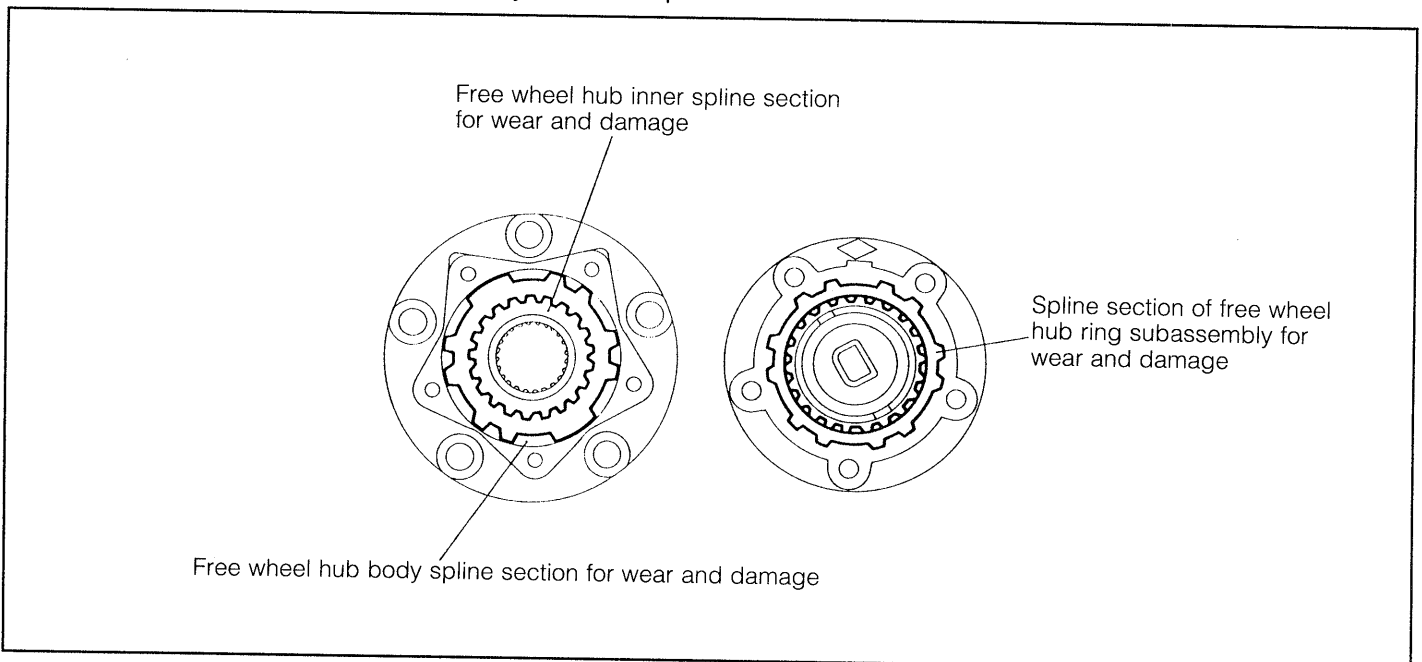
- Be very careful not to drop the hub body.
- Care must be exercised so as not to apply strong impacts to the hub body.



WRU90-FS145

Inspection

Check the following parts. Replace any defective parts.



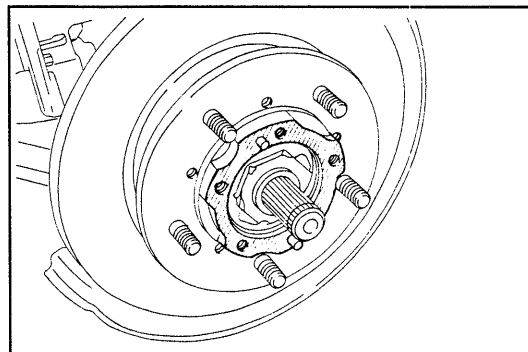
WRU90-FS146

FRONT AXLE & SUSPENSION

Assembly

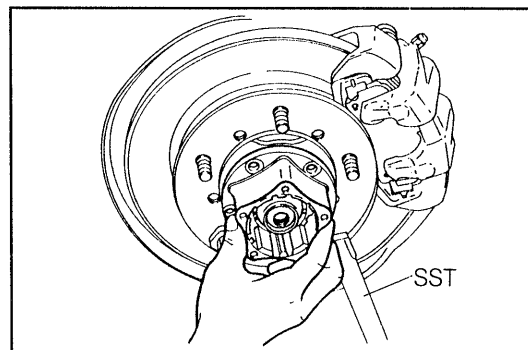
1. Installation of hub body

- (1) Clean the mating surfaces of the hub body and axle hub. Then, thinly and evenly apply the Daihatsu Bond No. 4.



WRU90-FS147

- (2) While aligning the knock pin hole of the hub body with the knock pin of the hub, install the hub body to the hub.



WRU90-FS148

- (3) Tighten the hub body attaching bolts to the specified torque over two or three stages evenly.

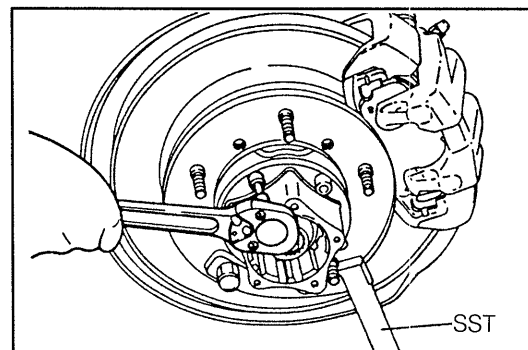
Tightening Torque:

6.0 - 7.0 kgf-m (43.4 - 50.6 ft-lb, 58.8 - 68.6 N-m)

NOTE:

- Prevent the axle hub from turning, using the following SST.

SST: 09511-87202-000

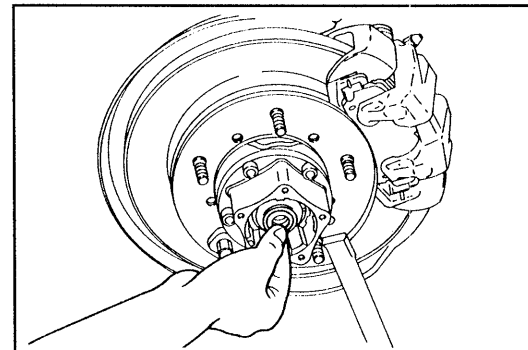


WRU90-FS149

2. Assemble a new snap ring to the drive shaft.

NOTE:

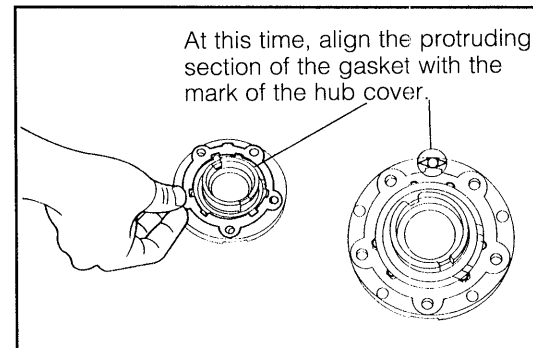
- Never reuse the snap ring.
- Fit the snap ring positively to the groove of the drive shaft.



WRU90-FS150

3. Assembly of hub cover

- (1) Install a new gasket to the hub cover.

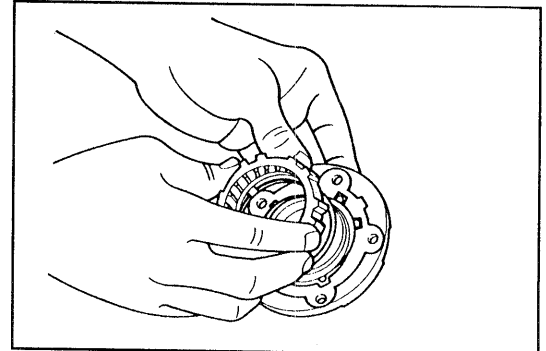


WRU90-FS151

- (2) Move the handle of the hub cover to the "FREE" position. Align the pawl of the clutch subassembly with the cut-out section of the handle.

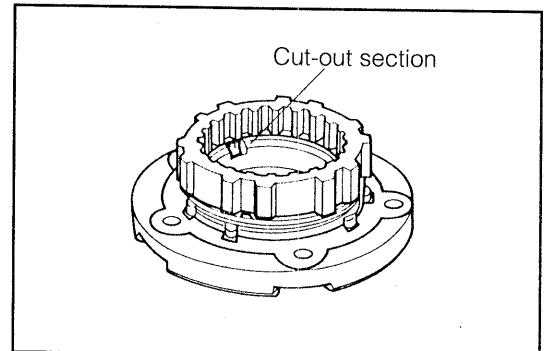
NOTE:

- Make sure that the compression spring is positively placed in the follower.



WRU90-FS152

- (3) Turn the clutch subassembly, until the clutch stops, while pushing the clutch subassembly against the cover side.
- (4) Move the handle of the hub cover several times from the "FREE" position to the "LOCK" position; from the "LOCK" position to the "FREE" position. At this time, ensure that the clutch operates smoothly.



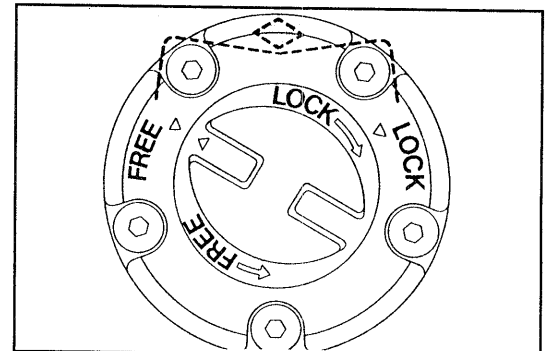
WRU90-FS153

4. Installation of hub cover

- (1) Set the handle of the hub cover to the "FREE" position.
- (2) Install the hub cover to the hub body, while aligning the mark at the reverse side of the hub cover with the protruding section at the hub body side.

NOTE:

- Be very careful not to displace the gasket position during this operation.



WRU90-FS154

- (3) Tighten the hub cover attaching bolts to the specified torque.

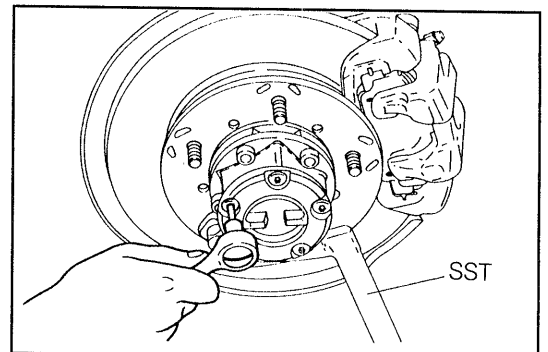
Tightening Torque:

0.8 - 1.2 kgf-m (5.8 - 8.7 ft-lb, 7.8 - 11.8 N-m)

NOTE:

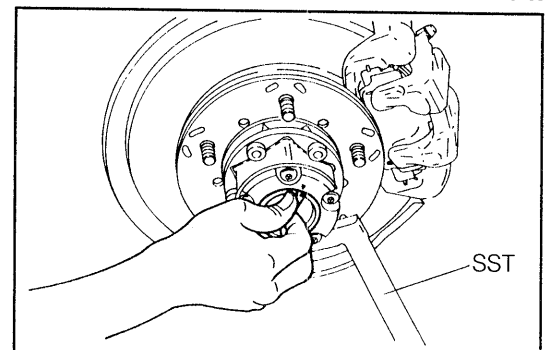
- Prevent the axle hub from turning, using the following SST.

SST: 09511-87202-000



WRU90-FS155

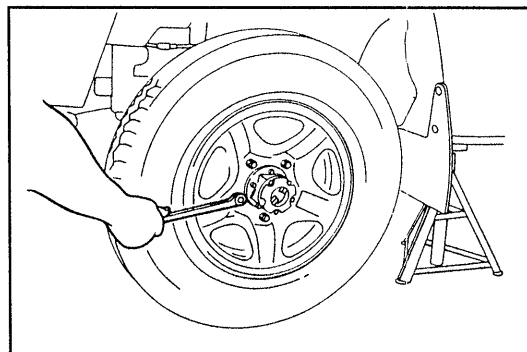
5. Move the handle of the hub cover several times from the "FREE" position to the "LOCK" position; from the "LOCK" position to the "FREE" position. At this time, ensure that the handle operates smoothly.



WRU90-FS156

FRONT AXLE & SUSPENSION

6. Install the front wheel temporarily.



WRU90-FS157

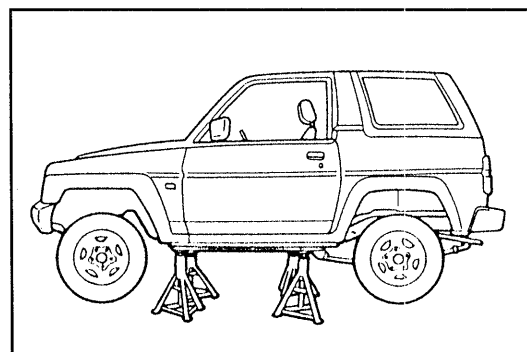
7. Perform the operation check.
(See page FS-30.)
8. Jack up the vehicle and remove the safety stands.
9. Tighten the front wheel attaching bolts to the specified torque.
(See page FS-19.)

WRU90-FS158

AUTOMATIC LOCKING HUB

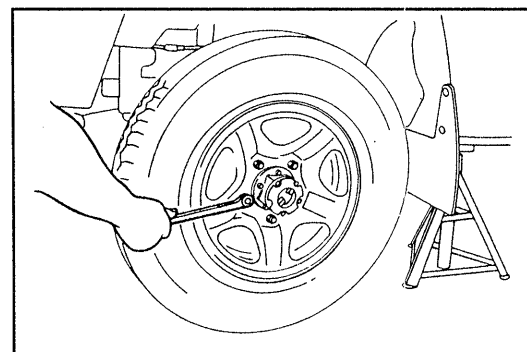
Removal

1. Jack up the vehicle and support it with safety stands.
(See GI section.)



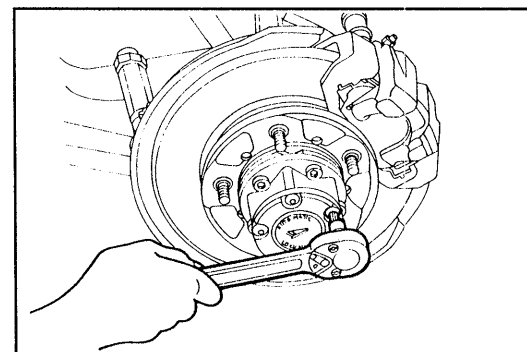
WRU90-FS159

2. Remove the front wheel.
(See page FS-18.)



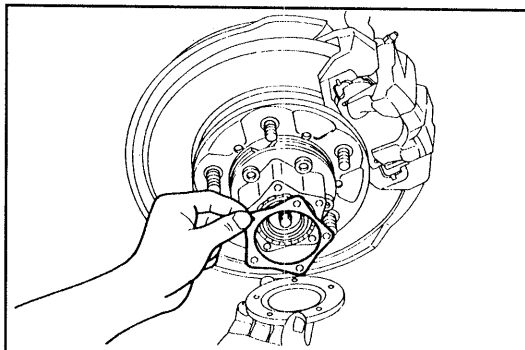
WRU90-FS160

3. Remove the hub cover.



WRU90-FS161

4. Remove the gasket from the hub body.



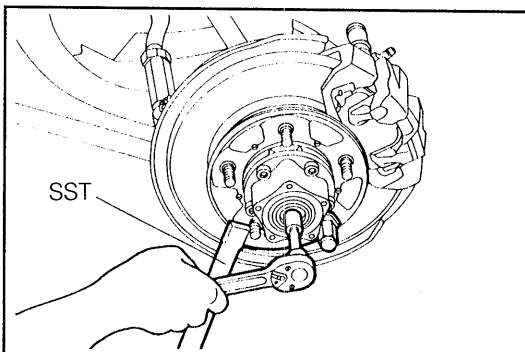
WRU90-FS162

5. Remove the attaching bolt with washer.

NOTE:

- Prevent the axle hub from turning, using the following SST.

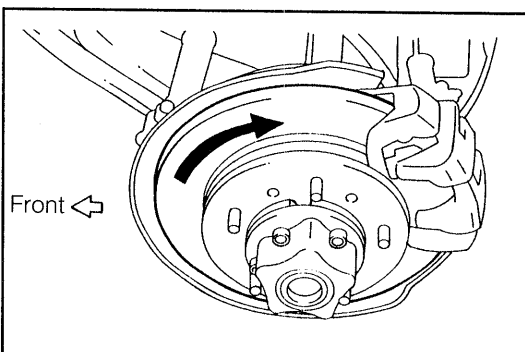
SST: 09511-87202-000



WRU90-FS163

6. Turn the hub. Ensure that the hub is set to the free wheel state.

If the hub is not set to the free condition, turn the hub (three turns or more) reversely relative to the forward direction so that the hub may be set to the free condition.



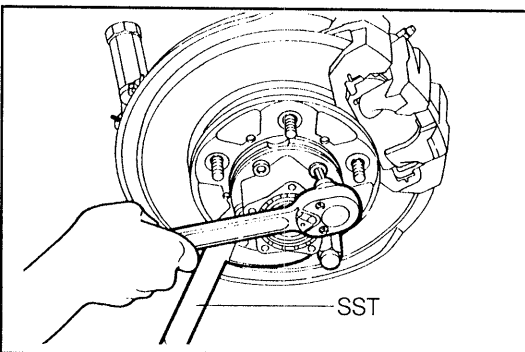
WRU90-FS164

7. Evenly loosen the hub body attaching bolts and remove them.

NOTE:

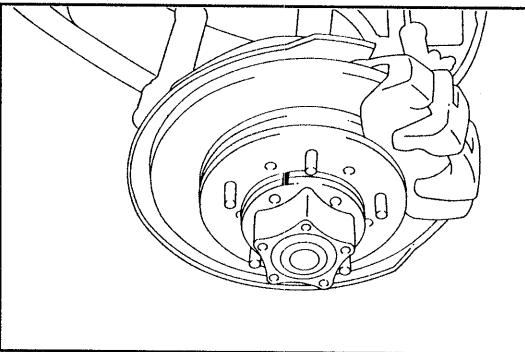
- Prevent the axle hub from turning, using the following SST.

SST: 09511-87202-000



WRU90-FS165

8. Put mating marks at a point between the hub body and the axle hub by means of a marker pen or the like.



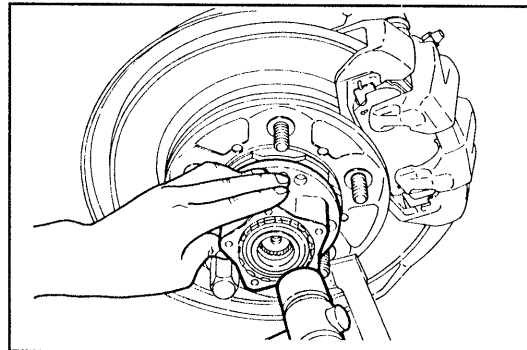
WRU90-FS166

FRONT AXLE & SUSPENSION

9. Remove the hub body from the axle hub by lightly tapping the hub body by means of a plastic hammer or the like.

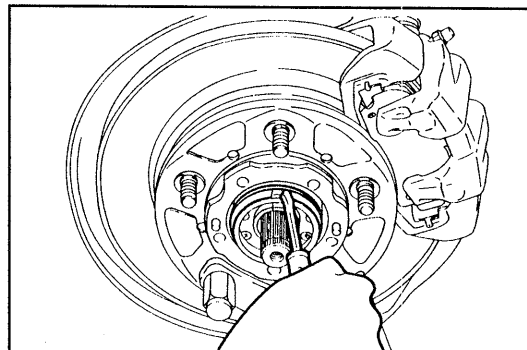
NOTE:

- Be very careful not to drop the hub body.
- Care must be exercised not to apply strong impacts to hub body.



WRU90-FS167

10. Remove the brake shoe snap ring.

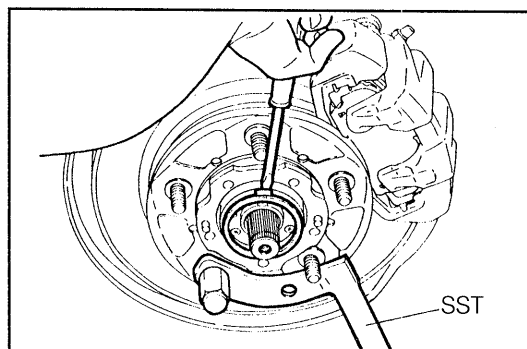


WRU90-FS168

11. Remove the brake shoe by lightly prying off the brake shoe by means of a screwdriver or the like.

NOTE:

- Since the brake shoe is provided with inserting sections at its upper and lower sides, be sure to pry off the brake shoe at upper and lower sides evenly and alternately.
- Be very careful not to scratch the brake drum and/or brake shoe.
- Do not remove the grease that has been applied to the removed brake shoe. Leave the grease as it is.
- Do not soil the removed brake shoe and grease.
- Do not allow the grease of the removed brake shoe to get to other sliding parts.
- Do not allow the grease of the removed brake shoe to get into other grease.



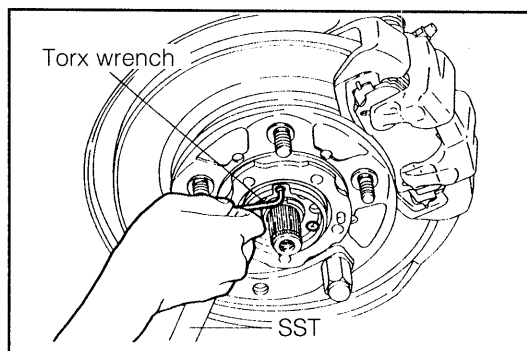
WRU90-FS169

12. Remove the brake drum from the lock nut, using a torx wrench.

NOTE:

- Prevent the axle hub from turning, using the following SST.

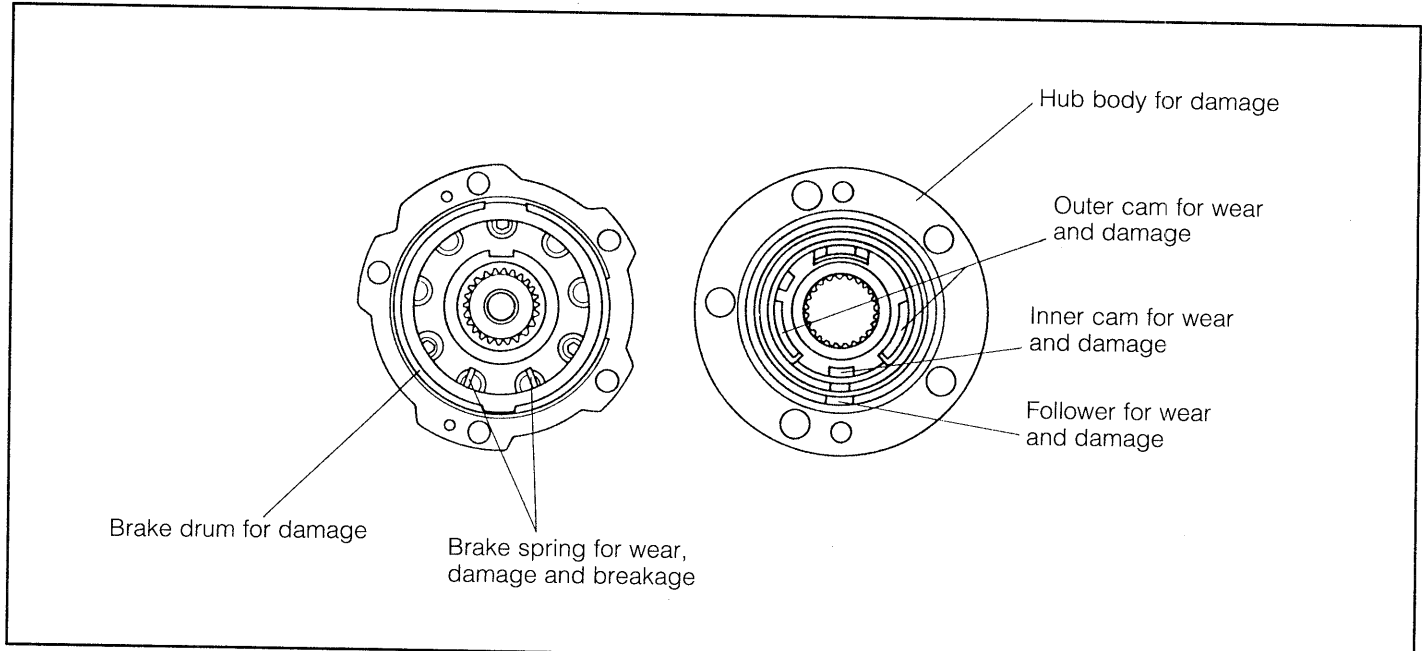
SST: 09511-87202-000



WRU90-FS170

Inspection

Check the following parts. Replace any defective parts.



WRU90-FS171

ASSEMBLY

NOTE:

Identification of Automatic Locking Hub

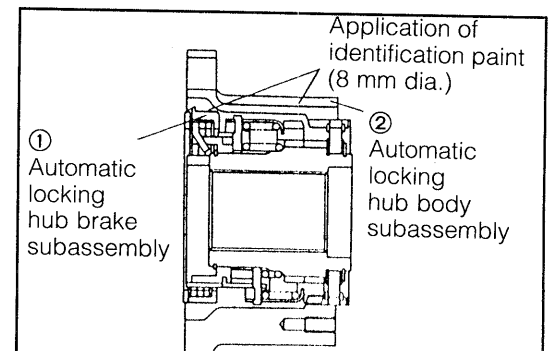
- When the hub body assembly and/or the hub brake subassembly is replaced, it is necessary to consider the combination of the hub body assembly and the hub brake subassembly.
- Before these parts are assembled, be certain to confirm their identification, using the table below.

Identification colors

Identification color		Brake subassembly	
		Yellow	blue
Hub body assembly	Yellow	○	○
	Blue	×	○

The O-marked combination only is acceptable.

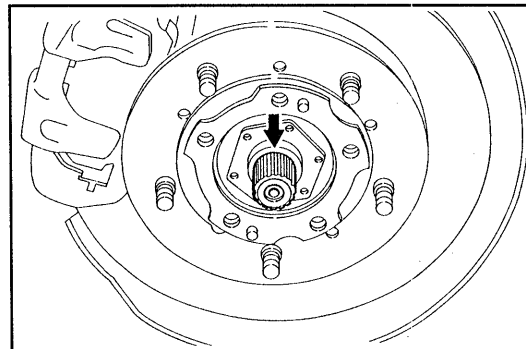
- However, when replacing the hub brake subassembly, if it is impossible to confirm the identification color of the hub body assembly, be certain to employ a blue brake subassembly.



WRU90-FS405

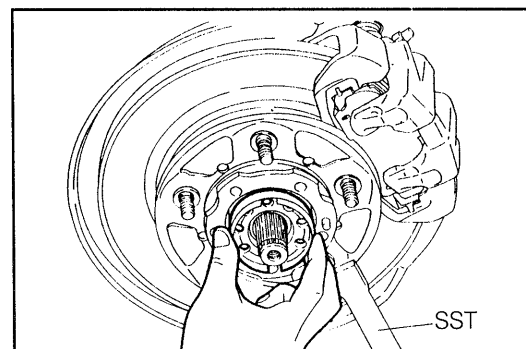
FRONT AXLE & SUSPENSION

1. Clean the serration section of the drive shaft so as to remove grease or the like.



WRU90-FS406

2. While aligning the brake drum with the groove of the knuckle, assemble them.



WRU90-FS172

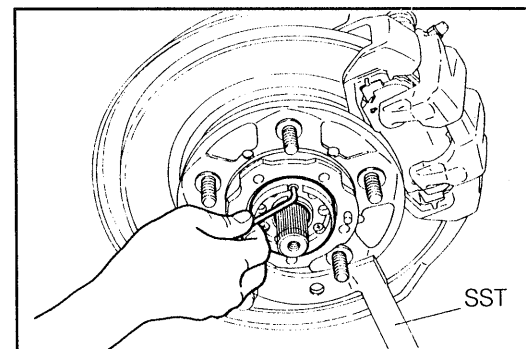
3. Tighten the brake drum attaching screws (torx) to the specified torque.

Tightening Torque:

0.5 - 0.9 kgf-m (3.6 - 6.5 ft-lb, 4.9 - 8.8 N-m)

NOTE:

- Prevent the axle hub from turning, using the following SST.
- SST: 09511-87202-000

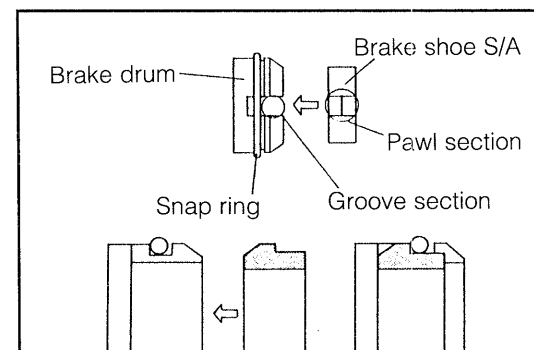


WRU90-FS173

4. Install the brake shoe to the brake drum.

NOTE:

- Since the width of the pawl of the brake shoe differs between the upper section and the lower section, be certain to confirm the width of the pawl before the installation.
- Make sure that the brake shoe is installed in the correct direction.
- Do not remove the grease that has been applied to the brake shoe.
- Do not soil the brake shoe and grease.
- Do not allow the grease applied to the brake shoe to get to other sliding parts.
- Do not allow the grease that has been applied to the brake shoe to get into other grease.



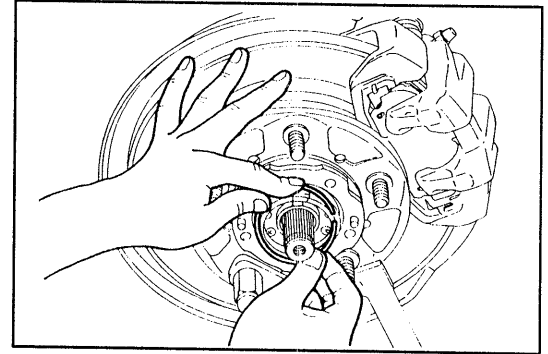
WRU90-FS174

If the grease applied to the brake shoe should be soiled and/or removed, be sure to replace the brake shoe with a new one. The new brake shoe will be supplied with grease applied.

5. Install the brake shoe snap ring so as to secure the the brake shoe.

NOTE:

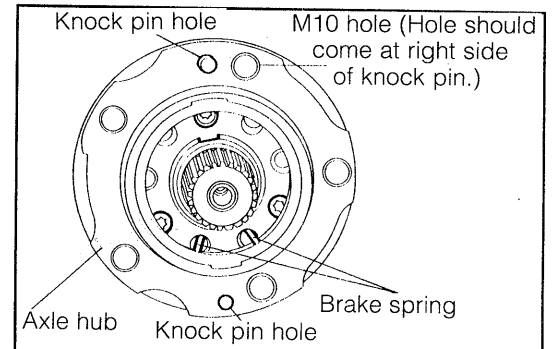
- Be sure to set the opening of the snap ring within a range of $90^\circ \pm 20$ relative to the cut-out section provided at the pawl section of the brake shoe of the brake drum.



WRU90-FS175

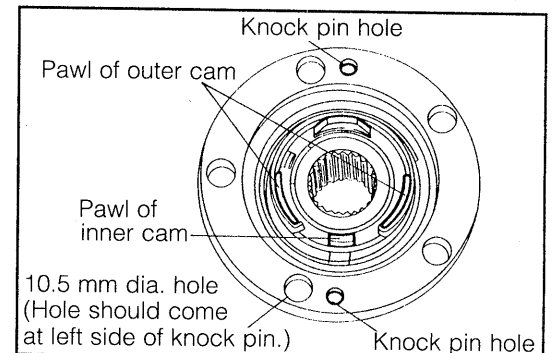
6. Installation of hub body

- (1) Turn the axle hub so as to set it, as indicated in the right figure.
- (2) Turn the spring so that the end section of the brake spring may come at the position as indicated in the right figure.



WRU90-FS177

- (3) Turn the cam so that the pawls of the inner cam and outer cam of the hub body may come at the position as indicated in the right figure.



WRU90-FS178

- (4) Clean the attaching surfaces of the axle hub and hub body. Thinly and evenly apply the Daihatsu Bond No.4 to the axle hub side.

NOTE:

- At this time, make sure that no grease is stuck to the serration section of the drive shaft.

- (5) Install the hub body to the axle hub. Tighten the attaching bolts to the specified torque evenly over two or three stages.

Tightening Torque:

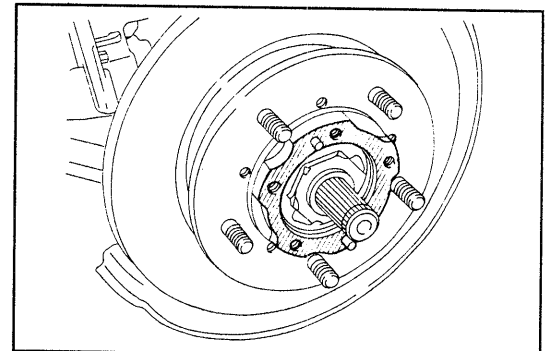
6.0 - 7.0 kgf-m (43.4 - 50.6 ft-lb, 58.8 - 68.6 N·m)

NOTE:

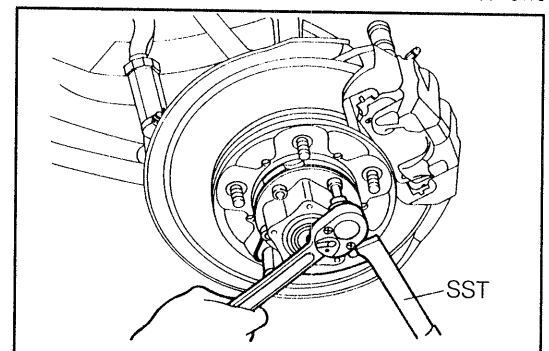
- Prevent the axle hub from turning, using the following SST.

SST: 09511-87202-000

- Wipe off any oozed bond.
- Be very careful not to get lithium based MP grease to the brake shoe subassembly.



WRU90-FS179



WRU90-FS180

FRONT AXLE & SUSPENSION

- (6) Install the plate washer with the attaching bolt.

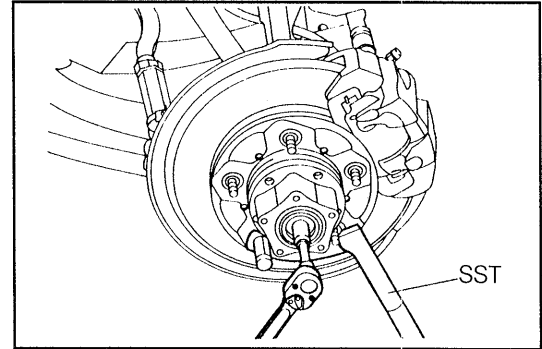
Tightening Torque:

1.5 - 2.2 kgf-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

NOTE:

- Prevent the axle hub from turning, using the following SST.

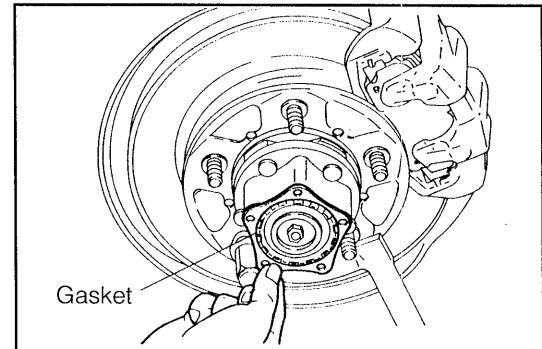
SST: 09511-87202-000



WRU90-FS181

7. Installation of hub cover

- (1) Install a new gasket to the hub body.



WRU90-FS182

- (2) Install the hub cover with the bolt.

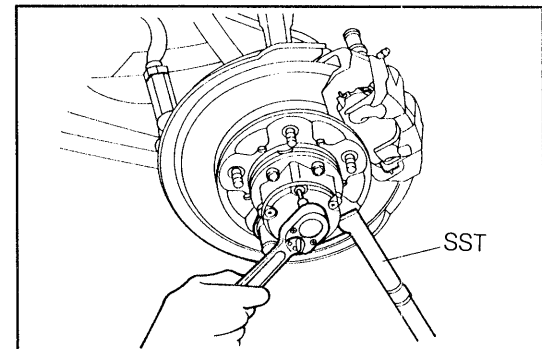
Tightening Torque:

0.8 - 1.2 kgf-m (5.8 - 8.7 ft-lb, 7.8 - 11.8 N·m)

NOTE:

- Prevent the axle hub from turning, using the following SST.

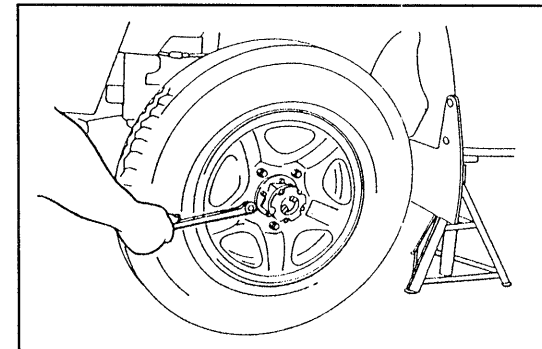
SST: 09511-87202-000



WRU90-FS183

8. Install the front wheel.

(See page FS-18.)



WRU90-FS184

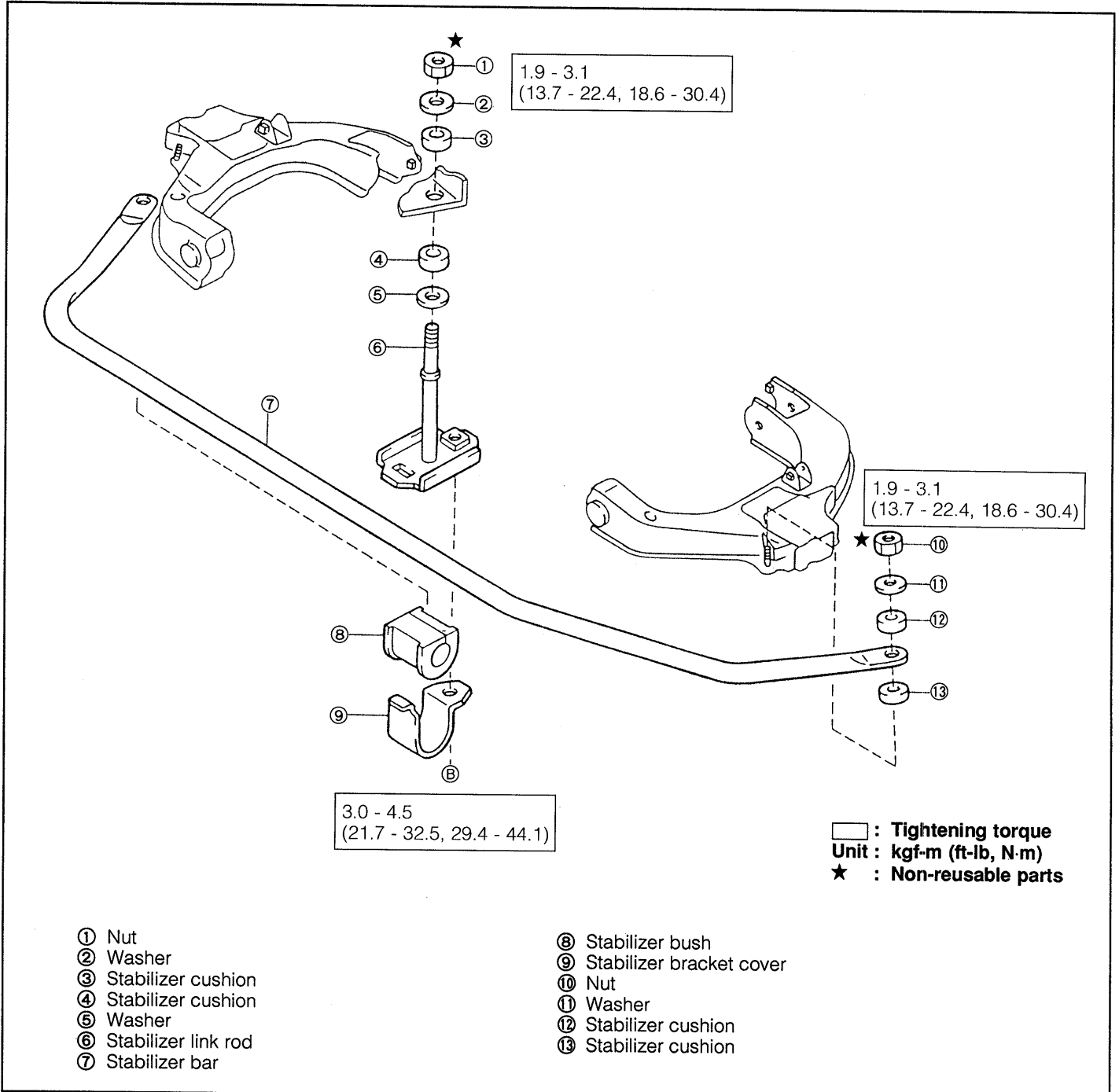
9. Perform the operation check.

(See page FS-30.)

10. Jack up the vehicle and remove the safety stands. Then, jack down the vehicle.

WRU90-FS185

STABILIZER BAR COMPONENTS



WRU90-FS186

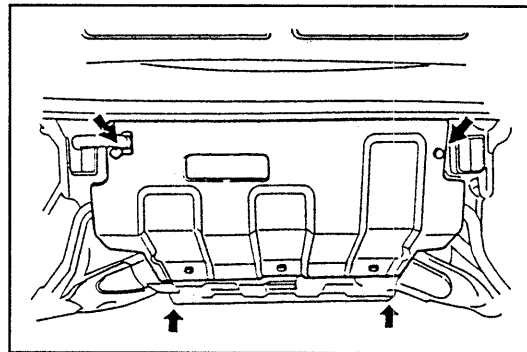
TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Excessive rolling of vehicle body during running	Stabilizer damaged	Check stabilizer.
	Stabilizer installing section damaged	Check stabilizer installing section.

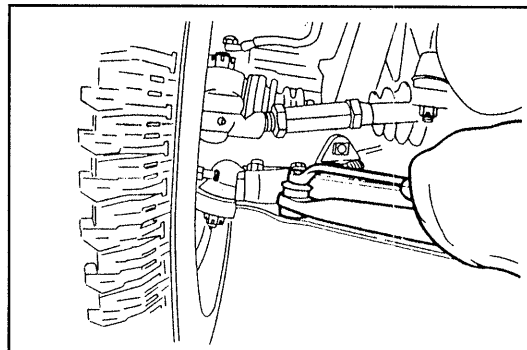
WRU90-FS187

REMOVAL

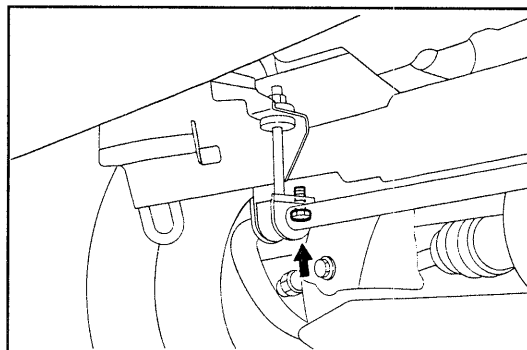
1. Place the vehicle in an unloaded state.
2. Remove the engine undercover at the front side.
3. Remove the bolts attaching the stabilizer bar to the lower arm at the right and left sides. Remove the washer and cushion.
4. Loosen the attaching bolts of the stabilizer bracket covers.
5. Remove the stabilizer link rod attaching nut. Remove the washer and cushion.
6. Remove the stabilizer bar from the lower arm. Remove the cushion.



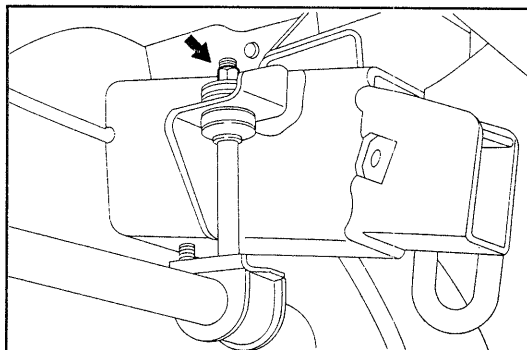
WRU90-FS188



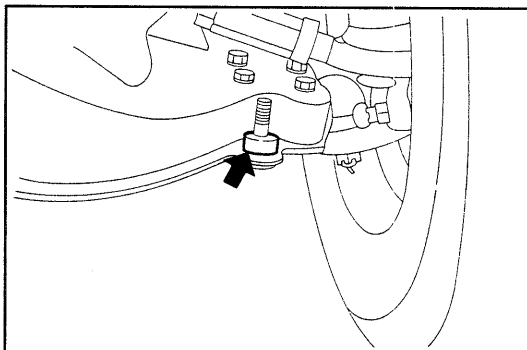
WRU90-FS189



WRU90-FS190

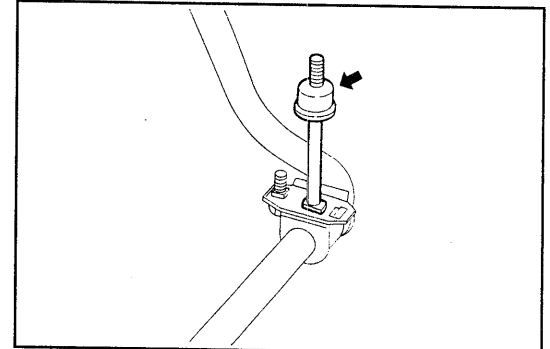


WRU90-FS191



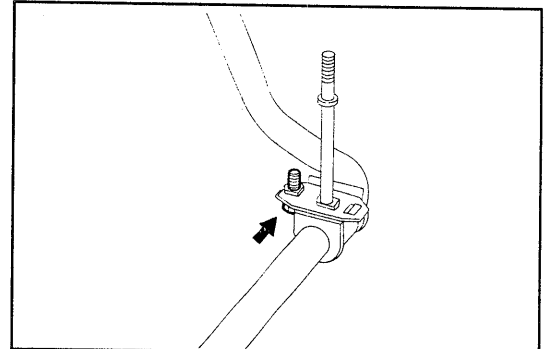
WRU90-FS192

7. Remove the cushion and washer from the stabilizer link rod.



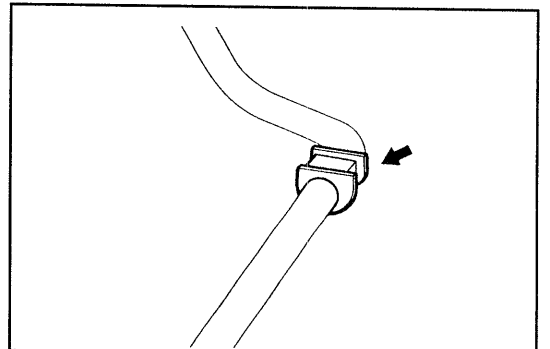
WRU90-FS195

8. Remove the stabilizer bracket cover.



WRU90-FS193

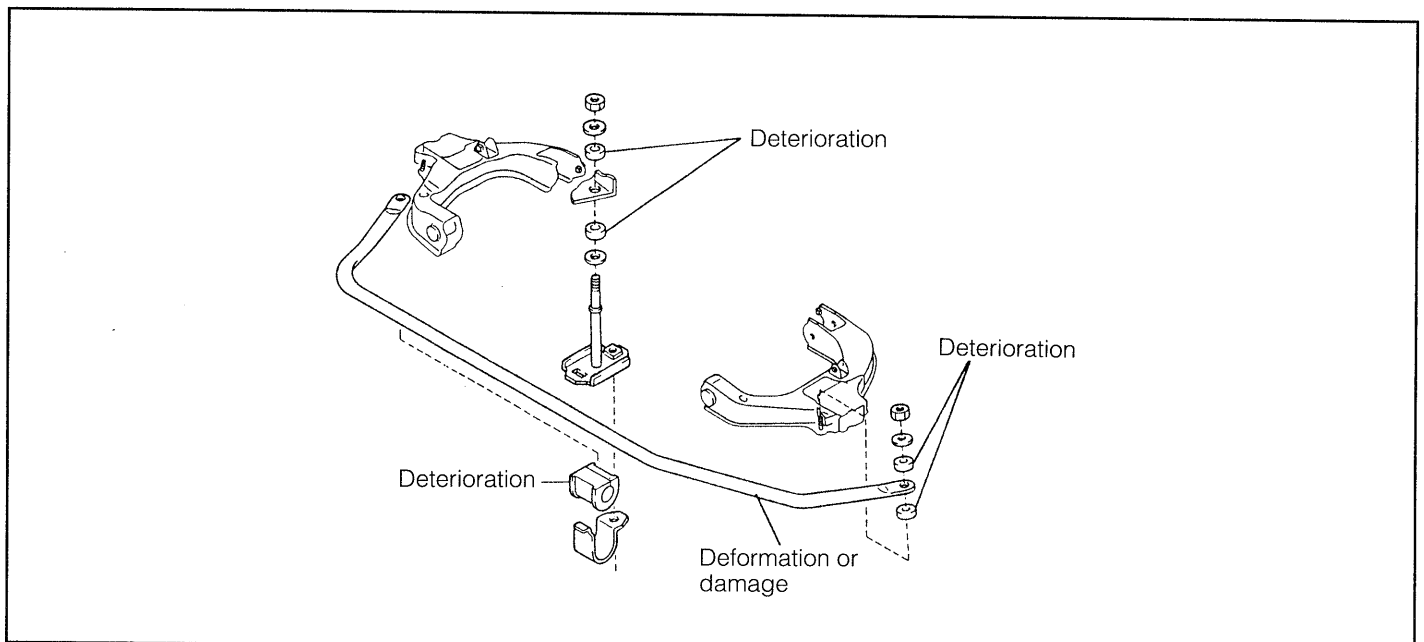
9. Remove the stabilizer bush.



WRU90-FS194

INSPECTION

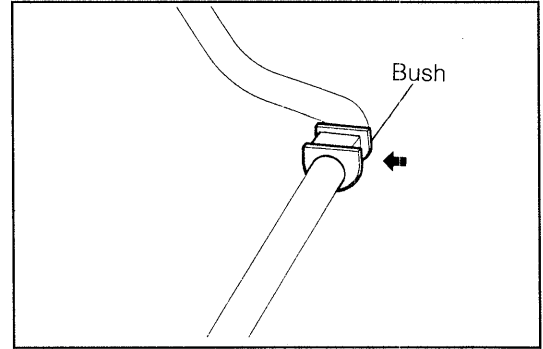
Check the following parts. Replace any defective parts.



WRU90-FS196

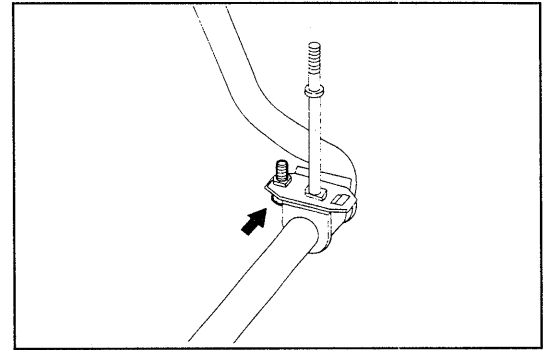
INSTALLATION

1. Install the bush to the stabilizer bar.



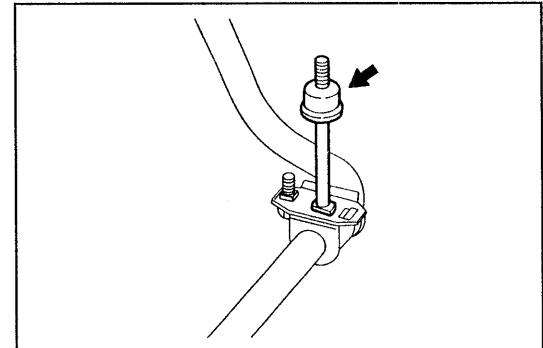
WRU90-FS197

2. Install the stabilizer link rod to the cushion. Temporarily install the stabilizer bracket cover.



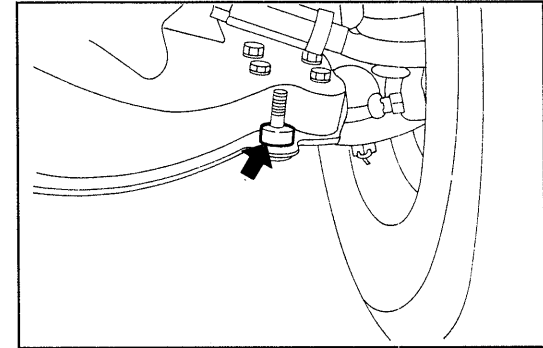
WRU90-FS198

3. Install the washer and cushion to the stabilizer link rod.



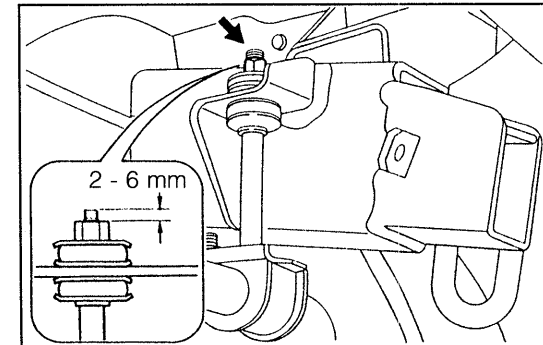
WRU90-FS199

4. Install the cushion to the lower arm.



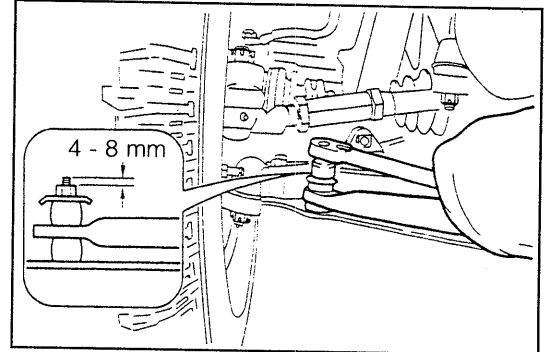
WRU90-FS200

5. Connect the stabilizer to the lower arm attaching bolt. Install the stabilizer link to the frame. Tighten the nut with the cushion and washer interposed.



WRU92-FS413

6. Install the cushion and washer to the lower arm. Tighten the attaching nut.

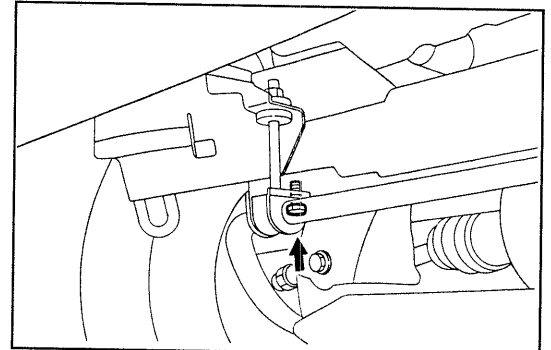


WRU92-FS414

7. Tighten the stabilizer bracket cover attaching bolt.

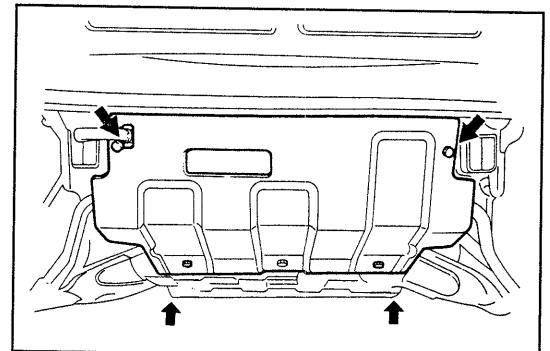
Tightening Torque:

3.0 - 4.5 kgf-m (21.7 - 32.5 ft-lb, 29.4 - 44.1 N-m)



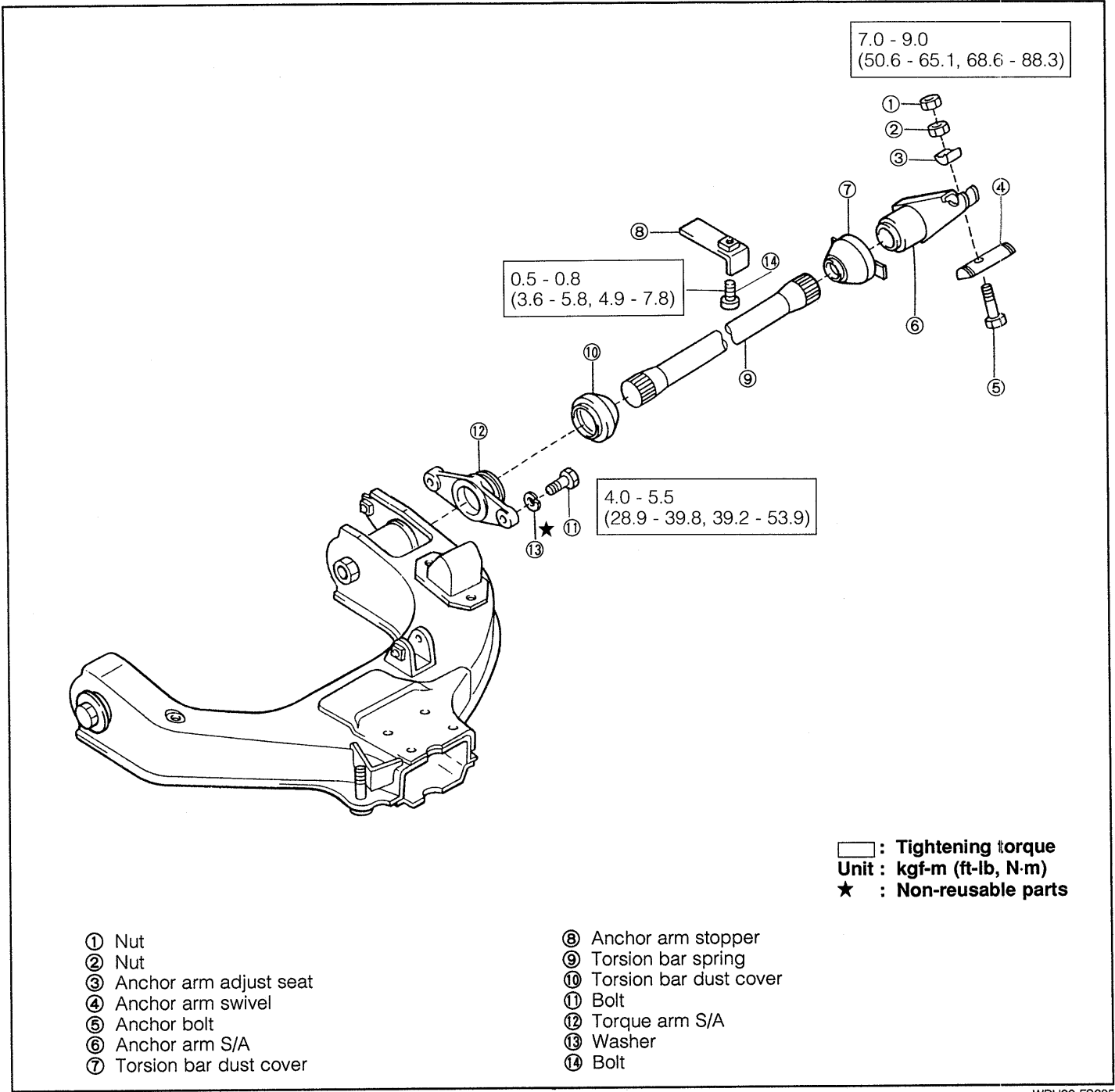
WRU90-FS203

8. Install the engine front undercover.



WRU90-FS204

TORSION BAR SPRINGS
COMPONENTS



WRU90-FS205

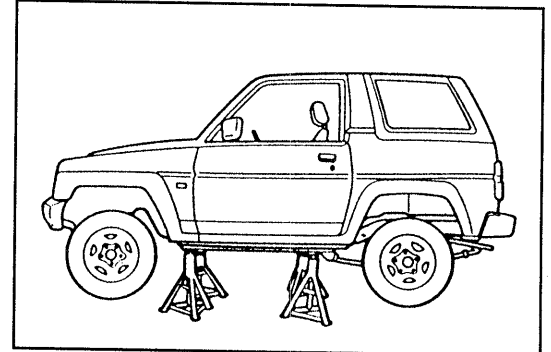
TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Vehicle body tilted	Torsion bar improperly adjusted	Adjust vehicle height.

WRU90-FS206

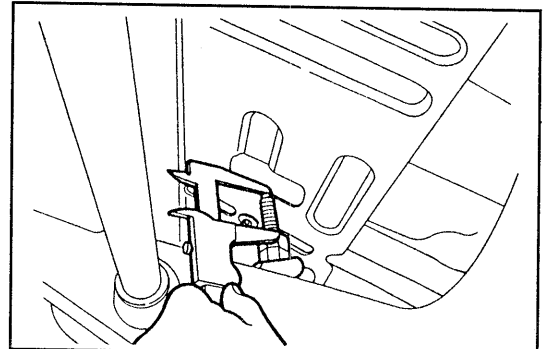
REMOVAL

1. Jack up the vehicle and support it with safety stands.
(See GI section.)



WRU90-FS207

2. Measure the protruding dimension of the anchor bolt.
Record the measured value.

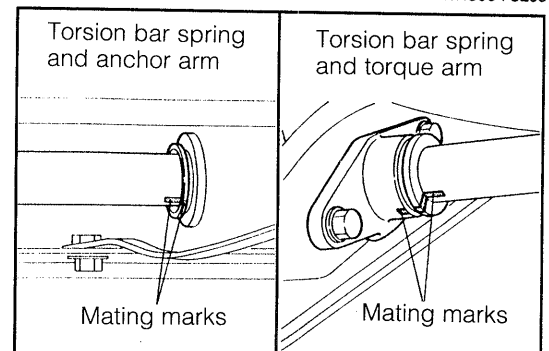


WRU90-FS208

3. Remove the rubber boot. Put mating marks at a point between the torsion bar spring and the anchor arm and also at a point between the torsion bar spring and the torque arm. For this identification marks, use white paint or the like.

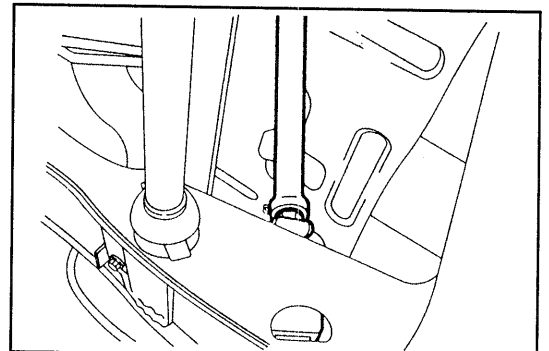
NOTE:

- Since the shape of the torsion bar spring differs between the right side and the left side, be sure to put mating marks, so that the torsion bar springs may be installed correctly in their original positions.



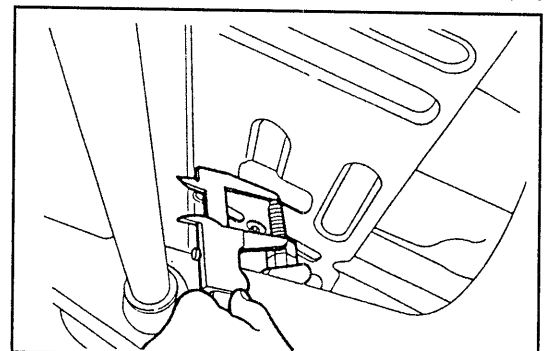
WRU90-FS209

4. Loosen the lock nut of the anchor bolt, until the reaction force of the torsion bar spring is just eliminated.



WRU90-FS210

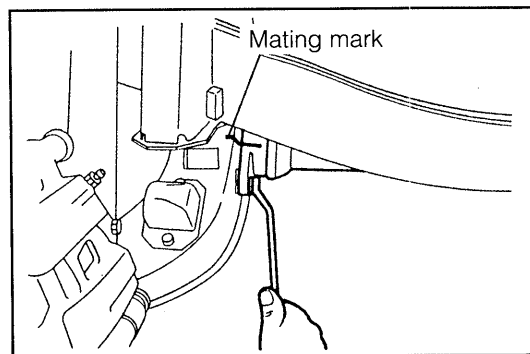
5. Measure the protruding dimension of the anchor bolt.
Record the measured value.



WRU90-FS211

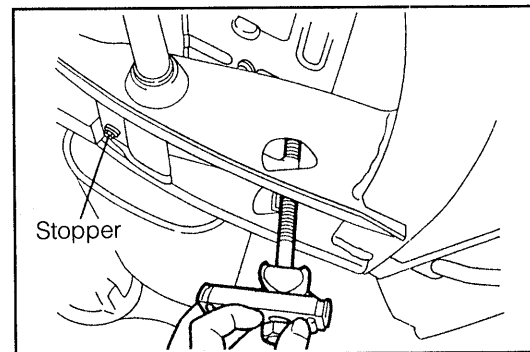
FRONT AXLE & SUSPENSION

6. Remove the torque arm from the lower arm by removing the torque arm attaching bolt.



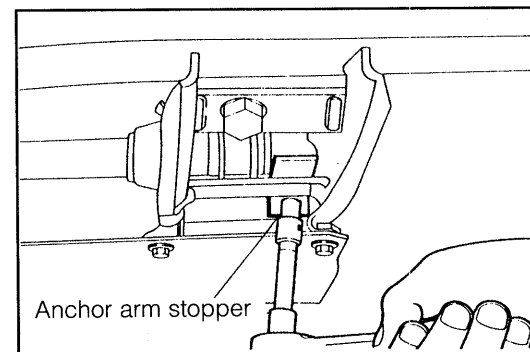
WRU90-FS212

7. Remove the adjusting seat from the anchor arm. Then, remove the anchor arm swivel together with the anchor bolts, nuts and anchor arm adjusting seat from the frame.



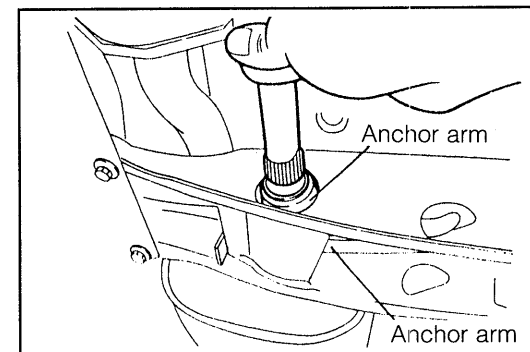
WRU90-FS213

8. Remove the anchor arm stopper from the frame.



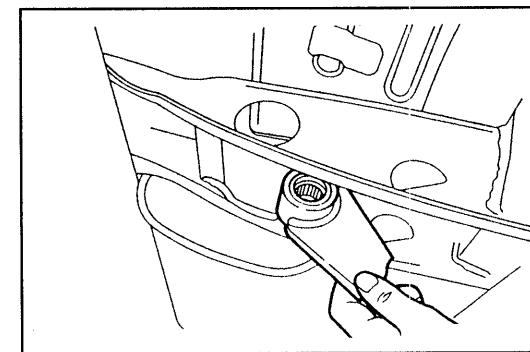
WRU90-FS214

9. Pull out the torsion bar spring from the anchor arm.



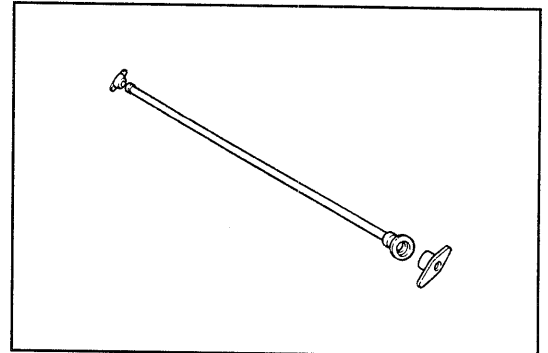
WRU90-FS215

10. Remove the anchor arm from the frame.



WRU90-FS216

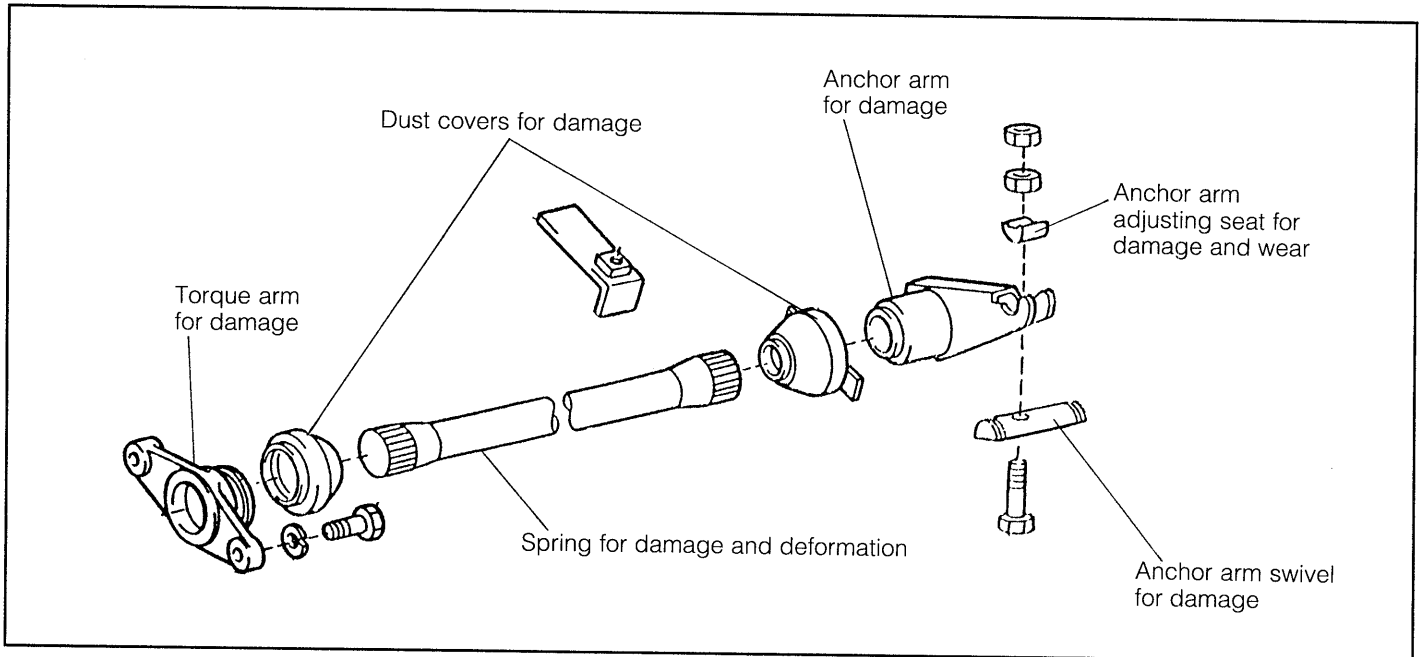
11. Remove the torque arm and dust covers from the torsion bar spring.



WRU90-FS217

INSPECTION

Check the following parts. Replace any defective parts.



NOTE:

- Torsion bar springs for the right and for the left are the designated parts exclusively for each side. Care must be exercised as to the following identification marks.

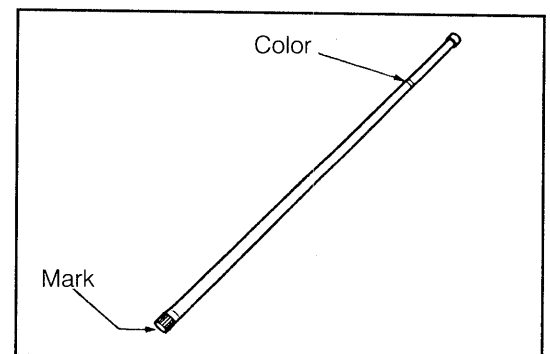
WRU90-FS218

<Identification Marks>

	Left side	Right side
Color	Blue	Orange
Mark		

CAUTION:

- As respects the torsion bar springs, be sure to observe the combination above.
- If this caution should fail to be observed, the running performance may drop significantly.



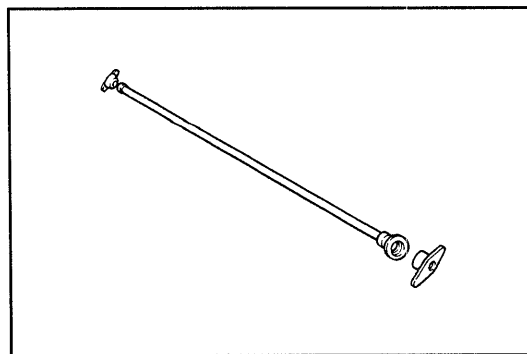
WRU90-FS219

INSTALLATION

1. Install the dust covers and torque arm to the torsion bar.

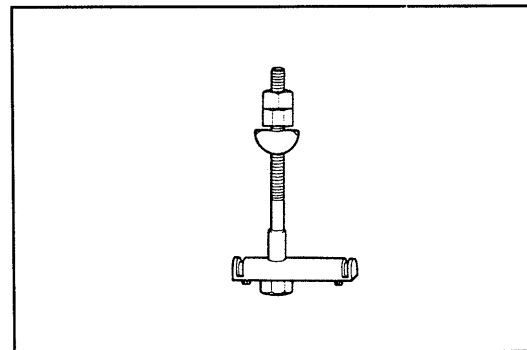
NOTE:

- Make sure that the front and rear dust covers are installed correctly in their respective positions.



WRU90-FS220

2. Install the anchor arm swivel, anchor arm stopper and lock nut to the anchor bolt.



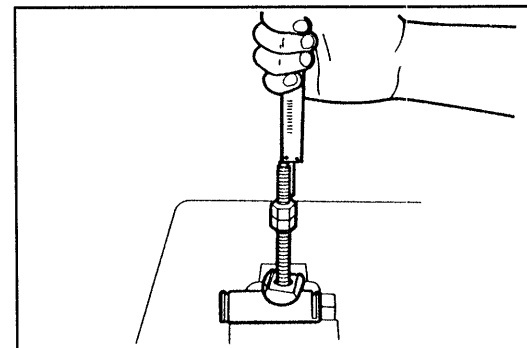
WRU90-FS221

3. Adjust the length from the anchor bolt end to the lock nut upper surface to the specified value.

Specified Value: 30 mm (1.18 inch)

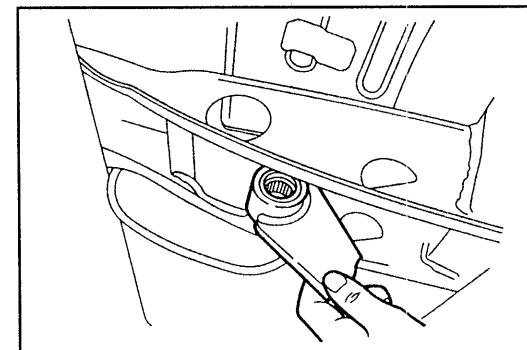
NOTE:

- In cases where the torsion bar, anchor arm and torque arm are reused, set their positions to the original heights measured during the disassembly.



WRU90-FS222

4. Insert the anchor arm into the frame.

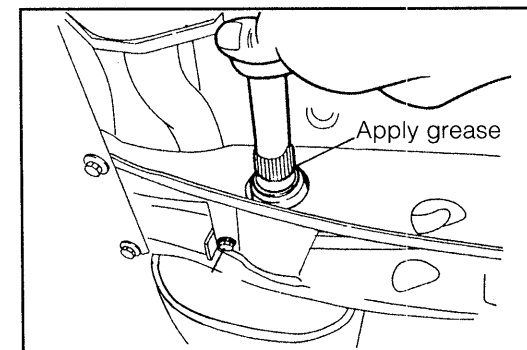


WRU90-FS223

5. Apply MP grease to the torsion bar spline section. Connect the torsion bar to the anchor arm.

NOTE:

- In cases where the torsion bar, torque arm and anchor arm are reused, align the mating marks put during the removal.

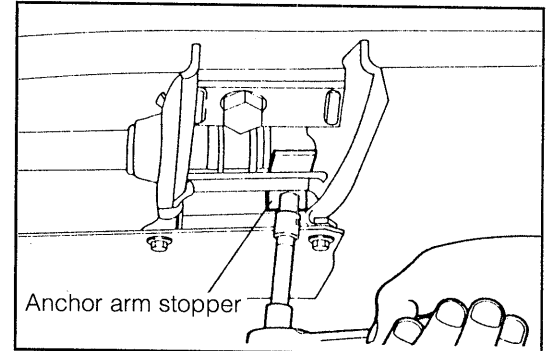


WRU90-FS224

6. Install the anchor arm stopper.

Tightening Torque:

0.5 - 0.8 kgf-m (3.6 - 5.8 ft-lb, 4.9 - 7.8 N-m)

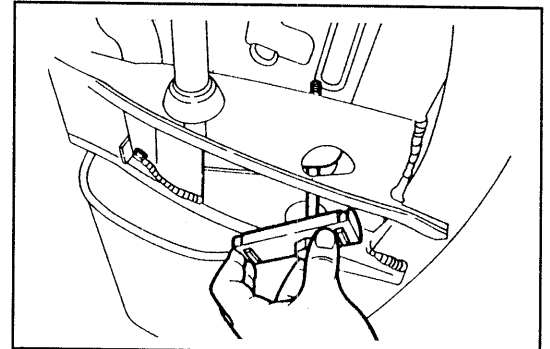


WRU90-FS225

7. Install the anchor arm stopper to the anchor. Install the anchor swivel to the frame.

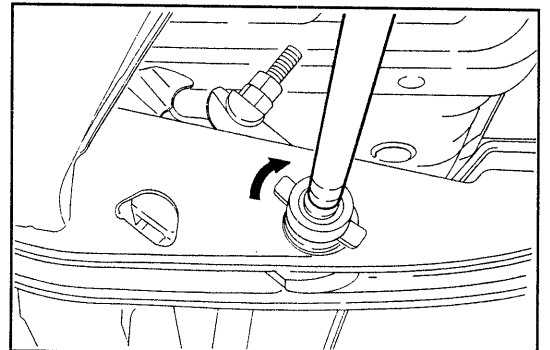
NOTE:

- Make sure that the anchor arm swivel is inserted into the frame positively.



WRU90-FS226

8. Turn the torque arm. Ensure that the anchor arm stopper and anchor swivel come at their correct positions.

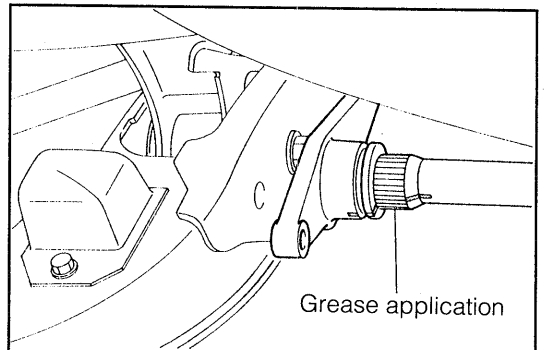


WRU90-FS227

9. Under the condition described in the step 8, apply lithium-based MP grease to the spline section of the torsion bar spring. Install the torque arm to the lower arm.

Tightening Torque:

4.0 - 5.5 kgf-m (28.9 - 39.8 ft-lb, 39.2 - 53.9 N-m)



WRU90-FS228

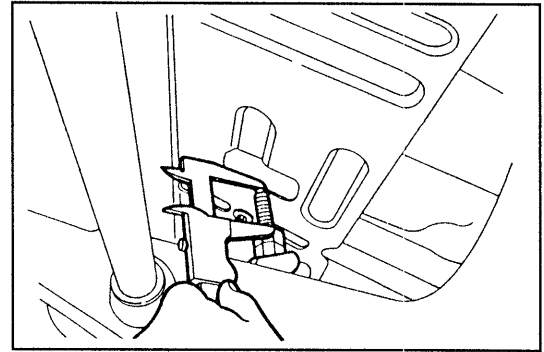
NOTE:

- In cases where the torque arm, torsion bar spring and anchor arm are reused, install the torque arm to the lower arm while aligning the mating marks put during the removal.
- At this time, make sure that the anchor arm stopper and anchor swivel are placed at their correct positional relationship and that no excessive play is present.

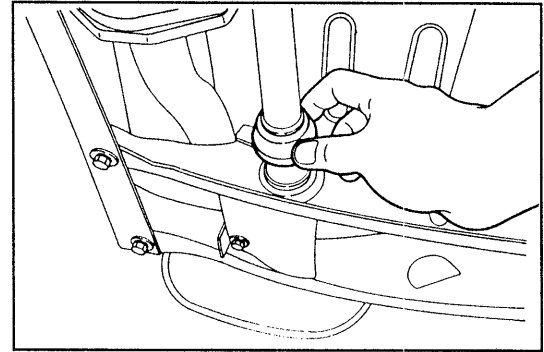
WRU90-FS229

FRONT AXLE & SUSPENSION

10. While preventing the lock nut at the frame side from turning, adjust the anchor bolt so that the protruding dimension of the anchor bolt may become the value measured before the disassembly.



11. Install the dust covers to the torque arm and anchor arm.



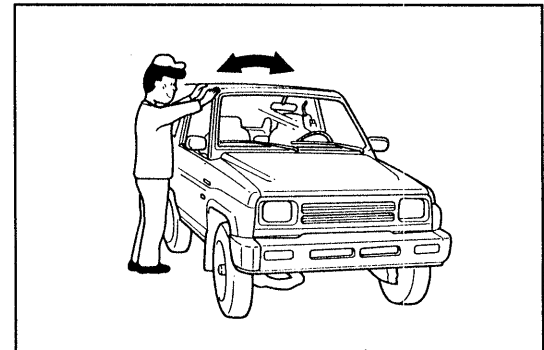
12. Remove the safety stands.

13. Check and adjustment of vehicle height

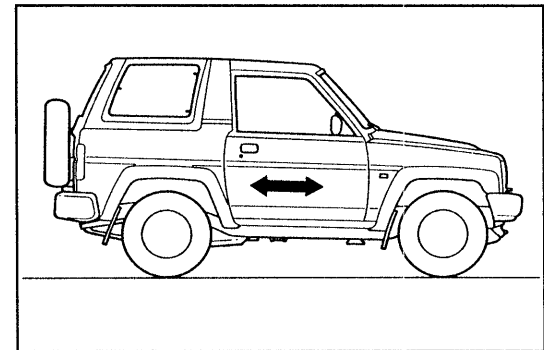
Confirmation items prior to check and adjustment

- Ensure that the designated tires are installed.
- Ensure that the tires are inflated to the specified air pressure. Also, ensure that the air inflation pressure is uniform on the four tires.
- Ensure that the vehicle is under no-loaded state.
- Ensure that the floor where the check and adjustment are carried out is level.

- (1) Rock the vehicle several times so as to stabilize the suspensions.

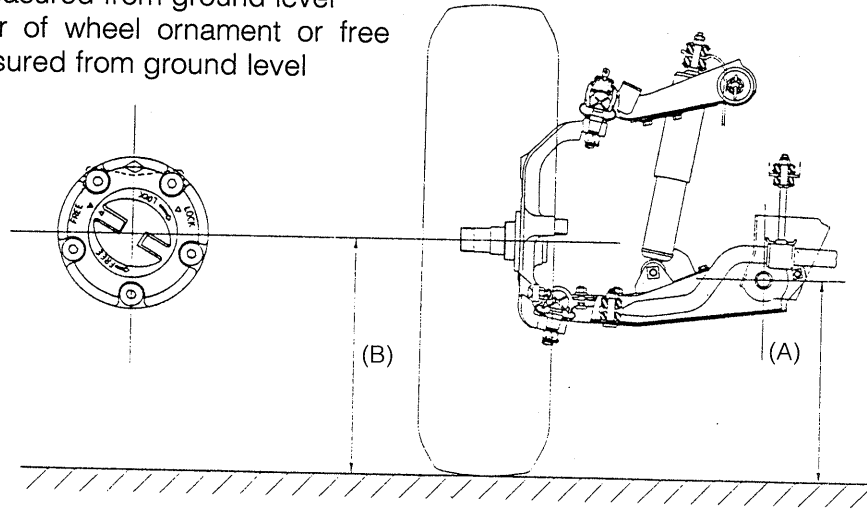


- (2) Move the vehicle about three meters twice in a fore-and-aft direction.



- (3) Measure the distance from the center of the front ornament or the free wheel hub to the ground level. Also, measure the distance from the center of the attaching bolt of the lower arm at the front side to the ground level. Record the measured values.

- (A): Height of center of attaching bolt at front side of lower arm, measured from ground level
(B): Height of center of wheel ornament or free wheel hub, measured from ground level



WRU90-FS234

- (4) Calculate the measured value. Ensure that the difference conforms to the specified value. However, the variation in the specified value between the right and left sides should be within 10 mm.

B - A = Specified value

Specified Value: 36 ± 10 mm (1.42 ± 0.39 inches)

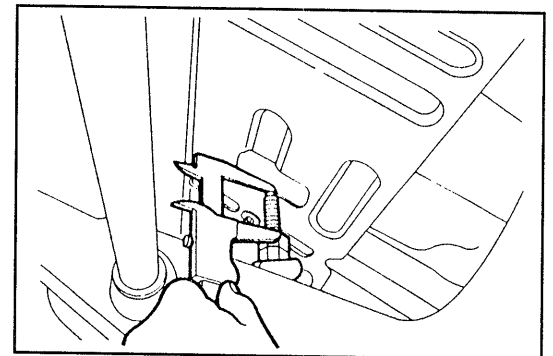
If the calculated results do not conform to the specified value or the variation in height between the right and left sides is 10 mm (0.39 inch) or more, adjust the vehicle height by means of the anchor bolt.

After the adjustment, repeat the operation from the step (1).

14. Measure the protruding dimension of the anchor bolt. Ensure that the variation between the right and left sides is within 10 mm (0.39 inch).

If not, replace the torsion bar spring.

Prior to the replacement of the torsion bar, recheck to ensure that the spline exhibits no displacement under assembled condition.



WRU90-FS235

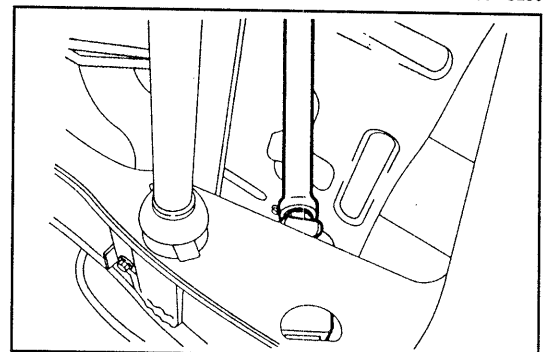
15. Tighten the lock nut of the anchor bolt and lock it.

Tightening Torque:

7.0 - 9.0 kgf-m (50.6 - 65.1 ft-lb, 68.6 - 88.3 N-m)

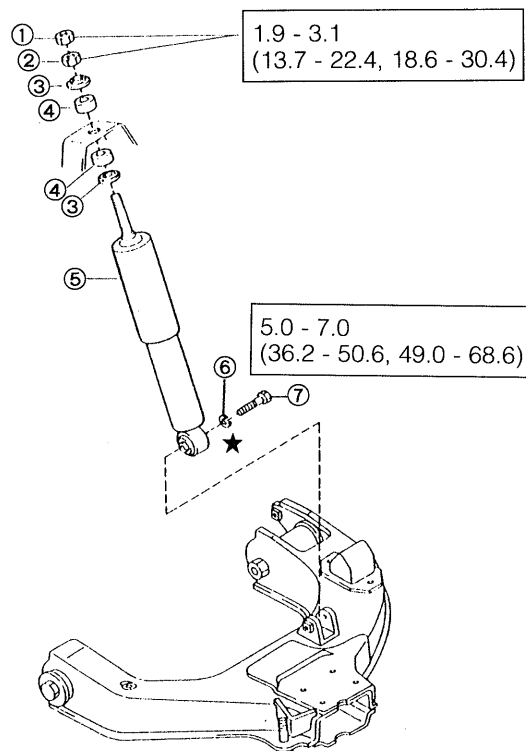
NOTE:

- As regards the tightening of the lock nut, be sure to prevent the lower nut from turning, using a spanner or the like. Then, tighten the upper nut.



WRU90-FS237

FRONT SHOCK ABSORBERS COMPONENTS



□ : Tightening torque
Unit : kgf-m (ft-lb, N-m)

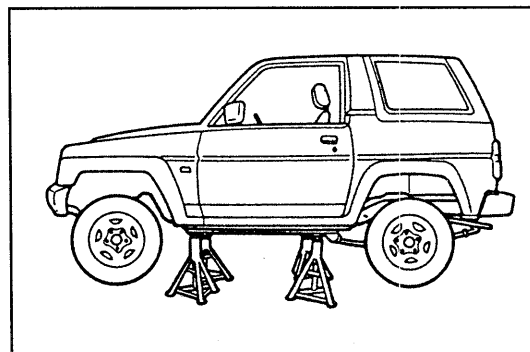
- ① Nut
- ② Nut
- ③ Washer plate
- ④ Cushion

- ⑤ Front shock absorber
- ⑥ Washer
- ⑦ Bolt

WRU90-FS238

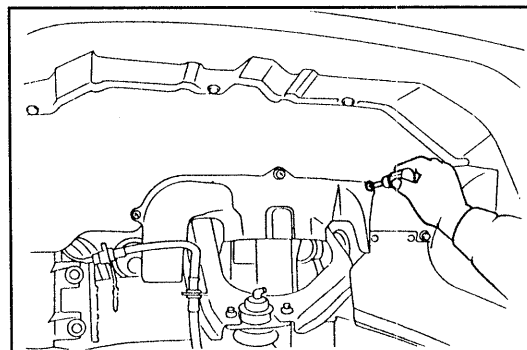
REMOVAL

1. Jack up the vehicle and support it with safety stands.
(See GI section.)



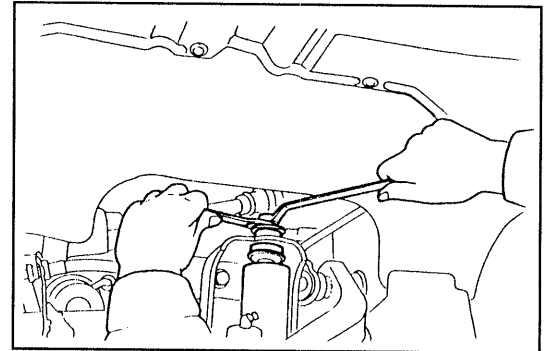
WRU90-FS239

2. Remove the dust cover.



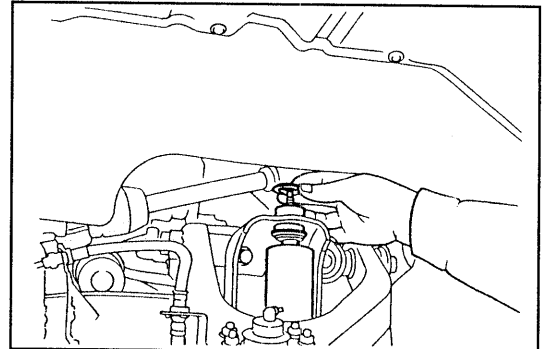
WRU90-FS240

3. Loosen the lock nut.
4. While preventing the lock nut and attaching nut from turning at the top of the shock absorber, remove them.



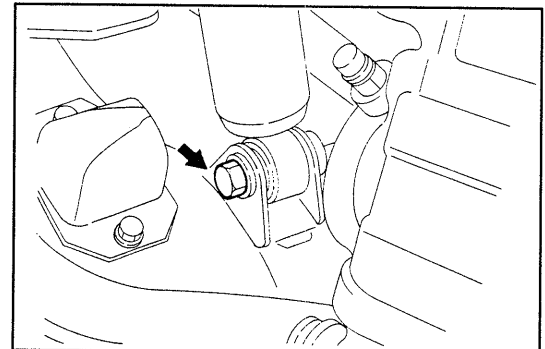
WRU90-FS241

5. Remove the plate washer and cushion.



WRU90-FS242

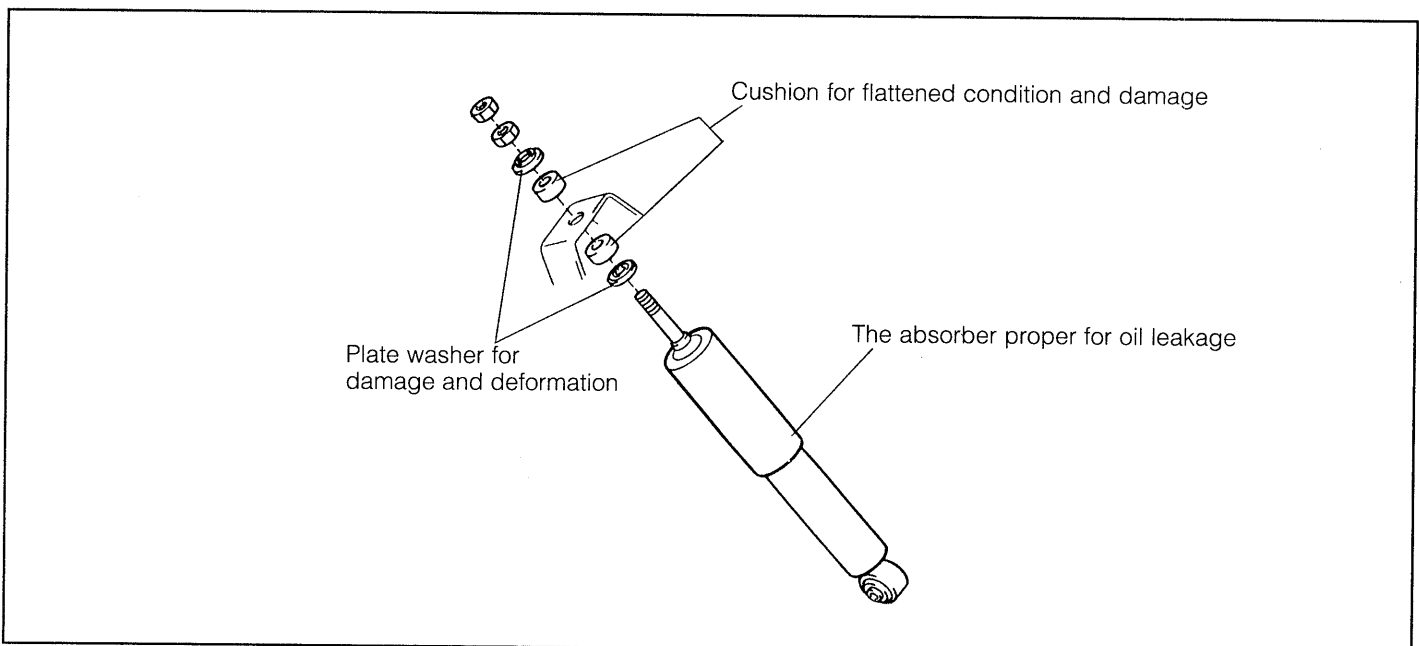
6. Remove the bolt connecting the shock absorber to the lower arm. Remove the shock absorber.
7. Remove the cushion and washer plate from the shock absorber.



WRU90-FS243

INSPECTION

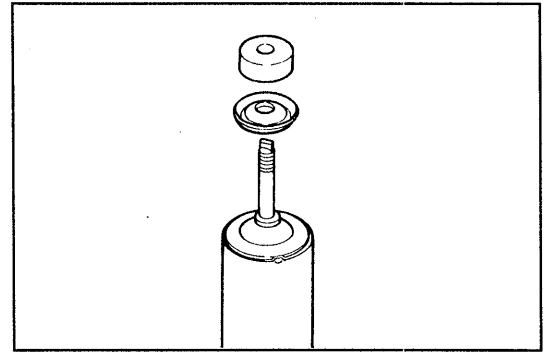
Check the following parts. Replace any defective parts.



WRU90-FS244

INSTALLATION

1. Install the washer plate and cushion to the shock absorber.

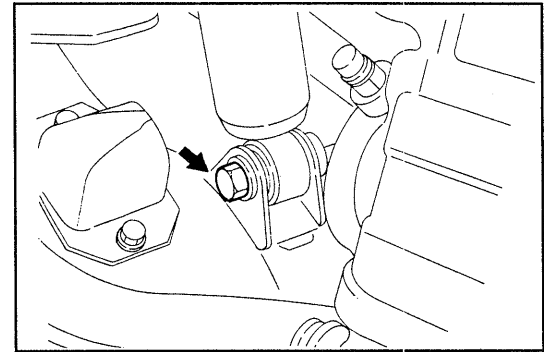


WRU90-FS245

2. Insert the shock absorber into the attaching hole at the chassis side.
3. With the shock absorber contracted, connect the shock absorber to the lower arm attaching section. Tighten the attaching bolt.

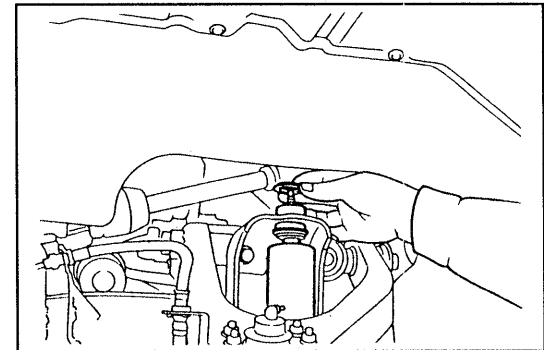
Tightening Torque:

5.0 - 7.0 kgf-m (36.2 - 50.6 ft-lb, 49.0 - 68.6 N·m)



WRU90-FS246

4. Install the cushion and washer plate.



WRU90-FS247

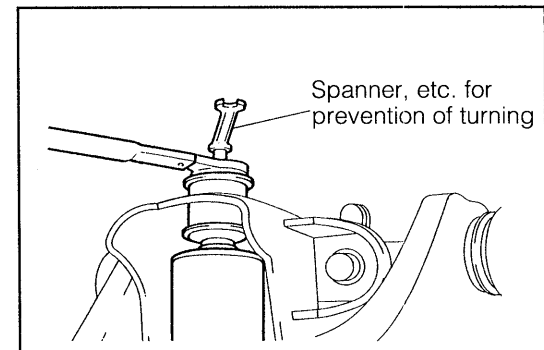
5. Install the attaching nut to the top of the shock absorber. While preventing the attaching nut from turning, tighten the nut to the specified torque.

Tightening Torque:

1.9 - 3.1 kgf-m (13.7 - 22.4 ft-lb, 18.6 - 30.4 N·m)

NOTE:

Nut thickness: 8 mm (0.31 inch)



WRU90-FS248

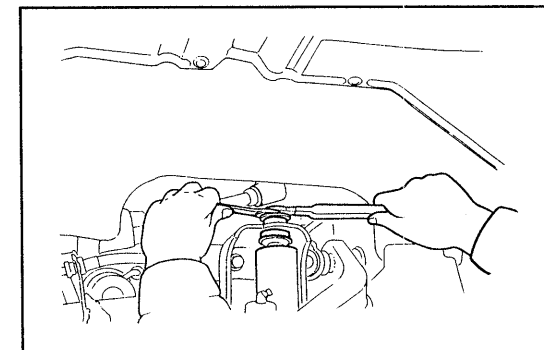
6. Install the lock nut and tighten it to the specified torque.

Tightening Torque:

1.9 - 3.1 kgf-m (13.7 - 22.4 ft-lb, 18.6 - 30.4 N·m)

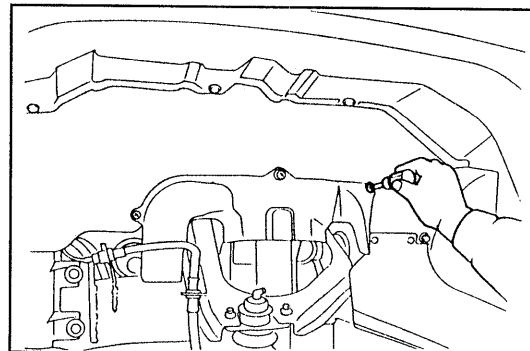
NOTE:

Nut thickness: 6 mm (0.23 inch)



WRU90-FS249

7. Install the dust cover.

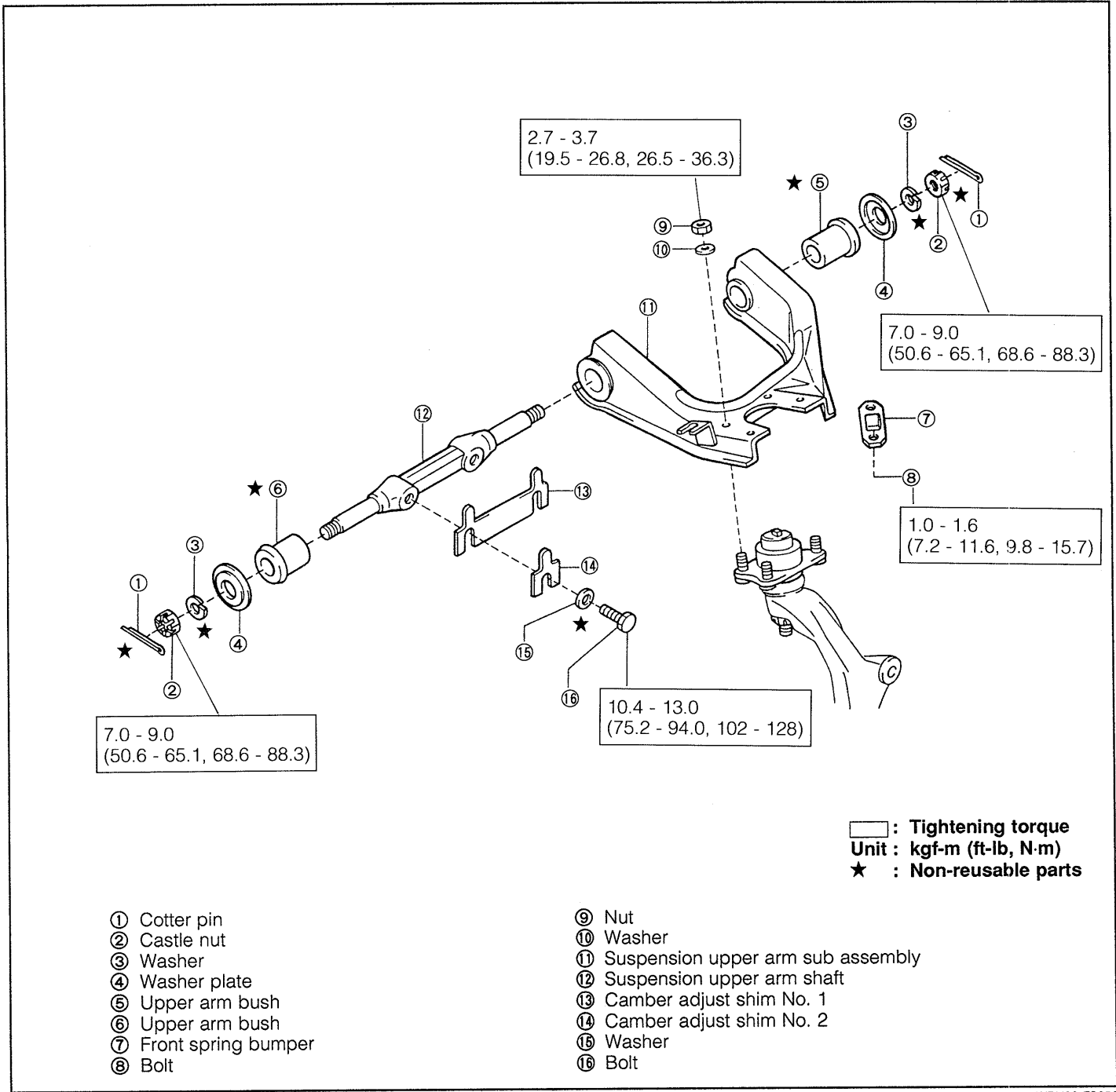


WRU90-FS250

8. Jack up the vehicle and remove the safety stands. Then, jack down the vehicle.

WRU90-FS251

UPPER ARMS
COMPONENTS



WRU90-FS252

TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Improper front alignment (Improper camber and caster)	Bush worn or damaged Upper arm damaged or deformed	Check bush. Check upper arm.

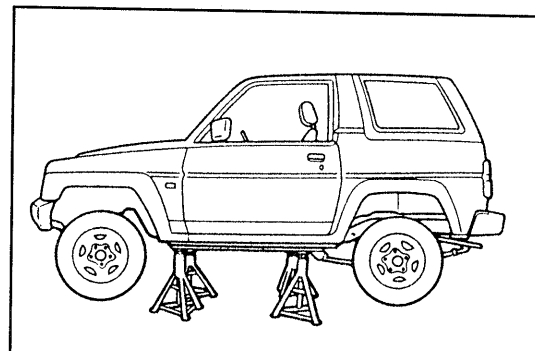
WRU90-FS253

REMOVAL

1. Remove the torsion bar.
(See page FS-60 to FS-63.)

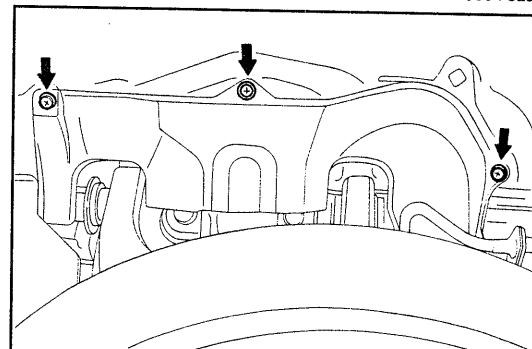
WRU90-FS254

2. Support the front frame with jacks. Lower the vehicle, until the front tires come in contact with the floor surface.
3. Support the vehicle with safety stands.



WRU90-FS255

4. Remove the dust cover by removing the attaching clip.

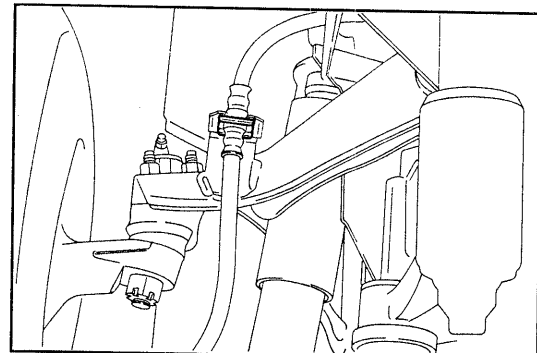


WRU90-FS256

5. Pull out the clip. Disconnect the brake hose from the upper arm.

NOTE:

- Do not reuse the clip.

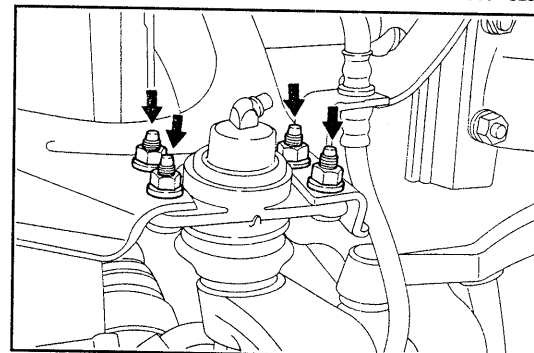


WRU90-FS257

6. Remove the attaching nut at the upper arm ball joint side.

NOTE:

- Do not reuse the spring washer.



WRU90-FS258

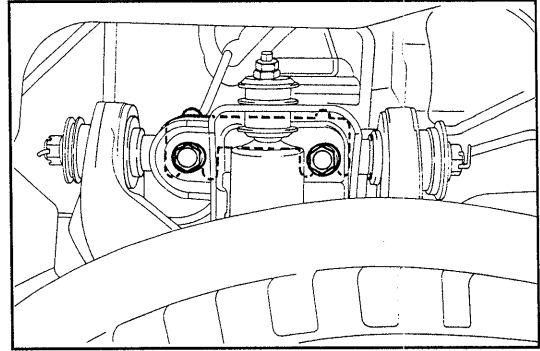
FRONT AXLE & SUSPENSION

7. Remove the camber adjusting shim by loosening the upper arm attaching bolts.

NOTE:

- Record the number, kind and installation position of the removed shim.

8. Remove the upper arm by removing the upper arm attaching bolts.



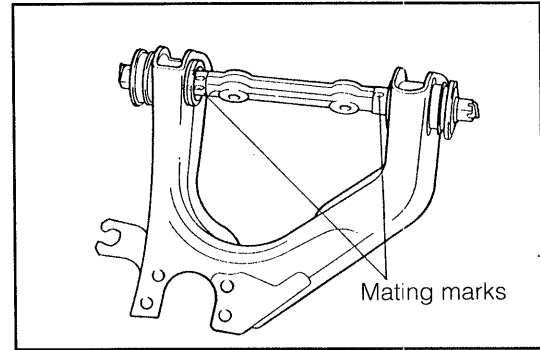
WRU90-FS259

DISASSEMBLY

1. Put mating marks at points between the upper arm and the upper shaft.

NOTE:

- Putting marks are required, only when either the upper arm or the upper shaft is reused.



WRU90-FS260

2. Remove the cotter pin.

NOTE:

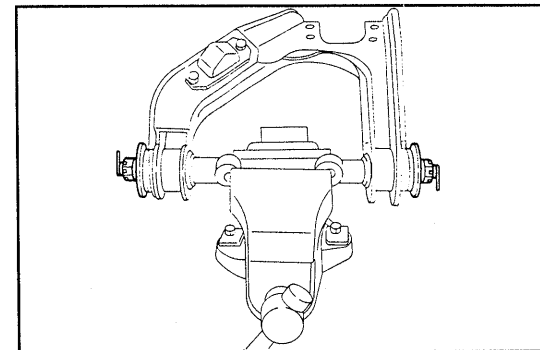
- Never reuse the cotter pin.

3. Remove the castle nuts.

4. Remove the washer and washer plate.

NOTE:

- Never reuse the washer.



WRU90-FS261

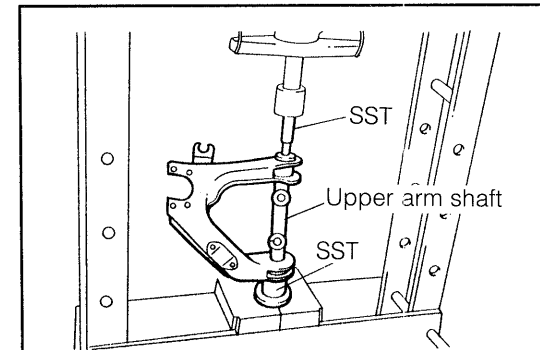
5. Removal of upper arm bush (at rear side)
Remove the upper arm shaft together with the upper arm bush, using a hydraulic press in combination with the following SST.

SST: 09608-87612-000

09608-87609-000

NOTE:

- Be very careful not to drop the upper arm shaft.

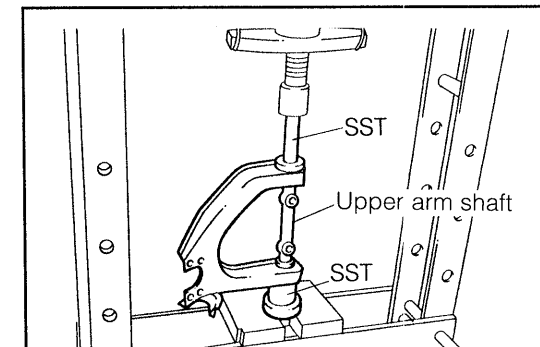


WRU90-FS262

6. Removal of upper arm bush (at front side)
Remove the upper arm bush, using a hydraulic press in combination with the following SST.

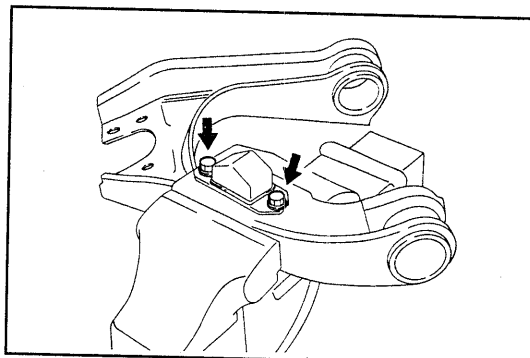
SST: 09608-87612-000

09608-87609-000



WRU90-FS263

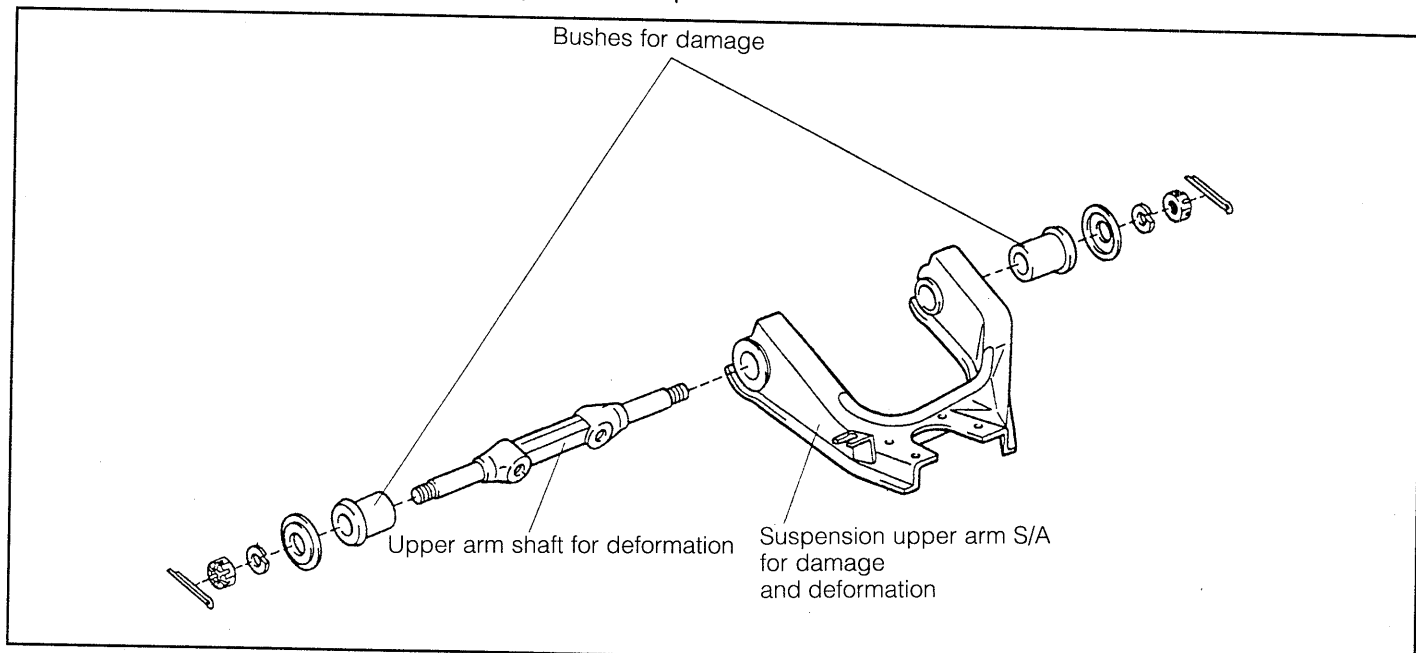
- Remove the front spring bumper from the upper arm.



WRU90-FS264

INSPECTION

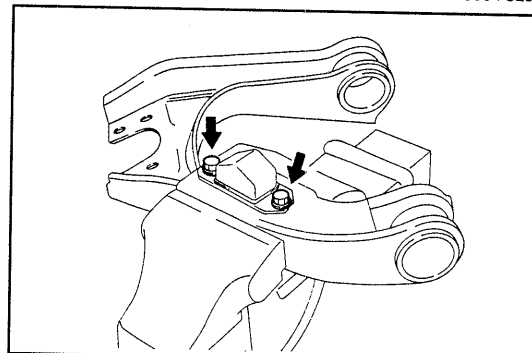
Check the following parts. Replace any defective parts.



WRU90-FS265

ASSEMBLY OF SUSPENSION ARM

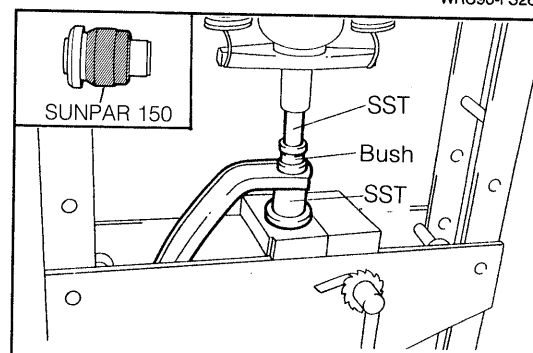
- Install the front spring bumper to the upper arm.
Tightening Torque:
1.0 - 1.6 kgf-m (7.2 - 11.6 ft-lb, 9.8 - 15.7 N·m)



WRU90-FS266

- Installation of upper arm bush (at front side)
 - Apply the SUNPAR 150® to the press-fitting section of a new bush.
 - Press the bush into the upper arm, using a hydraulic press in combination with the following SST.

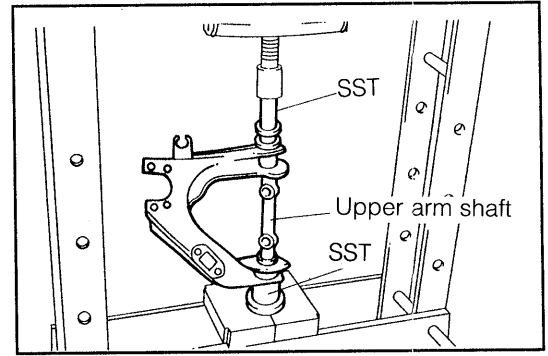
SST: 09608-87612-000
09608-87610-000



WRU90-FS267

FRONT AXLE & SUSPENSION

3. Installation of upper arm bush (at rear side)
 - (1) Install the upper arm shaft to the upper arm.
 - (2) Press the upper arm bush, using a hydraulic press in combination with the following SST.SST: 09608-87612-000
09608-87610-000



WRU90-FS268

4. Install the plate washer and washer.
5. Tighten the castle nut while aligning the mating marks which have been put at the upper arm and upper arm shaft during the disassembly. (In cases where the upper arm and upper shaft are reused.)

Tightening Torque:

7.0 - 9.0 kgf-m (50.6 - 65.0 ft-lb, 68.6 - 88.3 N-m)

NOTE:

- Align the cotter pin hole with the cotter pin groove during the tightening.

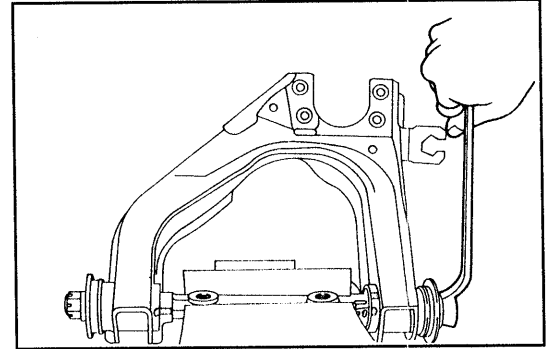
6. Set the upper arm and upper shaft in such a way that they are placed at their positional relationship as indicated in the right figure.

Tightening Torque:

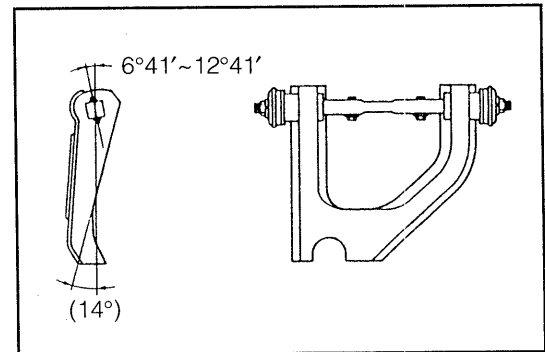
7.0 - 9.0 kgf-m (50.6 - 65.0 ft-lb, 68.6 - 88.3 N-m)

NOTE:

- Align the cotter pin hole with the cotter pin groove during the tightening.



WRU90-FS270

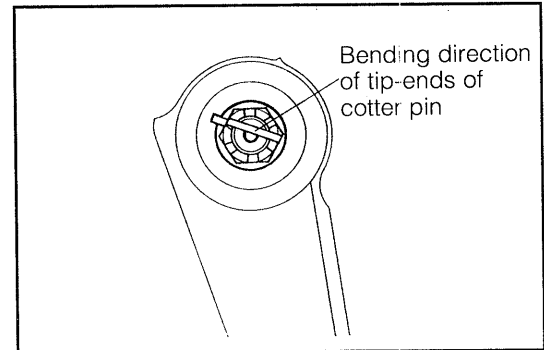


WRU90-FS271

7. Install the new cotter pin and bend its tip-ends, as indicated in the right figure.

NOTE:

- Do not reuse the cotter pin.



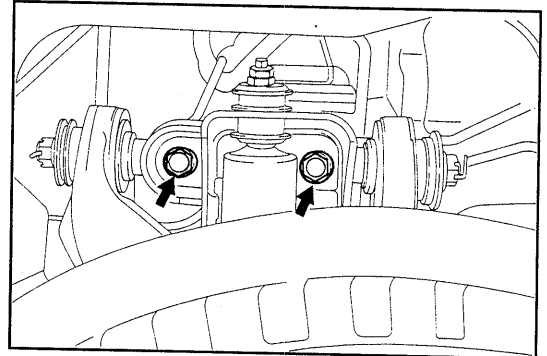
WRU90-FS272

INSTALLATION

1. Temporarily install the upper arm shaft to the chassis with bolts and new washers interposed.

NOTE:

- Never reuse the washer

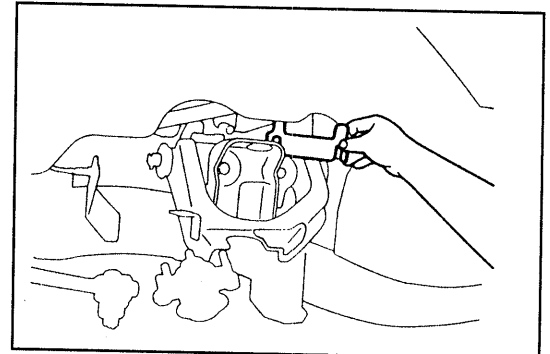


WRU90-FS273

2. Insert the camber adjusting shim into between the upper arm shaft and the chassis.

NOTE:

- Make sure that the correct number and kind of shims are installed in their respective installation positions.

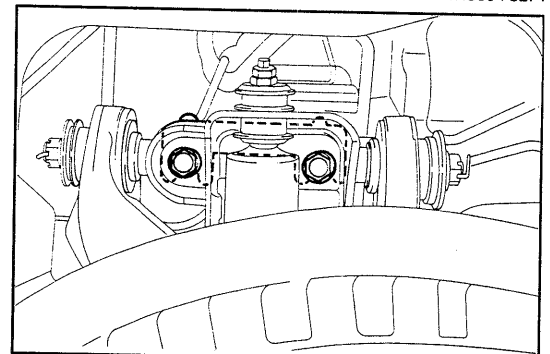


WRU90-FS274

3. Tighten the upper arm shaft attaching bolts.

Tightening Torque:

10.4 - 13.0 kgf-m (75.2 - 94.0 ft-lb, 102 - 128 N-m)



WRU90-FS275

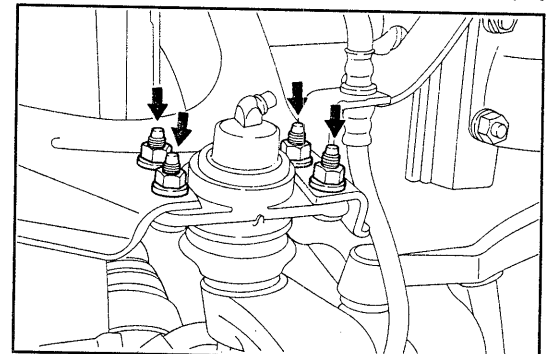
4. Connect the upper arm ball joint to the upper arm. Tighten the attaching nuts with a new washer interposed.

Tightening Torque:

2.7 - 3.7 kgf-m (19.5 - 26.8 ft-lb, 26.5 - 36.3 N-m)

NOTE:

- Never reuse the washer.

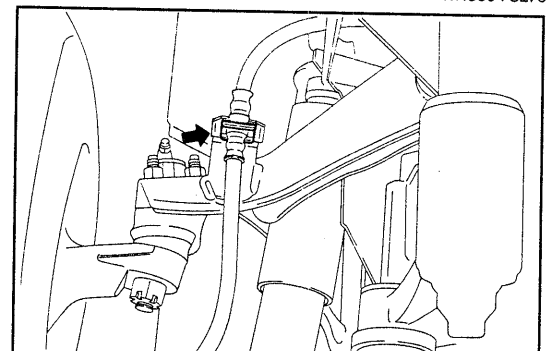


WRU90-FS276

5. Connect the brake hose to the upper arm. Install a new clip.

NOTE:

- Never reuse the clip.



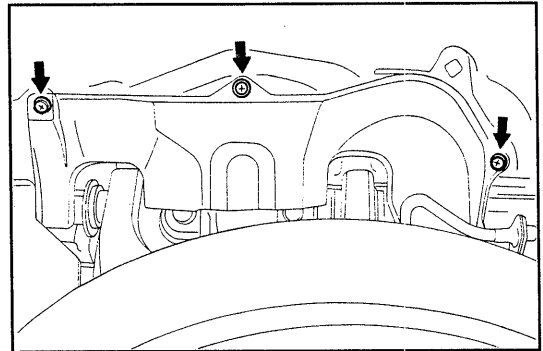
WRU90-FS277

FRONT AXLE & SUSPENSION

6. Install the torsion bar.
(See page FS-63 to FS-67.)
7. Check and adjust the front wheel alignment.
(See page FS-21 to FS-25)

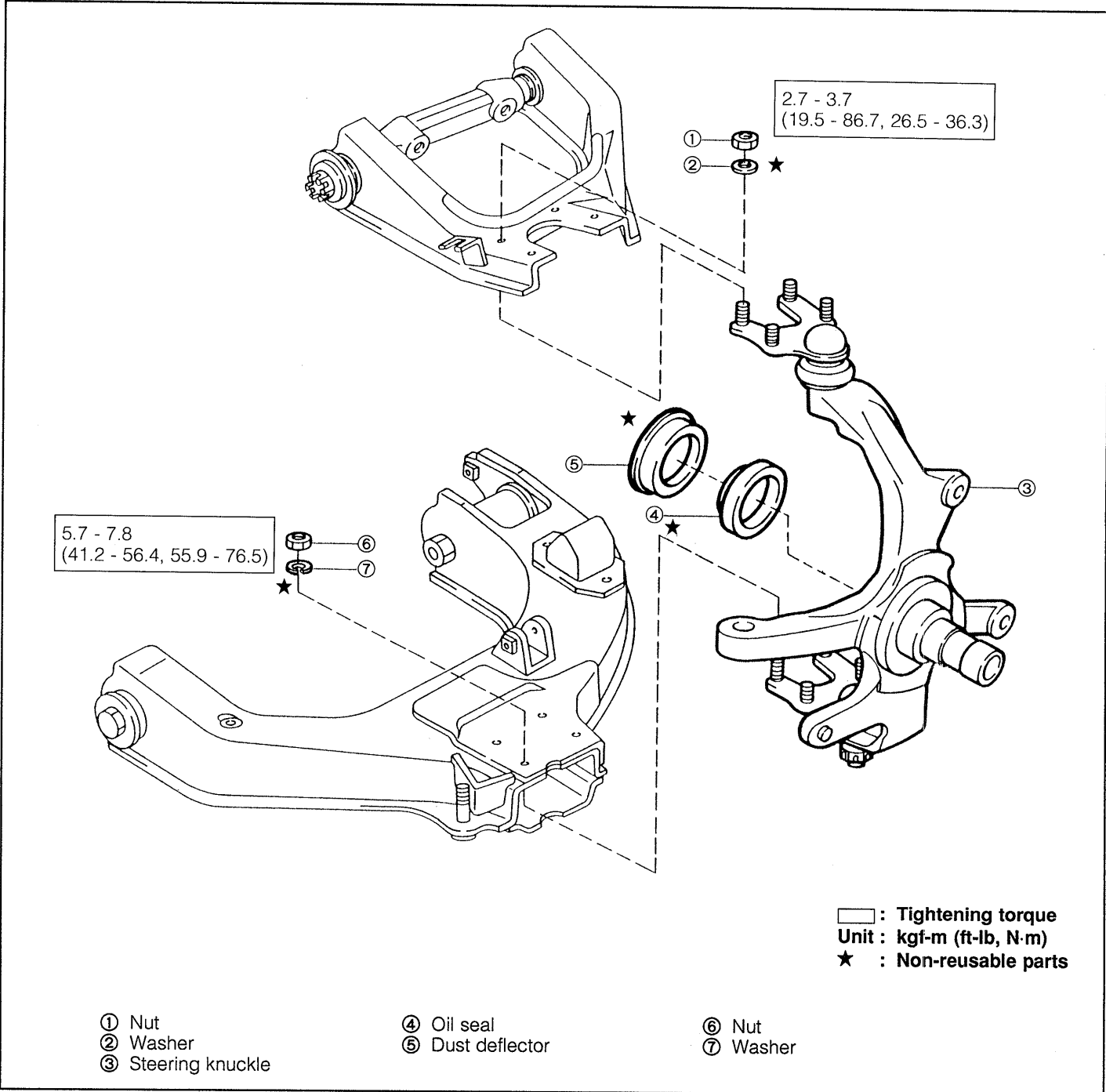
WRU90-FS278

8. Install the dust cover.



WRU90-FS279

STEERING KNUCKLES
COMPONENTS



WRU90-FS280

TROUBLE SHOOTING

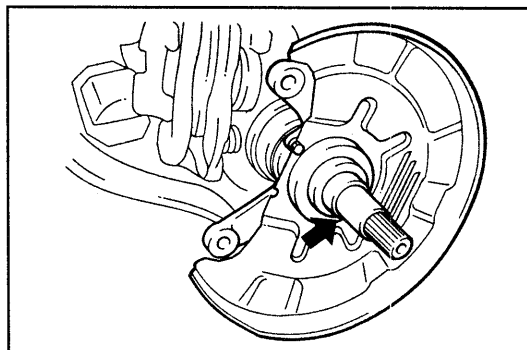
Symptom	Possible causes	Checking points
Oil leakage	Oil seal damaged	Installing condition of oil seal
	Oil seal improperly installed	
Abnormal noise	Bush seized	Check inner bush.

WRU90-FS281

REMOVAL

1. Remove the stabilizer bar.
(See page FS-55 to FS-57.)
2. Remove the torsion spring.
(See page FS-60 to FS-63.)
3. Remove the front axle hub.
(See page FS-31 to FS-33.)
4. Check of steering knuckle
Ensure that each section of the steering knuckle exhibits no damage, such as cracks and wear.
If any damage is present, replace the steering knuckle.

WRU90-FS282

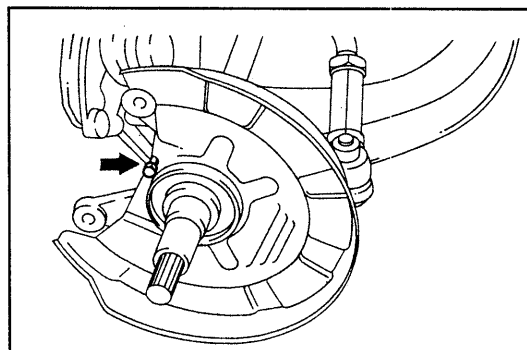


WRU90-FS283

Only when the brake disc dust cover is replaced, remove the brake disc dust cover attaching bolts. Then, remove the brake disc dust cover by lightly tapping it with a plastic hammer or the like.

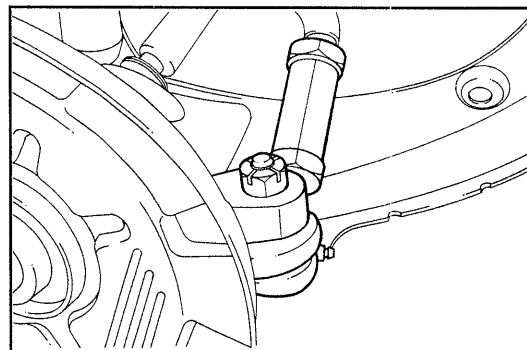
NOTE:

- Do not reuse the removed brake disc dust cover.



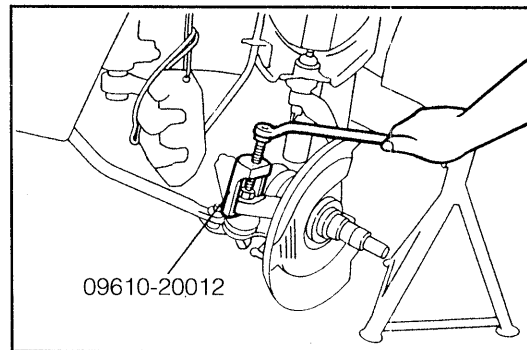
WRU90-FS284

5. Removal of tie rod end
 - (1) Remove the cotter pin of the tie rod end attaching nut.
 - (2) Remove the attaching nut.



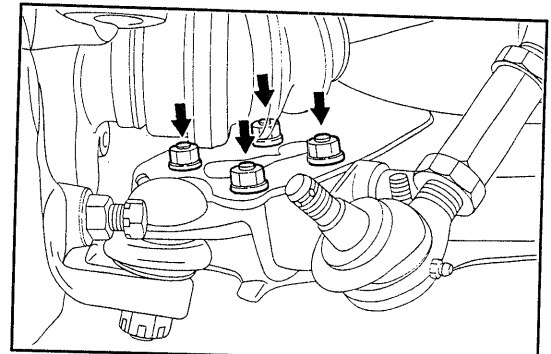
WRU90-FS285

- (3) Remove the tie rod end from the steering knuckle, using the following SST.
SST: 09610-20012-000
(See page SR-55.)



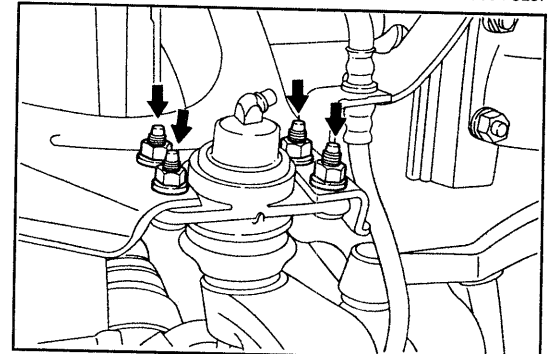
WRU90-FS286

6. Remove the lower arm ball joint attaching nut from the lower arm.



WRU90-FS287

7. Remove the upper arm ball joint attaching nut from the upper arm.

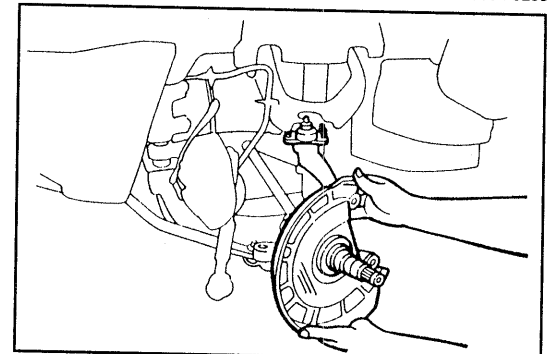


WRU90-FS288

8. Remove the steering knuckle.

NOTE:

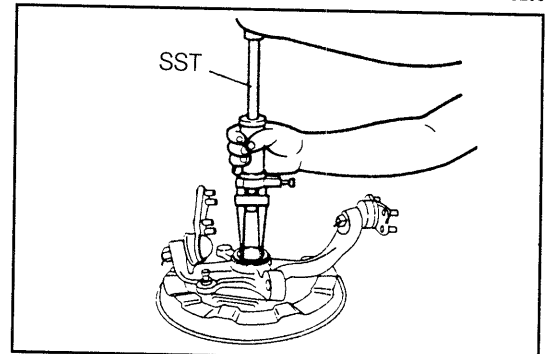
- Be very careful not to scratch the drive shaft during the removal.



WRU90-FS289

9. Remove the oil seal, using the following SST.

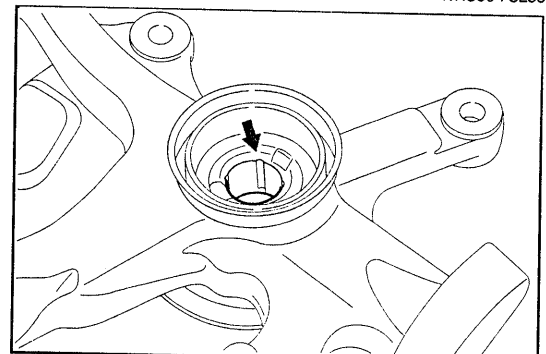
SST: 09308-00010-000



WRU90-FS290

10. Check of steering knuckle bush

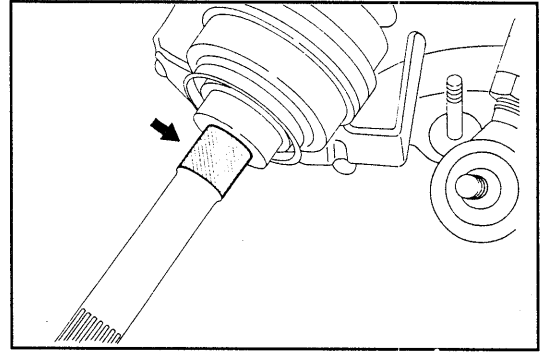
- (1) Ensure that the steering knuckle bush exhibits no seizure and abnormal wear.
If any defect is present, replace the steering knuckle and drive shaft.



WRU90-FS291

FRONT AXLE & SUSPENSION

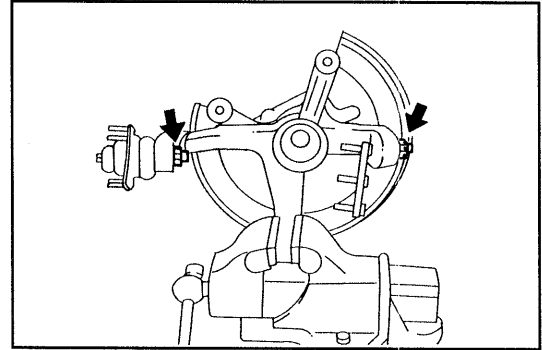
- (2) Ensure that the steering knuckle bush contact surface of the drive shaft exhibits no seizure and abnormal wear.
If any defect is present, replace the steering knuckle and drive shaft.



WRU90-FS29

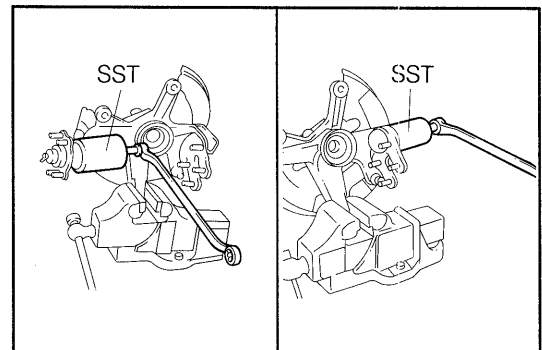
11. Removal of ball joints

- (1) Remove the cotter pin.
- (2) Loosen the castle nut.



WRU90-FS293

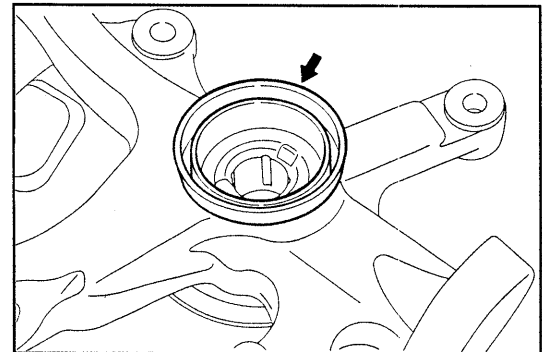
- (3) Remove the ball joints from the steering knuckle, using the following SST.
- SST: 09610-20012



WRU90-FS294

12. Check of dust deflector

Check the dust deflector for damage, such as deformation.
If any damage is present, replace the dust deflector.



WRU90-FS295

13. Removal of dust deflector

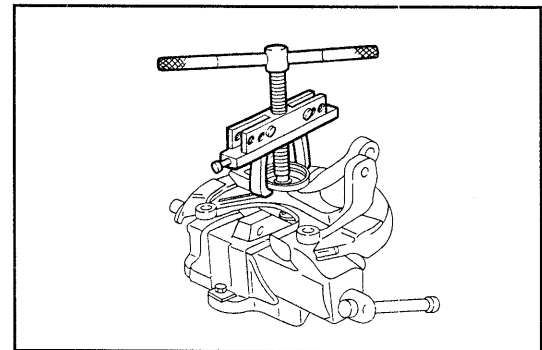
(Only when the removal is required)

Remove the dust deflector, using the following SST.

SST: 09950-20017-000

NOTE:

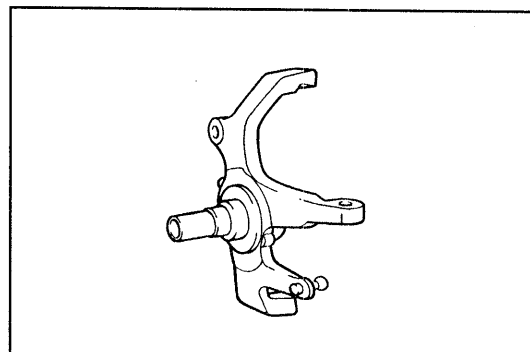
- Do not reuse the dust deflector.



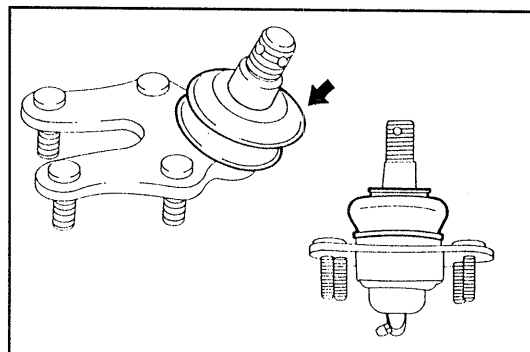
WRU90-FS296

INSPECTION

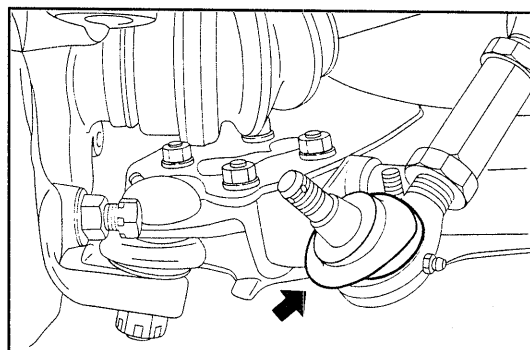
1. Steering knuckle
Ensure that the steering knuckle exhibits no damage, such as wear, seizure and cracks.
If any damage is present, replace the steering knuckle.
2. Check of upper and lower ball joints
Ensure that the boot sections of the upper and lower ball joints exhibit no damage.
If any damage is present, replace the boot.
(See page FS-103.)
3. Check of tie rod end
Ensure that the boot section of the tie rod end exhibits no damage.
If any damage is present, replace the boot.
(See page SR-60.)



WRU90-FS297



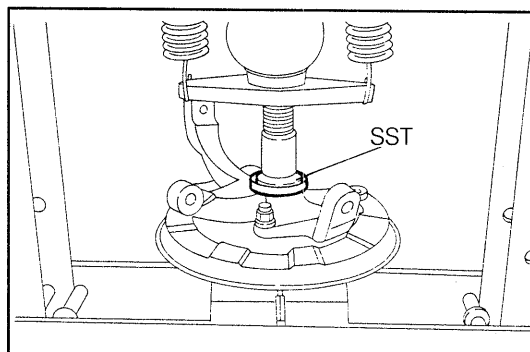
WRU90-FS298



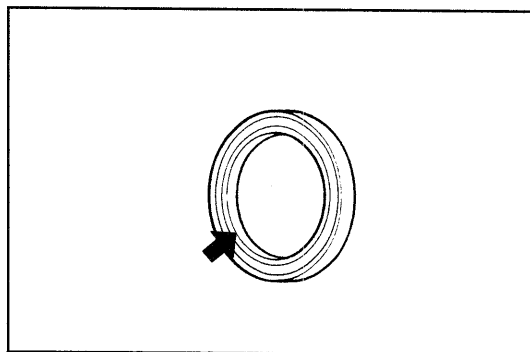
WRU90-FS299

INSTALLATION OF STEERING KNUCKLE

1. Press the oil deflector into the steering knuckle, using the following SST in combination with a hydraulic press.
SST: 09608-87605-000
2. Apply lithium-based MP grease to the oil seal lip section.



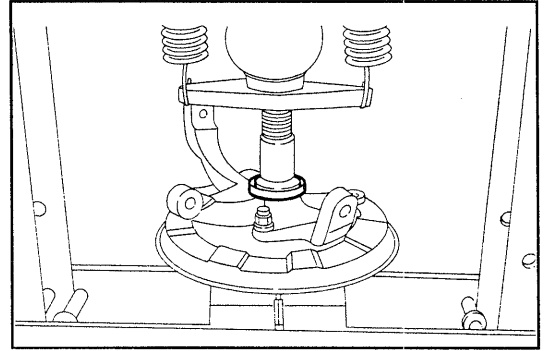
WRU90-FS300



WRU90-FS302

FRONT AXLE & SUSPENSION

3. Press the oil seal into position, using the following SST.
SST: 09608-87605-000

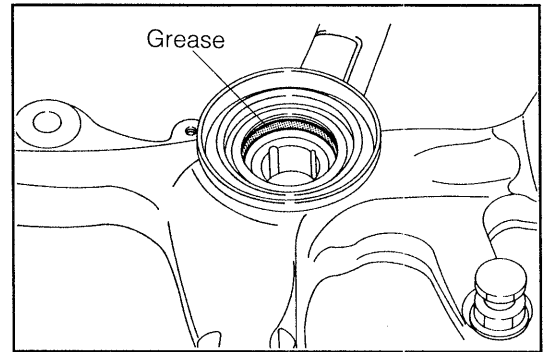


WRU90-FS303

4. Fill lithium based MP grease to a space between the oil seal and the bush.

Filling Amount of Grease:

25 - 30 grams (0.88 - 1.06 oz)

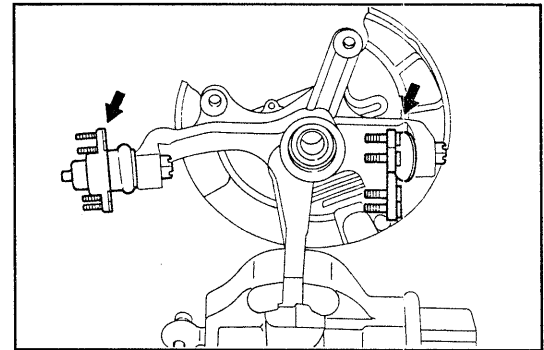


WRU90-FS304

5. Temporarily install the upper and lower ball joints to the steering knuckle with castle nuts.

NOTE:

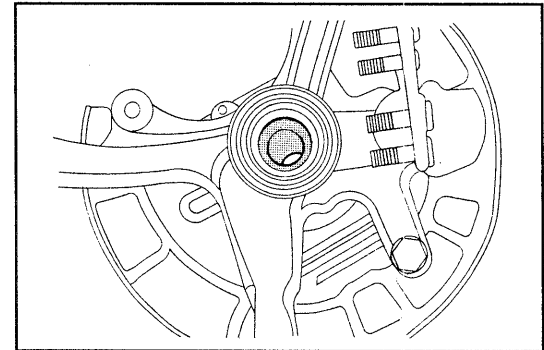
- Make sure that no grease and oil or the like is stuck on the tapered sections and threaded portions of the ball joints.



WRU90-FS305

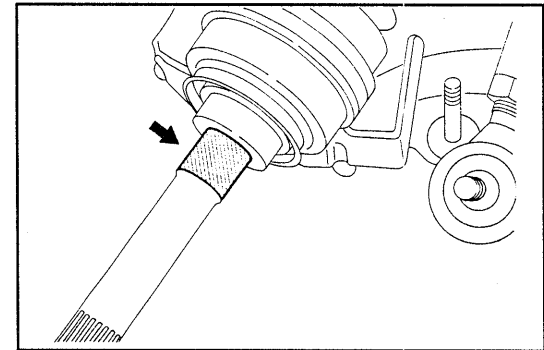
6. Apply the specified amount of lithium based MP grease to the steering knuckle bush section.

Specified Amount: 25 - 30 grams (0.88 - 1.06 oz)



WRU90-FS306

7. Clean the drive shaft. Apply lithium based MP grease to the steering knuckle bush contact surface.

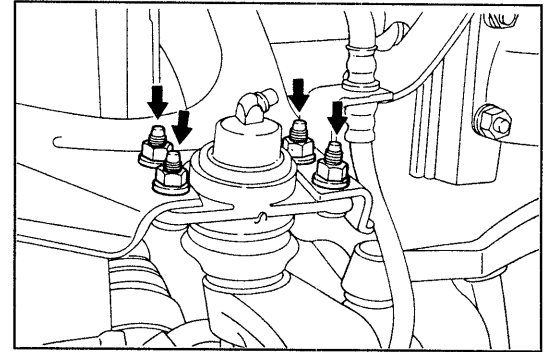


WRU90-FS307

8. Install the steering knuckle to the upper arm after passing the drive shaft through the steering knuckle.

Tightening Torque:

2.7 - 3.7 kgf-m (19.5 - 26.8 ft-lb, 26.5 - 36.3 N·m)

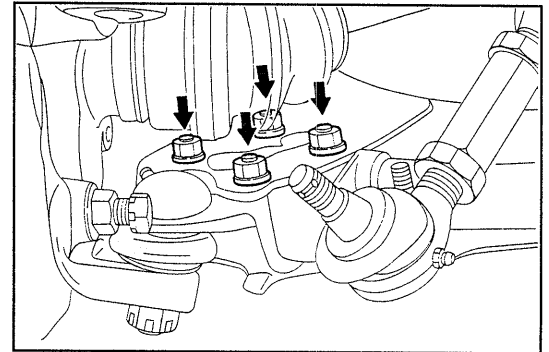


WRU90-FS308

9. Install the steering knuckle to the lower arm. Tighten the attaching bolts.

Tightening Torque:

5.7 - 7.8 kgf-m (41.2 - 56.4 ft-lb, 55.9 - 76.5 N·m)



WRU90-FS309

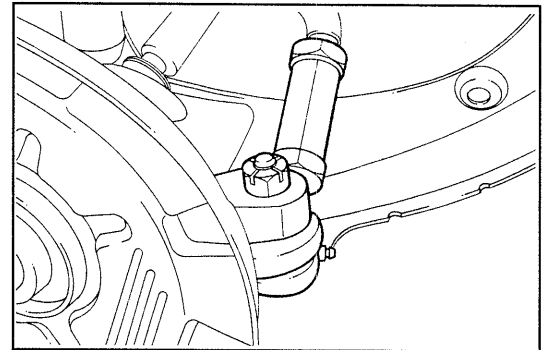
10. Install the tie rod end to the steering knuckle. Tighten the castle nut.

Tightening Torque:

7.0 - 14 kgf-m (50.6 - 101 ft-lb, 68.6 - 137 N·m)

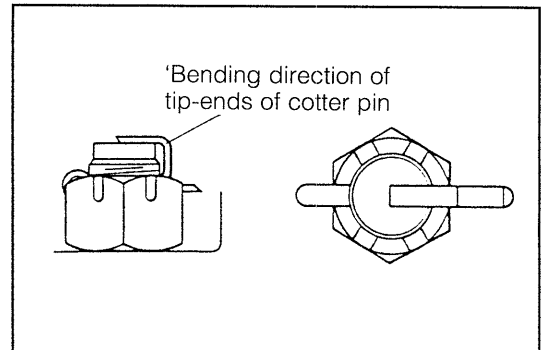
NOTE:

- Align the cotter pin hole of the ball joint with the cotter pin groove of the castle nut.



WRU90-FS310

11. Install the cotter pin to the castle nut, as indicated in the right figure.



WRU90-FS311

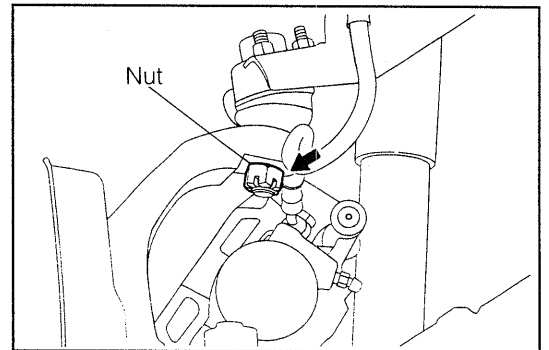
12. Tighten the upper ball joint attaching castle nut.

Tightening Torque:

9.0 - 12 kgf-m (65.1 - 87.0 ft-lb, 88.3 - 118 N·m)

NOTE:

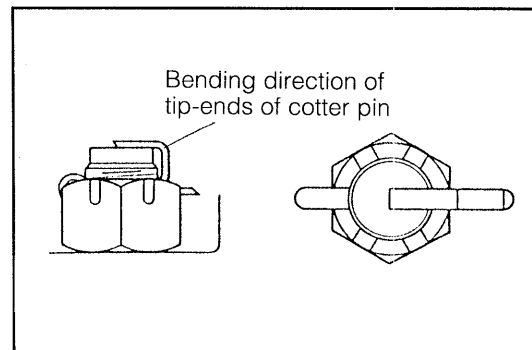
- Align the cotter pin hole of the ball joint with the cotter pin groove of the castle nut.



WRU90-FS312

FRONT AXLE & SUSPENSION

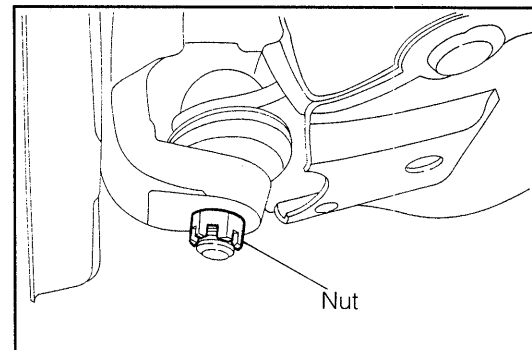
13. Install the cotter pin to the castle nut, as indicated in the right figure.



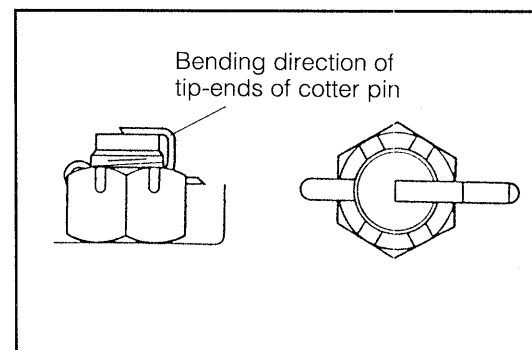
14. Tighten the lower ball joint attaching castle nut.
Tightening Torque:
9 - 12 kgf-m (65.1 - 87.0 ft-lb, 88.3 - 118 N·m)

NOTE:

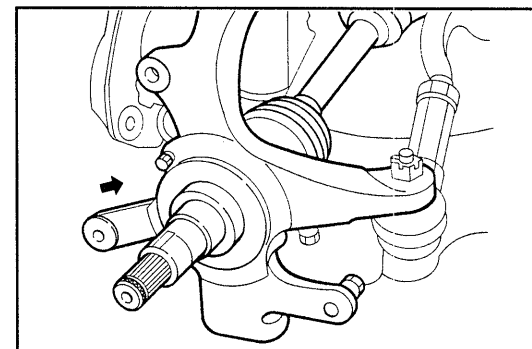
- Align the cotter pin hole of the ball joint with the cotter pin groove of the castle nut.



15. Install the cotter pin to the castle nut, as indicated in the right figure.



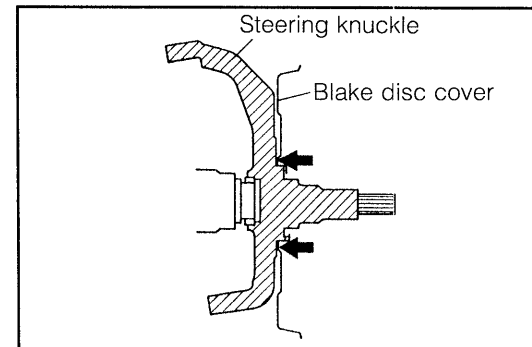
16. Installation of brake disc cover
(1) Slightly thread the brake disc cover attaching bolts into the steering knuckle.



- (2) Press a new brake disc cover into the steering knuckle with an appropriate rod applied to the point as indicated in the right figure.

NOTE:

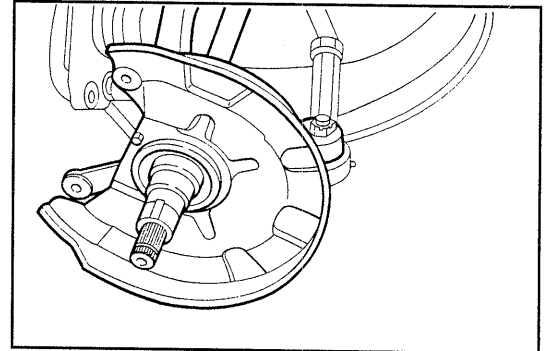
- Never reuse the brake disc cover.
- Care must be exercised to ensure that the arrowheaded sections are driven into position evenly.



- (3) Tighten the attaching bolts.

Tightening Torque:

0.6 - 0.9 kgf-m (4.3 - 6.5 ft-lb, 5.9 - 8.8 N-m)



WRU90-FS317

17. Install the front axle hub.
(See page FS-37 to FS-42.)
18. Install the torsion spring.
(See page FS-64 to FS-67.)
19. Install the stabilizer bar.
(See page FS-58 to FS-59.)

WRU90-FS318

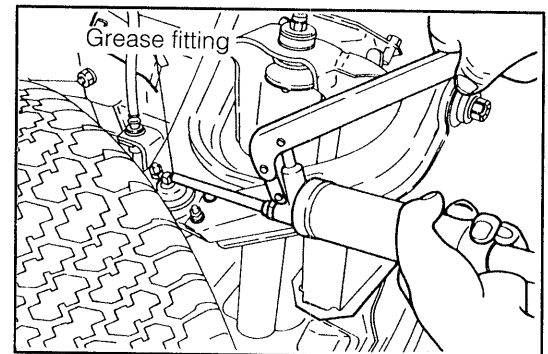
20. Fill lithium based MP grease to the upper joint, lower joint and tie rod end, using a grease gun.

Grease Filling Amount

Upper ball joint: 27 grams (0.95 oz)

Lower ball joint: 10 grams (0.35 oz)

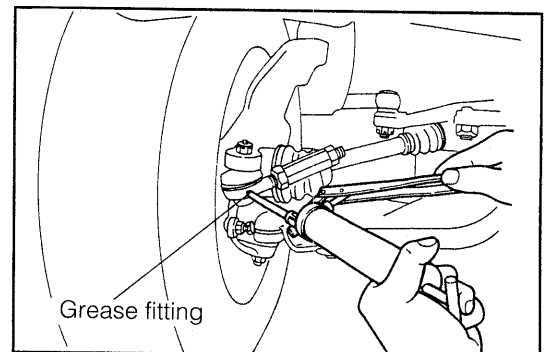
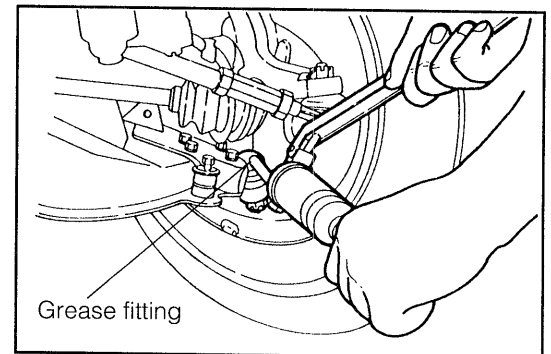
Pitman arm: 15 grams (0.53 oz)



Grease to Be Used:
Lithium-based MP grease

NOTE:

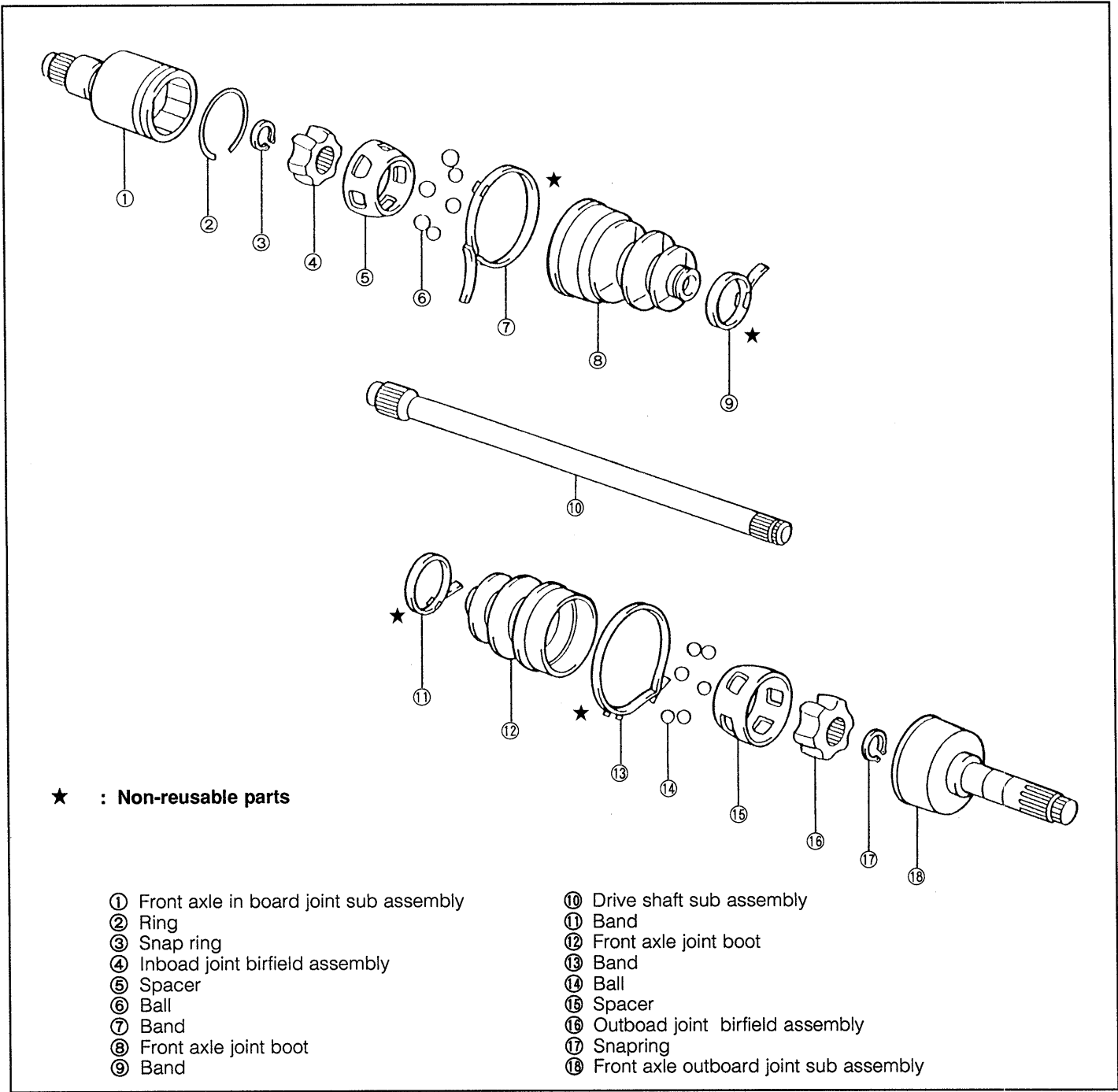
- The filling amount above is the specified amount for cases where new parts are assembled.



WRU90-FS319

21. Check the front alignment.
(See page FS-21.)

DRIVE SHAFTS
COMPONENTS



WRU90-FS320

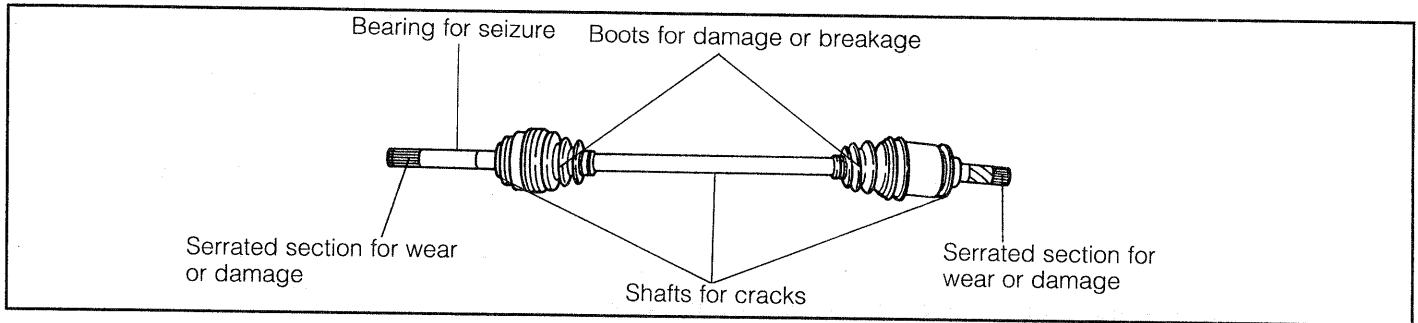
TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Abnormal noise Abnormal vibration Oil leakage	Drive shaft bent or damaged Joint section damaged Boot damaged	Check drive shaft. Check joint. Check boot.

WRU90-FS321

CHECK PRIOR TO DISASSEMBLY

Check the following points indicated in the figure below. Replace any defective parts.



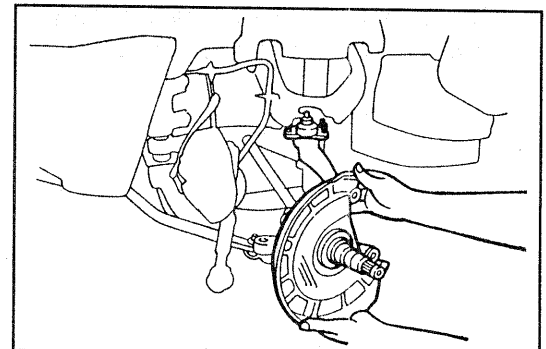
NOTE:

1. The outboard bearing is a part not to be disassembled.
2. As for those parts to be reused, wash them using cleaning solvent and then dry them in advance.
3. If the bearing section is encountered with damage, such as seizure, check the bush section of the steering knuckle.
4. If the splined section at the outboard side is encountered with damage, check the splined section of the hub.
5. If the splined section at the inboard side is encountered with damage, check the side gears of the differential.

REMOVAL

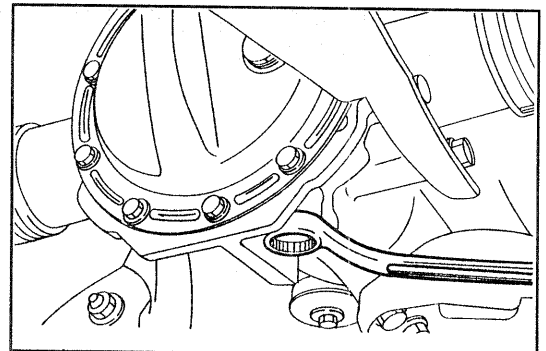
1. Remove the steering knuckle.
(See page FS-80 under section "Removal of Steering Knuckle.")

WRU90-FS322



2. Drain the front differential oil.
(See Differential section.)

WRU90-FS323

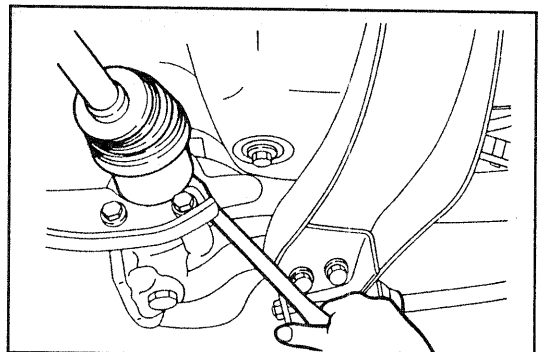


3. Pull out the drive shaft, using a tire lever or the like.

NOTE:

- Be very careful not to damage the spline, oil seal, boot and so forth during the removal.

WRU90-FS324



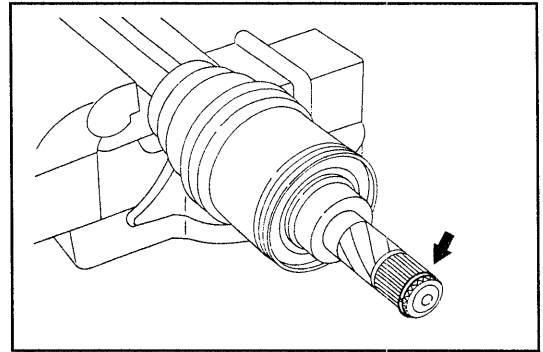
WRU90-FS325

DISASSEMBLY

1. Remove the expansion ring from the inboard joint.

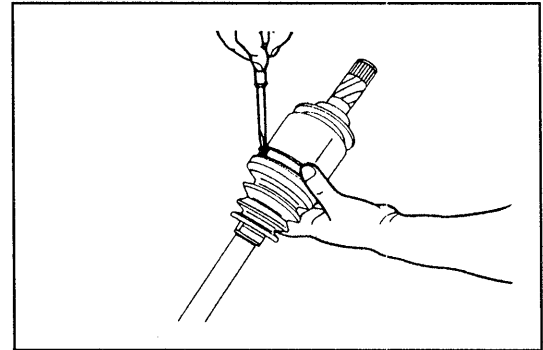
NOTE:

- Do not reuse the expansion ring.



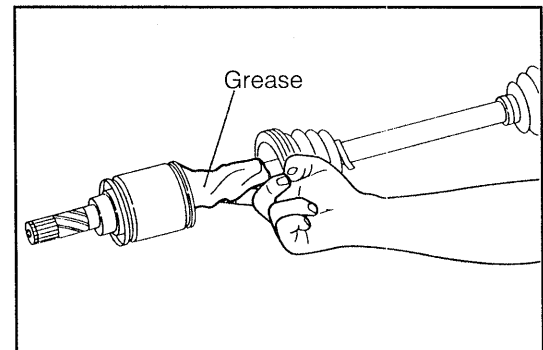
WRU90-FS326

2. Raise the tang of each boot band of the inboard bearing by means of a screwdriver or the like so as to loosen the boot band.



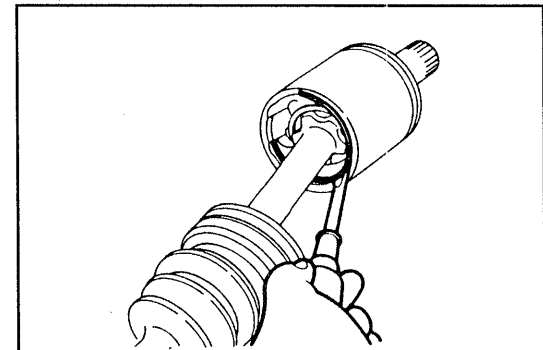
WRU90-FS327

3. Displace the boot toward the inboard side and remove any grease from the inside of the boot.



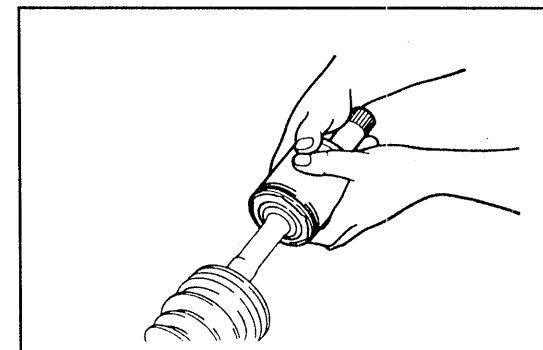
WRU90-FS328

4. Detach the hole snap ring from the inboard joint, using a minor screwdriver.



WRU90-FS329

5. Remove the inboard joint from the drive shaft.

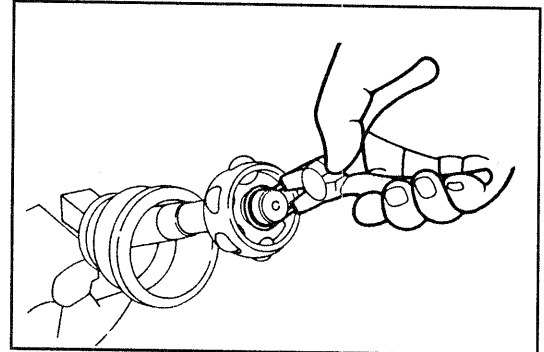


WRU90-FS330

6. Detach the snap ring from the drive shaft, using a snap ring expander.

NOTE:

- Do not reuse the removed snap ring.



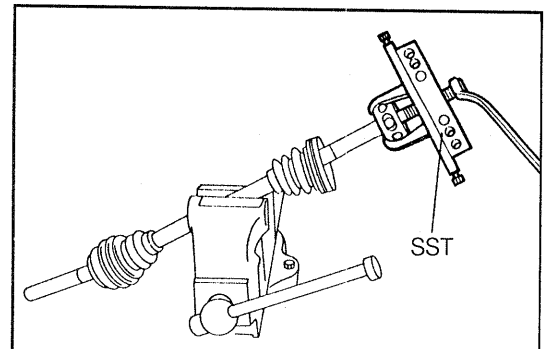
WRU90-FS331

7. Remove the ball subassembly from the drive shaft. If any difficulty is encountered in removing the ball subassembly by hands, drive it out by tapping it by means of an appropriate rod, or remove it using the following SST.

SST: 09950-20017-000

NOTE:

- When removing the ball subassembly, be sure to hold the inner race so as to avoid the interference with the bearing guide.

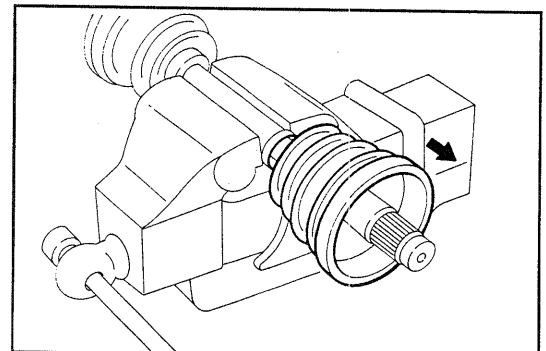


WRU90-FS332

8. Detach the boot and boot band at the inner race from the drive shaft.

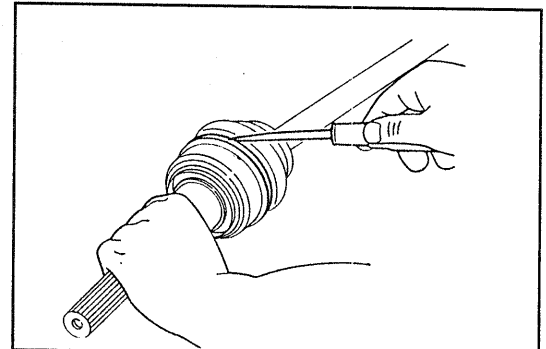
NOTE:

- Do not reuse the removed boot band.



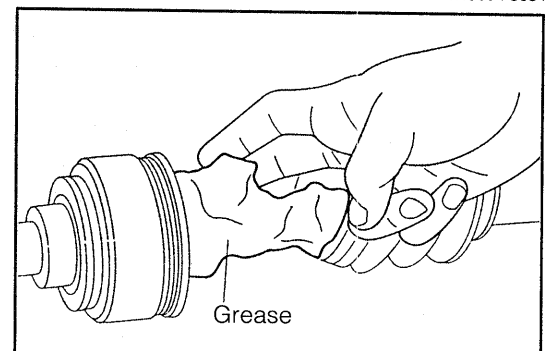
WRU90-FS333

9. Raise the tang of each boot band by means of a screwdriver or the like so as to loosen the boot band.



WRU90-FS334

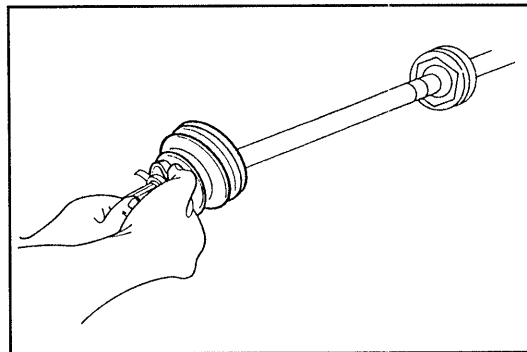
10. Displace the boot and remove any grease from the inside of the boot.



WRU90-FS335

FRONT AXLE & SUSPENSION

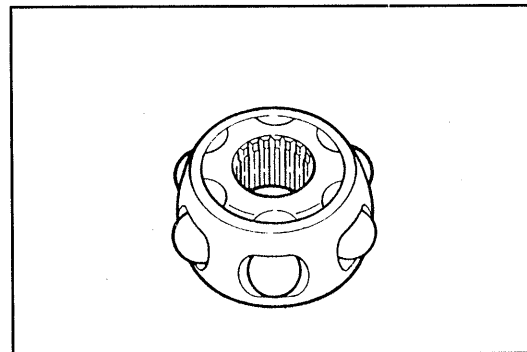
11. Detach the boot and boot band from the drive shaft.



WRU90-FS336

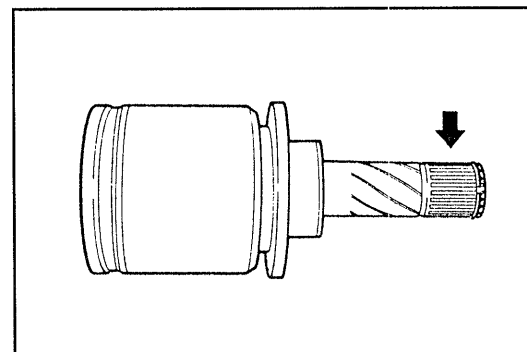
INSPECTION

1. Ensure that the ball subassembly exhibits no wear, cracks, scratches and so forth.
If any damage is present, replace the inboard assembly.



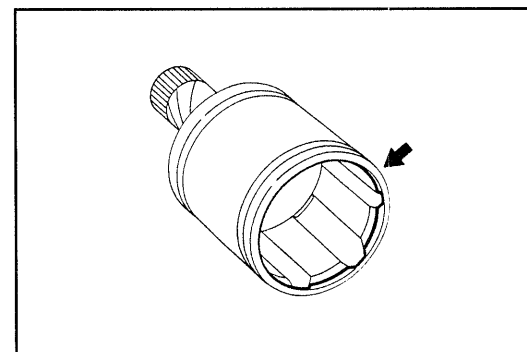
WRU90-FS337

2. Check of inboard joint
 - (1) Ensure that the spline section exhibits no damage, such as wear and cracks.
If any damage is present, replace the inboard assembly.



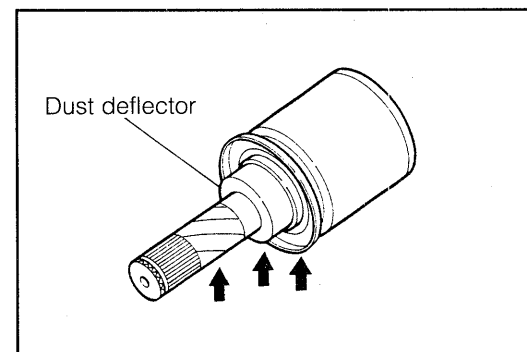
WRU90-FS338

- (2) Ensure that the ball joint groove section exhibits no damage, such as wear, cracks and scratches.
If any damage is present, replace the inboard assembly.



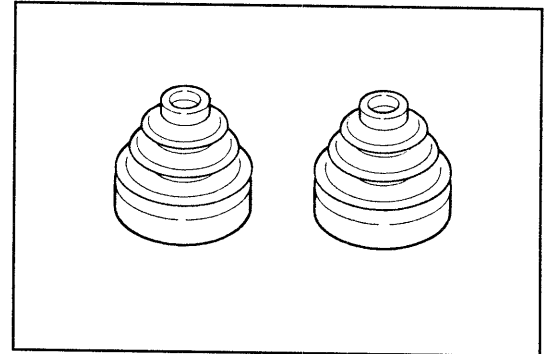
WRU90-FS339

- (3) Ensure that the dust deflector exhibits no damage.
If any damage is present, replace the inboard subassembly.
 - (4) Ensure that the shaft section and oil seal contact surface exhibit no damage, such as wear, scratches and rust.
If any damage is present, replace the inboard assembly.



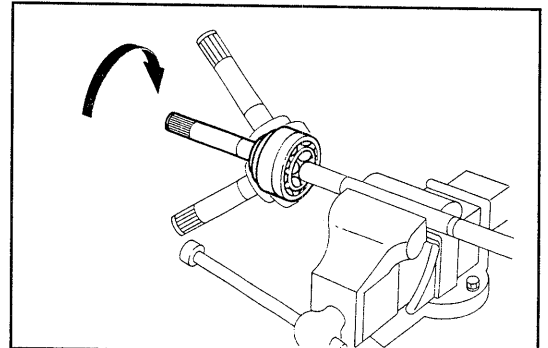
WRU90-FS340

3. Boot check
Ensure that the boot exhibits no damage, such as cracks.
If any damage is present, replace the boot.



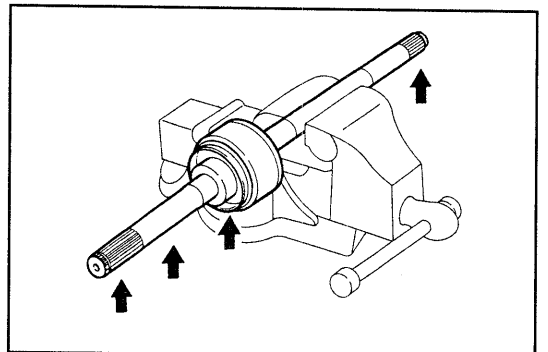
WRU90-FS341

4. Check of inboard joint
 - (1) Ensure that the inboard joint exhibits no excessive play and/or sticking.
If any damage is present, replace the inboard assembly.



WRU90-FS342

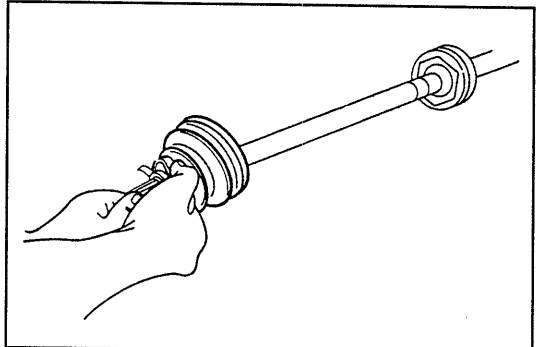
- (2) Ensure that the spline and shaft section exhibits no damage, such as wear, cracks and rust.
If any damage is present, replace the inboard assembly.
 - (3) Ensure that the dust deflector exhibits no damage.
If any damage is present, replace the inboard assembly.
 - (4) Ensure that the inboard ball subassembly attaching section exhibits no damage, such as wear and cracks.
If any damage is present, replace the inboard subassembly.



WRU90-FS343

ASSEMBLY

1. Install the boot to the outboard joint.
NOTE:
 - Be very careful not to damage the boot.

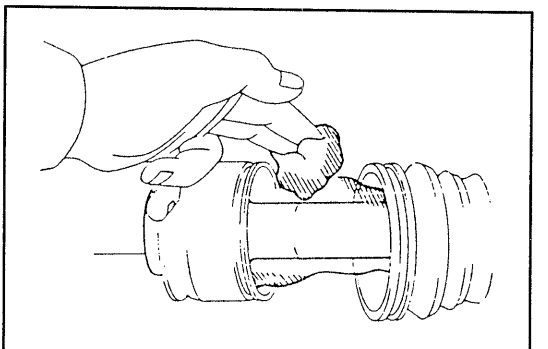


WRU90-FS344

2. Positively fill the specified amount of grease furnished in the boot band or the boot set to the outboard joint as well as the inside of the boot.

Grease to Be Used: Morilex No. 2

Amount to Be Used: 80 - 100 grams (2.82 - 3.53 oz)



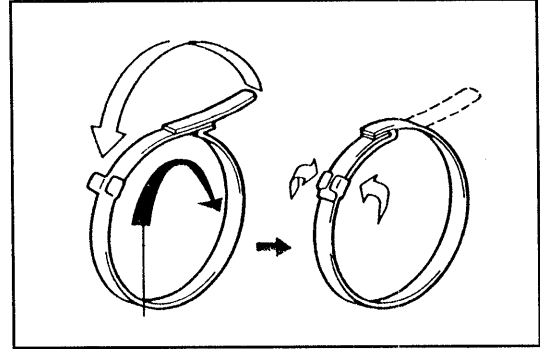
WRU90-FS345

FRONT AXLE & SUSPENSION

3. Install the boot correctly. Attach the boot bands and bend them in the sequence as indicated in the right figure.

NOTE:

1. Be sure to install the boot band in such a way that the bending direction of the boot band becomes opposite to the rotating direction of the drive shaft.
2. Be sure to use a new boot band.
3. Care must be exercised to ensure that no air is trapped inside of the boot, resulting in a bulging boot.

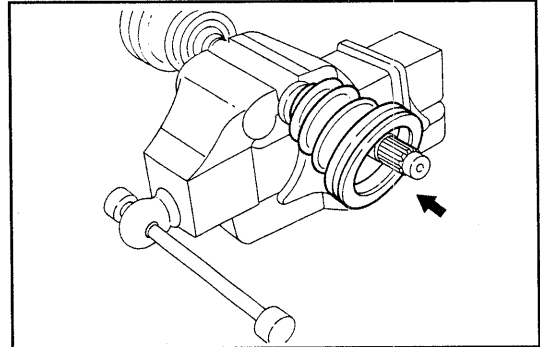


WRU90-FS346

4. Insert the boot and boot band at the inboard joint side into the drive shaft side.

NOTE:

- Make sure that the boot bands are bent in the correct direction.

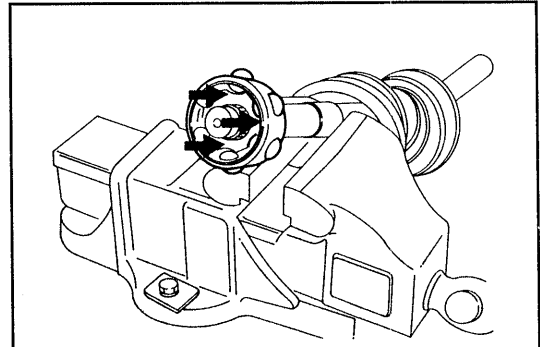


WRU90-FS347

5. Install the ball subassembly to the drive shaft by tapping the inner race of the ball subassembly by means of an appropriate rod.

NOTE:

- Be very careful not to damage the bearing guide section.
- Be sure to tap the inner race.

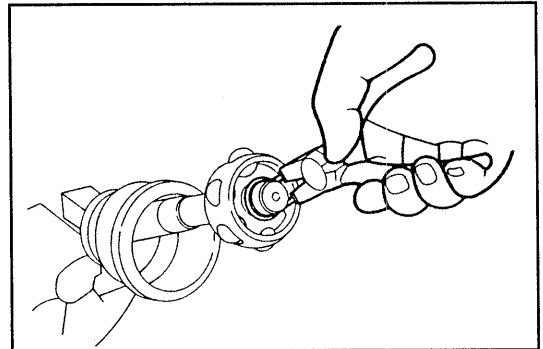


WRU90-FS348

6. Install the snap ring to the drive shaft, using a snap ring expander.

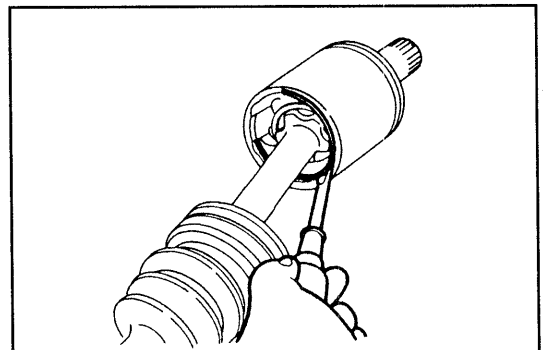
NOTE:

- Use a new snap ring.



WRU90-FS349

7. Connect the inboard joint to the ball subassembly. Install the hole snap ring to the inboard joint.



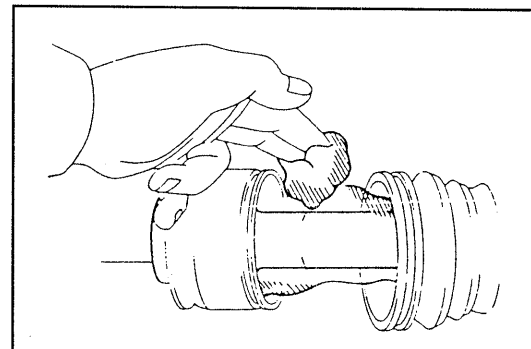
WRU90-FS350

8. Positively fill the specified amount of grease furnished in the boot band or the boot set to the inboard joint as well as the inside of the boot.

Grease to Be Used: Morilex No. 2

Amount to Be Used:

160 - 180 grams (5.65 - 6.35 oz)

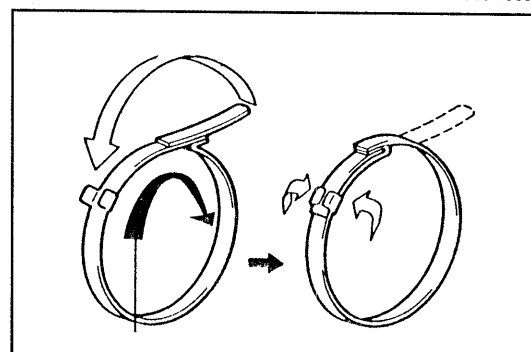


WRU90-FS351

9. Install the boot correctly. Attach the boot bands and bend them in the sequence as indicated in the right figure.

NOTE:

1. Be sure to install the boot band in such a way that the bending direction of the boot band becomes opposite to the rotating direction of the drive shaft.
2. Be sure to use a new boot band.
3. Care must be exercised to ensure that no air is trapped inside of the boot, resulting in a bulging boot.

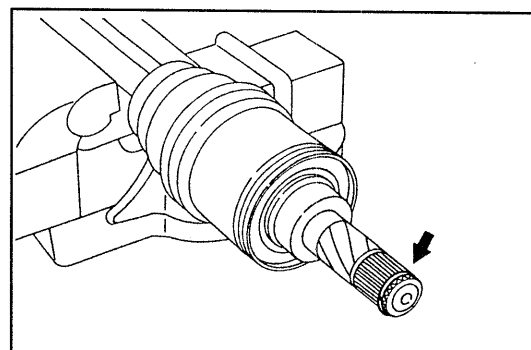


WRU90-FS352

10. Install the expansion ring to the inboard joint.

NOTE:

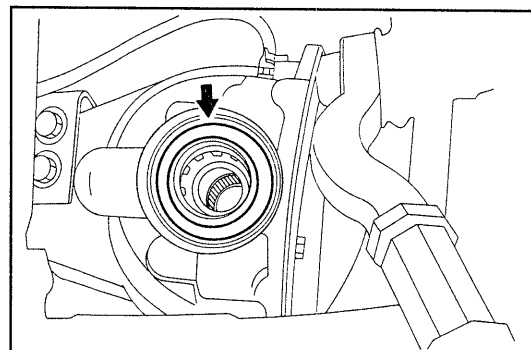
- Do not reuse the expansion ring.



WRU90-FS408

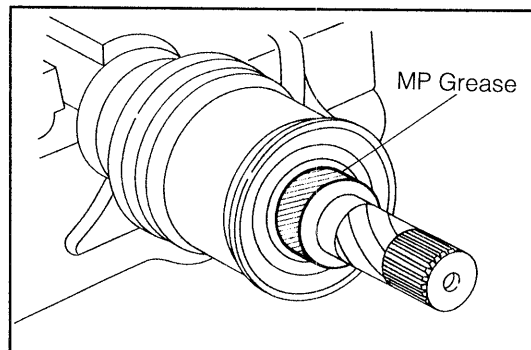
ASSEMBLY OF DRIVE SHAFT

1. Ensure that the oil seal at the front differential side exhibits no damage, such as scratches.
If any damage is present, replace the oil seal.
(See the Front Differential section.)
2. Apply lithium based MP grease to the lip section of the front differential oil seal.



WRU90-FS353

3. Thinly apply lithium based MP grease to the oil seal contact surface of the inboard.



WRU90-FS354

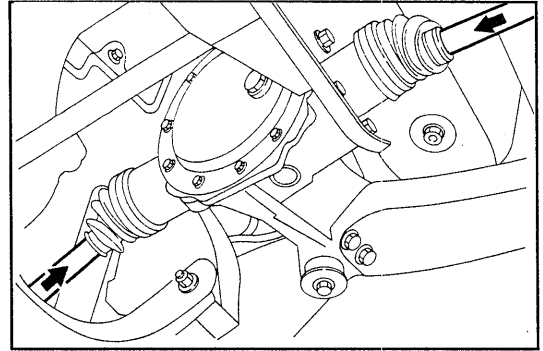
FRONT AXLE & SUSPENSION

4. Insert the inboard joint into the front differential.

NOTE:

- Be very careful not to get damage to the oil seals.

5. After inserting the inboard joint into the front differential, ensure that the inboard joint can not be pulled out by hands. If the inboard joint can be pulled out by hands, replace the expansion ring at the forward end of the inboard joint with a new part. After completion of the replacement, install the inboard joint again.

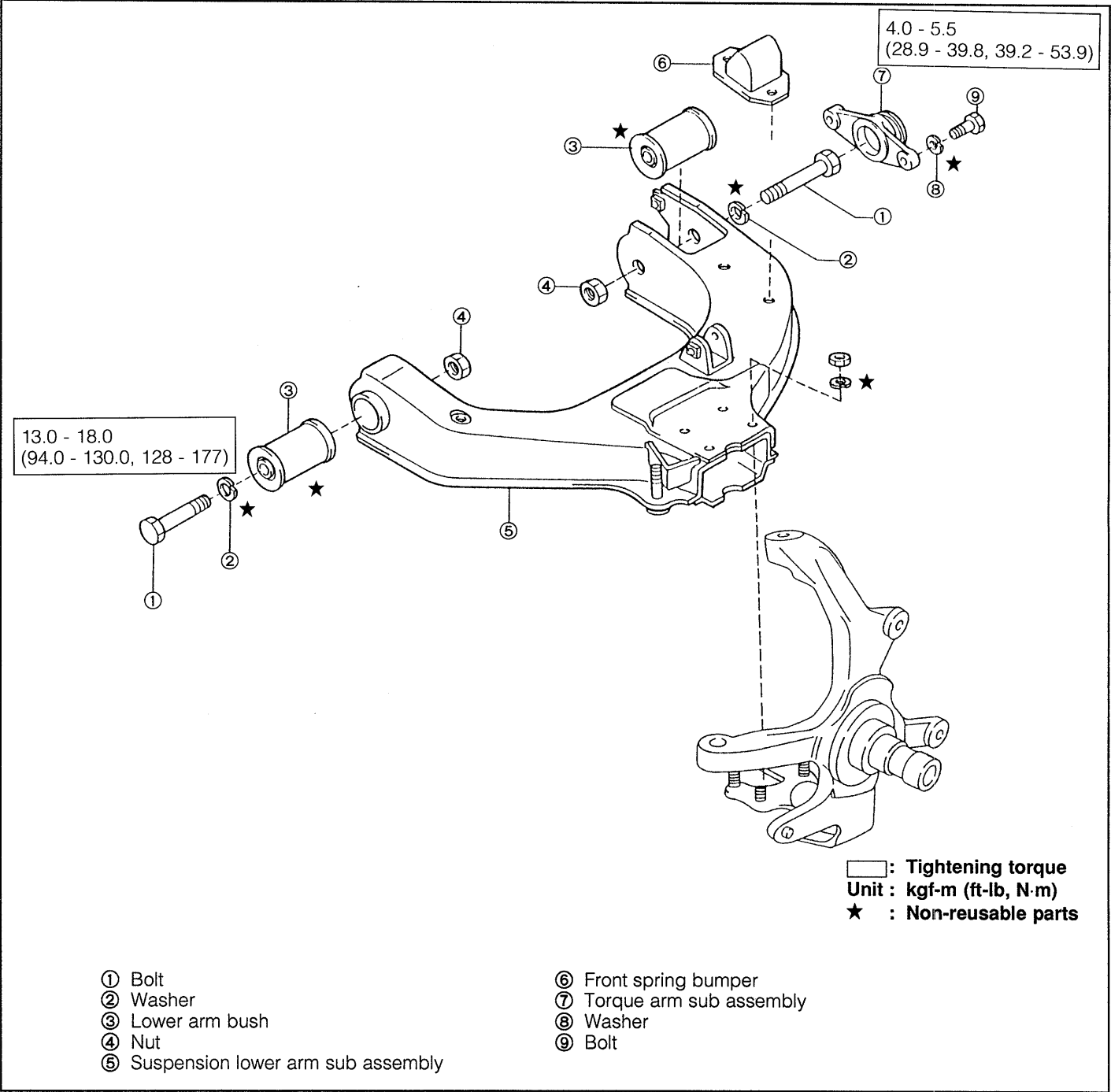


WRU90-FS355

6. Fill front differential oil.
(See the Front Differential section.)
7. Install the steering knuckle.
(See page FS-83.)

WRU90-FS356

LOWER ARMS
COMPONENTS



WRU90-FS357

TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Improper front alignment (Improper camber and caster)	Bush worn or damaged Lower arm damaged or deformed	Check bush. Check lower arm.
Abnormal noise		

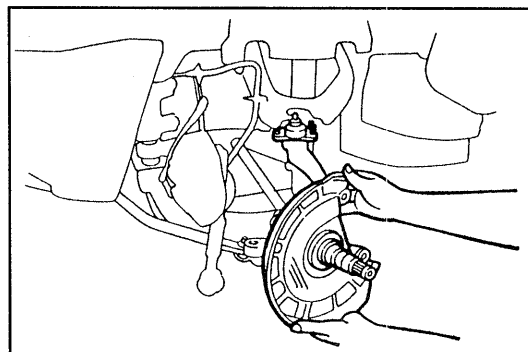
WRU90-FS358

REMOVAL

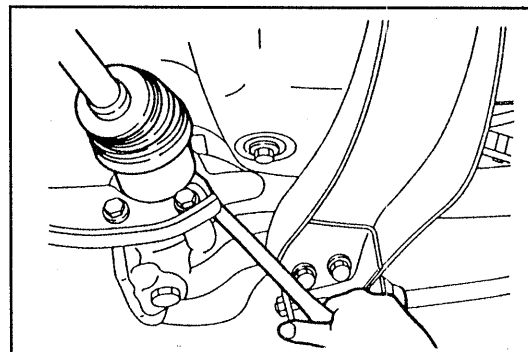
1. Remove the steering knuckle.
(See page FS-80 to FS-83.)
2. Remove the drive shaft (at the right side only).
(See page FS-89.)
3. Remove the shock absorber attaching bolts from the lower arm.
4. Remove the lower arm from the frame by removing the lower arm attaching bolts and nuts.
5. Removal of lower arm bush (at frame side)
Remove the lower arm bush, using the following SST.
SST: 09608-87615-000

NOTE:

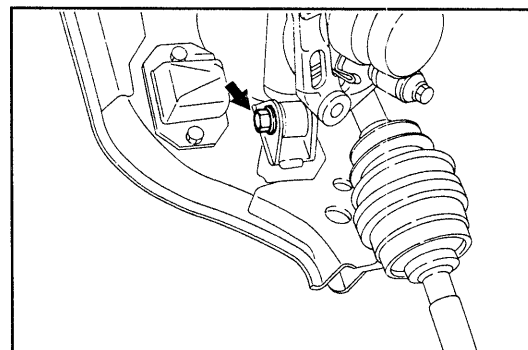
- Apply an adequate amount of MP grease to the threaded portion of the SST.
- If the bush rubber remains at the frame side, remove the rubber by attaching an appropriate plate washer to the SST.
- If the bolt turns when tightening the nut, prevent the bolt from turning, using the two flat sections provided at the forward end of the bolt.



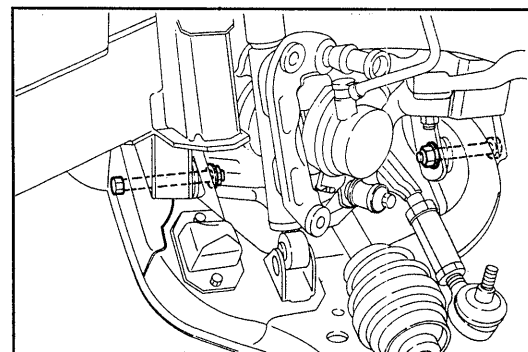
WRU90-FS409



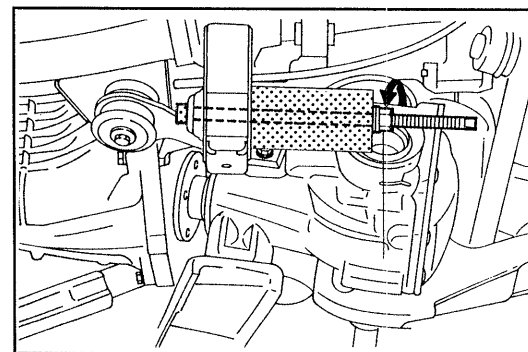
WRU90-FS359



WRU90-FS360



WRU90-FS361



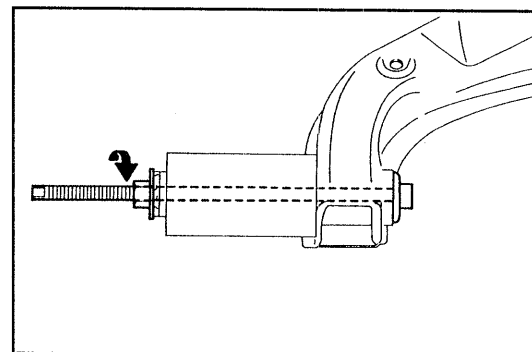
WRU90-FS362

6. Removal of lower arm bush (at lower arm side)
Remove the lower arm bush, using the following SST.
SST: 09608-87615-000

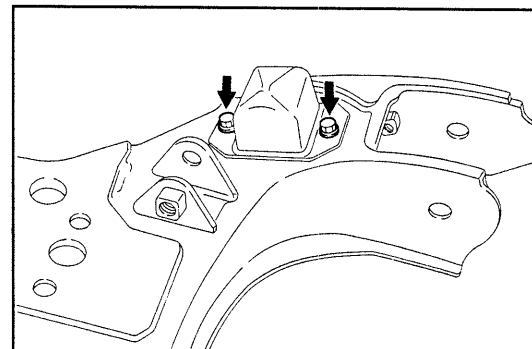
NOTE:

- Apply an adequate amount of MP grease to the threaded portion of the SST.
- If the bush rubber remains at the frame side, remove the rubber by attaching an appropriate plate washer to the SST.
- If the bolt turns when tightening the nut, prevent the bolt from turning, using the two flat sections provided at the forward end of the bolt.

7. Remove the front spring bumper from the lower arm.



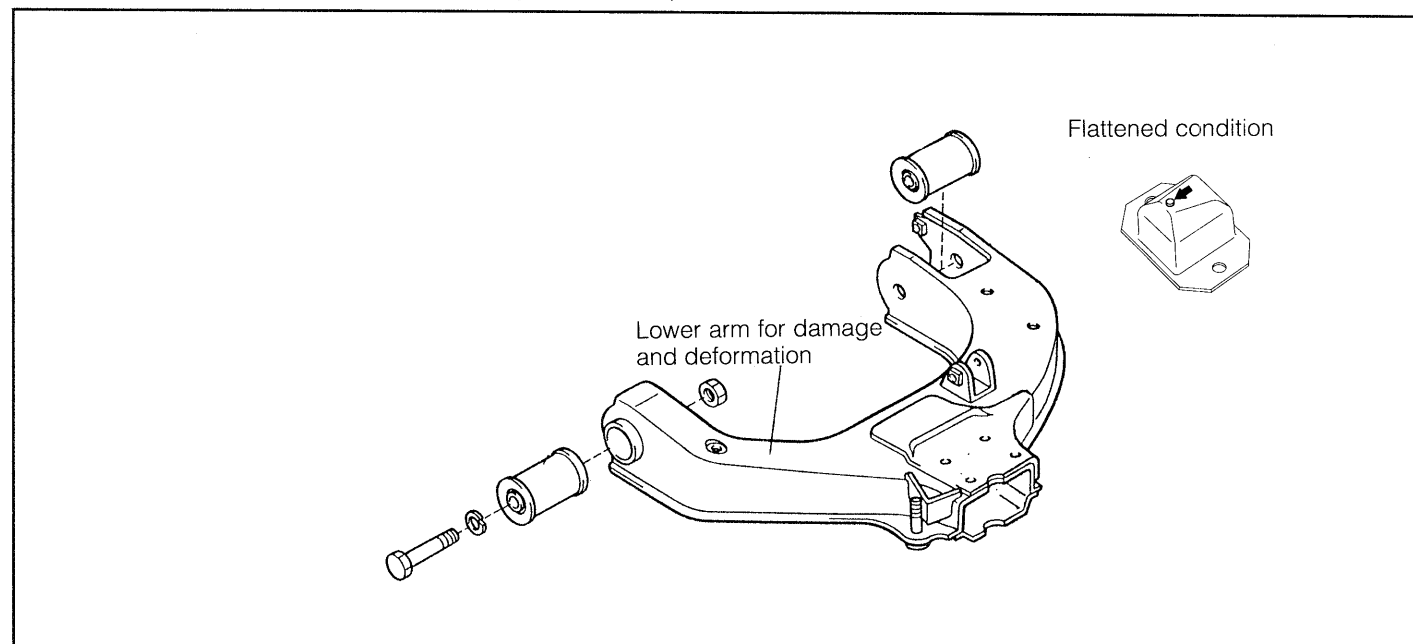
WRU90-FS363



WRU90-FS364

INSPECTION

Check the following parts. Replace any defective parts.



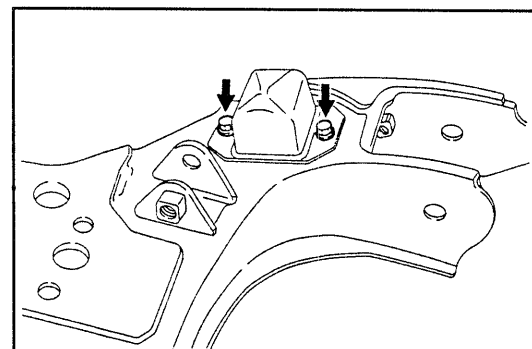
WRU90-FS365

INSTALLATION

1. Install the front spring bumper on the lower arm.

NOTE:

- Install the spring bumper in such a way that the arrow direction faces toward the forward direction of the vehicle.

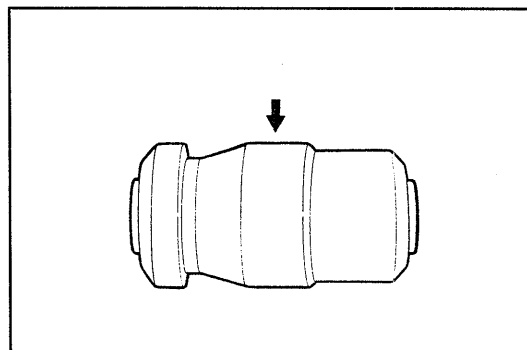


WRU90-FS410

FRONT AXLE & SUSPENSION

2. Installation of lower arm bush (at lower arm side)

- (1) Apply the SUNPAR 150® to the press-fitting section of the lower arm bush.



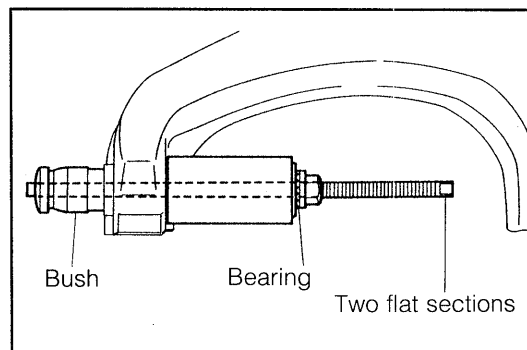
WRU90-FS366

- (2) Press the lower arm bush into the lower arm, using the following SST.

SST: 09608-87615-000

NOTE:

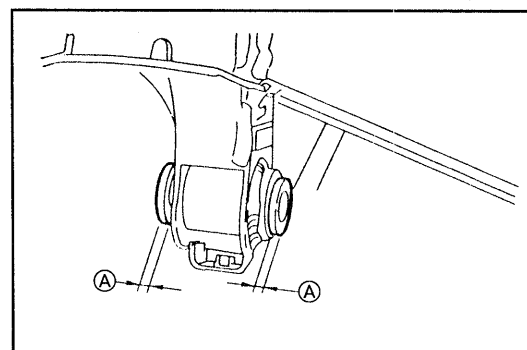
- If the bolt turns when tightening the nut, prevent the bolt from turning, using the two flat sections provided at the forward end of the bolt.



WRU90-FS367

- After completion of the press-fitting, perform adjustment so that the relationship between the bush edge surface and the lower arm may become as indicated in the right figure.

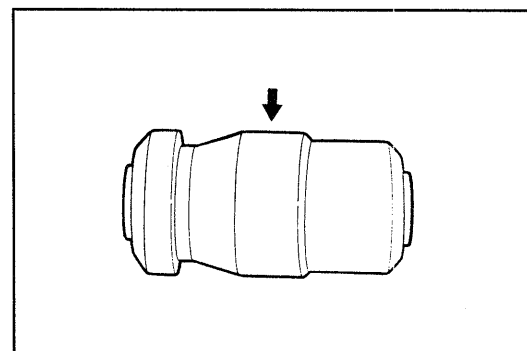
Dimension A: 7 ± 1 mm (0.28 ± 0.04 inch)



WRU90-FS368

3. Installation of lower arm bush (at frame side)

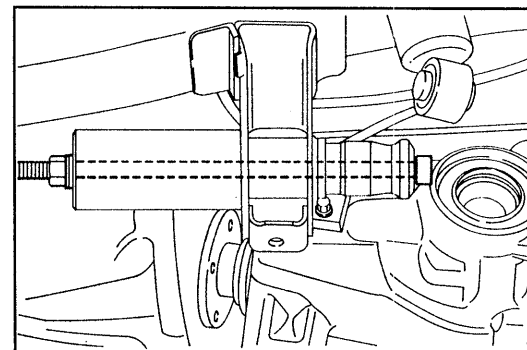
- (1) Apply the SUNPAR 150® to the press-fitting section of the lower arm bush.



WRU90-FS369

- (2) Press the lower arm bush into the frame, using the following SST.

SST: 09608-87615-000



WRU90-FS370

NOTE:

- After completion of the press-fitting, perform adjustment so that the relationship between the bush edge surface and the lower arm may become as indicated in the right figure.

Dimension A: 7 ± 1 mm (0.28 ± 0.04 inch)

- If the bolt turns when tightening the nut, prevent the bolt from turning, using the two flat sections provided at the forward end of the bolt.

- Install the lower arm to the frame. Temporarily tighten the attaching bolts and nuts.

NOTE:

- Never reuse the spring washer.

- Set the lower arm so that it may become as indicated in the right figure. Tighten the lower arm attaching bolts.

Installation Height: $A - B = C$

C: 82 ± 10 mm (3.23 ± 0.4 inch)

Tightening Torque:

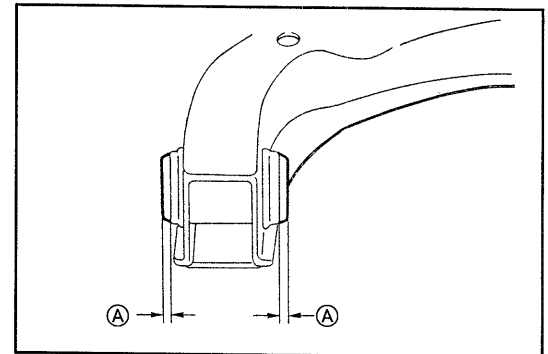
13.0 - 18.0 kgf-m (94.0 - 130 ft-lb, 128 - 177 N-m)

- Install the shock absorber to the lower arm with bolts.

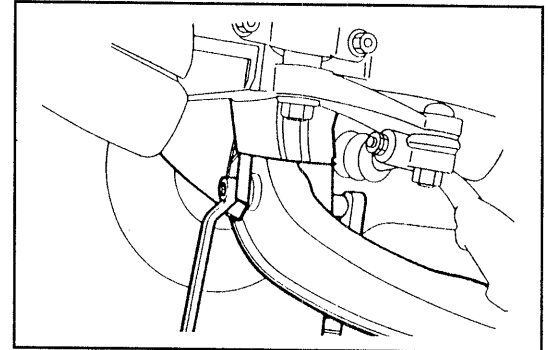
Tightening Torque:

5.0 - 7.0 kgf-m (36.2 - 50.6 ft-lb, 49.0 - 68.6 N-m)

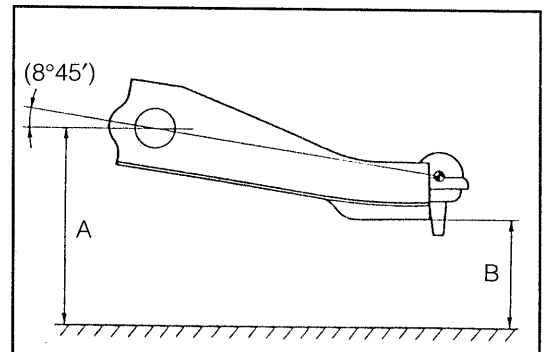
- Install the steering knuckle.
(See page FS-83 to FS-87.)



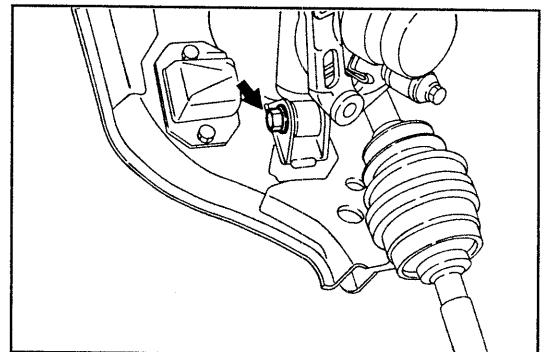
WRU90-FS371



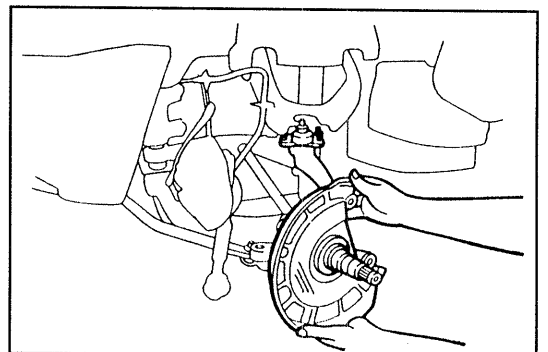
WRU90-FS372



WRU90-FS373



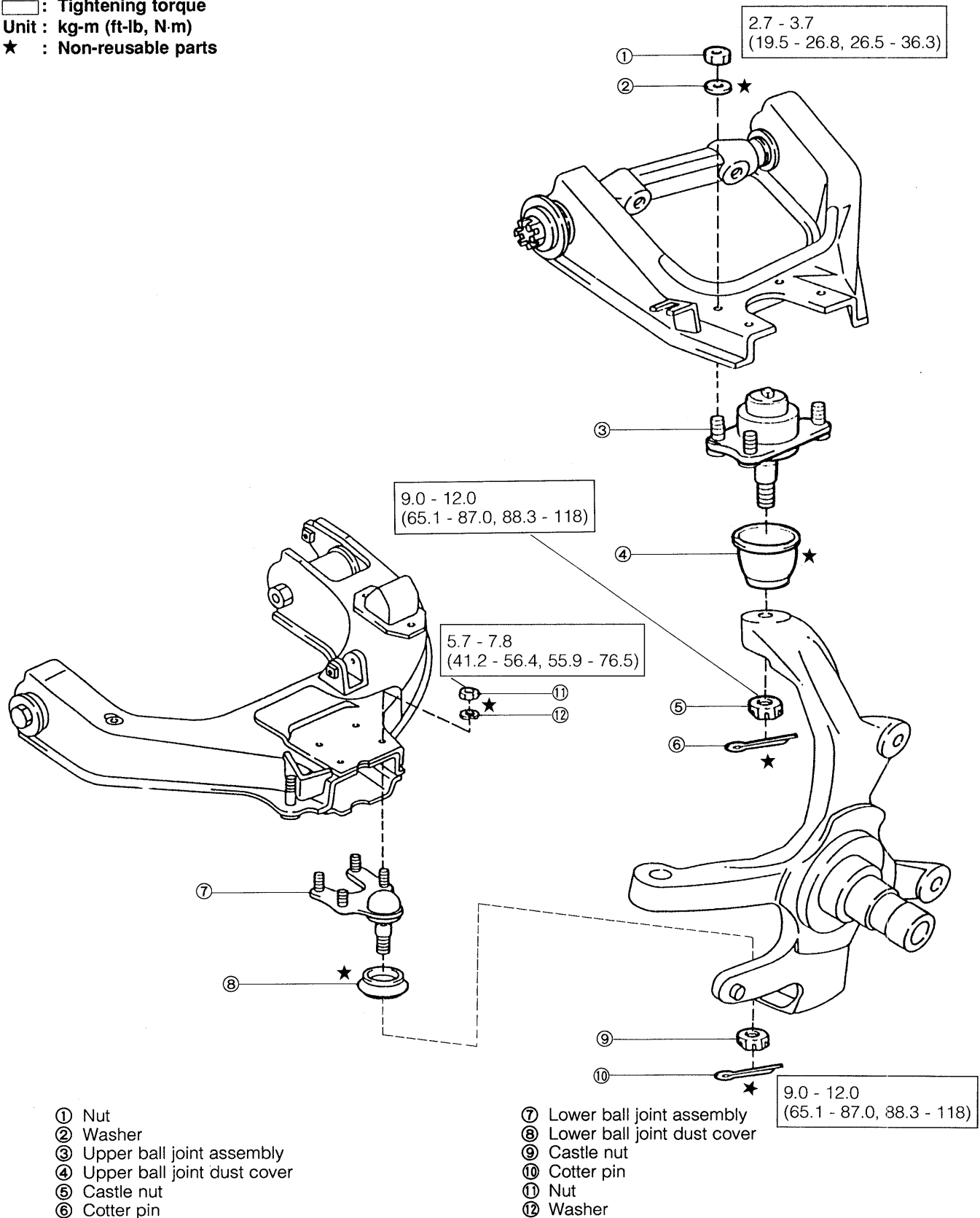
WRU90-FS374



WRU90-FS375

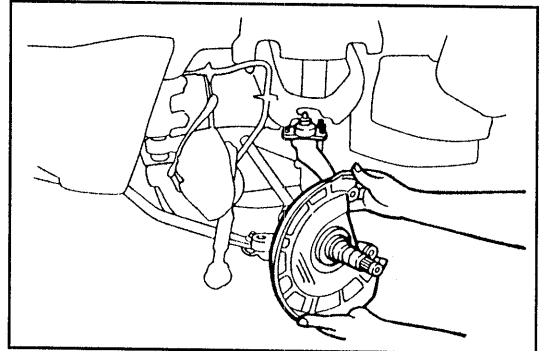
UPPER & LOWER BALL JOINTS COMPONENTS

 : Tightening torque
 Unit : kg-m (ft-lb, N-m)
 ★ : Non-reusable parts



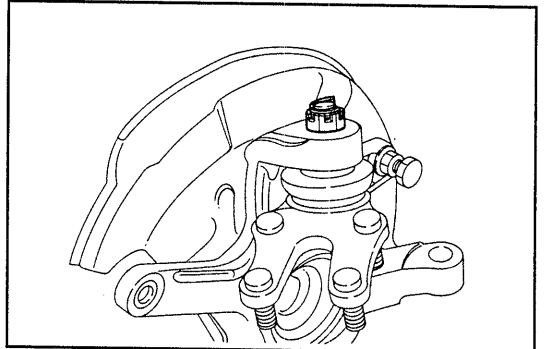
REMOVAL

1. Remove the steering knuckle arm.
(See page FS-80.)



WRU90-FS378

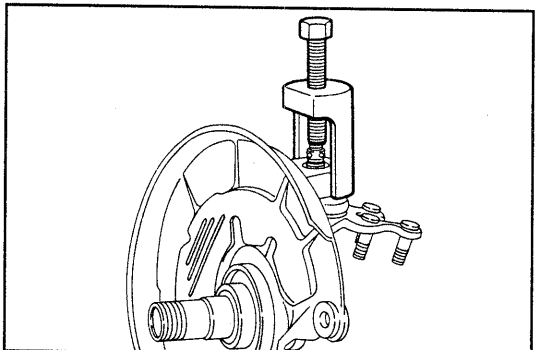
2. Pull out the cotter pin.
3. Remove the castle nut.



WRU90-FS379

4. Remove the ball joint from the knuckle arm, using the following SST.

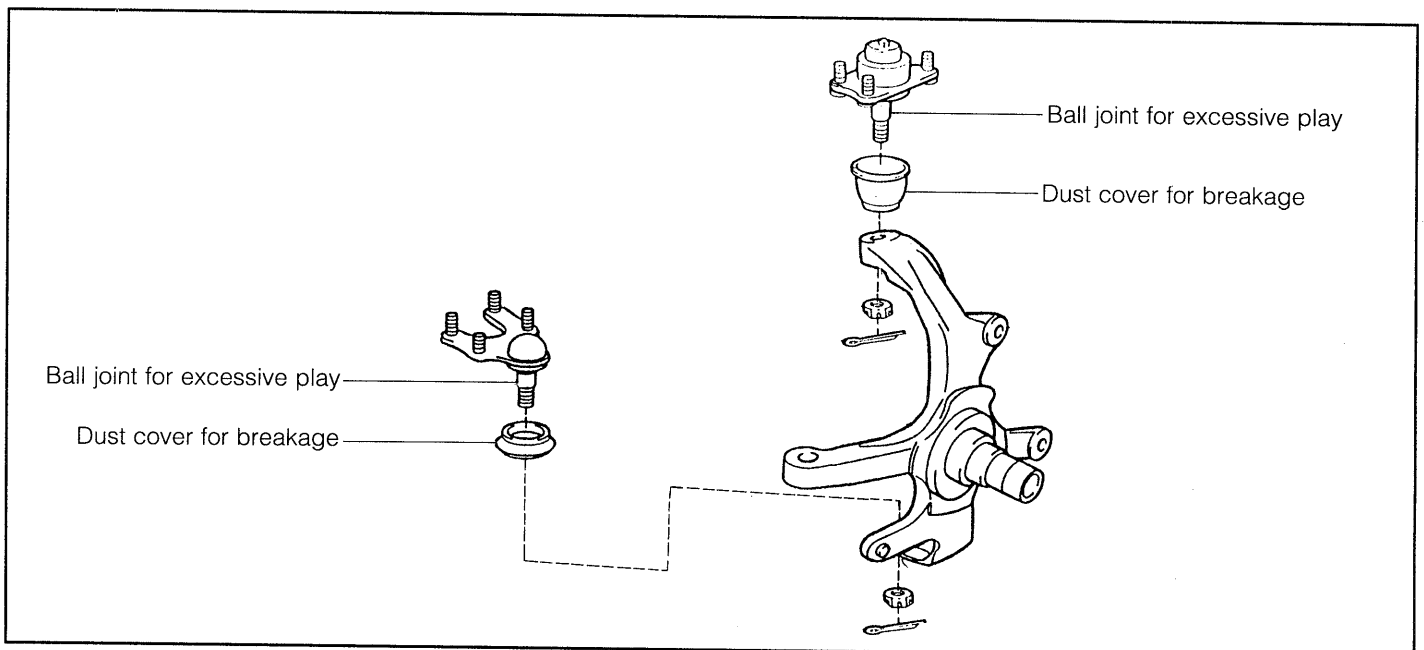
SST: 09610-20012-000



WRU90-FS380

INSPECTION

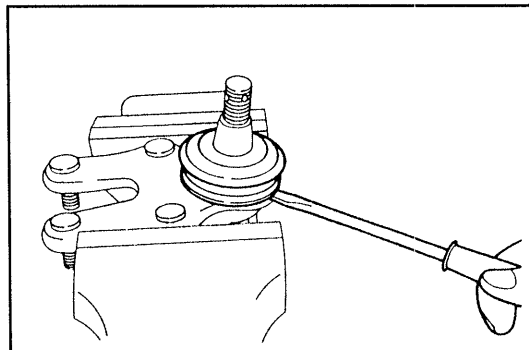
Check the following parts. Replace any defective parts.



WRU90-FS381

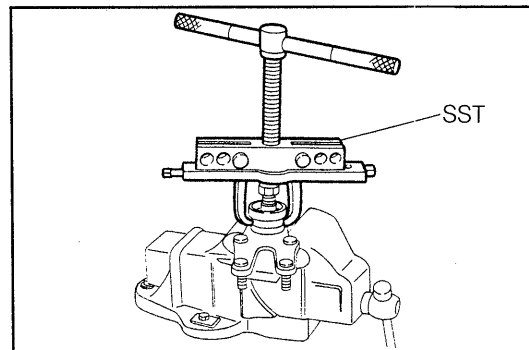
INSTALLATION

1. Replacement of rubber boot (if so required)
 - (1) Detach the press-fitting section of the rubber boot from the ball joint by means of a screwdriver or the like.



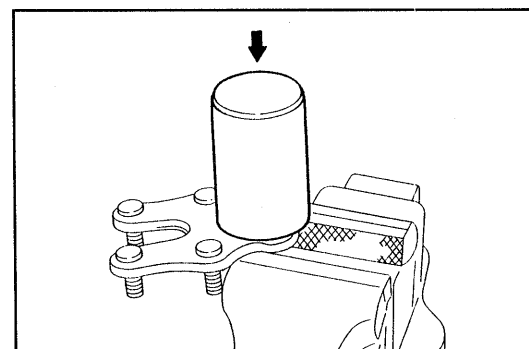
WRU90-FS382

- (2) Remove the rubber boot from the ball joint, using the following SST or a suitable tool.
SST: 09950-20017-000



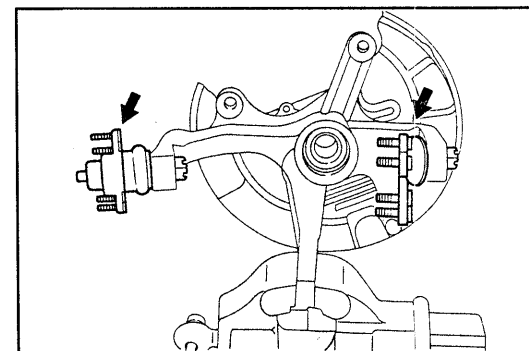
WRU90-FS383

- (3) Press a new rubber boot into position, using the following SST.
SST (lower ball joint): 09608-87611-000
(upper ball joint): 09608-87613-000



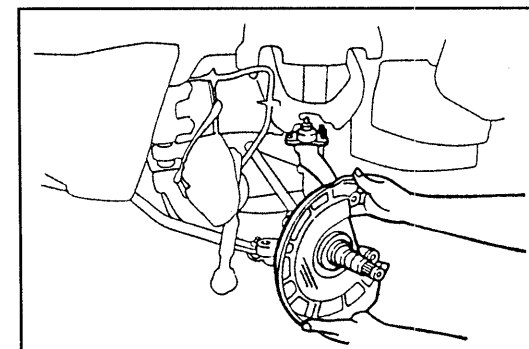
WRU90-FS384

2. Connect the ball joint to the steering knuckle.
NOTE:
 - Be very careful not to get any lubricant, such as grease, onto the tapered section.
3. Temporarily tighten the castle nut.



WRU90-FS385

4. Install the steering knuckle arm.
(See page FS-83.)



WRU90-FS386

DAIHATSU

Rocky

REAR AXLE & SUSPENSION

OUTLINE OF REAR AXLE & SUSPENSION	RS- 2
REAR SPRING	RS- 8
REAR SHOCK ABSORBER	RS-18
REAR AXLE SHAFT	RS-23

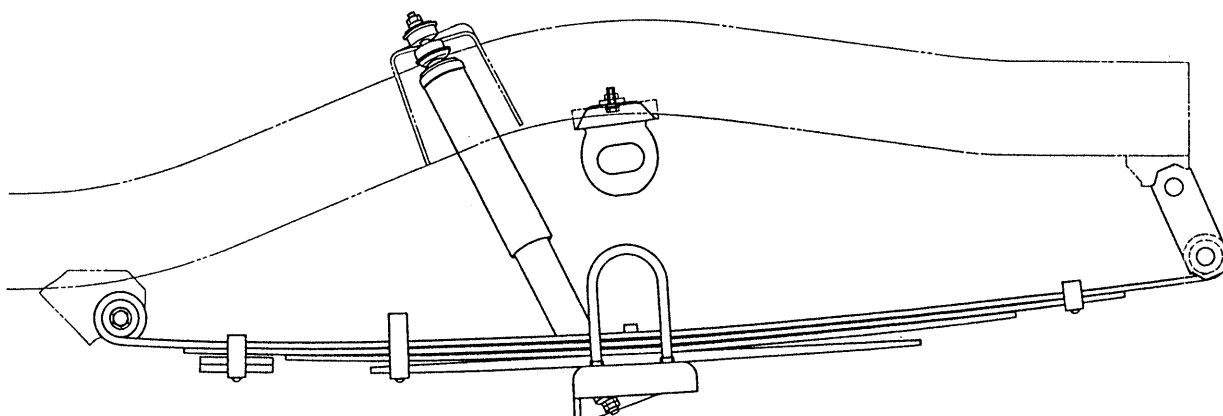
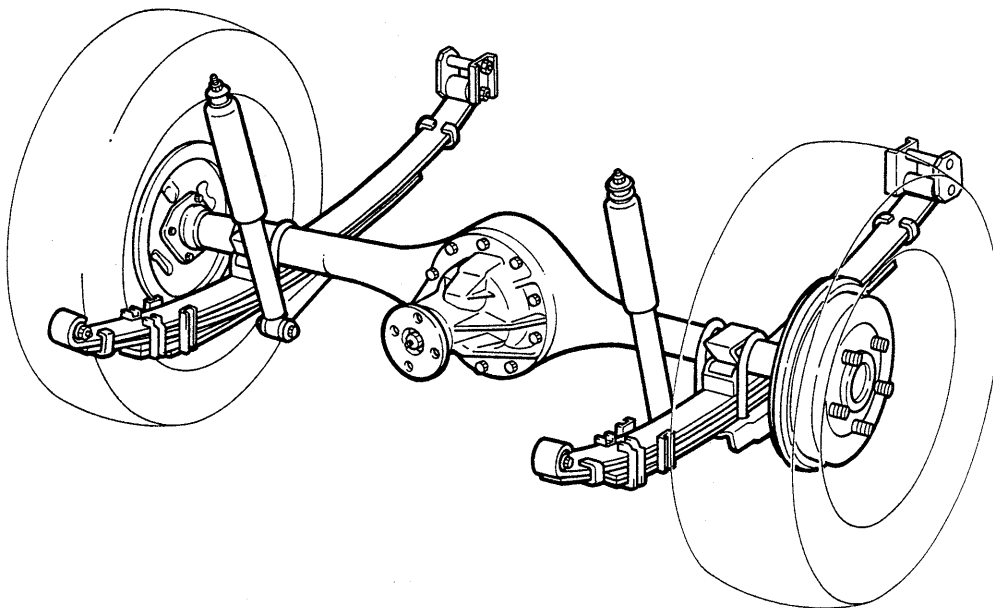
WRU90-RS001

RS

OUTLINE OF REAR AXLE & SUSPENSION

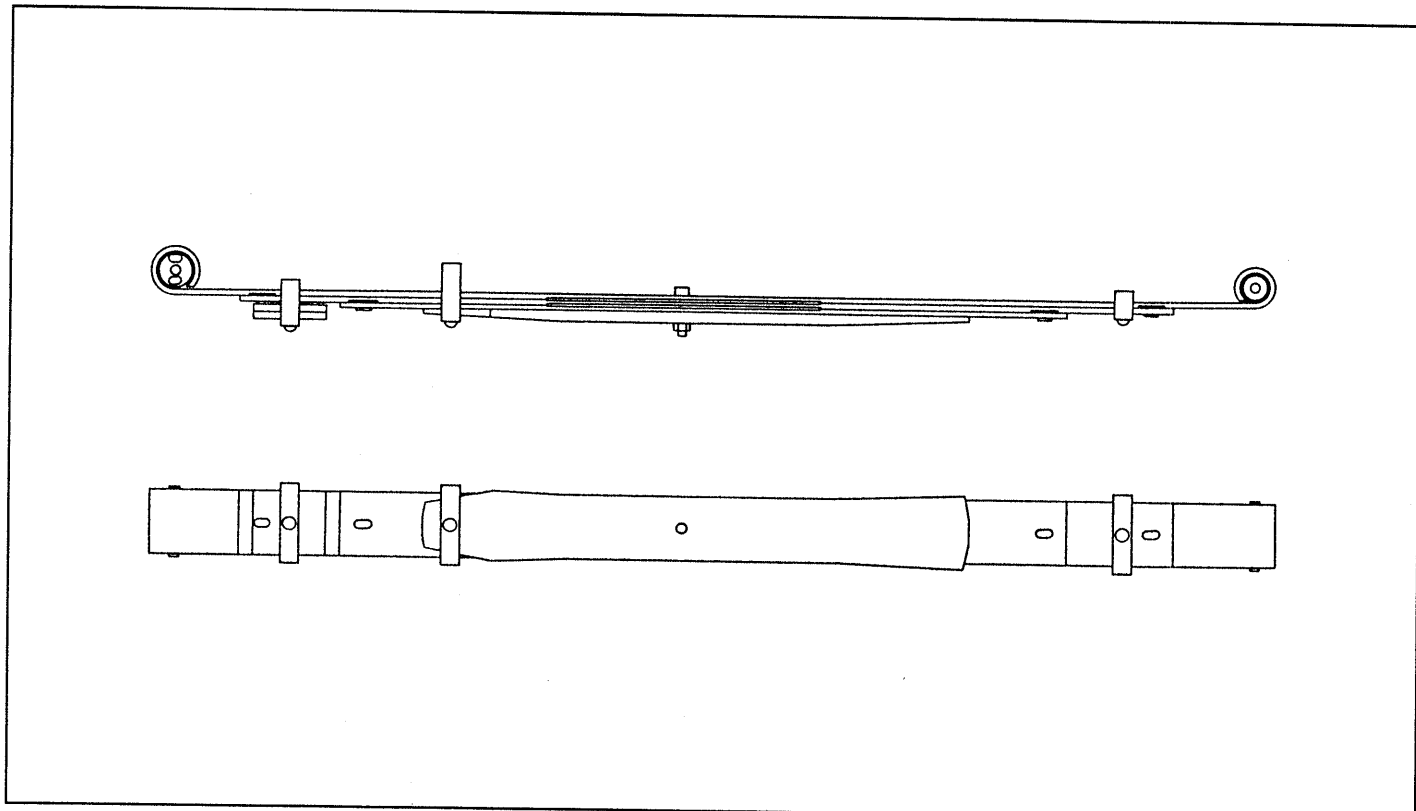
REAR SUSPENSION

The rear suspension is a rigid type and is composed of leaf springs. For improved negotiability over rough terrains and steering response, shackles are installed at the back side.



REAR SPRING

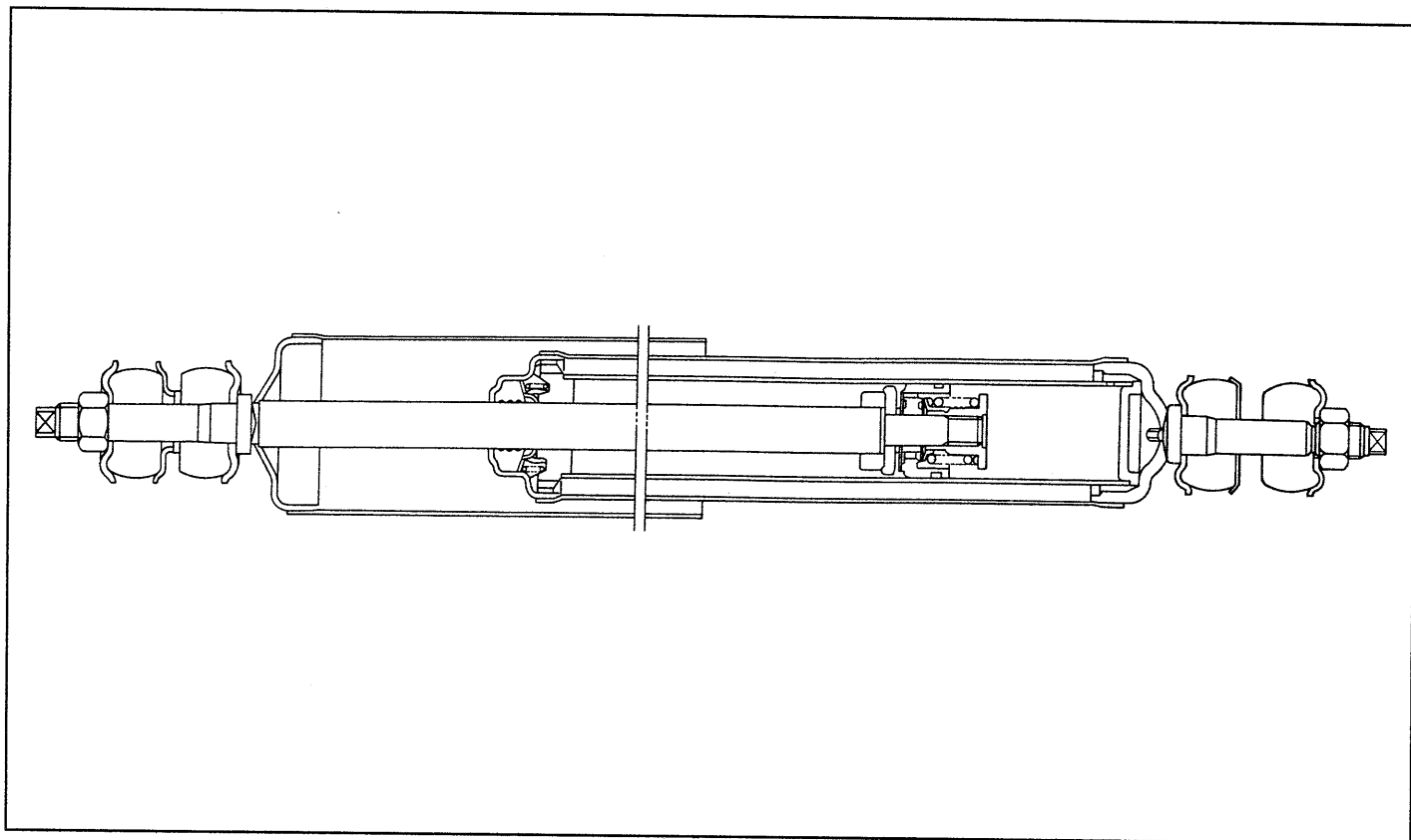
The rear spring adopts leaf springs which consist of 4 leaves, thus assuring excellent negotiability over rough terrains.



WRU90-RS003

REAR SHOCK ABSORBER

The rear shock absorber is a nitrogen gas-sealed type shock absorber.



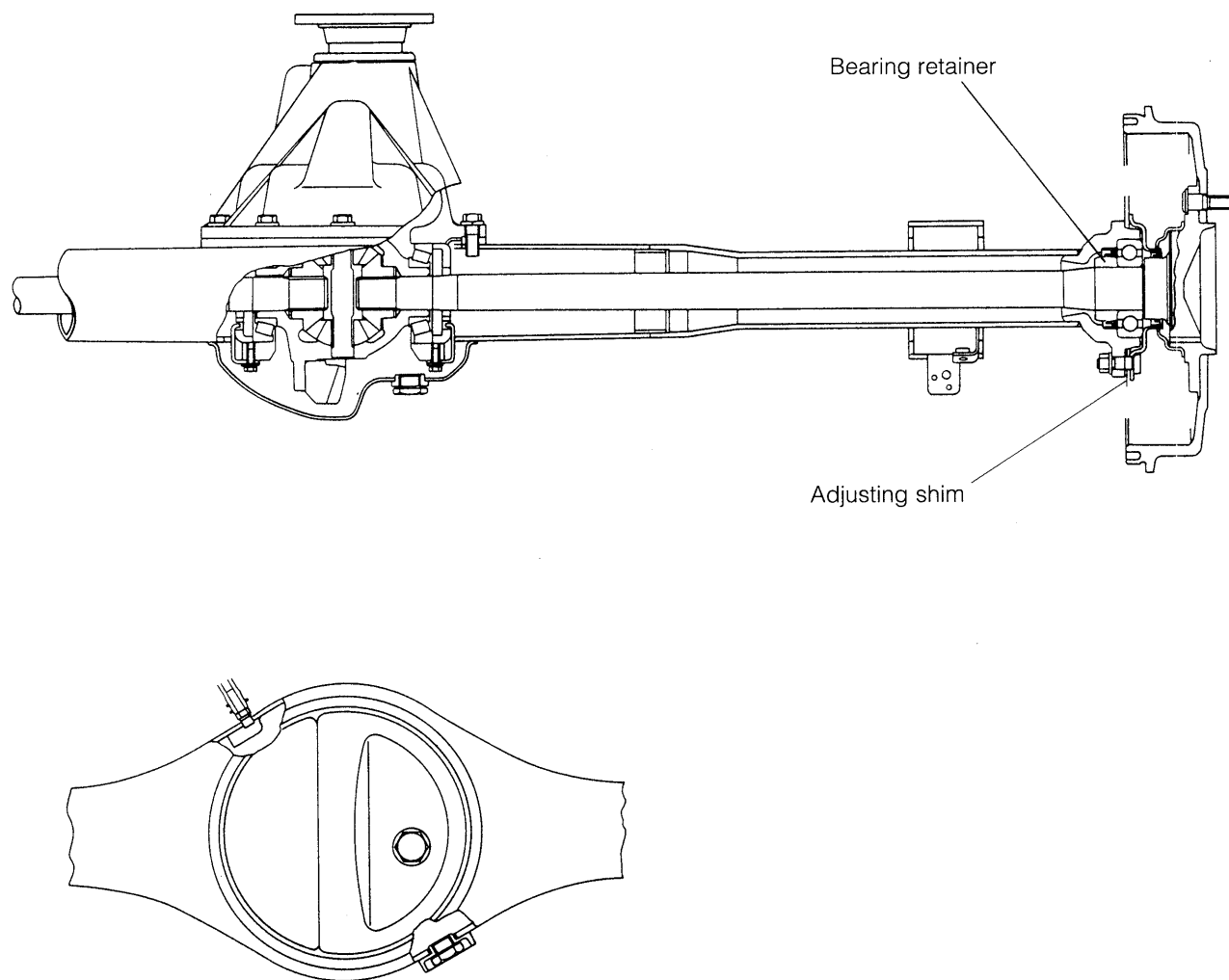
WRU90-RS004

REAR AXLE & SUSPENSION

REAR AXLE

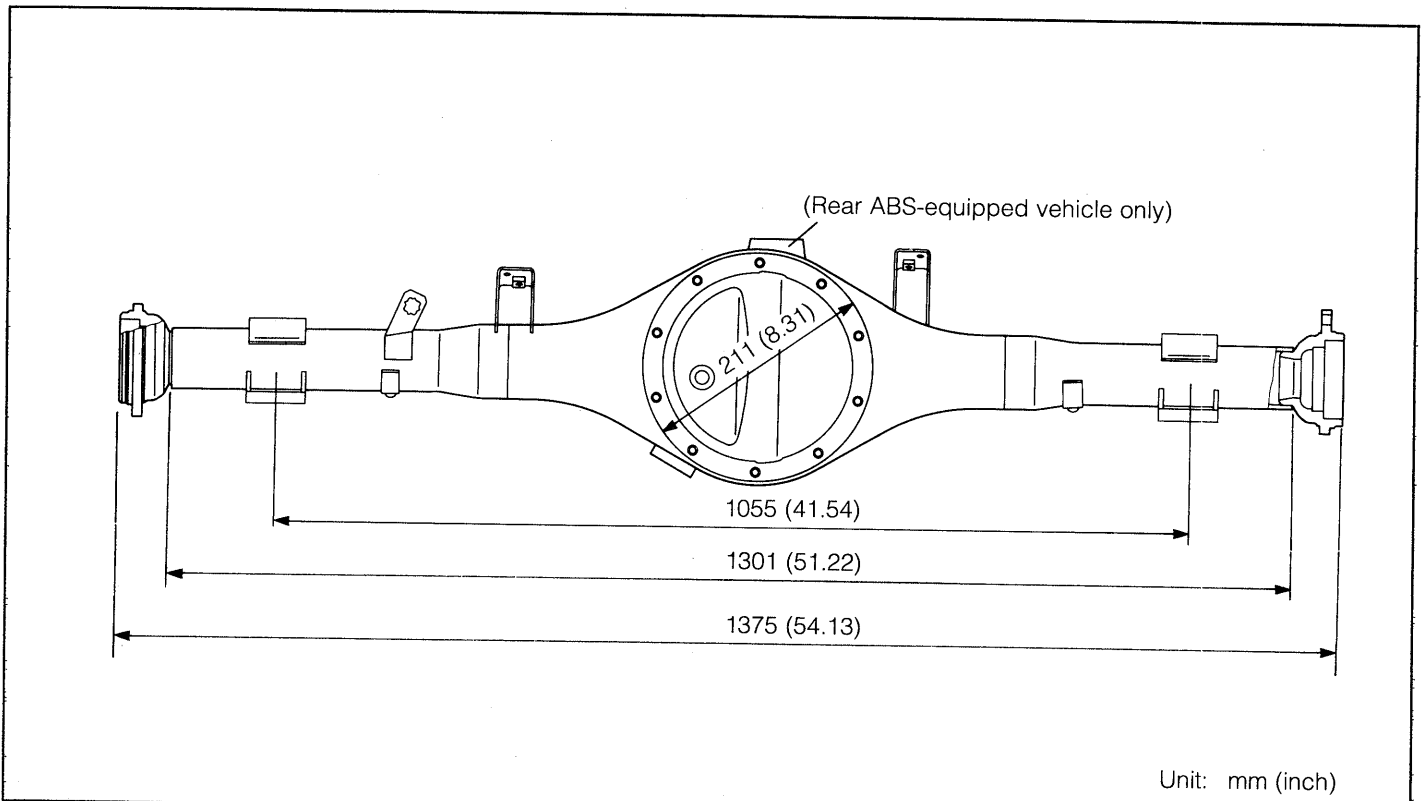
The rear axle housing employs a banjo type. The axle is a semi-floating type.

The bearing adopts a radial ball bearing, where the axle shaft is secured to the bearing retainer by means of shrinkage fitting. The clearance between the bearing and the backing plate is adjusted by shims.



REAR AXLE HOUSING

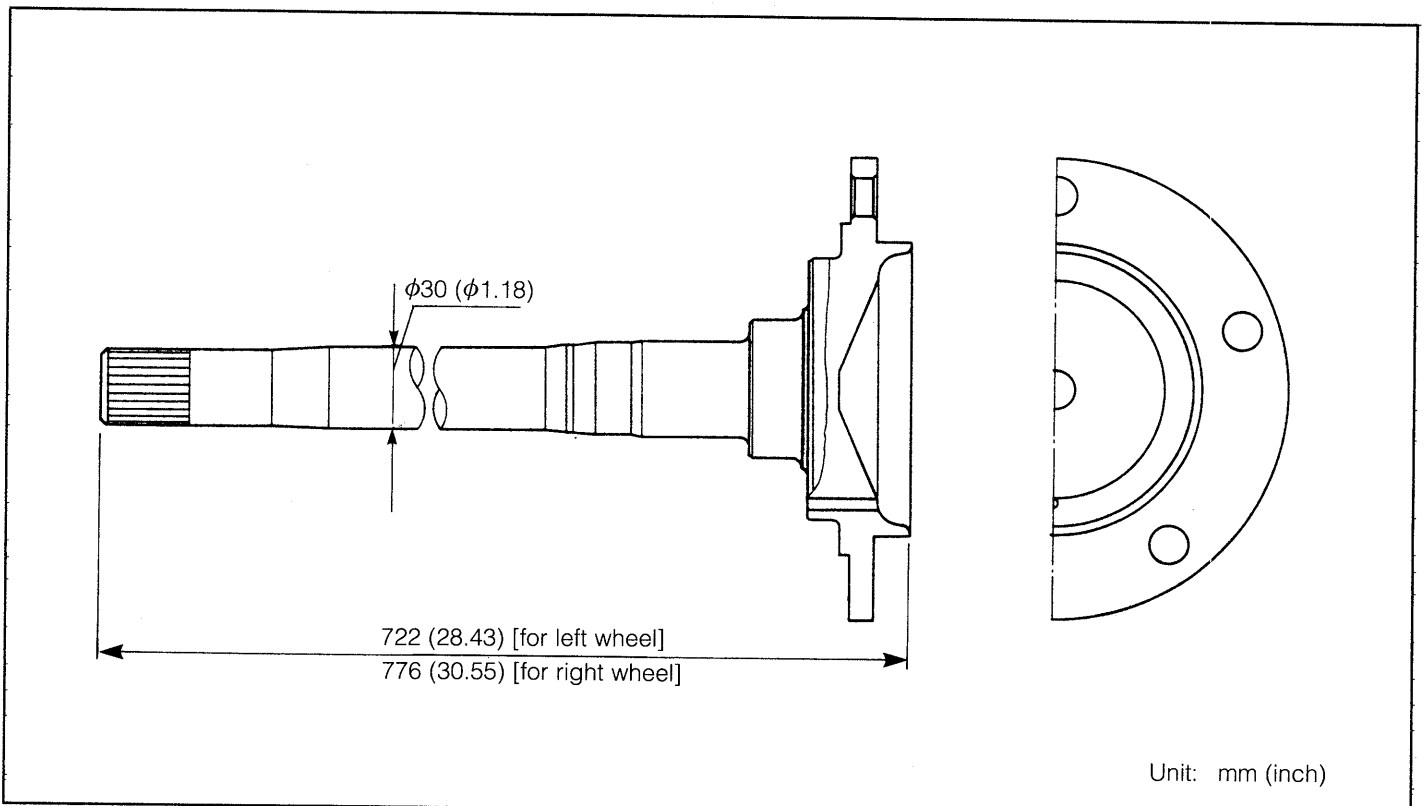
The rear axle housing employs a banjo type rear axle housing which features high rigidity of the axle tube and easy removal/installation of the rear differential carrier.



WRU90-RS006

REAR AXLE SHAFT

The rear axle shaft adopts a semi-floating type, where the wheel is attached directly to the drive shaft and the vehicle weight is sustained by the drive shaft and axle tube half-and-half.



WRU90-RS007

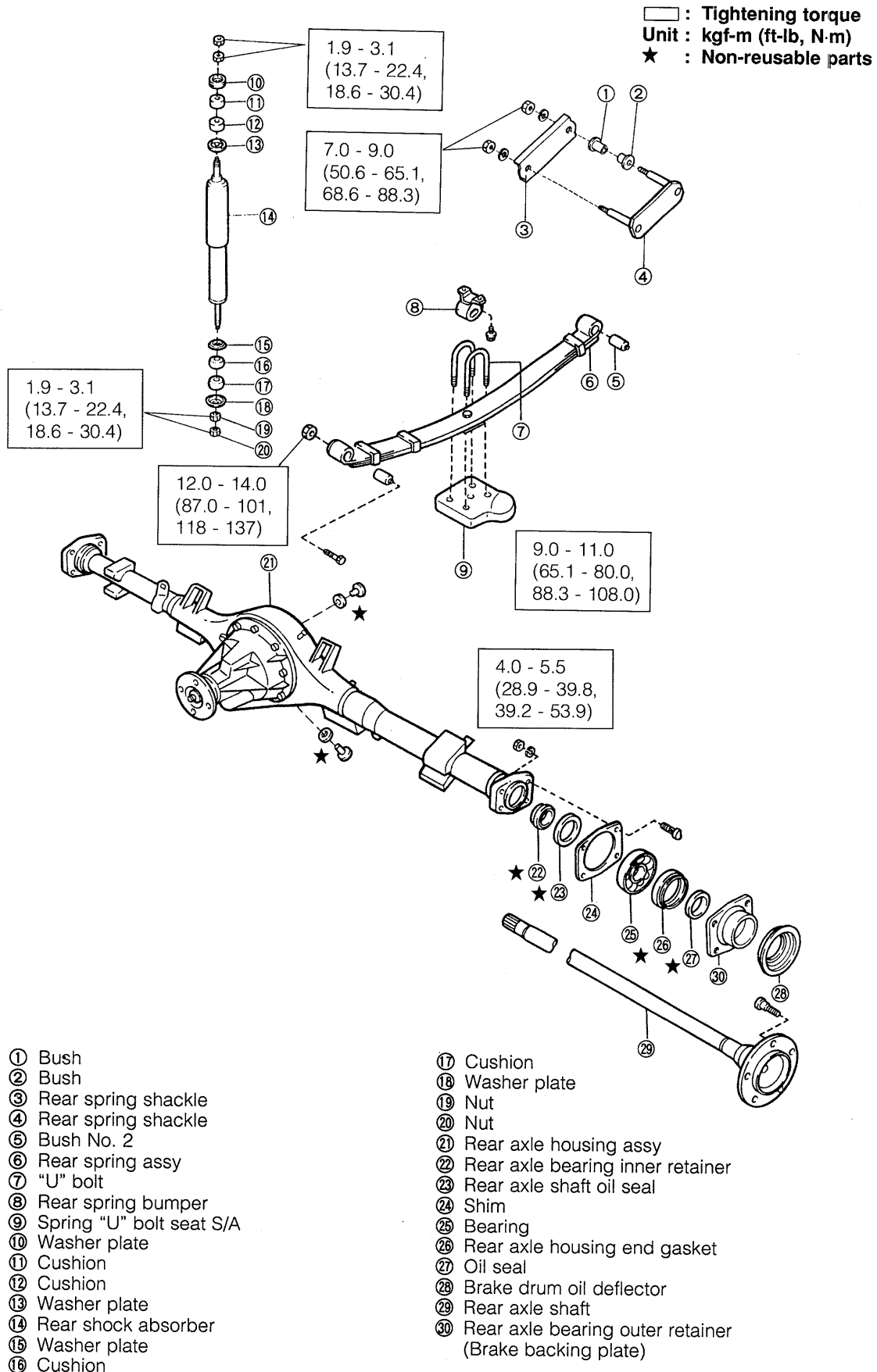
REAR AXLE & SUSPENSION

Rear suspension specifications

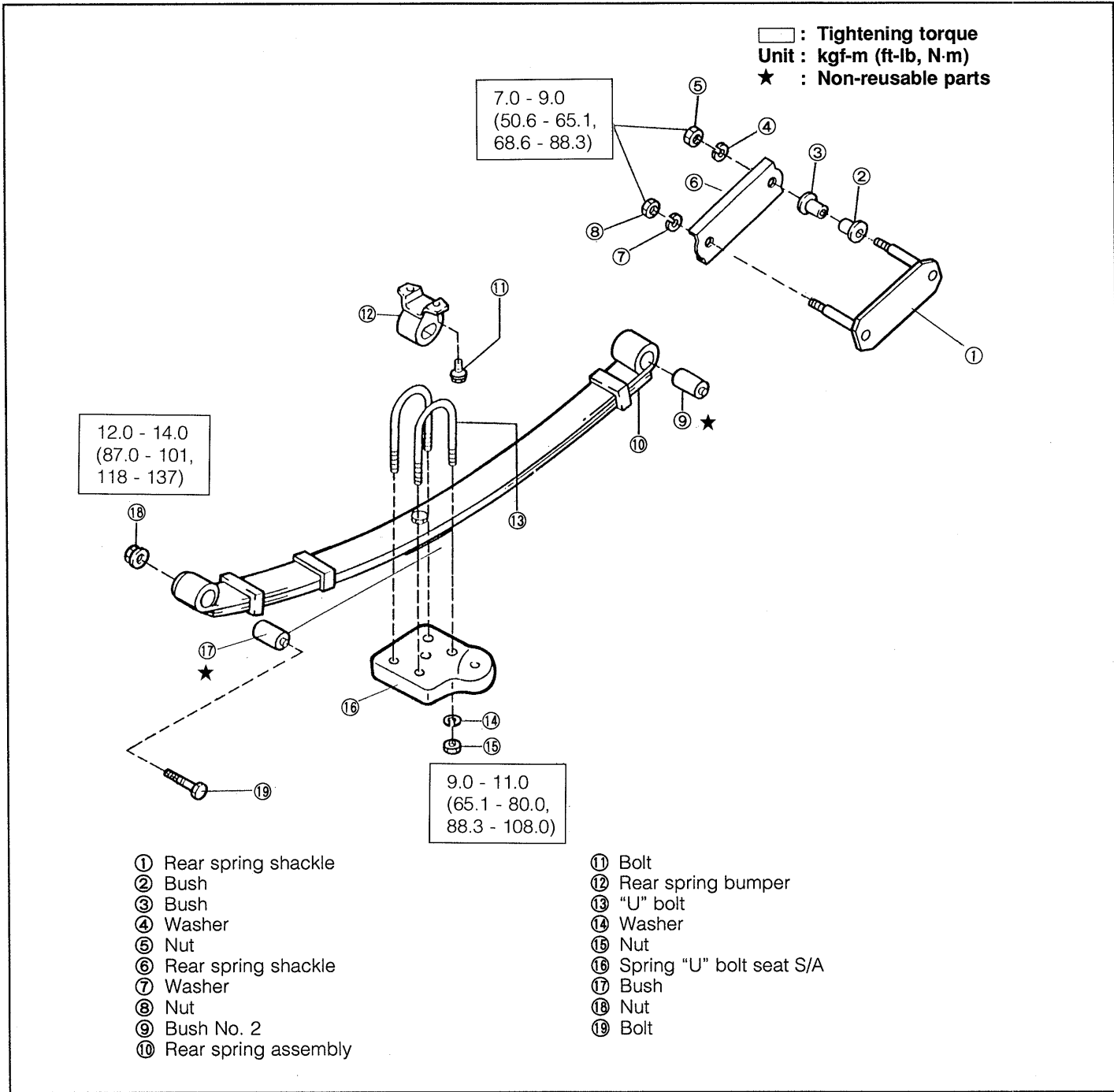
Item			Vehicle model	All models
Leaf spring	Camber (under unloaded state)		mm (inch)	165 (6.5)
	Main spring	Span x width x sheet thickness - Number of leaves (pcs.)		1,170 × 70 × 6 - 1 (46.06 × 27.6 × 0.24)
				1,010 × 70 × 6 - 1 (39.76 × 2.76 × 0.24)
				785 × 70 × 6 - 1 (30.91 × 2.76 × 0.24)
				590 × 70 × 12 - 1 (23.23 × 2.76 × 0.47)
Shock absorber	Spring constant	Main spring	kgf/mm (lb/inch)	2.12 (0.18)
		Combined	kgf/mm (lb/inch)	4.61 (0.4)
	Damping force (at time of piston speed of 0.3 m/s)		During rebound stroke	198 (436.6)
			During compression stroke	28 (61.74)
	Maximum length		mm (inch)	448 (17.6)
	Minimum length		mm (inch)	267 (10.5)
	Stroke		mm (inch)	181 (7.13)

WRU90-RS008

COMPONENTS



REAR SPRING
COMPONENTS



WRU90-RS010

TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Abnormal noise Vehicle body tilted	Spring bushes worn Spring damaged	Check spring and bush.

WRU90-RS011

NOTE:

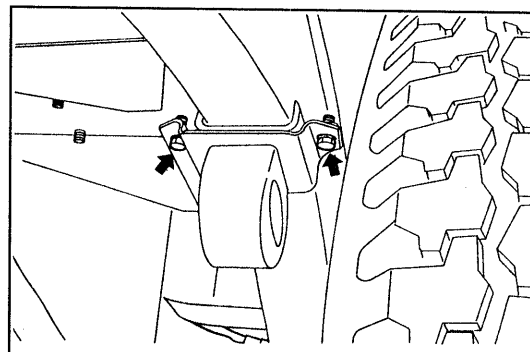
1. Care must be exercised so that the right and left leaf springs may not be exchanged with each other during the removal and installation of the leaf springs.
2. When replacing the leaf springs, assemble them according to the following combination of the marking codes (+, 0, -) which were put on the leaf springs. The right table indicates the priority order with the top priority attached to the (1).

	Right	Left
(1)	+	0
(2)	0	-
(3)	+	-
(4)	0	0
(5)	+	+
(6)	-	-

WRU90-RS103

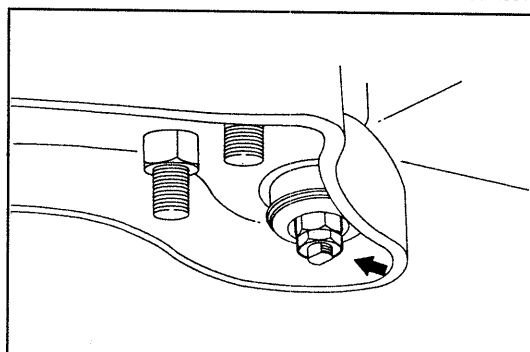
REMOVAL

1. Remove the rear spring bumper by removing the attaching bolts.



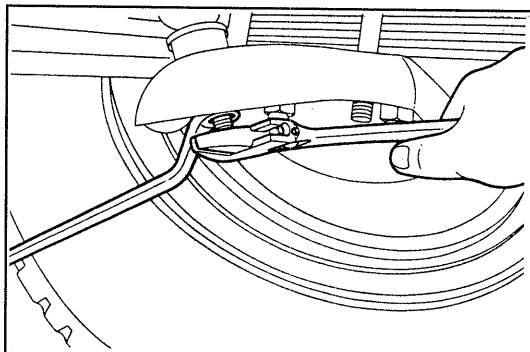
WRU90-RS012

2. Loosen the lock nut of the attaching nut at the lower side of the rear shock absorber.



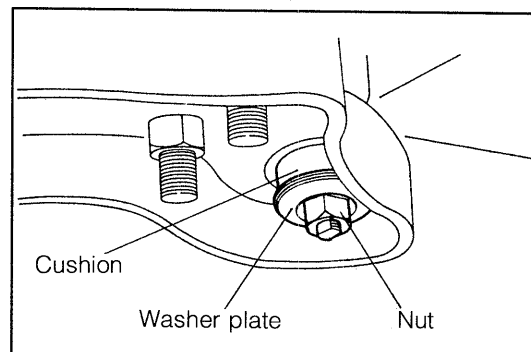
WRU90-RS013

3. Loosen the attaching nut at the lower side of the rear shock absorber, while preventing the rear shock absorber from turning by lower side of the shock absorber.



WRU90-RS014

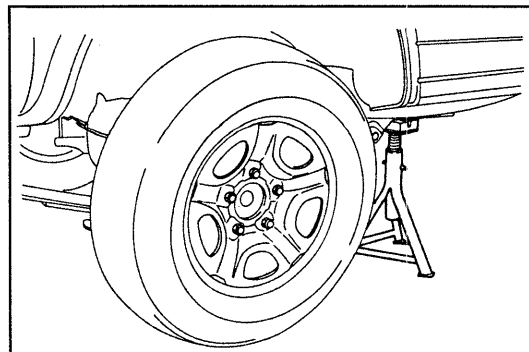
4. Remove the attaching nut at the lower side of the rear shock absorber. Remove the washer plate and cushion.



WRU90-RS015

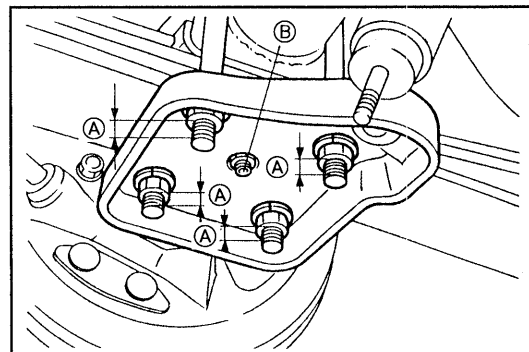
REAR AXLE & SUSPENSION

5. Jack up the vehicle until the rear tires are just contacting the ground (with no load applied to the rear axle). Apply safety stands to the frame so as to support the vehicle.



WRU90-RS016

6. Removal of U bolt
 - 1) Measure the protruding dimension of the U bolt tightening nut. Record the measured value.

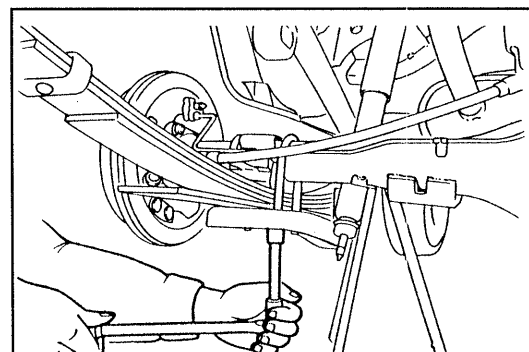


WRU90-RS017

- 2) Loosen the U bolt attaching nuts evenly over two or three stages.

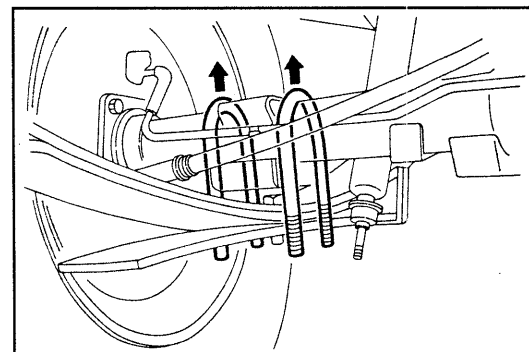
CAUTION:

- When loosening the nuts, make sure that the spring load is not sustained by the nuts.



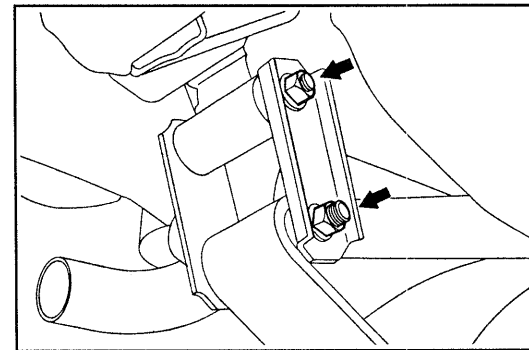
WRU90-RS018

- 3) Remove the U bolt attaching nuts. Remove the spring U bolt seat and U bolt.



WRU90-RS019

7. Removal of rear spring shackle pin
 - 1) Remove the rear spring shackle attaching nuts. Remove the shackle bracket.

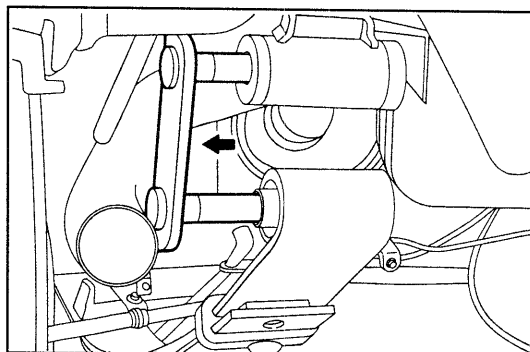


WRU90-RS020

- 2) Pull out the shackle pin about halfway by lightly tapping the shackle pin at its plate section by means of a plastic hammer or the like.

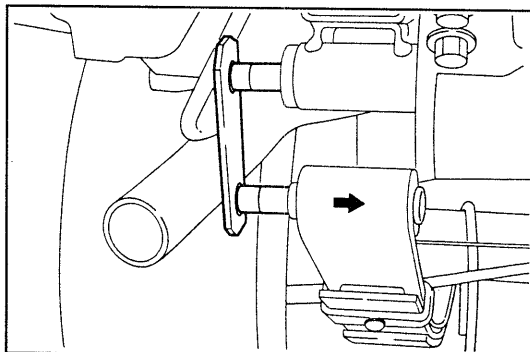
NOTE:

- When pulling out the shackle pin about halfway, keep the exhaust pipe to the left so that the left shackle may not interfere with the exhaust pipe.



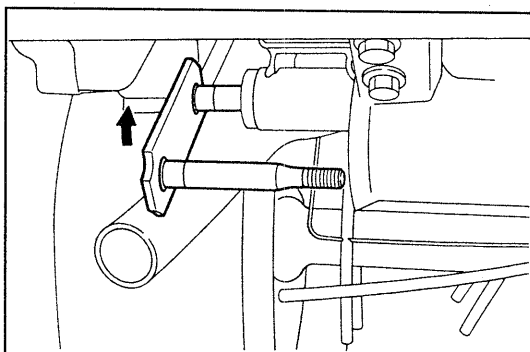
WRU90-RS021

- 3) Remove the leaf spring from the shackle pin.



WRU90-RS022

- 4) Raise the leaf spring connecting side of the shackle pin until it may not interfere with the exhaust pipe. (Left side only)

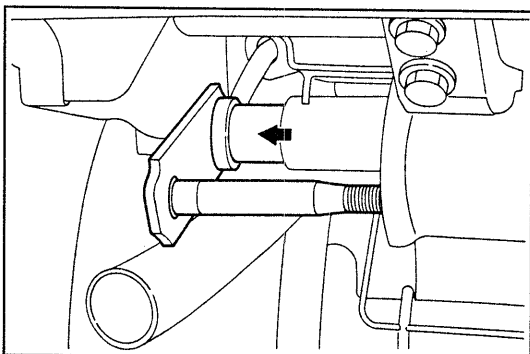


WRU90-RS023

- 5) Pull out the shackle pin with the shackle pin bush at the vehicle outside installed.

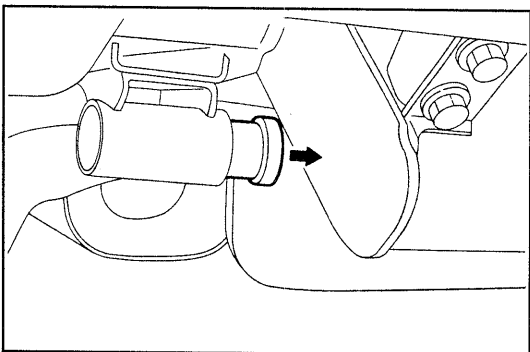
NOTE:

- If the shackle pin only should be pulled out, interference with the body would occur.
- The bush is a two-split type.



WRU90-RS024

8. Remove the shackle pin bush at the vehicle inside from the frame.



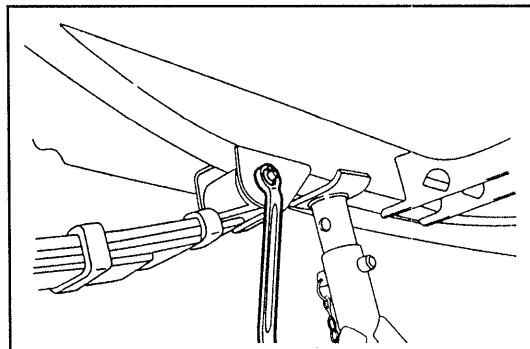
WRU90-RS025

REAR AXLE & SUSPENSION

9. Remove the leaf spring attaching bolt and nut at the front side. Remove the rear spring from the vehicle.

NOTE:

- When removing the bolt, be very careful not to drop the leaf spring.



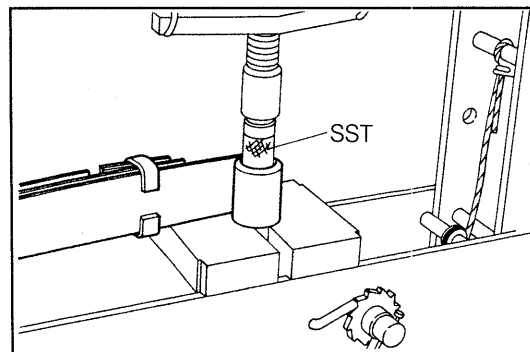
WRU90-RS026

10. Removal of rear spring bushes No.1 and No.2

- 1) Pull out the rear spring bush No.1, using the following SST in combination with a hydraulic press.
SST: 09608-87607-000

NOTE:

- Consideration should be taken at the receiver side so that the bush may be pulled downward.

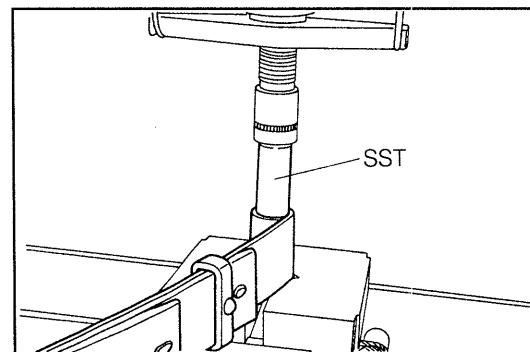


WRU90-RS027

- 2) Pull out the rear spring bush No.2, using the following SST in combination with a hydraulic press.
SST: 09608-87608-000

NOTE:

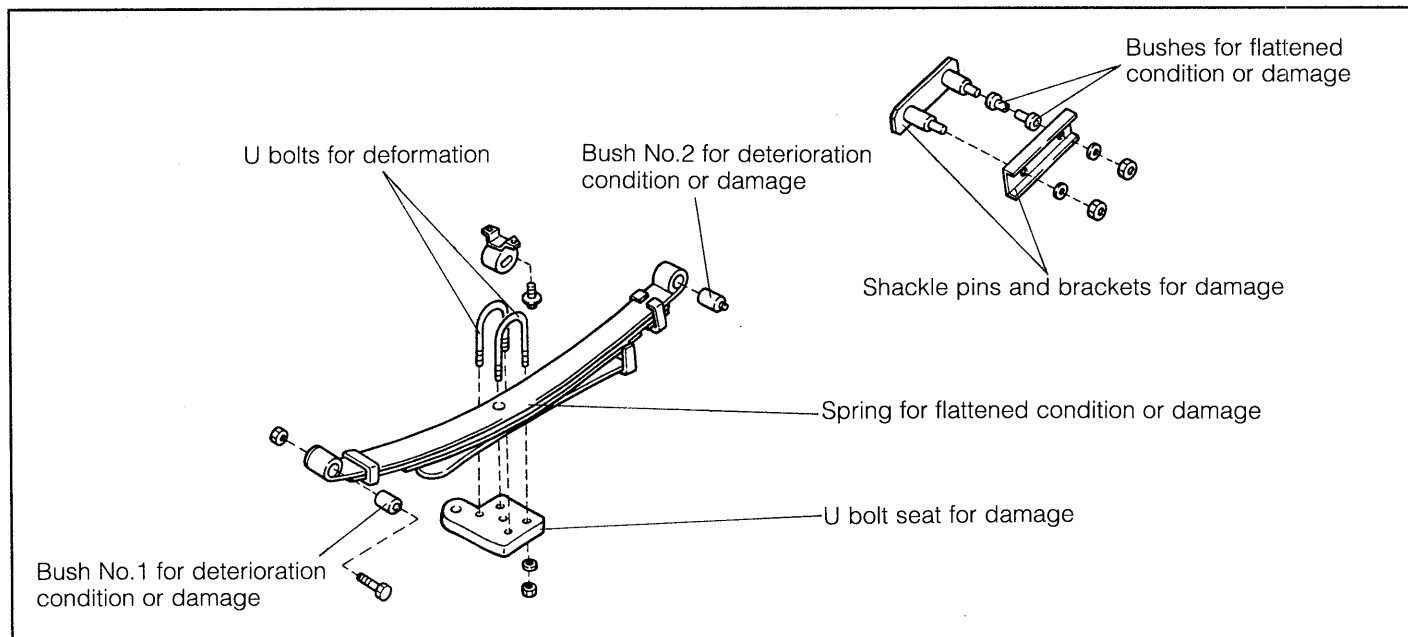
- Consideration should be taken at the receiver side so that the bush may be pulled downward.



WRU90-RS104

INSPECTION

1. Inspect each section in the figure below. Replace any defective parts.



WRU90-RS028

2. Ensure that the bush installing section of the chassis exhibits no damage.

INSTALLATION

1. Installation of rear spring bushes No.1 and No.2
 - 1) Press the rear spring bush No.1 into the rear spring with the following SST in combination with a press.
SST: 09608-87607-000

NOTE:

- Be sure to press the bush up to the edge surface of the leaf spring.
- For this operation, use a press stand having a hole so that no interference with the inner bush may occur.

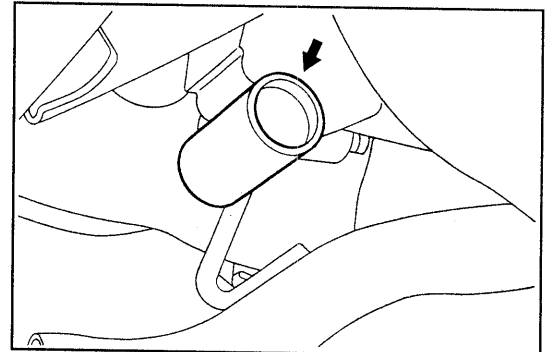
- 2) Press the rear spring bush No.2 into the rear spring with the following SST in combination with a press.
SST: 09608-87608-000

NOTE:

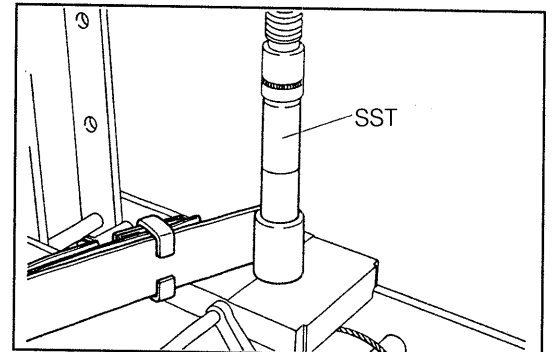
- Be sure to press the bush up to the edge surface of the leaf spring.
- For this operation, use a press stand having a hole so that no interference with the inner bush may occur.

2. Connect the front installing section of the rear spring. Temporarily install the attaching bolt and nut.

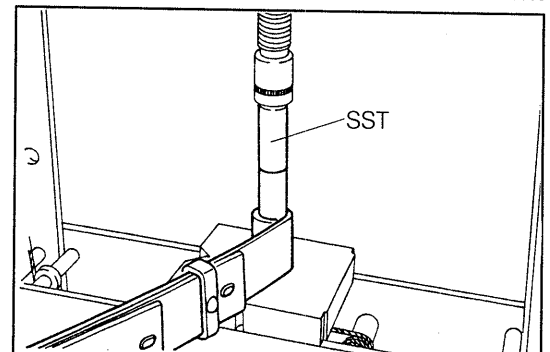
3. Apply a thin film of SUNPAR 150[®] to the bush at the vehicle outside. Install the bush to the shackle pin.



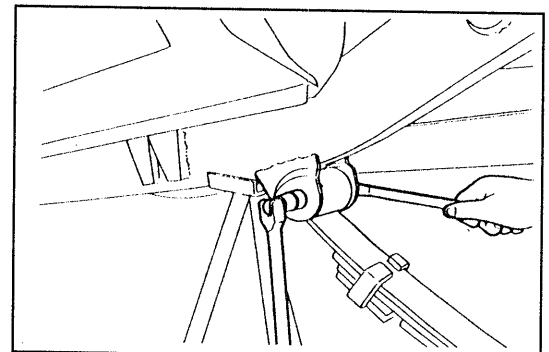
WRU90-RS029



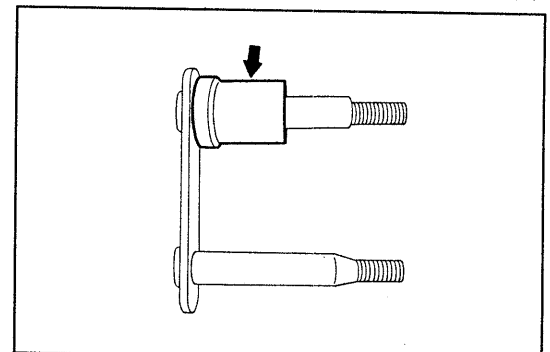
WRU90-RS030



WRU90-RS105



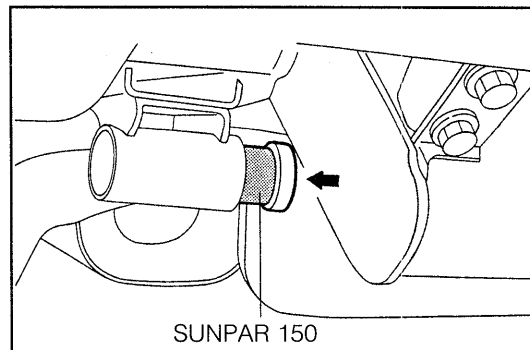
WRU90-RS031



WRU90-RS032

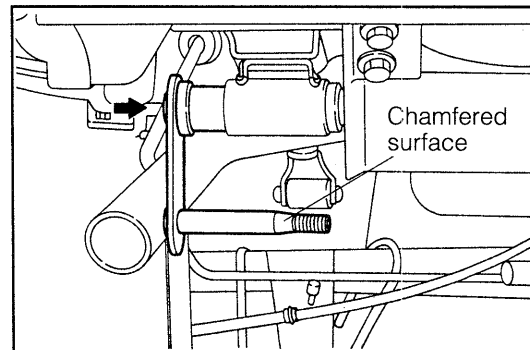
REAR AXLE & SUSPENSION

4. Apply a thin film of SUNPAR 150[®] to the bush at the vehicle inside. Install the bush to the frame.



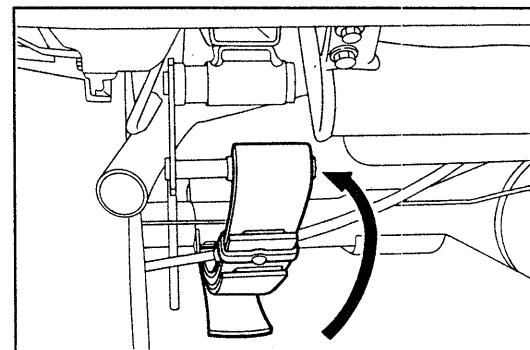
WRU90-RS033

5. Insert the shackle pin into the frame about halfway.



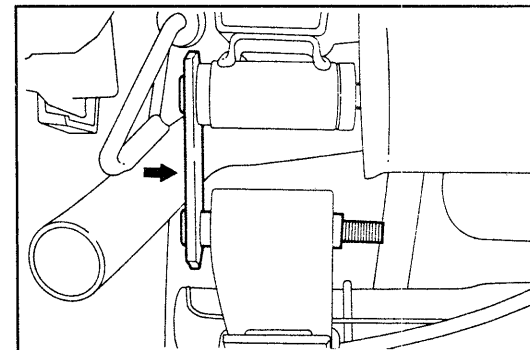
WRU90-RS034

6. Connect the leaf spring to the shackle pin.



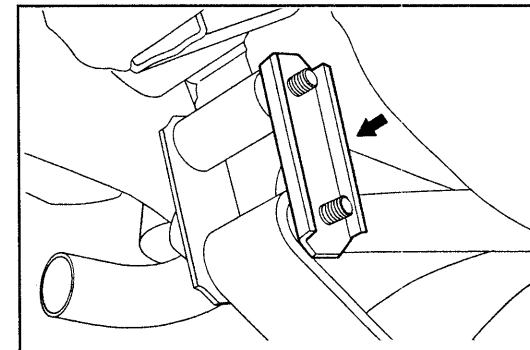
WRU90-RS035

7. Insert the shackle pin correctly.



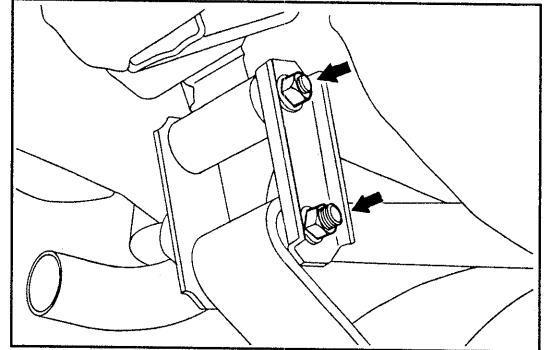
WRU90-RS036

8. Install the shackle pin bracket to the shackle pin.



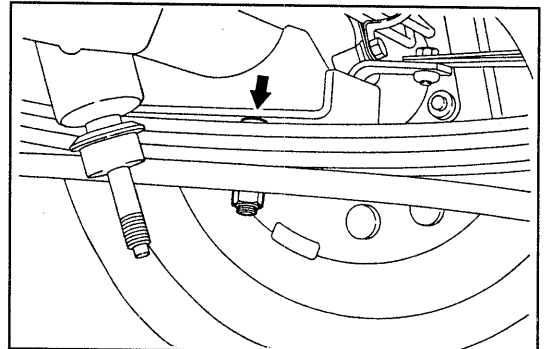
WRU90-RS037

9. Temporarily tighten the shackle pin bracket attaching nut with the new washer interposed.



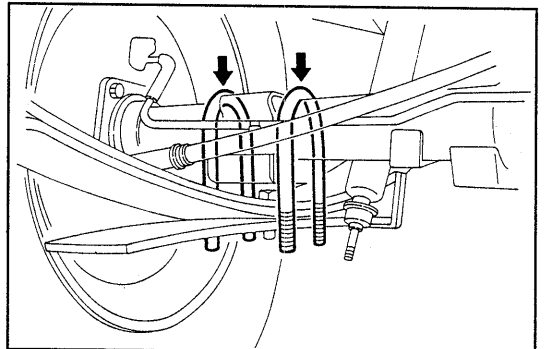
WRU90-RS038

10. Attach the bolt head of the leaf spring into the hole at the rear axle housing side.



WRU90-RS039

11. Install the U bolt to the rear axle housing.



WRU90-RS040

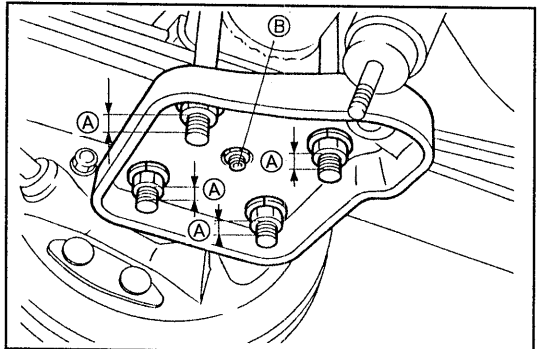
12. Install the spring U bolt seat. Connect the U bolt.
13. Tighten the spring U bolt seat attaching nuts with the new washers interposed. This tightening must be performed evenly over two or three stages to the specified torque in such a way that all the protruding amounts (dimension A) of the four bolts may become the same.

Tightening Torque:

9.0 - 11.0 kgf-m (65.1 - 80.0 ft-lb, 88.3 - 108 N-m)

NOTE:

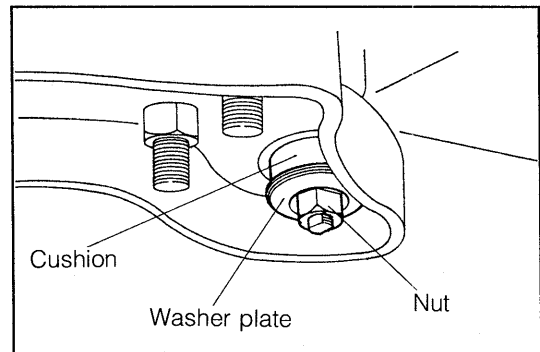
- When the U bolt is reused, make sure that the protruding dimension is virtually the same as the value which was measured during the disassembly.



WRU90-RS041

REAR AXLE & SUSPENSION

14. Connect the shock absorber to the spring/U bolt seat. Temporarily install the cushion, washer plate and nut.



WRU90-RS042

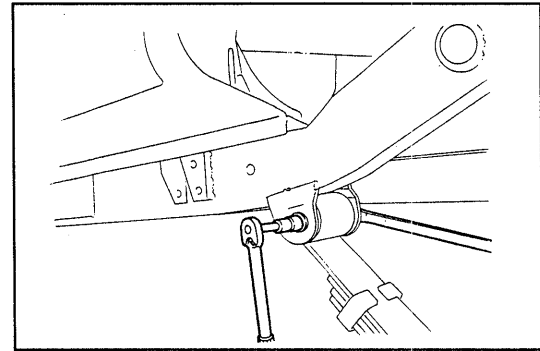
15. Jack down the vehicle.
16. Tighten the rear spring attaching bolt and nut at the front side to the specified torque.

Tightening Torque:

12.0 - 14.0 kgf-m (87.0 - 101 ft-lb, 118 - 137 N-m)

NOTE:

- Perform tightening under the no-loaded condition.



WRU90-RS043

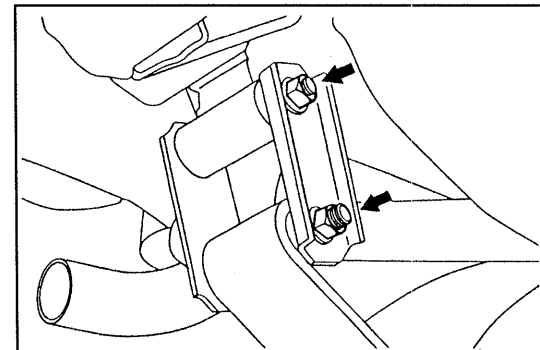
17. Tighten the rear spring shackle attaching nuts to the specified torque.

Tightening Torque:

7.0 - 9.0 kgf-m (50.6 - 65.1 ft-lb, 68.6 - 88.3 N-m)

NOTE:

- Perform tightening under the no-loaded condition.

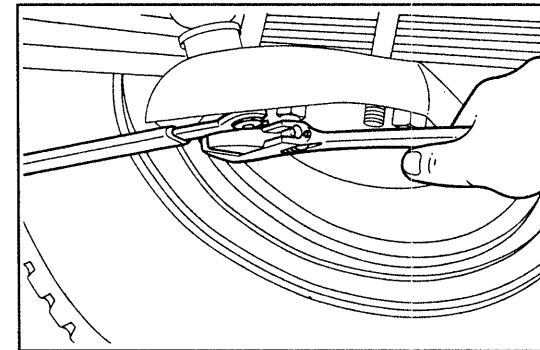


WRU90-RS044

18. Tighten the rear shock absorber attaching nut to the specified torque, while preventing the rear shock absorber from turning. For this operation, use the two-flat section provided at the rear shock absorber lower end.

Tightening Torque:

1.9 - 3.1 kgf-m (13.7 - 22.4 ft-lb, 18.6 - 30.4 N-m)

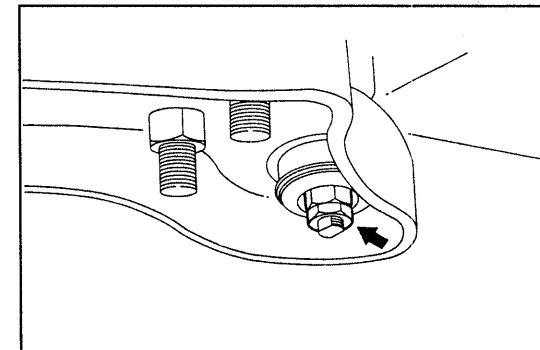


WRU90-RS045

19. Install the lock nut of the rear shock absorber attaching nut. Tighten the nut to the specified torque so as to lock it.

Tightening Torque:

1.9 - 3.1 kgf-m (13.7 - 22.4 ft-lb, 18.6 - 30.4 N-m)

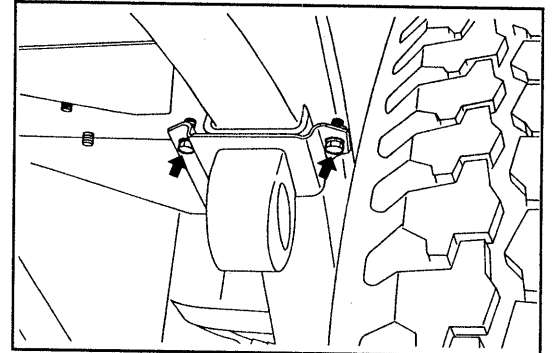


WRU90-RS046

20. Install the rear spring bumper. Tighten the attaching bolts to the specified torque.

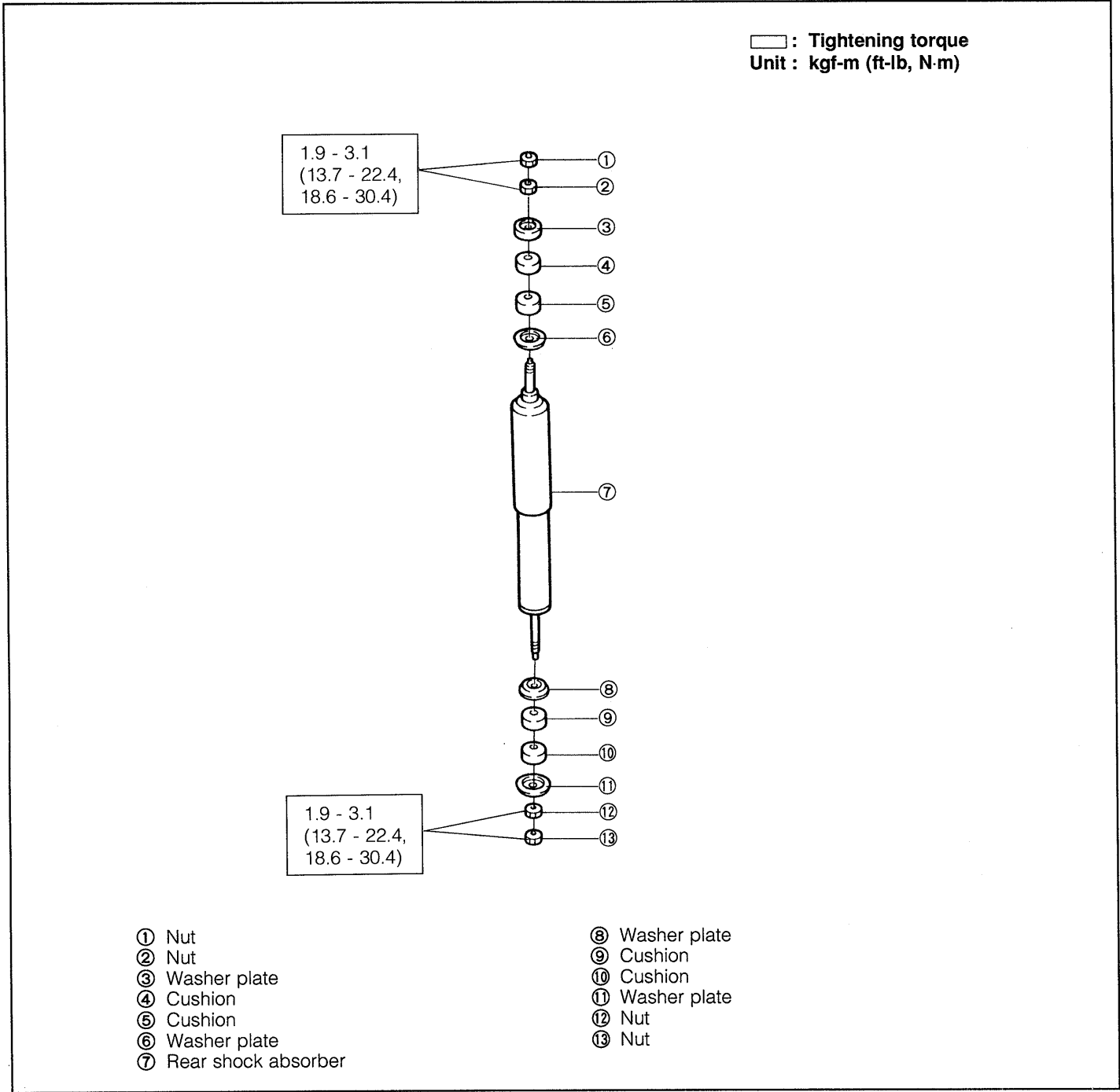
Tightening Torque:

1.5 - 2.2 kgf-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)



WRU90-RS106

REAR SHOCK ABSORBER
COMPONENTS



WRU90-RS047

TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Abnormal noise Oil leakage	Oil leakage at shock absorber Poor oil seal of shock absorber	Check shock absorber. Check shock absorber.

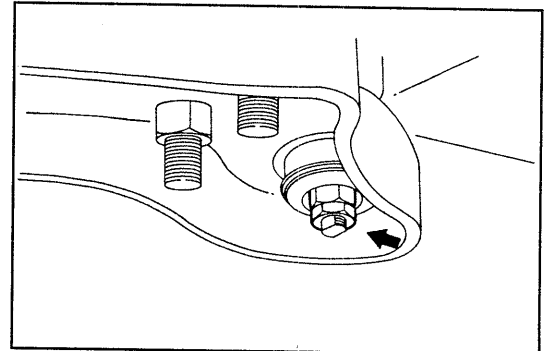
WRU90-RS048

- CAUTION:
- When discarding the rear shock absorber, prior to disposal be sure to release the filled gas.

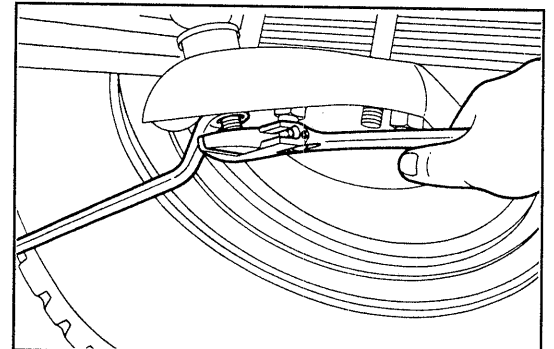
WRU90-RS107

REMOVAL

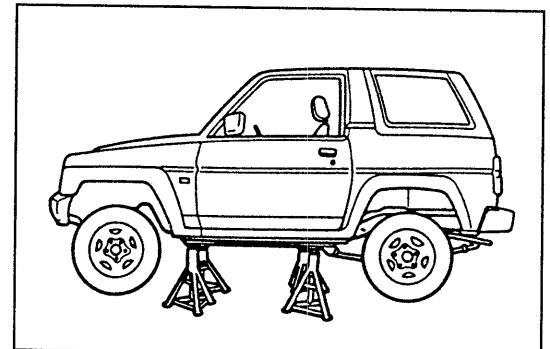
1. Loosen the lock nut provided at the lower side of the lower connecting section of the rear shock absorber.
2. Remove the attaching nut while preventing the rear shock absorber from turning at the two flat section at the lower section of the rear shock absorber. Remove the washer plate and cushion.
3. Jack up the vehicle and support it with safety stands. (See GI section.)
4. Loosen the lock nut provided at the upper side of the upper connecting section of the rear shock absorber.
5. Remove the attaching nut while preventing the rear shock absorber from turning. For this operation, use the two-flat section provided at the top of the rear shock absorber. Remove the washer plate and cushion.
6. Remove the rear shock absorber.



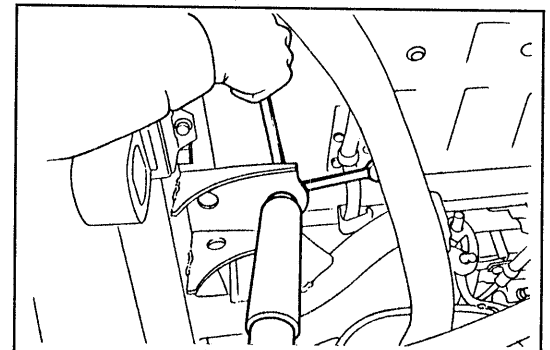
WRU90-RS049



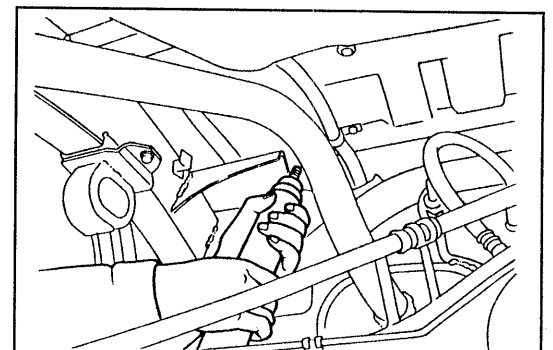
WRU90-RS050



WRU90-RS051



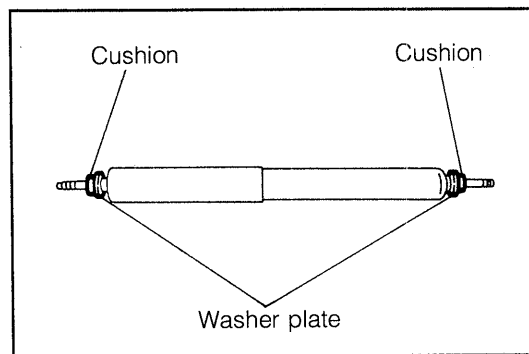
WRU90-RS052



WRU90-RS053

REAR AXLE & SUSPENSION

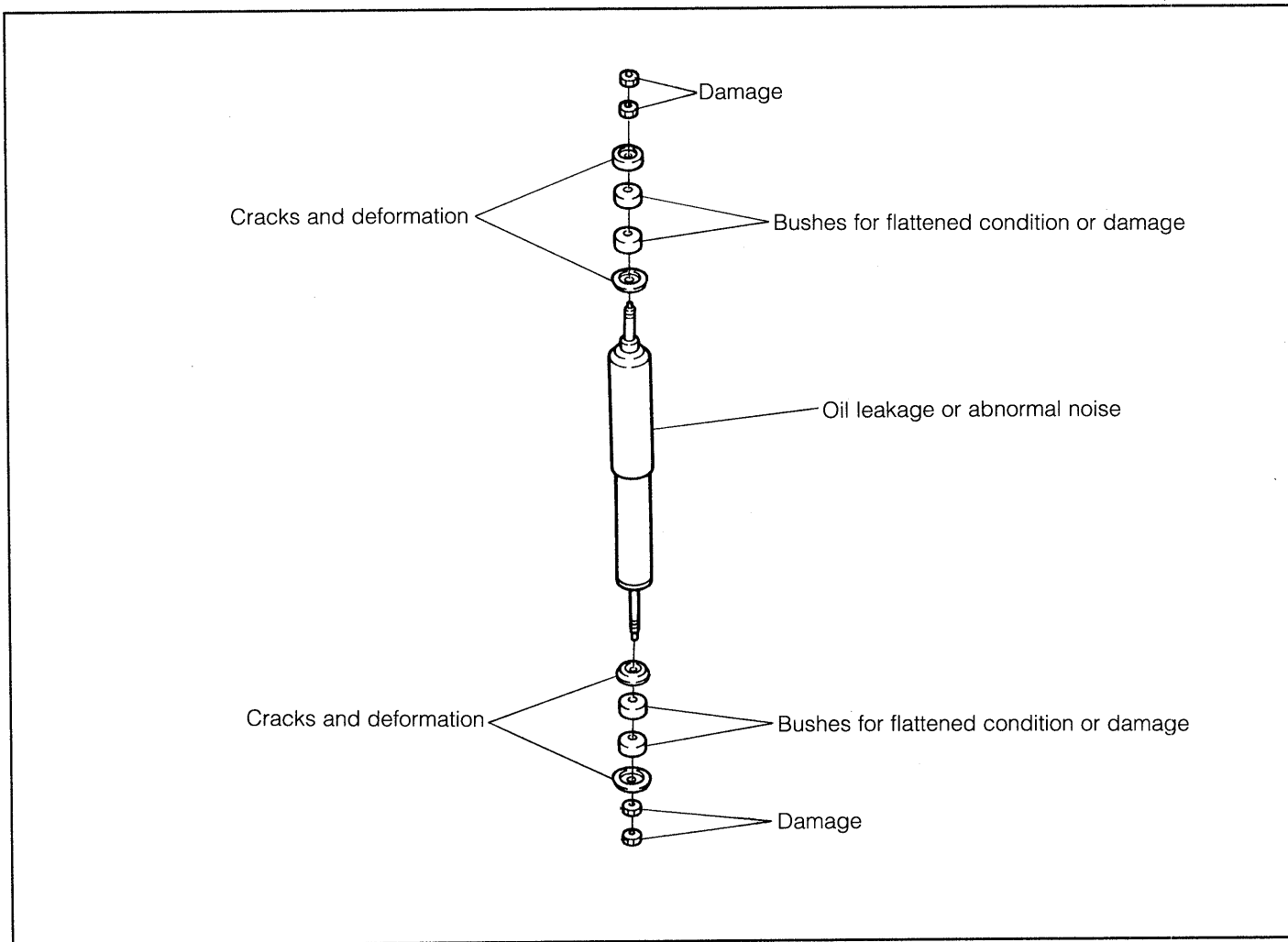
7. Remove the cushions and washer plates from the rear shock absorber.



WRU90-RS054

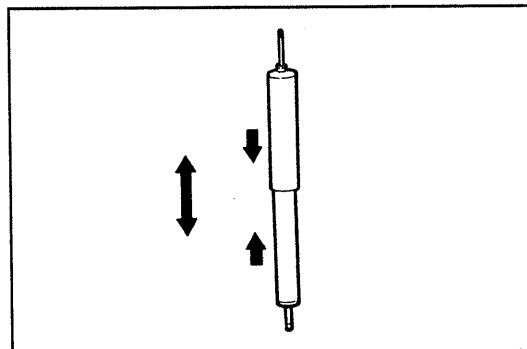
INSPECTION

1. Inspect each section in the figure below. Replace any defective parts.



WRU90-RS055

2. Check of shock absorber
Ensure that the shock absorber can be contracted slowly when it is compressed. Also, ensure that the shock absorber can extend slowly and smoothly when it is extended.



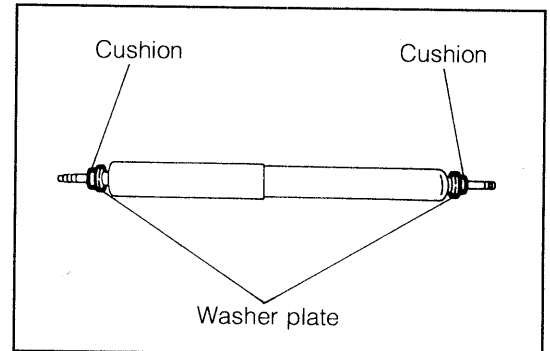
WRU90-RS056

INSTALLATION

1. Install the washer plates and cushions to the shock absorber.

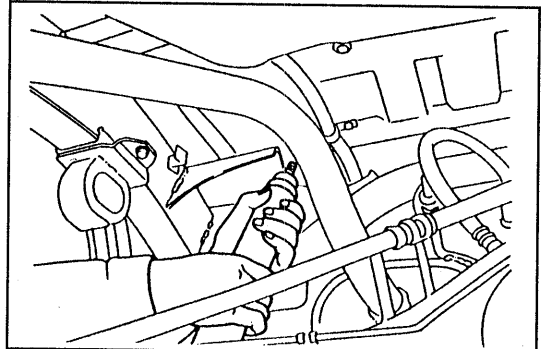
NOTE:

- Install the washer plate so that the recessed surface may come at the cushion side.



WRU90-RS057

2. Install the rear shock absorber, while contracting it.



WRU90-RS058

3. Install the cushions and washer plates to the upper and lower sections of the rear shock absorber. Install the attaching nut.
4. Tighten the attaching nuts, while preventing the rear shock absorber from turning. For this operation, use the two flat sections provided at the top and lower sections of the rear shock absorbers.

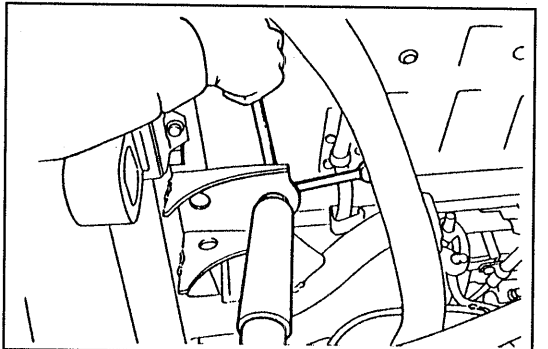
Tightening Torque:

1.9 - 3.1 kgf-m (13.7 - 22.4 ft-lb, 18.6 - 30.4 N·m)

5. Install and tighten the lock nut of the attaching nut at the rear shock absorber upper end.

Tightening Torque:

1.9 - 3.1 kgf-m (13.7 - 22.4 ft-lb, 18.6 - 30.4 N·m)



WRU90-RS059

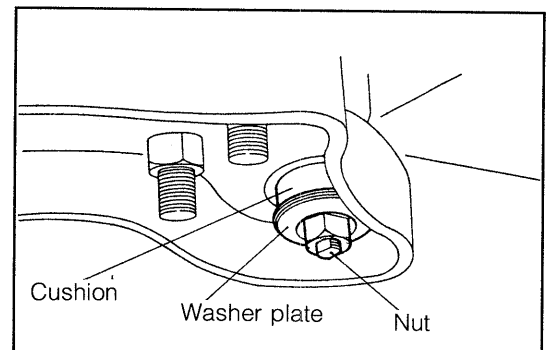
6. Jack down the vehicle.

NOTE:

- Be very carefull not to damage the shock absorber.

WRU90-RS060

7. Install the cushion, washer plate and nut to the attaching bolt section at the rear shock absorber lower end.



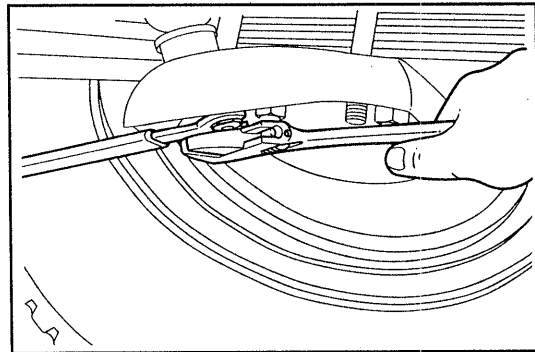
WRU90-RS061

REAR AXLE & SUSPENSION

8. Tighten the attaching nut to the specified torque, while preventing the rear shock absorber from turning. For this operation, use the two-flat section provided at the rear shock absorber lower end.

Tightening Torque:

1.9 - 3.1 kgf-m (13.7 - 22.4 ft-lb, 18.6 - 30.4 N·m)

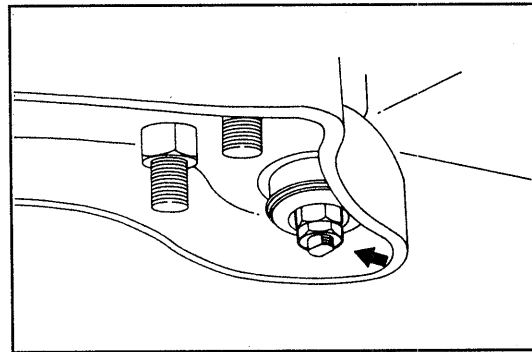


WRU90-RS062

9. Install and tighten the lock nut of the attaching nut at the rear shock absorber lower end.

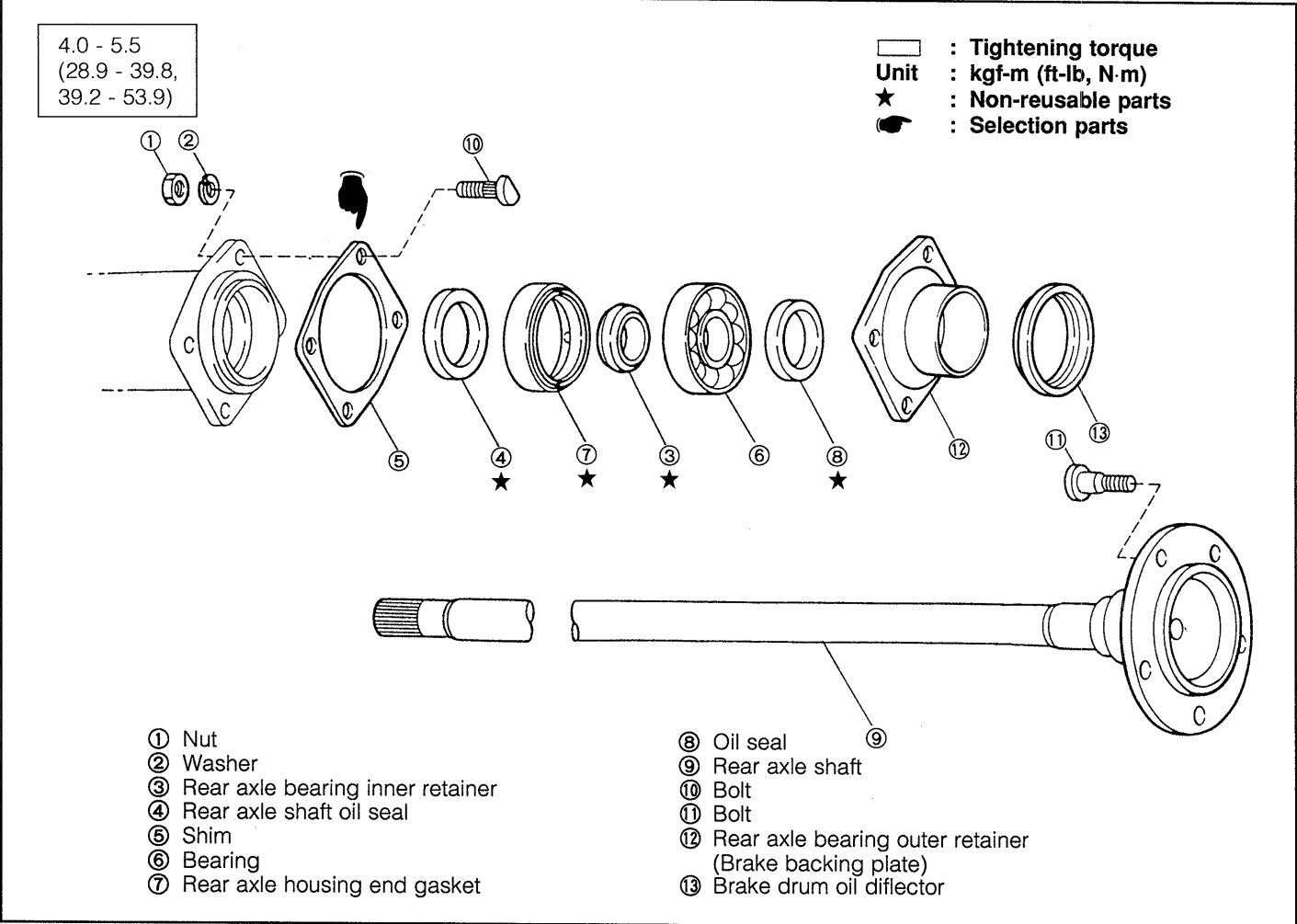
Tightening Torque:

1.9 - 3.1 kgf-m (13.7 - 22.4 ft-lb, 18.6 - 30.4 N·m)



WRU90-RS063

REAR AXLE SHAFT
COMPONENTS



TROUBLE SHOOTING

WRU90-RS064

Symptom	Possible causes	Checking points
Abnormal noise	Bearing damaged Bearing improperly lubricated	Check bearings.
Oil leakage	Oil seals damaged Oil seals improperly installed	Check oil seals.

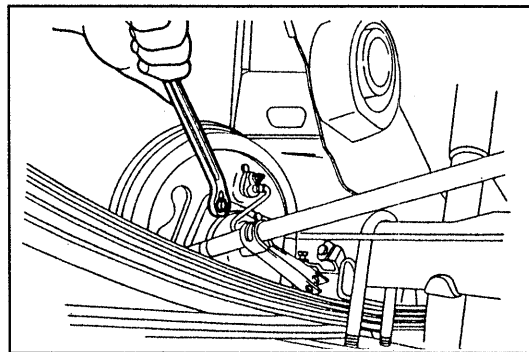
WRU90-RS065

REMOVAL

1. Disassemble the rear brake.
(For details, see the Brake section.)

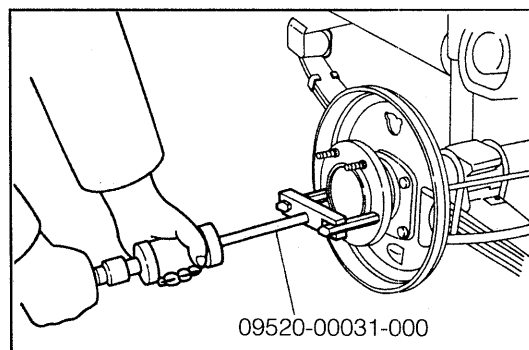
WRU90-RS066

2. Remove the attaching nuts of the backing plate from the rear axle housing.



WRU90-RS067

3. Remove the rear axle shaft, using the following SST.
SST: 09308-00031-000

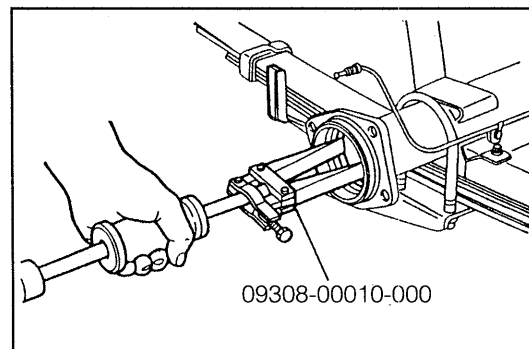


WRU90-RS068

4. Remove the oil seal, using the following SST.
SST: 09520-00010-000

NOTE:

- Never reuse the oil seal.

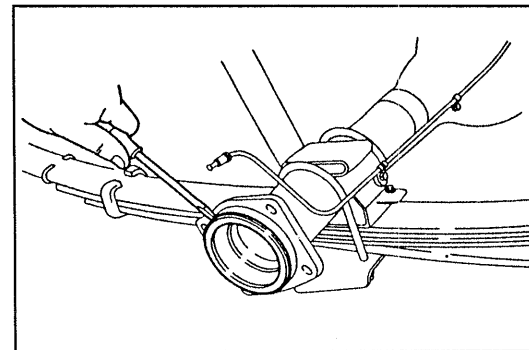


WRU90-RS069

5. Remove the oil seal, using a screwdriver or the like.

NOTE:

- Never reuse the gasket.



WRU90-RS070

DISASSEMBLY

1. Grind off the retainer, using a hand grinder.

WARNING:
Observe the operating instructions of the hand grinder.
Also, be sure to wear goggles during the grinding.

NOTE:

- Do not grind the rear axle shaft.

2. Split the retainer with a chisel.

WARNING:
Be sure to wear a pair of gloves and goggles during the operation.

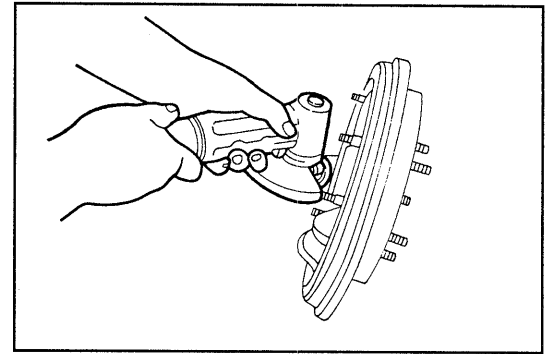
3. Remove the retainer and bearing, using the following SSTs in combination with a socket wrench.

SST: 09520-87603-000

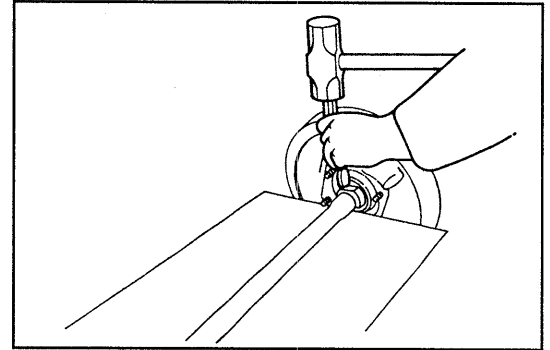
SST: 09956-00010-000

4. Remove the backing plate from the rear axle shaft.

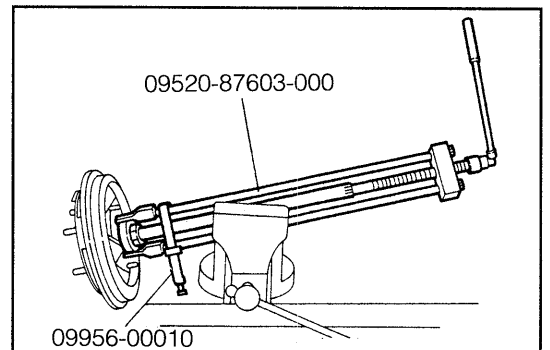
5. Remove the shim from the backing plate.



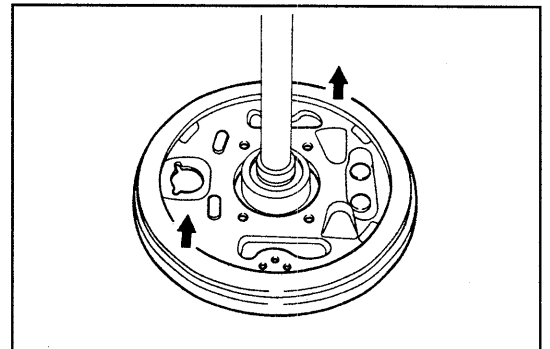
WRU90-RS071



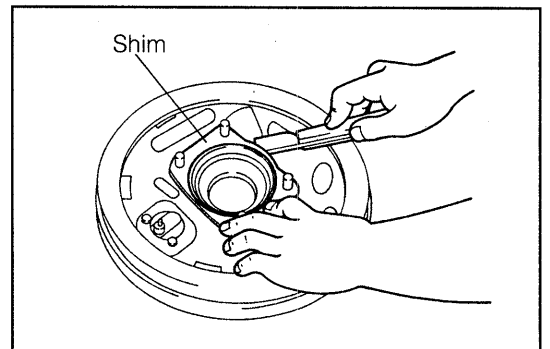
WRU90-RS072



WRU90-RS073



WRU90-RS074



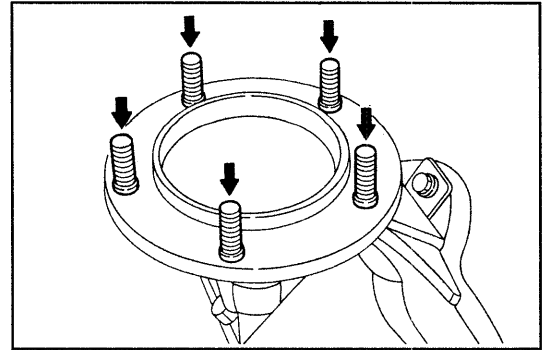
WRU90-RS075

REAR AXLE & SUSPENSION

6. Drive off the hub bolt from the rear axle shaft with a plastic hammer or the like.

NOTE:

- Be very careful not to damage the screw section.

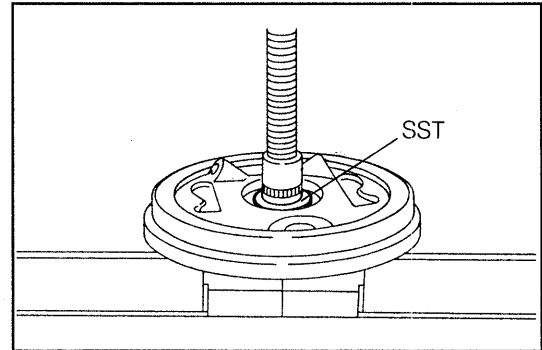


7. Remove the oil seal from the backing plate using the following SST in combination with a hydraulic press.

SST: 09608-87604-000

NOTE:

- Be sure to use the flat surface of the SST.



INSPECTION

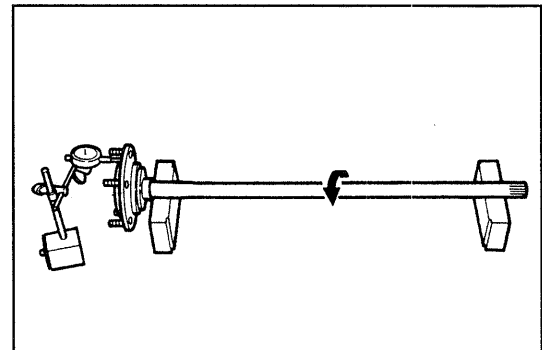
1. Rear axle shaft

- 1) Place the rear axle shaft on a "V" block. Ensure that the runout at the flange end surface is within the allowable limit.

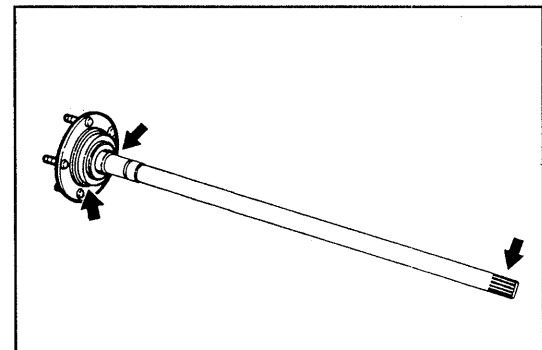
Maximum Allowable Runout: 0.15 mm (0.0059 inch)

NOTE:

- This maximum allowable runout does not include the runout caused by roughness on the flange surface.
- If the flange surface exhibits roughness, finish the surface with abrasive paper or the like.



- 2) Ensure that the rear axle shaft spline section exhibits no damage, such as cracks and wear. If any damage exists, replace the rear axle shaft.
- 3) Ensure that the oil seal contact surface of the rear axle shaft exhibits no damage, such as cracks, scores and/or rust. If any damage exists, replace the rear axle shaft.
- 4) Ensure that the oil deflector exhibits no damage, such as deformation. If any damage exists, replace the rear axle shaft.



2. Backing plate
Ensure that the backing plate exhibits no damage such as cracks, scores, rust and deformation.
If any damage exists, replace the backing plate.

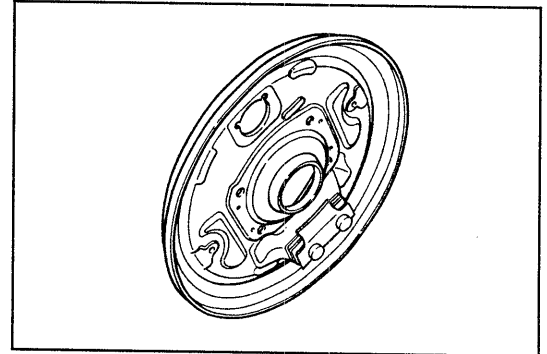
ASSEMBLY

1. Pack the back side of the lip section of the oil seal with specified amount of lithium-based MP grease.
Specified Amount: 5 grams (0.18 oz)
Specified Grease: Lithium-based MP grease
2. Apply a thin film of lithium-based MP grease to the lip surface of the oil seal.
3. Drive the oil seal from the brake shoe attaching surface of the backing plate up to the wheel end surface of the backing plate, using the following SST.
SST: 09608-87606-000
09611-87506-000

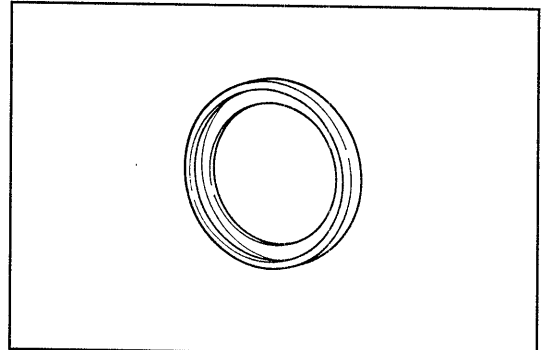
NOTE:

- At this time, the oil seal should be installed in such a direction that the rear axle bearing attaching surface comes at the inner side.
- Be very careful not to allow the oil seal to tilt.
- Install the oil seal so that its surface may come at the brake shoe side.

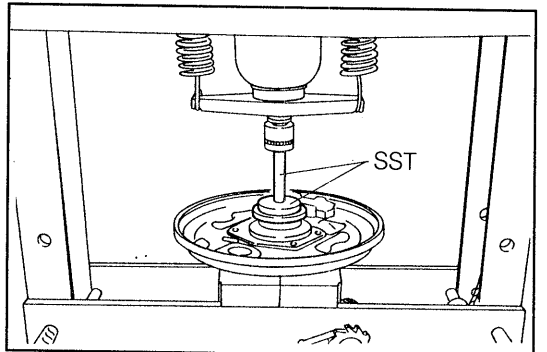
4. Drive the serration bolt into the backing plate with the cut-out section of the serration bolt aligned with the backing plate.



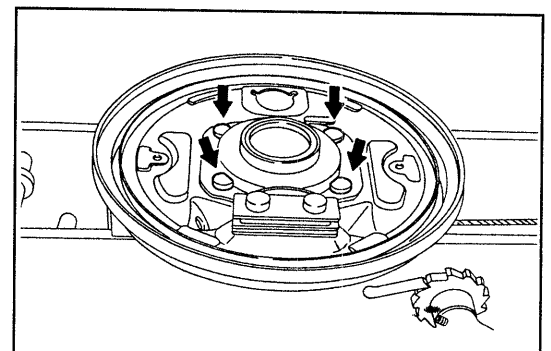
WRU90-RS080



WRU90-RS081



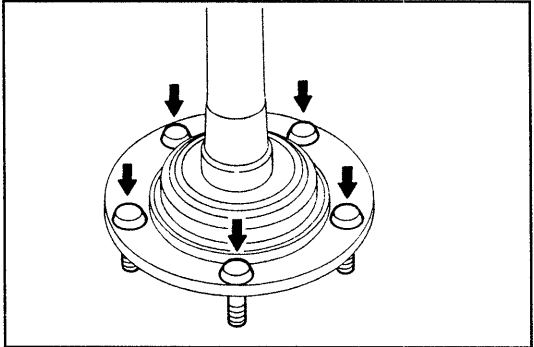
WRU90-RS082



WRU90-RS083

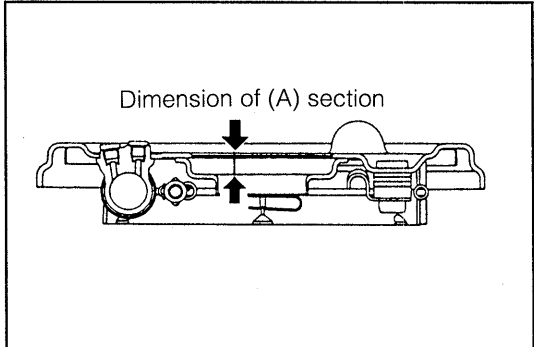
REAR AXLE & SUSPENSION

5. Drive the hub bolt into the rear axle shaft with the cut-out section of the hub bolt aligned to the rear axle shaft.



WRU90-RS084

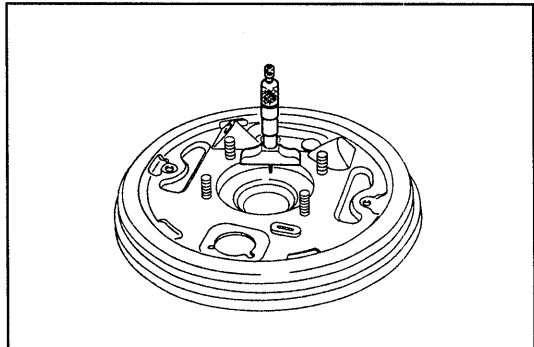
6. Selection of shim
1) Measure the dimension A of the backing plate at four points which are diagonally opposite with each other.



WRU90-RS085

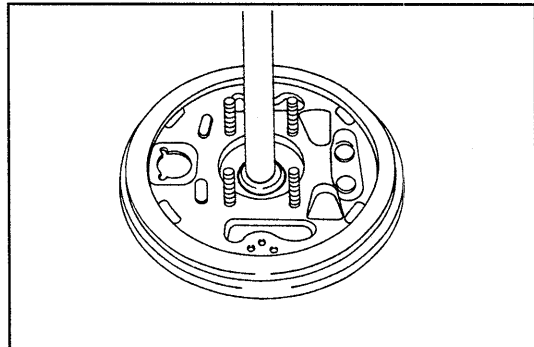
2) Calculate the mean value of the measured four dimensions. Select a shim which corresponds to the calculated value, referring to the table below.

mm (inch)	
Dimension A of backing plate	Suitable thickness of adjusting shim
14.4 - 14.65 (0.567 - 0.576)	0.50 (0.020)
14.66 - 14.90 (0.577 - 0.587)	0.25 (0.0098)



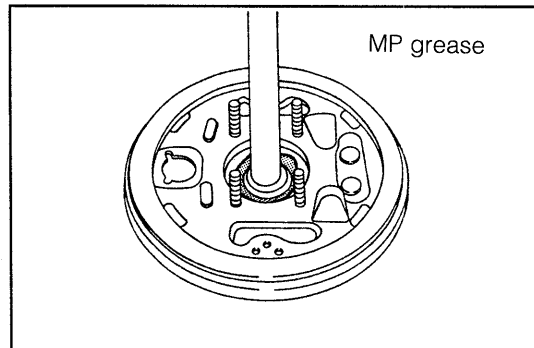
WRU90-RS086

7. Install the backing plate to the rear axle shaft.
NOTE:
• Be very careful not to damage the oil seal during the installation.



WRU90-RS087

8. Pack the back surface of the oil seal with 5 grams (0.18 oz) of lithium-based MP grease.

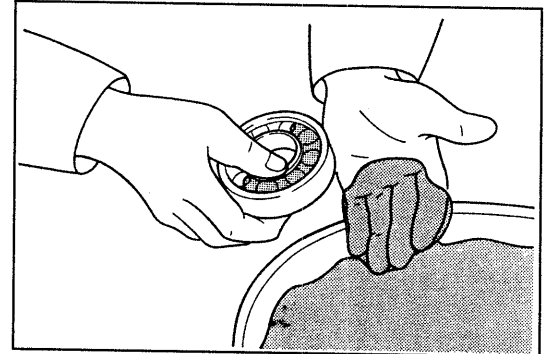


WRU90-RS088

9. Pack the rear axle bearing with lithium-based MP grease.

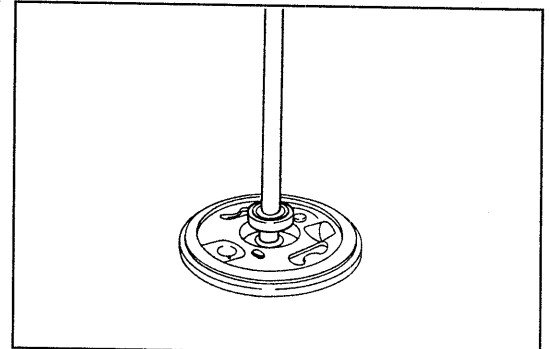
NOTE:

- Grease should not be applied only to the surface. After packing the bearing with grease, apply grease also to the surface.



WRU90-RS089

10. Install the rear axle bearing to the rear axle shaft.



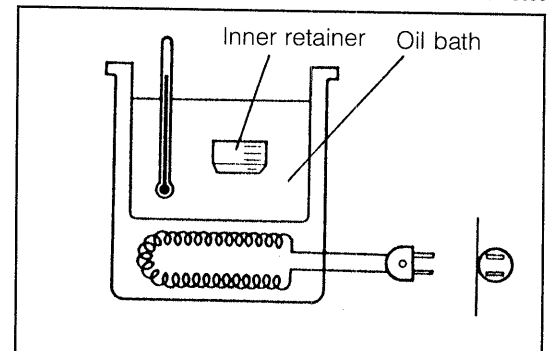
WRU90-RS090

11. Installation of rear axle bearing retainer

NOTE:

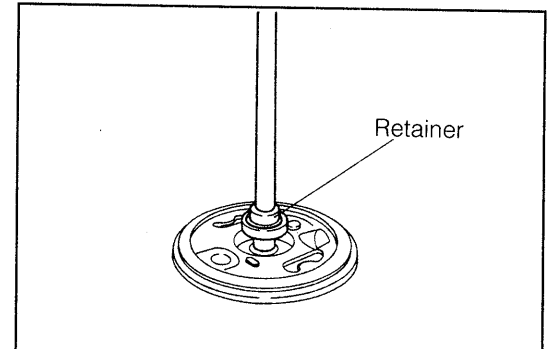
- Perform this operation promptly before the retainer temperature drops.

- 1) Heat the retainer to about $150 \pm 15^{\circ}\text{C}$ ($302 \pm 27^{\circ}\text{F}$).



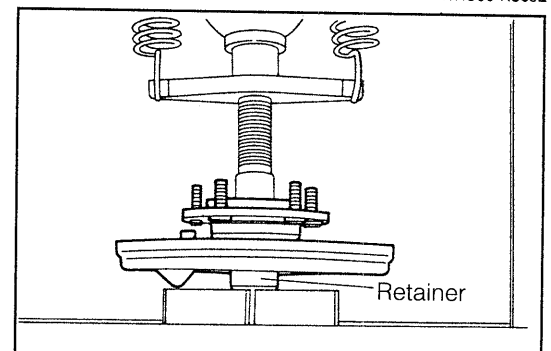
WRU90-RS091

- 2) Install the retainer to the rear axle shaft.



WRU90-RS092

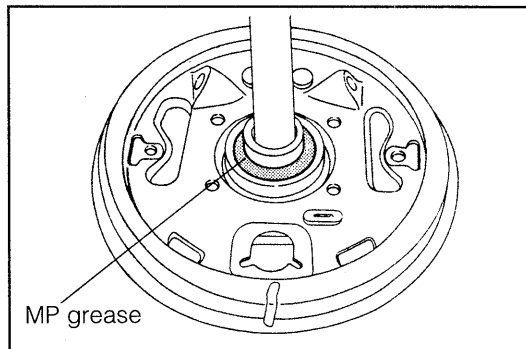
- 3) Press the retainer into the rear axle shaft, using a hydraulic press.



WRU90-RS093

REAR AXLE & SUSPENSION

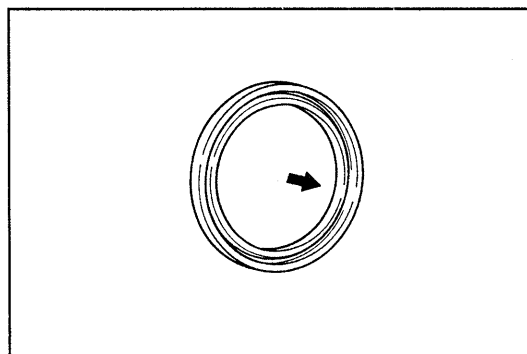
12. Apply 5 grams (0.18 oz) of lithium-based MP grease between the retainer and the bearing.



WRU90-RS094

INSTALLATION

1. Apply lithium-based MP grease to the lip section of the oil seal.



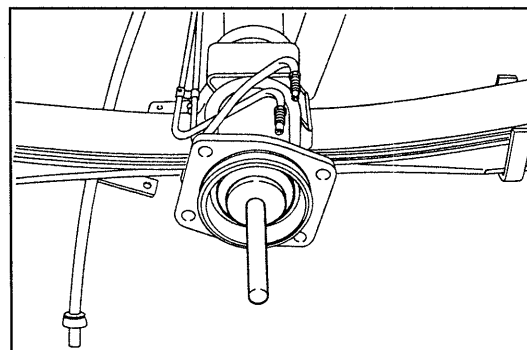
WRU90-RS095

2. Press the oil seal into the rear axle housing, using the following SSTs.

SST: 09608-87606-000
09611-87506-000

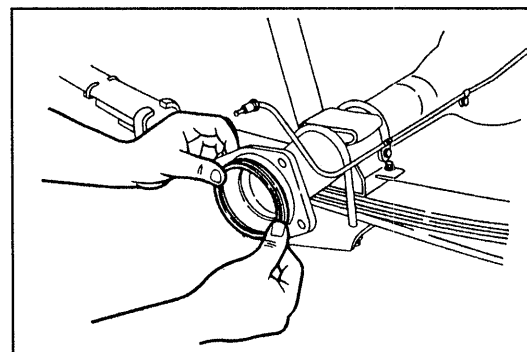
NOTE:

- Care must be exercised not to allow the oil seal to be tilted.
- The oil seal should be installed in such a way that the surface comes at the wheel side.



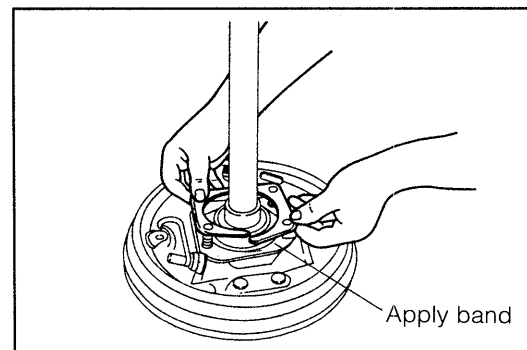
WRU90-RS096

3. Install the gasket to the rear axle housing.



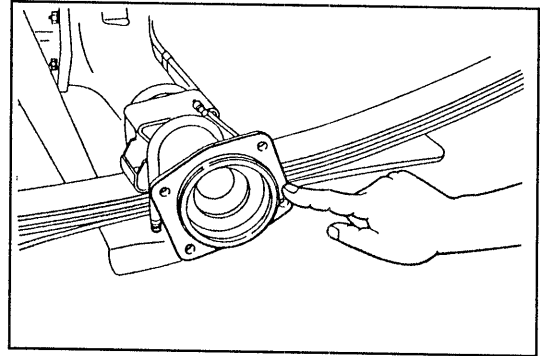
WRU90-RS097

4. Apply a thin film of Three Bond 1104® to the shim contact surface of the backing plate. Install the selected shim (at page RS-28) to the backing plate.



WRU90-RS098

5. Apply a thin film of Three Bond 1104® to the backing plate installing surface of the axle housing.

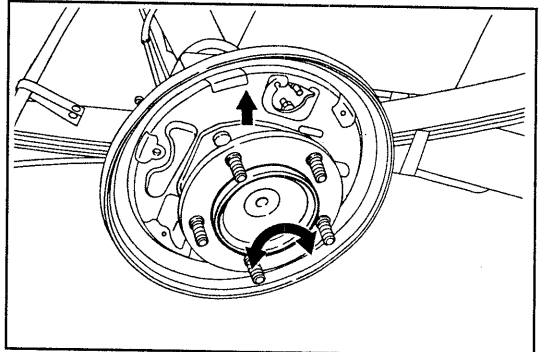


WRU90-RS099

6. Insert the rear axle shaft into the rear axle housing. Install the backing plate to the rear axle in such a way that the attaching bolt of the backing plate is aligned with the attaching hole of the rear axle housing and that the wheel cylinder installing hole of the backing plate comes at the upper side.

NOTE:

- 1) Turn the axle shaft so that the spline at the differential side may engage with the spline at the axle shaft side.
- 2) Be very careful not to damage the oil seals.

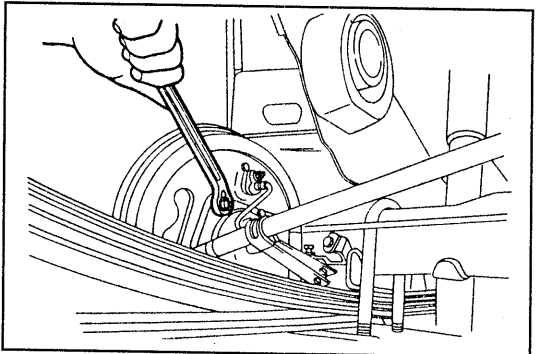


WRU90-RS100

7. Attach the backing plate attaching nuts and tighten them to the specified torque evenly over two or three stages.

Tightening Torque:

4.0 - 5.5 kgf-m (28.9 - 39.8 ft-lb, 39.2 - 53.9 N·m)



WRU90-RS101

8. Install the rear brake.
(For details, see the Brake section.)

WRU90-RS102

DAIHATSU

Rocky

BRAKE SYSTEM

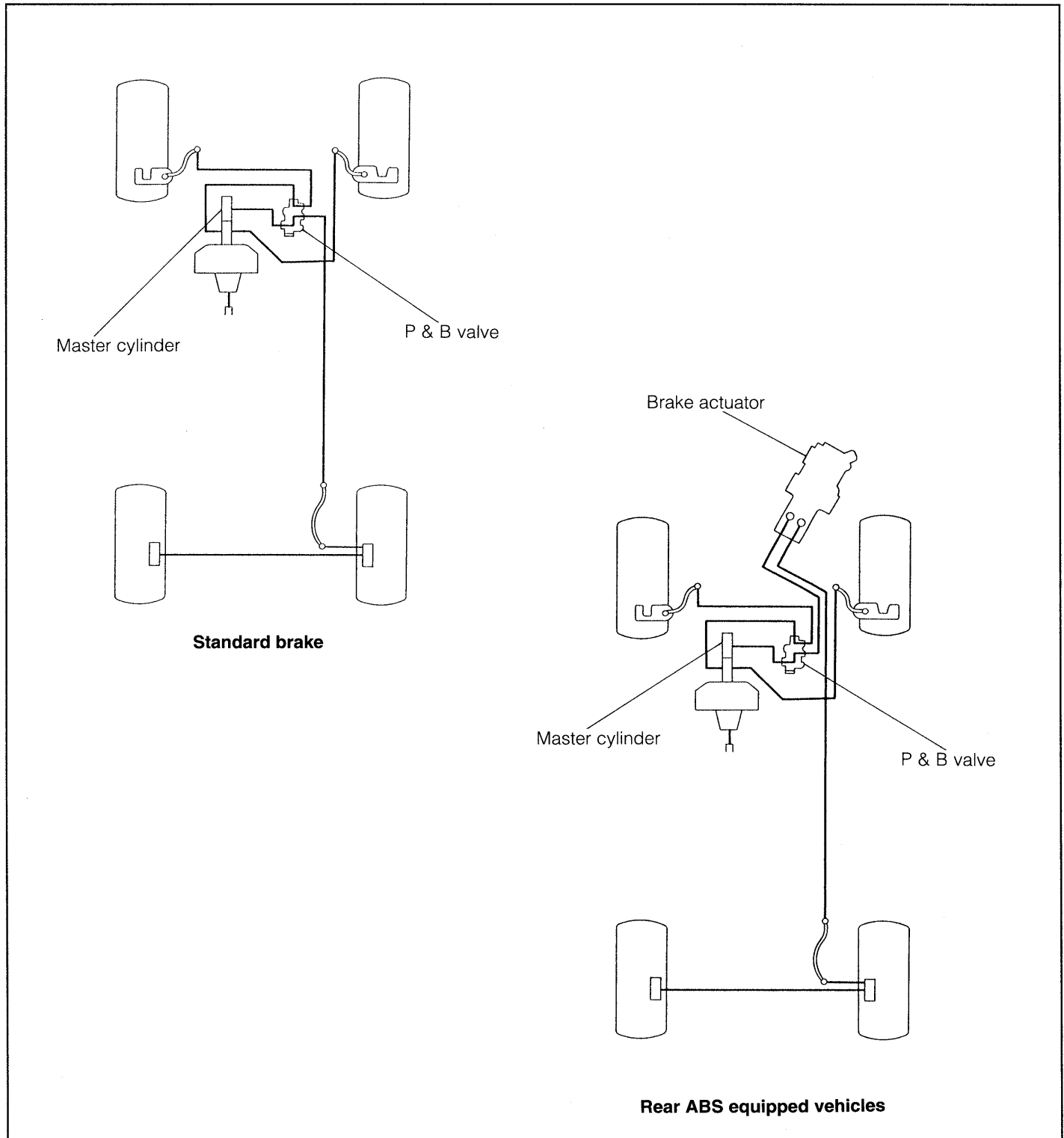
OUTLINE OF BRAKE SYSTEM	BR- 2
CHECK OF BRAKE SYSTEM	BR-15
BRAKE PEDAL	BR-20
FRONT BRAKE	BR-26
REAR BRAKE	BR-39
BRAKE MASTER CYLINDER	BR-53
BRAKE BOOSTER	BR-61
PARKING BRAKE	BR-79
P & B VALVE (PROPORTIONING AND BY-PASS VALVE)	BR-87

WRU92-BR577

BR

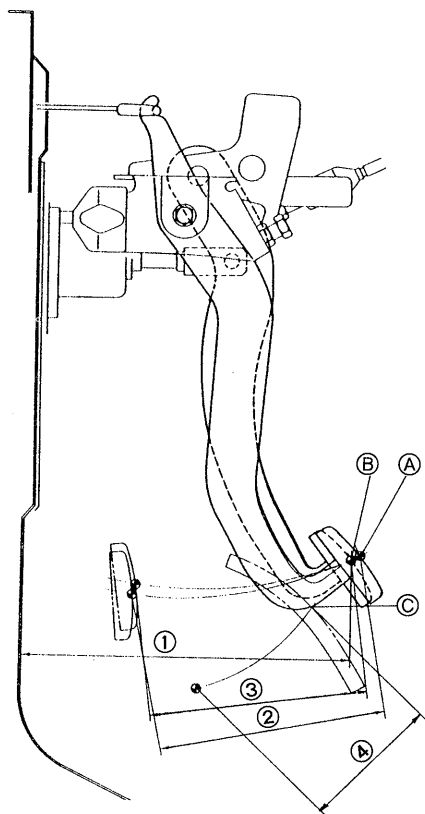
OUTLINE OF BRAKE SYSTEM

1. The brake line employs a conventional piping.
The brake tube is a double winding steel tube. As corrosion preventive measures, galvanizing plus fluoridate resin coating is applied to the outside of the brake tube.
The brake line comes in two kinds: One is for those vehicles equipped with the standard brake and the other is for those vehicles equipped with the Rear ABS.
2. On the Full-time 4WD vehicle, the rear-ABS is available as optional equipment. This system prevents the rear wheels from being locked in the event of hard braking application by controlling the hydraulic pressure applied to the wheel cylinders of the rear wheels.



PEDALS

All the operating pedals, such as the clutch pedal, accelerator pedal and brake pedal, adopt a hanging type whose pedal fulcrum is provided at the pedal support located upward of each pedal.



- (A) Clutch pedal
- (B) Brake pedal
- (C) Accelerator pedal
- ① Pedal installation height
- ② Clutch pedal stroke
- ③ Brake pedal stroke
- ④ Accelerator pedal stroke

Pedal-related specifications

WRU90-BR003

mm (inch)

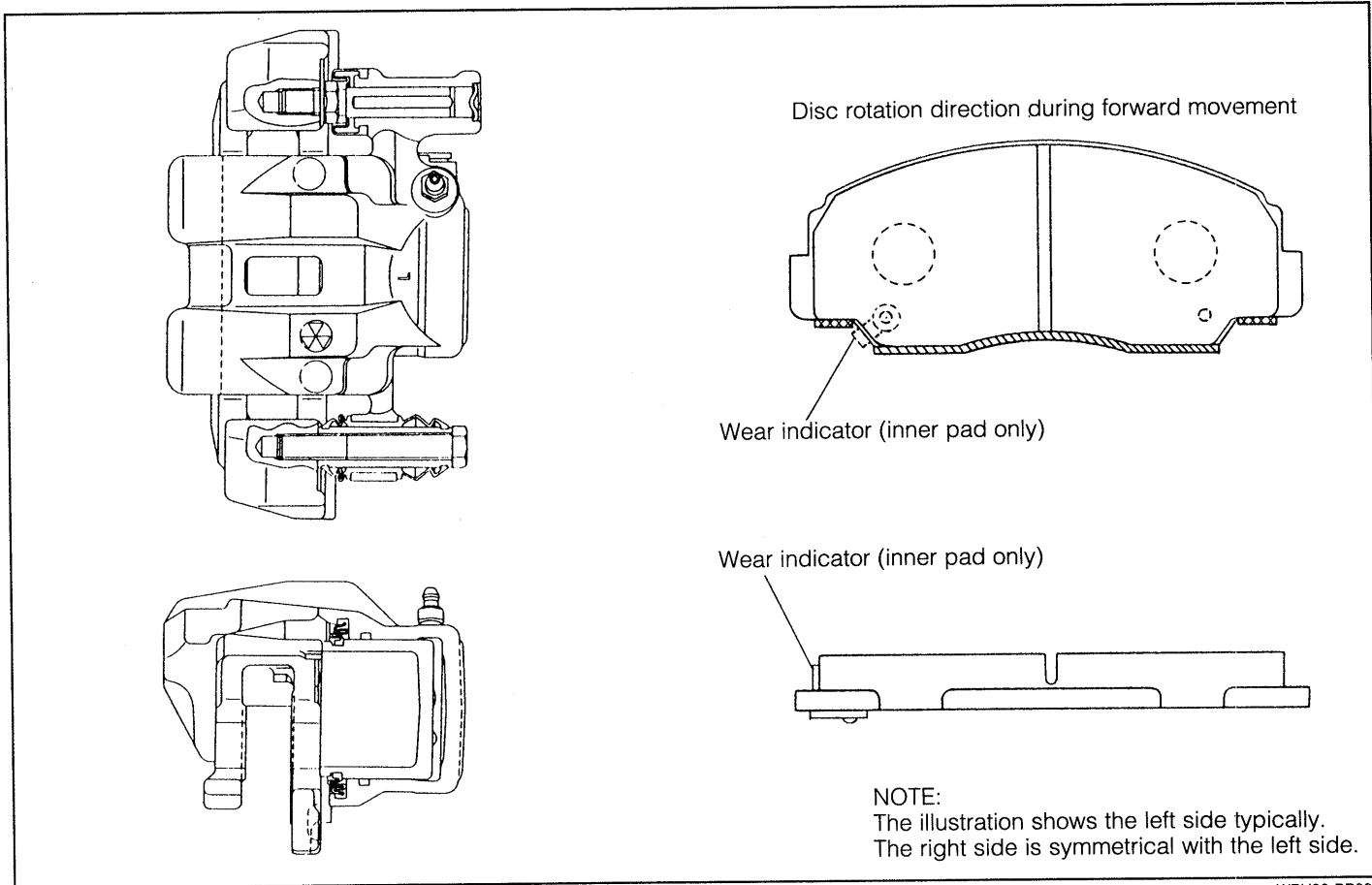
Pedal installation height	Clutch	219 - 227 (8.622 - 8.937)	Measured with dash board vertical wall as reference. Measured from dash board steel sheet with silencer turned over.
	Brake	211 - 221 (8.307 - 8.701)	
Stroke	Clutch	148 - 156 (5.827 - 6.142)	(Accelerator pedal) Adjust in such a way that stopper bolt-to-pedal stopper clearance becomes 0 to 3 mm (0 to 0.118 inch) when throttle valve is opened fully.
	Brake	138 - 148 (5.433 - 5.827)	
	Accelerator	58 - 62 (2.283 - 2.441)	
Pedal free travel	Clutch	18 - 27 (0.709 - 1.063)	(Brake pedal) With engine stopped, depress brake pedal strongly several times so that vacuum no longer exists inside brake booster. Measure free travel by pushing pedal lightly with your finger.
	Brake	1 - 3 (0.034 - 0.118)	
	Accelerator	1 - 5 (0.039 - 0.197)	

WRU90-BR004

BRAKE SYSTEM

FRONT BRAKE CALIPERS

For stable braking forces during high-speed running, the disc brake is standard equipment on all models. The brake pad material employs non-asbestos. Furthermore, the brake disc pad has a wear indicator which tells the driver the pad needs replacement (when the remaining thickness of the pad becomes less than 1.5 mm (0.06 inch)).



WRU90-BR005

Disc brake pad specifications

Pad thickness	mm (inch)	9 (0.345)
Lining area	cm ² (inch ²)	48.6 (313.6)
Materials	AK NS101 (Asbestos-free)	

WRU90-BR006

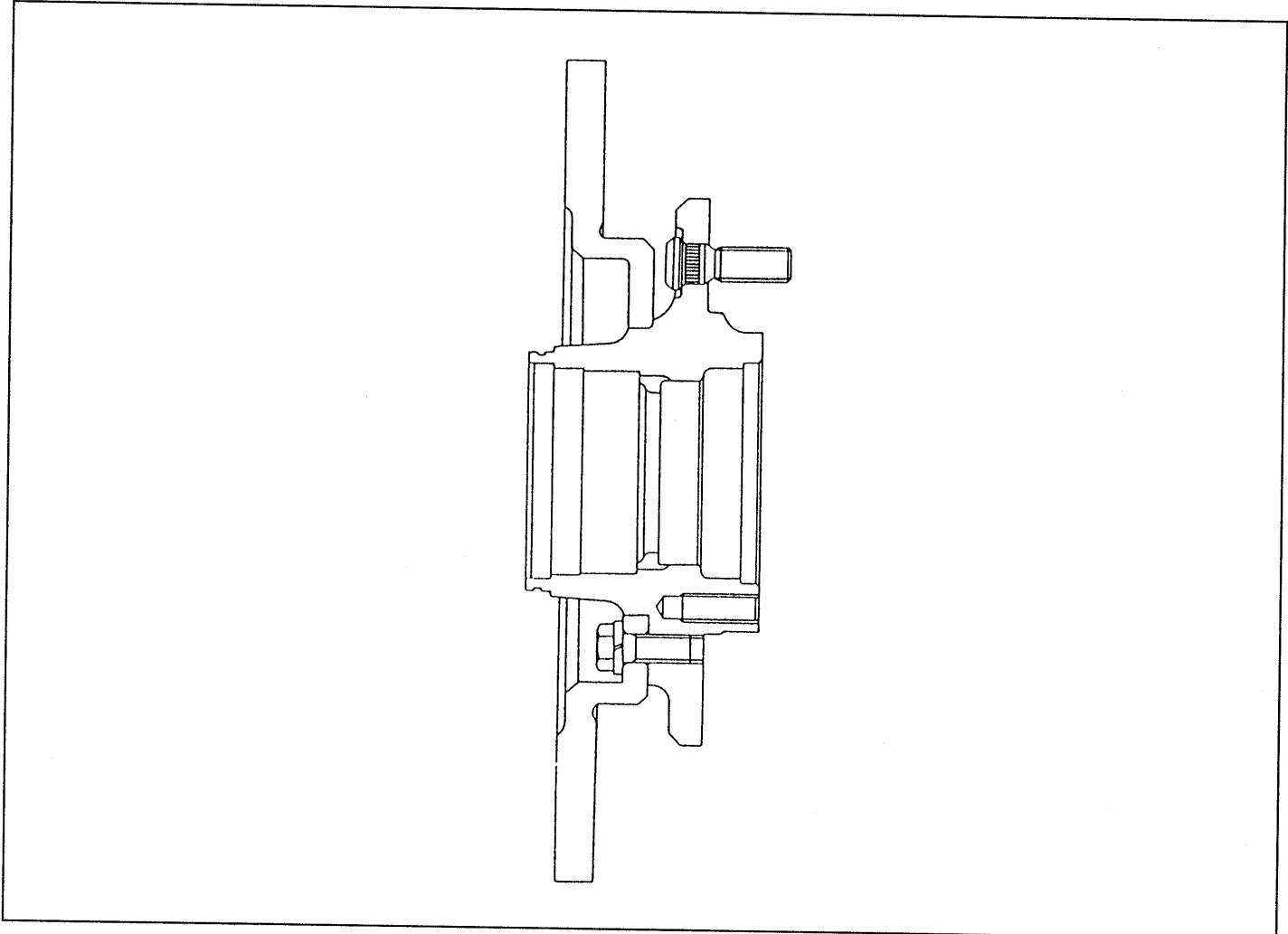
Front brake caliper specifications

Cylinder	Diameter	mm (inch)	53.97 (2.125)
	Area	cm ² (inch ²)	22.89 (3.548)
Brake effective radius		mm (inch)	R115 (R4.528)
Pad	Thickness	mm (inch)	9 (0.354)
	Area	cm ² (inch ²)	48.6 (313.6)
	Materials	AK NS101 (Asbestos-free)	

WRU90-BR007

FRONT DISC ROTORS

The front disc rotor employs a solid type disc rotor on all models.



WRU90-BR008

Front disc rotor specifications

Disc rotor outer diameter	mm (inch)	277 (10.905)
Disc rotor thickness	mm (inch)	12.5 (0.49)

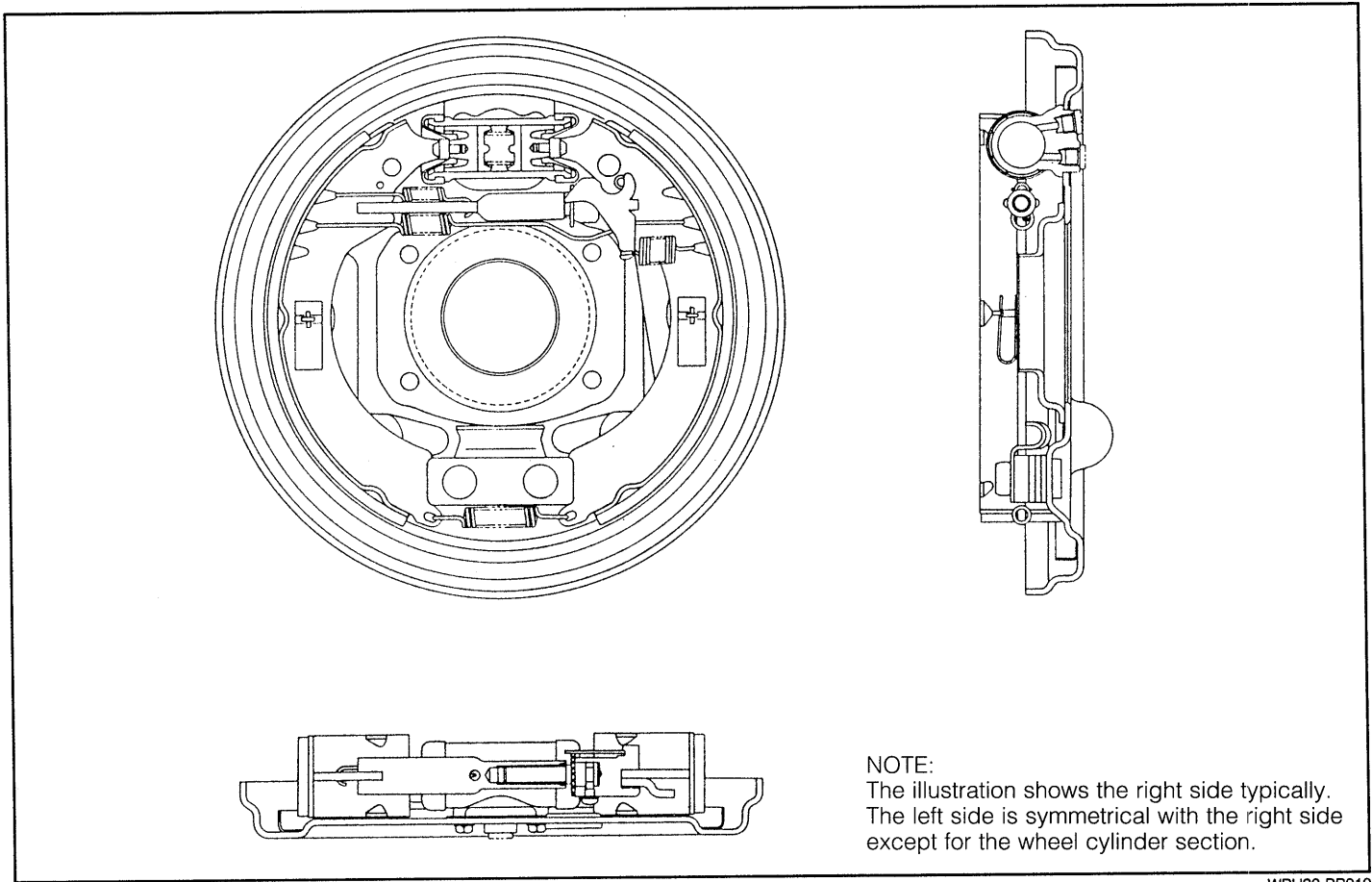
WRU92-BR579

BRAKE SYSTEM

REAR BRAKE

The rear brake is a leading and trailing type, in which the virtually same braking effectiveness can be attained both during the forward and reverse movement of the vehicle.

The parking brake is built inside the rear brake system, where the automatic adjuster of the rear brake shoe functions when the parking brake lever is actuated.



WRU90-BR010

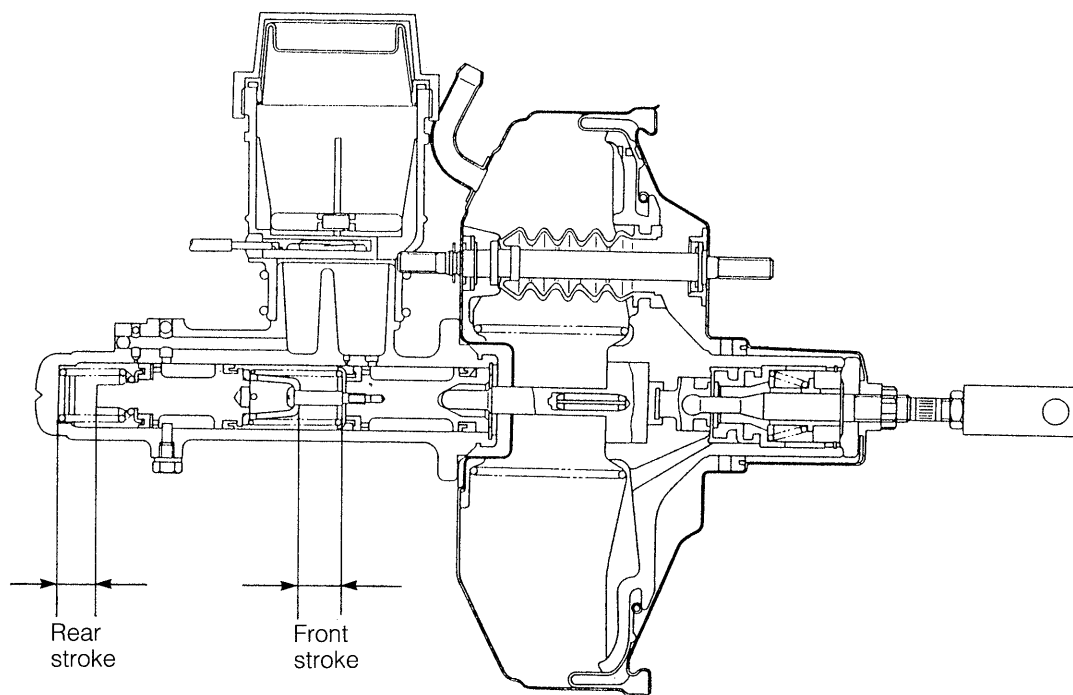
Rear brake specifications

Lining dimensions	mm (inch)	265.9 × 44.0 × 5.0 (10.468 × 1.732 × 0.197)
Lining area	cm ² (inch ²)	117 × 2-pieces × 2-wheels (18.14 × 2-pieces × 2-wheels)
Materials		AK L610 (asbestos-free)
Brake drum inner diameter	mm (inch)	φ254 (φ10)
Wheel cylinder bore diameter	mm (inch)	φ22.22 (φ0.875)

WRU90-BR011

BRAKE BOOSTER & MASTER CYLINDER

The brake booster employs a direct acting brake booster having an 8-inch effective diameter in order that the pedal applying force may be reduced during the braking and the braking performance may be improved. The master cylinder is an aluminum alloy tandem master cylinder located inside the engine compartment. The reservoir is a sealed type incorporating a diaphragm. In this reservoir, the brake fluid is shut from the atmosphere, thus preventing deterioration of the brake fluid and improving a reliability.



WRU90-BR012

Brake booster

Diaphragm effective diameter	mm (inch)	203 (8.0)
Effective storke	mm (inch)	31.5 or more (1.240 or more)
Servo ratio		3.5
Jumping amount	kgf (lb)	10 (22.05)

WRU90-BR013

Master cylinder

Stroke	Front	mm (inch)	18.5 (0.728)
	Rear	mm (inch)	11.5 (0.453)
Inner diameter		mm (inch)	22.22 (0.875)
Reserve tank capacity CC (CU.inch)	Front		16 (0.974)
	Rear		12 (0.732)
	Portion shared in common		114 (6.956)

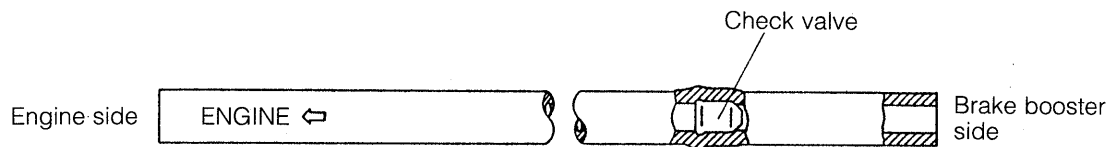
WRU90-BR014

BRAKE SYSTEM

VACUUM HOSE

The vacuum hose provided between the engine suction system and the brake booster incorporates a check valve.

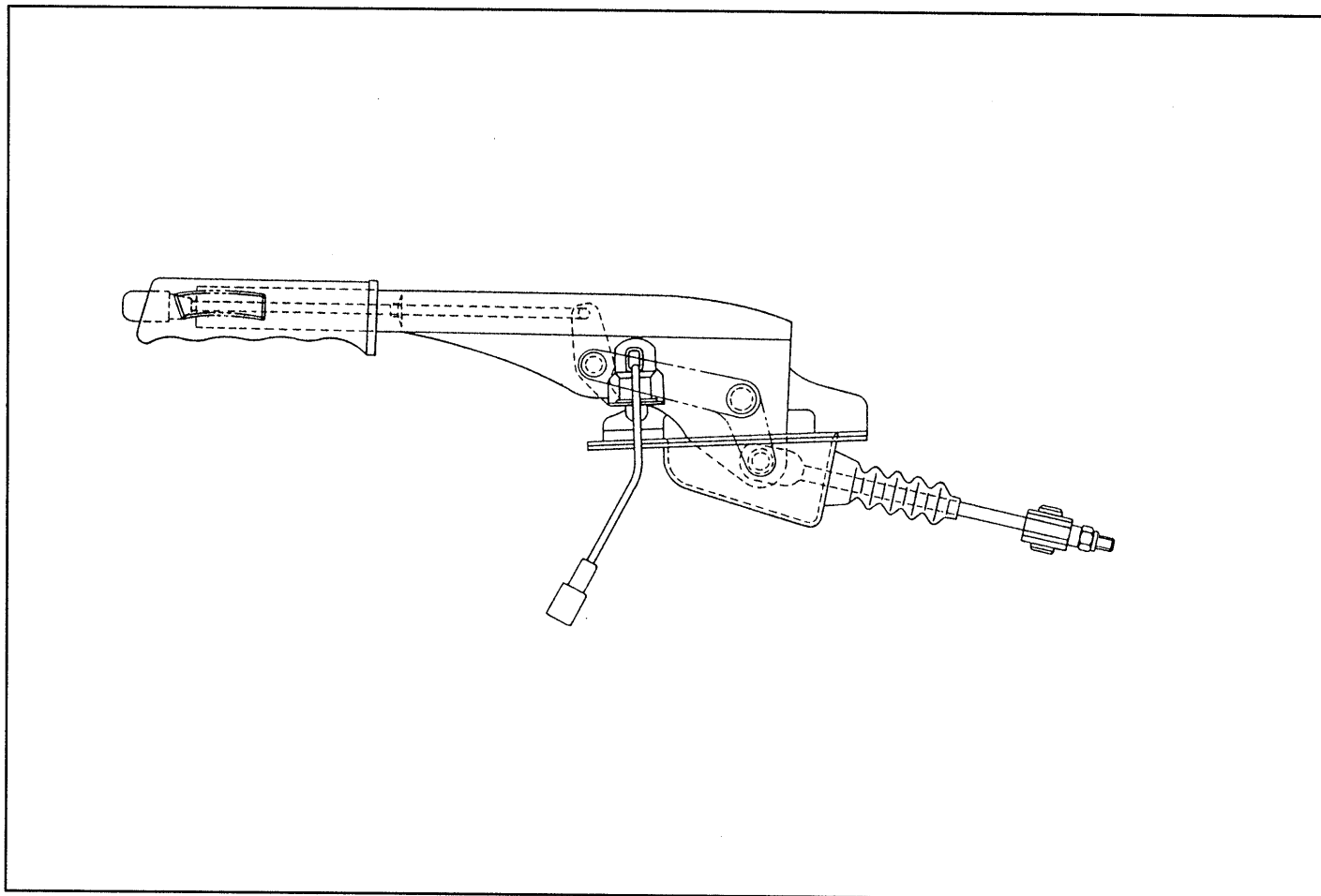
The vacuum hose bears a letter "ENGINE ⇐" The arrow headed direction must face toward the engine side.



WRU90-BR015

PARKING BRAKE

The parking brake is a mechanically-operated, rear wheel braking type. The parking brake lever is located at the center between the right and left front seats. The cable adjustment method employs a center lever type which can be adjusted from the under the vehicle.



WRU90-BR016

Parking brake specifications

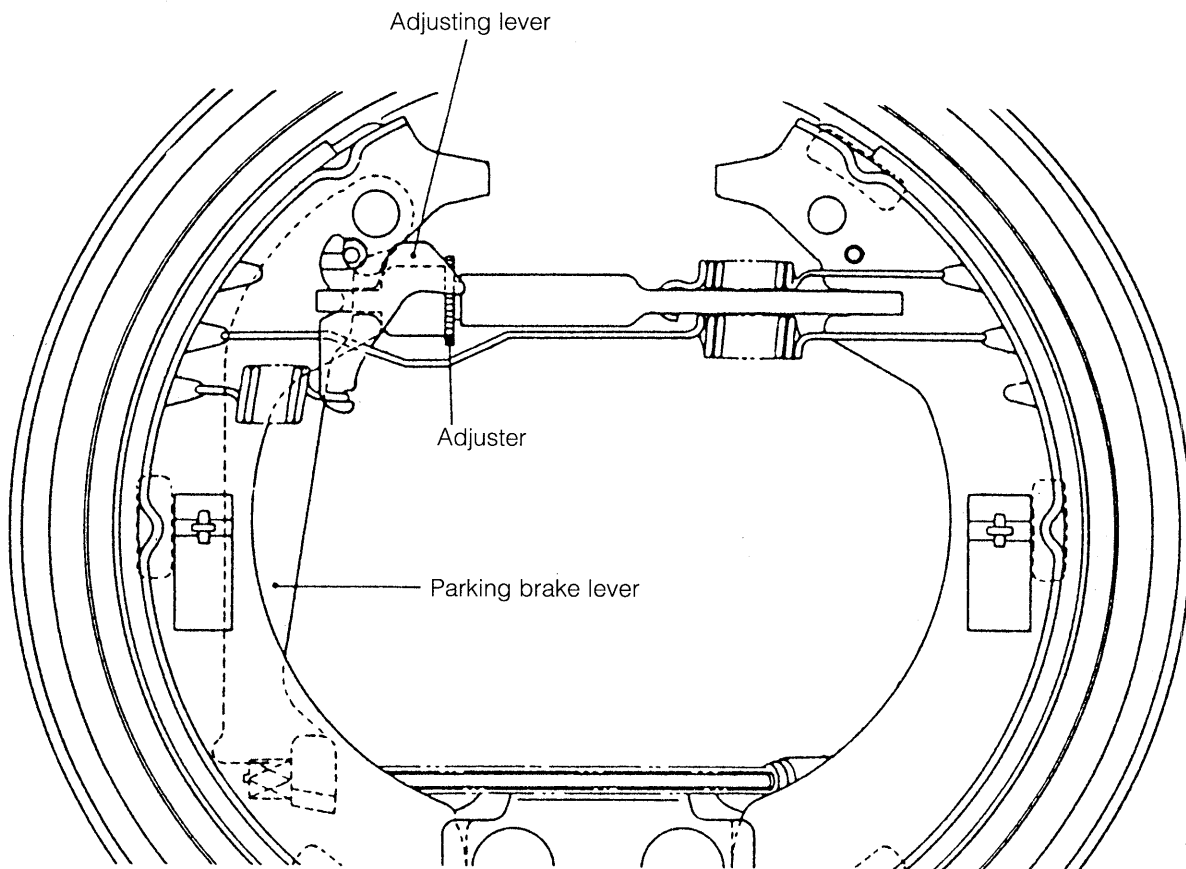
Type		Mechanically-operated, wheel braking type	
Braked wheel		Two rear wheels	
Lining	Area	cm ² (inch ²)	117 × 2-pieces × 2-wheel (18.14 × 2 pieces × 2-wheel)
	Materials		AK L610 (asbestos-free)
	Dimensions	mm (inch)	265.7 × 44.0 × 5.0 (10.468 × 1.732 × 0.197)
Brake drum inner diameter		mm (inch)	φ254 (φ10)

WRU90-BR017

Operation of automatic adjuster

The automatic rear brake shoe clearance adjuster is activated when the parking brake is operated. As shown in the figure below, the adjusting lever is secured to the parking brake lever.

This adjusting lever holds the adjuster teeth, thus locking it in place. The adjusting lever acts in such a way that it causes the adjuster teeth to advance when the parking brake is applied. If the shoe clearance is normal, the amount of movement of the adjusting lever is not great enough to move one tooth of the adjuster. However, if the lining is worn and the shoe clearance is great, the lever operating angle is great, too. As a result, the amount of movement of the adjusting lever is great enough to cause the adjuster to advance one tooth, thereby maintaining a normal shoe clearance at all times.



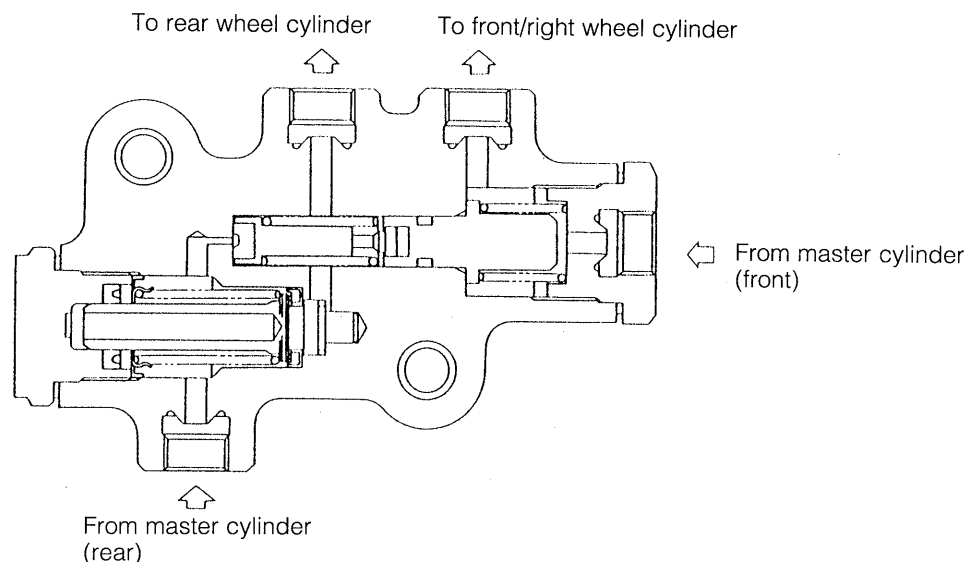
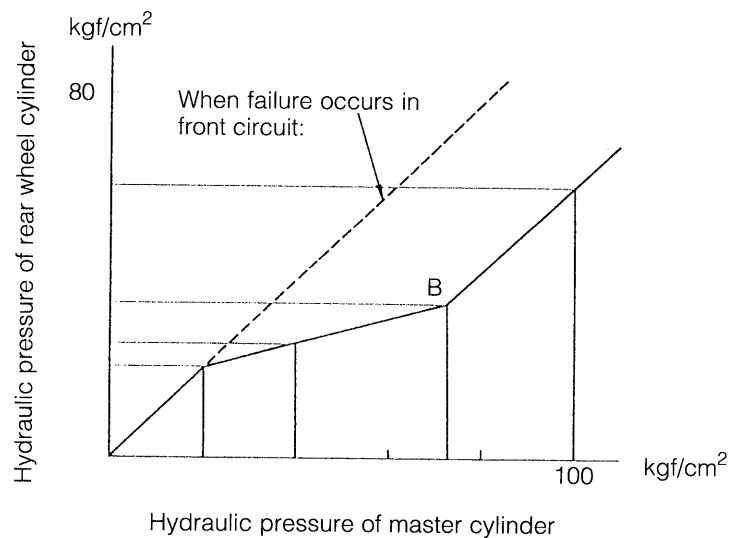
P & B VALVE (PROPORTIONING & BYPASS VALVE)

The P & B valve is provided in the brake line between the front and rear wheel brake systems.

Normally, the P & B valve controls the hydraulic pressure of the rear wheel cylinder and prevents the rear wheels from being locked at an early stage, thus making it possible to assure the vehicle stability during the braking period. However, if any failure should occur in the front brake system, the P & B valve will stop the control of the rear wheels, thereby allowing the master cylinder pressure to be transmitted directly to the wheel cylinders. Consequently, normal braking forces are assured.

Moreover, the proportioning valve adopts a secondary turning point type.

In addition to the normal proportioning valve function, the secondary turning point type proportioning valve has such characteristics that the ratio of the hydraulic pressure for the rear wheels becomes greater again at a middle point (point B in the figure below) in the hydraulic pressure characteristic diagram. This increase in hydraulic pressure is necessary because the braking forces become insufficient for the rear wheels due to greater rear wheel load when the vehicle is under the full loaded state.

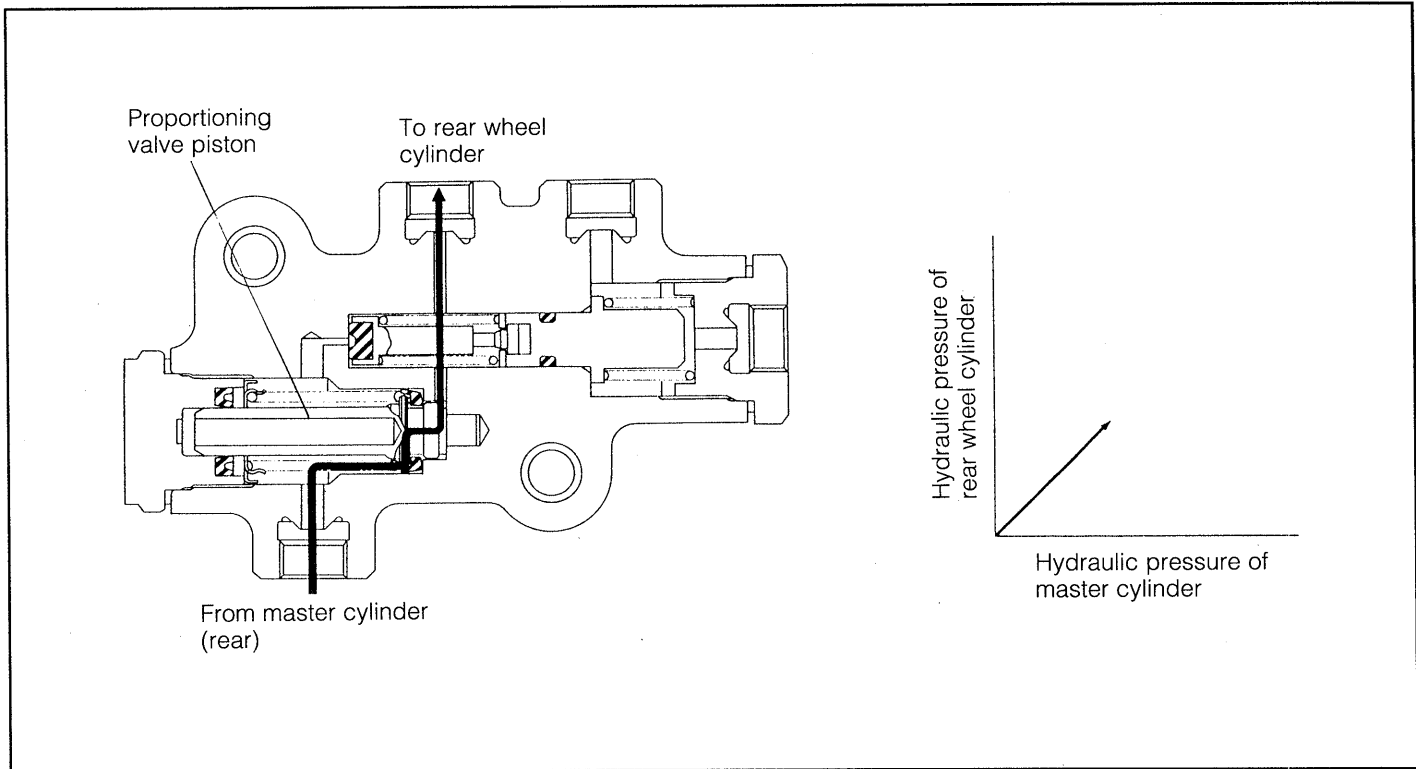


BRAKE SYSTEM

OPERATION OF P & B VALVE

Operation of proportioning valve

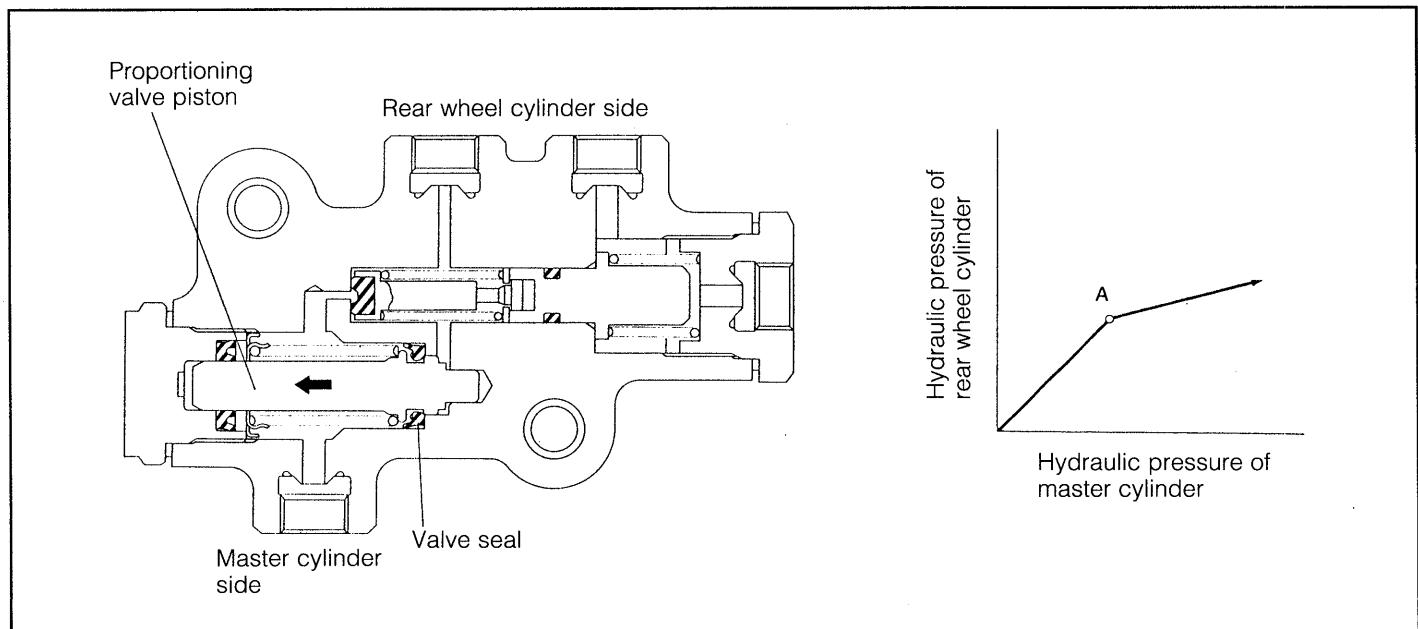
1. The hydraulic pressure of the master cylinder is transmitted directly to the rear wheel cylinders, until the proportioning valve piston starts functioning.



WRU90-BR020

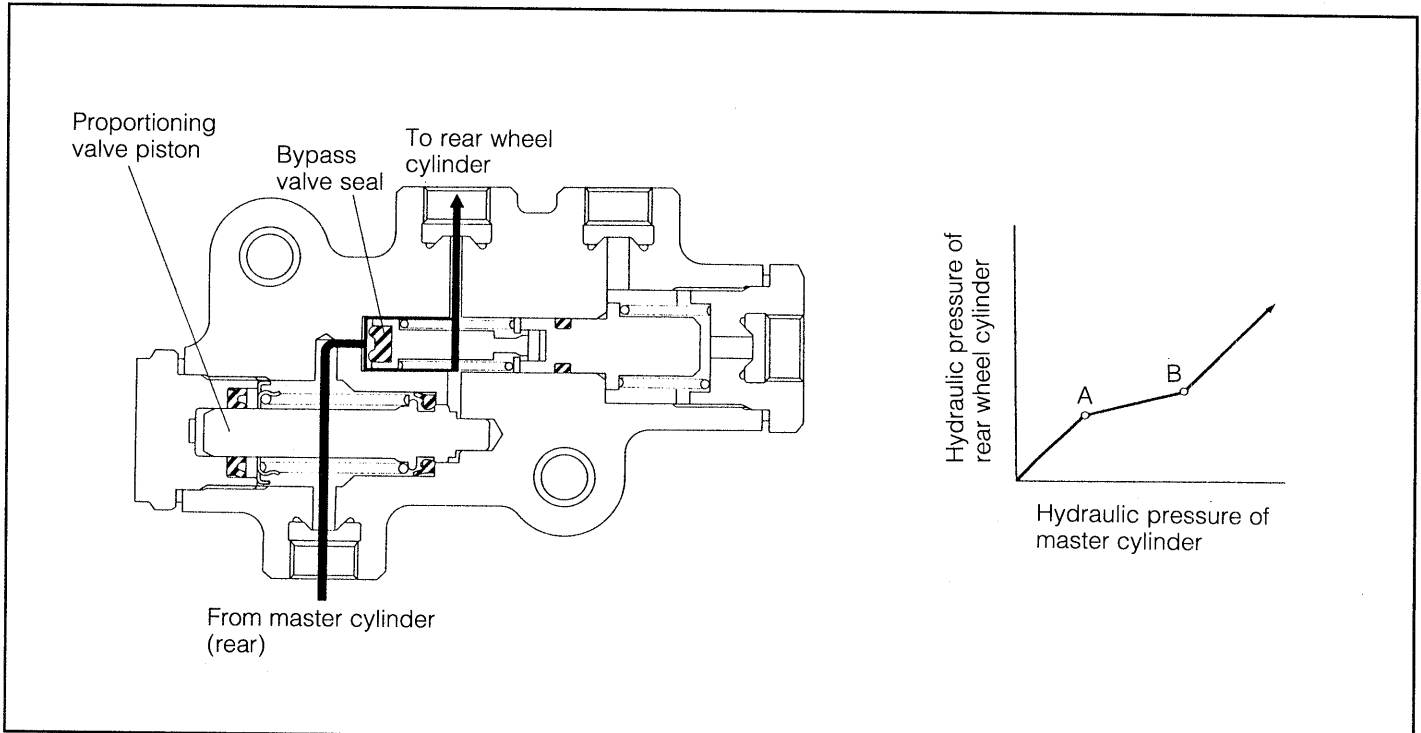
2. When the hydraulic pressure of the master cylinder rises further, the proportioning valve piston moves to the left side, thereby closing between the seal valve and the proportioning valve piston. (Turning point A)

From this point, the proportioning valve operates under a balanced state between the hydraulic pressure of the master cylinder and the hydraulic pressure at the rear wheel cylinder side. However, the pressure receiving area of the proportioning valve is greater at the rear wheel cylinder than the area at the master cylinder. Consequently, the hydraulic pressure at the rear wheel cylinder is smaller than the pressure at the master cylinder.



WRU90-BR021

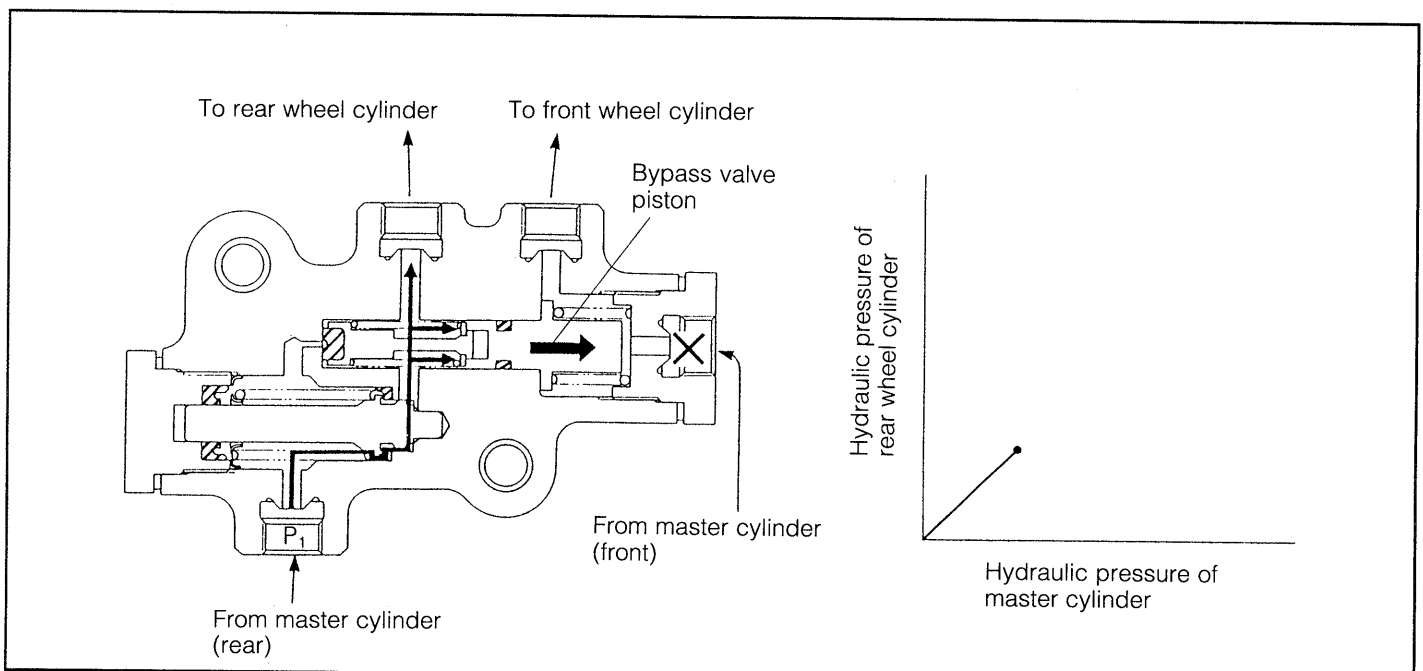
- The master cylinder pressure is applied to the proportioning valve piston as well as to the bypass valve seal. Hence, when the master cylinder pressure rises above a specified level, the bypass valve seal opens. (Turning point B)
 At a stage where the master cylinder pressure exceeds this level, the master cylinder pressure is applied directly to the wheel cylinders.



WRU90-BR022

Operation of bypass valve

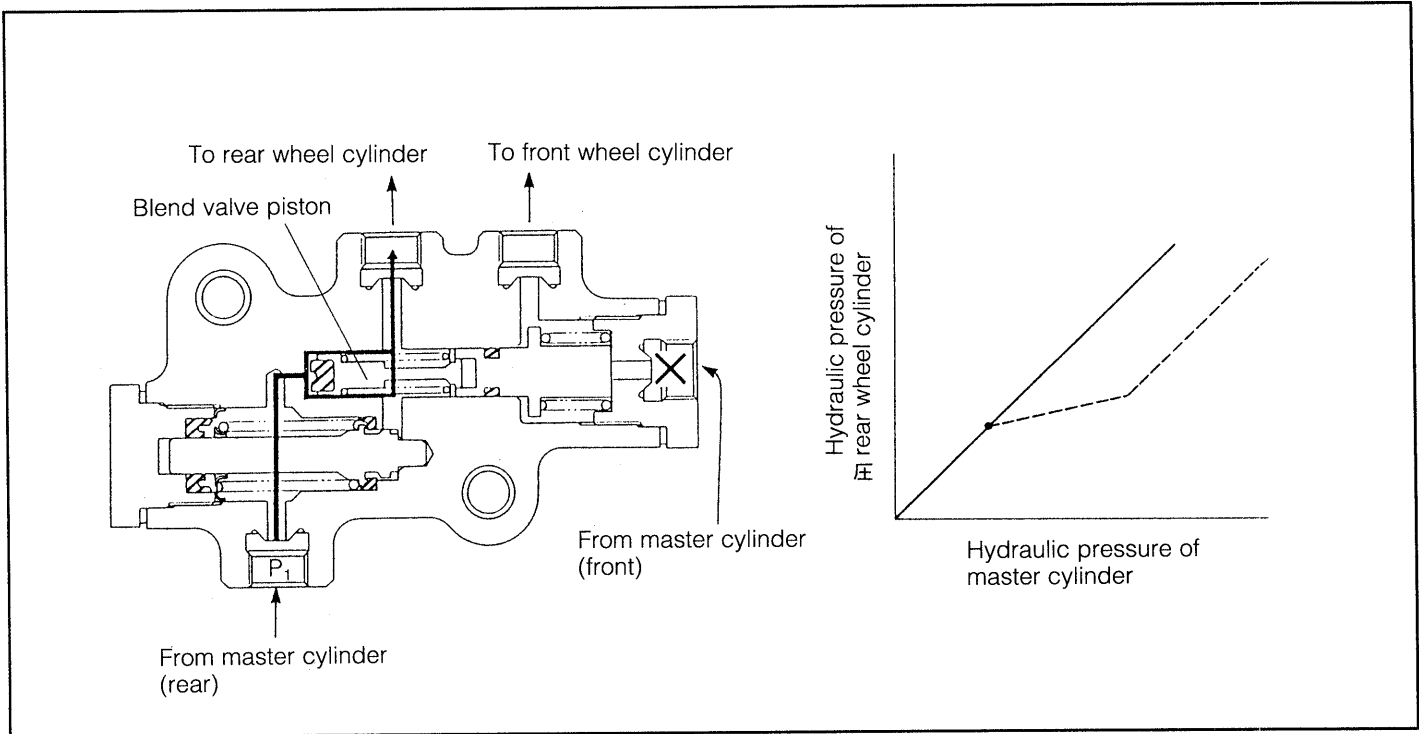
- If the front brake system is encountered with a malfunction due to some reasons, the hydraulic pressure acting on the front wheel cylinder drops. Hence, the hydraulic pressure P_1 acting on the rear wheel cylinder will overcome the spring tension of the bypass valve, thus allowing the bypass valve piston to start moving toward the right side. Since the proportioning valve is still not operating, the master cylinder pressure is applied directly to the rear wheel cylinders.



WRU90-BR023

BRAKE SYSTEM

2. When the bypass valve piston moves toward the right side because of the hydraulic pressure drop of the front wheel cylinder, the blend valve piston is forcibly moved to the right side, thus forming a bypass circuit. Since the proportioning valve is not functioning, the rear wheel cylinder pressure will not be reduced. Consequently, the master cylinder pressure is applied continuously to the rear wheel cylinders. Therefore, no turning point is formed, as indicated in the figure below.



WRU90-BR024

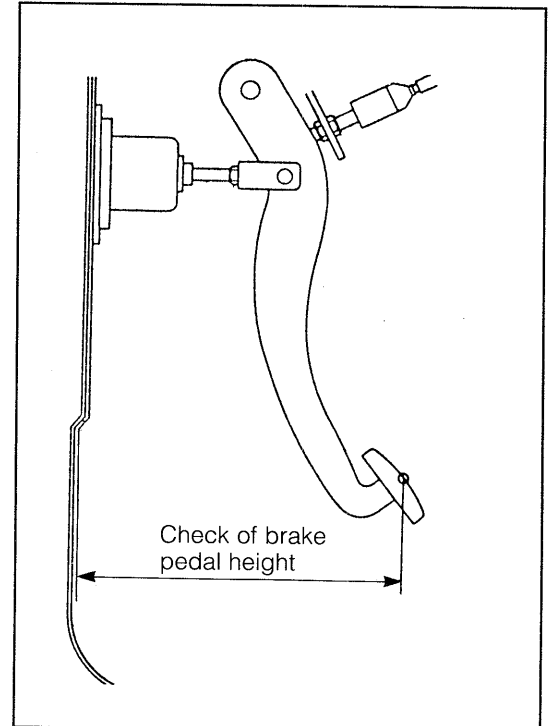
CHECK OF BRAKE SYSTEM

1. Check of brake pedal height

Measure the distance between the center of the pedal applying surface and the dash panel surface which is in parallel to the brake pedal applying center surface. Ensure that the measured value complies with the specifications and that the center of the brake pedal surface is located 47 ± 6 mm (1.85 ± 0.24 inch) higher than that of the accelerator pedal.

Specified Brake Pedal Height: 216 ± 5 mm
(8.5 ± 0.2 inch)

If not, adjust the brake pedal height. (See page BR-20.)



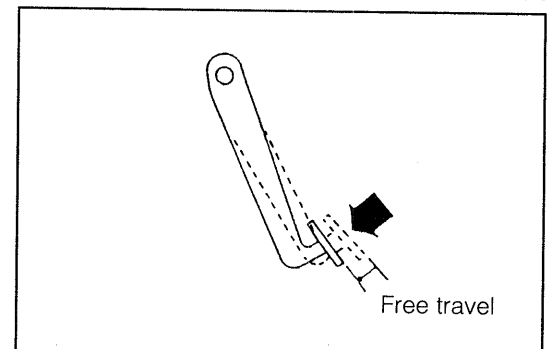
WRU92-BR579

2. Check of brake pedal free travel

- (1) After stopping the engine, depress the brake pedal firmly four or five times so that no vacuum may remain in the brake booster.
- (2) Measure the brake pedal free travel by pushing the brake pedal lightly with fingers. Ensure that the free travel is with the specifications.

Specified Value: 1 - 3 mm (0.04 - 0.12 inch)

If not, adjust the brake pedal free travel.
(See page BR-20.)



WRU92-BR580

3. Check of brake pedal reserve travel

- (1) With the engine running at the idling speed and with the parking brake lever released, apply the specified load to the brake pedal. Measure the distance between the center of the brake pedal applying surface and the lower end of the dash panel. Ensure that the distance complies with the specifications.

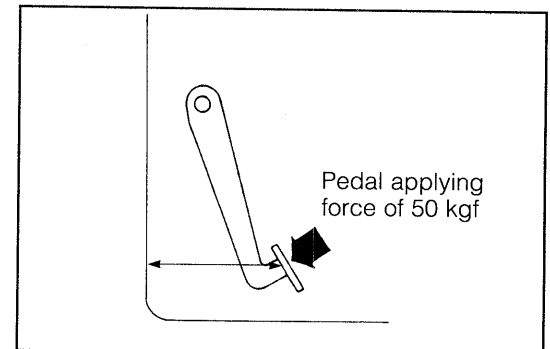
Specified Load: 50 kgf (110.25 lb)

Specified Value: 80 mm or more
(3.15 inches or more)

If the measured value is lower than the specified value, check the air bleeding condition and/or check and repair the brake automatic adjustment system.

- (2) When the brake pedal is held under the specified load in (1), ensure that the height of the brake pedal applying surface remains unchanged.

If the brake pedal applying surface drops, check the brake fluid for leakage and/or repair the brake fluid leakage, as required. Moreover, perform the brake master cylinder overhauling, as required.

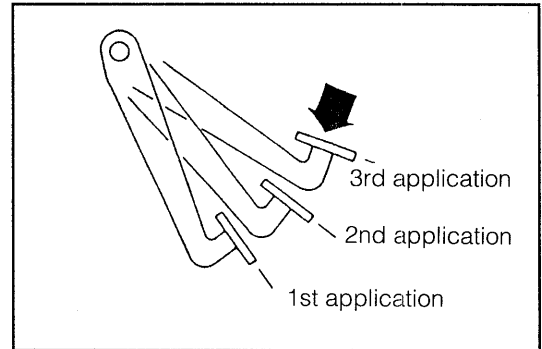


WRU90-BR065

WRU90-BR066

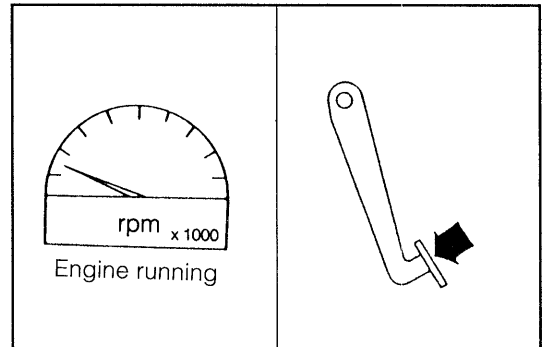
4. Check of brake booster

- (1) Check of brake booster air-tight performance
 - ① Start the engine. After allowing the brake booster to hold negative pressure, stop the engine.
 - ② Depress the brake pedal several times, applying force used during normal brake applications and allowing at least five seconds between each application. Ensure that the position of the brake pedal rises progressively at the second and third applications.



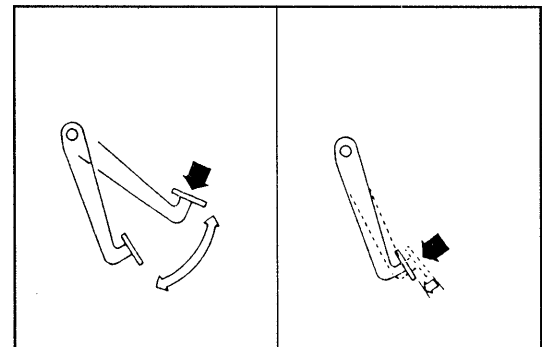
WRU90-BR067

- (2) Check of brake booster air-tight performance under loaded condition
With the engine running, depress the brake pedal. While maintaining this condition, stop the engine. Ensure that no change in the pedal height occurs in about 30 seconds.



WRU90-BR068

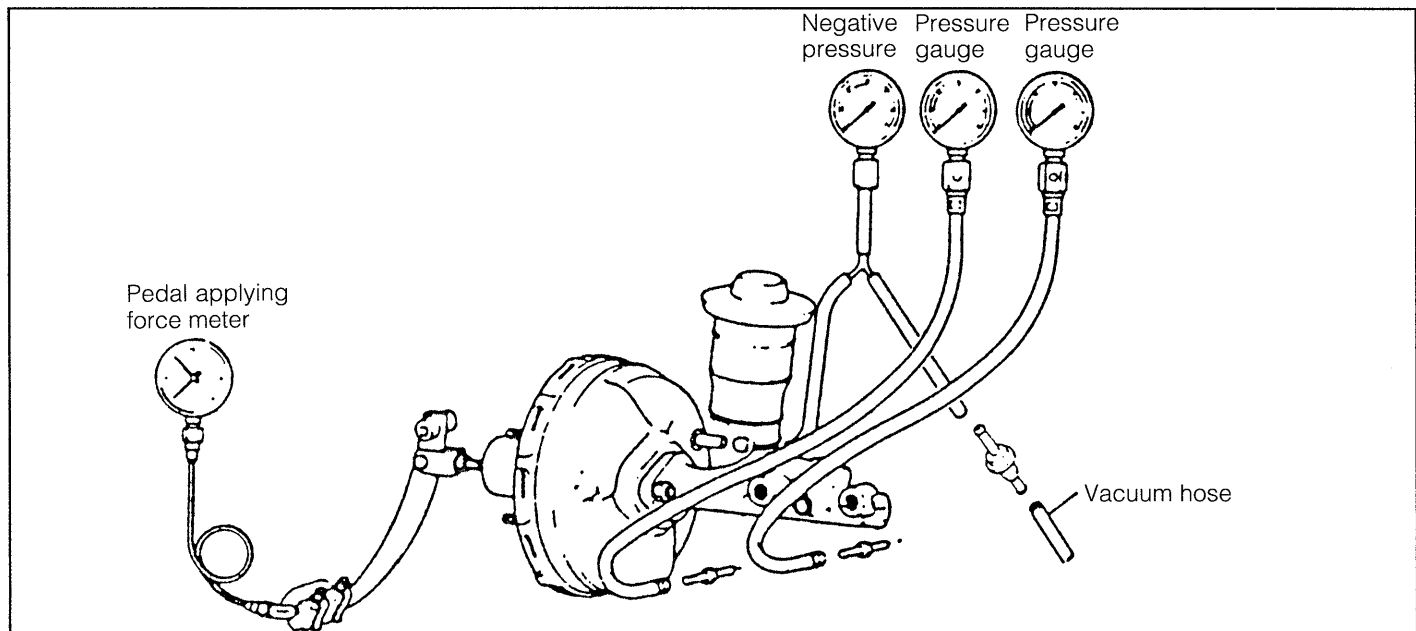
- (3) Check of booster operation
 - ① With the engine stopped, depress the brake pedal several times, until the brake pedal height will not vary at each application.
 - ② With the engine stopped, depress the brake pedal. While maintaining the same applying force, start the engine. If the brake pedal moves in slightly, it indicates that the booster operates satisfactory.



WRU90-BR069

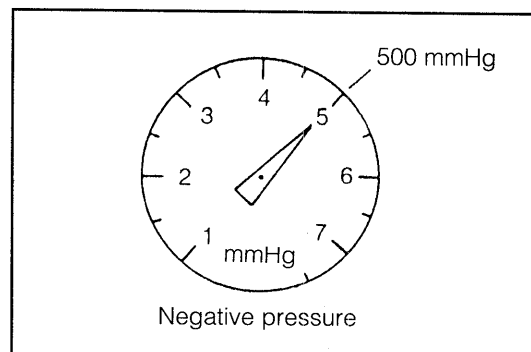
5. Check employing portable brake booster tester

- (1) Connect the portable brake booster tester, as indicated in the figure. Perform air bleeding.



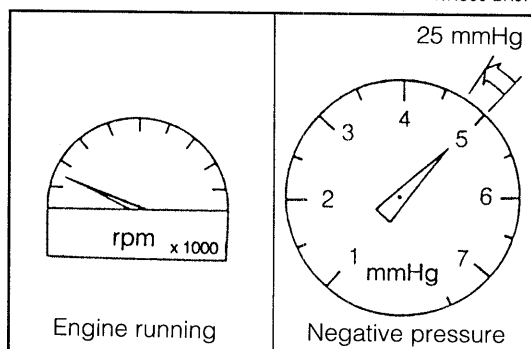
WRU90-BR070

- (2) Check of booster air-tight performance
 - ① Start the engine. Apply a negative pressure of 500 mmHg (19.69 inchHg) to the brake booster.
 - ② Stop the engine. Ensure that no negative pressure drops for 15 seconds after the engine has stopped. If not, check the check valve and brake booster.



WRU90-BR071

- (3) Check of booster air-tight performance under loaded condition
 - ① Start the engine.
 - ② Depress the brake pedal with a force of 20 kgf (44.1 lb).
 - ③ Apply a negative pressure of 500 mmHg (19.69 inchHg) to the booster.
 - ④ Stop the engine.
 - ⑤ Ensure that the negative pressure drop does not exceed 25 mmHg (0.98 inchHg) after the engine has stopped. If not, repair the brake booster.



WRU90-BR072

- (4) Check of brake hydraulic pressure
 - ① With the engine stopped, depress the brake pedal several times so that no negative pressure may not apply to the brake booster.
 - ② Ensure that the hydraulic pressure is obtained in accordance with the pedal applying force, as indicated in the right table. If not, check the air bleeding condition.

Pedal applying force kgf (lb)	Hydraulic pressure kgf/cm ² (psi)
10 (22)	0 - 6 (0 - 512)
20 (44)	8 - 18 (114 - 256)
30 (66)	19 - 29 (271 - 412)

WRU90-BR073

- (5) Check of booster operation
 - ① Start the engine.
 - ② Set the booster negative pressure to 500 mmHg (19.69 inchHg). Ensure that the hydraulic pressure is obtained in accordance with the pedal applying force. If not, repair the brake booster.

Pedal applying force kgf (lb)	Hydraulic pressure kgf/cm ² (psi)
5 (11)	6 - 14 (86 - 199)
10 (22)	24 - 34 (342 - 483)
20 (44)	63 - 73 (897 - 1038)
30 (66)	74 - 84 (1053 - 1194)

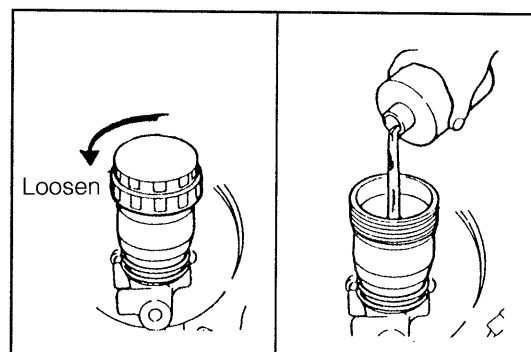
WRU90-BR074

6. Air bleeding of brake system

1. Filling brake fluid

Fill the brake reservoir tank with the specified brake fluid to the full level. Maintain the full level at all times during the brake air bleeding.

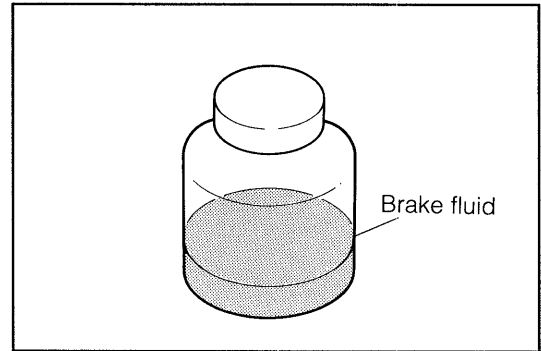
Specified Brake Fluid: DOT 3 or SAEJ 1703



WRU92-BR578

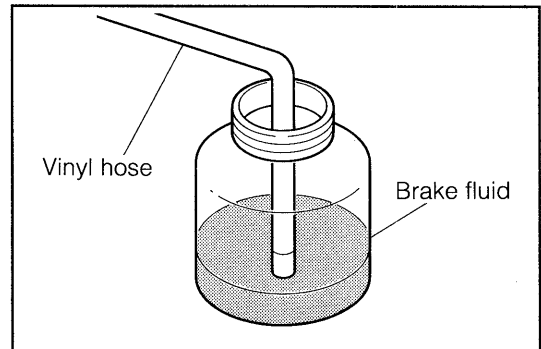
BRAKE SYSTEM

2. Prepare an adequate container for the air bleeding. Fill a small amount of brake fluid in the container.



WRU90-BR076

3. Detach the air bleeder cap connect one end of a suitable vinyl hose to the air bleeder plug. Insert the other end of the vinyl hose into the prepared container in such a way that the vinyl hose may be submerged in the brake fluid in the container. Start this air bleeding operation at the brake which is located at the furthest point from the master cylinder.

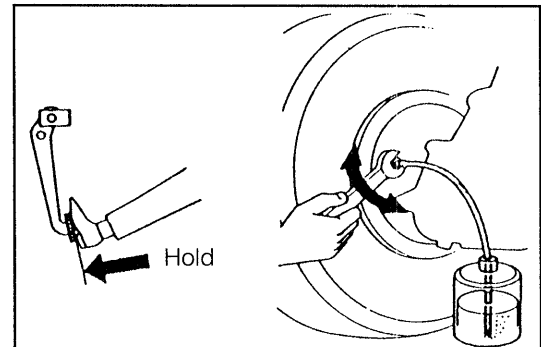


WRU90-BR077

4. Air bleeding

This operation should be performed by two persons.

- (1) One person depresses the brake pedal several times and hold it in a depressed state.
- (2) The other person loosens the air bleeder plug 1/3 through 1/2 turn to bleed the air. Tighten the plug again.



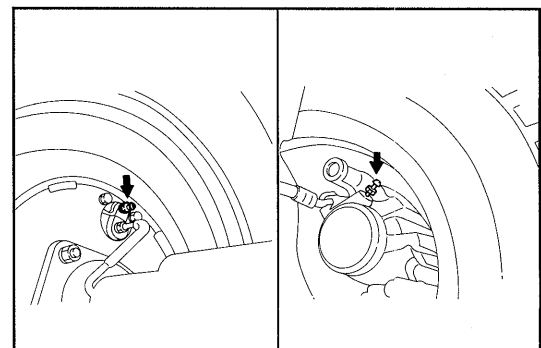
WRU90-BR078

- (3) Repeat the steps (1) and (2), until no air or bubble comes from the air bleeder plug.
- (4) Start the engine. Repeat the steps (1) and (2), until no air or bubble comes from the air bleeder plug. (Rear-ABS equipped vehicle only)

WRU90-BR079

5. Tighten the air bleeder plug to the specified torque.

Tightening Torque: 0.9 - 1.3 kgf-m
(6.5 - 9.4 ft-lb, 8.8 - 12.7 N·m)

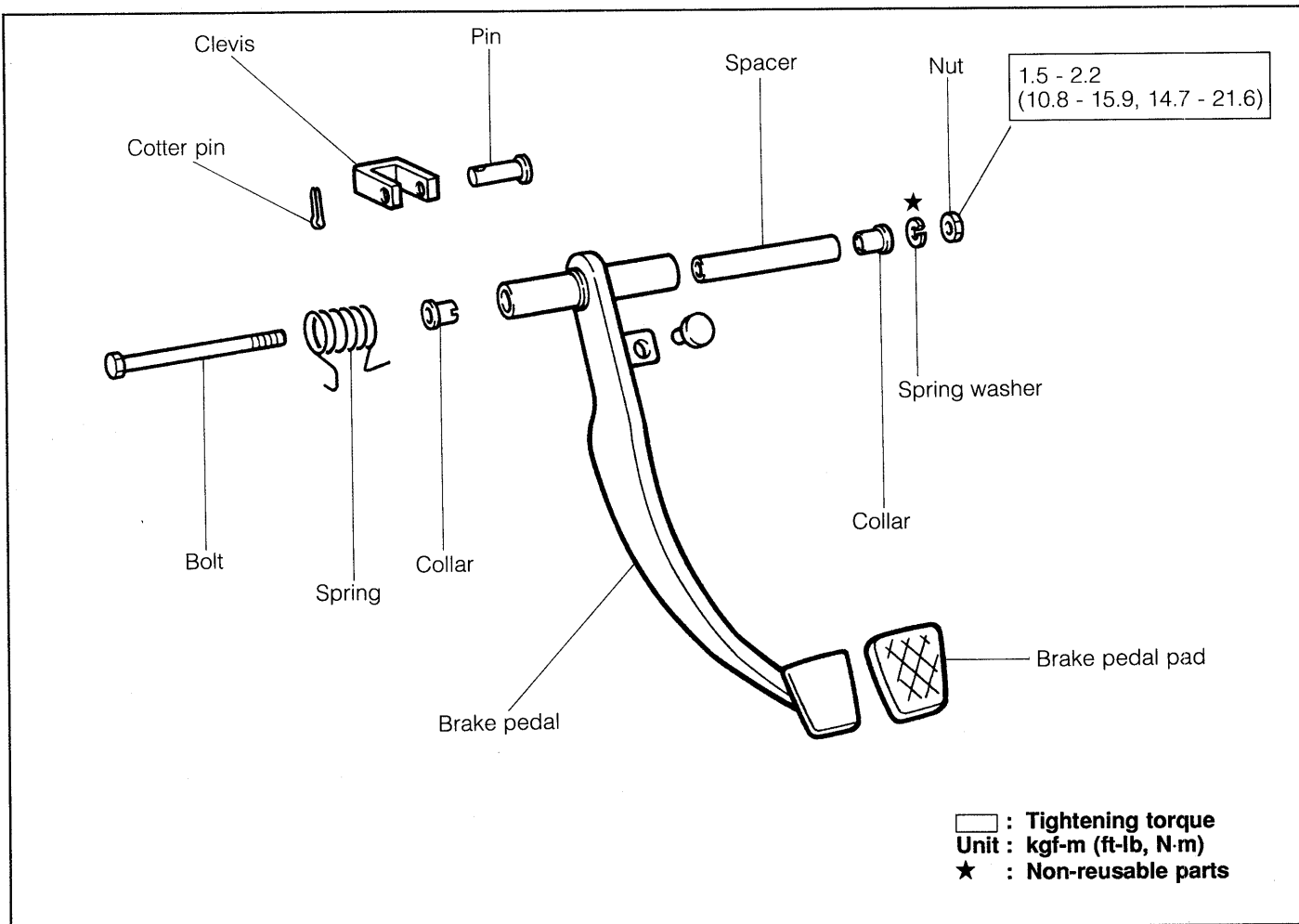


WRU90-BR080

6. Install the bleeder plug cap to the bleeder plug.
7. Perform air bleeding for the other brakes in turn, starting from the step (3).
8. Perform the brake pedal reserve travel check.
(See page BR-15.)

WRU92-BR581

BRAKE PEDAL COMPONENTS



WRU90-BR088

ADJUSTMENT OF BRAKE PEDAL HEIGHT

1. Disconnect the connector of the stop lamp switch.
2. Loosen the lock nut (3) of the stop lamp switch.
3. Back off the stop lamp switch.

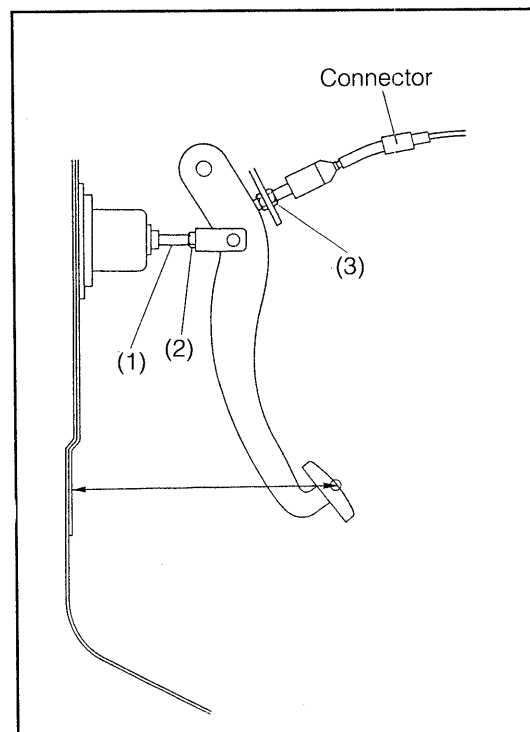
NOTE:

- Be very careful not to twist the cord by turning it together with the switch.

4. Loosen the lock nut of the clevis (2).
5. Turn the push rod (1) to adjust the pedal height to the specified height.

Specified Height: 216 ± 5 mm (8.5 ± 0.2 inches)

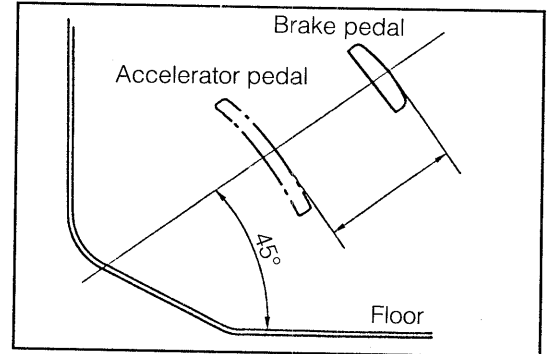
The measurement should be made between the center of the brake pedal applying surface and the dash panel surface which is in parallel to the brake pedal applying center surface.



WRU90-BR089

NOTE:

- Adjust the brake pedal height so that the difference in height between the accelerator pedal and the brake pedal may become 47 ± 6 mm (1.85 ± 0.24 inches).

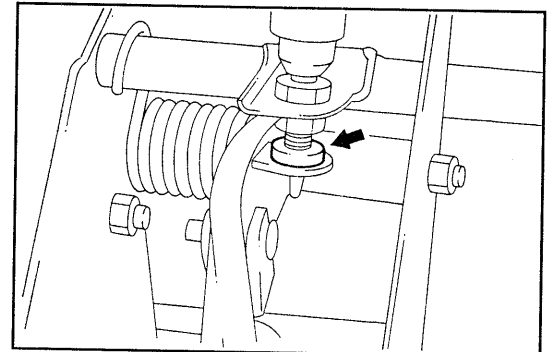


WRU90-BR090

- Push in the stop lamp switch, until the lower end of the threaded portion is brought into contact with the brake pedal cushion.

- Tighten the stop lamp switch lock nut.

Tightening Torque: 1.8 - 3.0 kgf-m
(13 - 21.7 ft-lb, 17.7 - 29.4 N·m)



WRU90-BR091

- Turn the push rod, until the brake pedal free travel becomes the specified value.

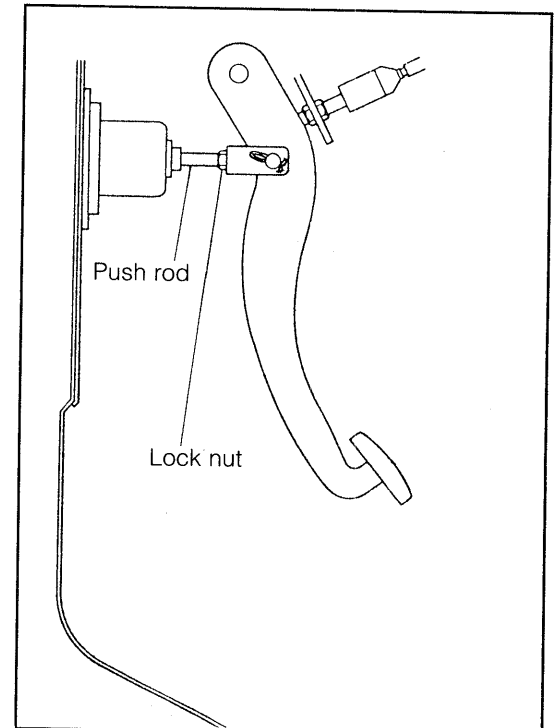
Specified Value: 1 - 3 mm (0.04 - 0.12 inch)

NOTE:

- The free travel represents a mechanical play observed before the brake pedal pushes the push rod of the brake booster.

- Tighten the clevis lock nut.

Tightening Torque: 1.3 ± 0.26 kgf-m
(9.4 ± 1.9 ft-lb, 12.7 ± 2.6 N·m)



WRU90-BR092

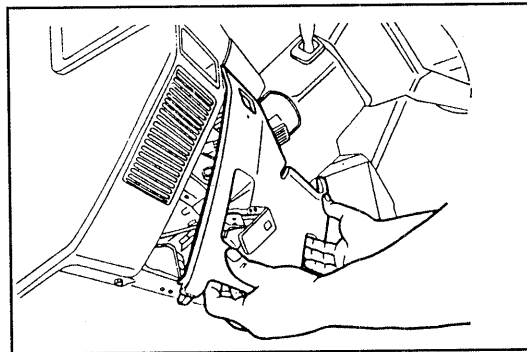
- Check the brake pedal height. (See the step 5.)
If the height fails to conform to the specifications, repeat the operation from the step 2 onward.
- Reconnect the stop lamp switch connector.
- Depress the brake pedal. Ensure that the stop lamp goes on.
If not, check and repair the brake lamp system.
(See the Body Electrical Section.)

WRU90-BR093

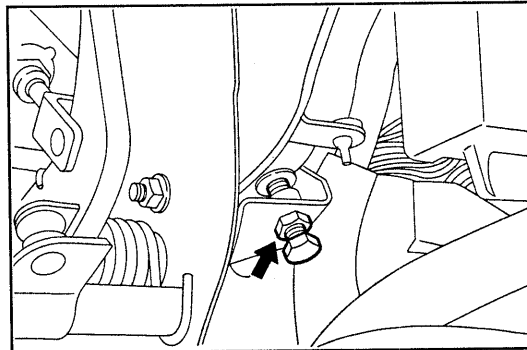
BRAKE SYSTEM

REMOVAL

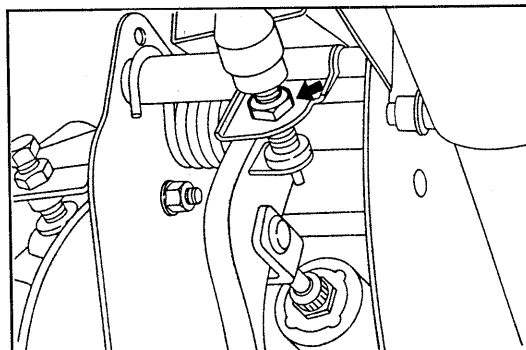
1. Remove the instrument finish lower panel.
(See the Body Section.)
2. Remove the height adjusting bolt for the clutch pedal by loosening its lock nut.
3. Disconnect the connector of the stop lamp switch.
4. Remove the stop lamp switch by loosening its lock nut.
5. Pull out the clevis pin by removing its cotter pin.
6. Remove the brake pedal set nut and pull out the set bolt.
NOTE:
 - Before pulling out the set bolt, be sure to align the end surface across the two flat sections of the set bolt with the clutch pedal end surface so that they may not interfere with each other.



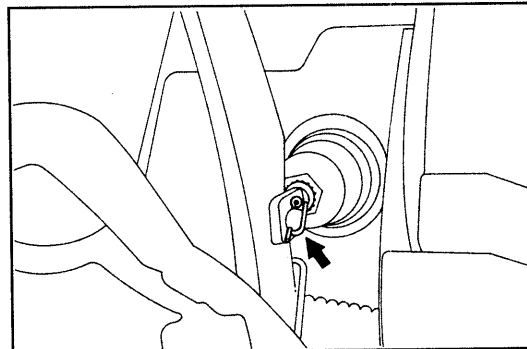
WRU90-BR094



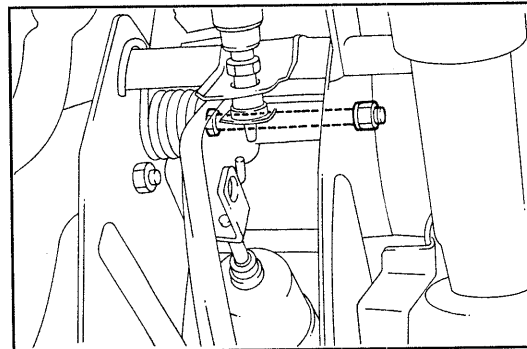
WRU90-BR095



WRU90-BR096

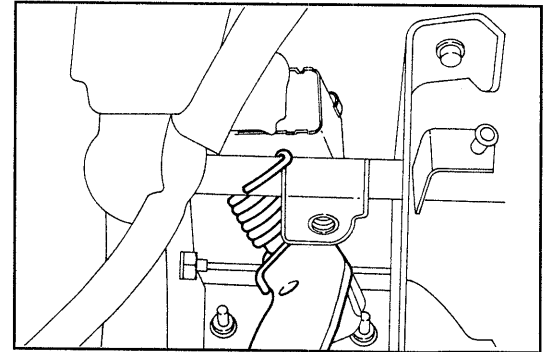


WRU90-BR097



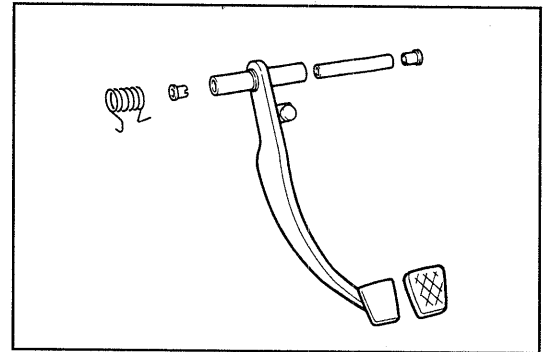
WRU90-BR098

- Remove the return spring from the pedal bracket while changing the brake pedal angle.



WRU90-BR099

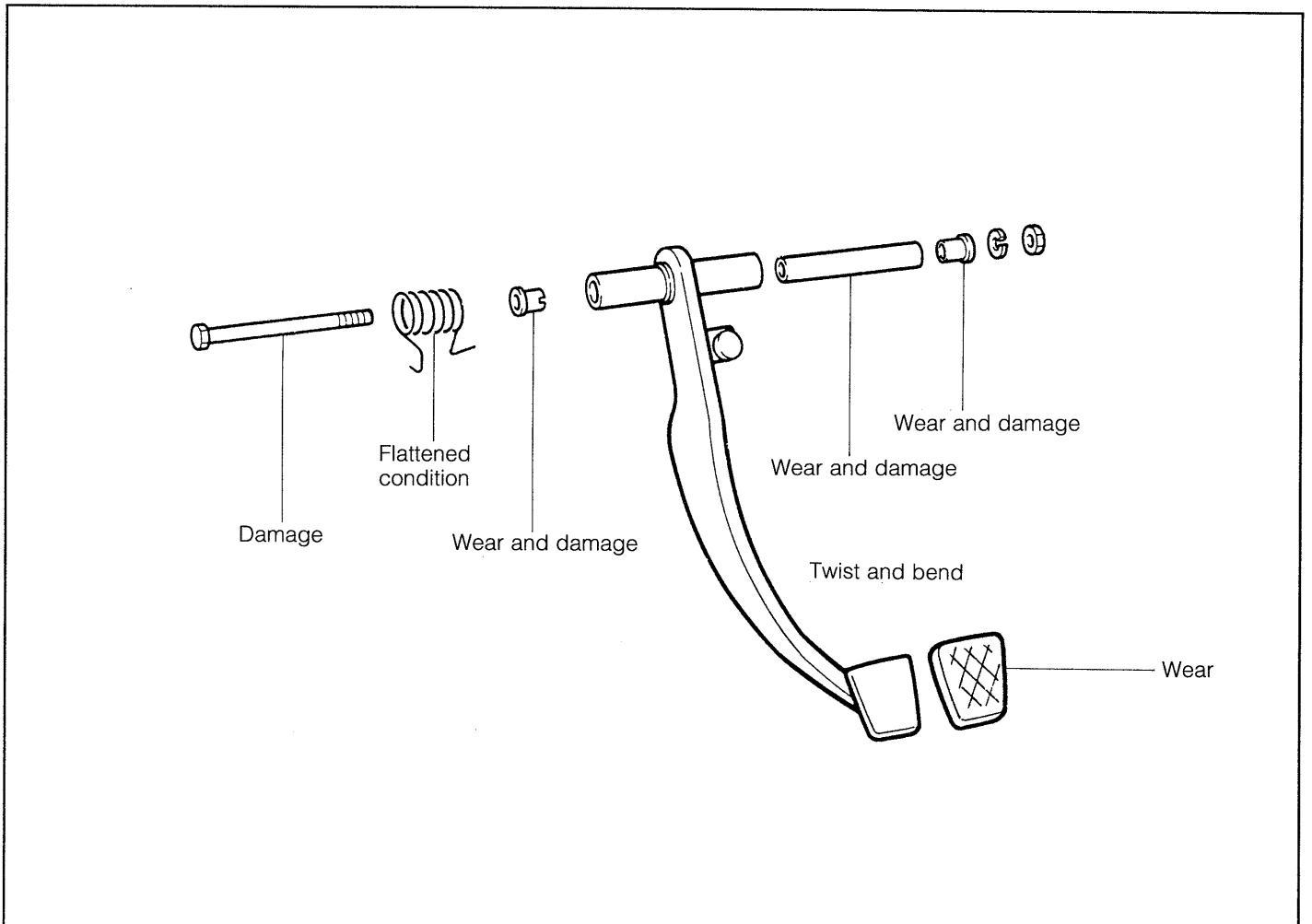
- Remove the spring, bushes, spacer, cushion and pedal pad from the brake pedal.



WRU90-BR100

INSPECTION

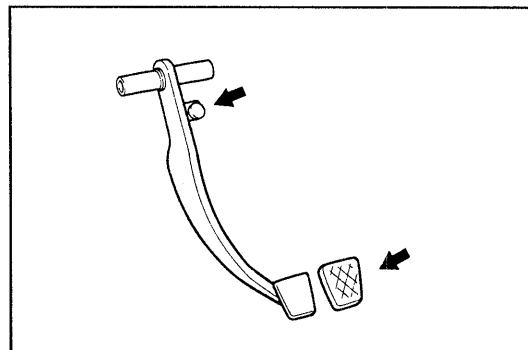
Inspect the following parts and replace any defective part.



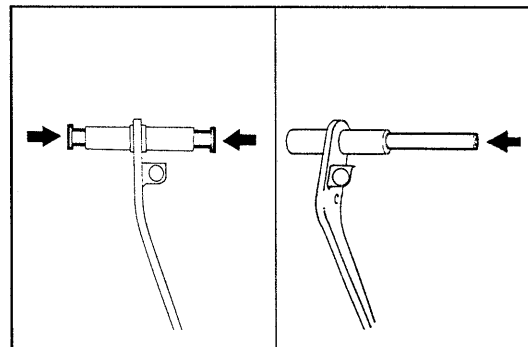
WRU90-BR101

INSTALLATION

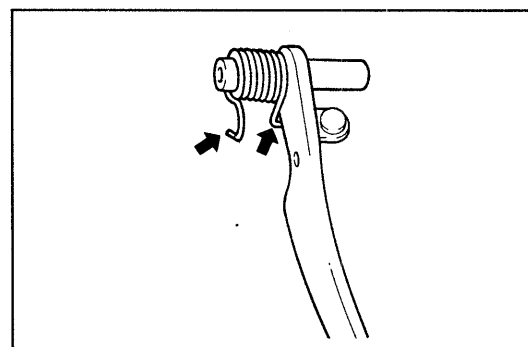
1. Install the pedal pad and cushion to the brake pedal.
2. Insert the bushes into the brake pedal.
3. Apply a thin film of lithium based MP grease to the spacer. Insert the spacer into the bush.
4. Apply a thin film of lithium based MP grease to the supporting section of the return spring. Install the return spring to the brake pedal.
5. Hook the return spring to the pedal bracket.
6. With the brake pedal aligned with the attaching hole, insert the attaching bolt.



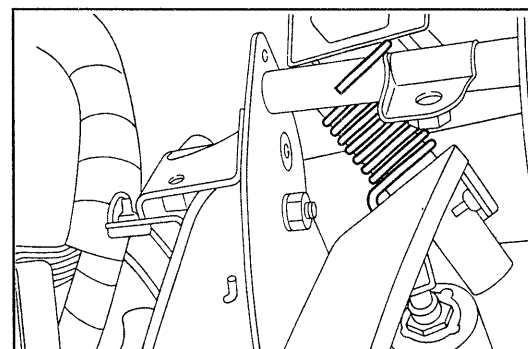
WRU90-BR102



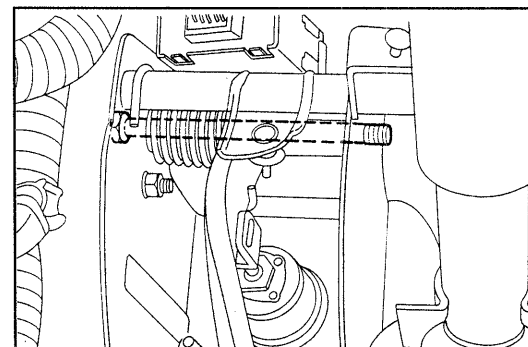
WRU90-BR103



WRU90-BR104



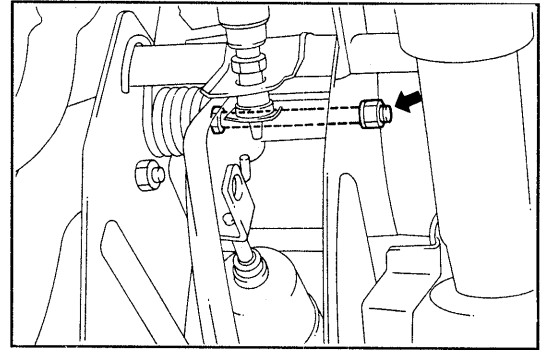
WRU90-BR105



WRU90-BR106

7. Tighten the attaching nut to the installation specified torque.

Tightening Torque: 1.5 - 2.2 kgf-m
(10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)

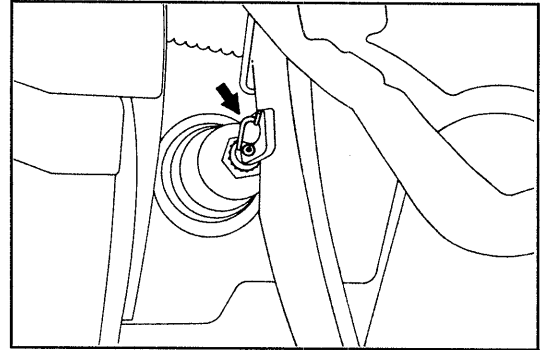


WRU90-BR107

8. Connect the clevis to the brake pedal by means of the clevis pin. Install the cotter pin and bend its legs.

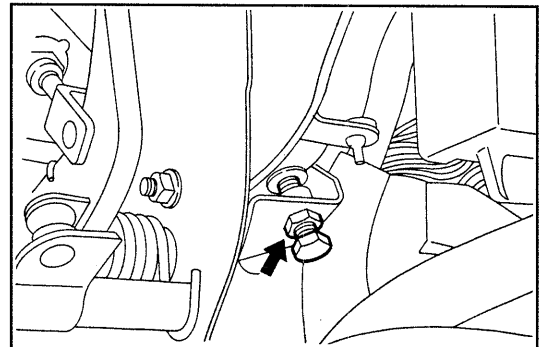
NOTE:

- Be sure to bend the cotter pin beyond 90 degrees.



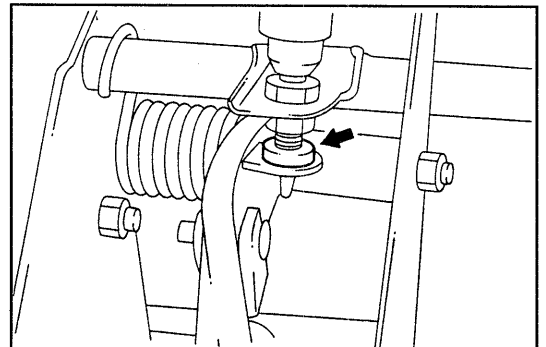
WRU90-BR108

9. Install the clutch pedal height adjusting bolt and nut. Adjust the clutch pedal height.
(See the Clutch Section.)



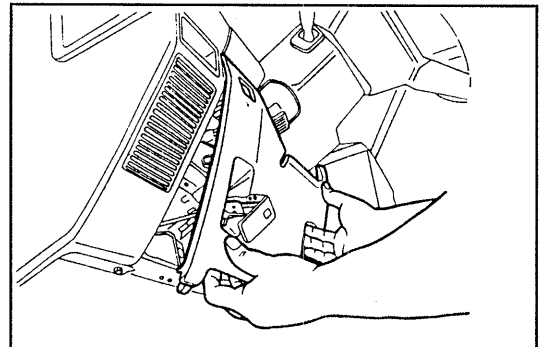
WRU90-BR109

10. Install the stop lamp switch. Adjust the brake pedal height.
(See page BR-41.)
11. Operate the brake pedal and check to see if any trouble exists.



WRU90-BR110

12. Install the instrument finish lower panel.
(See the Body Section.)



WRU90-BR111

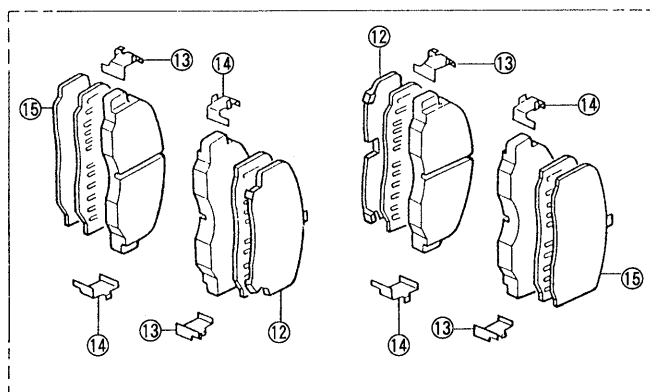
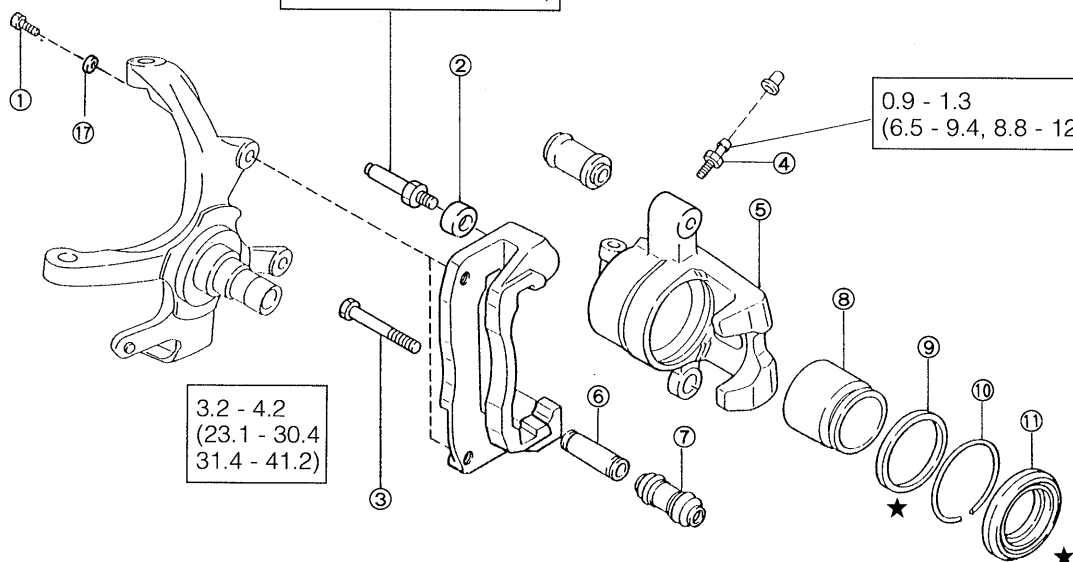
FRONT BRAKE COMPONENTS

7.0 - 9.0
(50.6 - 65.1
68.6 - 88.3)

4.0 - 5.0
(28.9 - 36.2, 39.2 - 49.0)

0.9 - 1.3
(6.5 - 9.4, 8.8 - 12.7)

3.2 - 4.2
(23.1 - 30.4
31.4 - 41.2)



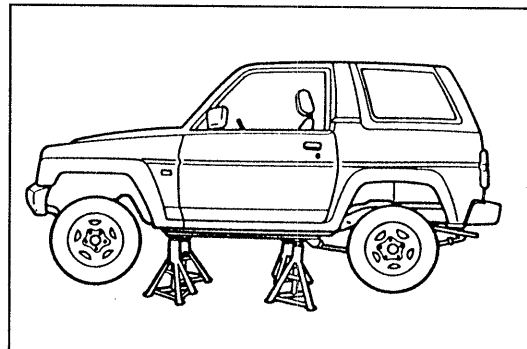
□ : Tightening torque
Unit : kgf-m (ft-lb, N-m)
★ : Non-reusable parts

- ① Bolt
- ② Boot
- ③ Bolt
- ④ Bleeder plug
- ⑤ Body caliper
- ⑥ Cylinder slide bush
- ⑦ Bush dust boot
- ⑧ Front disc brake piston

- ⑨ Piston seal
- ⑩ Set ring
- ⑪ Cylinder boot
- ⑫ Antisquel shim
- ⑬ Disc brake pad guide plate
- ⑭ Disc brake pad guide plate No. 2
- ⑮ Antisquel shim
- ⑯ Mounting support
- ⑰ Washer

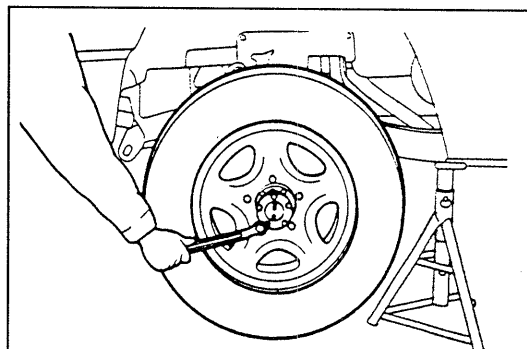
INSPECTION OF BRAKE PAD AND DISC

1. Jack up the vehicle and support it with rigid racks.
(As for the jack-up point and rigid rack supporting position, see GI Section.)



WRU90-BR113

2. Remove the front wheel.
(See page FS Section.)

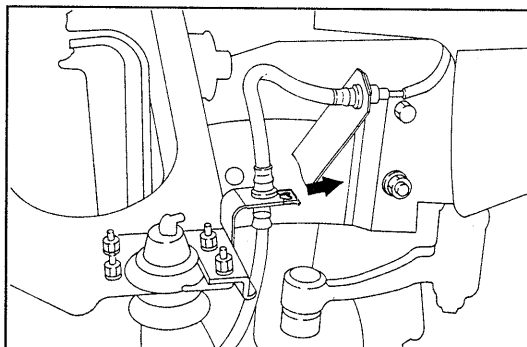


WRU92-BR582

3. Detach the clamp from the brake hose clamp of the upper arm.

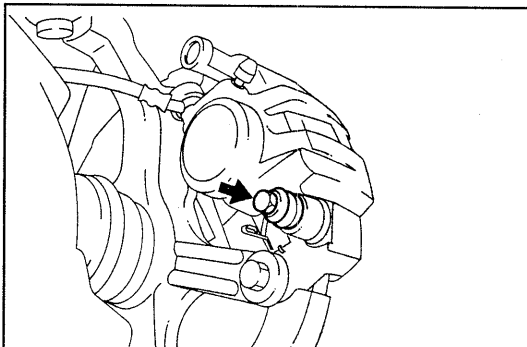
NOTE:

- Do not reuse the clip.



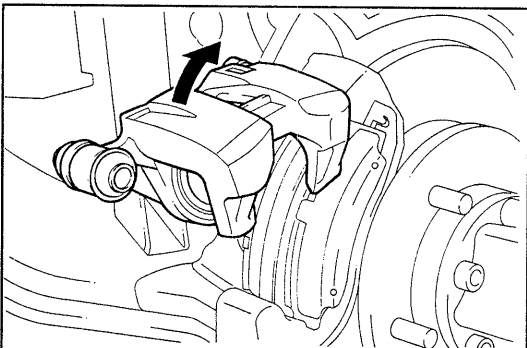
WRU90-BR553

4. Remove the caliper body attaching bolt.



WRU90-BR115

5. Lift the caliper body.



WRU90-BR116

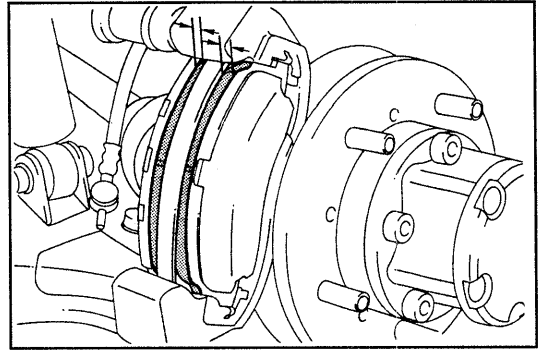
BRAKE SYSTEM

6. Measure the brake pad thickness.

New Part: 9 mm (0.35 inch)

Minimum Limit: 1.5 mm (0.06 inch)

If the measure value is lower than the minimum limit, replace the brake pad.

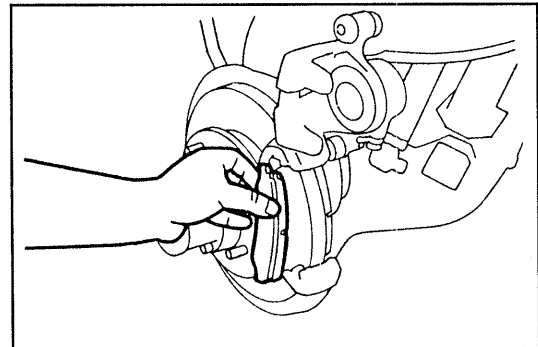


7. Inspection of brake pad

(1) Remove the brake pad.

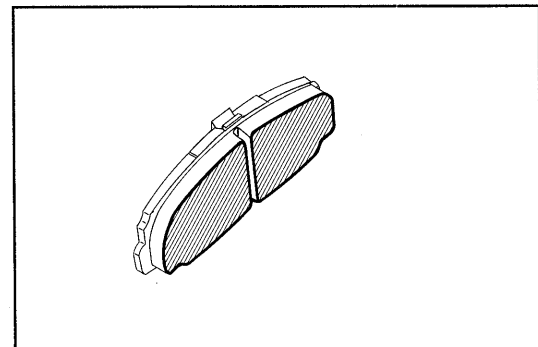
NOTE:

- Be very careful not to disengage the disc brake pad guide plate during this operation.



(2) Inspect the brake pad surface for burning.

If the brake pad exhibits burning, replace the brake pad.

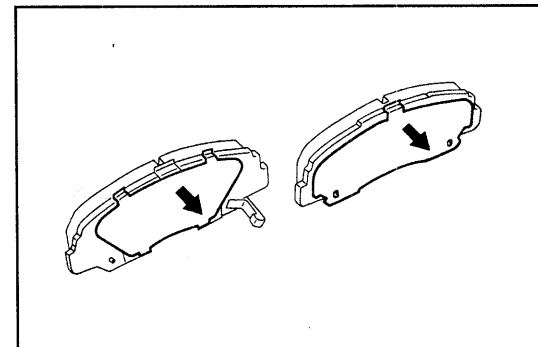


8. Replacement of brake pad

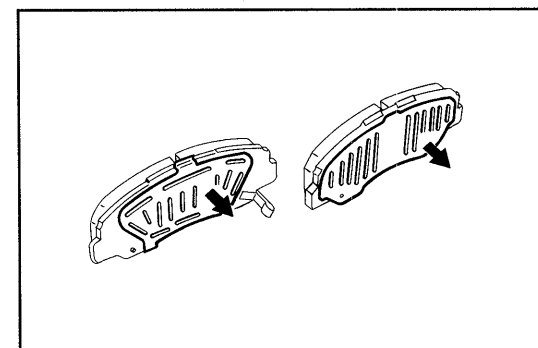
NOTE:

- When replacing the brake pad be sure to replace the pads inside and outside for both the right and left sides as a set. This replacement is required so as to prevent the vehicle from pulling to one side on application of brakes.

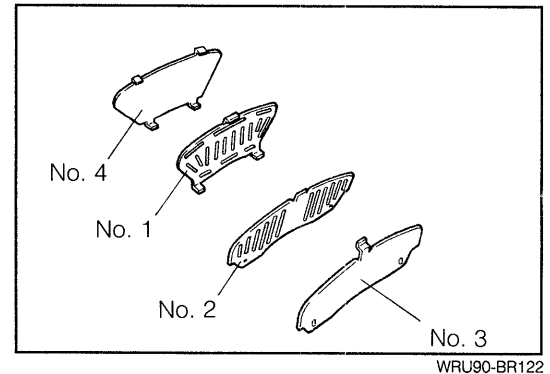
(1) Remove the antisqueal shims No.3 and No.4 from the brake pad.



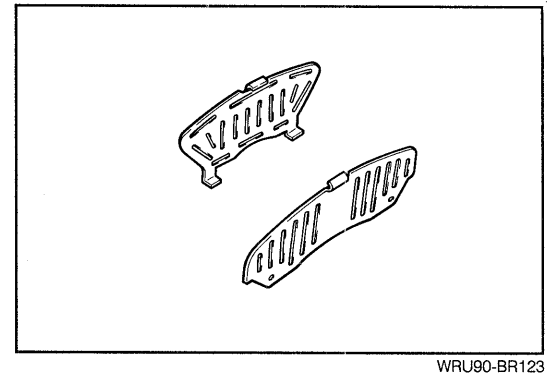
(2) Remove the antisqueal shims No.1 and No.2 from the brake pad.



- (3) Clean the antisqueal shims No.1, No.2, No.3 and No.4. Inspect them for damage. Replace any shim which exhibits damage.

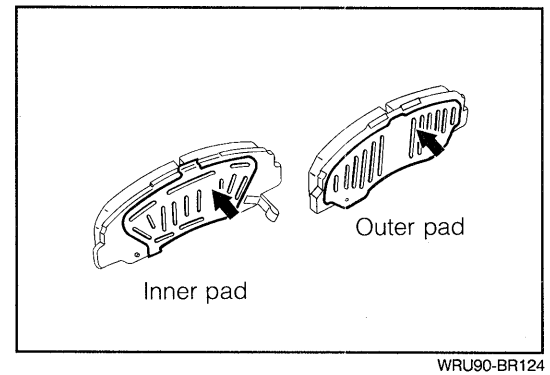


- (4) Apply antisqueal grease or pad grease to the both side of antisqueal shims No.1 and No.2.

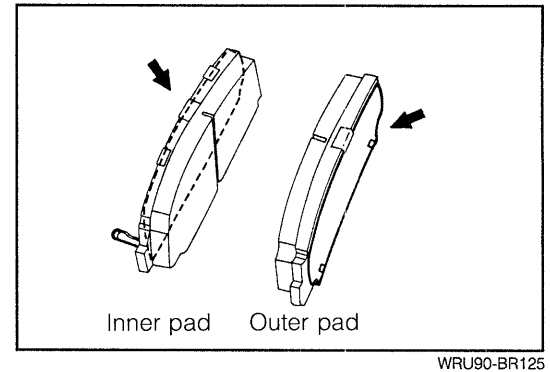


- (5) Install the antisqueal shims No.1 and No.2 to a new brake pad.
- (6) Apply antisqueal grease or pad grease into the slit of the antisqueal shim.

Filling Amount: Antisqueal shim No. 1
0.8 - 1.3 grams (0.03 - 0.046 oz)
Antisqueal shim No. 2
0.6 - 1.1 grams (0.02 - 0.039 oz)



- (7) Install the antisqueal shims No.3 and No.4 to the brake pad.



9. Inspection of brake disc

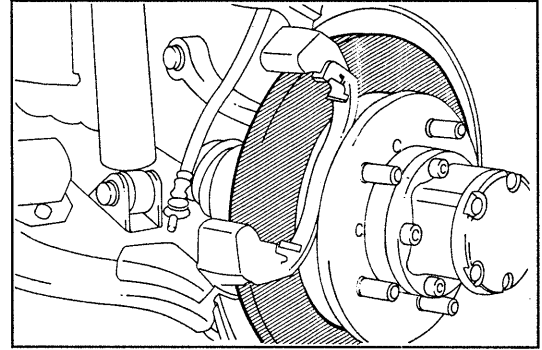
NOTE:

- Never allow any oil to get to the disc surface.

WRU90-BR126

BRAKE SYSTEM

- (1) Ensure that the disc surface exhibits no damage, such as abnormal wear and cracks.
If any damage exists on the disc surface, replace the disc. (See page FS Section.)



WRU92-BR583

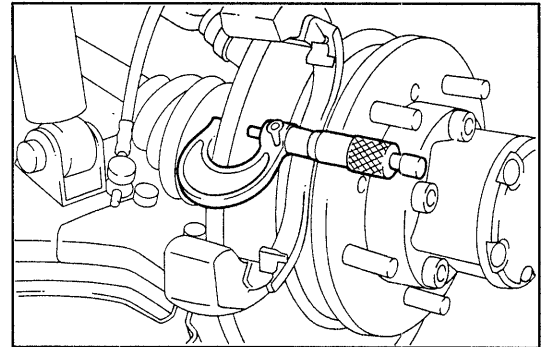
- (2) Measure the disc thickness. Ensure that the measured value is above the minimum limit.

New Part: 18.0 mm (0.71 inch)

Minimum Limit: 17.0 mm (0.67 inch)

Difference in disc thickness on the same circumference: Not exceed 0.015 mm (0.0006 inch)

If the measured value is less than the minimum limit, replace the disc. (See page FS Section.)



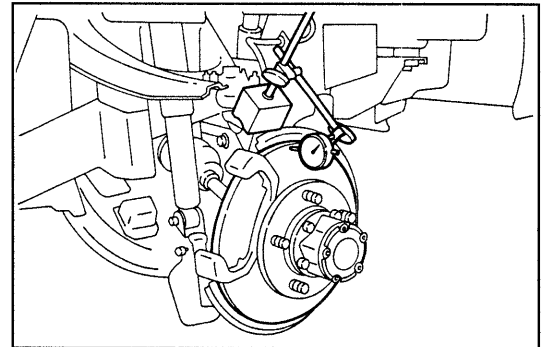
WRU92-BR580

- (3) Ensure that the runout of the brake disc is within the allowable limit.

Allowable Runout Limit: 0.15 mm (0.0059 inch)

NOTE:

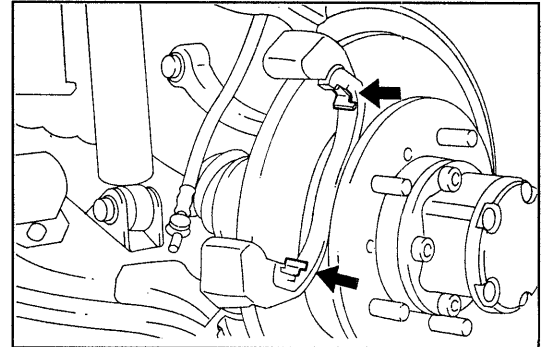
- Measuring point should be point 10 mm (0.39 inch) inward from outer periphery of brake disc.



WRU90-BR554

10. Inspection of disc brake pad guide

- (1) Ensure that no damage exists on the disc brake pad guide.
If any damage is present, replace the disc brake pad guides.

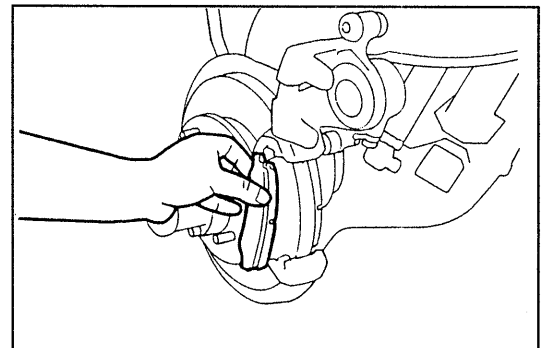


WRU90-BR129

- (2) Install the pad to the mounting support.

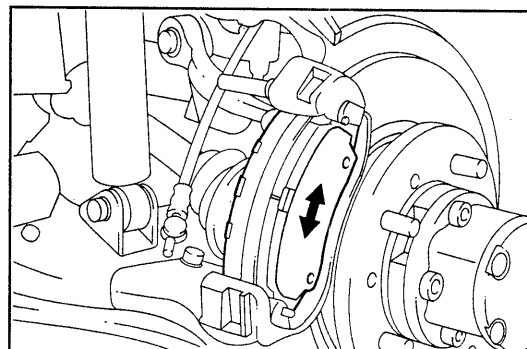
NOTE:

- The pad equipped with the warner should come at the inside of the vehicle.
- Never allow any oil to get to the pad.



WRU90-BR130

- (3) Turn the pad in the rotating direction to ensure that no excessive looseness exists.
If any excessive looseness exists, replace the disc brake pad guides.



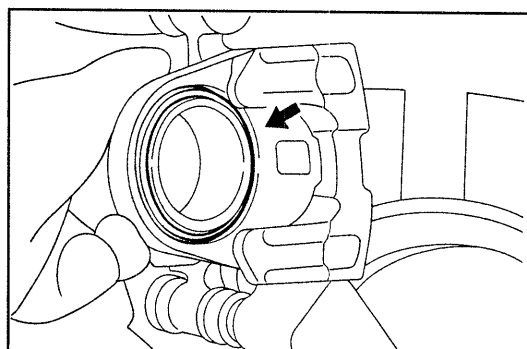
WRU90-BR131

11. Installation of caliper

- (1) Inspect the caliper piston for brake fluid leakage.

NOTE:

- If any brake fluid leakage is present, repair the fluid leakage.

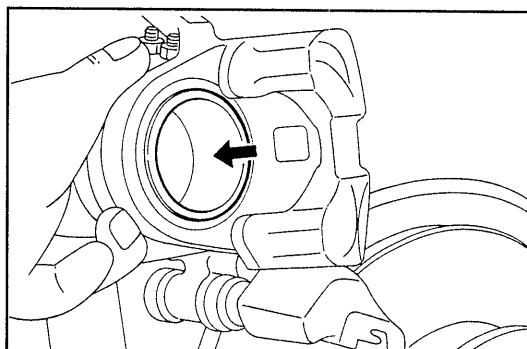


WRU90-BR132

- (2) Push the caliper piston to the cylinder side.

NOTE:

- Prior to this operation, drain the brake fluid from reservoir tank, as required, so that no brake fluid overflows from the brake reservoir tank during this operation.

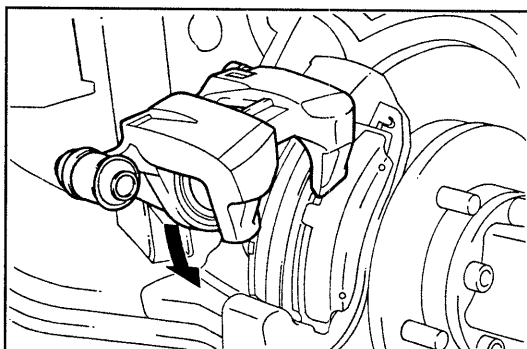


WRU90-BR133

- (3) Install the caliper on the brake pad.

NOTE:

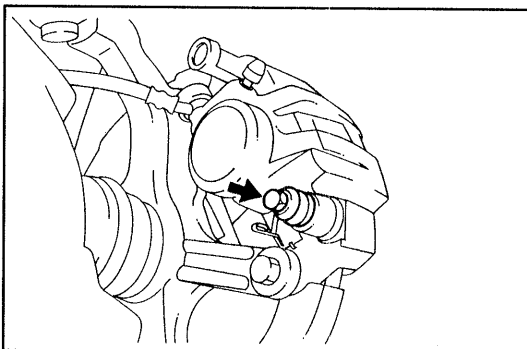
- Care must be exercised not to bring the caliper into contact with the antisqueal shims during this operation.



WRU90-BR134

- (4) Install the caliper attaching bolt and tighten it to the specified torque.

Tightening Torque: 3.2 - 4.2 kgf-m
 (23.2 - 30.3 ft-lb, 31.4 - 41.2 N·m)



WRU90-BR136

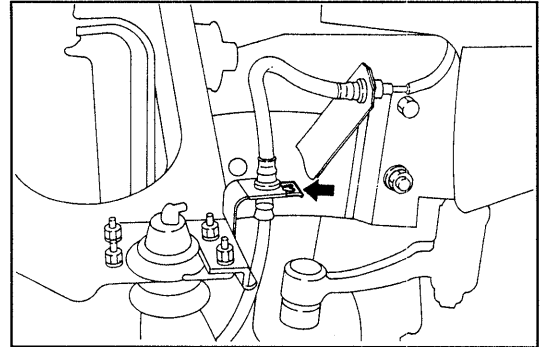
BRAKE SYSTEM

12. Connect the brake hose to the upper arm bracket. Install the new clip.

NOTE:

- Never reuse the clips.

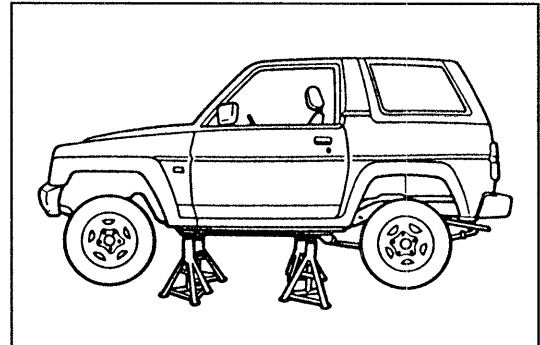
13. Perform brake tests on a brake tester.



WRU90-BR555

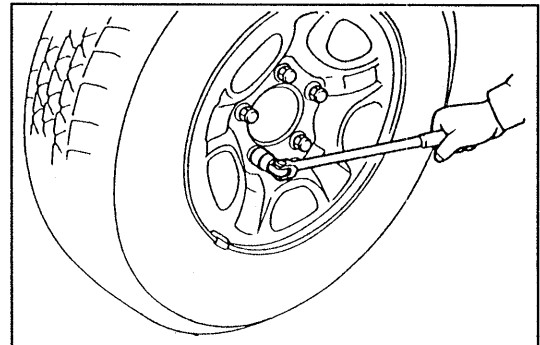
REMOVAL OF BRAKE CALIPER

1. Jack up the vehicle and support it with safety stands. (As for the jacking-up points and supporting points for the safety stands, see GI Section.)



WRU90-BR136

2. Remove the front wheel. (See page FS Section.)
3. Drain the brake fluid of the caliper from the air bleeder plug.

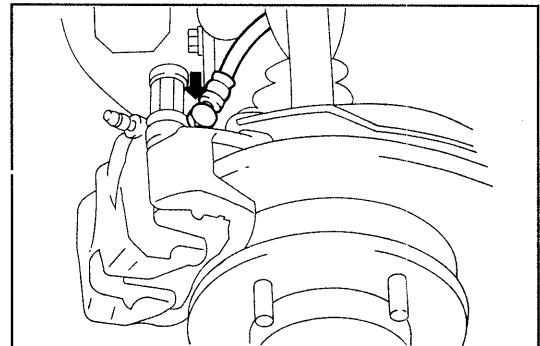


WRU92-BR584

4. Disconnect the brake hose from the caliper.
NOTE:
 - Since the brake fluid flows out, receive the brake fluid with an adequate container.

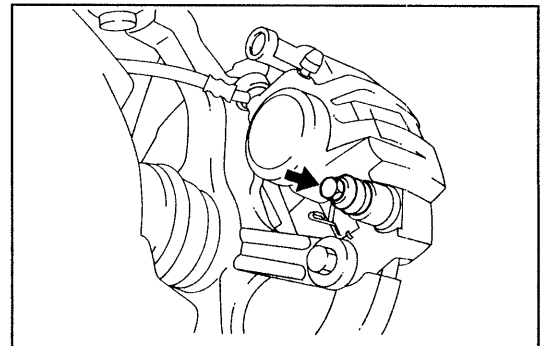
CAUTION:

- Never reuse the removed gaskets.



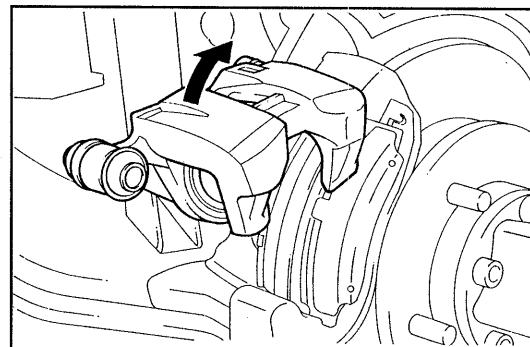
WRU90-BR138

5. Remove the brake caliper attaching bolt.



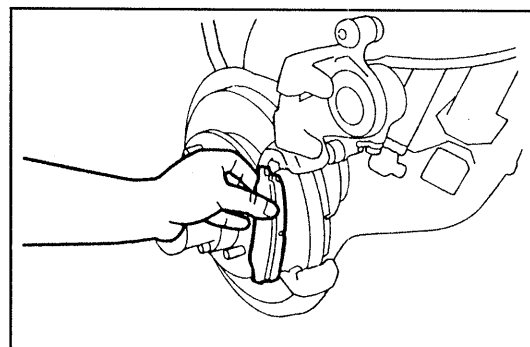
WRU90-BR139

- Remove the brake caliper from the mounting support pin.



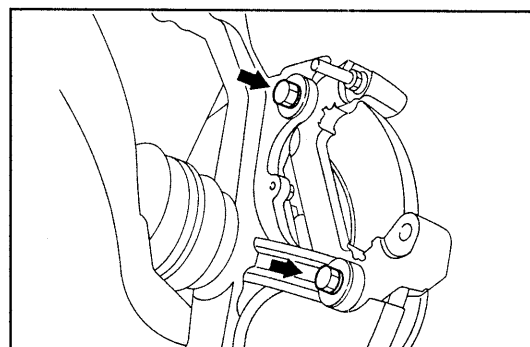
WRU90-BR140

- Remove the brake pads.



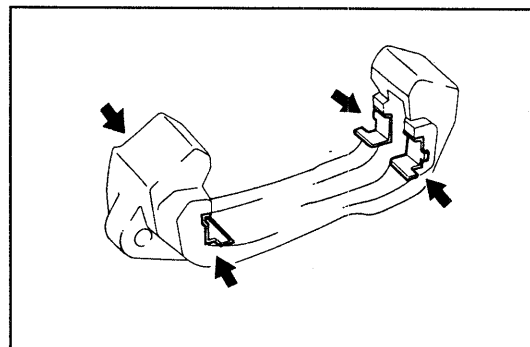
WRU90-BR141

- Remove the brake mounting support.



WRU90-BR142

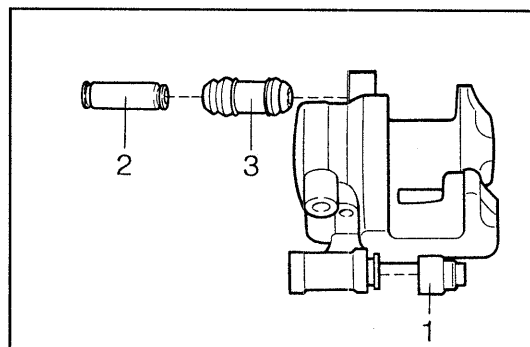
- Remove the disc brake pad guide plates from the brake mounting support.



WRU90-BR143

DISASSEMBLY OF CALIPER

- Remove the rubber boot from the caliper.
- Pull out the cylinder slide bush.
- Remove the bush dust boot.



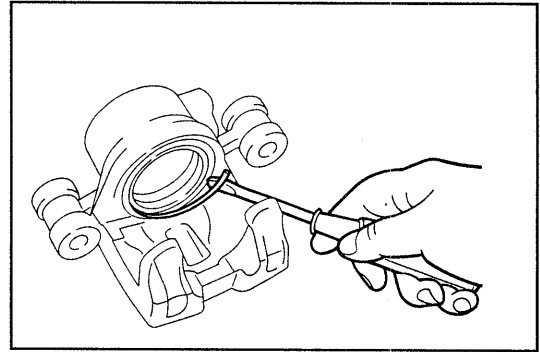
WRU90-BR144

BRAKE SYSTEM

4. Remove the boot set ring.

CAUTION:

- Never reuse the removed set ring.

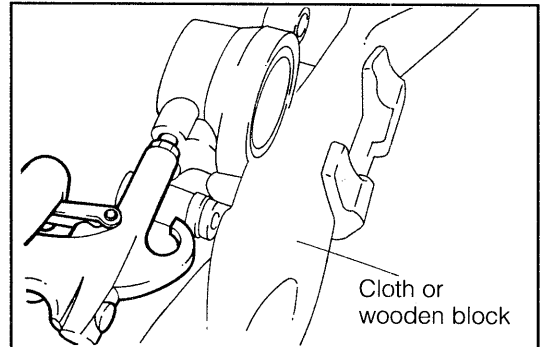


WRU90-BR145

5. Insert a suitable cloth or a wooden block in front of the piston. Then, pull out the piston by applying compressed air from the brake hose connecting section.

WARNING:

- Since the piston jumps out strongly when applying compressed air, care must be exercised so that your fingers or the like may not be caught in.
- Be sure to put on safety goggles when using compressed air.

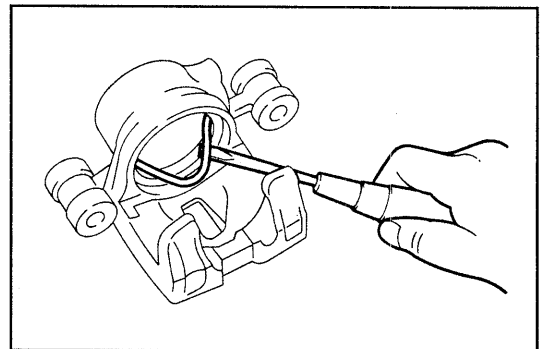


WRU90-BR146

6. Remove the piston seal from the cylinder section.

CAUTION:

- Never reuse the removed boot.

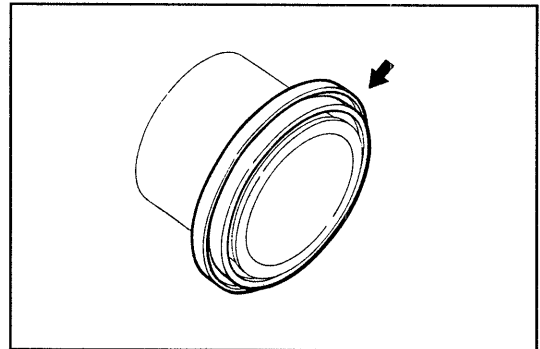


WRU90-BR147

7. Remove the rubber boot from the piston.

CAUTION:

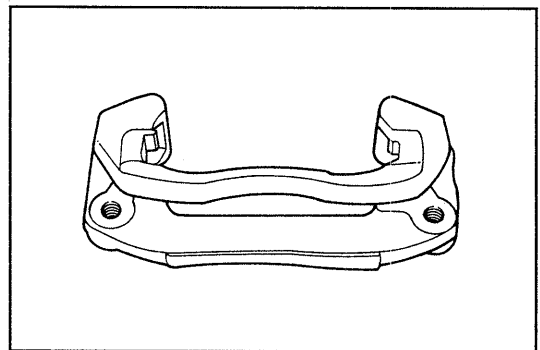
- Never reuse the removed boot.



WRU90-BR148

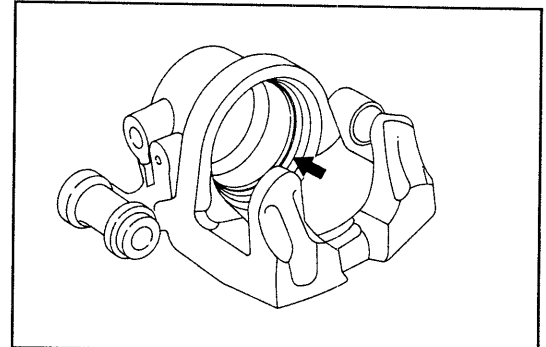
INSPECTION

1. Ensure that the mounting support exhibits no damage, such as cracks and/or wear.



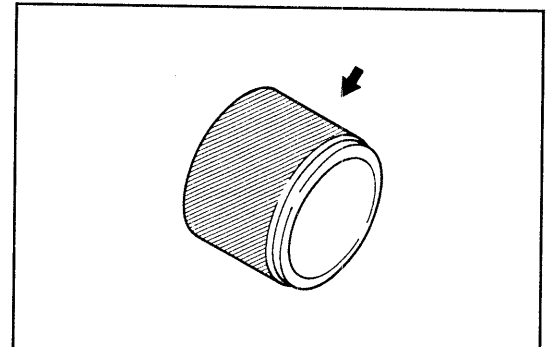
WRU90-BR149

2. Ensure that the caliper exhibits no damage, such as cracks and wear.
3. Ensure that the caliper and inner surface of the piston exhibit no damage, such as rust and/or scratches.



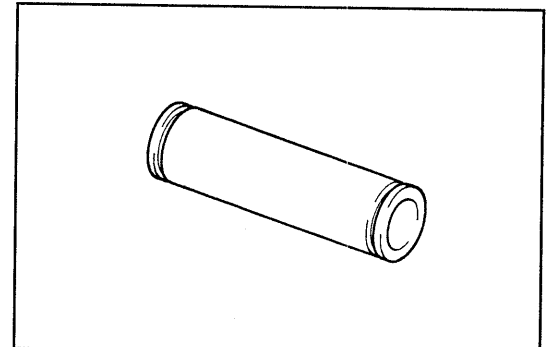
WRU90-BR150

4. Ensure that the piston exhibits no damage, such as rust and/or scratches.



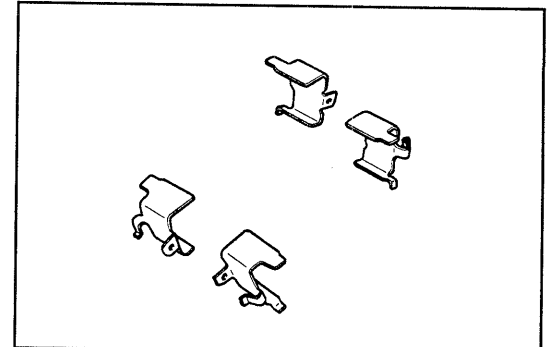
WRU90-BR151

5. Ensure that the cylinder slide bush, bush dust boot and rubber boot exhibit no damage, such as rust and/or scratches.



WRU90-BR152

6. Ensure that the pad guide plates exhibit no wear and/or damage.



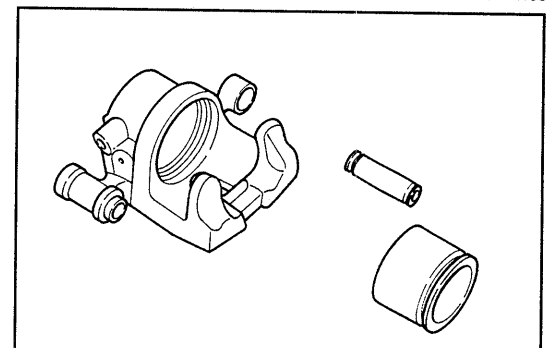
WRU90-BR153

ASSEMBLY OF CALIPER

1. Wash the reassembling parts and dry them with compressed air.

WARNING:

- Be sure to put on safety goggles when using compressed air.



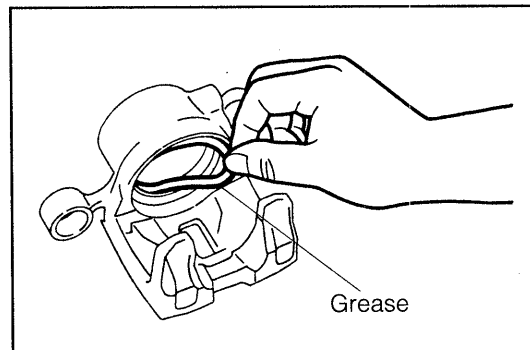
WRU92-BR571

BRAKE SYSTEM

2. Apply rubber grease to the piston seal. Install the piston seal to the cylinder.

CAUTION:

- Never reuse the piston seal.
- Be very careful not to scratch the edge of the piston seal.



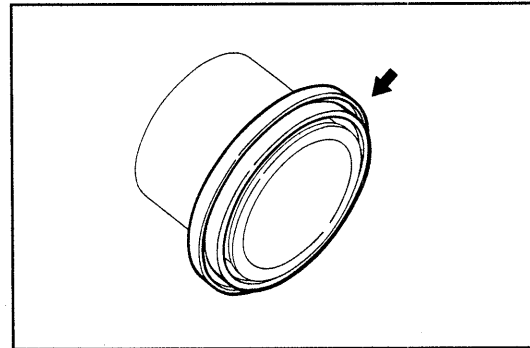
WRU90-BR155

3. Apply rubber grease to the cylinder boot. Install the cylinder boot to the piston.

CAUTION:

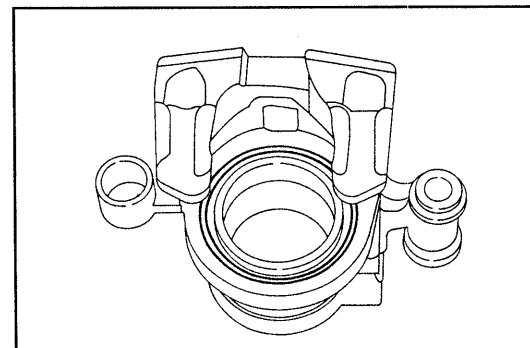
- Never reuse the cylinder boot.

4. Apply rubber grease to the piston sliding surface.



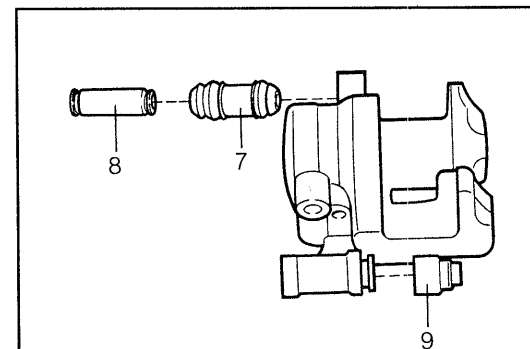
WRU90-BR156

5. Insert the piston into the cylinder.
6. Fit the cylinder boot into the groove at the cylinder side. Fit the set ring into the groove of the cylinder boot.



WRU90-BR157

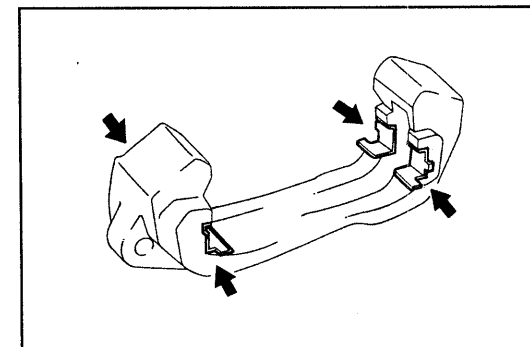
7. Insert the bush dust boot into the caliper.
8. Apply rubber grease to the cylinder slide bush. Insert the cylinder slide bush into the bush dust boot. Then, fit both edge sections of the bush dust boot into the groove sections of the cylinder slide bush.
9. Install the rubber boot to the caliper.



WRU90-BR158

INSTALLATION OF BRAKE CALIPER

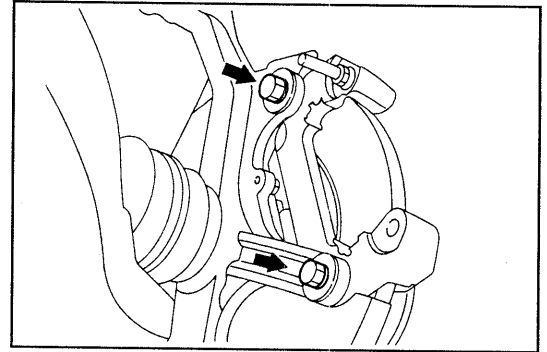
1. Install the disc brake pad guide plates to the brake mounting support.



WRU90-BR159

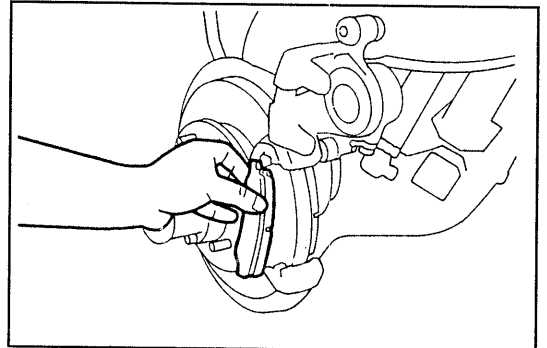
2. Install the brake mounting support to the steering knuckle with new spring washer interposed.

Tightening Torque: 7.0 - 9.0 kgf-m
(50.6 - 65.1 ft-lb, 68.6 - 88.3 N·m)



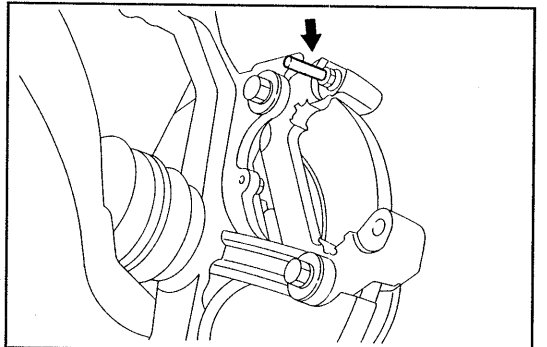
WRU90-BR160

3. Install the brake pad to the brake mounting support.



WRU90-BR161

4. Apply rubber grease to the brake mounting support pin.

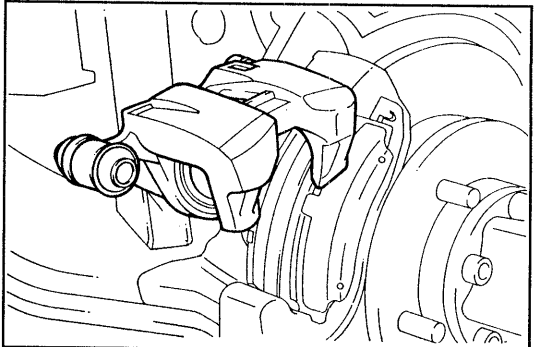


WRU90-BR162

5. Install the brake caliper to the mounting support. Place the mounting support over the brake pad.

NOTE:

- Be very careful not to damage the antisqueal shim during this operation.

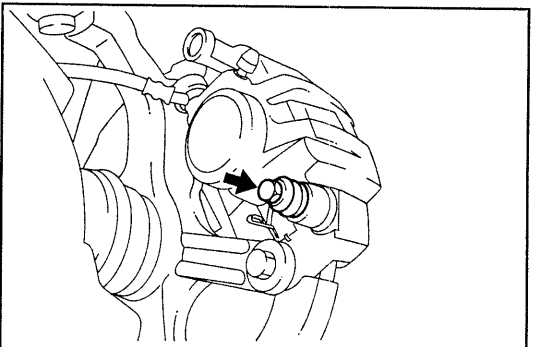


WRU90-BR163

6. Tighten the brake caliper attaching bolts.

Tightening Torque: 3.2 - 4.2 kgf-m
(23.1 - 30.3 ft-lb, 31.4 - 41.2 N·m)

7. Ensure that each boot of the caliper exhibits no damage, such as cracks. Also, ensure that no turning-over is present at the fitting section of each boot.



WRU90-BR164

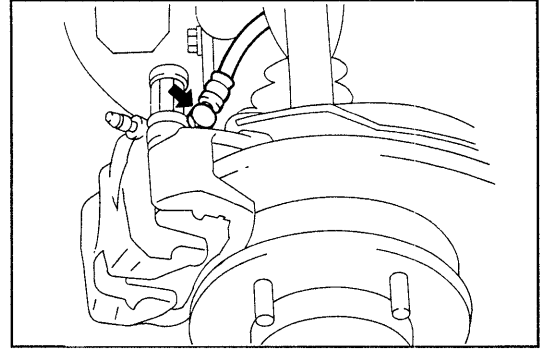
BRAKE SYSTEM

8. Connect the brake hose to the caliper with new gaskets interposed.

Tightening Torque: 2.1 - 2.7 kgf-m
(15.2 - 19.5 ft-lb, 20.6 - 26.5 N·m)

CAUTION:

- Never reuse the gaskets.



WRU90-BR165

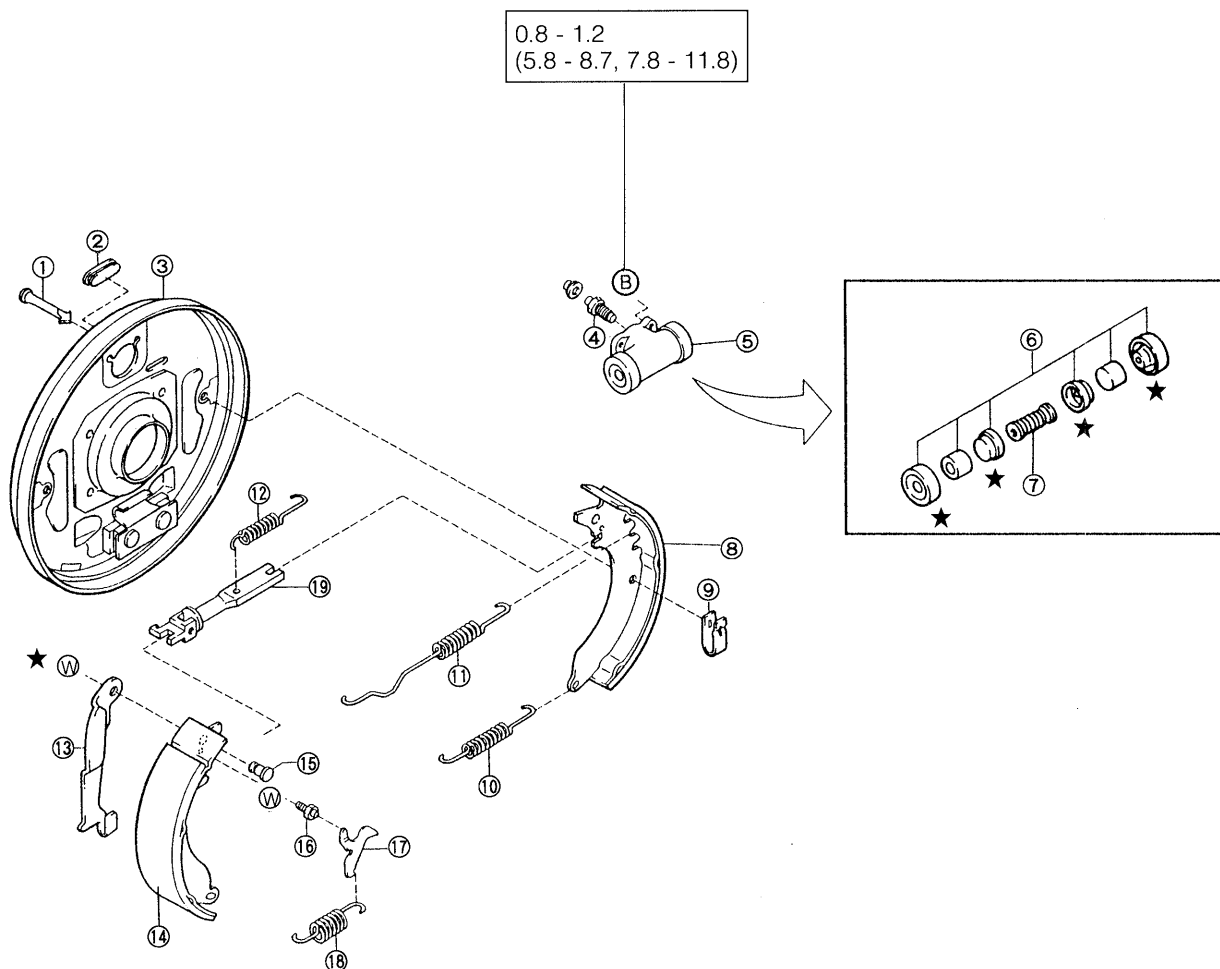
9. Perform brake air bleeding.

(See page BR-18.)

10. Perform the brake test, using a brake tester.

WRU92-BR593

REAR BRAKE COMPONENTS



0.8 - 1.2 : Tightening torque
 Unit : kgf-m (ft-lb, N-m)
 ★ : Non-reusable parts

- ① Shoe hold down spring pin
- ② Hole plug
- ③ Rear brake backing plate S/A
- ④ Bleeder plug
- ⑤ Rear wheel brake cylinder assy
- ⑥ Rear wheel cylinder cap kit
- ⑦ Compression spring
- ⑧ Rear brake shoe
- ⑨ Shoe hold down spring
- ⑩ Tension spring

- ⑪ Tension spring
- ⑫ Tension spring No. 2
- ⑬ Parking brake shoe lever S/A
- ⑭ Rear brake shoe
- ⑮ Parking brake lever pin
- ⑯ Bolt
- ⑰ Automatic adjust lever
- ⑱ Tension spring
- ⑲ Parking brake shoe strut

BRAKE SYSTEM

DISASSEMBLY

CAUTION:

- Make sure that no lubricant, such as grease, gets to the brake shoe surfaces.
- When replacing the brake shoe, be sure to replace the leading and trailing shoe for both the right and left side as a set. This replacement required so as to prevent the vehicle from pulling to one side on application of the brakes.

1. Jack up the vehicle and support it with safety stands.
(As for the jacking-up points and supporting points for the safety stands, see GI Section.)

2. Remove the rear wheel.

NOTE:

- Be sure to loosen the attaching bolts evenly over two or three stages in the sequence indicated in the right figure.

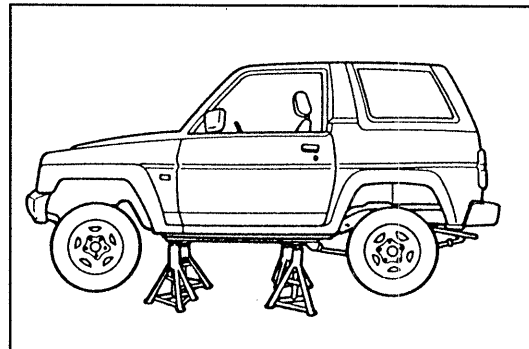
3. Remove the brake drum.

If any difficulty is encountered in removing the brake drum, install the bolts (M10 × 1.25) to each bolt hole, as indicated in the right figure.

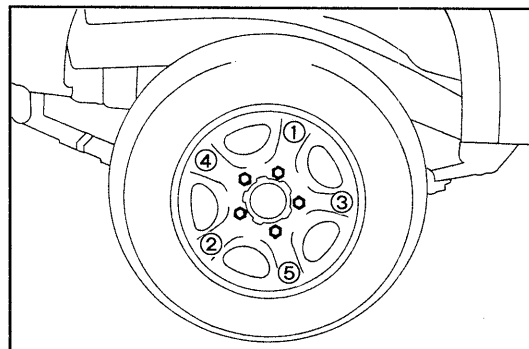
The brake drum can be detached easily when the bolts are tightened alternately.

4. Detach the tension springs from the trailing side shoe, using the following SST and remove the tension springs.

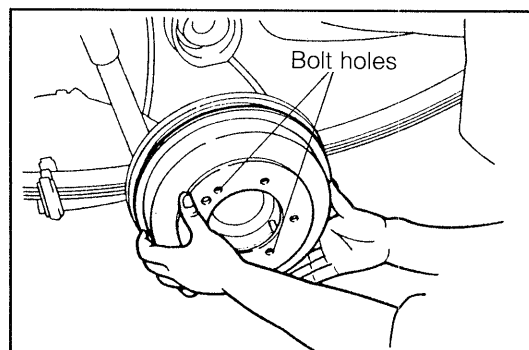
SST: 09921-00010-000



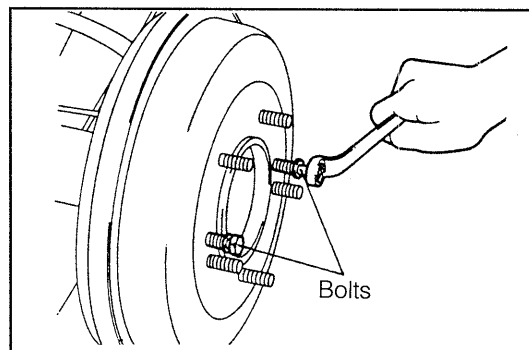
WRU90-BR168



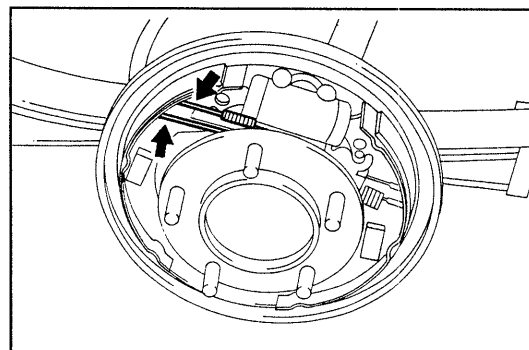
WRU90-BR169



WRU90-BR170

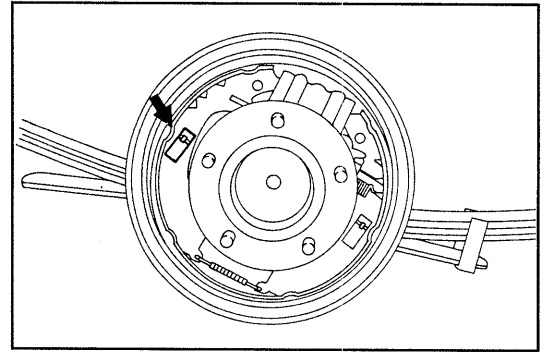


WRU90-BR556



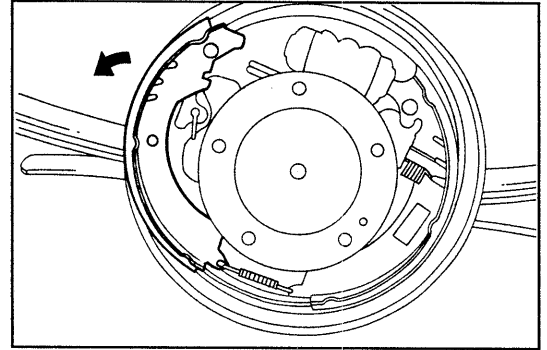
WRU90-BR171

5. Detach the shoe hold down spring pin and hold down spring at the trailing side.



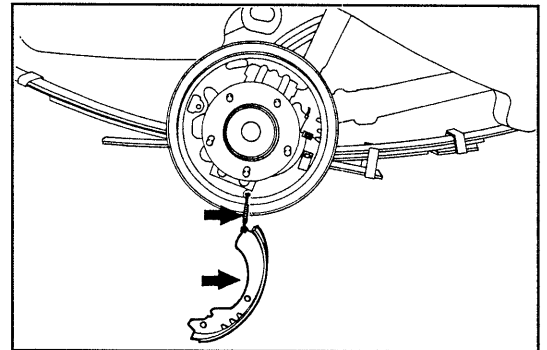
WRU90-BR172

6. Remove the shoe at the trailing side from the backing plate.



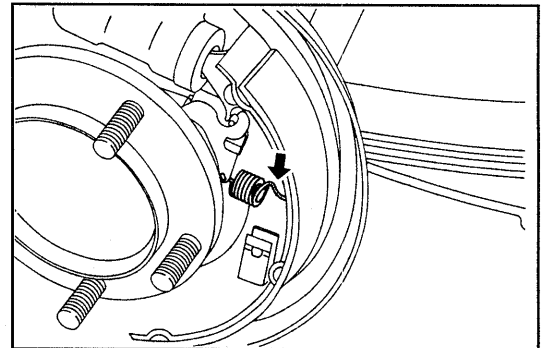
WRU90-BR173

7. Remove the shoe at the trailing side from the tension spring.
8. Remove the tension spring from the shoe at the leading side.



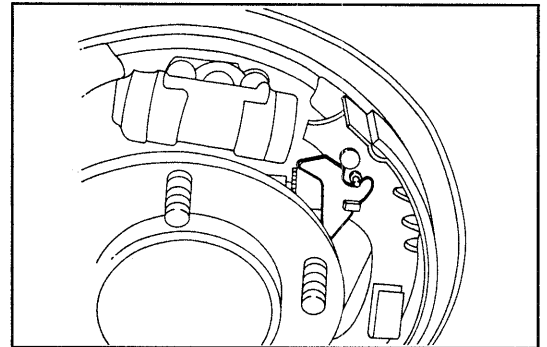
WRU90-BR174

9. Remove the tension spring, using the following SST.
SST: 09921-00010-000



WRU90-BR175

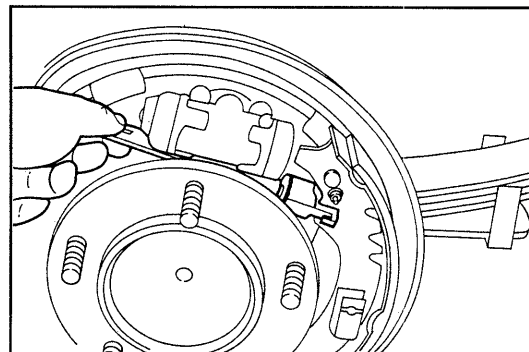
10. Remove the automatic adjusting lever.



WRU90-BR557

BRAKE SYSTEM

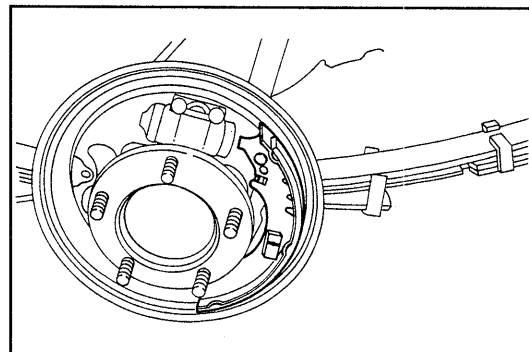
11. Remove the parking brake shoe strut.



WRU90-BR176

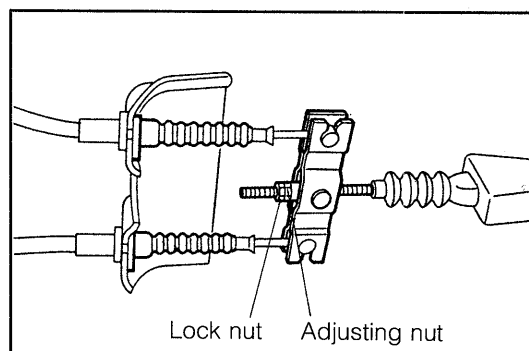
12. Remove the hold-down spring and pin of the leading side shoe.

13. Remove the leading side shoe from the backing plate.



WRU90-BR177

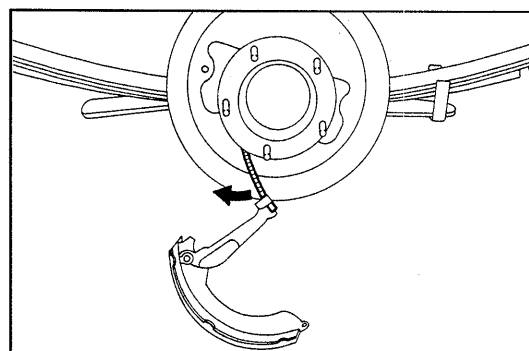
14. Loosen the lock nut of the parking brake lever adjusting nut.
Fully loosen the adjusting nut.



Lock nut Adjusting nut

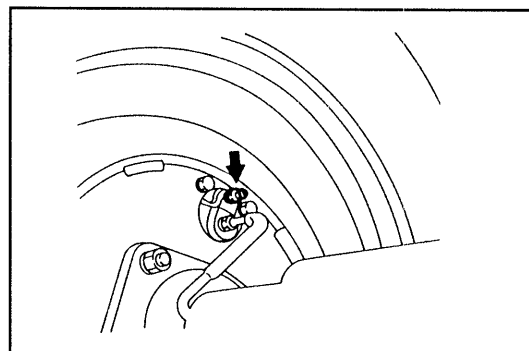
WRU90-BR558

15. Disconnect the parking brake cable from the parking brake shoe lever.



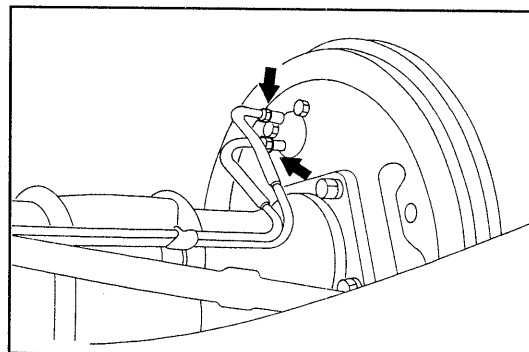
WRU90-BR178

16. Drain the brake fluid by loosening the rear wheel cylinder air bleeder plug.



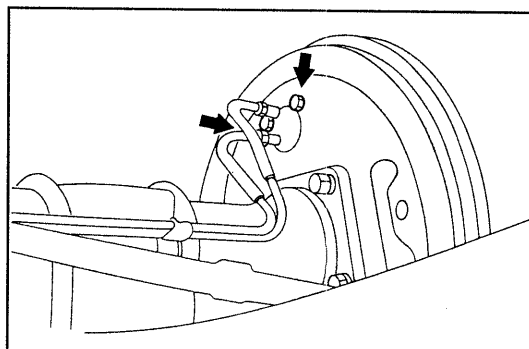
WRU90-BR559

17. Disconnect the brake pipes from the rear wheel cylinder, using a brake pipe spanner.



WRU90-BR179

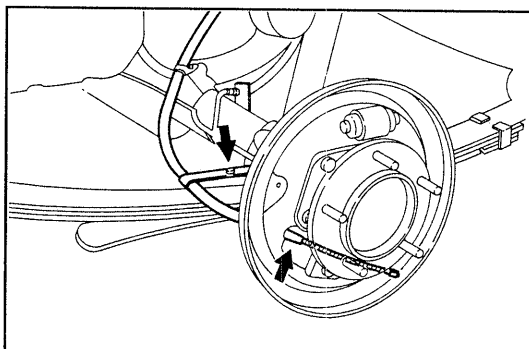
18. Remove the rear wheel cylinder from the backing plate.



WRU90-BR180

19. Removal of parking brake cable

- (1) Remove the parking brake cable clamp bolt.
- (2) Pull out the parking brake cable from the backing plate by retracting the pawl of the parking brake cable.



WRU90-BR181

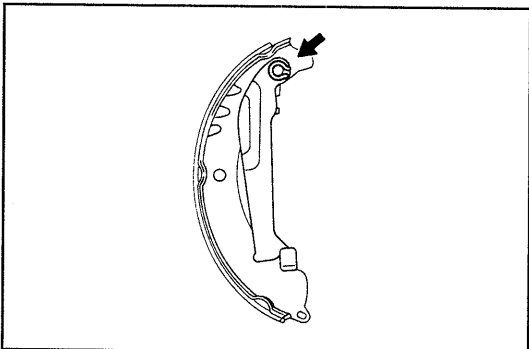
20. Disassembly of leading side shoe

- (1) Remove the "C" washer.

NOTE:

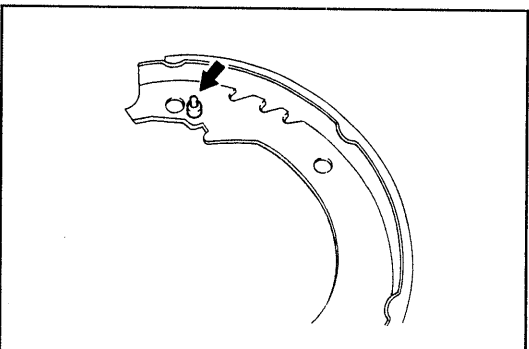
- Never reuse the "C" washer.

- (2) Remove the parking brake shoe lever and parking brake lever pin.



WRU90-BR184

- (3) Remove the washer and automatic adjusting lever pin.



WRU90-BR185

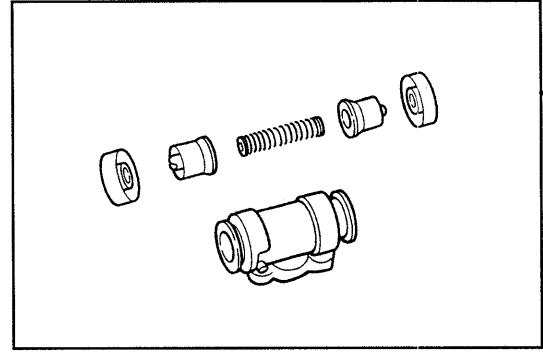
BRAKE SYSTEM

21. Disassembly of rear wheel cylinder

- (1) Remove the wheel cylinder boots.
- (2) Remove the wheel cylinder pistons.
- (3) Remove the piston cup.
- (4) Remove the compression spring.

22. Removal of brake backing plate

(See the Rear Axle section.)

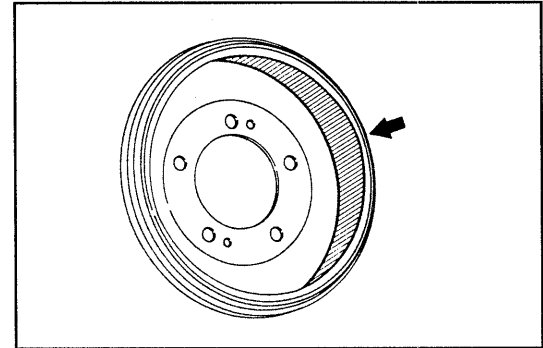


WRU90-BR185

INSPECTION

1. Check of brake drum

- (1) Ensure that the brake shoe contact surface exhibits no defect, such as severe roughness and abnormal wear. If any defect is present, replace the brake drum with a new one.

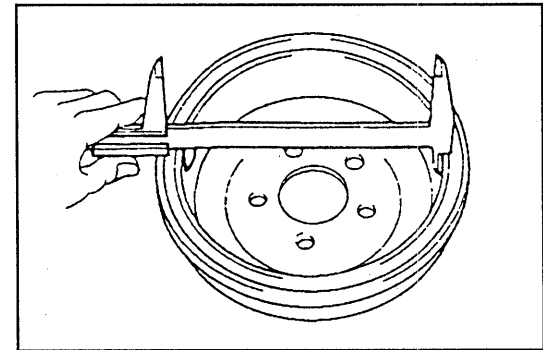


WRU90-BR188

- (2) Measure the inner diameter of the brake drum. Ensure that the measured value is less than the maximum limit. If the measured value is greater than the maximum limit, replace the brake drum with a new one.

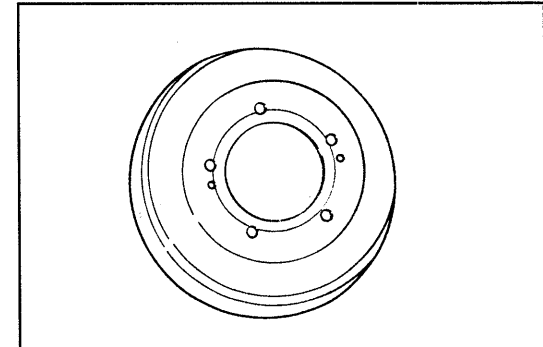
New Part: 254.00 mm (10.0 inches)

Maximum Limit: 256.00 mm (10.08 inches)



WRU90-BR189

- (3) Ensure that the brake drum exhibits no damage, such as cracks. If any damage is present, replace the brake drum.



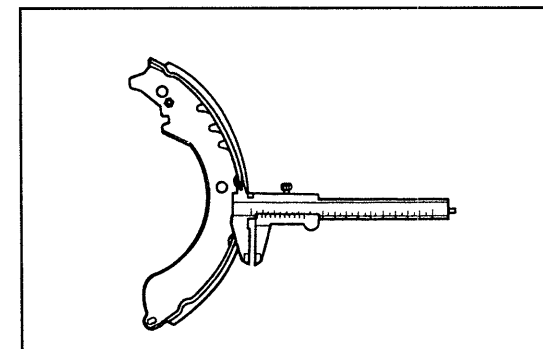
WRU90-BR190

2. Check of brake shoe

- (1) Ensure that the remaining amount of the brake lining exceeds the minimum limit. If the remaining amount is less than the minimum limit, replace the brake lining.

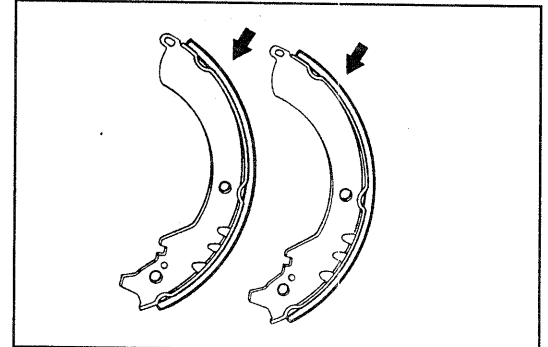
New Part: 5 mm (0.2 inch)

Minimum Limit: 1 mm (0.04 inch)



WRU90-BR191

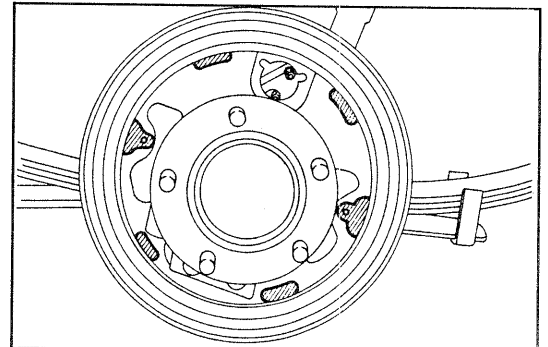
- (2) Ensure that each brake shoe contact surface exhibits no defect, such as abnormal wear and/or cracks.
If any defect is present, replace the brake shoe.



WRU92-BR572

3. Check of brake backing plate

- (1) Ensure that the brake shoe contact surface exhibits no abnormal wear.
- (2) Ensure that the backing plate exhibits no damage, such as bend.
If any defect is present, replace the backing plate.
(See the Rear Axle section.)



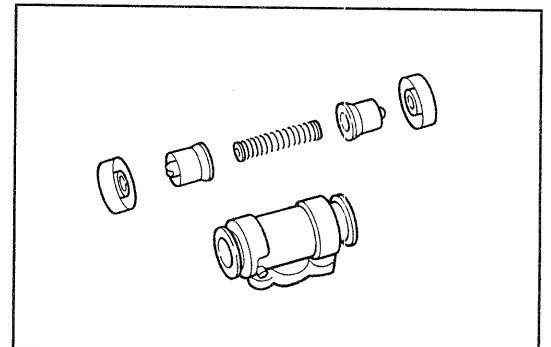
WRU90-BR193

4. Check of wheel cylinder

CAUTION:

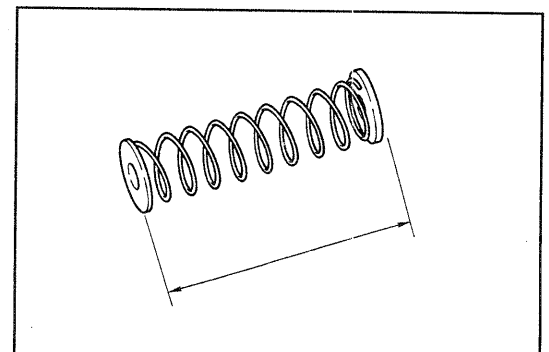
- Never reuse the cups and boots.

- (1) Ensure that the inner surface of the wheel cylinder exhibits no rust and/or scratches.
If any rust or scratch is present, replace the wheel cylinder.
- (2) Ensure that no rust or scratch is present at the piston-to-cylinder contact surface and cup-to-cylinder contact surface. Also, ensure that the brake shoe contact surface exhibits no abnormal wear.
If any rust or scratch is present, replace the piston.
- (3) Ensure that the compression spring exhibits no damage, such as flattened condition.
If any damage is present, replace the compression spring.



WRU92-BR573

- (4) Ensure that the free length of the compression spring is within specified value.
Specified Value: 57 ± 1.5 mm (2.24 ± 0.059 inches)



WRU90-BR195

BRAKE SYSTEM

5. Check of related parts
 - (1) Ensure that the tension springs exhibit no damage, such as wear and/or flattened condition.
 - (2) Ensure that the parking brake strut exhibits no wear and rust. Also, ensure that the screw turns smoothly.
 - (3) Ensure that each of the levers, pins and so forth exhibits no damage, such as wear.If any defect is present, replace the defective parts.

ASSEMBLY

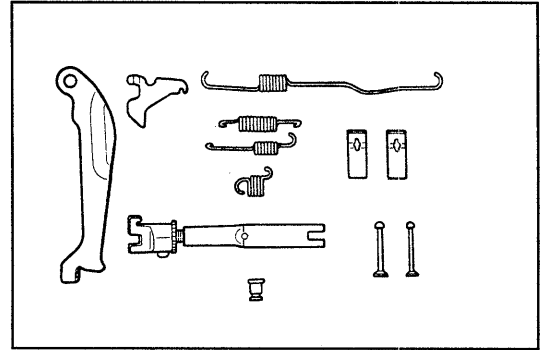
CAUTION:

- Make sure that no lubricant, such as grease, gets to the brake shoe surfaces.

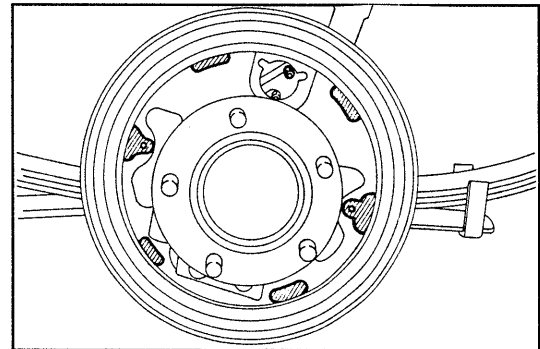
1. Clean the backing plate.
2. Installation of wheel cylinder
 - (1) Thinly apply rubber grease to the pistons and cup. Assemble the pistons and cup to the cylinder together with the compression spring.

CAUTION:

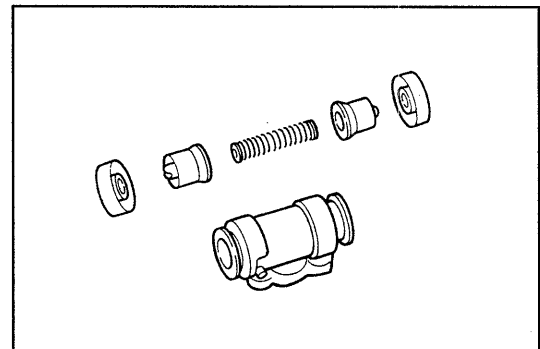
 - Make sure that the cup is installed in the correct direction. The cup should be assembled in such a way that the protruding surface of the cup faces toward the piston side.
 - (2) Install the boot to the cylinder. Assemble the boot to the piston.
 - (3) Apply the Three Bond 1105B to the wheel cylinder installation surface of the backing plate.



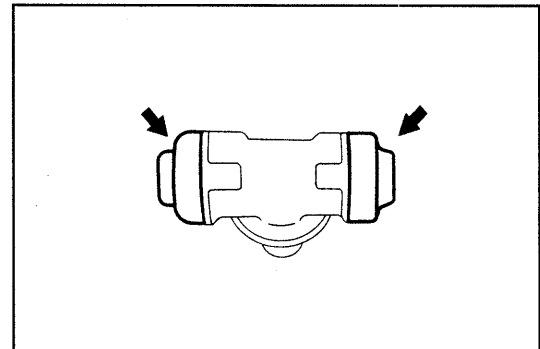
WRU92-BR574



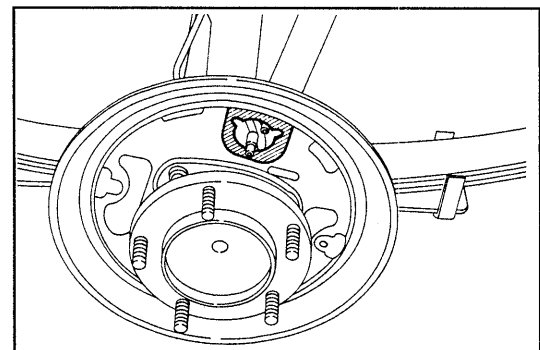
WRU90-BR197



WRU90-BR198



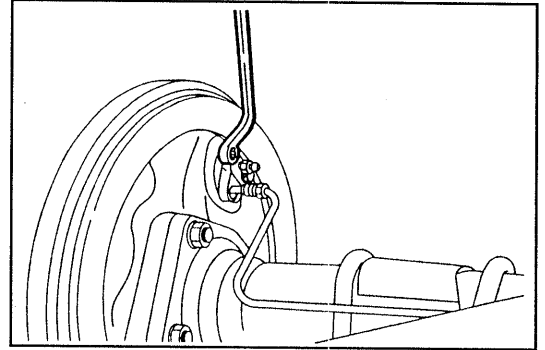
WRU90-BR199



WRU90-BR200

- (4) Install the wheel cylinder to the backing plate.

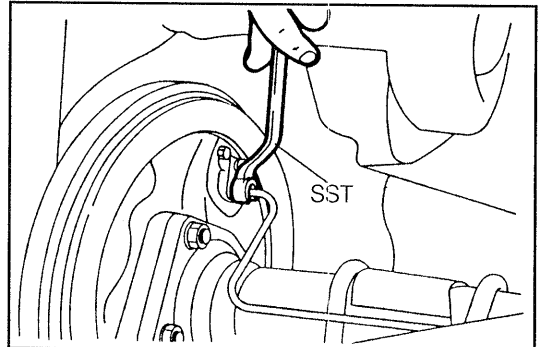
Tightening Torque: 0.8 - 1.2 kgf-m
(5.8 - 8.7 ft-lb, 7.8 - 11.8 N·m)



WRU90-BR201

- (5) Connect the brake tube to the wheel cylinder.

Tightening Torque: 1.3 - 1.8 kgf-m
(9.4 - 13.0 ft-lb, 12.7 - 17.7 N·m)

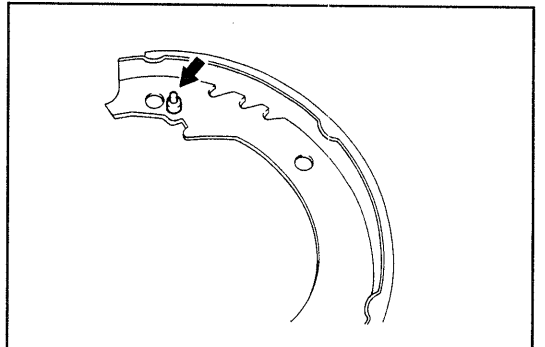


WRU90-BR202

3. Assembly of shoe at leading side

- (1) Install the washer and automatic adjusting lever pin.

Tightening Torque: 0.26 - 0.5 kgf-m
(1.88 - 3.62 ft-lb, 2.55 - 4.9 N·m)

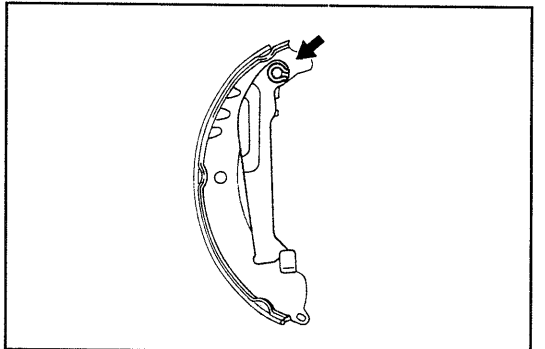


WRU90-BR203

- (2) Thinly apply brake grease to the parking brake lever pin. Install the parking brake lever pin to the shoe.

- (3) Install the parking brake lever to the pin.

- (4) Install a new "C" washer to the parking brake lever pin. Bend the "C" washer by means of pliers, until both ends of the "C" washer come in contact with each other.

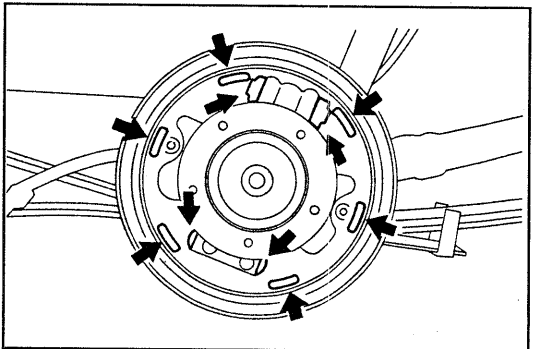


WRU90-BR204

4. Assembly of brake shoe at leading side

- (1) Apply a thin film of brake grease to the shoe contact surface of the backing plate.

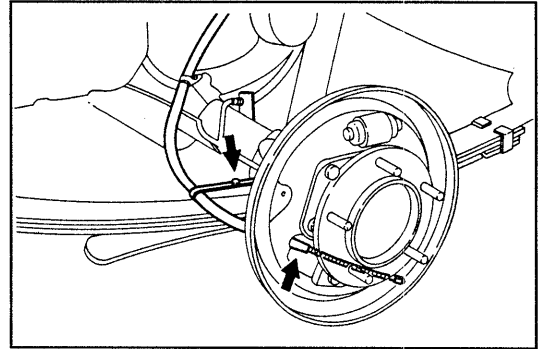
- (2) Apply a thin film of brake grease to the pawl section of the wheel cylinder piston.



WRU90-BR208

BRAKE SYSTEM

- (3) Connect the parking brake cable to the backing plate.
- (4) Install the cable clamp.

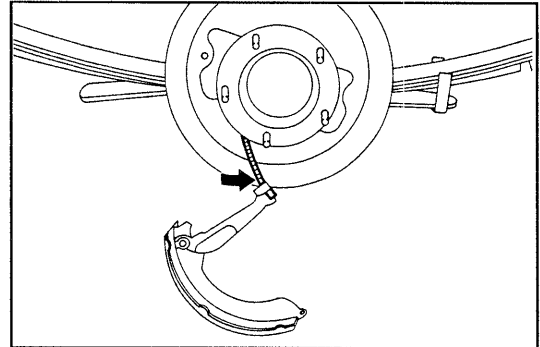


WRU90-BR209

- (5) Connect the parking brake cable to the parking brake lever.

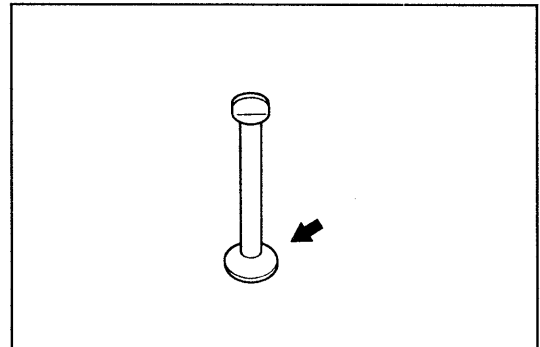
NOTE:

- Be very careful not to bend the parking brake cable by applying undue force to it.



WRU90-BR210

- (6) Apply the Three Bond 1105B® to the head section of the hold down spring pin.

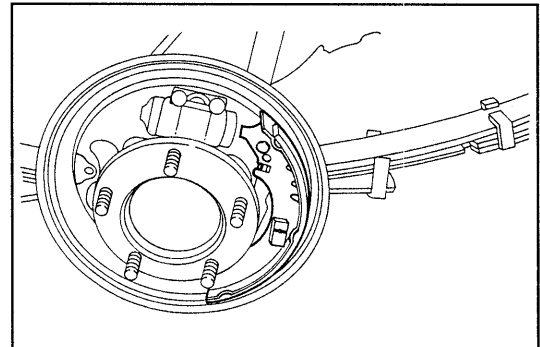


WRU90-BR211

- (7) While holding the shoe toward the backing plate, install the shoe to the backing plate by means of the shoe hold down spring pin and shoe hold down spring.

NOTE:

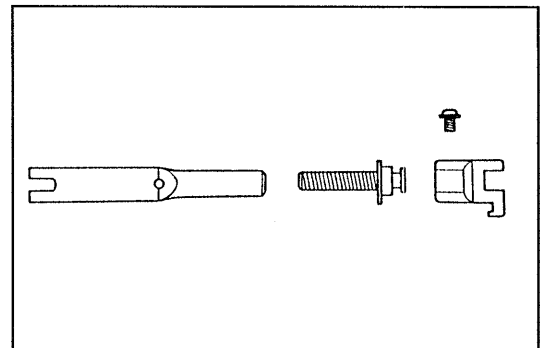
- Make sure that the head of the shoe hold down spring pin is positively fitted into the groove of the shoe hold down spring.



WRU90-BR212

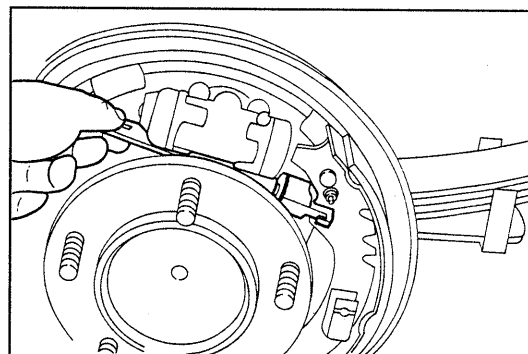
- (8) Disassemble the parking brake shoe strut. Apply a thin film of brake grease to each sliding section. Assemble the parking brake shoe strut.

Tightening Torque: 0.26 - 0.4 kgf-m
(1.9 - 2.9 ft-lb, 2.6 - 3.9 N·m)



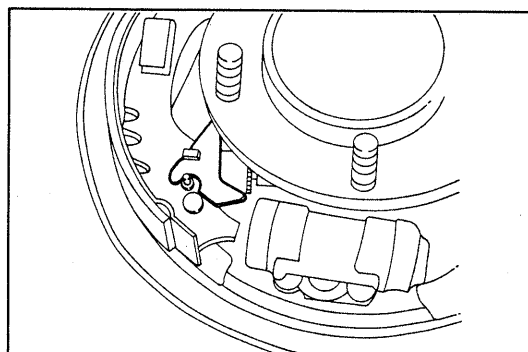
WRU90-BR560

(9) Connect the parking brake shoe strut to the shoe.



WRU90-BR561

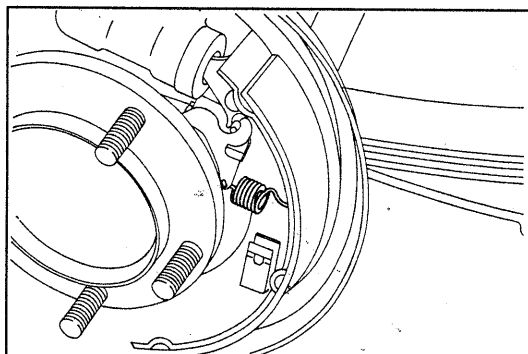
(10) Apply brake grease to each contact surface of the automatic adjusting lever. Install the automatic adjusting lever to the shoe.



WRU90-BR562

(11) Install the tension spring, using the following SST or a suitable lever.

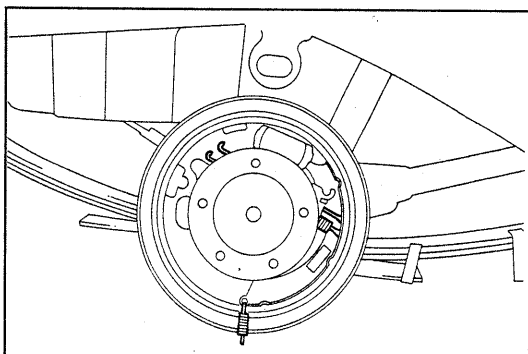
SST: 09921-00010-000



WRU90-BR563

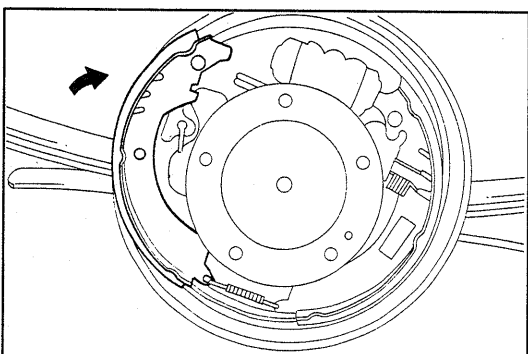
5. Installation of shoe at trailing side

- (1) Install the tension spring to the shoe at the leading side.
- (2) Install the shoe at the trailing side to the tension spring.



WRU90-BR213

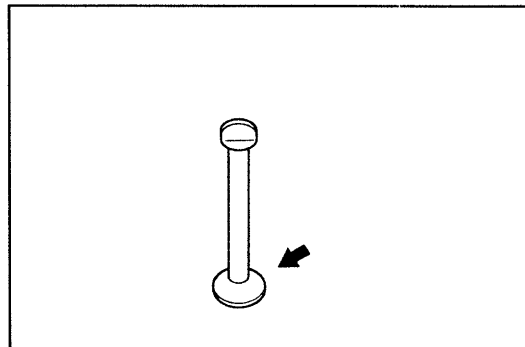
(3) Lift the shoe at the trailing side over the backing plate.



WRU90-BR214

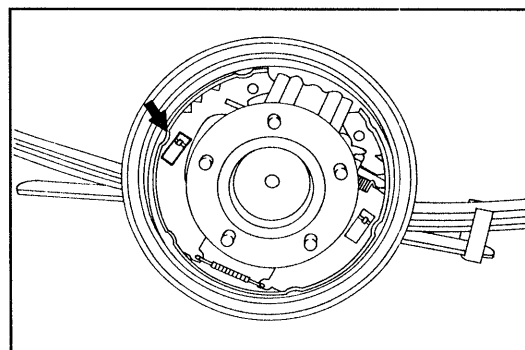
BRAKE SYSTEM

- (4) Apply the Three Bond 1105B® to the head section of the shoe hold down spring pin.



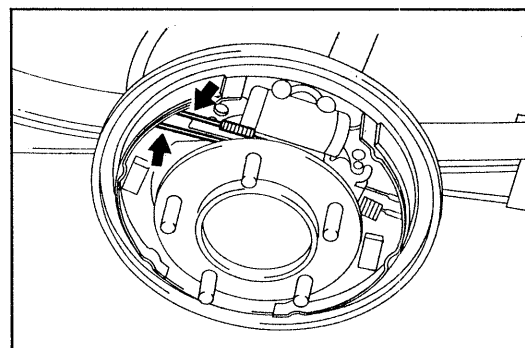
WRU90-BR215

- (5) While holding the shoe at the trailing side toward the backing plate, install the shoe to the backing plate by means of the shoe hold down spring pin and shoe hold down spring.



WRU90-BR216

- (6) Install the tension springs.



WRU90-BR217

6. Inspection

Be sure to perform the following inspection to assure safe running.

- (1) Ensure that the rear brake is mounted correctly as indicated in the figure below.

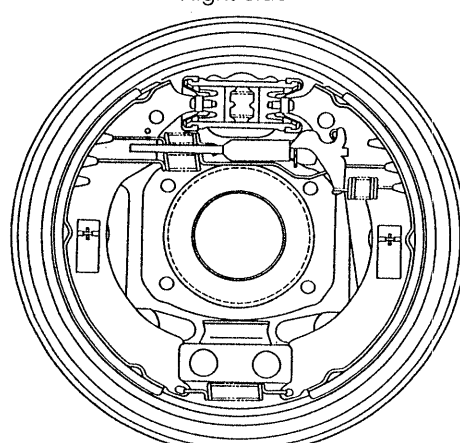
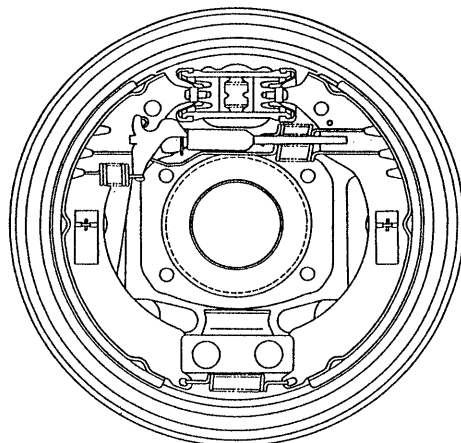
WARNING:

If the rear brake is not mounted correctly, it may cause brake failure during the running or parking brake failure.

SECTIONAL VIEW

Left side

Right side



WRU90-BR218

- (2) Inspect that lubricant, such as oil or grease, gets on the surface of the rear brake drum or brake lining. If any lubricant gets on the surface, remove the lubricant, using abrasive paper.

WARNING:

- If any lubricant gets on the surface of the rear brake drum or the brake lining, it may cause inadequate braking.

- (3) Check that the rear wheel cylinder and brake tube attaching sections are tightened to the specified torque. Inspect the attaching sections for brake fluid leakage.

WARNING:

- If the brake tubes are not installed correctly, it may cause brake failure.

7. Installation of brake drum.

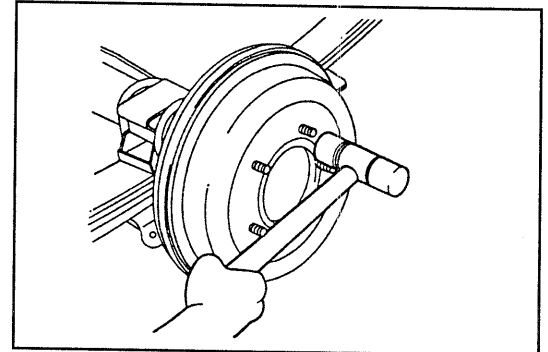
Attach the brake drum to the axle shaft. Tap the brake drum lightly into the axle shaft, using a plastic hammer or the like.

WARNING:

- If any lubricant, such as grease or oil, gets on the inner surface of the brake drum, be sure to wipe it off.
- Failure to observe this warning may cause inadequate braking.

NOTE:

- When assembling the axle shaft, never apply impact strong enough to produce traces inside the bearing. Moreover, be very careful not to damage the oil seal provided at the housing end.
- If paint was removed during the installation, be sure to apply chassis black to such areas to prevent rust formation. However, no paint should be applied to the threaded portions.

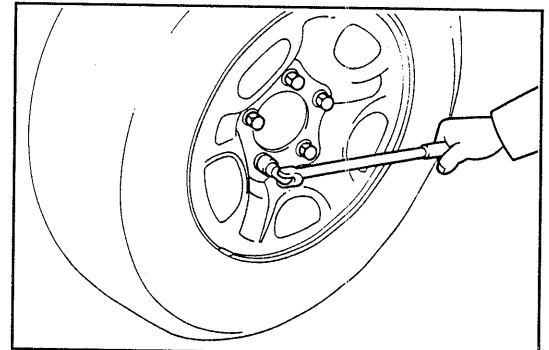


WRU92-BR575

WRU90-BR220

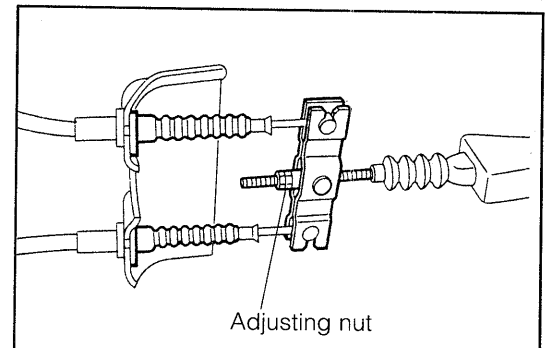
- 8. Install the wheel.** Tighten the attaching bolts to the specified torque evenly over two or three stages in the sequence indicated in the right figure.

Tightening Torque: 9.0 - 12 kgf-m
(65.1 - 87.0 ft-lb, 88.3 - 118 N·m)



WRU90-BR221

- 9. Tighten the parking lever adjusting nut about halfway.**

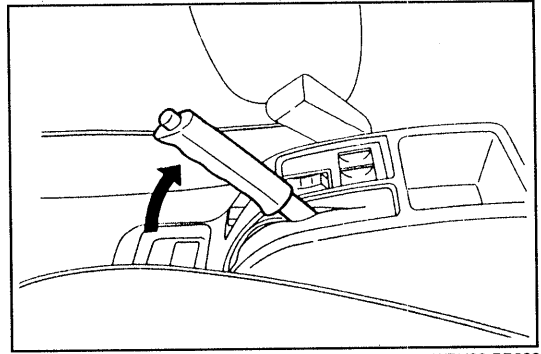


Adjusting nut

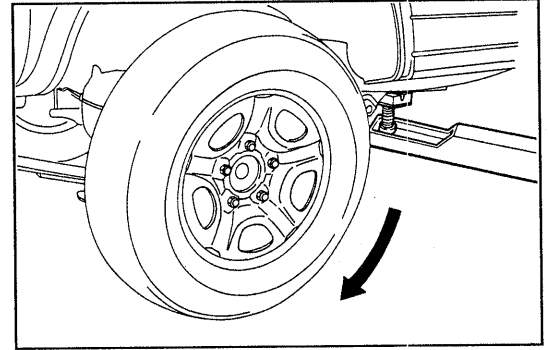
WRU90-BR600

BRAKE SYSTEM

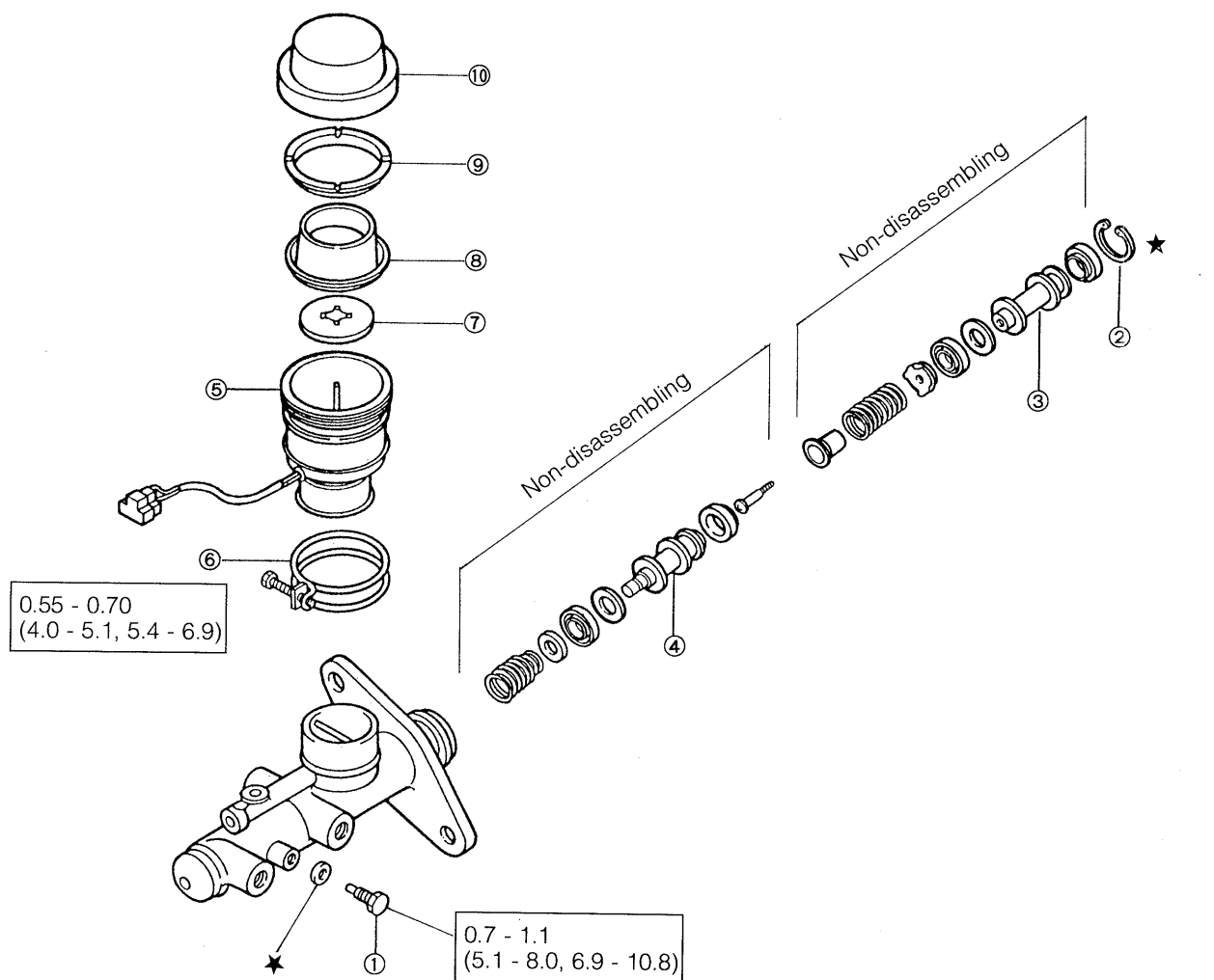
10. Repeat the pulling/returning operation of the parking brake lever, until no clicking noise is emitted from the brake drum.



11. Turn the wheel. At this time, ensure that the brake is not dragging.
12. Perform brake air bleeding.
(See page BR-18.)
13. Perform the brake fluid leakage check.
(See page BR-15.)
14. Perform the brake test, using a brake tester.
15. Adjust the height of the parking brake lever.
(See page BR-80.)



BRAKE MASTER CYLINDER COMPONENTS



- ① Set bolt
- ② Snap ring
- ③ Piston master cylinder No.1
- ④ Piston master cylinder No.2
- ⑤ Hose clamp

- ⑥ Master cylinder reservoir subassembly
- ⑦ Master cylinder reservoir float
- ⑧ Reservoir diaphragm
- ⑨ Spacer
- ⑩ Reservoir filler cap

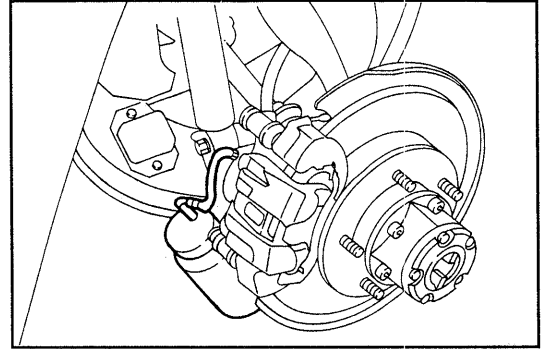
REMOVAL

CAUTION:

- If the brake fluid is spilled inadvertently over the paint-finish surface of the vehicle, quickly wipe off the brake fluid. In addition, wipe the affected area, using white gasoline or the like.

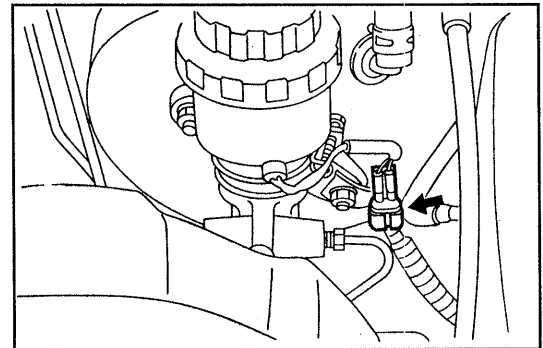
WRU90-BR225

1. Drain the brake fluid from the rear and front wheel cylinder.



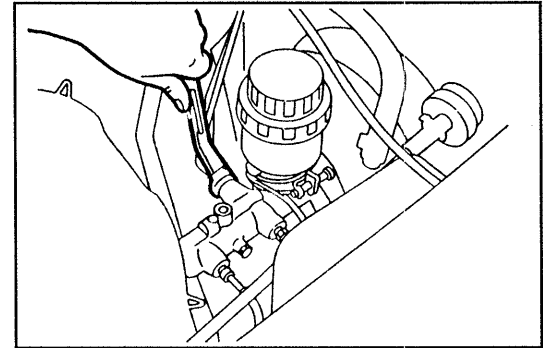
WRU90-BR226

2. Disconnect the brake fluid level switch connector.



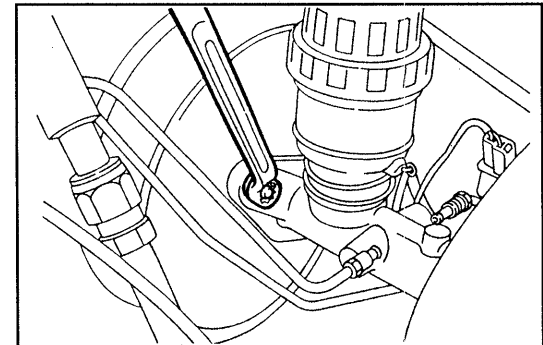
WRU90-BR227

3. Disconnect the brake tubes from the master cylinder, using a flare nut wrench.



WRU90-BR228

4. Remove the brake master cylinder from the brake booster by removing the brake master cylinder attaching nuts.

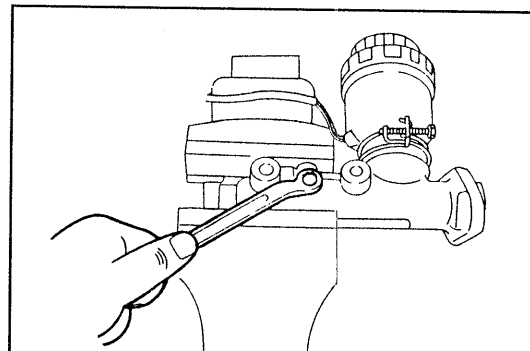


WRU90-BR229

5. Remove the piston set bolt.

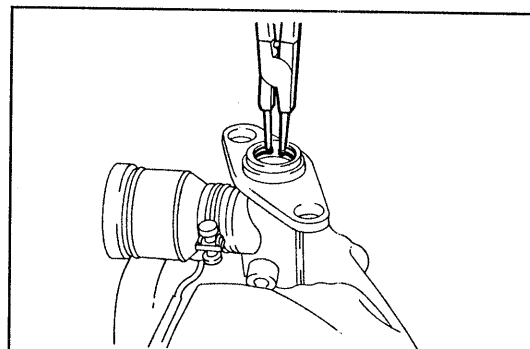
NOTE:

- Do not apply excessive force when installing the cylinder to a vise.



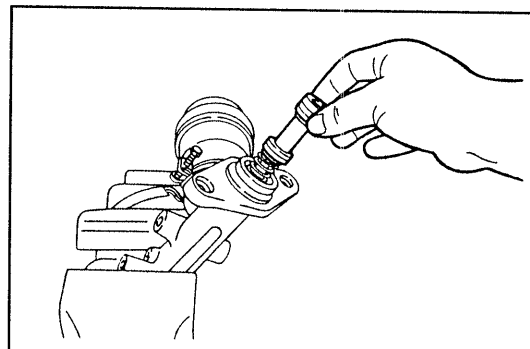
WRU90-BR230

6. While holding the piston by hand, remove the snap ring.



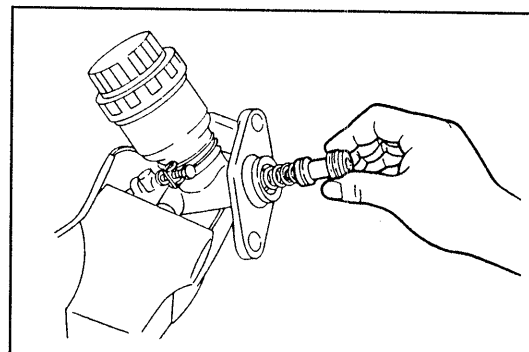
WRU90-BR231

7. Remove the brake master cylinder piston No.1.



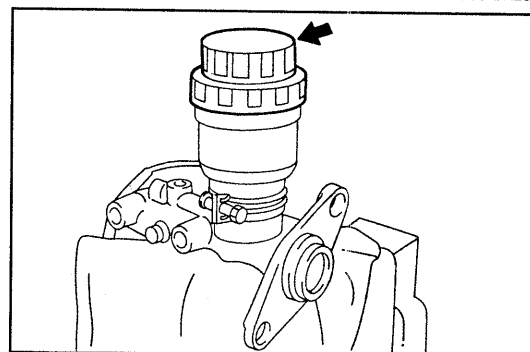
WRU90-BR232

8. Remove the brake master cylinder piston No.2 by blowing air from the brake pipe connecting hole.



WRU90-BR233

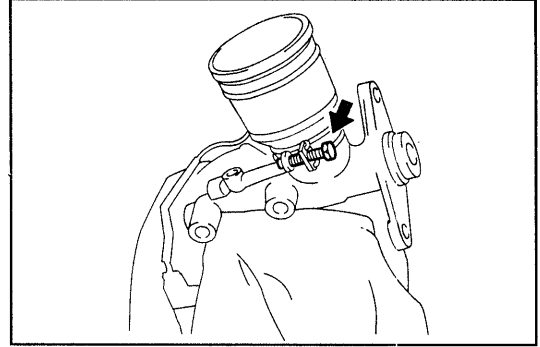
9. Remove the reservoir filler cap. Take out the float.



WRU90-BR234

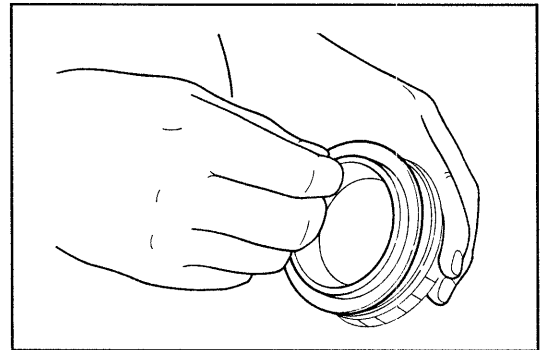
BRAKE SYSTEM

10. Remove the reservoir tank by loosening the reservoir tank hose clamp.



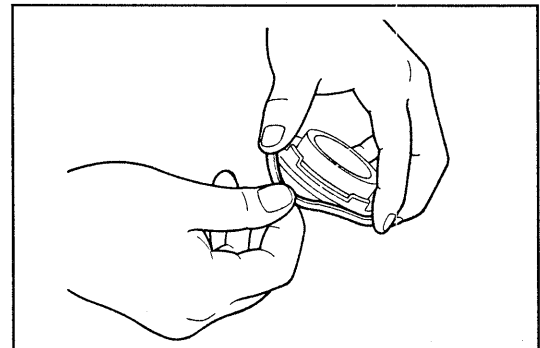
WRU90-BR235

11. Remove the spacer together with the reservoir diaphragm from the reservoir filler cap.



WRU90-BR564

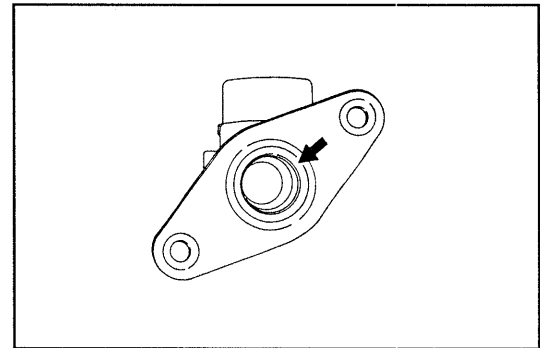
12. Remove the reservoir diaphragm from the spacer.



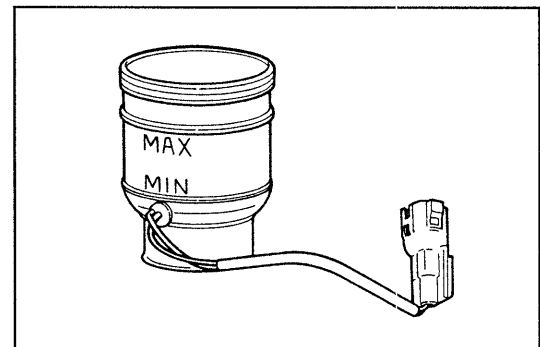
WRU90-BR565

INSPECTION

1. Check of master cylinder
 - (1) Ensure that the inner surface of the master cylinder exhibits no scratches.
 - (2) Ensure that each part of the master cylinder exhibits no damage, such as deformation.
2. Check of reservoir tank
 - (1) Ensure that the reservoir tank exhibits no damage, such as cracks.

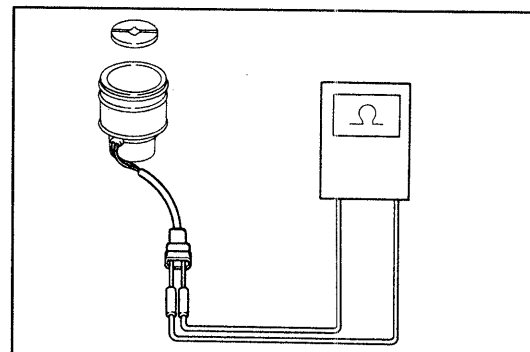


WRU90-BR236



WRU90-BR237

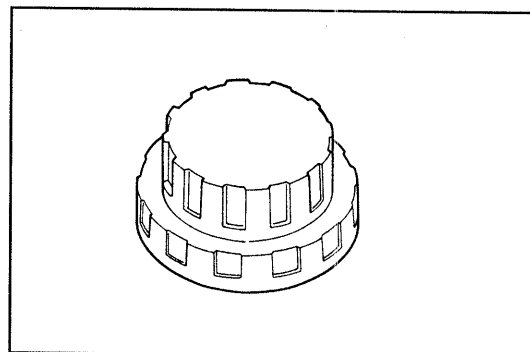
- (2) Ensure that continuity exists between the terminals of the connector when the float is put in the reservoir tank. Also, ensure that no continuity exists when the float is taken out from the reservoir tank. If not, replace the reservoir tank.



WRU90-BR238

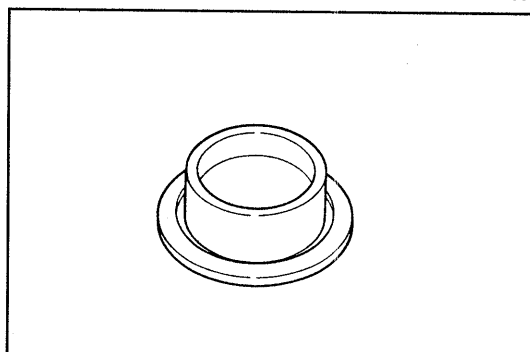
3. Inspection of reservoir tank cap

- (1) Ensure that the reservoir tank exhibits no damage, such as cracks.



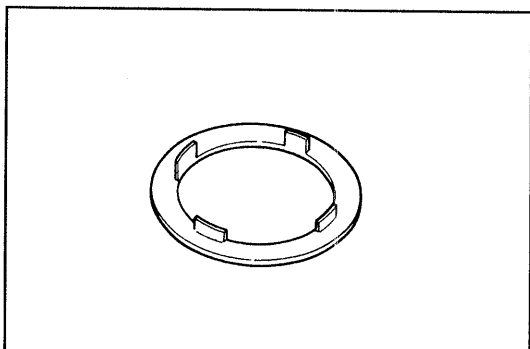
WRU90-BR566

- (2) Ensure that the reservoir diaphragm exhibits no damage, such as cracks and holes.



WRU90-BR567

- (3) Ensure that the spacer exhibits no damage, such as cracks.



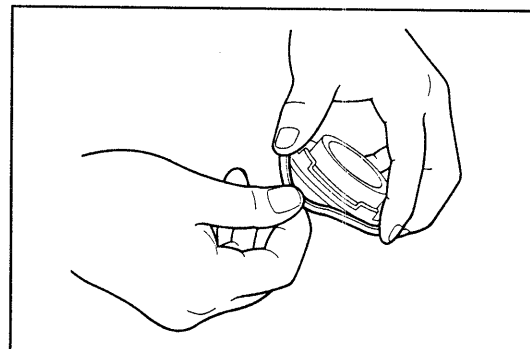
WRU90-BR568

ASSEMBLY

1. Install the reservoir diaphragm to the spacer.

NOTE:

- Be sure to fit the reservoir diaphragm to the recessed section of the spacer.



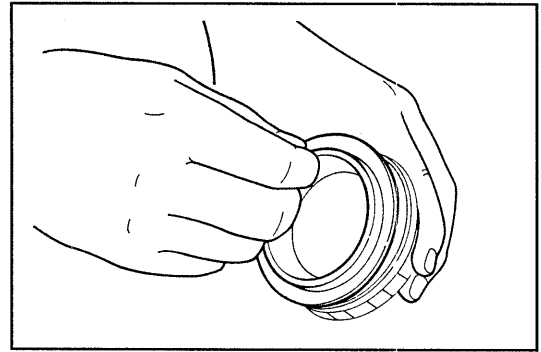
WRU90-BR569

BRAKE SYSTEM

2. Install the spacer together with the reservoir diaphragm to the reservoir tank cap.

NOTE:

- Fit the pawl section of the spacer into the reservoir tank cap securely.

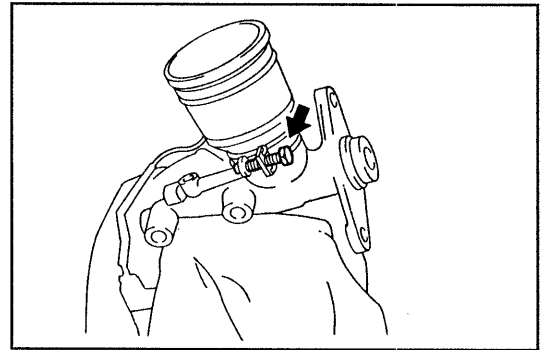


WRU90-BR570

3. Install the reservoir tank to the master cylinder. Tighten the clamp.

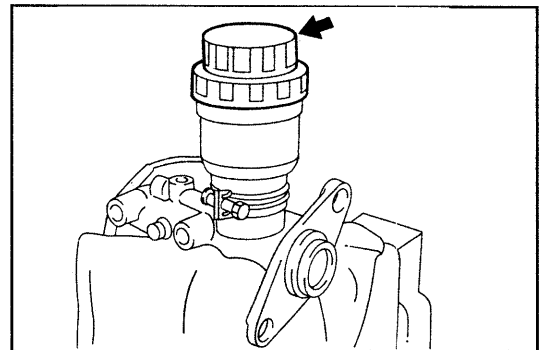
Tightening Torque:

0.55 - 0.70 kgf-m (4.0 - 5.1 ft-lb, 5.4 - 6.9 N-m)



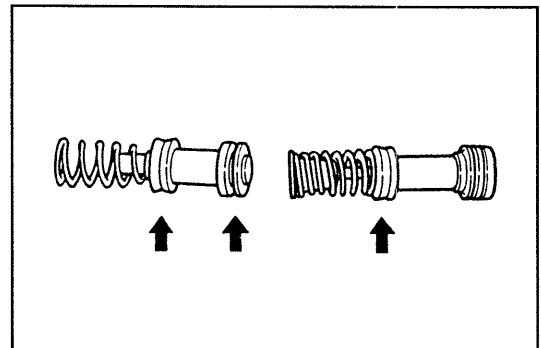
WRU90-BR239

4. Insert the float in the reservoir tank. Install the reservoir tank cap.



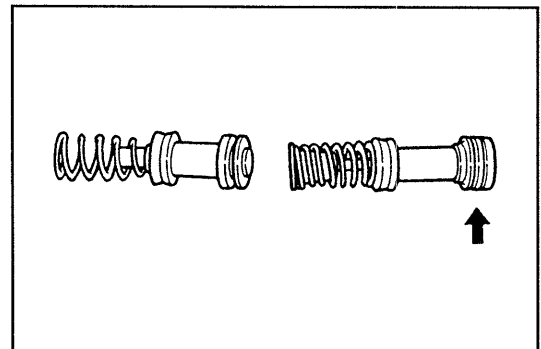
WRU90-BR240

5. Apply brake fluid to the piston cups indicated in the right figure.



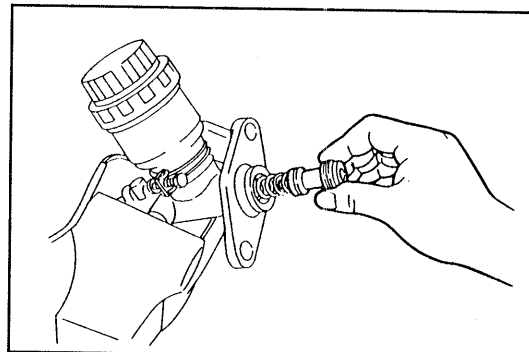
WRU90-BR241

6. Apply rubber grease to the piston cups indicated in the right figure.



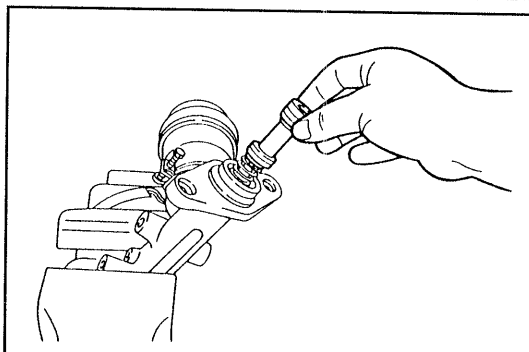
WRU90-BR242

7. Insert the piston No.2 into the master cylinder.



WRU90-BR243

8. Insert the piston No.1 into the master cylinder.

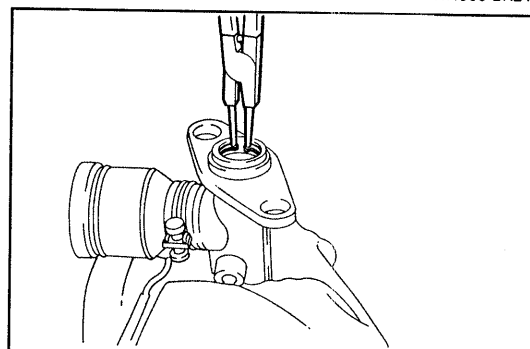


WRU90-BR244

9. While holding the piston No.1 by hand, install a new snap ring.

NOTE:

- Never reuse the snap ring.

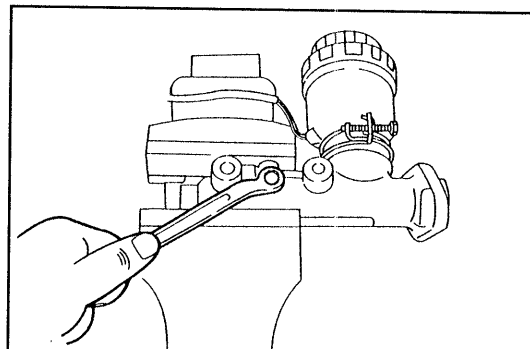


WRU90-BR245

10. Install the set bolt to the master cylinder with a new gasket interposed.

Tightening Torque:

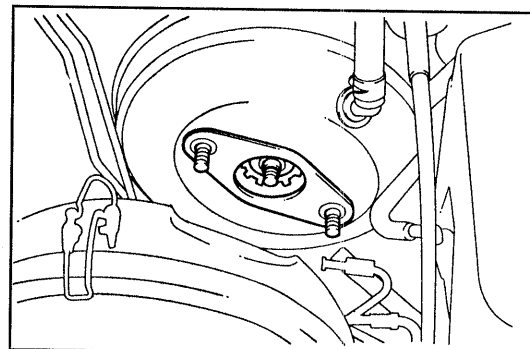
0.7 - 1.1 kgf-m (5.1 - 8.0 ft-lb, 6.9 - 10.8 N-m)



WRU90-BR246

11. Ensure that the gasket at the brake booster side exhibits no damage.

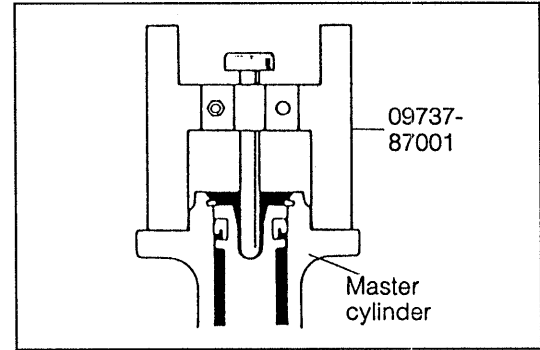
If any damage is present, replace the gasket.



WRU90-BR247

BRAKE SYSTEM

12. Adjust the clearance between the brake booster push rod and the master cylinder.
(See page BR-75.)



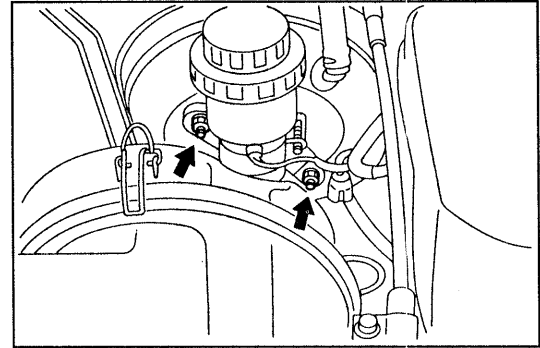
WRU92-BR586

13. Install the master cylinder to the brake booster. Tighten the attaching nuts evenly to the specified torque over two or three stages.

Tightening Torque: 1.04 - 1.56 kgf-m
(7.52 - 11.3 ft-lb, 10.2 - 15.3 N-m)

NOTE:

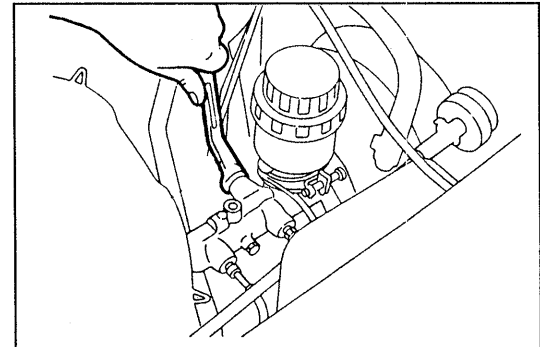
- The installation section at the vehicle exterior side should be tightened together with the connector bracket of the brake fluid level switch.



WRU90-BR249

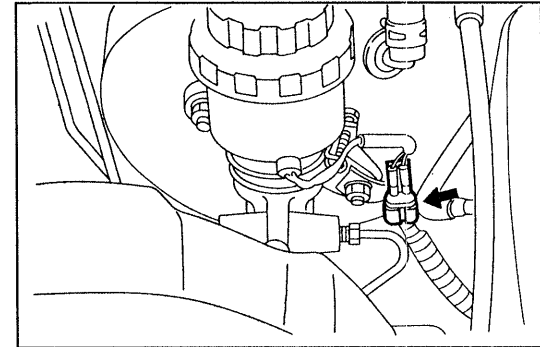
14. Connect the brake tubes to the master cylinder. Tighten the flare nut to the specified torque, using a flare nut wrench.

Tightening Torque: 1.3 - 1.8 kgf-m
(9.4 - 13.0 ft-lb, 12.7 - 17.7 N-m)



WRU90-BR250

15. Reconnect the brake fluid level switch connector.



WRU90-BR251

16. Fill brake fluid to the reservoir tank.

Specified Brake Fluid: DOT 3 or SAEJ - 1703

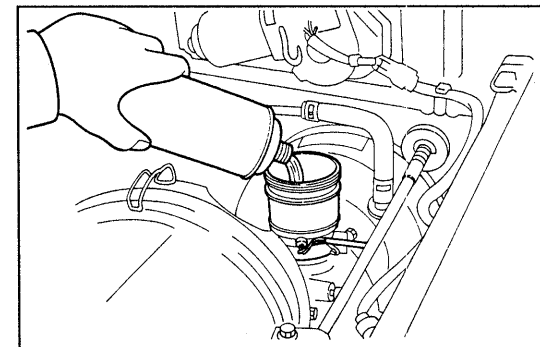
17. Perform air bleeding.

(See page BR-18.)

18. Ensure that no brake fluid leakage is present.

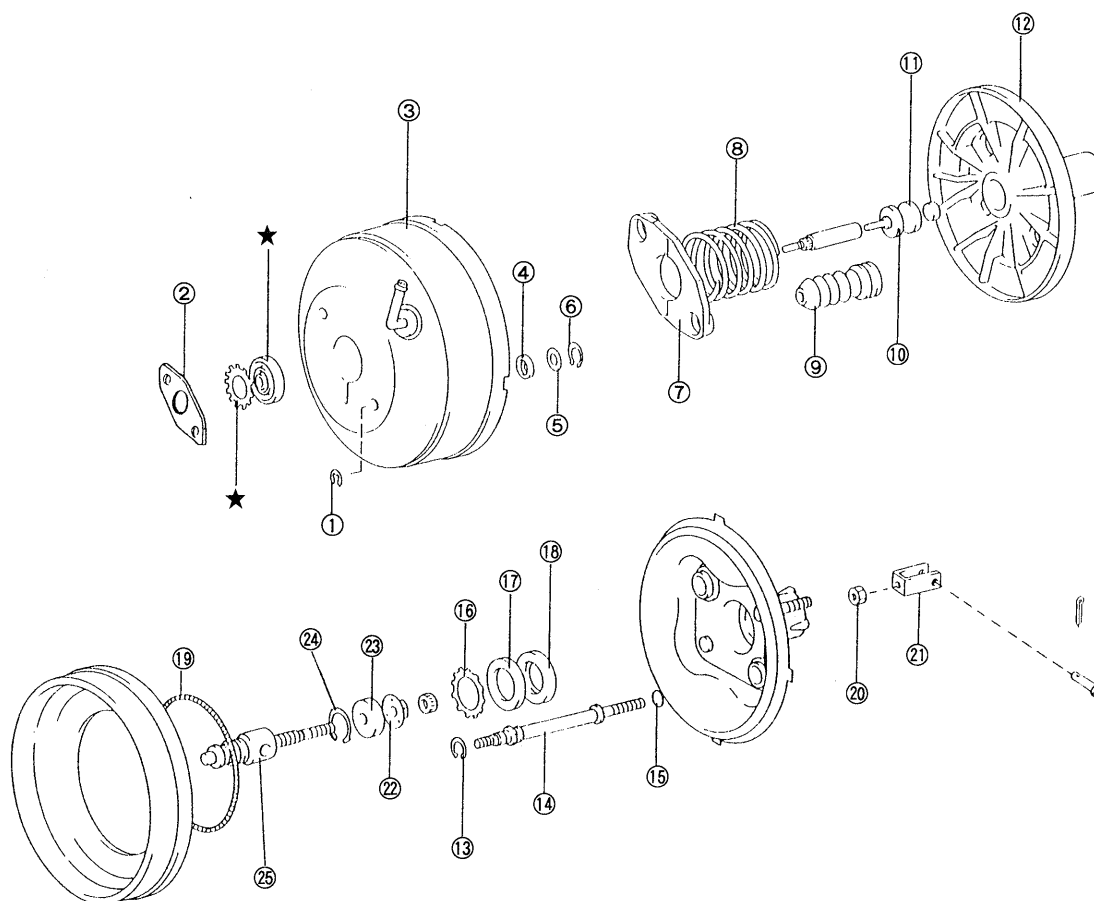
19. Check and adjust the brake pedal height.

(See page BR-20.)



WRU92-BR587

BRAKE BOOSTER COMPONENTS



★ : Non-reusable parts

- | | |
|-------------------|---------------------------------------|
| ① "E" ring | ⑭ Tie rod |
| ② Gasket | ⑮ "O" ring |
| ③ Booster body | ⑯ Bush stopper |
| ④ Tie rod seal | ⑰ Bush |
| ⑤ Seal plate | ⑱ Piston seal |
| ⑥ Snap ring | ⑲ Diaphragm band |
| ⑦ Spring retainer | ⑳ Nut |
| ⑧ Booster spring | ㉑ Clevis master cylinder push rod |
| ⑨ Tie rod boot | ㉒ Booster operating rod adjusting nut |
| ⑩ Reaction ring | ㉓ Element |
| ⑪ Reaction rubber | ㉔ Booster piston stop ring |
| ⑫ Booster piston | ㉕ Poppet valve complete |
| ⑬ Snap ring | |

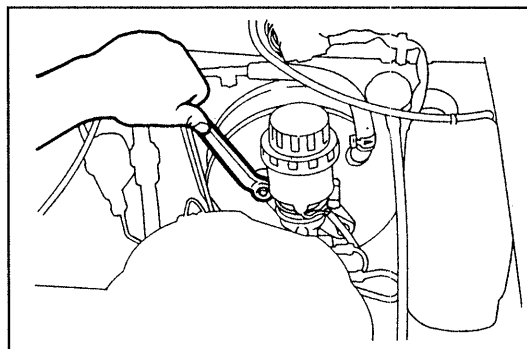
REMOVAL

NOTE:

- If any brake fluid gets on the painting surface, immediately wipe off the brake fluid and wash the painting surface with water.

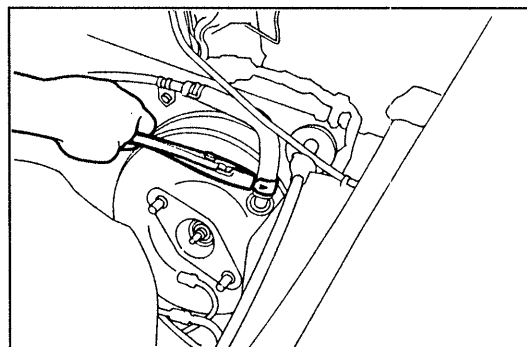
WRU90-BR254

1. Remove the master cylinder.
(See page BR-54.)



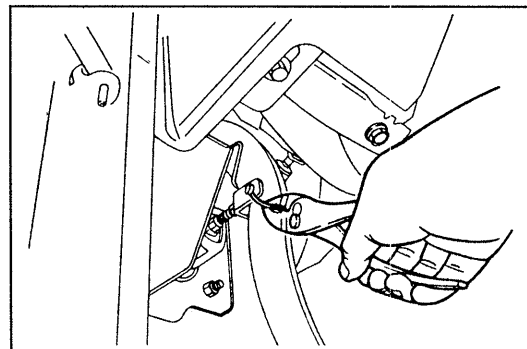
WRU92-BR588

2. Disconnect the brake booster hose from the brake booster.



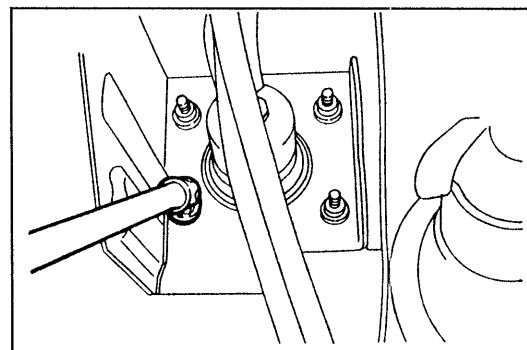
WRU90-BR256

3. Remove the cotter pin. Remove the clevis pin.



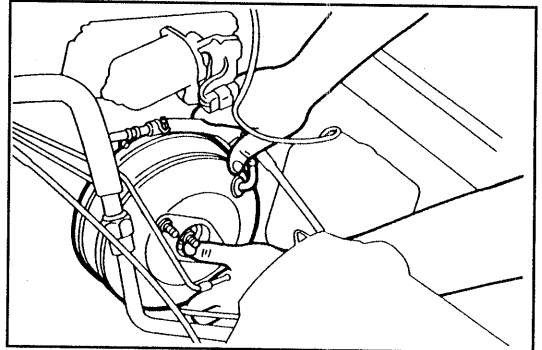
WRU90-BR257

4. Remove the brake booster attaching nuts.



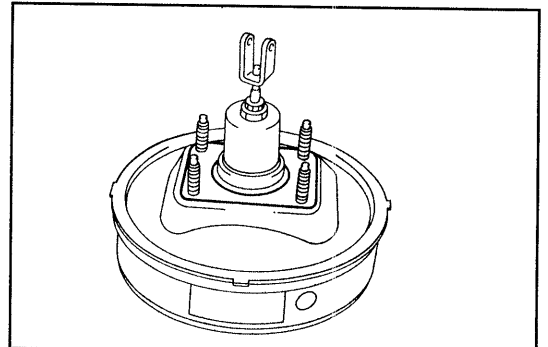
WRU90-BR258

5. Remove the brake booster from the dash panel.
CAUTION:
 - Be very careful not to damage the brake tubes.



WRU90-BR259

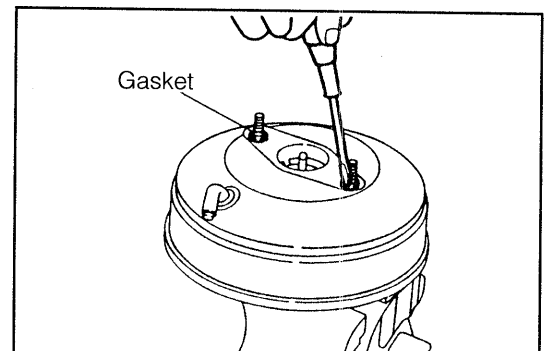
6. Remove the gasket from the brake booster.



WRU90-BR260

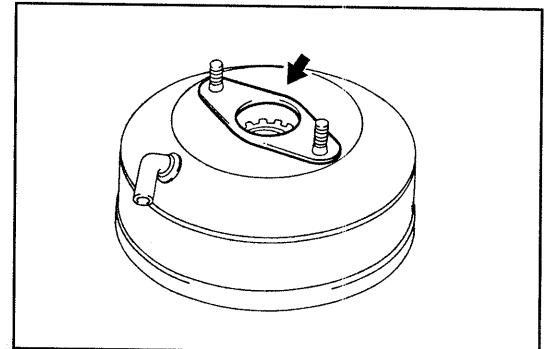
DISASSEMBLY

1. Remove the "E" ring.
NOTE:
 - Never reuse the "E" ring.



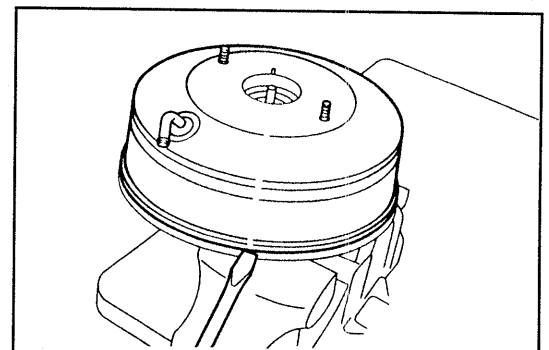
WRU90-BR261

2. Remove the gasket.
NOTE:
 - Never reuse the gasket.



WRU90-BR262

3. Remove the booster body from the booster housing, using a standard screwdriver or the like.
NOTE:
 - Be very careful not to deform the booster body and booster housing.



WRU90-BR263

4. Remove the booster piston rod.

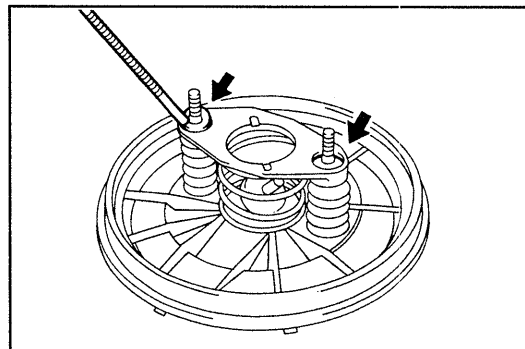
BRAKE SYSTEM

5. Remove the tie rod seal, using a standard screwdriver or the like.

NOTE:

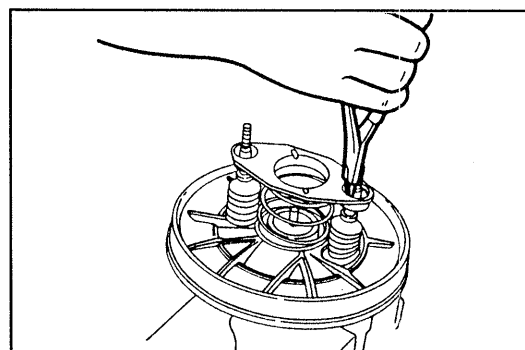
- Never reuse the tie rod seal.

6. Remove the tie rod seal plate, using a magnet finger or the like.



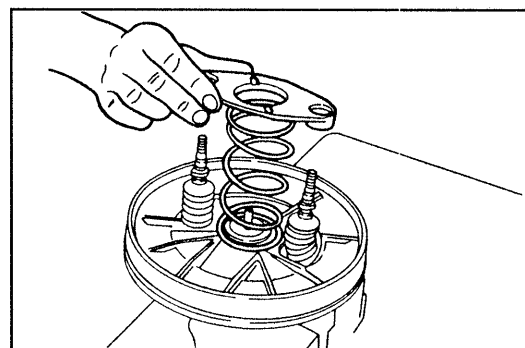
WRU90-BR264

7. While holding the spring retainer, remove the snap rings.



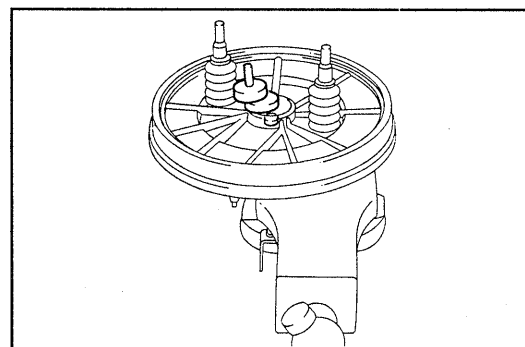
WRU90-BR266

8. Remove the spring retainer and booster spring from the booster piston.



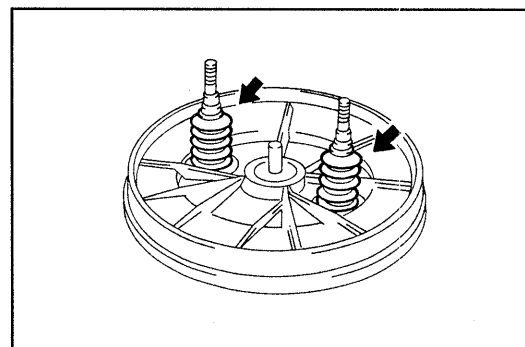
WRU90-BR267

9. Remove the reaction ring, rubber and reaction plate.



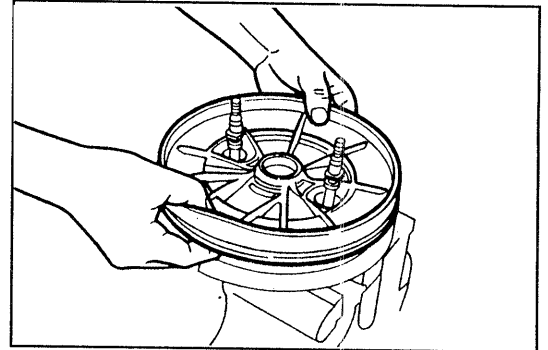
WRU90-BR268

10. Remove the tie rod boot from the tie rod and piston.



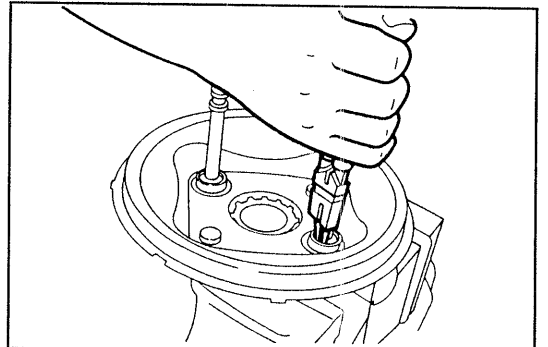
WRU90-BR269

11. Remove the booster piston from the booster housing.



WRU90-BR270

12. Remove the snap rings. Remove the tie rod from the booster housing.

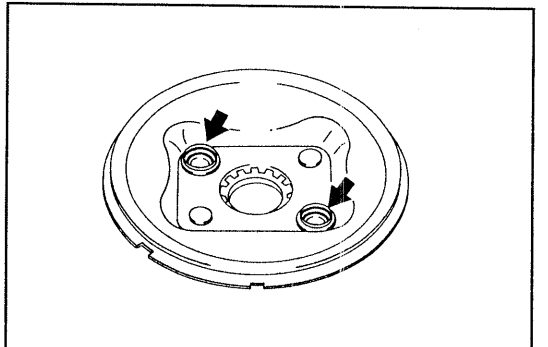


WRU90-BR271

13. Remove the "O" ring from the booster housing.

NOTE:

- Never reuse the "O" ring.

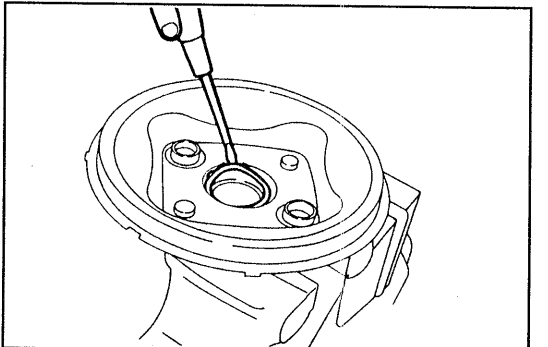


WRU90-BR272

14. Remove the bush retainer.

NOTE:

- Never reuse the bush retainer.

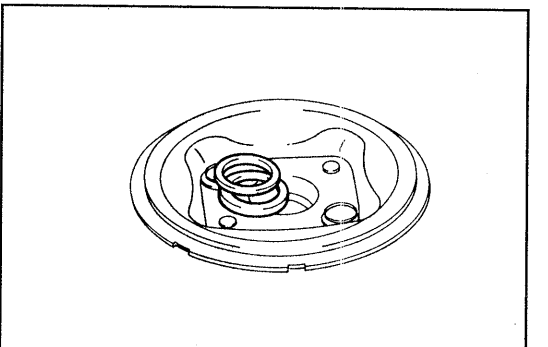


WRU90-BR273

15. Remove the bush and piston seal from the booster housing.

NOTE:

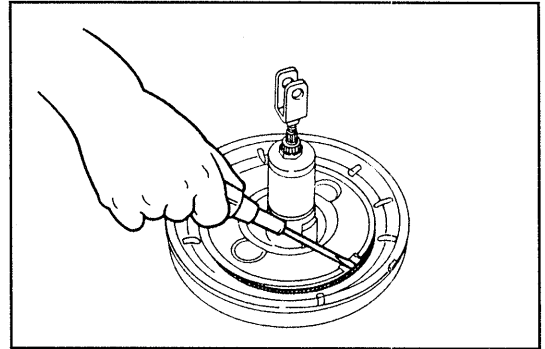
- Never reuse the piston seal.



WRU90-BR274

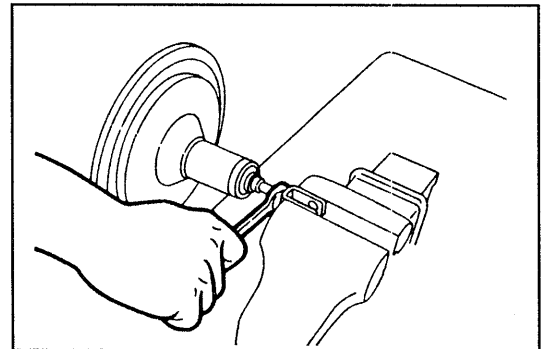
BRAKE SYSTEM

16. Remove the diaphragm band. Remove the diaphragm.



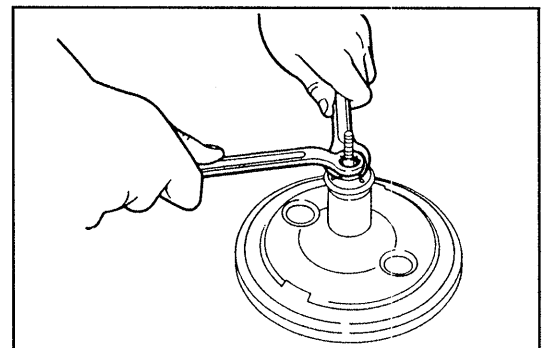
WRU90-BR275

17. Loosen the lock nut. Remove the clevis and lock nut.



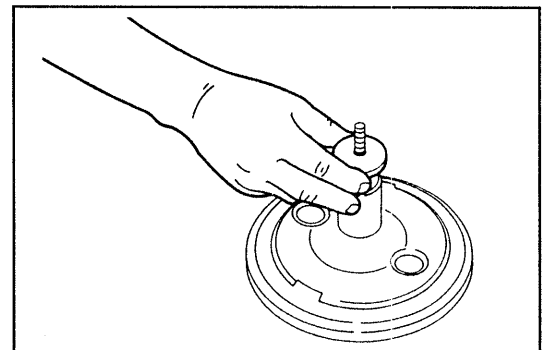
WRU90-BR276

18. Loosen the lock nut. Remove the lock nut and adjusting nut.



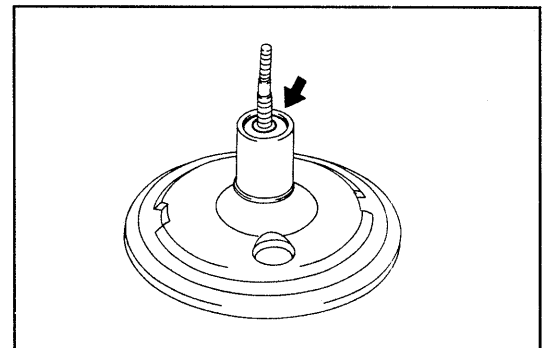
WRU90-BR277

19. Remove the element from the booster piston.



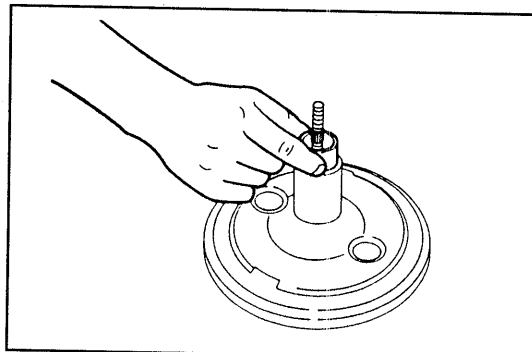
WRU90-BR278

20. Remove the booster piston stop ring.



WRU90-BR279

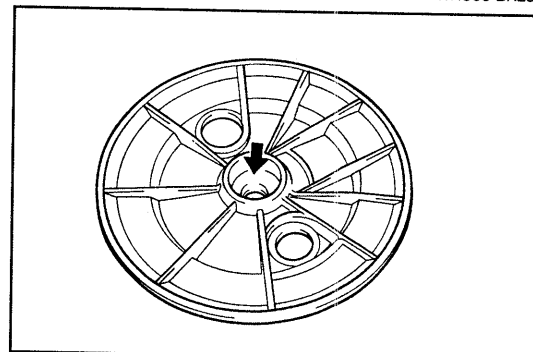
21. Remove the poppet valve assembly from the booster piston.



WRU90-BR280

NOTE:

- If any difficulty is encountered in drawing out the poppet valve, lightly tap the poppet valve from the back side of the piston with a suitable rod interposed.

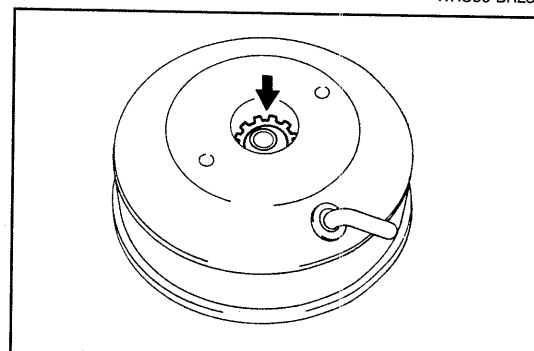


WRU90-BR281

22. Remove the circular internal ring from the booster body.

NOTE:

- Never reuse the circular internal ring.

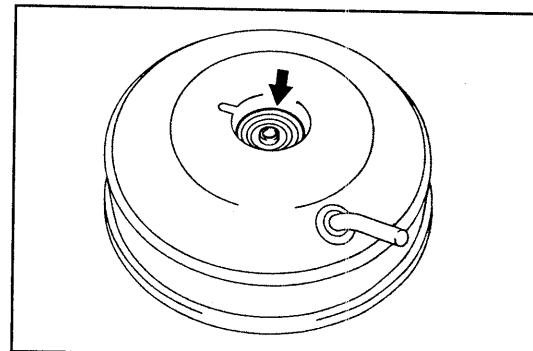


WRU90-BR282

23. Remove the booster plate and seal from the booster body.

NOTE:

- Never reuse the booster plate and seal.

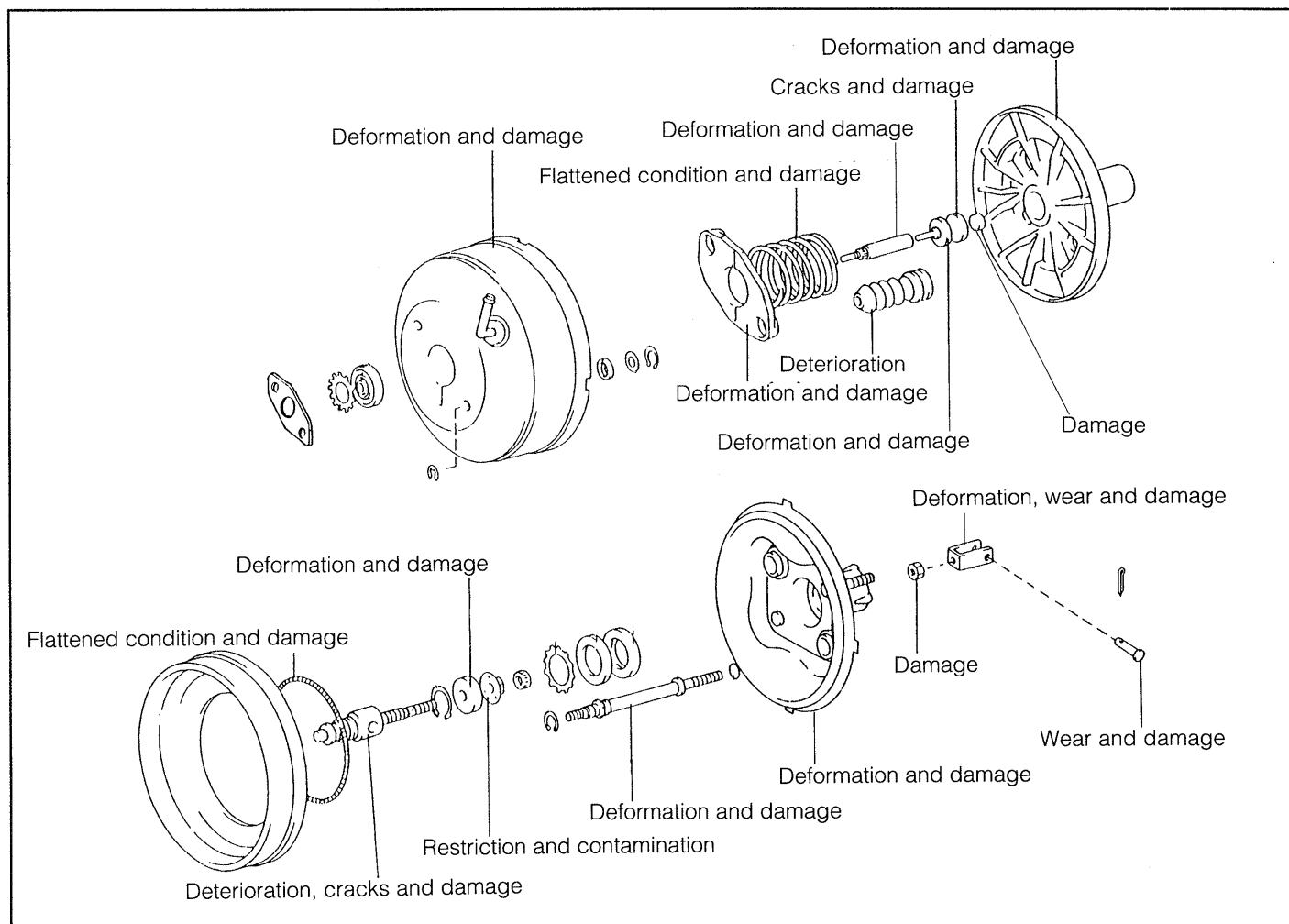


WRU90-BR283

BRAKE SYSTEM

INSPECTION

Check the following parts. Replace any defective parts.



WRU90-BR284

ASSEMBLY

NOTE:

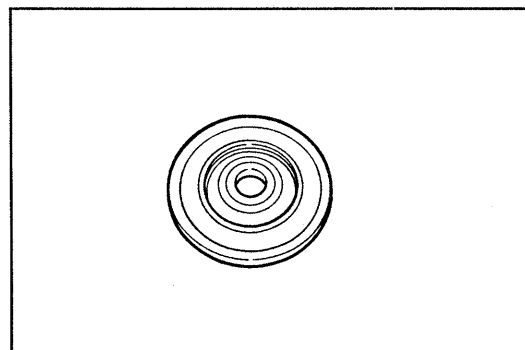
- Be sure to use the silicone grease furnished in the gas-ket kit.

1. Thinly apply silicone grease to the inner surfaces of the booster plate and seal.

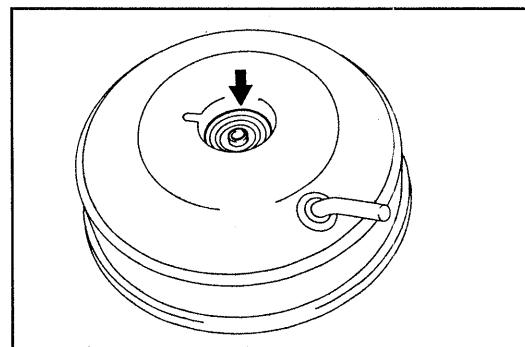
NOTE:

- Be sure to use a new booster plate and seal.
- If silicone grease has been already applied to those new parts, it is unnecessary to perform this step.

2. Install the booster plate and seal to the booster body.

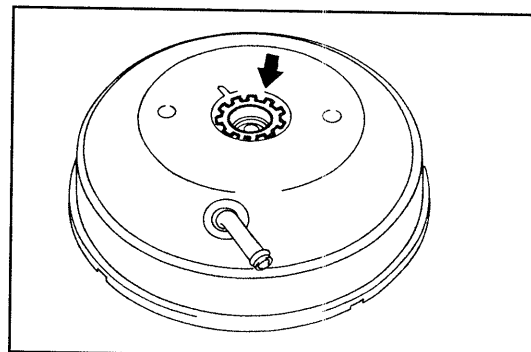


WRU90-BR285



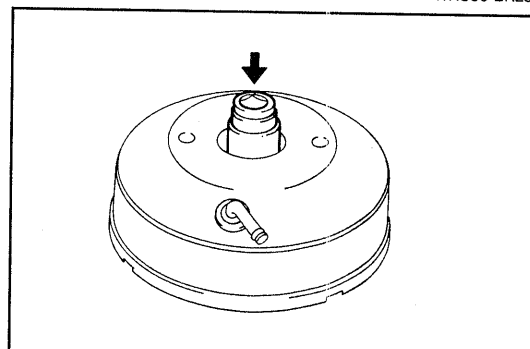
WRU90-BR286

- Place the circular internal ring on the booster body.



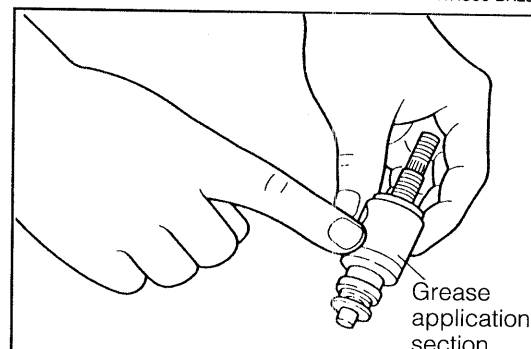
WRU90-BR287

- While applying a box wrench having a suitable outer diameter on the circular internal ring, press the circular internal ring into the booster body.



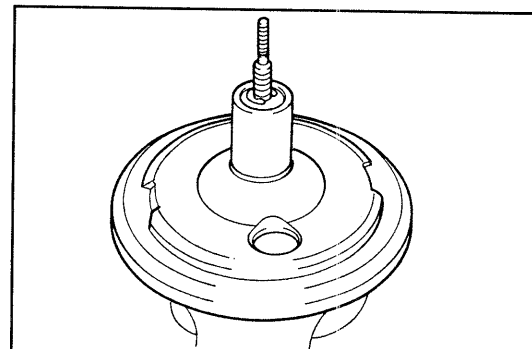
WRU90-BR288

- Thinly apply silicone grease to the poppet valve at the section indicated in the right figure.



WRU90-BR289

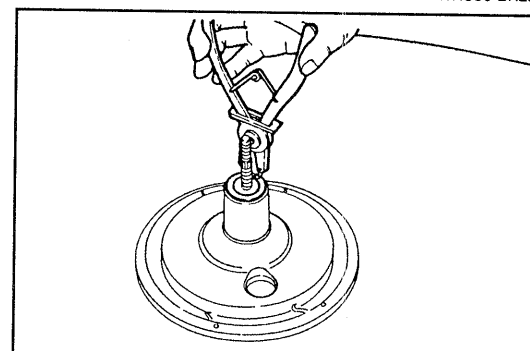
- Insert the poppet valve into the piston.



WRU90-BR290

- While pushing the booster piston stop ring toward the poppet valve, install the booster piston stop ring to the piston.
NOTE:

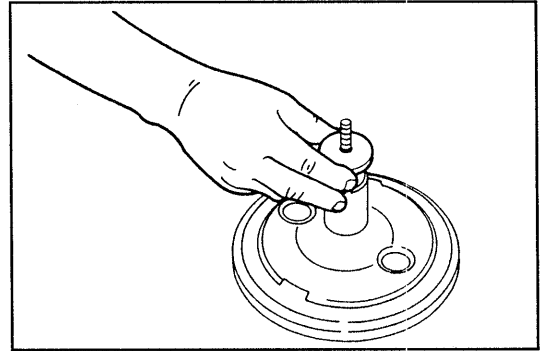
- Make sure that the stop ring is securely fitted into the groove of the piston inner surface.



WRU90-BR291

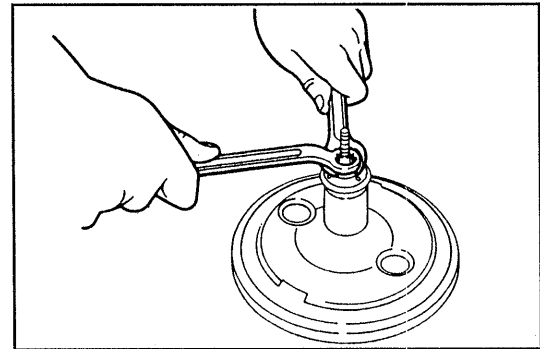
BRAKE SYSTEM

8. Install the element to the booster piston.



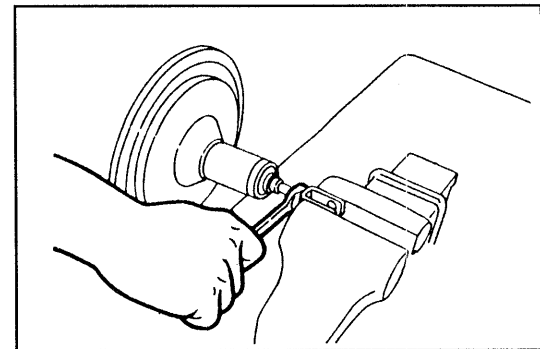
WRU90-BR292

9. Install and temporarily tighten the lock nut and adjusting nut.



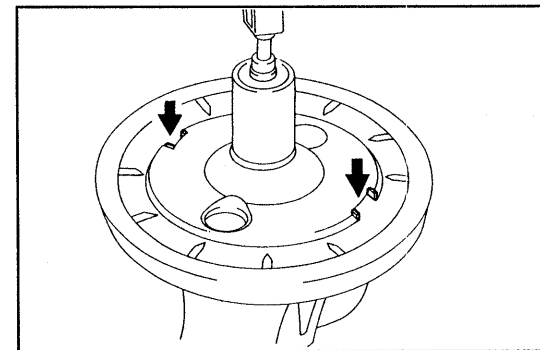
WRU90-BR293

10. Install and temporarily tighten the lock nut and clevis.



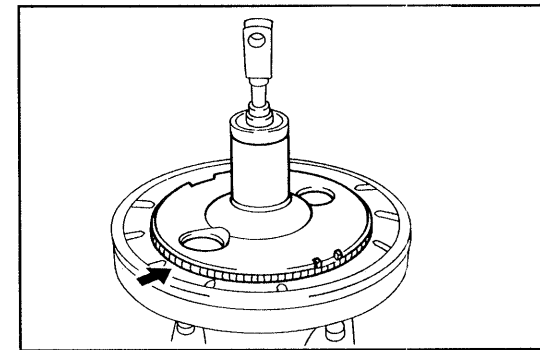
WRU90-BR294

11. Install the diaphragm to the piston while aligning the diaphragm with the cut-out section.



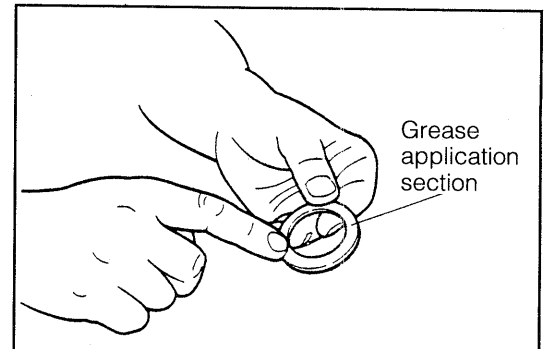
WRU90-BR295

12. Install the diaphragm stopper to the diaphragm in such a way that its connection may not be aligned with the cut-out section.



WRU90-BR296

13. Thinly apply silicone grease to the piston seal.



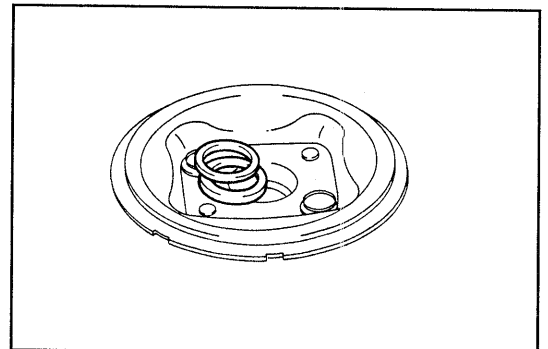
WRU90-BR297

14. Install the piston seal to the booster housing.

NOTE:

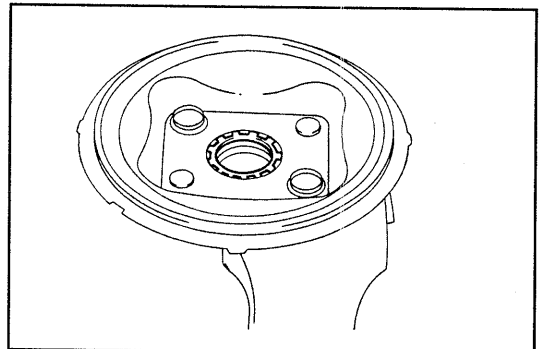
- Be sure to use a new piston seal.

15. Install the bush to the booster housing.



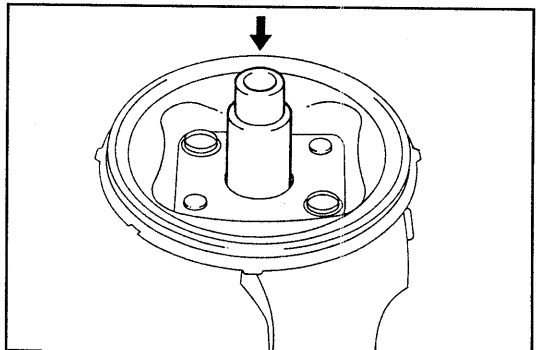
WRU90-BR298

16. Lightly fit the bush retainer to the booster housing.



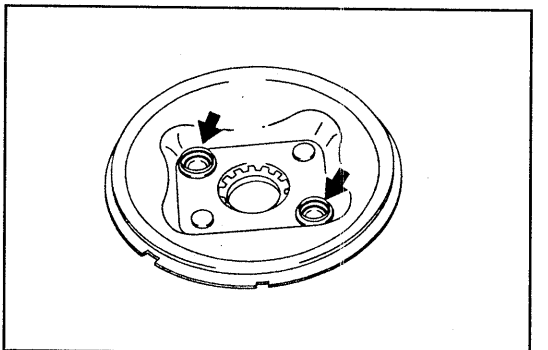
WRU90-BR299

17. Press the retainer into the booster housing, using a box wrench having a suitable outer diameter or the like.



WRU90-BR300

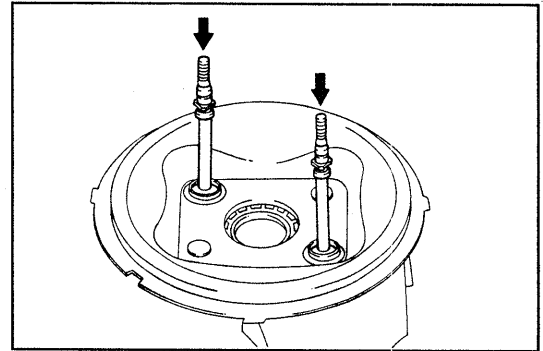
18. Install the "O" ring to the booster housing.



WRU90-BR301

BRAKE SYSTEM

19. Install the tie rod to the booster housing.

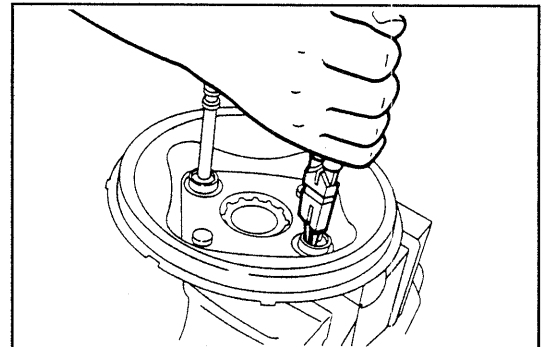


WRU90-BR302

20. Secure the tie rod to the booster housing with a snap ring.

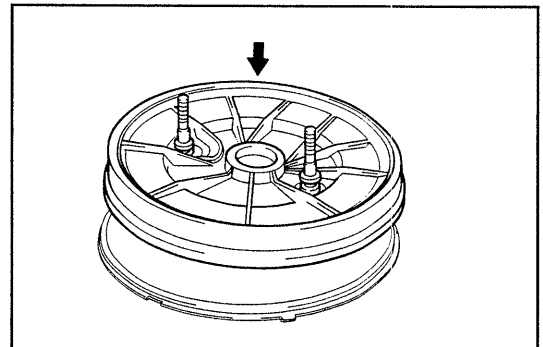
NOTE:

- Be sure to use a new snap ring.
- Make sure that the snap ring is securely fitted into the groove section of the booster housing.



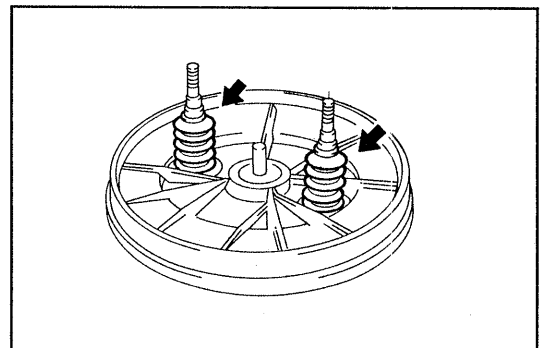
WRU90-BR303

21. Install the booster piston to the booster housing while aligning the protruding section of the diaphragm with the cut-out section of the booster housing.



WRU90-BR304

22. Assemble the tie rod boot to the tie rod and piston.

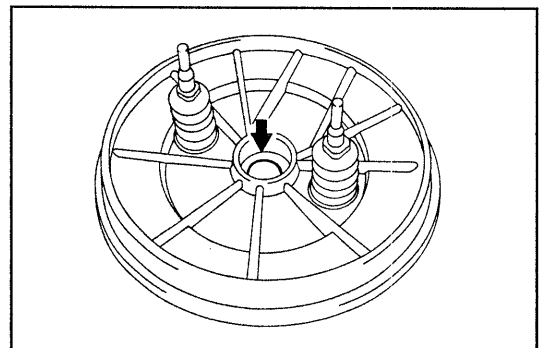


WRU90-BR305

23. Install the reaction plate to the booster piston.

NOTE:

- The reaction plate should be assembled in such a way that the recessed side may come at the piston side.



WRU90-BR306

24. Thinly apply silicone grease to the rubber surface.

NOTE:

- Never reuse the rubber.

25. Install the rubber and reaction ring to the booster piston.

26. Place the booster spring and retainer on the piston.

27. Align the recessed section of the retainer with the direction of the tie rod connecting section.

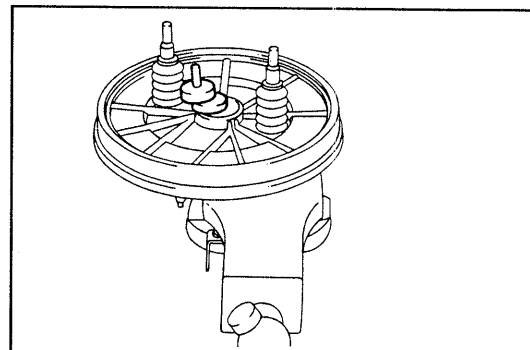
28. While holding the retainer, install the snap ring.

29. Install the tie rod seal plate to the tie rod section.

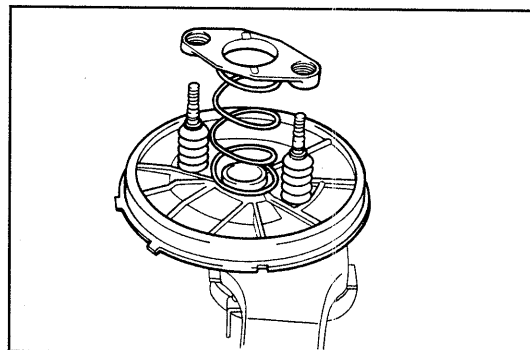
30. Thinly apply silicone grease to the tie rod seal. Install the tie rod seal to the tie rod section.

NOTE:

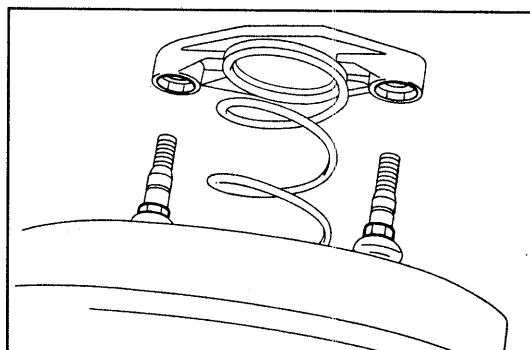
- Make sure that the lip surface of the oil seal faces upward.



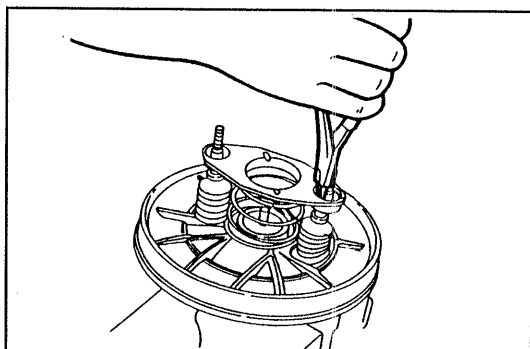
WRU90-BR307



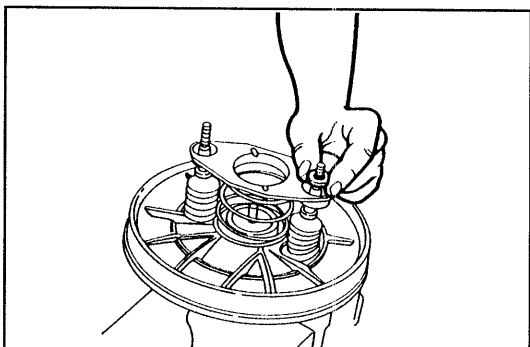
WRU90-BR308



WRU90-BR309



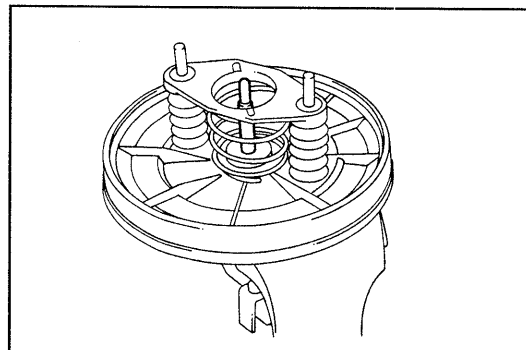
WRU90-BR310



WRU90-BR311

BRAKE SYSTEM

31. Apply a small amount of silicone grease to the forward end of the reaction ring shaft.
32. Install the booster piston rod. Apply a small amount of silicone grease to the forward end of the booster piston rod.

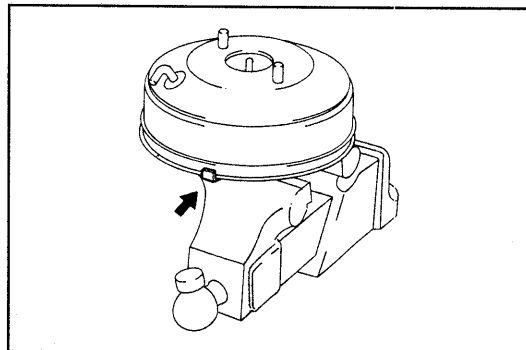


WRU90-BR312

33. Install the booster body to the booster housing while aligning the cut-out section.

NOTE:

- Slowly and completely fit the booster body with the housing.



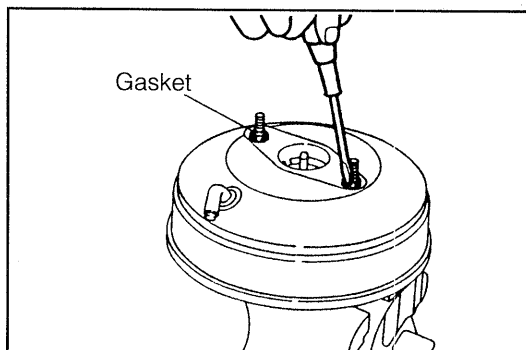
WRU90-BR313

34. Install the gasket to the booster body.

35. Install the "E" rings.

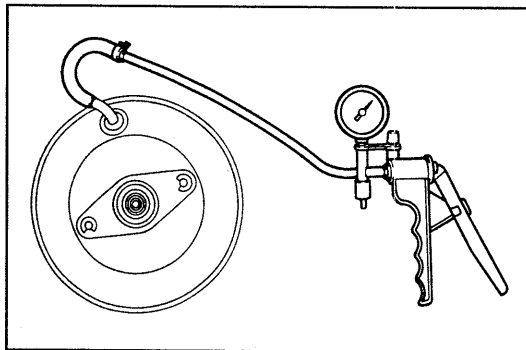
NOTE:

- Be very careful not to damage the gasket.



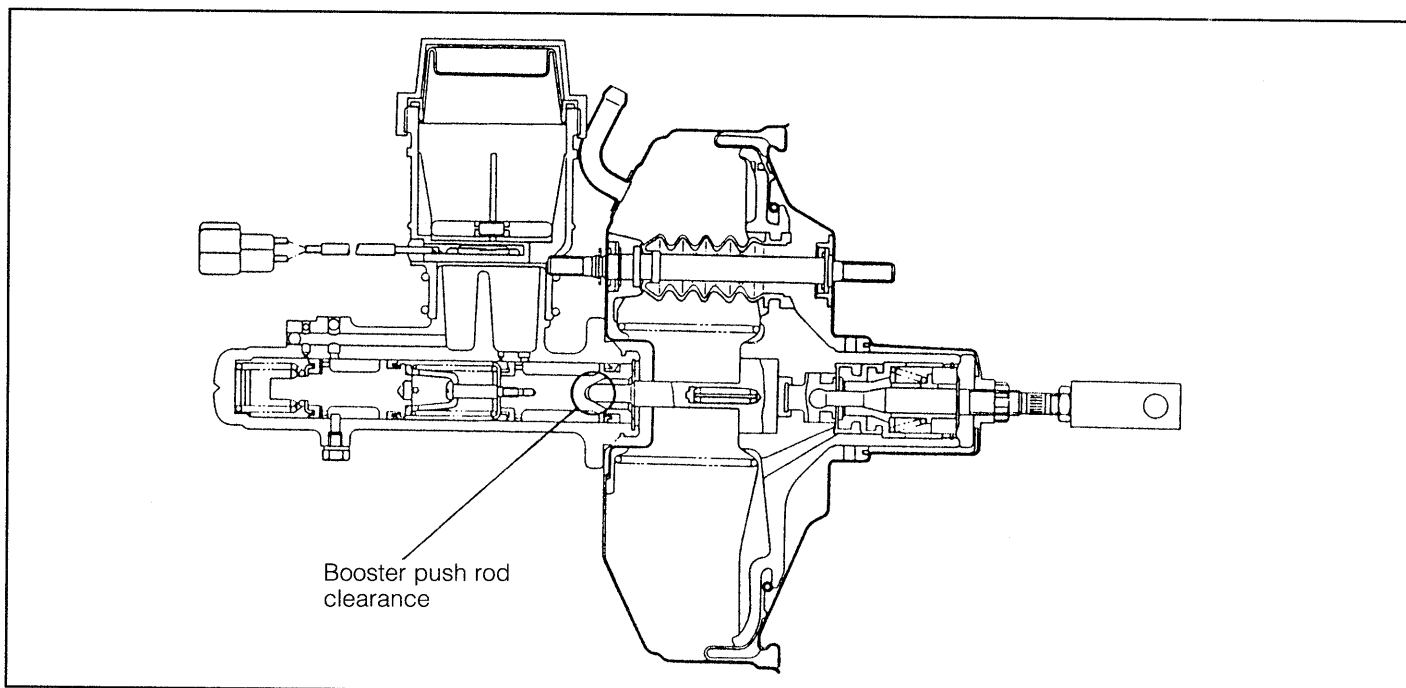
WRU90-BR314

36. Apply negative pressure to the brake booster, using a Mity-Vac. At this time, ensure that no air leakage is present.



WRU90-BR315

ADJUSTMENT OF PUSH ROD CLEARANCE



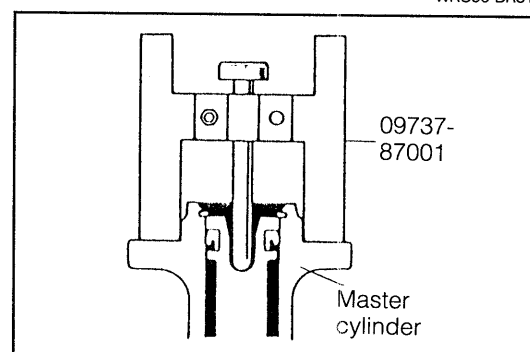
WRU90-BR316

1. Place the following SST on the master cylinder. Adjust the central rod of the SST so that it may contact with the bottom of the piston.

SST: 09737-87001-000

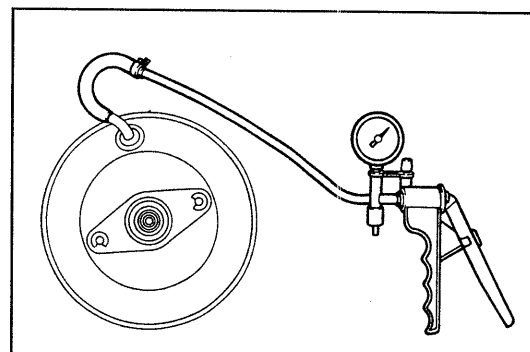
CAUTION:

- Be very careful not to allow the SST or rod to tilt. Failure to observe this caution may lead to brake malfunctioning.



WRU90-BR317

2. Apply a negative pressure of 500 mmHg (19.7 inch Hg) to the brake booster, using a MityVac or the like.



WRU92-BR576

3. Place the SST which was adjusted at the step 1 on the brake booster in a turned-over state, as shown in the right figure. Ensure that the clearance between the push rod and the SST is zero.

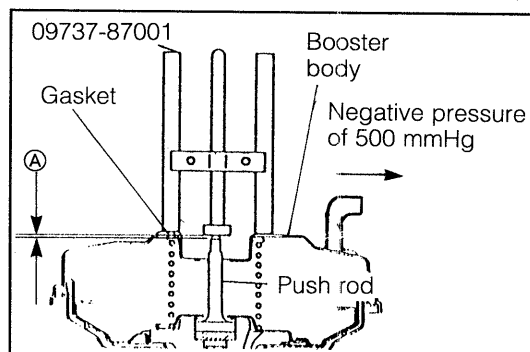
If not, adjust the push rod height.

NOTE:

- This operation should be performed with the gasket installed.

CAUTION:

- Be very careful not to allow the SST or rod to tilt. Failure to observe this caution may lead to brake malfunctioning.

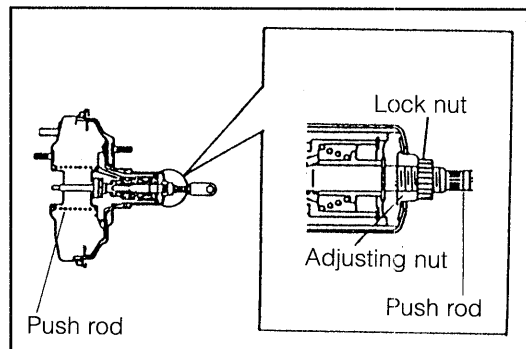


WRU90-BR319

BRAKE SYSTEM

4. Adjustment of push rod height
Loosen the lock nut. While preventing the push rod from turning, turn the adjusting nut, until the push rod height becomes the same height as at the step 3.
5. Tighten the lock nut, while preventing the adjusting nut from turning.

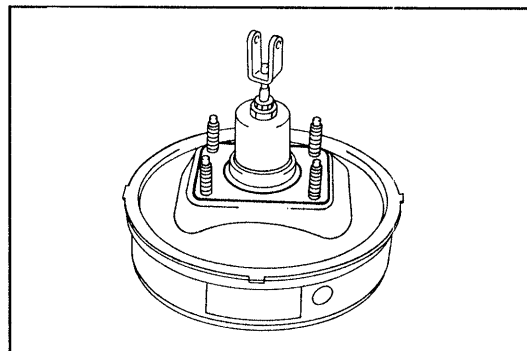
Tightening Torque: 2.08 - 3.12 kgf-m
(15.1 - 22.5 ft-lb, 20.4 - 30.6 N·m)



WRU90-BR320

INSTALLATION

1. Install a new gasket to the dash panel installation surface of the brake booster.

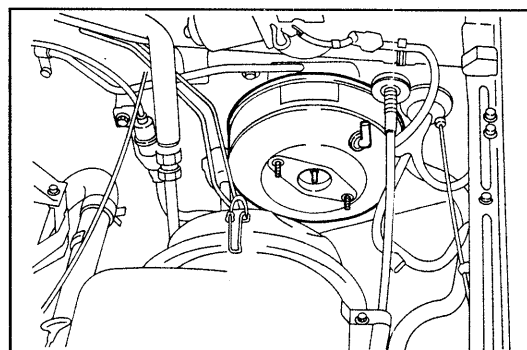


WRU90-BR321

2. Install the brake booster to the dash panel in such a way that the brake booster hose connection may be positioned as indicated in the right figure and that the clevis may be incorporated into the brake pedal.

NOTE:

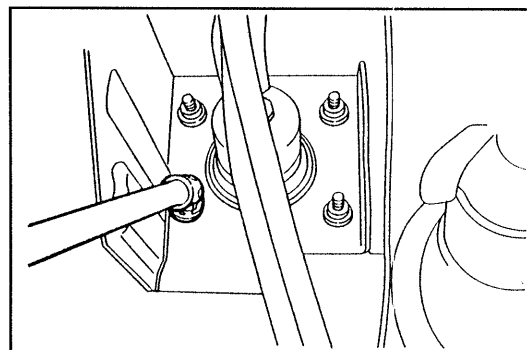
- Be very careful not to deform the brake pipe.



WRU90-BR322

3. Tighten the brake booster attaching nuts.

Tightening Torque: 1.0 - 1.6 kgf-m
(7.2 - 11.6 ft-lb, 9.8 - 15.7 N·m)

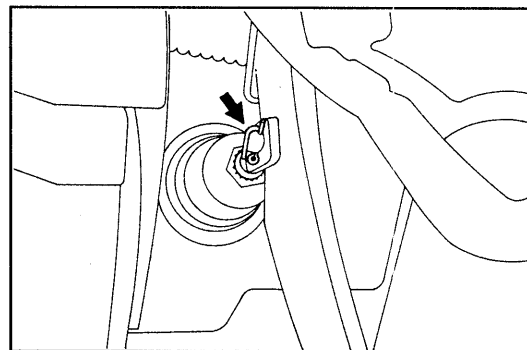


WRU90-BR323

4. Connect the clevis to the brake pedal by means of the pin. Install the cotter pin to prevent the pin from dropping.

NOTE:

- Be sure to bend the cotter pin beyond 90 degrees.
- Be sure to apply chassis grease to the pin.

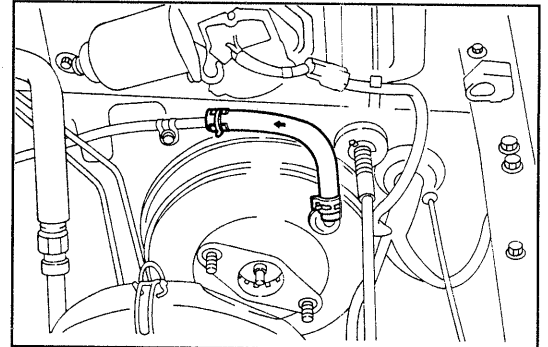


WRU90-BR324

- Connect the brake booster hose to the brake booster as indicated in the right figure. Install a new hose band.

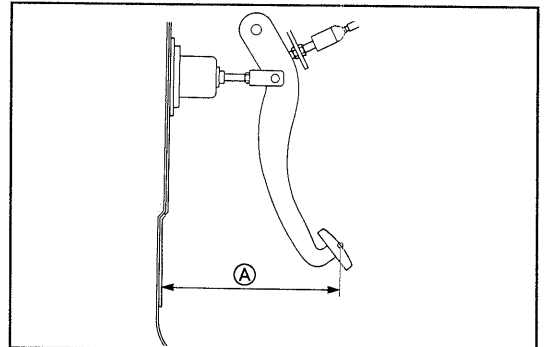
CAUTION:

- The hose should be connected in such a way that the arrowheaded direction may face toward the engine side. Failure to observe this caution may lead to booster malfunctioning.
- Be sure to insert the hose up to the bottom of the spool at the inner side.
- Be sure to install the hose band between the spools.



WRU90-BR325

- Adjust the brake pedal height.
(See page BR-20.)

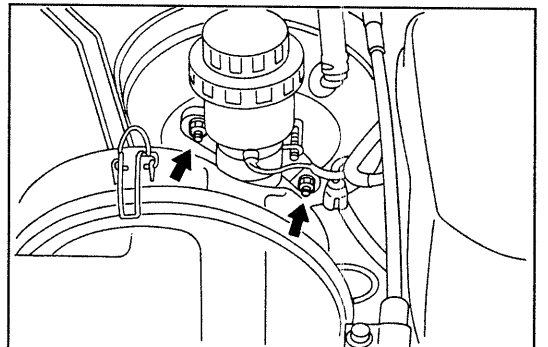


WRU92-BR589

- Install the master cylinder.
(See page BR-60.)

CAUTION:

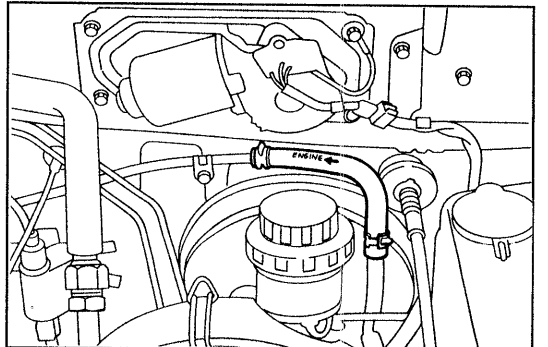
- Prior to the installation of the master cylinder, be sure to adjust the brake booster push rod clearance.



WRU92-BR590

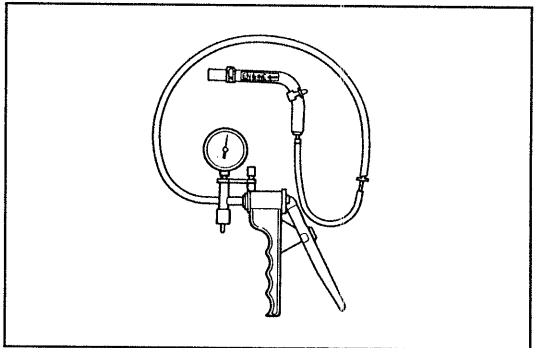
CHECK OF CHECK VALVE

- Remove the booster vacuum hose bands. Remove the booster vacuum hose.



WRU90-BR328

- Connect a MityVac to the booster vacuum hose as indicated in the right figure. Apply negative pressure. Ensure that negative pressure is applied and the applied pressure is maintained.
If not, replace the booster vacuum hose.



WRU90-BR329

BRAKE SYSTEM

3. Blow air into the booster vacuum hose from the booster side. Ensure that air continuity exists. If not, replace the booster vacuum hose.

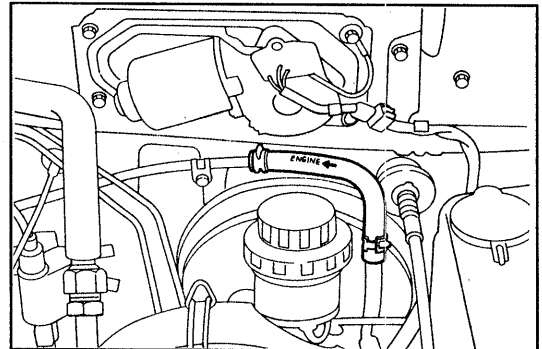


WRU90-BR330

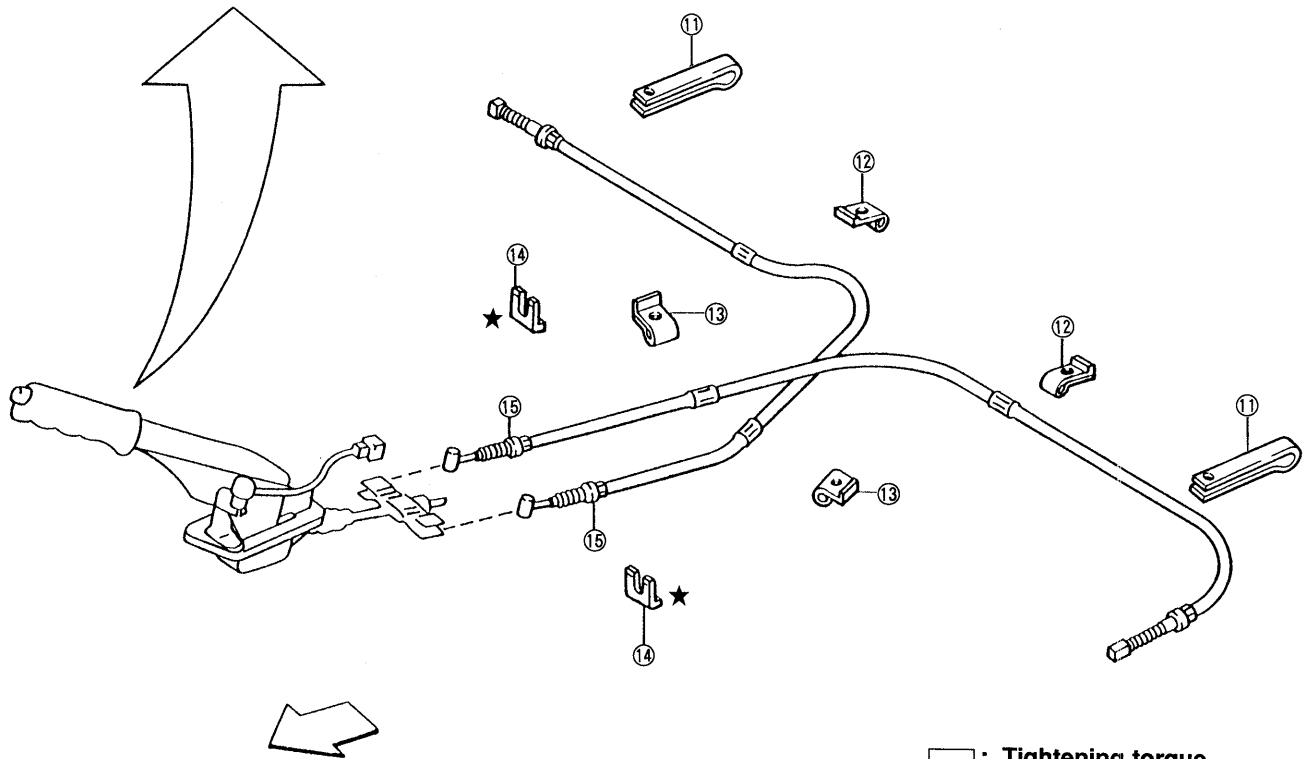
4. Connect the brake booster hose as indicated in the right figure. Install new hose bands.

CAUTION:

- The hose should be connected in such a way that the arrowheaded direction may face toward the engine side. Failure to observe this caution may lead to booster malfunctioning.
- Be sure to insert the hose up to the bottom of the spool at the inner side.
- Be sure to install the hose band between the spools.



WRU90-BR331



- ⑨ Nut
- ⑩ Nut
- ⑪ Clamp
- ⑫ Clamp
- ⑬ Clamp
- ⑭ Clamp
- ⑮ Parking brake cable assy

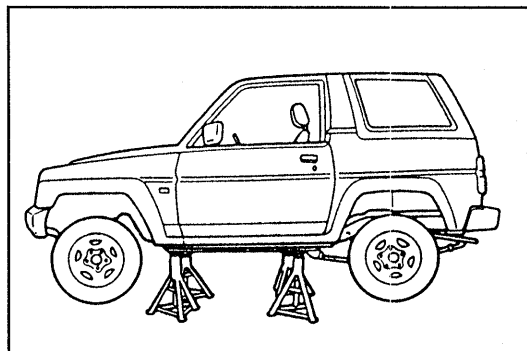
BRAKE SYSTEM

REMOVAL

CAUTION:

- Be very careful not to damage the cable.
- Be sure not to deform the cable by applying undue force to it.

1. Jack up the vehicle and support it with safety stands.
(See GI Section.)
2. Loosen the lock nut of the parking brake lever adjusting nut.

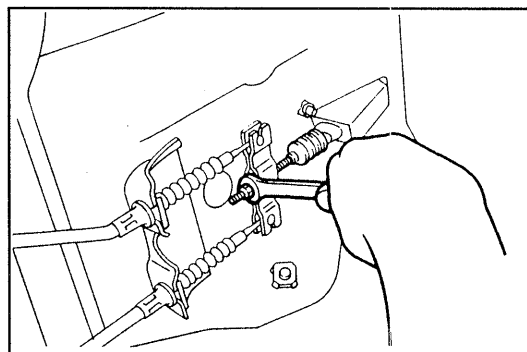


WRU90-BR333

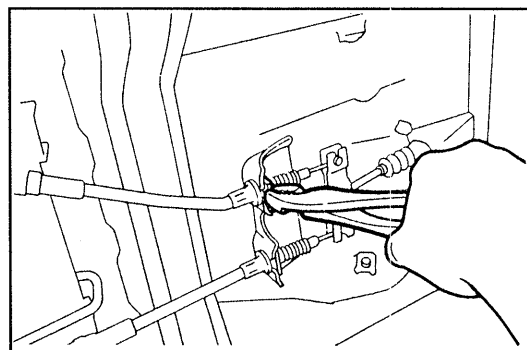
3. Remove the lock nut and adjusting nut.
4. Remove the collar.
5. Detach the cable clamp clip.

NOTE:

- Do not reuse the clip.

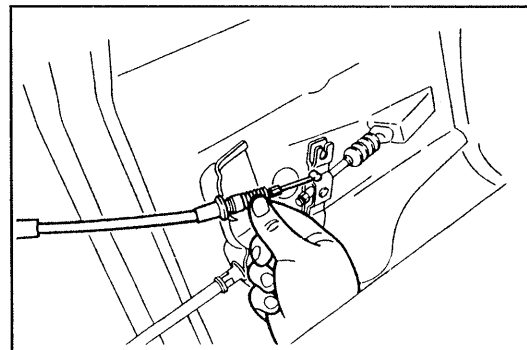


WRU90-BR334



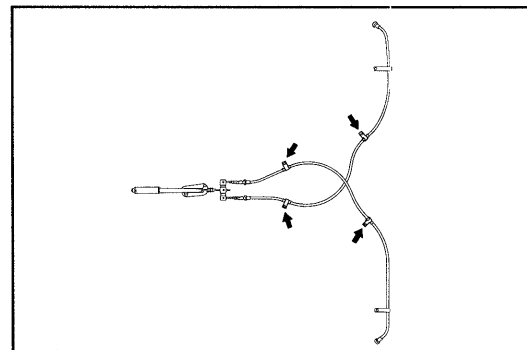
WRU90-BR335

6. Disconnect the parking brake cable from the bracket and remove it from the equalizer.
7. Pull out the parking brake plunger from the equalizer. Remove the parking brake plunger pin.



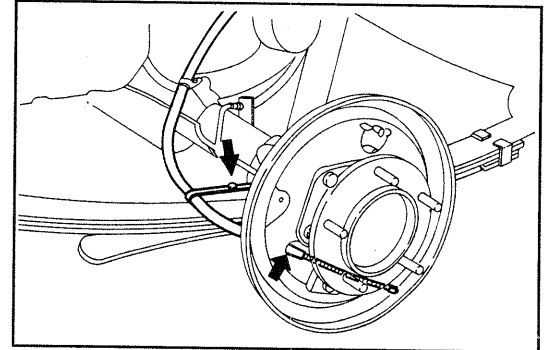
WRU90-BR336

8. Remove the parking brake cable clamps and bolts.



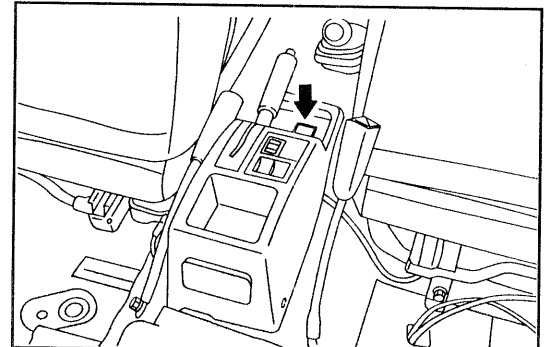
WRU90-BR338

9. Disconnect the parking cable from the brake backing plate.
(See the Rear Brake section.)



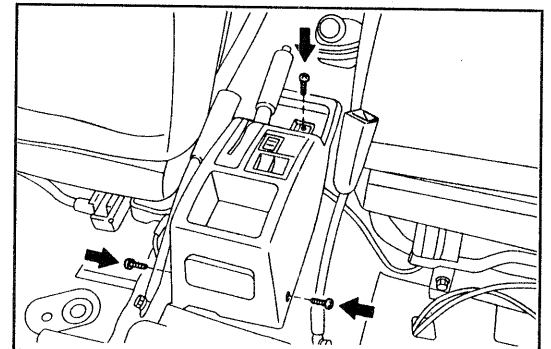
WRU90-BR339

10. Removal of console box
(For details, see the Body section.)
(1) Remove the box hole cover, using a small-sized standard screwdriver or the like.



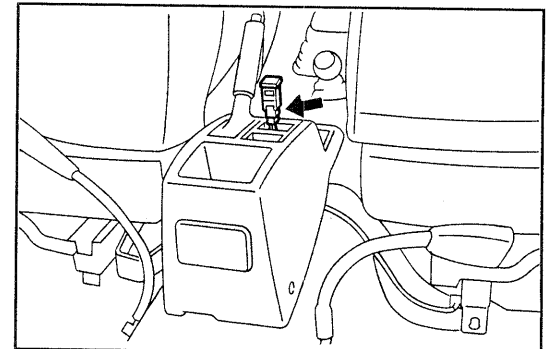
WRU90-BR340

- (2) Remove the console box attaching screws.



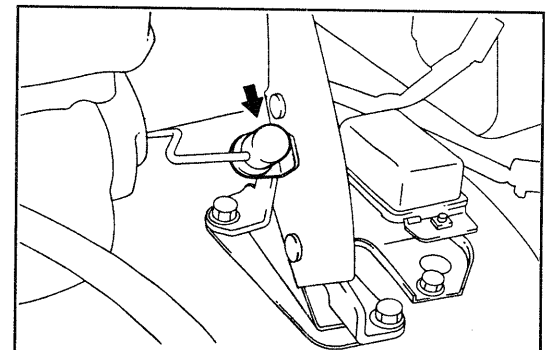
WRU90-BR341

- (3) Lift the console box and disconnect the connectors of the door lock control switch and/or the power window.
(On vehicles so equipped)
- (4) Remove the console box.



WRU90-BR342

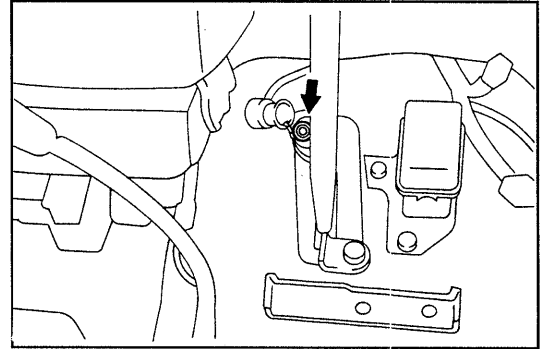
11. Remove the rubber cap of the parking brake lever switch from the switch.



WRU90-BR343

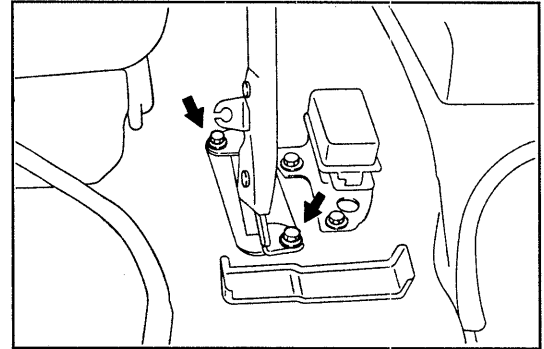
BRAKE SYSTEM

12. Push the parking brake lever switch to release the lock section. Then, remove the parking brake lever switch from the parking brake lever.



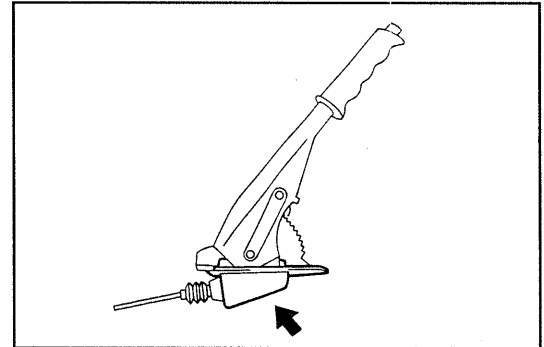
WRU90-BR344

13. Remove the attaching bolts of the parking brake control handle. Then, remove the parking brake control handle from the vehicle.



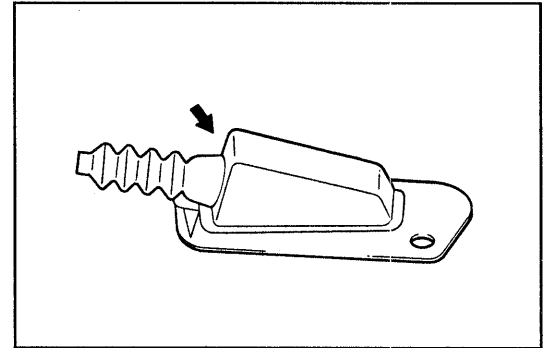
WRU90-BR345

14. Remove the parking brake lever dust cover from the parking brake control handle.



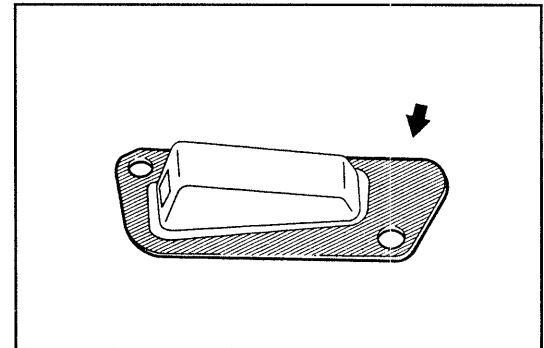
WRU90-BR346

15. Remove the parking brake dust cover from the parking brake lever dust cover.



WRU90-BR347

16. Remove the parking brake hole shield from the parking brake lever dust cover.



WRU90-BR348

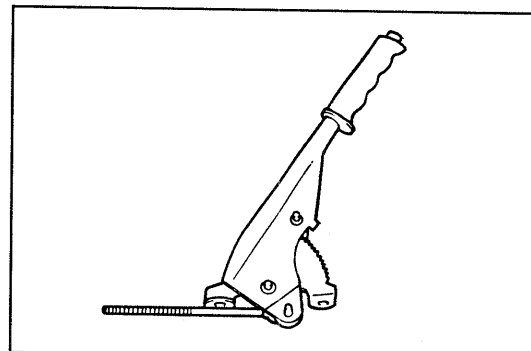
INSPECTION

1. Check of parking brake control lever
 - (1) Ensure that the sector and pawl sections exhibit no wear or deformation.
 - (2) Ensure that the pawl for the rack operates smoothly, interlocking with the release button.
 - (3) Ensure that the screw section exhibits no damage.
 - (4) Ensure that each staking section exhibits no excessive play.
 - (5) Ensure that the lever section exhibits no damage, such as deformation.
2. Inspection of parking brake lever dust cover

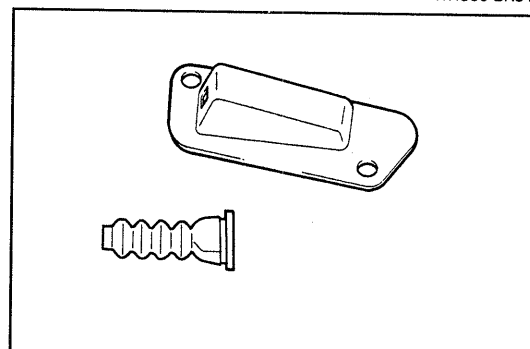
Ensure that the parking brake lever dust cover exhibits no damage, such as cracks.
3. Inspection of parking brake dust cover

Ensure that the parking brake dust cover exhibits no damage, such as wear and cracks.
4. Ensure that no damage, such as wear, is present at the parking brake equalizer, parking brake plunger pin, collar, adjusting nut and lock nut.
Replace any defective part.
5. Check of parking brake cable

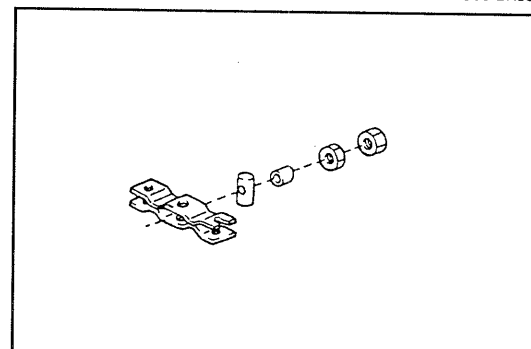
Ensure that the parking brake cable and rubber boot exhibits no damage, such as wear, cut and deformation. Also, ensure that the inner cable operates smoothly.



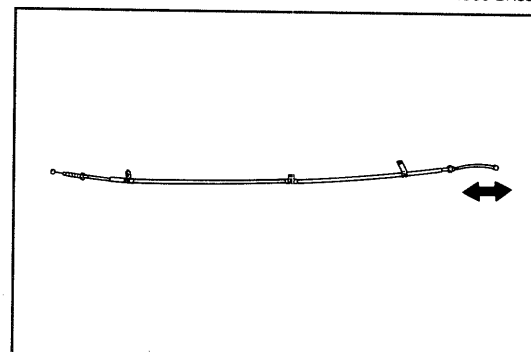
WRU90-BR349



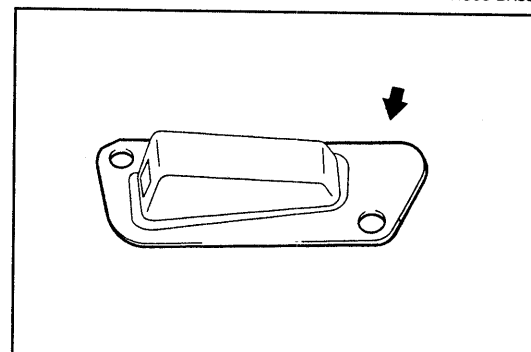
WRU90-BR350



WRU90-BR351



WRU90-BR352



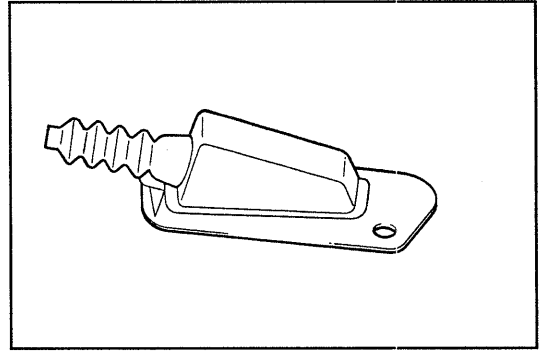
WRU90-BR354

INSTALLATION

1. Install the parking brake hole shield to the parking brake lever dust cover.

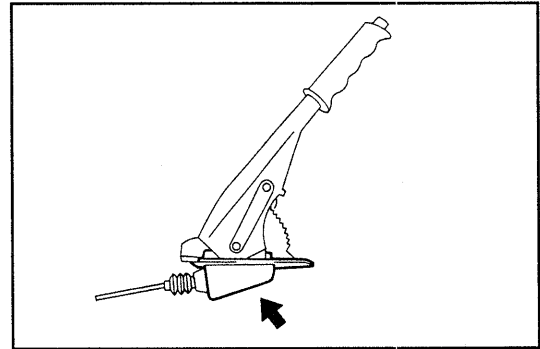
BRAKE SYSTEM

2. Assemble the parking brake lever dust cover to the parking brake lever dust cover.



WRU90-BR355

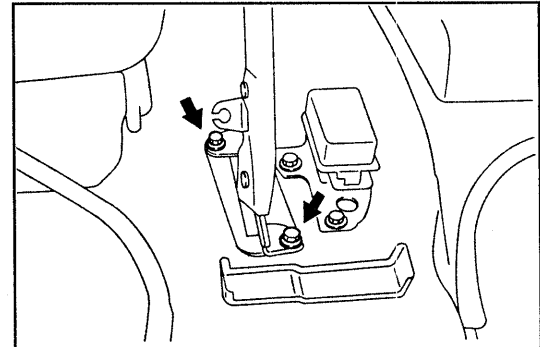
3. Insert the parking brake lever dust cover through the parking brake control handle.



WRU90-BR356

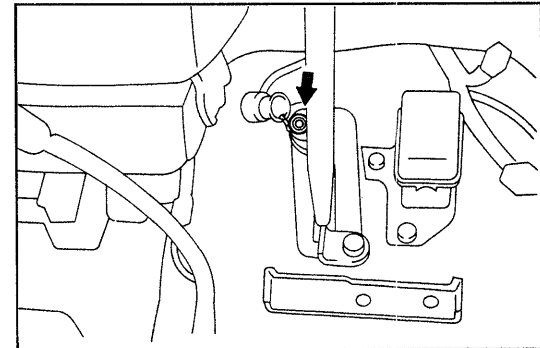
4. Install the parking brake control handle to the floor panel. Tighten the attaching bolts to the specified torque.

Tightening Torque: 1.0 - 1.6 kgf-m
(7.2 - 11.6 ft-lb, 9.8 - 15.7 N·m)



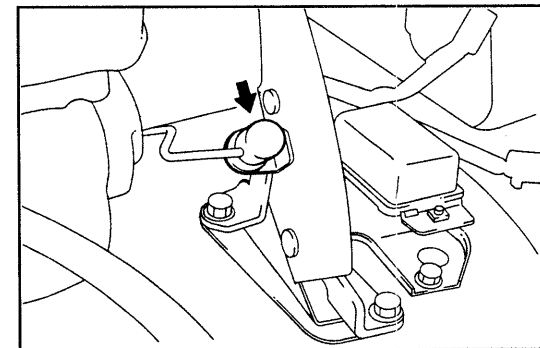
WRU90-BR357

5. Insert the parking brake switch into the parking brake lever.



WRU90-BR358

6. Put the rubber cap of the parking brake lever switch over the switch.



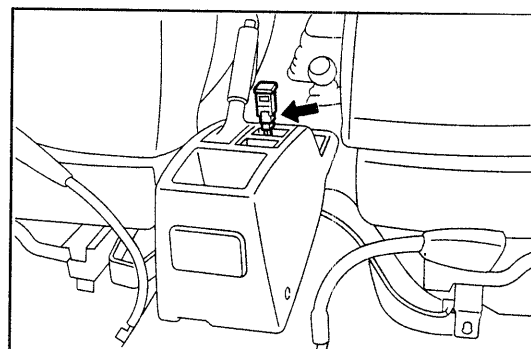
WRU90-BR359

7. Installation of console box

- (1) Install the console box through the parking brake lever.

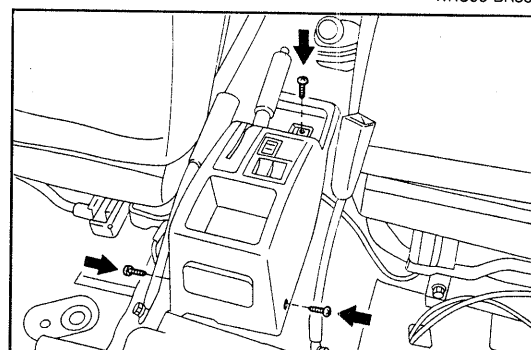
WRU90-BR360

- (2) Reconnect the connectors of the door lock control switch and/or power window control switch.
(On vehicles so equipped only)



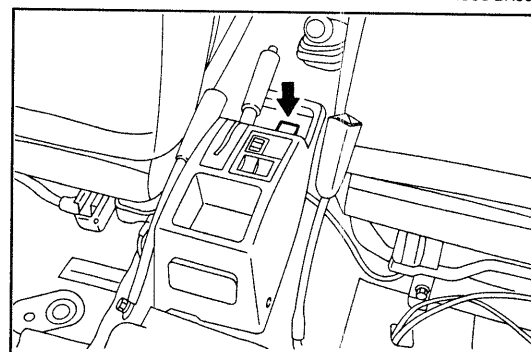
WRU90-BR361

- (3) Install the console box and tighten the attaching screws.



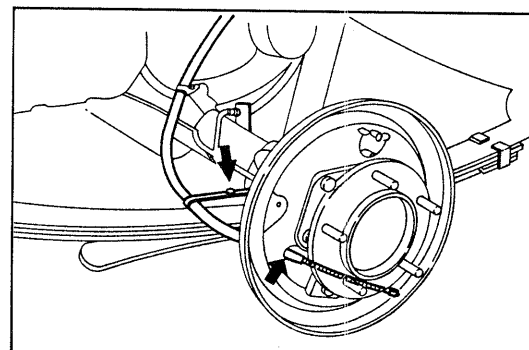
WRU90-BR362

- (4) Install the console box hole cover.



WRU90-BR363

8. Install the parking brake to the brake backing plate.
(See the Rear axle section.)



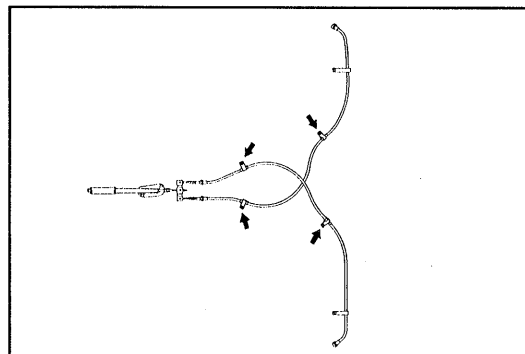
WRU90-BR364

BRAKE SYSTEM

9. Secure the parking brake cable clamps by installing the attaching bolt.

NOTE:

- The cable clamp should be installed in such a way that the gap between the parking brake cable and the fuel tank protector becomes at least 20 mm (0.79 inch).



WRU90-BR365

10. Connect the parking brake cable to the equalizer.
11. Install the parking brake plunger pin to the equalizer. Pass the parking brake plunger in place.
12. Install the adjusting nut and lock nut to the plunger.
13. Insert the parking brake cable to the bracket. Clamp the parking brake cable with new cable clamp clips.

NOTE:

- Never reuse the cable clamp clips.

14. Remove the slack of the parking brake cable by pulling the parking brake lever with a force of around 30 - 40 kgf (66.15 - 88.2 lb).
15. Adjust the adjusting nut so that the working travel of the parking brake lever may become the specified value when the lever is pulled with a force of 25 kgf (55 lb).

Specified Working Travel of Parking Lever:

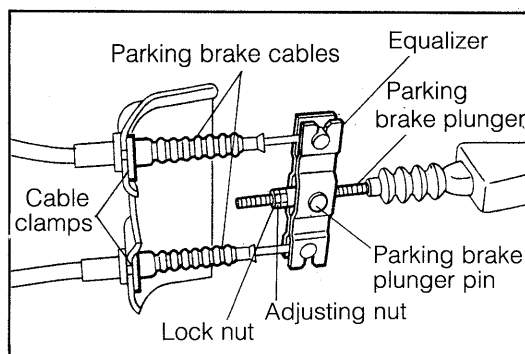
4 - 6 notches

(with an operating force of 25 kgf (55 lb) applied)

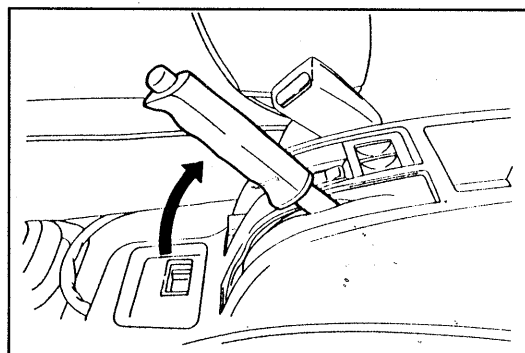
16. While preventing the adjusting nut from turning, tighten the lock nut to the specified torque.

Tightening Torque: 0.4 - 0.7 kgf-m

(2.9 - 5.1 ft-lb, 3.9 - 6.9 N-m)

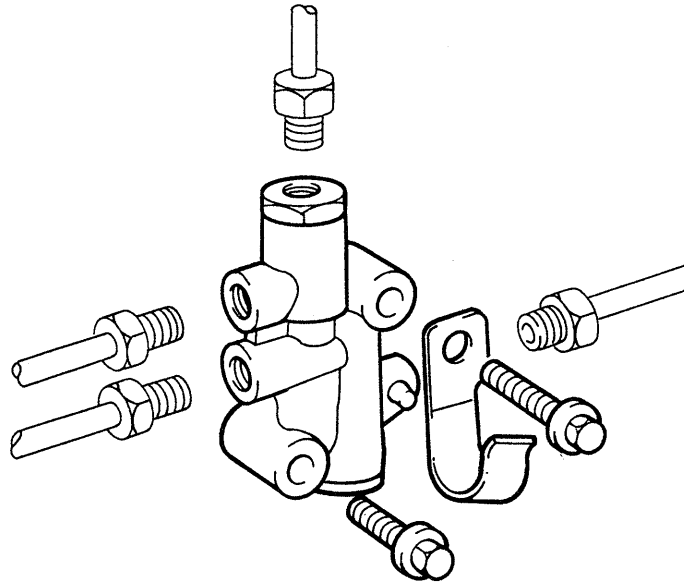


WRU90-BR367



WRU90-BR367

P & B VALVE (PROPORTIONING AND BY-PASS VALVE)



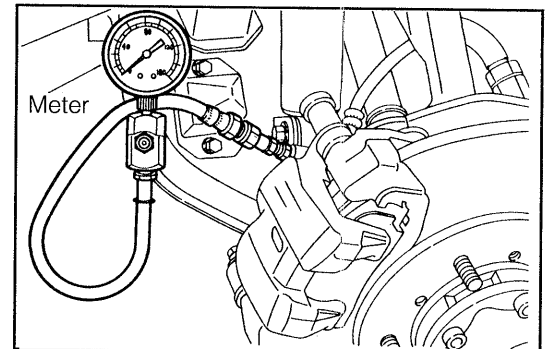
WRU90-BR368

INSPECTION

1. Connect a suitable brake hydraulic pressure gauge to the front wheel brake. Perform air bleeding.

NOTE:

- Be sure to follow the manufacturer's instructions of the brake hydraulic pressure gauge during the connection.

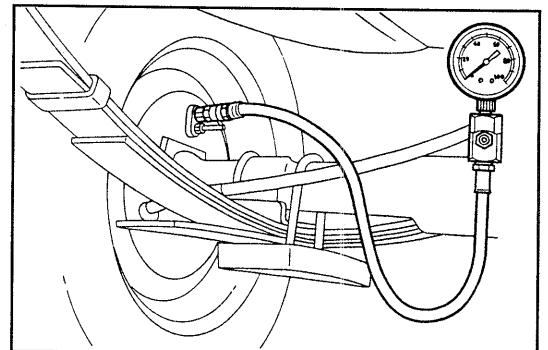


WRU90-BR369

2. Connect a suitable brake hydraulic pressure gauge to the rear wheel brake. Perform air bleeding.

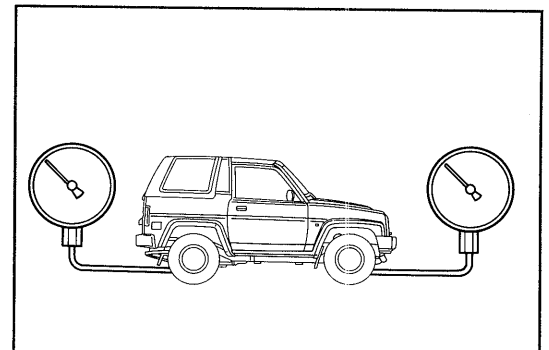
NOTE:

- Be sure to follow the manufacturer's instructions of the brake hydraulic pressure gauge during the connection.



WRU90-BR370

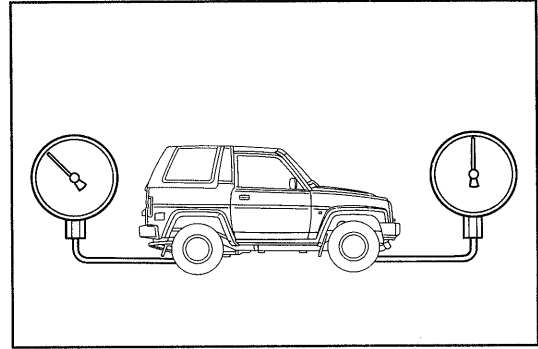
3. With the brake pedal depressed, set the reading of the hydraulic pressure gauge installed to the front wheel brake to 10 kgf/cm². Ensure that the hydraulic pressure gauge installed to the rear wheel brake registers almost the same hydraulic pressure as that applied to the front wheel. If not, replace the P & B valve.



WRU90-BR371

BRAKE SYSTEM

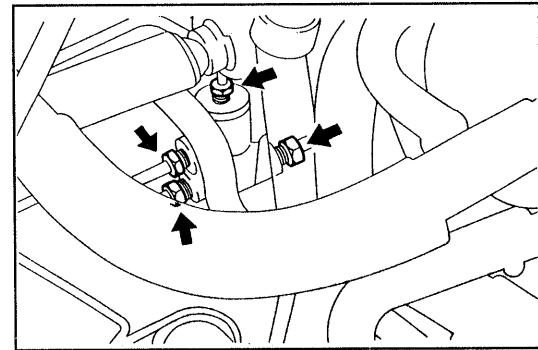
4. Apply a hydraulic pressure of 30 kg/cm² or more to the front wheel brake by depressing the brake pedal. Ensure that the hydraulic pressure applied to the rear wheel brake is lower than that applied to the front wheel.
If not, replace the P & B valve.
5. Remove the brake hydraulic pressure gauge. Perform air bleeding.
(See page BR-18.)



WRU92-BR591

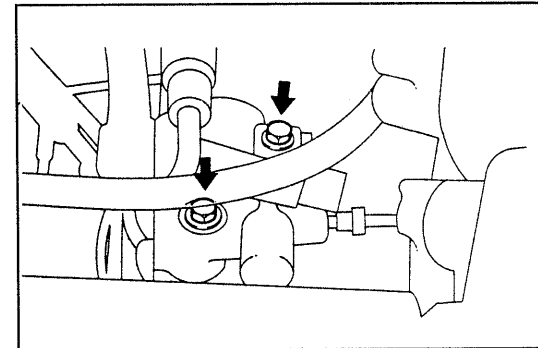
REMOVAL

1. Drain the brake fluid from the front and rear brake bleeder plugs.
2. Remove the brake pipe from the P & B valve.



WRU90-BR373

3. Remove the P & B valve by removing the P & B valve attaching bolts.



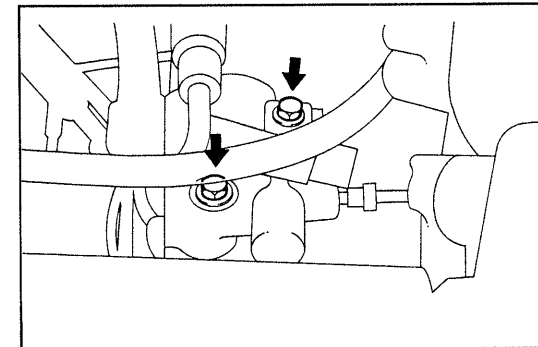
WRU90-BR374

INSTALLATION

1. Install the P & B valve and tighten the attaching bolts.
Tightening Torque: 0.6 - 1.0 kgf-m
(4.3 - 7.2 ft-lb, 5.9 - 9.8 N-m)

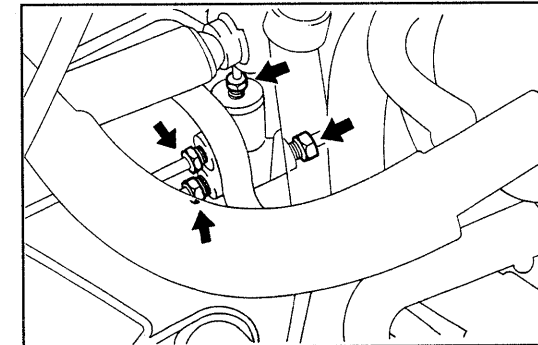
NOTE:

- On air conditioner-equipped vehicles, be sure to tighten the drain hose clamp together with the valve.



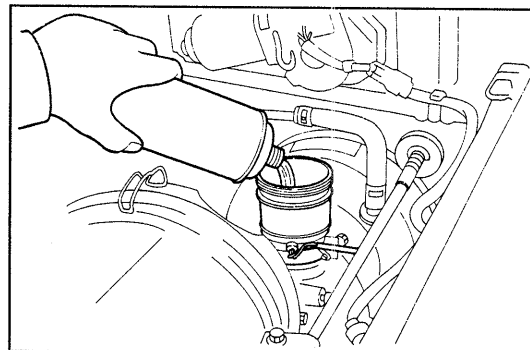
WRU90-BR375

2. Connect the brake pipes to the P & B valve.
Tightening Torque: 1.3 - 1.8 kgf-m
(9.4 - 13.0 ft-lb, 12.7 - 17.7 N-m)



WRU90-BR376

3. Fill brake fluid to the master cylinder. Perform air bleeding.
(See page BR-18.)
4. Perform the brake fluid leakage test.
5. Perform the in-vehicle inspection.
6. Perform the brake test on a brake tester.



WRU92-BR592

DAIHATSU

ROCKY

STEERING

OUTLINE OF STEERING SYSTEM	SR- 2
TROUBLESHOOTING	SR- 9
IN-VEHICLE INSPECTION	SR-10
STEERING WHEEL	SR-22
STEERING COLUMN	SR-29
STEERING LINKAGE	SR-53
STEERING GEAR HOUSING	SR-66
VANE PUMP	SR-80

WRU90-SR001

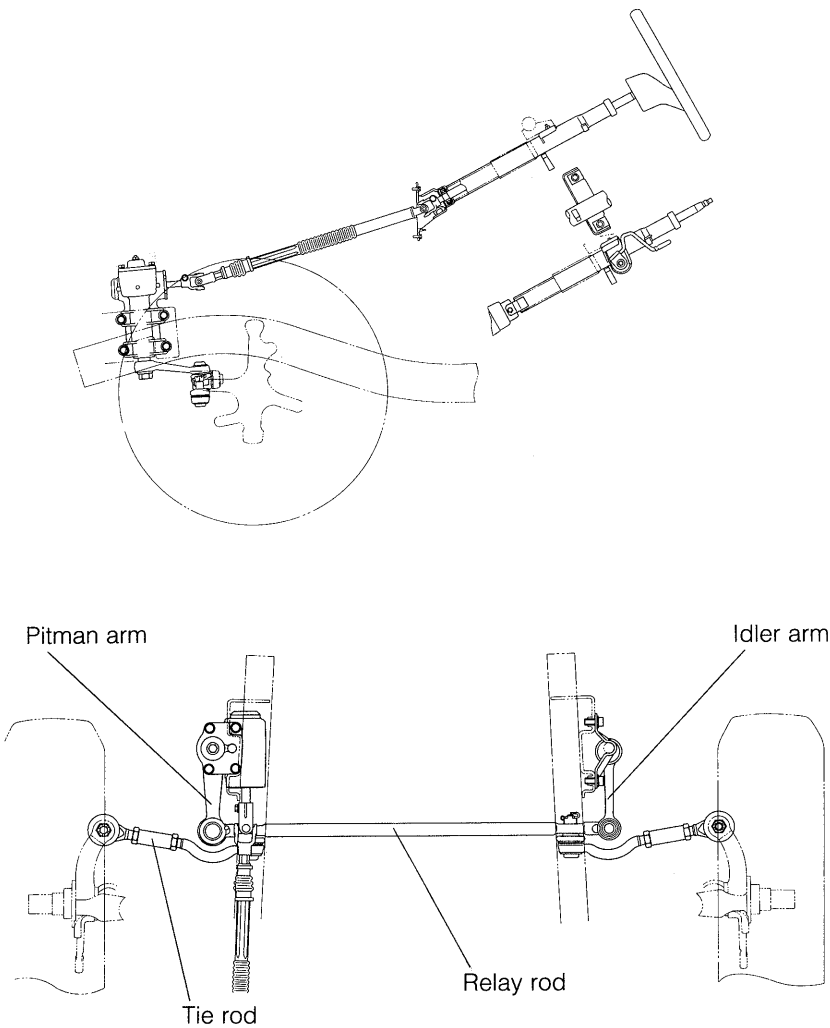
SR

OUTLINE OF STEERING SYSTEM

The steering gear box employs a recirculating ball type. Furthermore, the power steering is available as optional equipment.

The steering column employs an impact absorption type. Furthermore, a tilt steering is available as optional equipment.

The steering linkage consists of a pitman arm, a relay rod, an idler arm and tie rods.



WRU92-SR406

Steering specifications

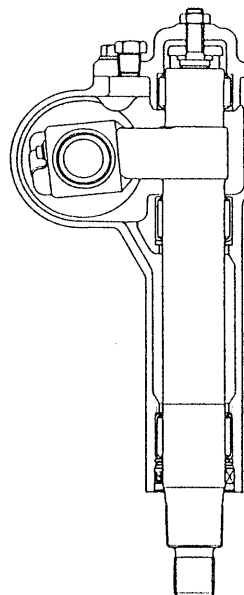
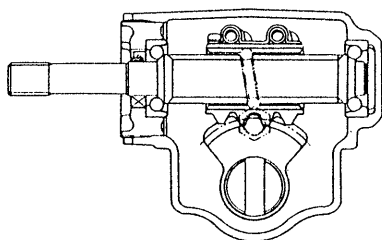
Item		Specifications
Turning angle degrees	Inner	27°05' +0° -3°
	Outer	23°55'
Minimum turning radius	m (ft)	5.8 (18.4)

WRU92-SR428

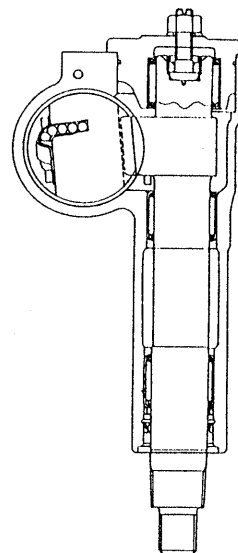
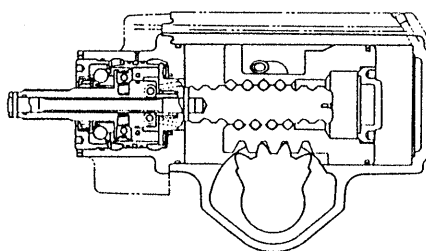
STEERING GEAR BOX

As regards the steering gear box, the manual steering (recirculating ball type) is standard, where as the power steering (integral type) is optional.

Manual type



Power steering



WRU90-SR004

Steering gear box specifications

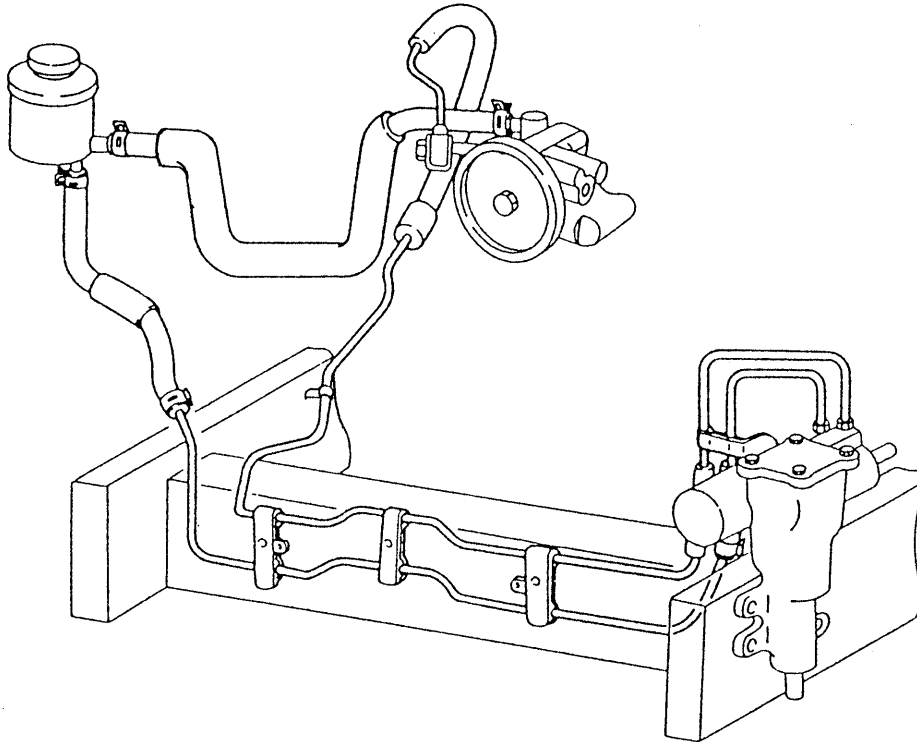
	Manual type		Power steering	
Type	Recirculating ball type		Integral type	
Gear ratio	24 – 28		19.8	
Oil capacity	Upper limit	480 cc	—	
	Lower limit	460 cc		

WRU90-SR005

STEERING

POWER STEERING

The power steering consists of the following components: A vane pump which generates hydraulic pressure, an integral type gear box which detects a force being applied to the steering system, controls the hydraulic pressure and converts the hydraulic pressure to a mechanical power, an oil reservoir which stores hydraulic fluid, and those hoses, pipes, etc. linking these components.



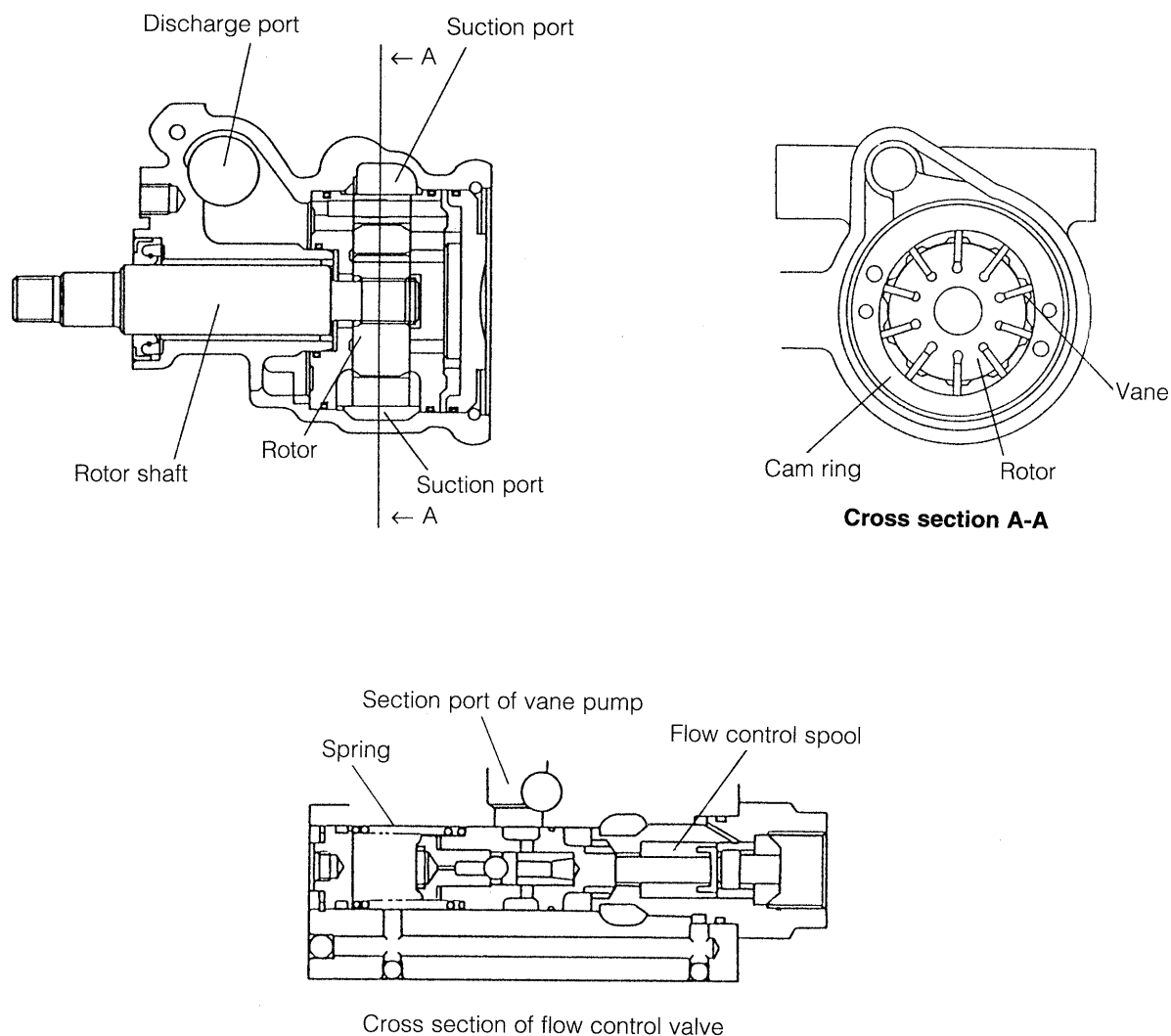
NOTE:

- The illustration shows the vehicle without the rear ABS. (See page SR-80.)

WRU90-SR006

VANE PUMP

The vane pump consists of a cam ring, a pump rotor, vanes and so forth. A flow control valve which controls the fluid flow rate according to the revolution speed is incorporated at the rear section of the pump.



WRU90-SR007

Vane pump specifications

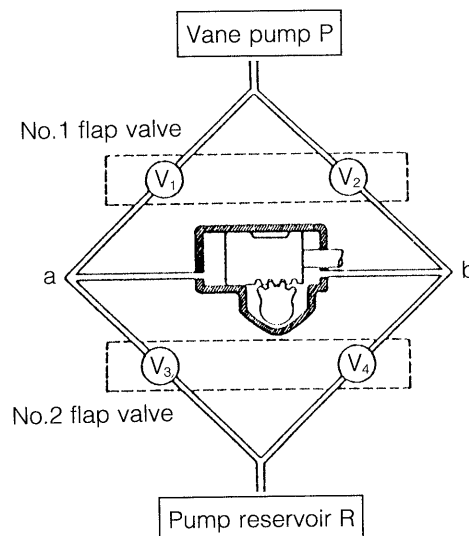
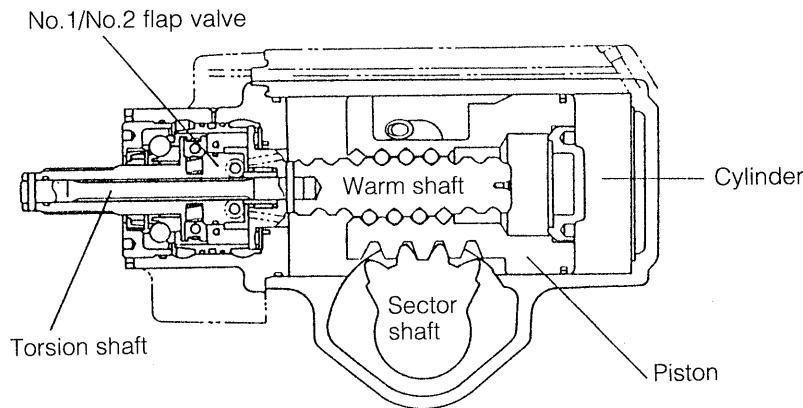
Revolution speed used	(rpm)	500 - 7000
Control discharge rate	(liter/min)	7.5 [at 1000 rpm]
Relief set pressure	(kg/cm ²)	60 - 70 [at 500 rpm]
Fluid		Power steering fluid
Ambient temperature	(°C)	-40 - 120

WRU90-SR008

POWER STEERING GEAR BOX

Operation principle

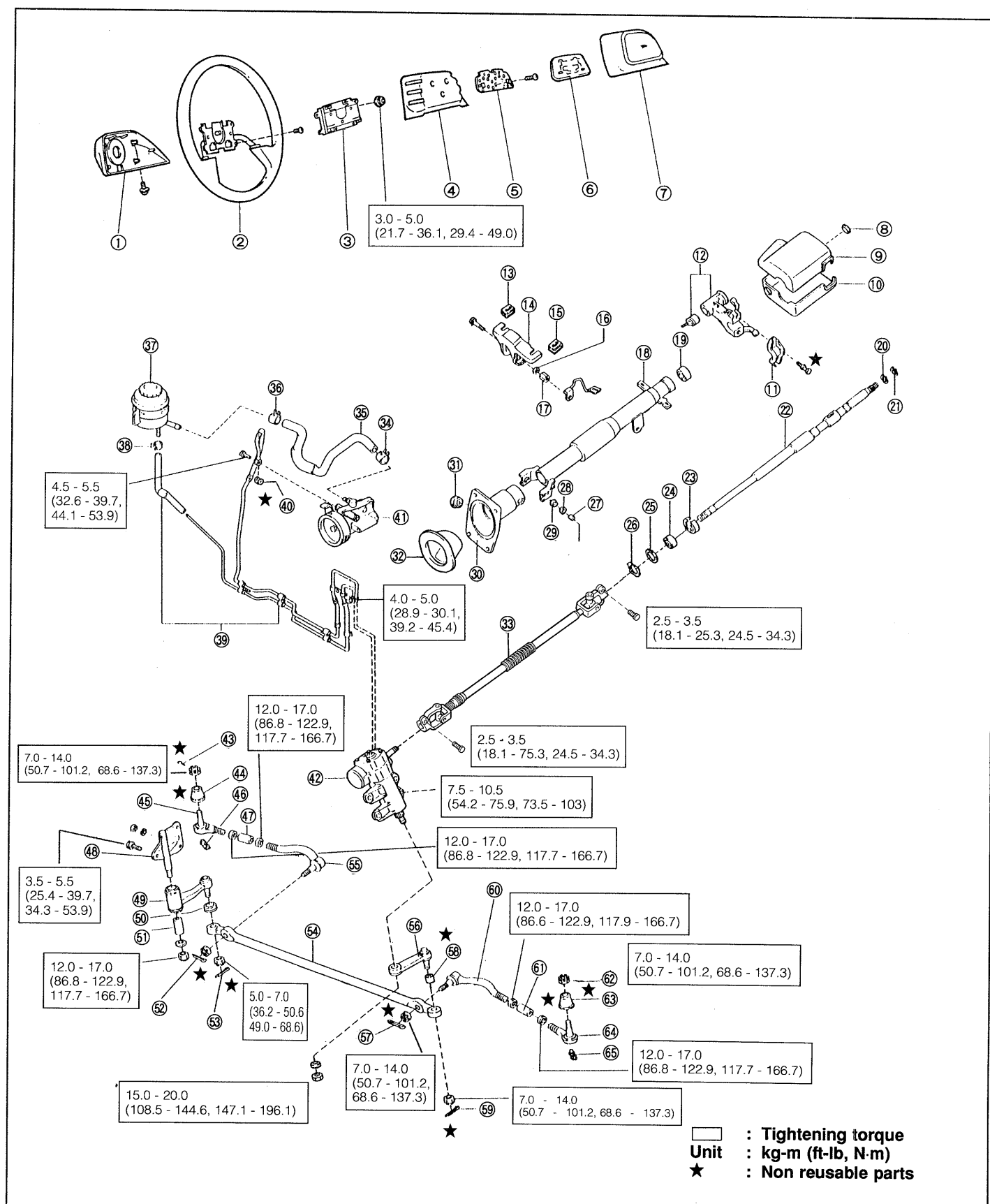
1. The V_1 and V_2 of the No. 1 flap valve are direction controlling valves, which switch the oil passage to either P-a-R or R-b-P, according to the movement of the steering wheel.
The V_3 and V_4 of the No. 2 flap valve are pressure controlling valves, which determines pressures at the points "a" and "b" according to steering.
2. When the steering wheel is in the neutral position, all those valves of V_1 , V_2 , V_3 and V_4 are open and there is no difference in pressure between the points "a" and "b".
3. When the steering wheel is turned to the right, the V_1 closes, V_2 and V_3 open and V_4 almost closes. The hydraulic pressure at the point "b" (in the cylinder) increases. Then the piston is pushed to the left in the figure, thus assisting the driver's steering effort.
The greater the steering effort, the smaller the opening of the V_4 , thus increasing the pressure at the pint "b".
4. When the steering wheel is turned to the left, the power steering operation is reverse to that of (3).



COMPONENTS

NOTE:

- This illustration below typically indicates those components of power steering-equipped model.



- | | |
|--|-----------------------------------|
| ① Steering wheel cover | ④④ Clip |
| ② Steering wheel sub assembly | ④⑤ Oil reservoir-to-pump hose |
| ③ Energy absorbing pad | ④⑥ Clip |
| ④ Steering wheel lower cover | ④⑦ Oil reservoir assembly |
| ⑤ Horn bottom contact plate | ④⑧ Clip |
| ⑥ Horn bottom contact plate No.2 | ④⑨ Pressure feed tube assembly |
| ⑦ Horn pad sub assembly | ④⑩ Gasket |
| ⑧ Grommet | ④⑪ Vane pump assembly |
| ⑨ Steering column upper cover | ④⑫ Steering gear housing assembly |
| ⑩ Steering column lower cover | ④⑬ Cotter pin |
| ⑪ Steering column housing | ④⑭ Steering link joint dust seal |
| ⑫ Steering column upper w/switch bracket | ④⑮ Tie rod end sub assembly, R.H. |
| ⑬ Steering column upper attachment plate | ④⑯ Fitting grease |
| ⑭ Tilt steering support sub assembly | ④⑰ Tie rod adjusting tube |
| ⑮ Steering column upper attachment plate | ④⑱ Idler arm support pin |
| ⑯ Washer | ④⑲ Steering idler arm assembly |
| ⑰ Bolt | ④⑳ Dust seal |
| ⑱ Steering column tube sub assembly | ④㉑ Collar |
| ⑲ Radial ball bearing | ④㉒ Cotter pin |
| ⑳ Snap ring | ④㉓ Cotter pin |
| ㉑ Snap ring | ④㉔ Steering relay rod |
| ㉒ Steering main shaft sub assembly | ④㉕ Tie rod assembly, R.H. |
| ㉓ Steering shaft thrust stopper sub assembly | ④㉖ Pitman arm sub assembly |
| ㉔ Radial ball bearing | ④㉗ Cotter pin |
| ㉕ Washer | ④㉘ Steering link joint seal |
| ㉖ Snap ring | ④㉙ Cotter pin |
| ㉗ Collar | ④㉚ Tie rod assembly, L.H. |
| ㉘ Bush | ④㉛ Tie rod adjusting tube |
| ㉙ Bush | ④㉜ Cotter pin |
| ㉚ Steering column hole cover | ④㉝ Steering link joint dust seal |
| ㉛ Hole plug | ④㉞ Tie rod end sub assembly, L.H. |
| ㉜ Steering column hole cover shield | ④㉟ Grease fitting |
| ㉝ Steering intermediate shaft | |

NOTE:

- The illustration shows the vehicle without the rear ABS. (See page SR-80.)

TROUBLESHOOTING

Symptom	Possible causes	Checking points
Hard steering Hard steering persists even after being jacked up.	<ul style="list-style-type: none"> Faulty steering gear Preload improperly adjusted Faulty ball joint 	<ul style="list-style-type: none"> Check steering gear. Check steering linkage.
Steering effort becomes lighter after being jacked up.	<ul style="list-style-type: none"> Tire size Front wheels improperly aligned 	<ul style="list-style-type: none"> Check front alignment and tire size. Check tire air pressure.
Excessive play	<ul style="list-style-type: none"> Steering wheel improperly installed Faulty steering linkage Suspension improperly installed Faulty steering gear Bush worn 	<ul style="list-style-type: none"> Check steering wheel. Check steering linkage. Check suspension. Check steering gear. Check steering linkage bush.
Abnormal noise	<ul style="list-style-type: none"> Faulty steering shaft Faulty steering gear Faulty steering linkage 	<ul style="list-style-type: none"> Check steering shaft. Check steering gear. Check steering linkage. Check ball joint rattle.

WRU90-SR012

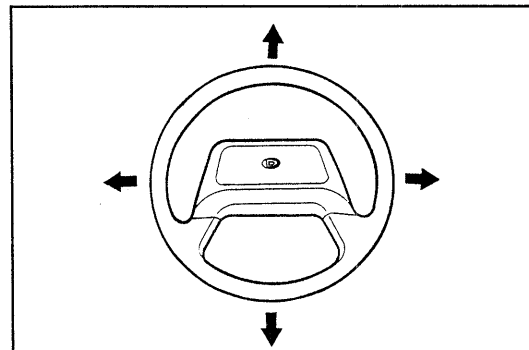
IN-VEHICLE INSPECTION

(Except power steering-equipped models)

1. Check of steering wheel

Move the steering wheel in an axial direction and/or in a perpendicular direction so as to ensure no looseness and/or excessive play is present.

If any looseness and/or excessive play is present, check the steering wheel for improper installing condition. Repair any defective parts.



WRU90-SR013

2. Check of steering wheel for free play

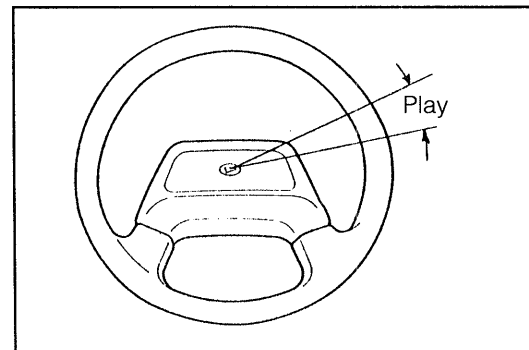
(1) Set the steering wheel to a straight-ahead state.

(2) Turn the steering wheel clockwise and counterclockwise. Measure the steering wheel movement at the circumference of the steering wheel which is registered before the steering tires start to be steered. Ensure that this steering wheel play is not more than the specified value.

Specified Value: 30 mm (1.18 inches)

If not, check each joint section for excessive play. If the joints are satisfactory, replace the steering gear box.

If the joint sections exhibit defects, such as excessive play, replace the defective parts.



WRU90-SR014

3. Check of steering gear box fluid level

(1) Remove the fluid level check plug of the steering gear box.

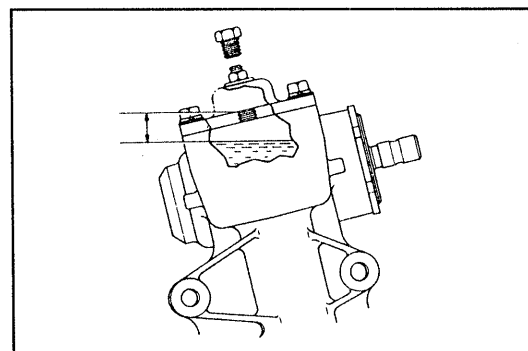
(2) Check the fluid level by inserting a clean screwdriver, etc. from the check hole. Ensure that the height from the fluid level to the upper edge of the check hole conforms to the specified value.

Specified Level: 13 - 23 mm (0.51 - 0.91 inch)

If not, ensure that the steering gear box exhibits no fluid leakage. Replenish the specified fluid to the upper level.

Specified Fluid: Gear oil API GL-3, SAE90

If any fluid leakage is present, replace the steering gear box.



WRU90-SR015

- (3) Clean the plug and plug hole. Furthermore, apply Three Bond 1216 to the threaded portion of the plug. Tighten the plug to the specified torque.

Tightening Torque:

0.2 - 0.4 kgf-m (1.4 - 2.9 ft-lb, 2.0 - 3.9 N-m)

4. Check of steering linkage and gear housing

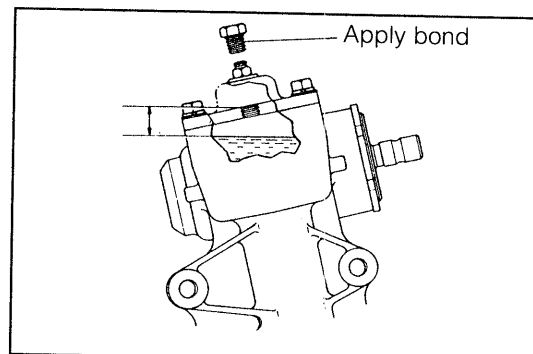
- (1) Ensure that the steering linkage exhibits no excessive play and/or looseness.

If any excessive play and/or looseness is present, check and/or repair the defective parts.

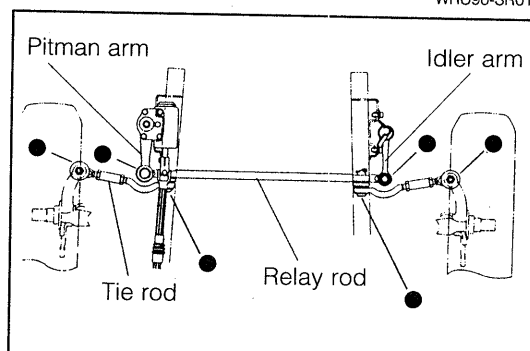
- (2) Ensure that the dust seals exhibits no damage. (Points bearing a "●" mark in the right figure.) Replace any defective dust seal.

- (3) Ensure that the steering gear housing exhibits no fluid leakage.

If any fluid leakage is present, replace the steering gear housing.



WRU90-SR016



WRU92-SR408

(Power steering-equipped models)

1. Check of steering wheel

Move the steering wheel in an axial direction and/or in a perpendicular direction so as to ensure that no looseness and/or excessive play is present.

If any looseness and/or excessive play is present, check the steering gear for improper installing condition. Repair any defective parts.

2. Check of steering wheel free play

- (1) Set the steering wheel to a straight-ahead state.

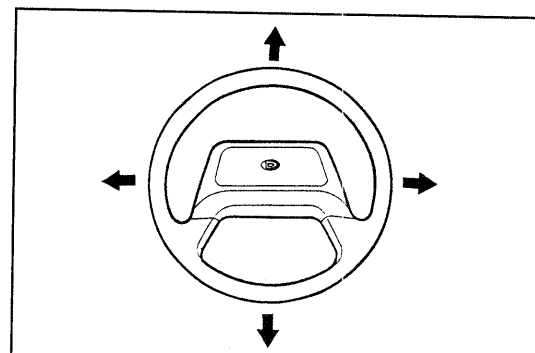
- (2) Turn the steering wheel clockwise and counterclockwise.

Measure the steering wheel movement at the circumference of the steering wheel which is registered before the steering tires start to be steered. Ensure that this steering wheel play is not more than the specified value.

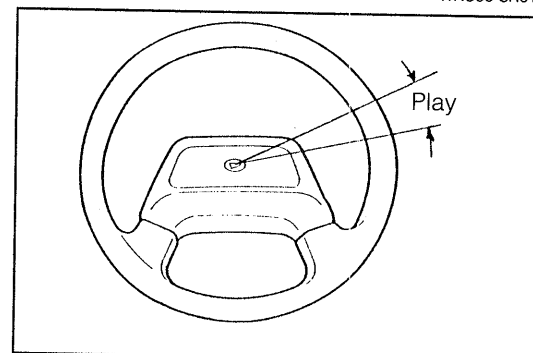
Specified Value: 30 mm (1.18 inches)

If not, check each joint section for excessive play. If the joints are satisfactory, replace the steering gear box.

If the joint sections exhibit defects, such as excessive play, replace the defective parts.



WRU90-SR018

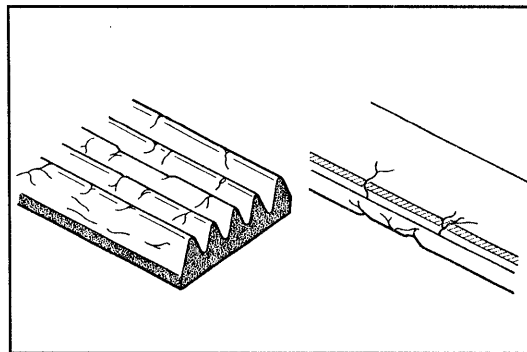


WRU90-SR019

STEERING

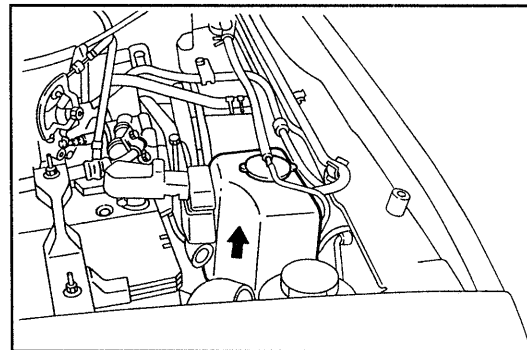
3. Check of power steering vane pump drive belt

- (1) Visually check the belt for separation of the adhesive rubber above and below the core, core separation of the rib from the belt side, severed core, separation of the adhesive rubber, cracks or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs. If necessary, replace the drive belt. (See page SR-81 to SR-90.)



WRU90-SR020

- (2) Remove the radiator reserve tank by raising it. Put the reservoir tank on the radiator.



WRU90-SR021

- (3) Check the amount of drive belt deflection when the midpoint of the drive belt between the vane pump pulley and the crankshaft pulley is pushed with a force of 22 lb (10 kgf).

Specified Belt Deflection:

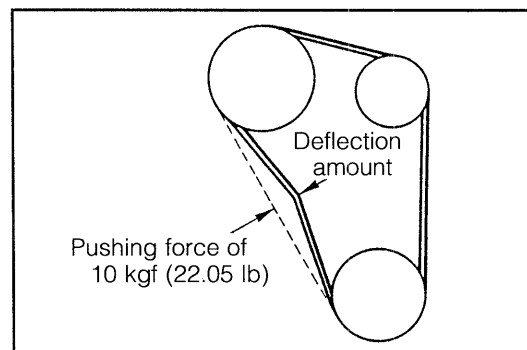
9 - 11 mm (0.35 - 0.43 inch)

[When a force of 10 kgf (22 lb) is applied.]

Reference:

Belt Tension: 50 - 75 kgf (110.25 - 165.38 lb)

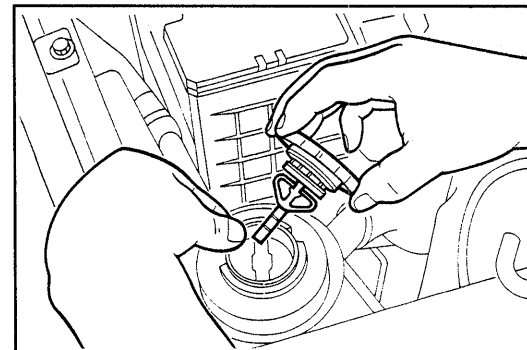
If the amount of belt deflection does not conform to the specified value, adjust the drive belt tension.
(See page SR-89 to SR-90.)



WRU90-SR022

4. Check of power steering fluid

- (1) Open the reservoir tank cap.
- (2) Ensure that the power steering fluid viscosity is not low abnormally.
If the viscosity is low abnormally, change the power steering fluid.



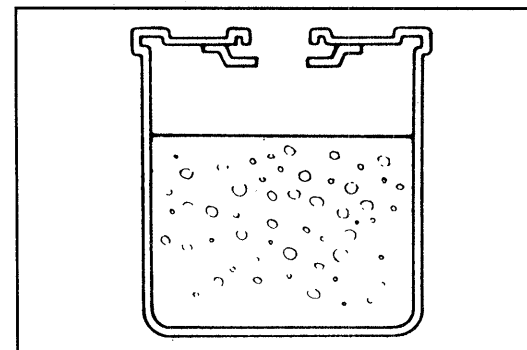
WRU90-SR023

- (3) Ensure that no aeration, whitish cloudy state or discoloration is present in the fluid.
If any aeration or whitish cloudy state is observed, check the power steering fluid level.
If the fluid level is low, replenish the power steering fluid.
Then, proceed to perform air bleeding.

Specified Power Steering Fluid: ATF DEXRON® II

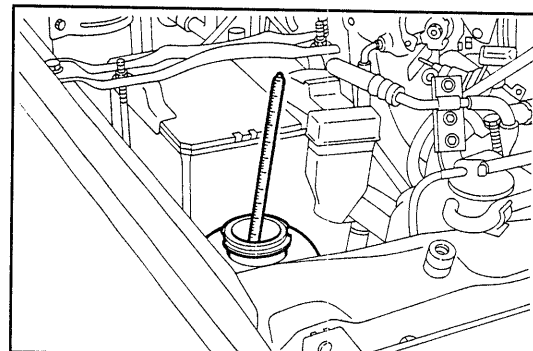
If the level is within the specified range, change the power steering fluid.

- (4) Close the reservoir tank cap.



WRU90-SR024

5. Check of power steering fluid level
 - (1) Open the reservoir tank cap.
 - (2) Measure the power steering fluid temperature.



WRU90-SR025

- (3) When the power steering fluid temperature is within the range of 0 to 40 °C (32 - 104 °F) or 40 - 80 °C (104 - 176 °F), check to see if the fluid level is within the specified range corresponding to the measured temperature condition.

NOTE:

- The term "cold" represents a range of 0 - 40 °C (32 - 104 °F).
- The term "hot" represents a range of 40 - 80 °C (104 - 176 °F).

If the fluid level is low, replenish the specified power steering fluid up to the upper level.

Specified Power Steering Fluid: ATF DEXRON® II

- (4) Close the reservoir tank cap.

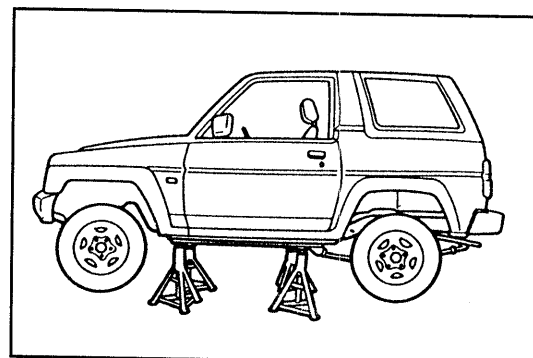
WRU90-SR026

6. Power steering fluid change procedure

CAUTION:

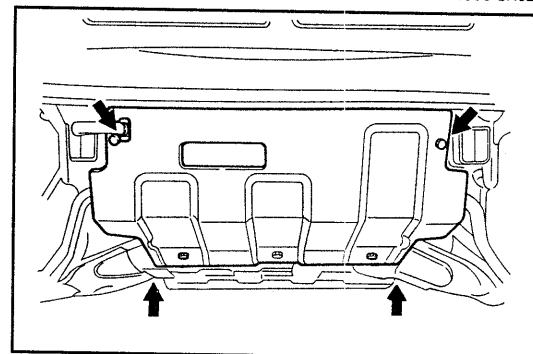
- Never start the engine while the power steering fluid is being drained.

- (1) Place the vehicle on a level floor. Jack up the vehicle and support it with safety stands. (See GI section.)



WRU90-SR028

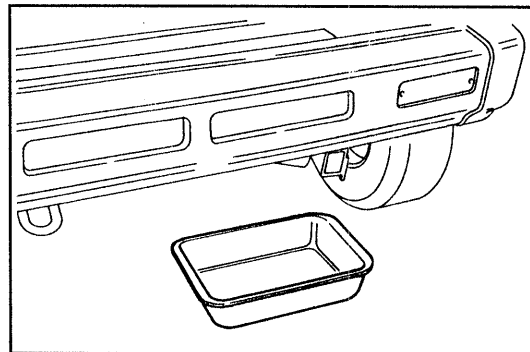
- (2) Detach the engine undercover by removing the engine undercover attaching bolts.



WRU90-SR029

STEERING

- (3) Place a suitable container below the return hose connecting section.



WRU90-SR030

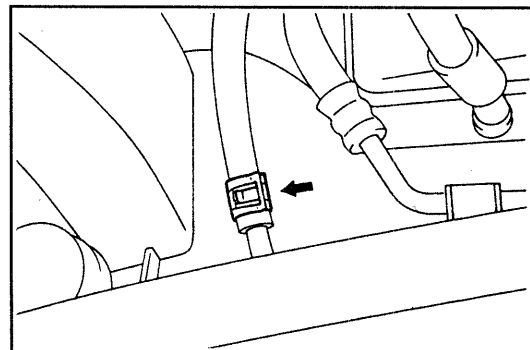
- (4) Detach the return hose clamp. Drain the fluid by disconnecting the return hose from the return pipe.

CAUTION:

- When disconnecting the return hose, special caution must be paid as to the flowing fluid.

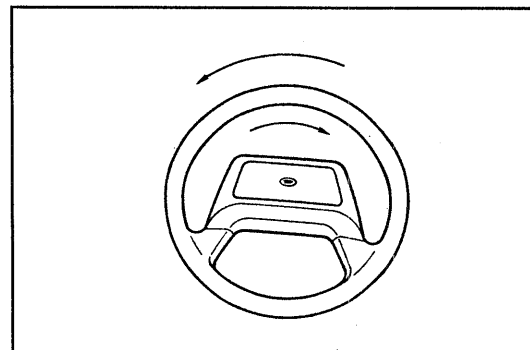
NOTE:

- Be very careful not to deform the return pipe.



WRU90-SR031

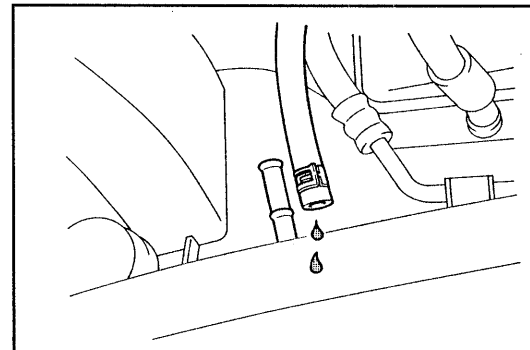
- (5) Turn the steering wheel fully clockwise or counterclockwise from the lock to the lock several times so as to drain the fluid inside the steering gear box.



WRU90-SR032

NOTE:

- When the steering wheel is turned fully from the lock to the lock, be certain to hold the steering wheel for four to five seconds at the fully turned state.
- Make sure that the fluid no longer flows from the return hose.

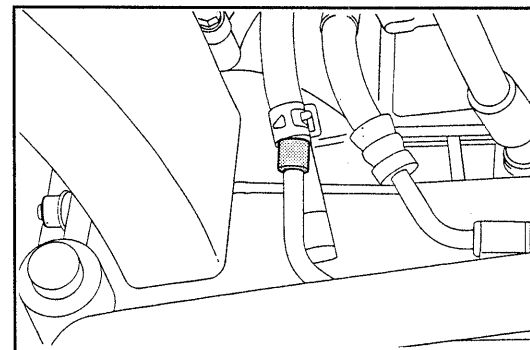


WRU90-SR033

- (6) Pour the power steering fluid into the reservoir tank, until the fluid starts to flow from the return pipe. When the fluid starts flowing from the return pipe, install a blank plug to the return pipe.

NOTE:

- Make sure that the power steering fluid will not run out from the reservoir tank.
- When the fluid starts flowing from the return pipe, allow about 100 cc (6.1 cub inch) of fluid to flow out so that the old fluid may be drained completely.



WRU90-SR034

Specified Power Steering Fluid: ATF DEXRON® II

- (7) While replenishing the power steering fluid to the reservoir tank approximately up to the upper level in the COLD range, keep turning the steering wheel fully clockwise and counterclockwise from the lock to the lock.

NOTE:

- Make sure that the power steering fluid will not run out from the reservoir tank.
- When the steering wheel is turned fully from the lock to the lock, be certain to hold the steering wheel for four to five seconds at the fully turned state.
- Turn the steering wheel as quickly as possible. Do not stop the steering wheel midway nor turn the steering wheel reversely.

- (8) Turn the steering wheel fully clockwise or counterclockwise from the lock to the lock, until about 100 cc (6.1 cub inch) of the power steering fluid flows from the return hose.

NOTE:

- Make sure that the power steering fluid will not run out from the reservoir tank.
- (9) Remove the blank plug from the return pipe. Connect the return hose to the return pipe and install the new hose clamp.

NOTE:

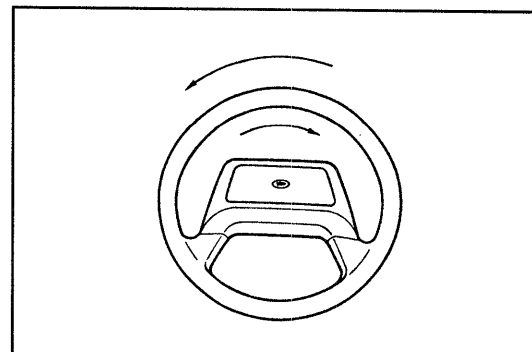
- Make sure that the power steering fluid will not run out from the reservoir tank.

- Correctly clamp the return hose as shown in the right figure.
- Be sure to install the return hose so that the distance from the center of the hose clamp to the edge of the spool becomes 15 ± 2 mm (0.59 ± 0.078 inch).

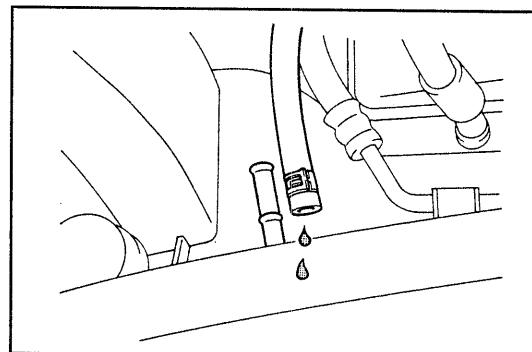
- (10) Replenish the power steering fluid to the reservoir tank approximately up to the upper level in the COLD range.
Specified Power Steering Fluid: ATF DEXRON® II

NOTE:

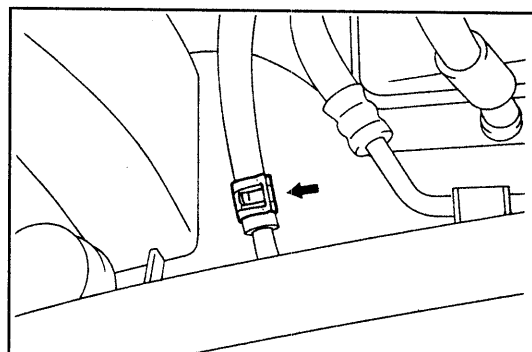
- If the oil temperature is above 40 °C (104 °F), fill the power-steering fluid up to the upper level in the HOT level.



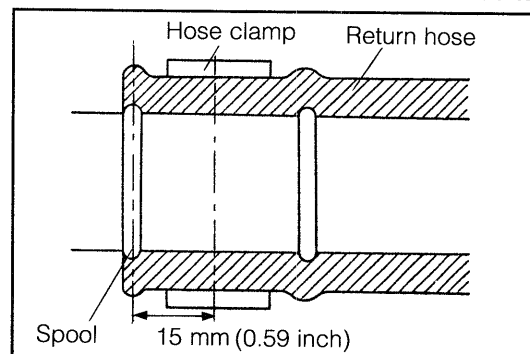
WRU90-SR035



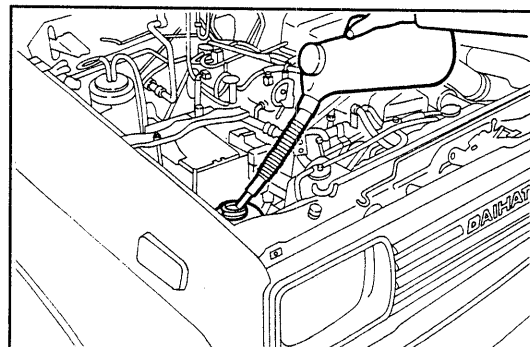
WRU90-SR036



WRU90-SR037



WRU90-SR038



WRU90-SR039

STEERING

- (11) Start the engine. Keep running the engine at the idle speed.
- (12) Turn the steering wheel fully either to the right or to the left. Hold the steering wheel for two to three seconds at the fully turned state. Then, turn the steering wheel in the opposite direction and hold it for two to three seconds.

NOTE:

- Make sure that the power steering fluid will not run out from the reservoir tank.

- (13) Repeat the operations described in the step (12) onward three or four times.

- (14) Ensure that no aeration or whitish cloudy state is present at the power steering fluid in the reservoir tank.
If any aeration and/or whitish cloudy state is observed, stop the engine. Wait for about ten minutes. Again, repeat the operations described in (11) onward.

- (15) Ensure that the difference in fluid level between the time when the engine is stopped and the time when the engine is kept running at the idle speed will not exceeds the specified value.

Specified Value: 5 mm (0.2 inch)

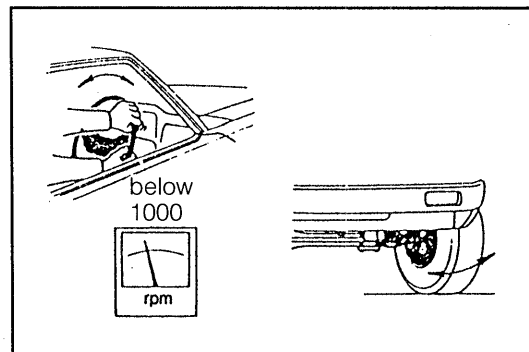
If the difference in fluid level exceeds the specified value, again perform air bleeding.

If the difference in fluid level fails to become within the specified value persistently, check the hydraulic pressure.

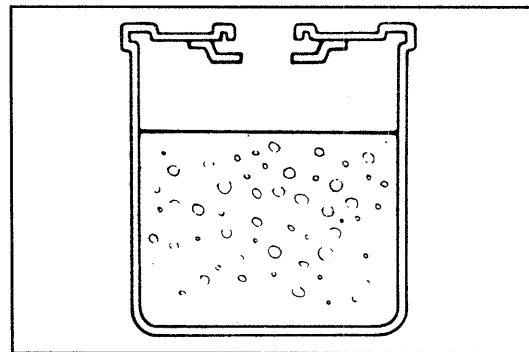
- (16) Check the fluid level.
(See page SR-13.)
- (17) Start the engine. Ensure that no fluid leakage is present.

- (18) Perform the following inspection.
 - ① Ensure that no whitish cloudy state is present in the power-steering fluid when the engine revolution speed is raised quickly.
 - ② Ensure that the steering wheel can be turned smoothly without emanating abnormal noise.
 - ③ Ensure that the oil level will not change more than 5 mm (0.2 inch) during the engine starting period or when the steering wheel is being turned.
 - ④ Ensure that no abnormal noise is emanated when turning the steering wheel (when the front wheels are being turned) during the running.

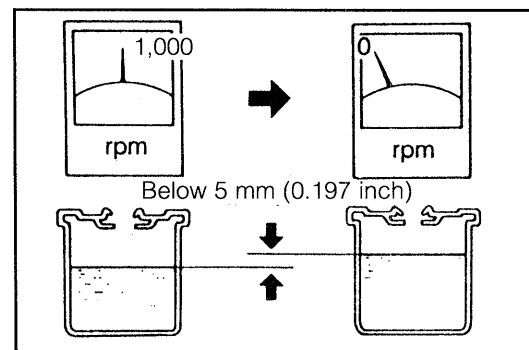
If any abnormality is present, perform air bleeding again.



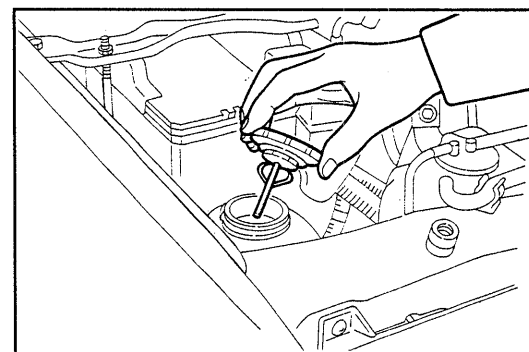
WRU90-SR040



WRU90-SR400



WRU90-SR041



WRU90-SR042

7. Check of power steering turning effort

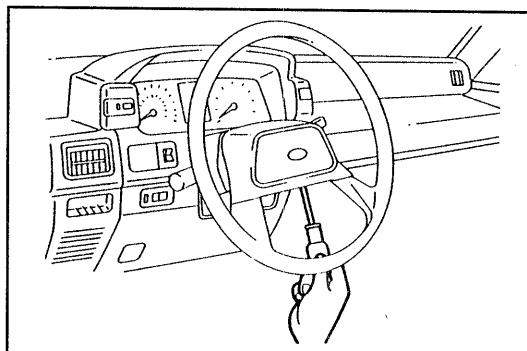
NOTE:

Before this power steering turning effort is checked, the following requirements must be satisfied in advance.

- The vehicle is mounted with the tires whose use has been approved.
- The tire size and tire manufacturer are the same on all four tires.
- All of the tires are inflated accurately to the specified pressure.

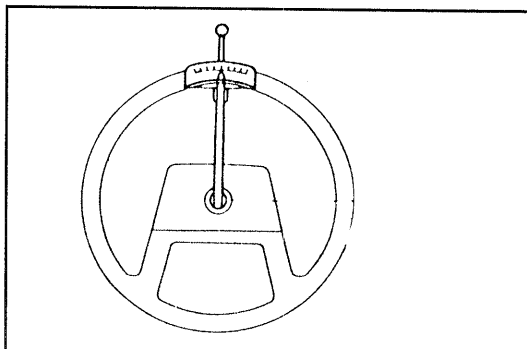
WRU90-SR043

- (1) Remove the steering wheel cover assembly from the steering wheel.
(See page SR-23.)



WRU90-SR044

- (2) Start the engine. Keep running the engine at the idle speed.
- (3) Set the steering wheel to a straight-ahead condition.
- (4) Install a torque wrench to the steering wheel attaching nut.



WRU90-SR045

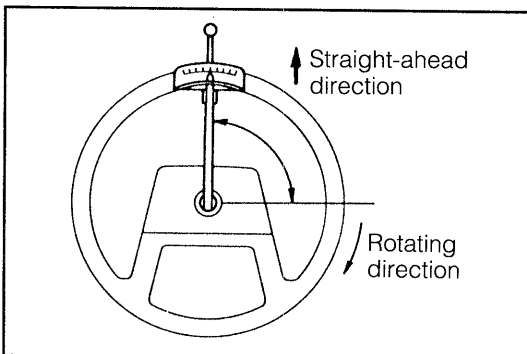
- (5) Measure the maximum steering torque which is registered while the steering wheel is being turned one-fourth turn slowly in the clockwise direction by means of the torque wrench. Ensure that this maximum turning effort will not exceeds the specified value.

Specified Value: 80 kgf-cm (5.8 ft-lb, 7.8 N-m)

If not, perform the power steering hydraulic pressure check.

If the results of the hydraulic pressure check are satisfactory, check the following items given below:

Steering gear box preload, operating conditions of each steering linkage, steering shaft ball joints and/or operating conditions of universal joints.



WRU90-SR046

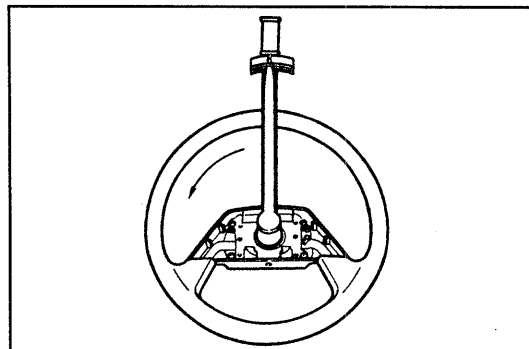
STEERING

- (6) Set the steering wheel to a straight-ahead condition.
- (7) Measure the maximum steering torque which is registered while the steering wheel is being turned one-fourth turn slowly in the counterclockwise direction by means of the torque wrench. Ensure that this maximum turning effort will not exceed the specified value.
Specified Value: 80 kgf-cm (5.8 ft-lb, 7.8 N·m)

If not, perform the power steering hydraulic pressure check.

If the results of the hydraulic pressure check are satisfactory, check the following items given below:

Steering gear box preload, operating conditions of each steering linkage, steering shaft ball joints and/or operating conditions of universal joints.

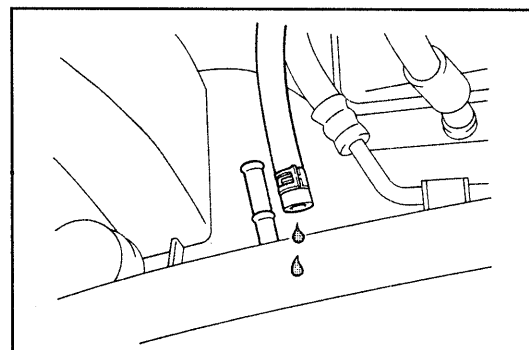


WRU90-SR047

8. Check of power steering hydraulic pressure

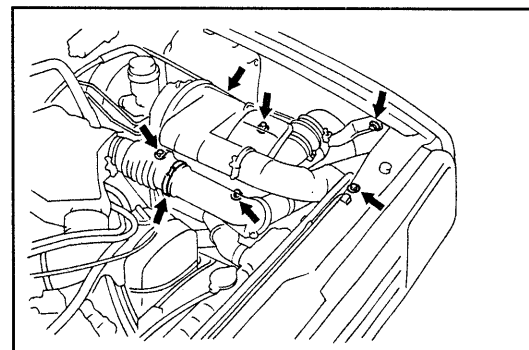
(1) Installation of pressure gauge

- ① Drain the power steering fluid.
(See page SR-13 to SR-14.)



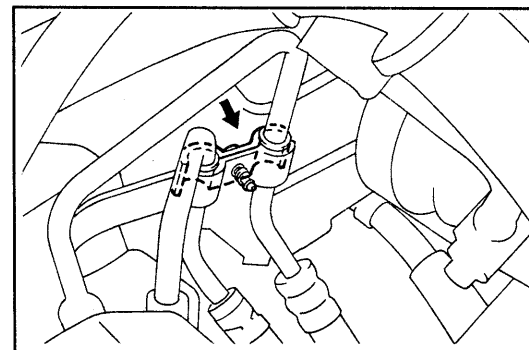
WRU90-SR048

- ② Remove the attaching bolts for the air cleaner and air cleaner hose. Also, remove the clutch cable clamp bolts and hose bands. Remove the air cleaner and air hose as an assembly from the vehicle.
(For further details, see the Engine section.)



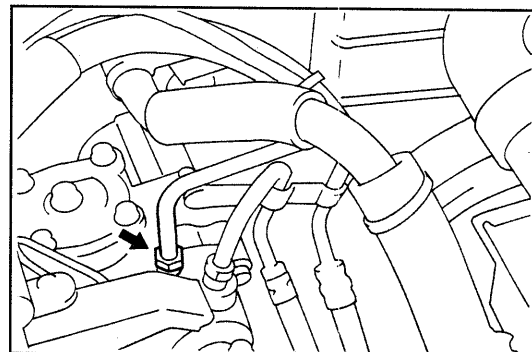
WRU90-SR049

- ③ Detach the pressure tube clamp by removing the clamp screw.



WRU90-SR050

- ④ Disconnect the pressure side tube from the steering gear box.

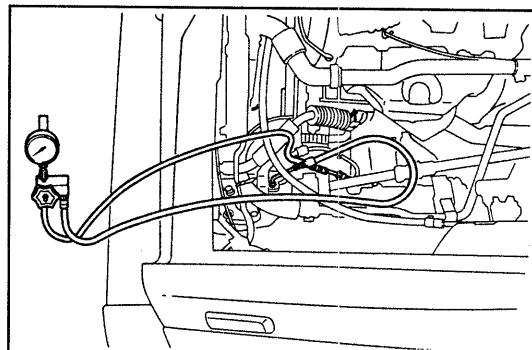


WRU90-SR051

- ⑤ Connect the pressure gauge midway between the disconnected tube and the steering gear box.

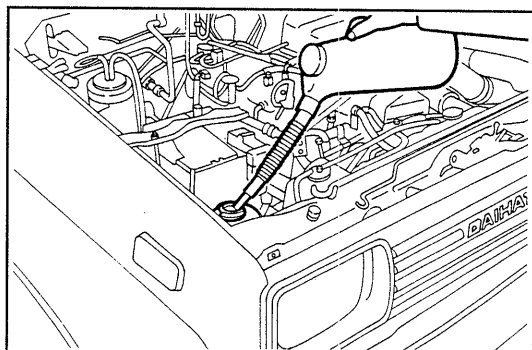
NOTE:

- Connect the pressure gauge in accordance with the pressure gauge manufacturer's instructions.



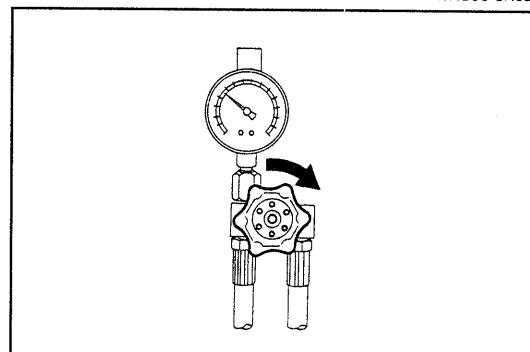
WRU90-SR052

- (2) Fill power steering fluid.
(See page SR-14 to SR-16.)



WRU90-SR053

- (3) Start the engine.
- (4) With the valve of the pressure gauge closed and while maintaining the line pressure at 40 to 50 kg/cm² (569 - 711 psi), warm up the power steering fluid, until its temperature reaches 80 °C (176 °F).



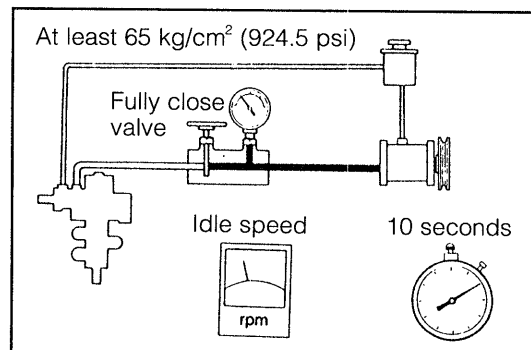
WRU90-SR054

- (5) Check of vane pump hydraulic pressure
Close the valve of the pressure gauge temporarily and fully. Ensure that the pressure exceeds the specified pressure.
Specified Pressure: 65 kg/cm² (924.5 psi) or more

CAUTION:

- The valve of the pressure gauge must not be kept closed for more than 10 seconds.

If the vane pump fails to deliver the specified pressure, replace the vane pump.



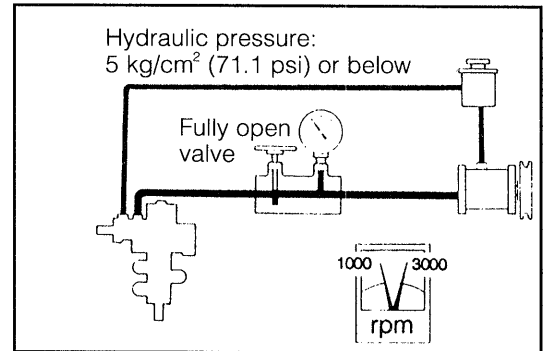
WRU90-SR055

STEERING

- (6) Check of hydraulic pressure under unloaded state
- ① Open the valve of the pressure gauge fully.
 - ② Set the steering wheel to a straight-ahead condition.
 - ③ Measure the hydraulic pressure at times when the engine speed is 1000 rpm and 3000 rpm, respectively. Ensure that the difference in these pressures will not exceed the specified value.

Specified Value: 5 kg/cm² (71.1 psi)

If the difference in pressure exceeds the specified value, replace the vane pump.



WRU90-SR056

- (7) Check of steering gear housing hydraulic pressure
- ① Open the valve of the pressure gauge fully.
 - ② Turn the steering wheel fully either clockwise or counterclockwise and hold the steering wheel at the fully turned state. Ensure that the hydraulic pressure under this state exceeds the specified value.

Specified Value: 65 kg/cm² (924.5 psi) or more

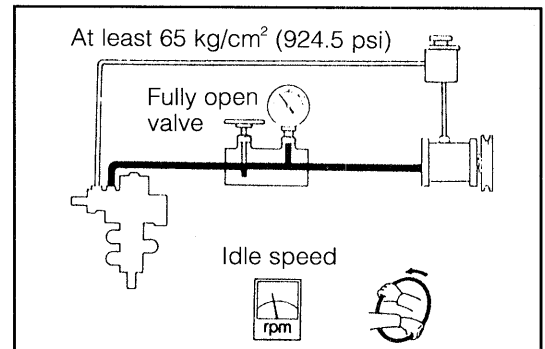
If the hydraulic pressure is below the specified value, replace the steering gear box.

- (8) Remove the pressure gauge.
(9) Connect the pressure side tube to the steering gear box.

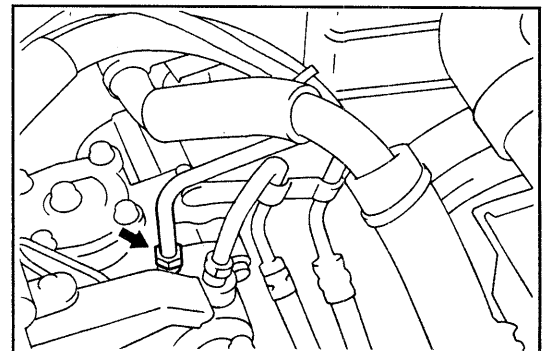
(See page SR-78.)

Tightening Torque:

4.5 - 5.5 kgf-m (32.5 - 39.8 ft-lb, 44.1 - 53.9 N-m)

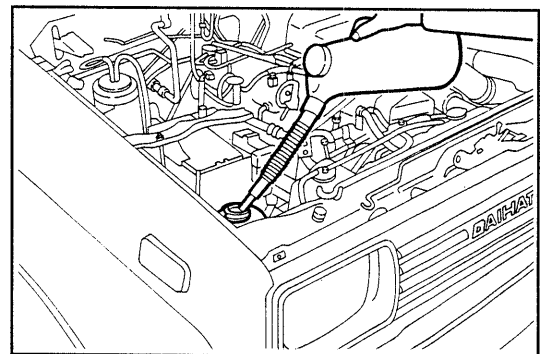


WRU90-SR057



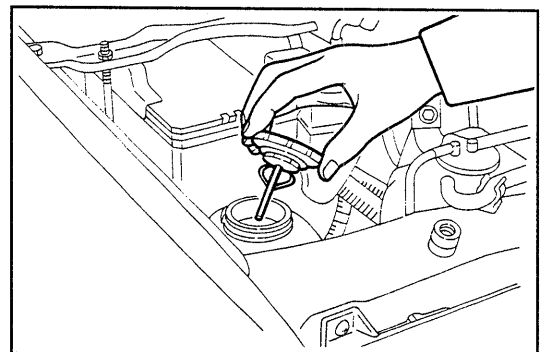
WRU90-SR058

- (10) Replenish the power steering fluid to the reservoir tank. Perform air bleeding. For the air bleeding procedure, refer to page SR-16, step (11) to step (18).



WRU90-SR059

- (11) Check the fluid level.
(See page SR-13.)
(12) Start the engine. Ensure that no fluid leakage is present.



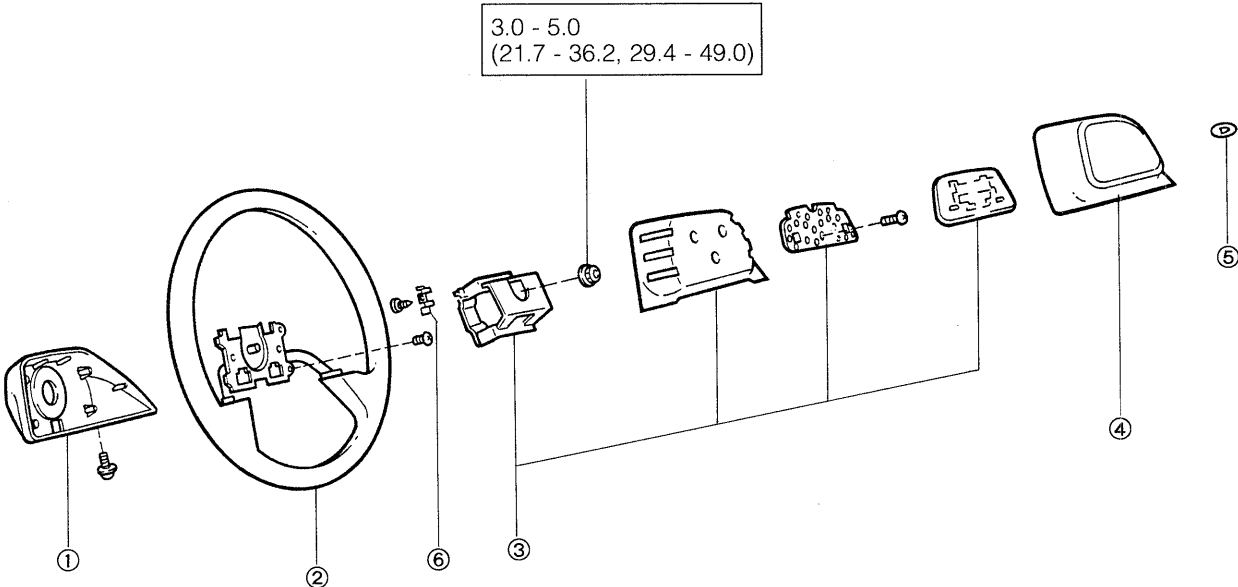
WRU90-SR060

Inspection of idle-up VSV


1. When turning the steering wheel, ensure that air continuity exists.
2. When the steering wheel is set to a straight-ahead position, ensure that no air continuity exists.
If not, replace the vane pump.

WRU90-SR402

STEERING WHEEL
COMPONENTS



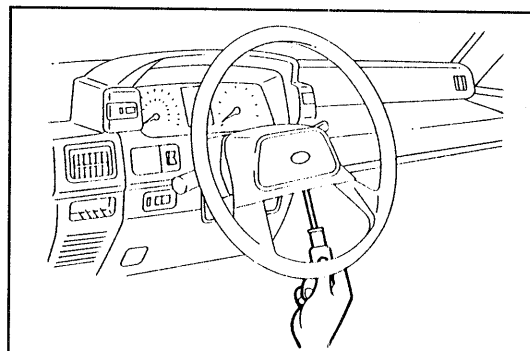
- ① Steering wheel cover
- ② Steering wheel S/A
- ③ Horn pad subassembly
- ④ Steering wheel pad
- ⑤ Steering wheel ornament No. 1
- ⑥ Steering wheel pad set spring

 : Tightening torque
Unit : kgf-m (ft-lb, N-m)

STEERING WHEEL

REMOVAL

1. Disconnect the battery ground cable terminal from the negative (-) terminal of the battery.
2. Remove the horn pad assembly attaching screw.

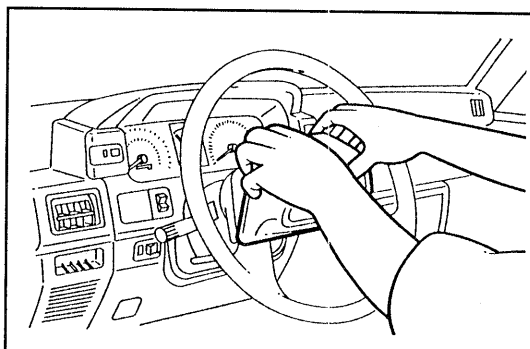


WRU90-SR062

3. Remove the horn pad assembly by pulling it out.

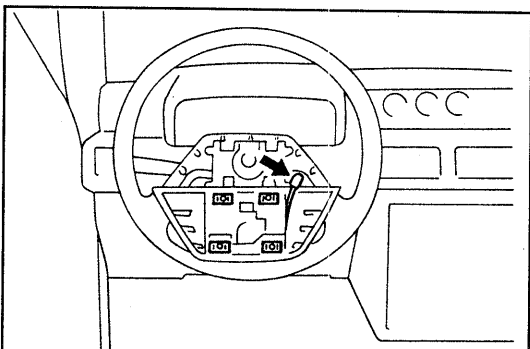
NOTE:

- Be very careful not to damage the horn wire during the removal.



WRU90-SR063

4. Disconnect the horn connector.

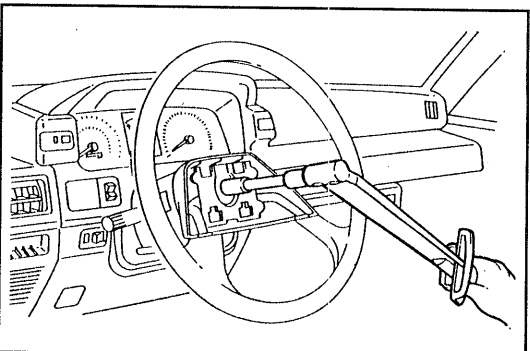


WRU90-SR064

5. Loosen the steering wheel mounting nut.

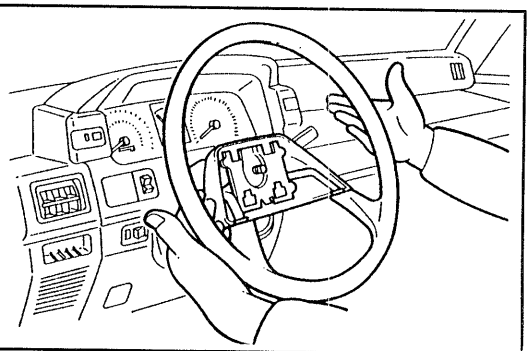
NOTE:

Just loosen the nut by four to five helical ridges; do not remove it.



WRU90-SR065

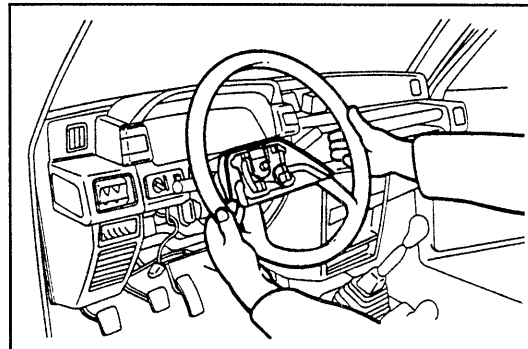
6. Pull the steering wheel with both hands to disconnect it from the steering shaft.



WRU90-SR066

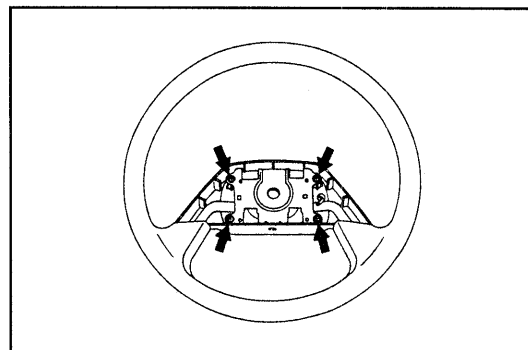
STEERING

7. Remove the steering wheel attaching nut. Remove the steering wheel from the steering shaft.



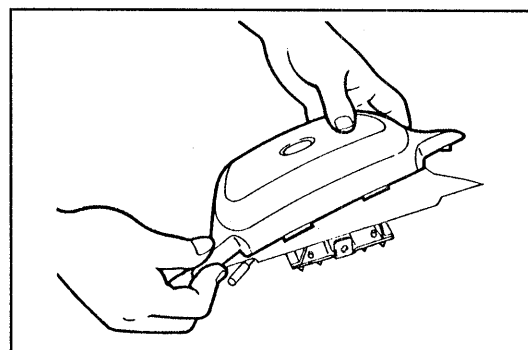
WRU90-SR067

8. Detach the steering wheel cover from the steering wheel by removing the attaching screw.



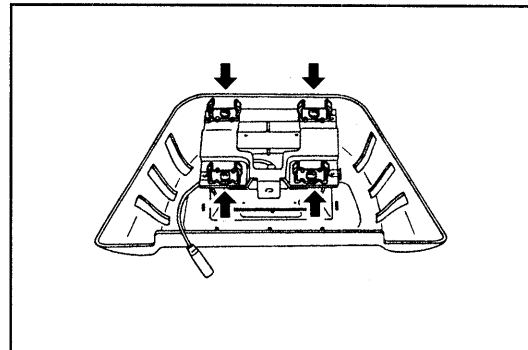
WRU90-SR068

9. Disassembly of horn pad assembly
 - (1) Remove the steering wheel pad from the steering wheel lower cover.



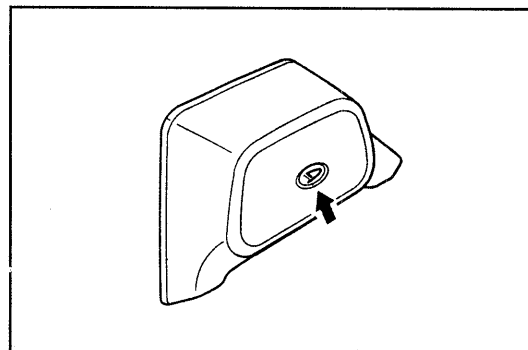
WRU90-SR069

- (2) Detach the steering wheel pad set spring from the steering wheel lower cover.



WRU90-SR070

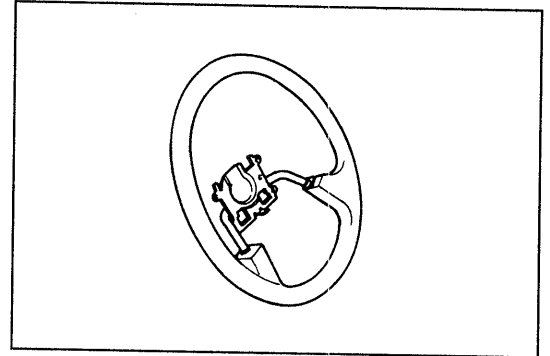
- (3) Remove the ornament from the steering wheel pad, as required.



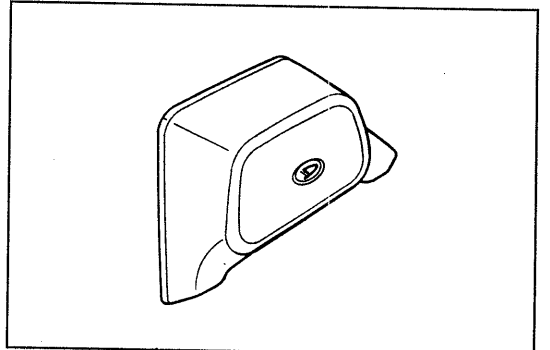
WRU90-SR071

INSPECTION

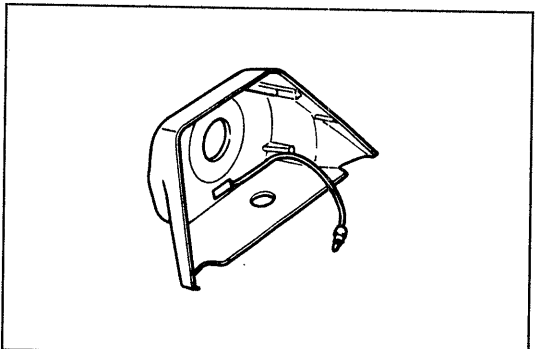
1. Ensure that the steering wheel exhibits no damage, such as cracks and/or wear.
Replace the steering wheel if any defect is present.
2. Ensure that the steering wheel pad exhibits no damage, such as cracks.
Replace the steering wheel pad if any defect is present.
3. Check of steering wheel cover
 - (1) Ensure that the steering wheel cover exhibits no damage, such as cracks and/or wear at the terminal contact surface.
Replace the steering wheel cover if any defect is present.
 - (2) Ensure that continuity exists between the steering wheel cover terminal contact surface and the terminal.
If no continuity exists, replace the steering wheel cover.
4. Check of horn pad sub assembly
 - (1) Ensure that continuity exists between the horn button contact plate and the connector terminal.
If no continuity exists, replace the steering wheel lower cover.



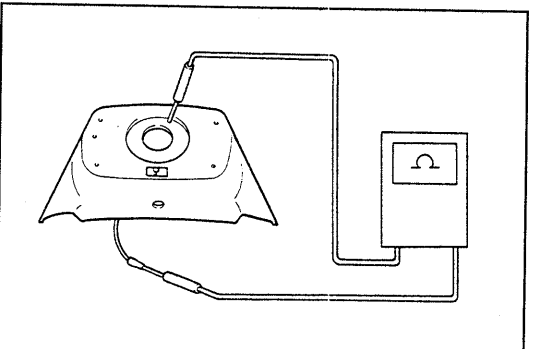
WRU92-SR409



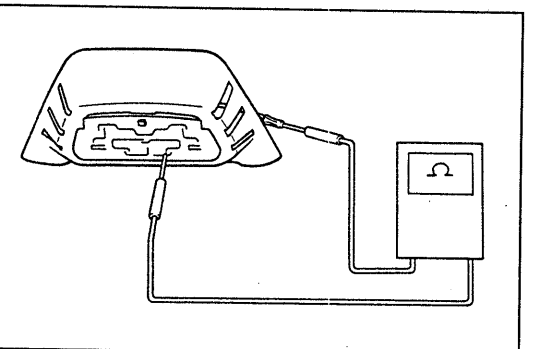
WRU90-SR073



WRU90-SR074



WRU90-SR075



WRU90-SR076

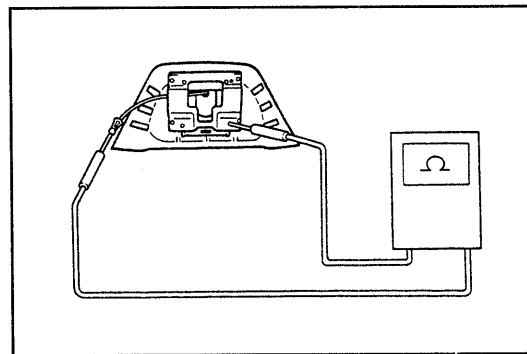
STEERING

- (2) Ensure that no continuity exists between the connector terminal and the steering wheel lower cover.

NOTE:

- Do not push the horn button contact plate.

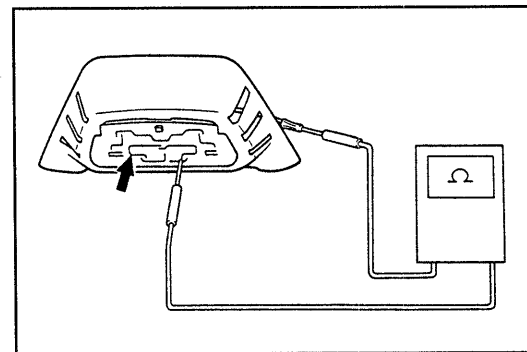
If continuity exists, replace the steering wheel pad sub-assembly.



WRU90-SR077

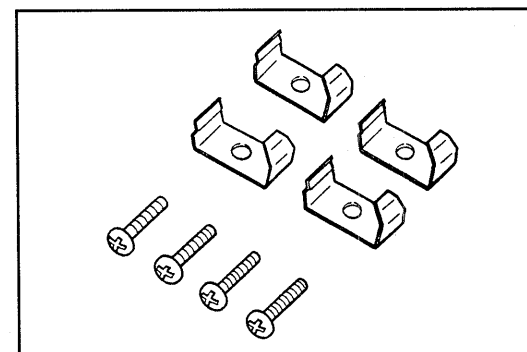
- (3) Ensure that continuity exists between the connector terminal and the steering wheel lower cover when the horn button contact plate is pushed.

If no continuity exists, replace the steering wheel pad subassembly.



WRU90-SR078

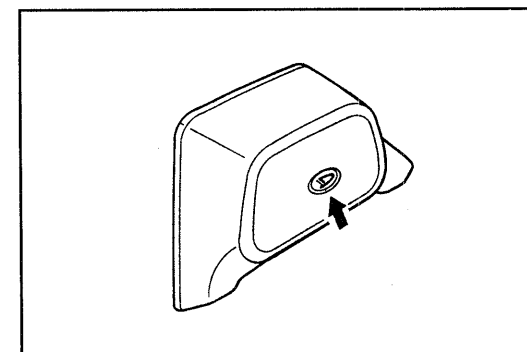
5. Check of steering wheel pad set spring
Ensure that the steering wheel pad set spring exhibits no damage, such as wear, cracks and deformation.
Replace the steering wheel pad set spring if any defect is present.



WRU90-SR079

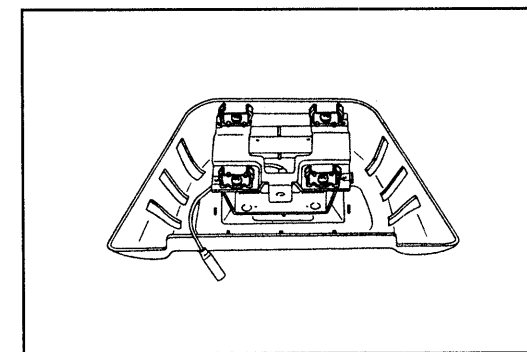
INSTALLATION

1. Assembly of horn pad assembly
 - (1) Affix the ornament on the steering wheel pad by means of two-faced adhesive tape.



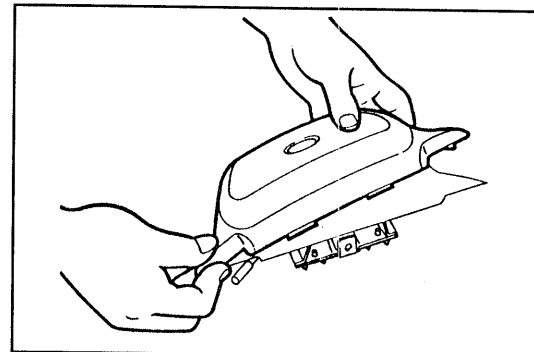
WRU90-SR080

- (2) Install the steering wheel pad set spring to the steering wheel lower cover.



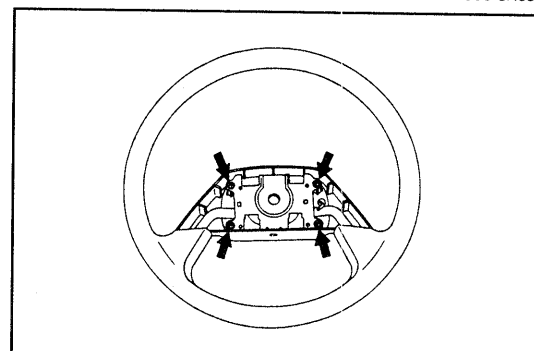
WRU90-SR081

- (3) Install the steering wheel pad to the steering wheel lower cover.



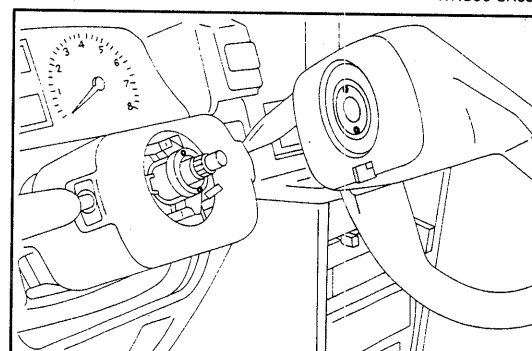
WRU90-SR082

2. Install the steering wheel cover on the steering wheel.



WRU90-SR083

3. Install the steering wheel in such a way that the steering wheel is assembled in the correct direction when it is set to a straight-ahead position and the protruded section of the turn signal cancelling cam is aligned with the steering wheel hole.

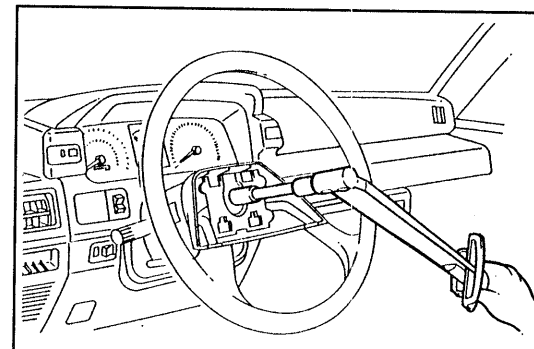


WRU90-SR084

4. Install a new steering wheel attaching nut. Tighten the attaching nut to the specified torque.

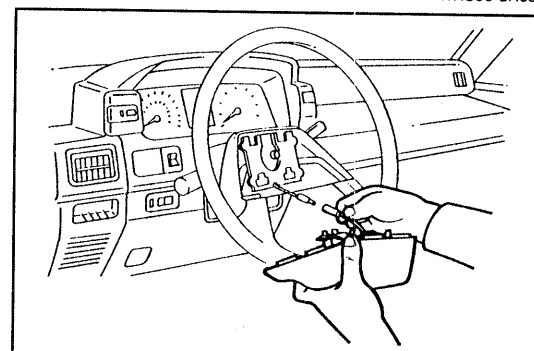
Tightening Torque:

3.0 - 5.0 kgf-m (21.7 - 36.2 ft-lb, 29.4 - 49.0 N-m)



WRU90-SR085

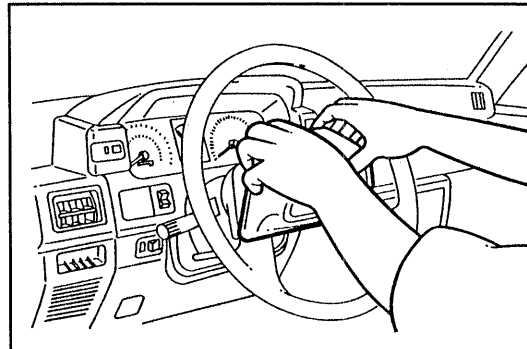
5. Connect the connector for horn use.



WRU90-SR086

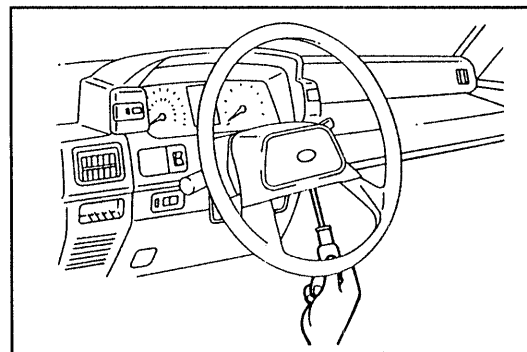
STEERING

6. Push the steering wheel pad set spring of the horn pad assembly into position, while aligning it with the steering wheel attaching section.



WRU90-SR087

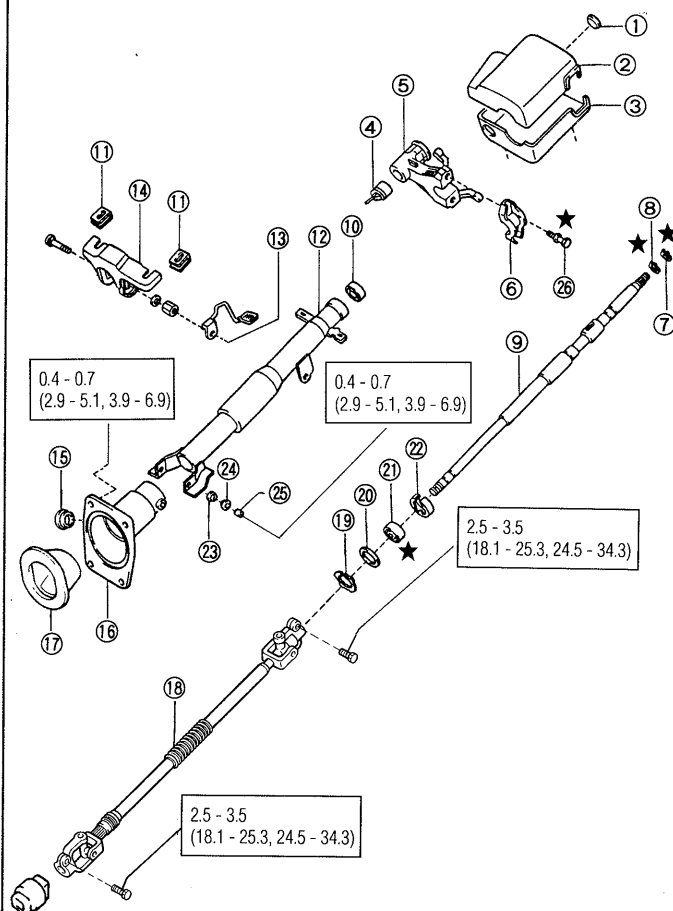
7. Install the horn pad assembly attaching screw.
8. Connect the battery ground cable terminal to the negative (-) terminal of the battery.
9. Perform the re-setting of the clock, radio and so forth, as required.
10. Perform the in vehicle inspection.



WRU90-SR088

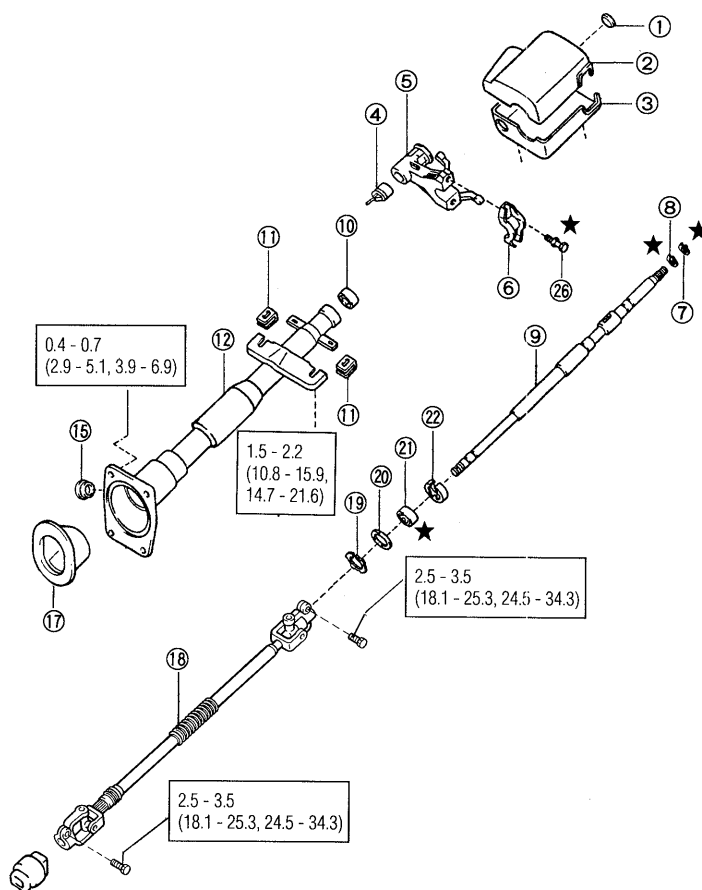
STEERING COLUMN COMPONENTS

Tilt steering type



- ① Grommet
- ② Steering column upper cover
- ③ Steering column lower cover
- ④ Ignition switch assembly
- ⑤ Steering column upper bracket
- ⑥ Steering column housing
- ⑦ Snap ring
- ⑧ Snap ring
- ⑨ Steering main shaft sub assembly
- ⑩ Radial ball bearing
- ⑪ Steering column upper attachment plate
- ⑫ Steering column tube sub assembly
- ⑬ Steering tilt lever
- ⑭ Tilt steering support sub assembly

Standard type

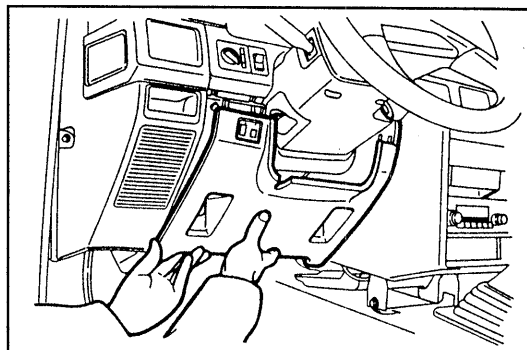


- ⑮ Hole plug
- ⑯ Steering column hole cover
- ⑰ Steering column hole cover shield
- ⑱ Steering intermediate shaft
- ⑲ Hole snap ring
- ⑳ Washer
- ㉑ Radial ball bearing
- ㉒ Steering shaft thrust stopper sub assembly
- ㉓ Bush
- ㉔ Bush
- ㉕ Collar
- ㉖ Steering lock set bolt
- ㉗ Dust boot

□ : Tightening torque
 Unit : kgf-m (ft-lb, N-m)
 ★ : Non-reusable parts

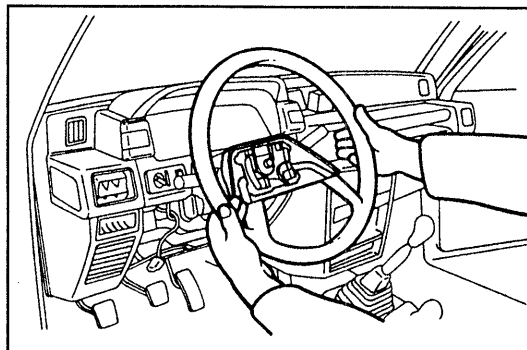
REMOVAL

1. Remove the instrument panel lower panel.
(As for the removal procedure of the instrument panel lower panel, see the Body section.)



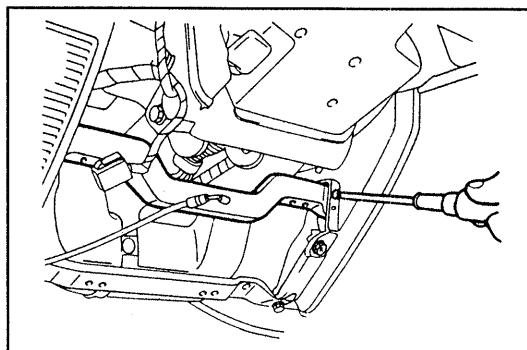
WRU90-SR090

2. Remove the steering wheel.
(See page SR-23.)



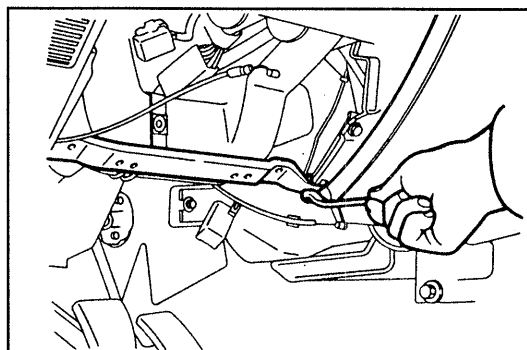
WRU90-SR091

3. Remove the instrument panel finish panel No. 1.



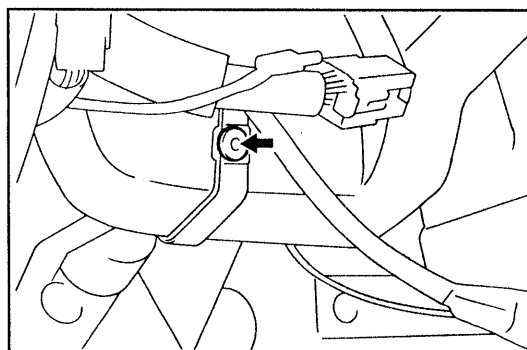
WRU90-SR092

4. Remove the instrument panel reinforcement subassembly.



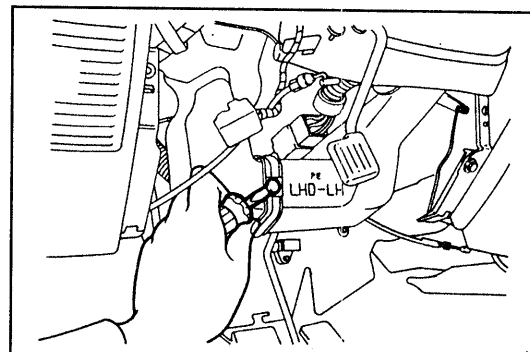
WRU90-SR093

5. Removal of air duct assembly No.1
(1) Push the center of the clip by the forward end of a Phillips screwdriver or the like.



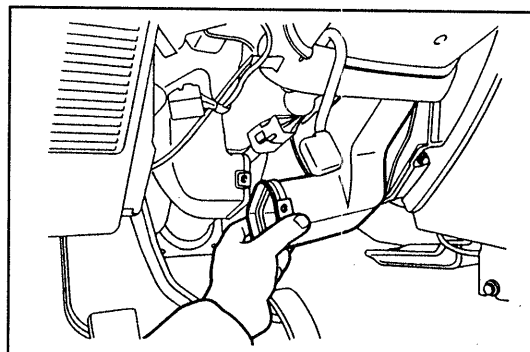
WRU90-SR094

(2) Detach the clip from the duct.



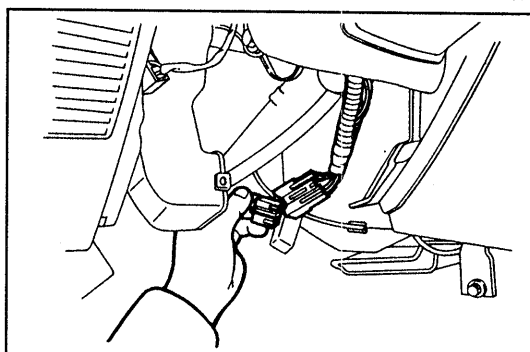
WRU90-SR095

(3) Remove the air duct assembly No.1.



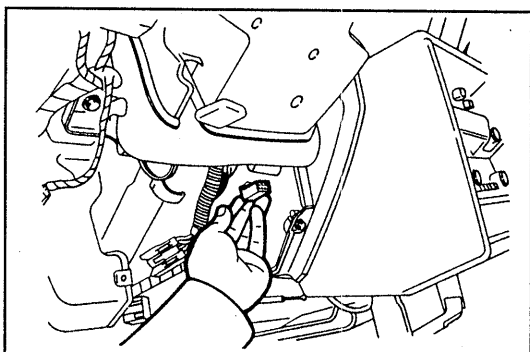
WRU90-SR096

6. Disconnect the connector of the turn signal switch.



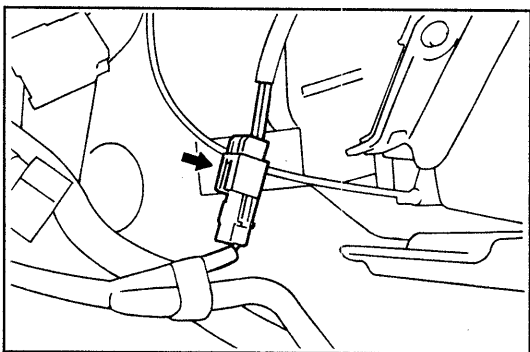
WRU90-SR097

7. Disconnect the connector from the ignition switch.



WRU90-SR098

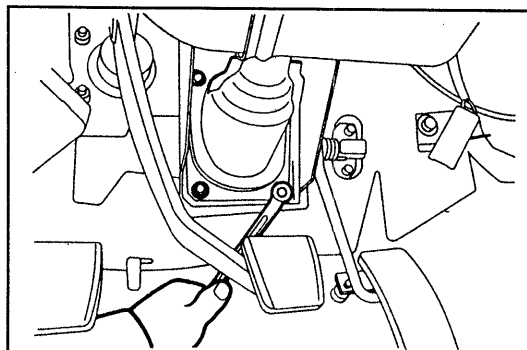
8. Disconnect the connector of the key reminder switch (if so equipped).



WRU90-SR099

STEERING

9. Remove the attaching bolts at the steering column tube hole cover side.



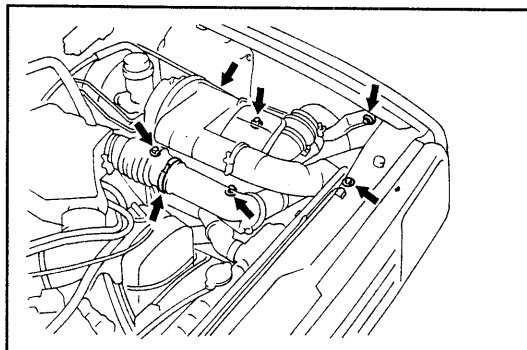
WRU90-SR100

10. Removal of air cleaner

NOTE:

- For details, refer to the Engine section.
- The air cleaner assembly has been removed so that the disconnection/reconnection of the intermediate shaft may be performed easily.

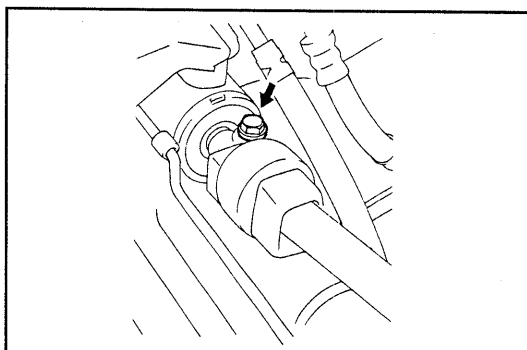
- (1) Remove the attaching bolts of the air cleaner and air hoses.
- (2) Loosen the hose band.
- (3) Remove the air cleaner and air hose as an assembly from the vehicle.



WRU90-SR101

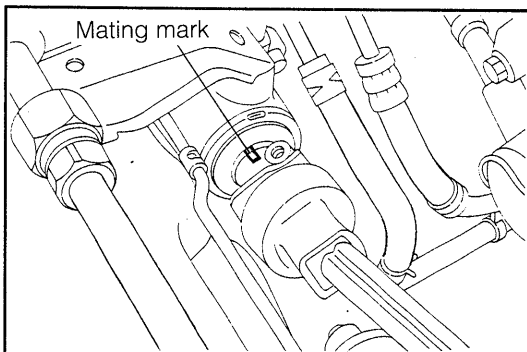
11. Disconnection of intermediate shaft from steering gear housing

- (1) Remove the connecting bolts at the universal joint of the intermediate shaft.



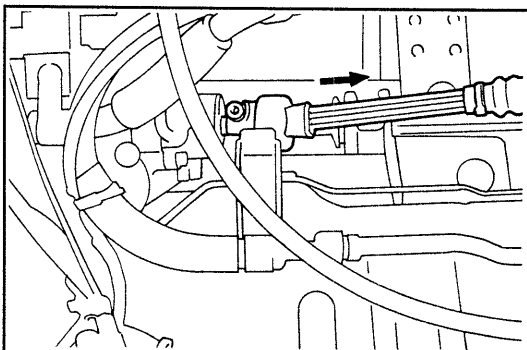
WRU90-SR102

- (2) Put mating marks on the universal joint of the intermediate shaft and the shaft at the steering gear housing side.



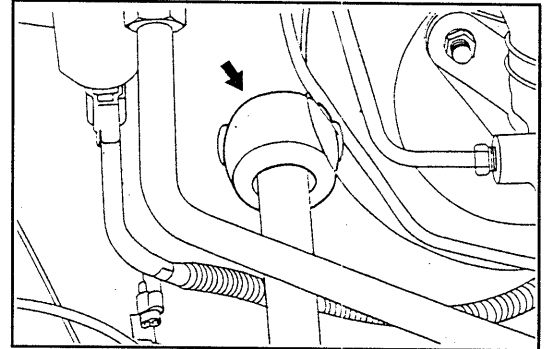
WRU90-SR103

- (3) Disconnect the intermediate shaft from the steering gear housing by contracting the intermediate shaft.



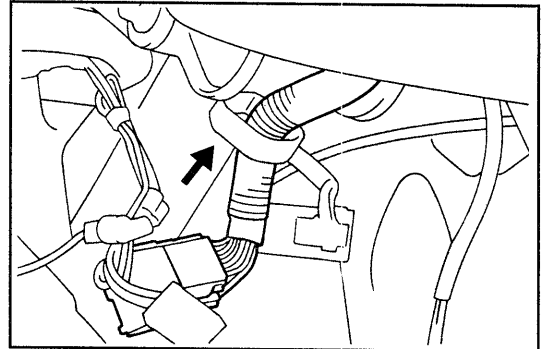
WRU90-SR105

12. Keep the steering column hole cover shield stored inside the vehicle interior.



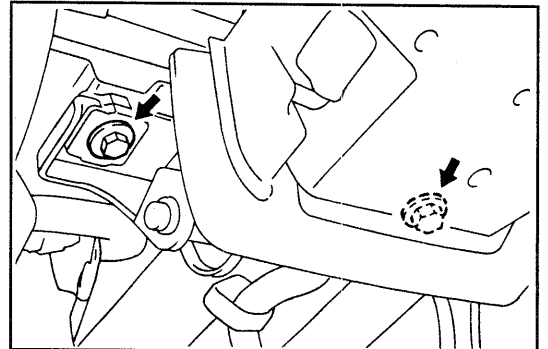
WRU90-SR106

13. Detach the wiring harness which is clamped to the steering column.



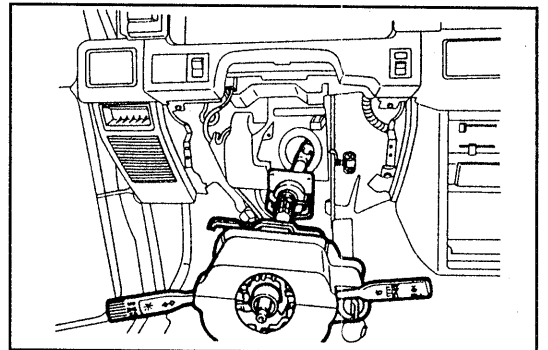
WRU90-SR107

14. Remove the steering column attaching bolts.
NOTE:
 - Be very careful not to drop the steering column.
 - Care must be exercised not to soil the seat.



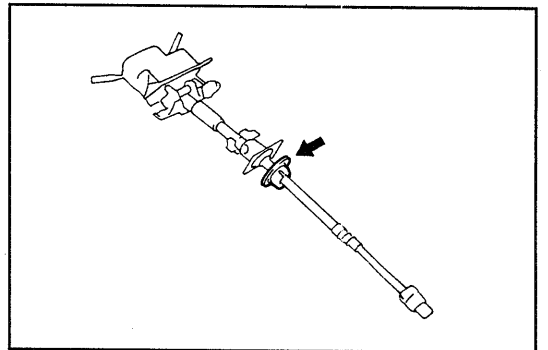
WRU90-SR108

15. Remove the steering column assembly together with the intermediate shaft from the vehicle.
NOTE:
 - Care must be exercised so that the spline connecting section of the intermediate shaft may not be disconnected.



WRU90-SR109

16. Remove the steering hole cover shield.



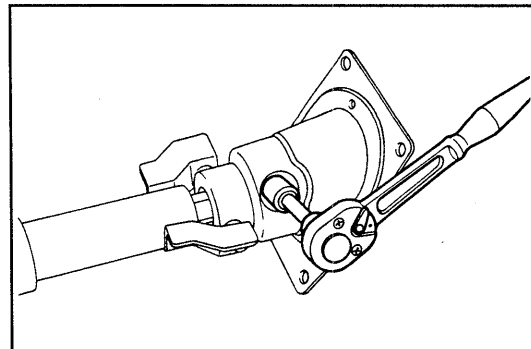
WRU90-SR110

STEERING

17. Remove the hole plug. Remove the bolts which connect the steering shaft to the intermediate shaft.
18. Pull out the intermediate shaft from the steering shaft.

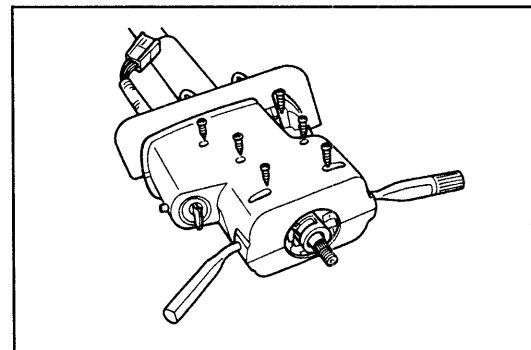
NOTE:

- Be sure to put a mating mark over the steering shaft and the intermediate shaft so that the assembling position may be known readily.



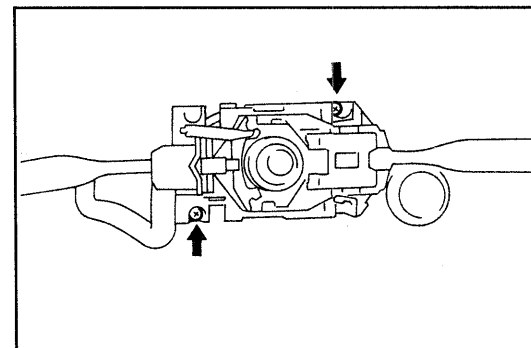
WRU90-SR111

19. Remove the six attaching screws of the steering column cover. Remove the steering column cover from the steering column.



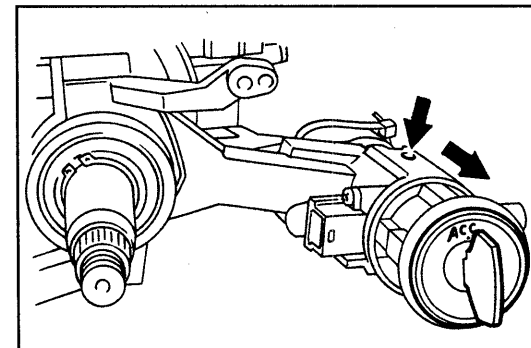
WRU90-SR112

20. Remove the attaching screws of the turn signal lamp switch assembly. Remove the turn signal lamp switch assembly from the steering column.



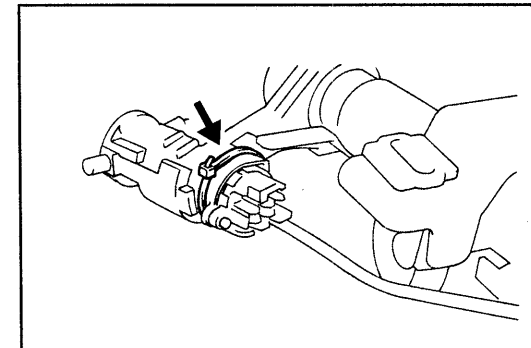
WRU90-SR113

21. Removal of ignition key cylinder
 - (1) Insert the ignition key and set it to the "ACC" position.
 - (2) While retaining the cylinder lock section with a suitable rod through the cylinder upper hole, pull out the key cylinder from the steering column upper bracket.



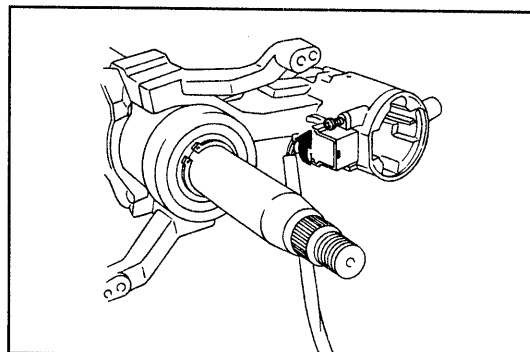
WRU90-SR114

22. Detach the key reminder switch cord coat clamp. (Key reminder switch-equipped vehicle only)



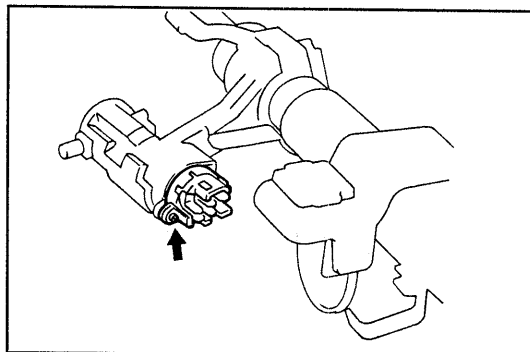
WRU90-SR115

23. Remove the attaching screw of the key reminder switch. Remove the key reminder switch from the pawl section of the steering column upper bracket by turning the switch clockwise. In this way, remove the key reminder switch from the steering column upper bracket.
(Only for key reminder switch equipped vehicle)



WRU90-SR116

24. Remove the ignition key switch from the steering column upper bracket by removing the ignition key switch attaching screw.

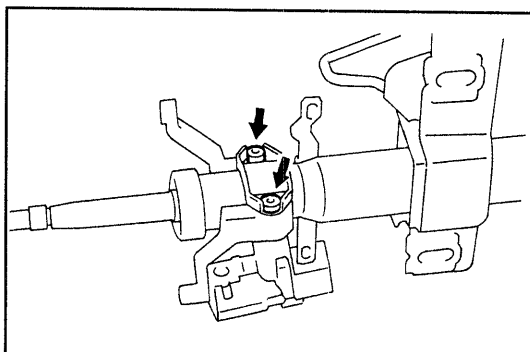


WRU90-SR117

25. Removal of steering column upper bracket
- (1) Make a recessed mark at the center of the steering lock set bolt with a punch.
 - (2) Remove the head of the set bolt by drilling the center of the set bolt with a drill of about 17 mm (0.67 inch) diameter.

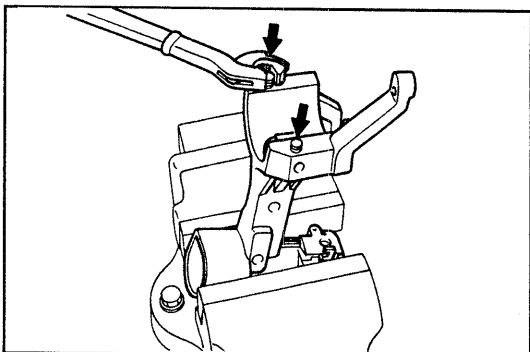
NOTE:

- Be very careful not to damage the steering column housing.
- Care must be exercised not to drop the steering column bracket.



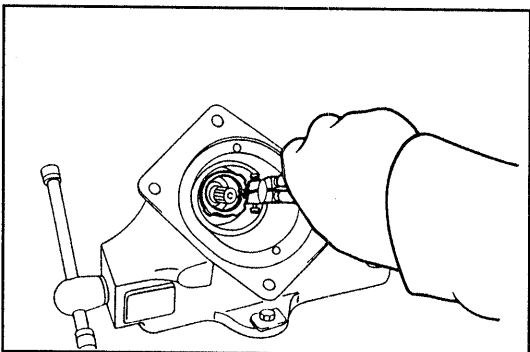
WRU90-SR118

- (3) Remove the bolt threaded portion which is remaining at the steering column upper bracket, using a pipe wrench or the like.



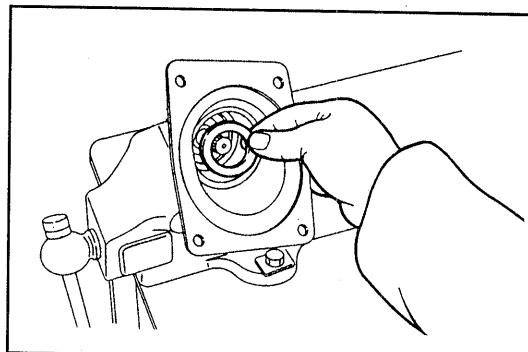
WRU90-SR119

26. Disassembly of steering column
- (1) Detach the hole snap ring.



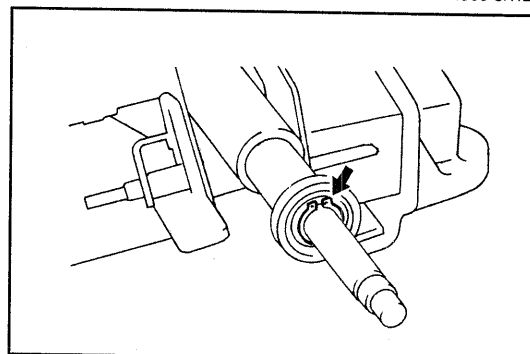
WRU90-SR120

(2) Remove the washer plate.



WRU90-SR121

(3) Detach the shaft snap ring.

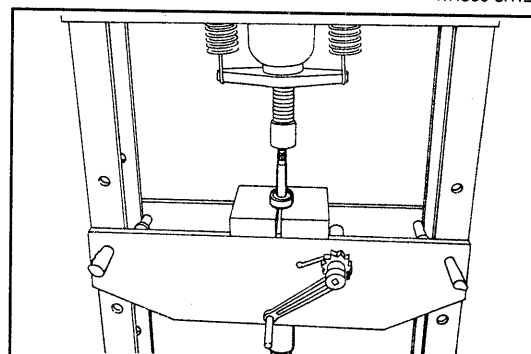


WRU90-SR122

(4) Remove the steering shaft from the steering column tube, using a press. (Standard type only)

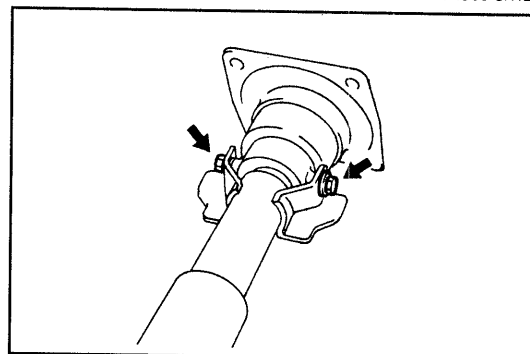
NOTE:

- When applying load to the steering shaft with a press, apply the load gradually, making sure that no impact may be applied to the steering shaft. Failure to observe this caution will lead to breakage of the center connecting section of the steering shaft.
- Be very careful not to drop the steering shaft.



WRU90-SR123

(5) Remove the attaching bolts of the steering column hole cover. Remove the steering shaft together with the steering column hole cover. (Tilt steering type only)

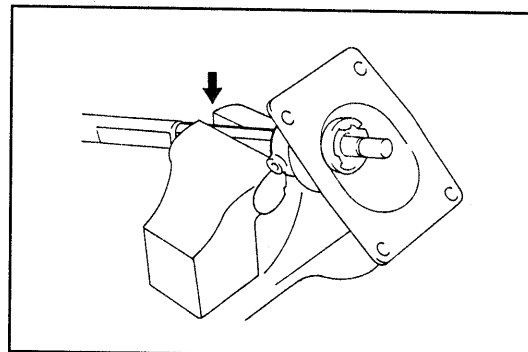


WRU90-SR124

(6) Clamp the steering shaft lower shaft in a vice. (Tilt steering type only)

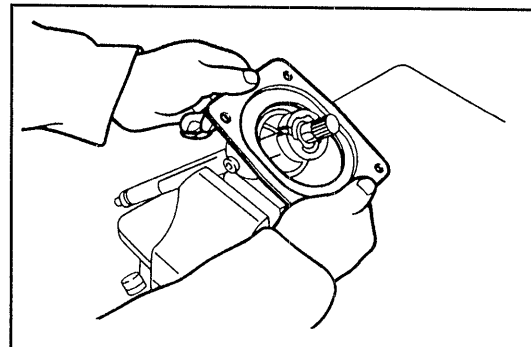
NOTE:

- Be sure to clamp the lower shaft only in a vice. Never clamp the upper shaft (hollow shaft) in a vice.



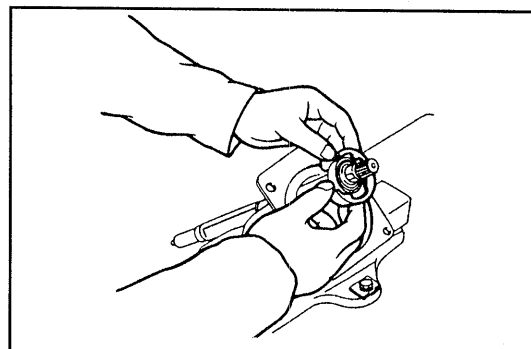
WRU90-SR125

- (7) Remove the steering column hole cover from the steering shaft while prying and lowering the cover. (Tilt steering type only)
- (8) Remove the steering shaft from the vice. Remove the steering column hole cover. (Tilt steering type only)



WRU90-SR126

27. Remove the steering shaft thrust stopper from the radial ball bearing.



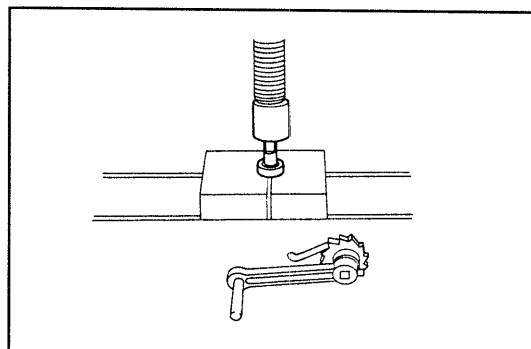
WRU90-SR127

28. Removal of radial ball bearing
(Only cases where such operation is required. See page SR-38.)

Pull out the radial ball bearing from the steering shaft, using a hydraulic press.

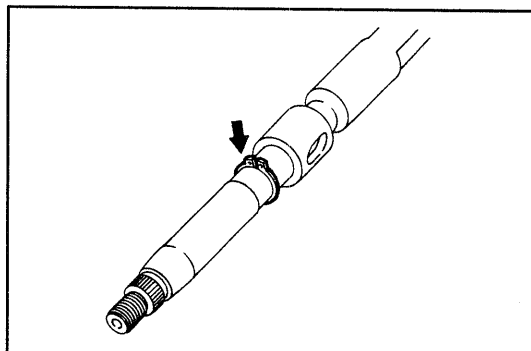
NOTE:

- Be very careful not to drop the steering shaft. If the shaft should be dropped, the connecting section of the steering shaft will be broken.
- Never reuse the removed bearing.



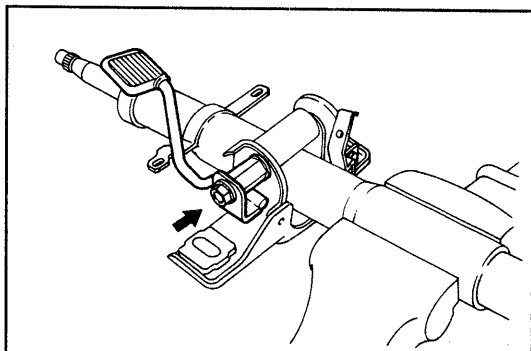
WRU90-SR128

29. Detach the snap ring from the steering shaft. (Only cases where such operation is required)



WRU90-SR129

30. Removal of tilt steering support
 - (1) Remove the steering tilt lever attaching nut, while applying a spanner to the long nut to prevent the nut from turning.
 - (2) Remove the steering tilt lever.



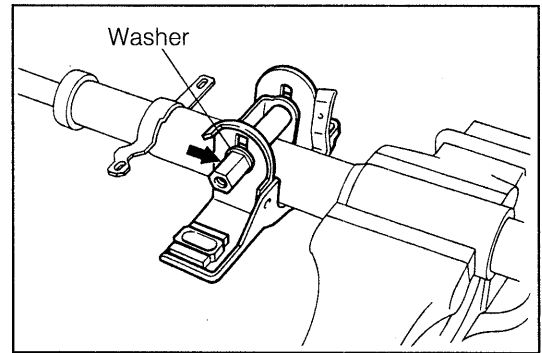
WRU90-SR130

STEERING

- (3) Remove the long nut and washer. Pull out the attaching shaft. Remove the tilt steering support.

NOTE:

- The long nut is a left-hand threaded nut.



WRU90-SR131

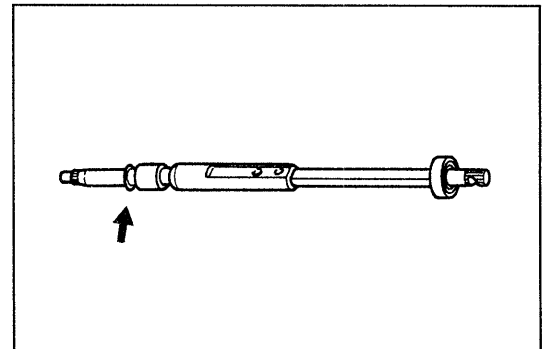
INSPECTION

1. Inspection of steering shaft

- (1) Ensure that each section of the steering shaft exhibits no damage, such as wear, cracks and/or deformation.

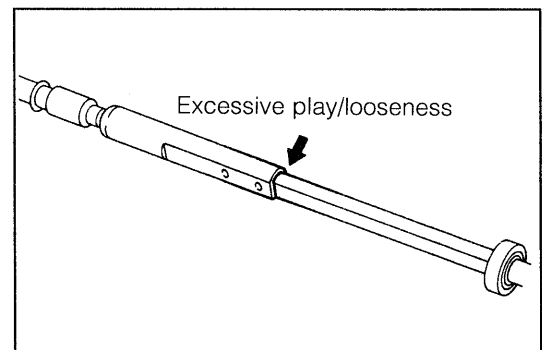
NOTE:

- If the snap ring is damaged, remove the snap ring. (See page SR-42.)



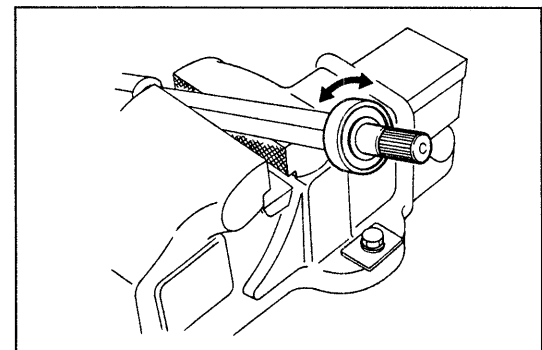
WRU92-SR411

- (2) Ensure that no excessive play or looseness is present at the connecting section between the upper and lower sections of the steering shaft.



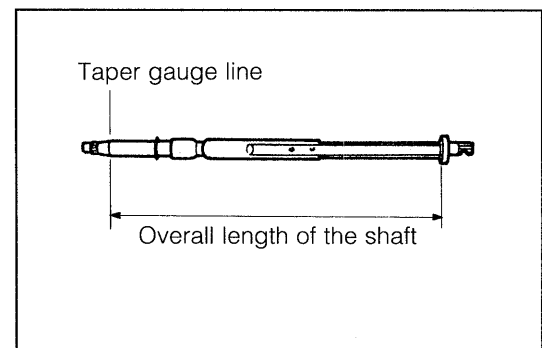
WRU90-SR133

- (3) Ensure that the radial ball bearing of the steering shaft exhibits no defect, such as abnormal binding. If any defect is present, replace the radial ball bearing. (See page SR-37.)



WRU90-SR134

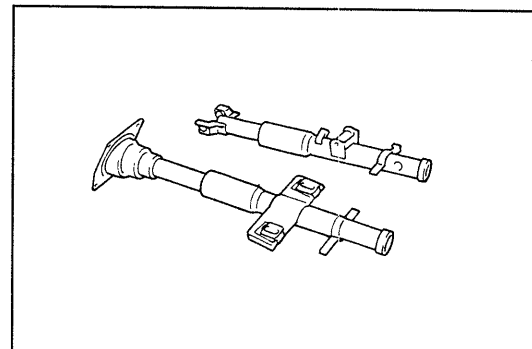
- (4) Ensure that the overall length of the steering shaft is within the specified value.
Specified Value: About 545.5 mm (21.48 inches)



WRU90-SR135

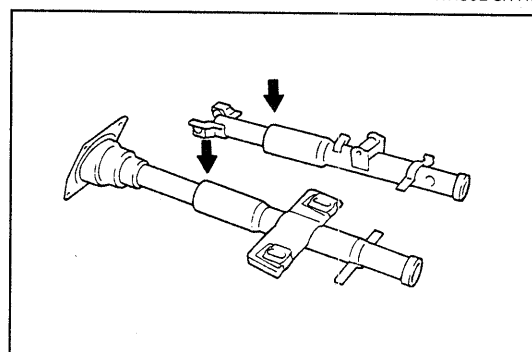
2. Steering column tube

- (1) Ensure that the steering column tube exhibits no damage, such as deformation, wear and/or cracks.



WRU92-SR412

- (2) Ensure that no excessive play or looseness is present at the connecting section between the upper and lower sections of the steering column tube.



WRU90-SR137

- (3) Ensure that the overall length of the steering column tube is within the specified value.

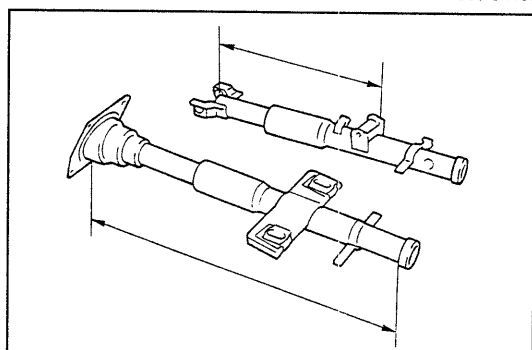
Specified Value:

Standard Type:

About 313 mm (12.32 inches) ^{*1}

Tilt Steering Type:

About 559 mm (22.01 inches) ^{*2}



WRU90-SR138

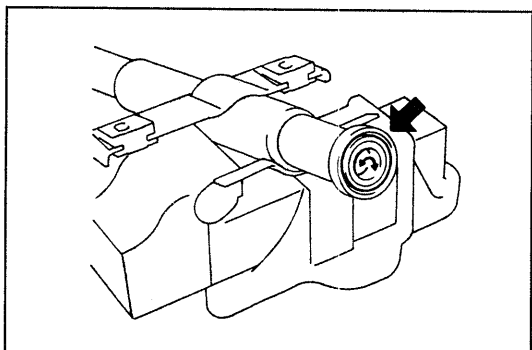
NOTE:

^{*1} Dimension between the centers of bolt holes

^{*2} Dimension between the center of hole at the column hole cover and the bearing end section

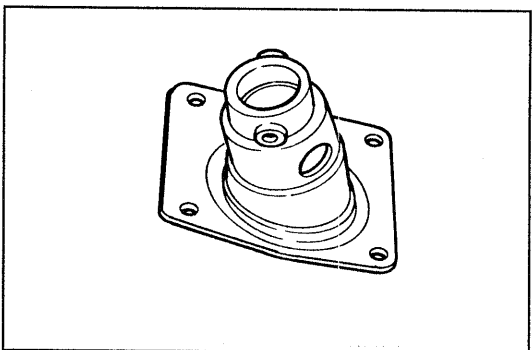
- (4) Ensure that the radial ball bearing assembled in the steering column tube exhibits no defect, such as abnormal binding.

If any defect is present, replace the steering column tube.



WRU90-SR139

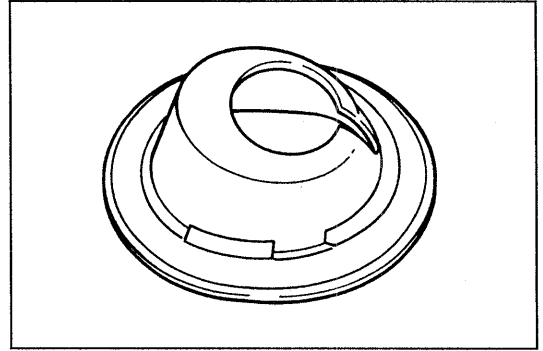
3. Ensure that the steering column hole cover exhibits no damage, such as wear, cracks and/or deformation. (Tilt steering-equipped vehicle only)



WRU92-SR413

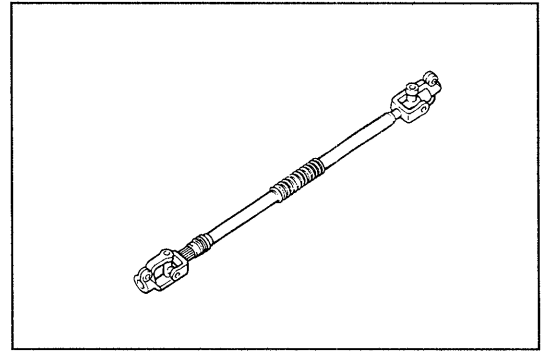
STEERING

4. Ensure that the steering column hole cover shield exhibits no damage, such as cracks.



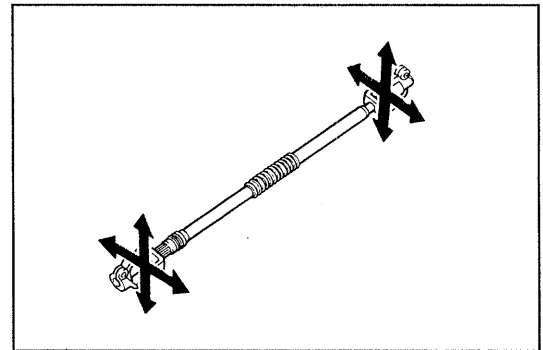
WRU90-SR141

5. Inspection of intermediate shaft
 - (1) Ensure that the intermediate shaft exhibits no defect, such as excessive play at the spline section.



WRU92-SR414

- (2) Ensure that the intermediate shaft exhibits no defect, such as excessive play at the joint section of the universal joint.

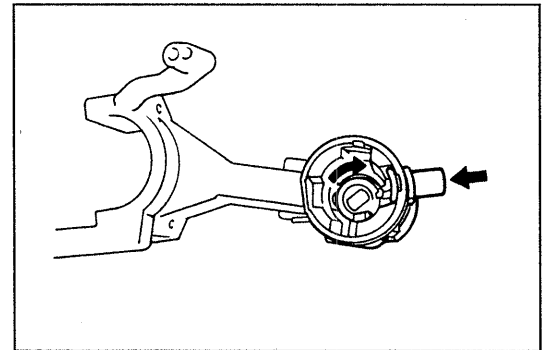


WRU92-SR415

6. Inspection of steering column upper bracket
 - (1) While holding the pushbutton, turn the cam inside the steering column upper bracket, using a standard screwdriver, until the cam assumes the positional relationship as indicated in the right figure.

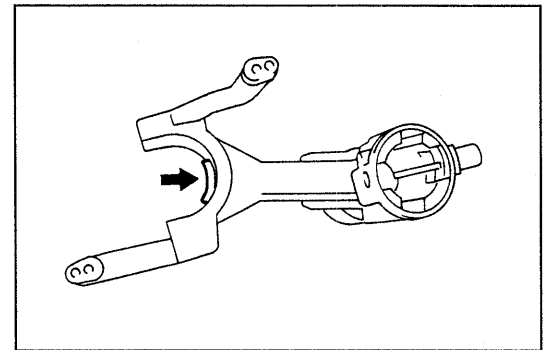
NOTE:

- Do not pull out the cam.



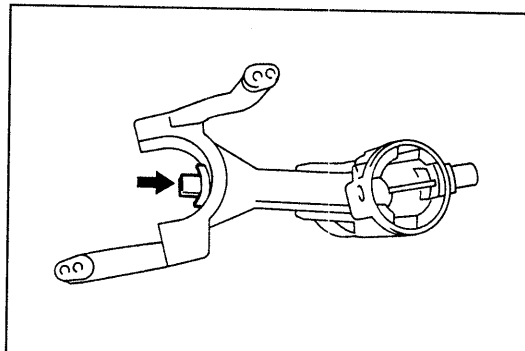
WRU90-SR144

- (2) Ensure that the pawl of the steering lock is not protruded under the condition (1).



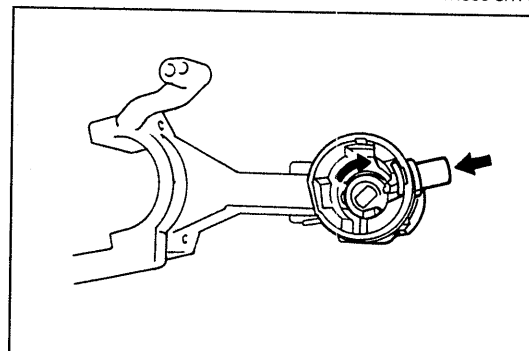
WRU90-SR145

- (3) Under the condition (1), push the pushbutton. Ensure that the pawl for steering shaft lock jumps out.



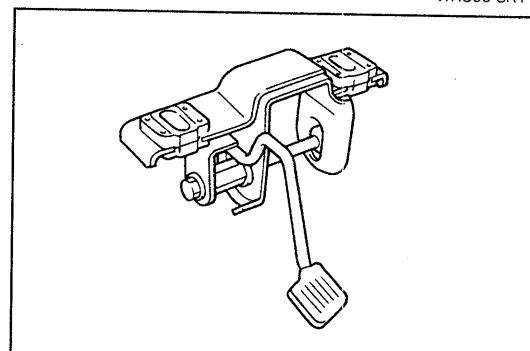
WRU90-SR146

- (4) Return the steering column upper bracket to the condition (1).



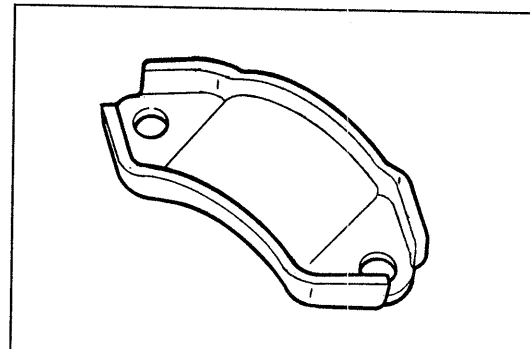
WRU90-SR147

7. Ensure that no damage is present at the tilt steering support, plain washer, lock nut and steering tilt lever. Replace any damaged part.



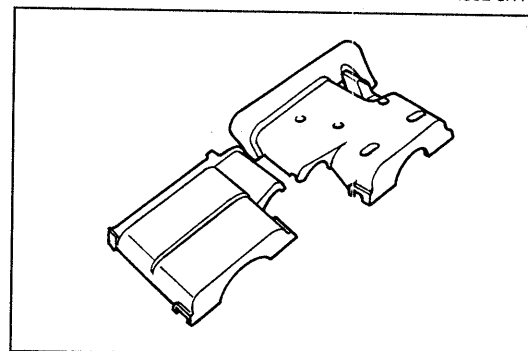
WRU90-SR148

8. Ensure that the steering column housing exhibits no damage, such as cracks and/or deformation.



WRU92-SR416

9. Inspection of steering column cover
Ensure that the steering column cover exhibits no damage, such as scratch, wear and/or deformation.



WRU90-SR150

STEERING

10. Perform unit inspection for each switch.
(Refer to the Body Electrical System section.)

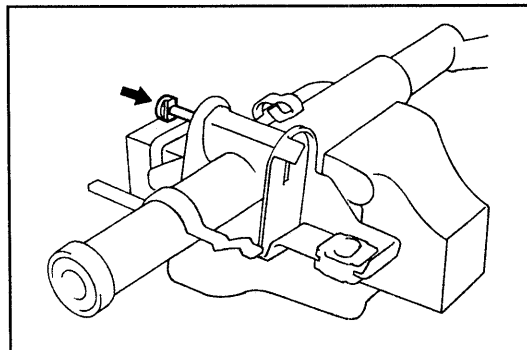
INSTALLATION

1. Installation of tilt steering support
(Tilt steering-equipped vehicle only)
(1) Install the steering shaft support to the steering column tube through the attaching shaft.

NOTE:

- Be sure to align the shaft with the column tube groove during the assembling.

WRU90-SR151

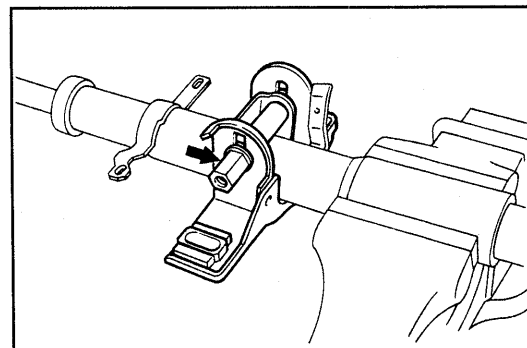


WRU90-SR152

- (2) Install the long nut to the shaft with the washer interposed. Temporarily tighten the long nut.

NOTE:

- The long nut is a left-hand threaded nut.

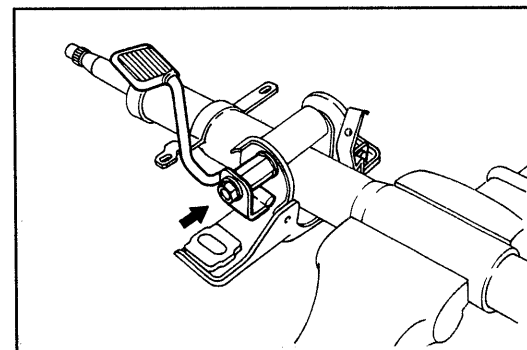


WRU90-SR153

- (3) Install the steering tilt lever to the shaft. Temporarily tighten the attaching bolt with a new spring washer interposed.

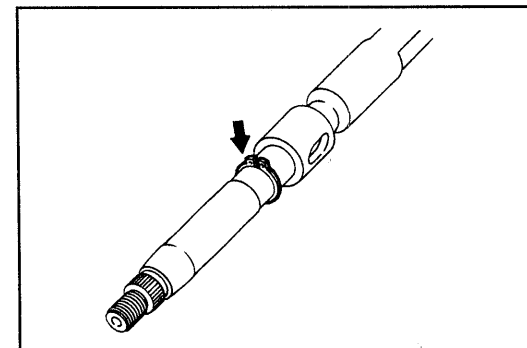
NOTE:

- Never reuse the spring washer.
- Be sure to insert the spring washer between the tilt lever and the long nut.



WRU90-SR154

2. Install a new snap ring to the steering shaft (if it was removed.)



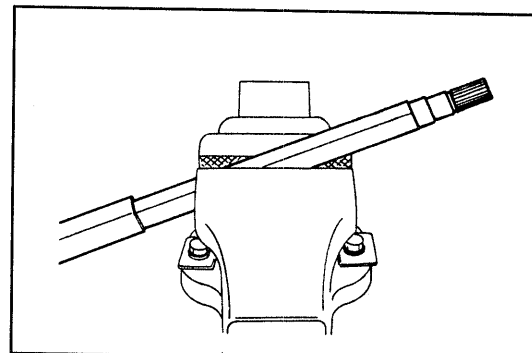
WRU90-SR155

3. Assembling of radial ball bearing (Only when it was removed)

(1) Clamp the steering shaft lower shaft in a vice or the like.

NOTE:

- Never clamp the steering shaft upper shaft.

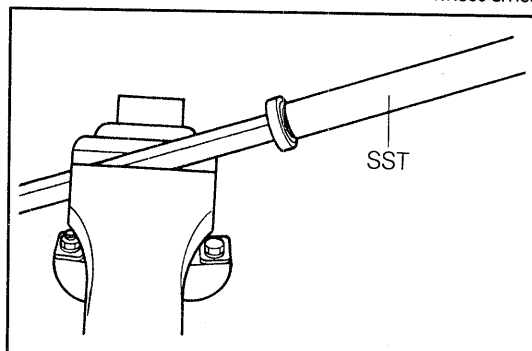


WRU90-SR156

- (2) Press a new radial ball bearing into the steering shaft, using the handle section of the following SST or the like.
SST: 09648-87201-000

NOTE:

- When pressing the radial ball bearing, be sure to drive the inner race. Never apply force to the outer race and/or bearing cover, etc.

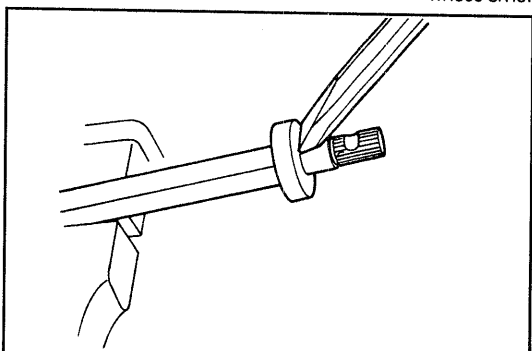


WRU90-SR157

- (3) To prevent the steering shaft radial ball bearing from dropping, lightly prevent the steering shaft from turning with a chisel. At this time, be careful not to deform the steering shaft.

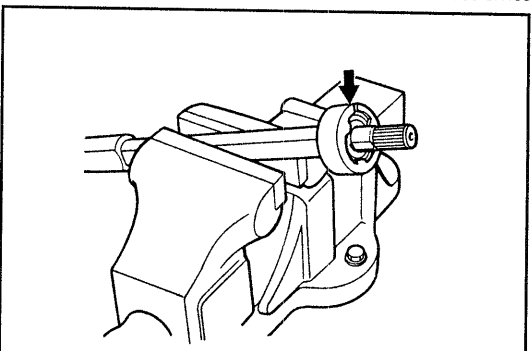
NOTE:

- Be very carefull not to bent the steering shaft.



WRU90-SR158

4. Install the steering shaft thrust stopper to the radial ball bearing.
5. Apply a thin film of Sanper® 150 to the steering shaft thrust stopper surface.



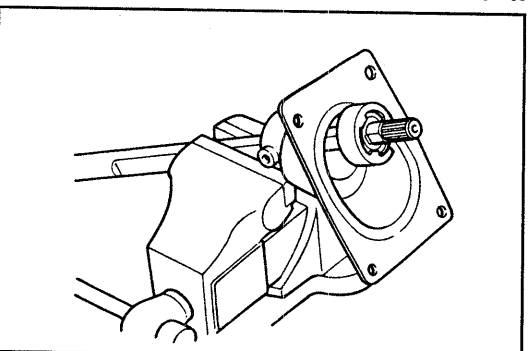
WRU90-SR159

6. Installation of steering column hole cover
(Tilt steering-equipped vehicle only)

(1) With the steering column hole cover passed through the steering shaft, clamp the steering shaft lower shaft in a vice.

NOTE:

- Never clamp the steering shaft upper shaft (hollow shaft) in a vice.



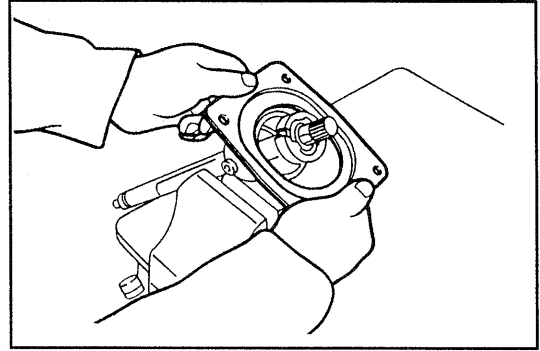
WRU90-SR160

STEERING

- (2) Assemble the steering column hole cover to the steering shaft thrust stopper by pulling the cover.

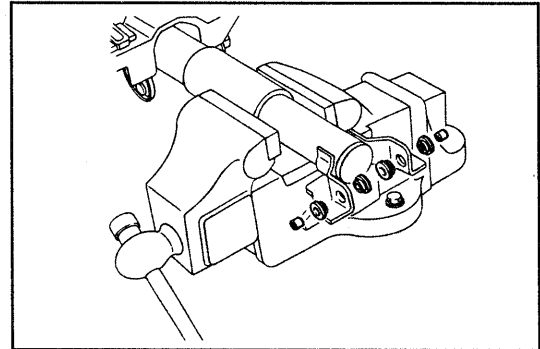
NOTE:

- Care must be exercised so that the steering shaft thrust stopper may not be detached.



WRU90-SR161

7. Installation of steering column tube
(Tilt steering-equipped vehicle only)
- (1) Install the bushes and collars on the steering column hole cover installation section of the steering column tube.
- (2) Insert the steering shaft into the steering column tube.



WRU90-SR162

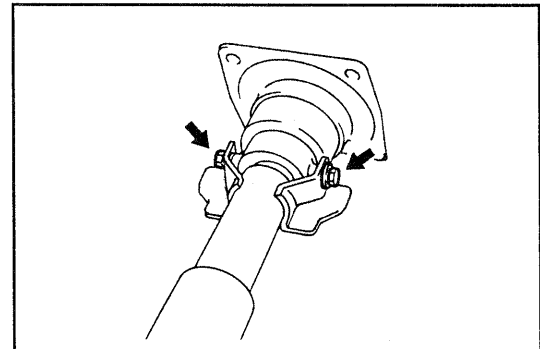
- (3) Connect the steering column tube to the steering column hole cover with the bolts. Tighten the bolts to the specified torque.

Tightening Torque:

0.4 - 0.7 kgf-m (2.9 - 5.1 ft-lb, 3.9 - 6.9 N-m)

NOTE:

- Be sure to install the steering hole cover in the correct direction.

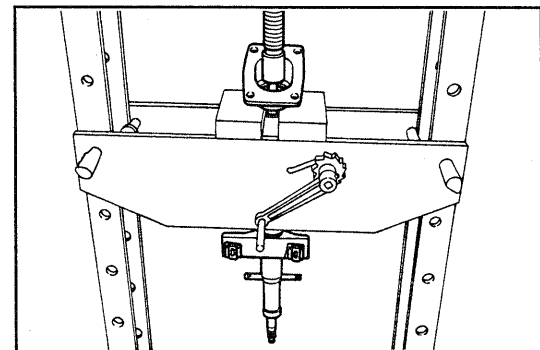


WRU90-SR163

8. Installation of steering column tube
(Standard type only)
- Press the steering shaft into the steering column by means of a hydraulic press.

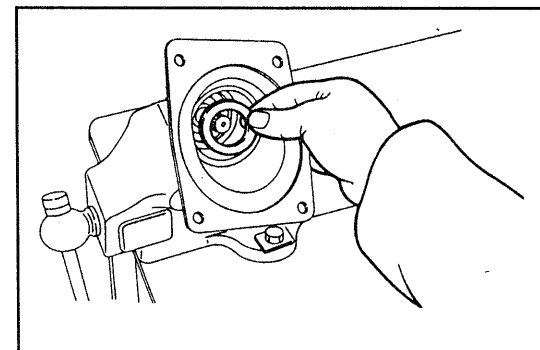
NOTE:

- Never apply excessive load to the steering shaft.
- Never hold the upper section of the steering column tube.
- The press-fitting should be performed only to such an extent that the washer and snap ring can be installed. Never continue the press-fitting beyond that extent.



WRU90-SR164

9. Insert the washer at the steering column hole side.

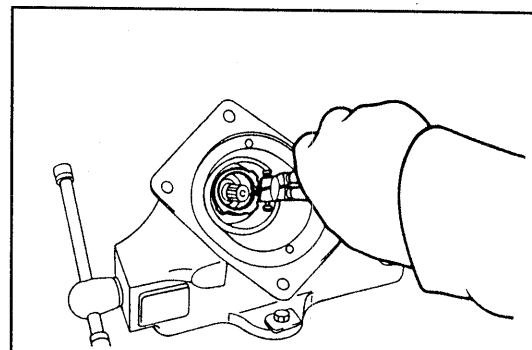


WRU90-SR165

10. Attach a new snap ring.

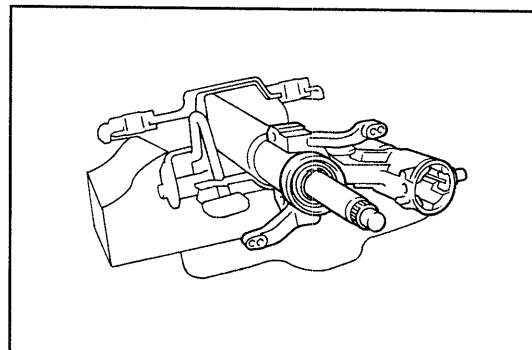
NOTE:

- Make sure that the snap ring is fitted in the snap ring groove of the steering column tube or steering column hole cover.



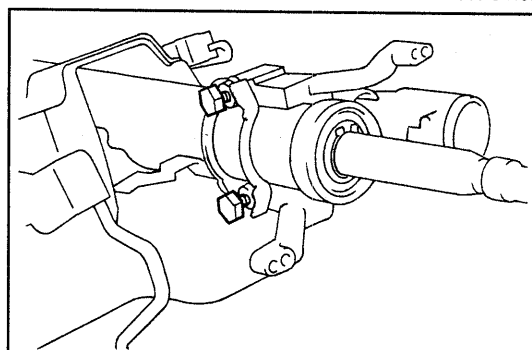
WRU90-SR166

11. Install the new shaft snap ring
12. Install the steering column upper bracket to the steering column tube, while aligning it with the hole of the pawl for steering column tube locking use.



WRU90-SR167

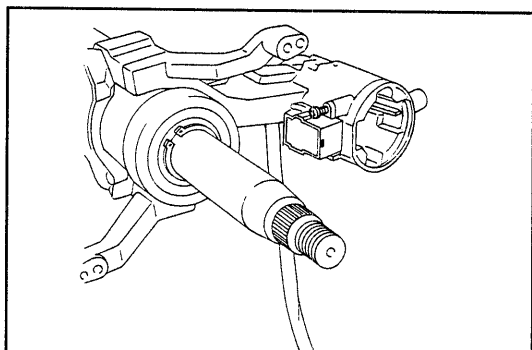
13. Install the steering column housing. Connect the steering column upper bracket with the steering column by attaching a new bolt.
14. Tighten the attaching bolts evenly, until the hexagonal section of the bolts are broken.



WRU90-SR168

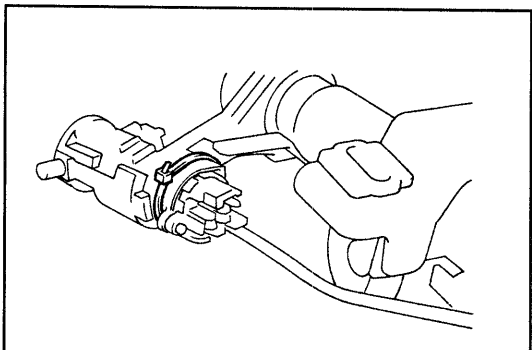
15. Installation of key reminder switch (only for key reminder switch equipped vehicle)

- (1) Insert the key reminder switch into the installation section of the steering column upper bracket. Hook the key reminder switch to the pawl of the steering column upper bracket.
- (2) Tighten the attaching screw.



WRU90-SR169

- (3) Install the harness to the steering column upper bracket with a clamp band.

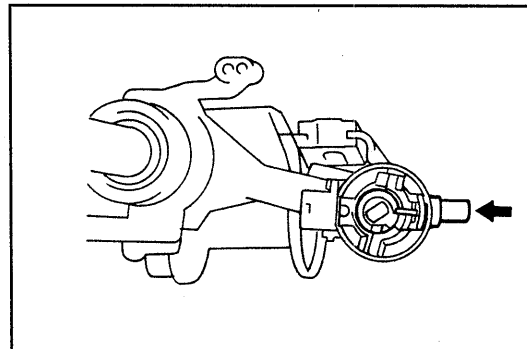


WRU90-SR170

STEERING

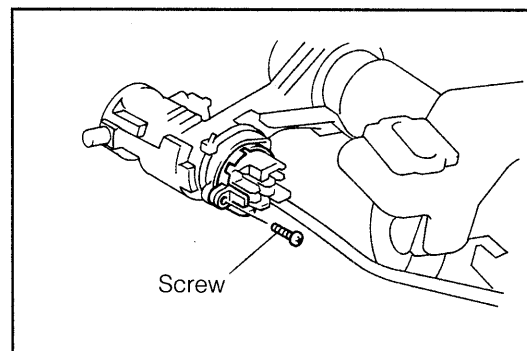
16. Installation of ignition key switch

- (1) With the pushbutton pushed, turn the shaft of the steering column upper bracket until the shaft assumes the position as indicated in the right figure.



WRU90-SR171

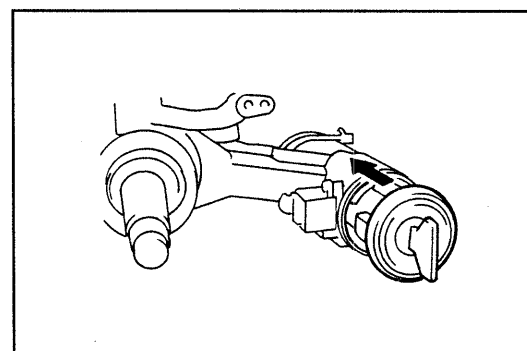
- (2) While aligning the recessed section of the ignition key switch with the pawl of the steering column upper bracket, insert the ignition key switch into the steering column upper bracket. Tighten the attaching screw.



WRU90-SR172

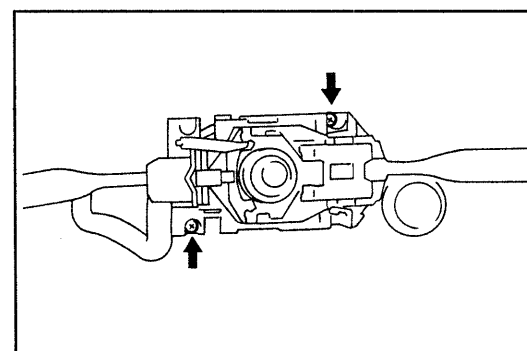
17. Installation of ignition key cylinder

Set the key of the ignition key cylinder to the ACC position. Align the recessed section of the steering column upper bracket with the protruded section of the ignition key cylinder. Under this setting, insert the ignition key cylinder into the steering upper bracket.



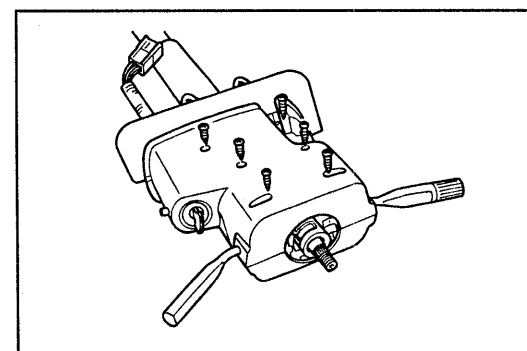
WRU90-SR173

18. Install the turn signal lamp switch assembly (combination switch) to the steering column. Tighten the attaching screws.



WRU90-SR174

19. Install the steering column cover to the steering column. Tighten the attaching screws.



WRU90-SR175

20. Connection of intermediate shaft

- (1) Connect the intermediate shaft to the steering shaft in such a way that the cut-out section of the steering shaft may be aligned with the bolt hole of the intermediate shaft.

NOTE:

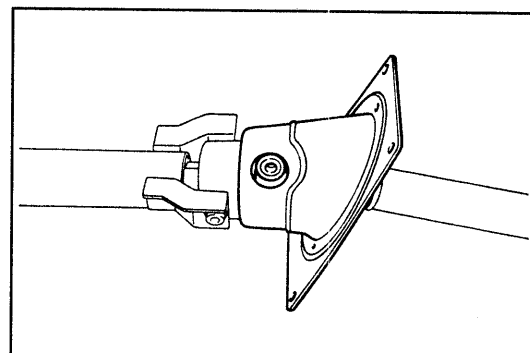
- Be sure to positively connect the universal joint to the serration section as far as it will go, until the serration section of the steering shaft becomes invisible from the universal joint edge surface of the intermediate shaft.
- If the steering shaft and intermediate shaft are reused, align the mating mark which was put during the disassembly when these parts are assembled.

- (2) Insert the attaching bolts and tighten them to the specified torque.

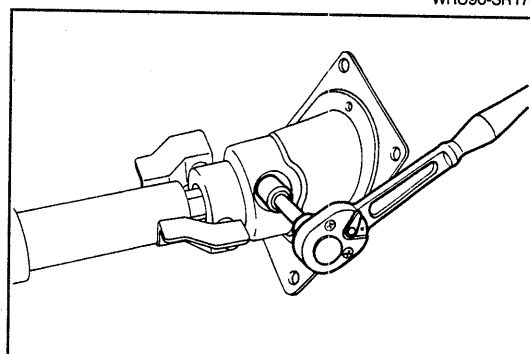
Tightening Torque:

2.5 - 3.5 kgf-m (18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)

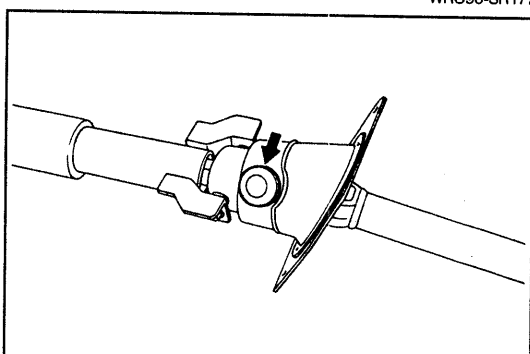
- (3) Install the hole plug.



WRU90-SR176



WRU90-SR177

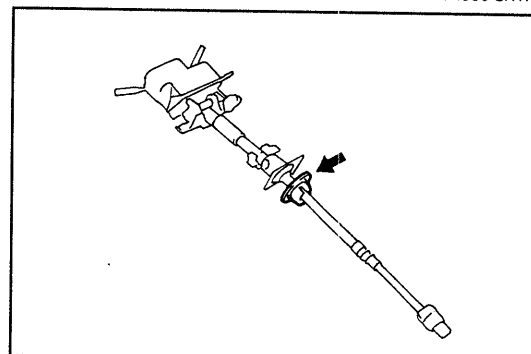


WRU90-SR178

21. Insert the steering column hole cover shield into the intermediate shaft.

NOTE:

- Install the steering column hole cover shield in such a way that its cut-out section may face toward the lower side of the vehicle.

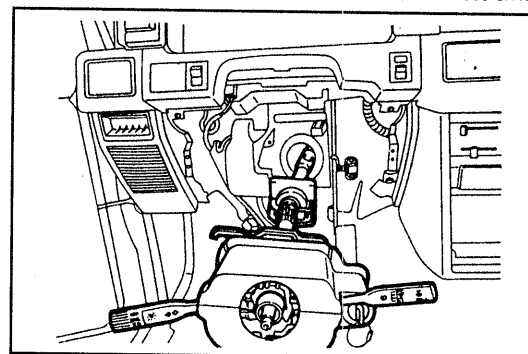


WRU90-SR179

22. Insert the steering column assembly together with the intermediate shaft.

NOTE:

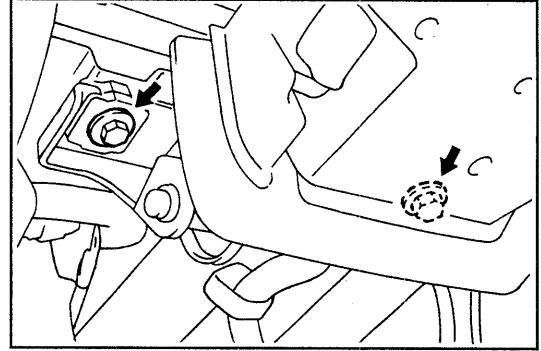
- Care must be exercised so that the intermediate shaft may not interfere with other parts.



WRU90-SR180

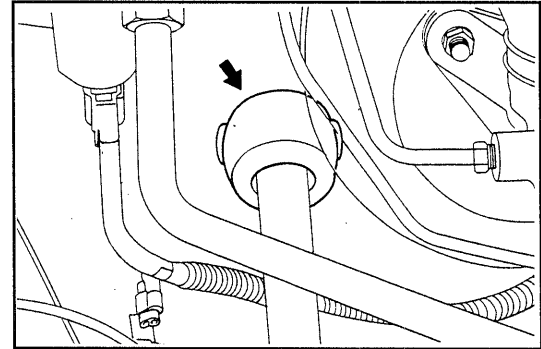
STEERING

23. Install the steering column to the upper installation section. Temporarily tighten the attaching bolts.



WRU90-SR181

24. Install the steering column cover shield as indicated in the right figure.

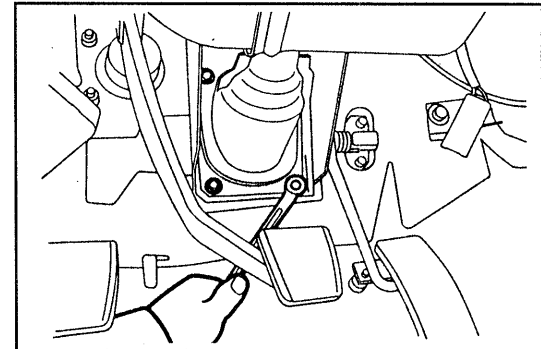


WRU90-SR182

25. Install the attaching bolts at the column cover side of the steering column. Tighten them to the specified torque.

Tightening Torque:

0.4 - 0.7 kgf-m (2.9 - 5.1 ft-lb, 3.9 - 6.9 N·m)

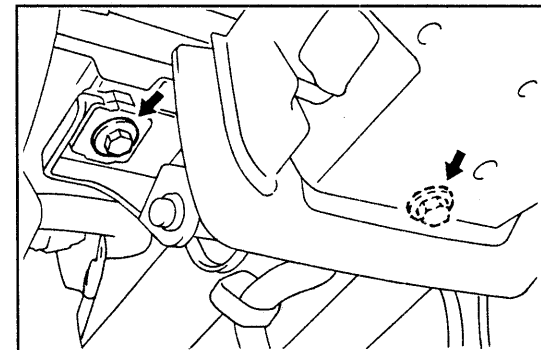


WRU90-SR183

26. Tighten the upper attaching bolts of the steering column to the specified torque.

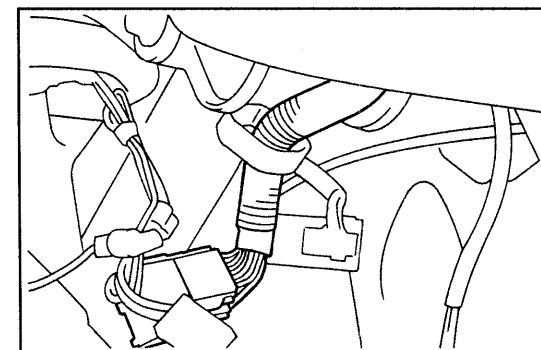
Tightening Torque:

1.5 - 2.2 kgf-m (10.8 - 15.9 ft-lb, 14.7 - 21.6 N·m)



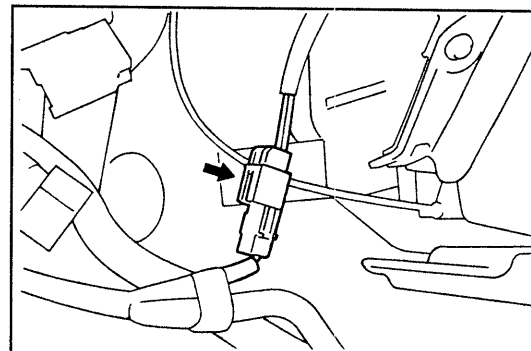
WRU90-SR184

27. Clamp the wire harness to the steering column.



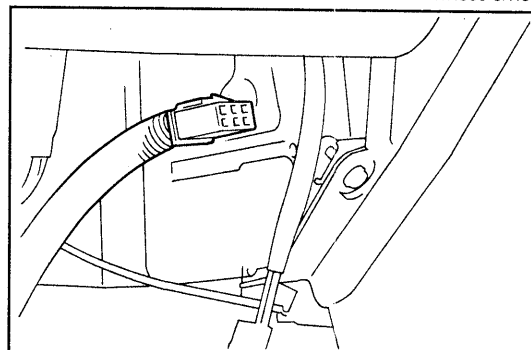
WRU90-SR185

28. Connect the key reminder switch connector (if so equipped).



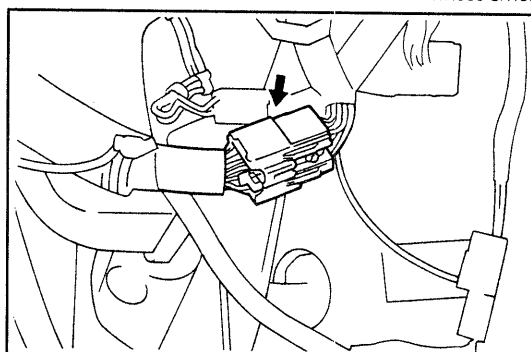
WRU90-SR186

29. Connect the connector to the ignition switch.



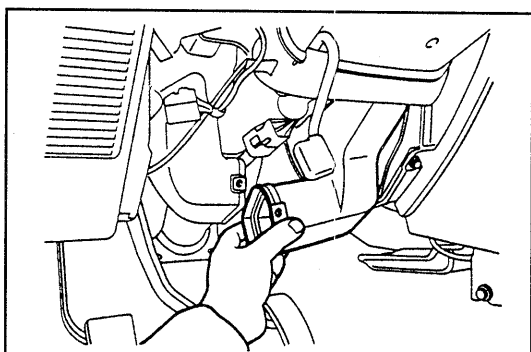
WRU90-SR187

30. Connect the connector of the turn signal switch.



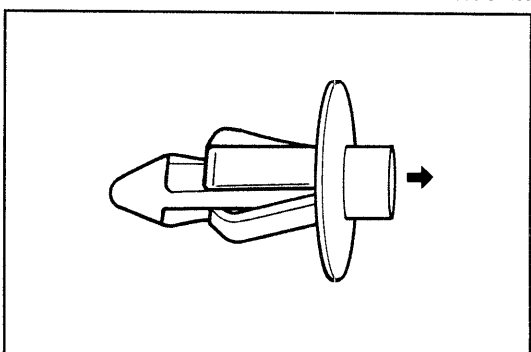
WRU90-SR188

31. Install the air duct assembly No. 1.



WRU90-SR189

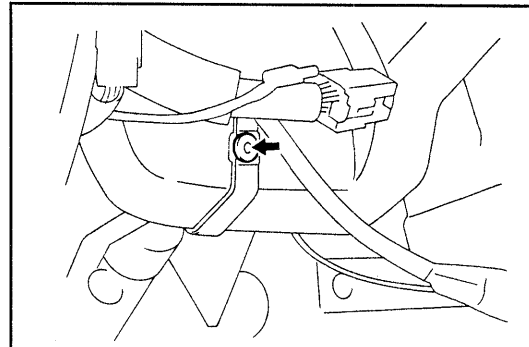
32. Pull out the center of the clip, as indicated in the right figure.



WRU90-SR190

STEERING

33. Install the clip to the air duct No. 1. Push down the shaft at the clip central section until it becomes flush with the clip surface. Then, lock the clip.

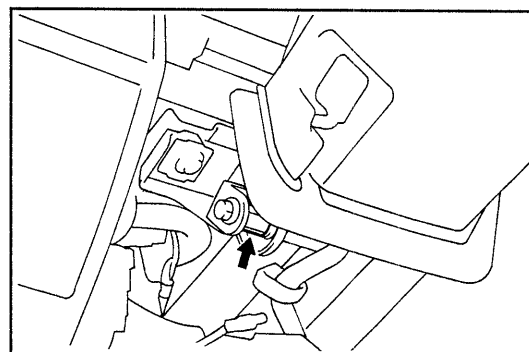


WRU90-SR191

34. Tighten the long nut of the tilt steering support.
Tightening Torque: 1.3 kgf-m (9.4 ft-lb, 12.7 N-m)

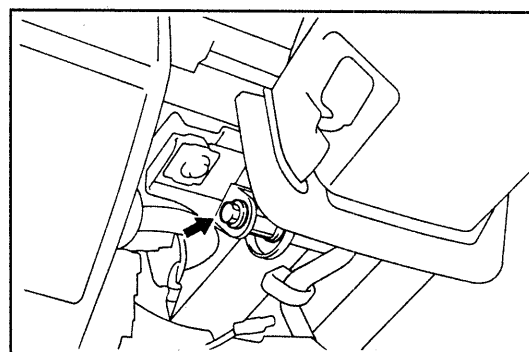
NOTE:

- The long nut is a left-threaded nut.



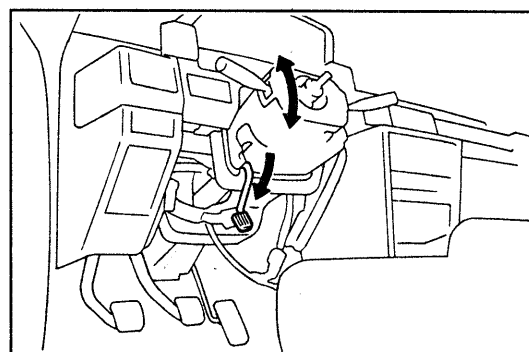
WRU90-SR192

35. Set the tilt steering lever to the upper position. While preventing the lever from turning with the long nut, tighten the tilt steering lever attaching bolt to the specified torque.
Tightening Torque:
3.0 - 4.5 kgf-m (21.7 - 36.2 ft-lb, 29.4 - 49.0 N-m)



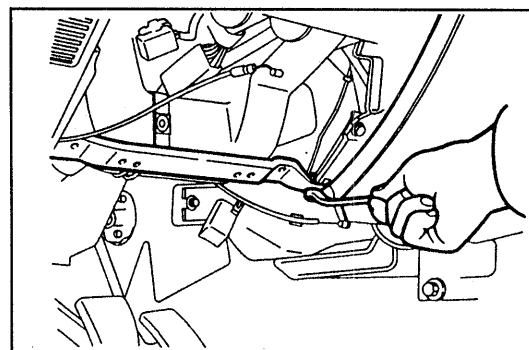
WRU90-SR193

36. Ensure that the steering column is secured.
If not, adjust the tightening torque, as instructed in the step 34.
37. Lower the tilt steering lever. Ensure that the steering tilt function operates properly.
If not, loosen the tilt steering lever attaching bolt while preventing the long nut from turning. Adjust the tightening torque of the long nut and repeat the operations from the step 34.



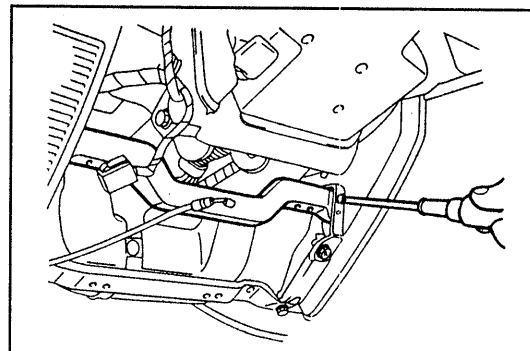
WRU90-SR194

38. Install the instrument panel reinforcement sub-assembly.
(For details, refer to the Body section.)



WRU90-SR195

39. Install the instrument panel finish panel No. 1.
(For details, refer to the Body section.)

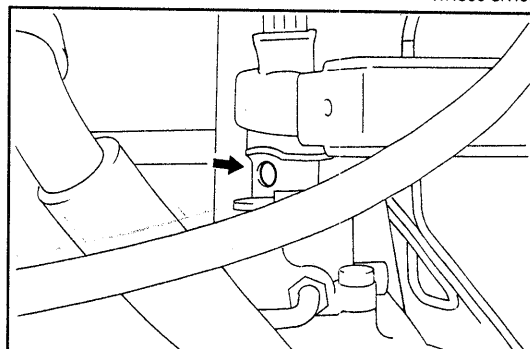


WRU90-SR196

40. Connect the intermediate shaft to the steering gear housing, while aligning the cut-out section of the steering gear housing shaft with the bolt hole of the intermediate shaft.

NOTE:

- Be sure to positively connect the universal joint to the serration section as far as it will go, until the serration section of the shaft at the steering gear box side becomes invisible from the universal joint edge surface of the intermediate shaft.
- If the steering shaft and intermediate shaft are reused, align the mating mark which was put during the disassembly when these parts are assembled.

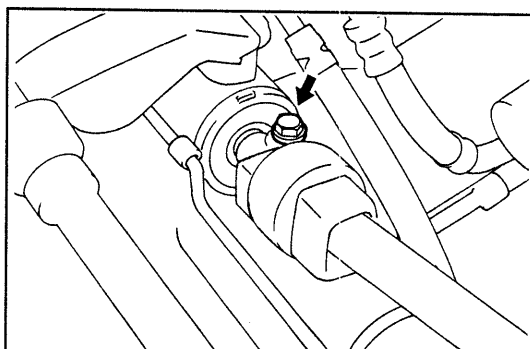


WRU90-SR197

41. Tighten the bolts which connect the intermediate shaft to the steering gear housing to the specified torque.

Tightening Torque:

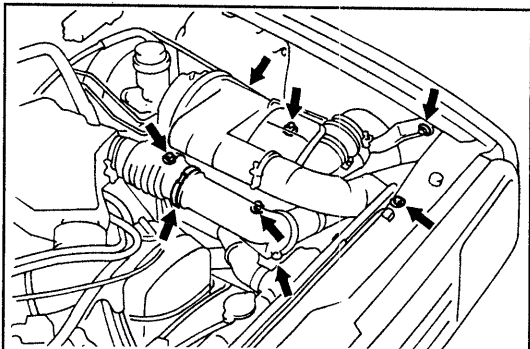
2.5 - 3.5 kgf-m (18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)



WRU90-SR198

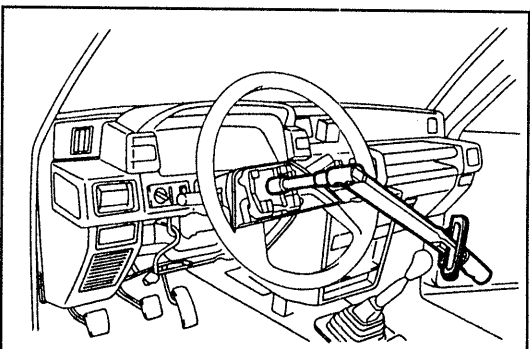
42. Installation of air cleaner and air hose
(For details, refer to the Engine section.)

- (1) Install the air cleaner and air hose as an assembly to the vehicle. Tighten the five attaching bolts.
- (2) Tighten the hose band.
- (3) Tighten the clutch cable clamp bolt.



WRU90-SR199

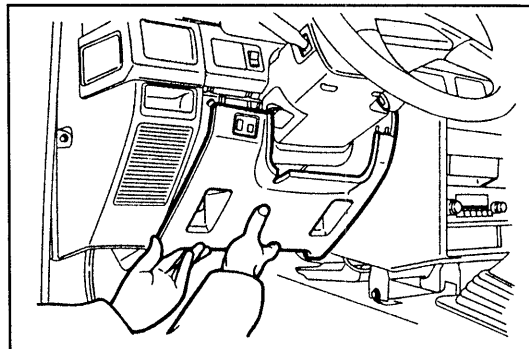
43. Installation of steering wheel
(See page SR-27.)



WRU90-SR200

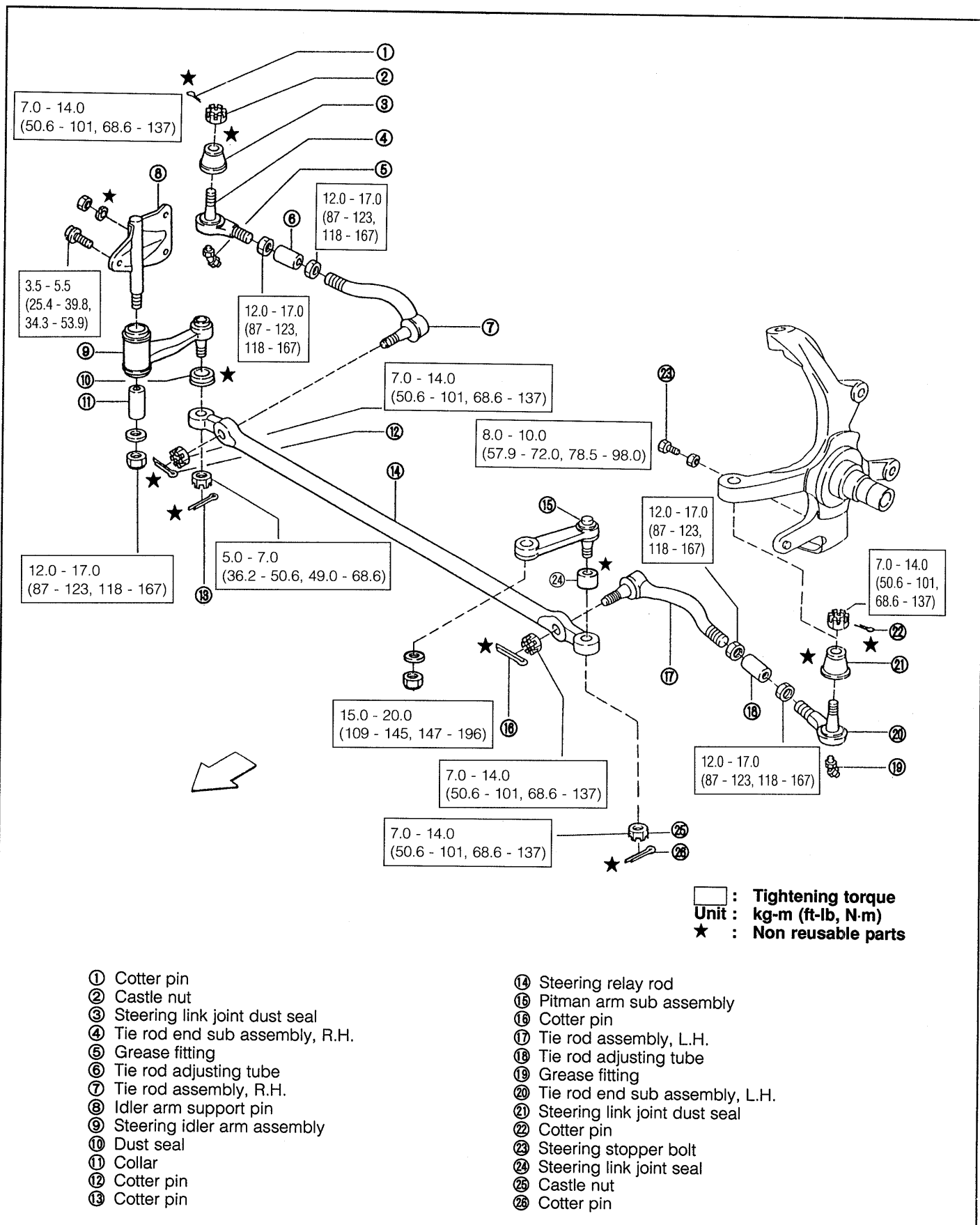
STEERING

44. Install the instrument panel lower panel.
(For details, see the Body section.)



WRU90-SR201

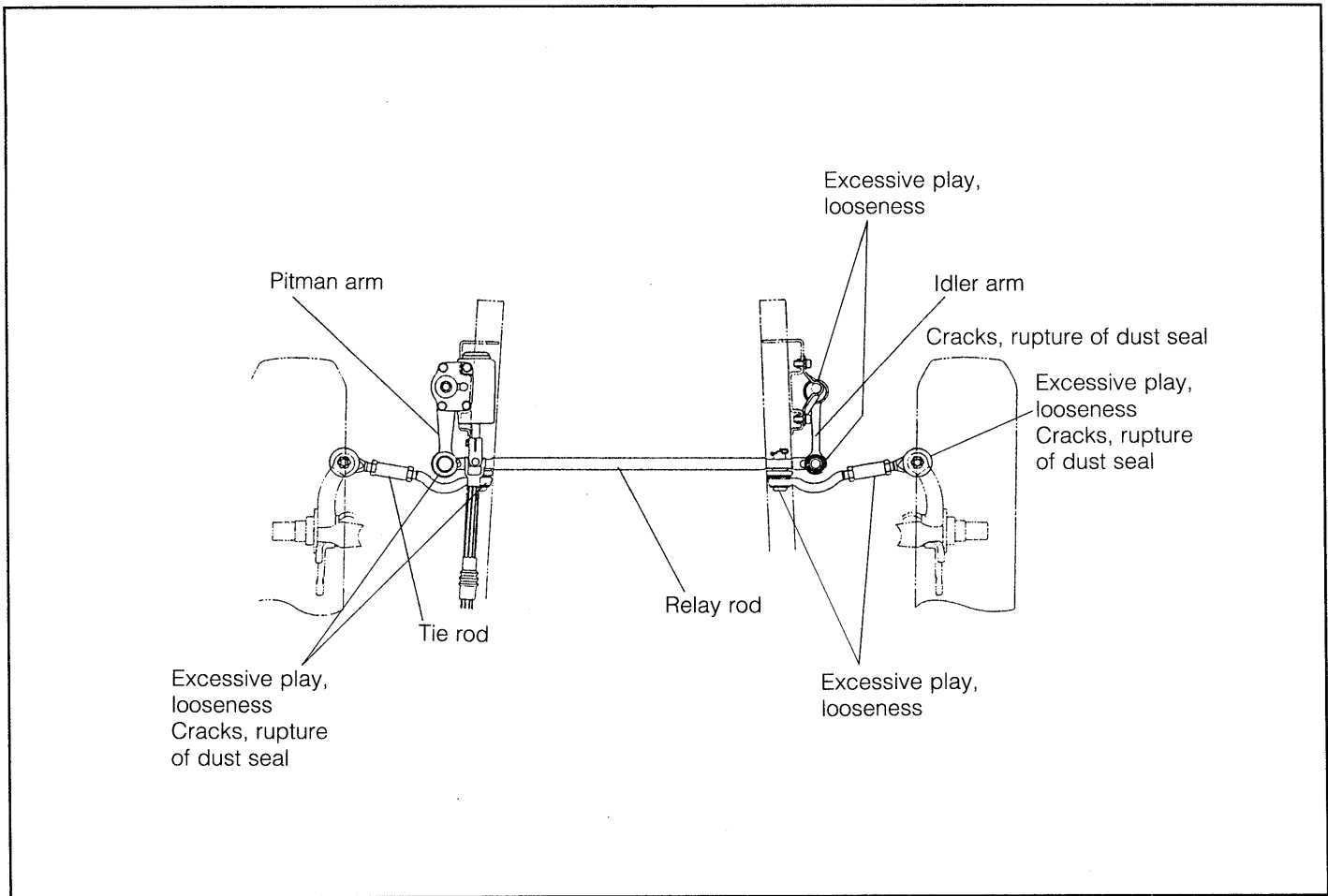
STEERING LINKAGE COMPONENTS



STEERING

INSPECTION

Ensure that each section exhibits no defect, such as cracks, excessive play, looseness and deformation. Replace any defective part.



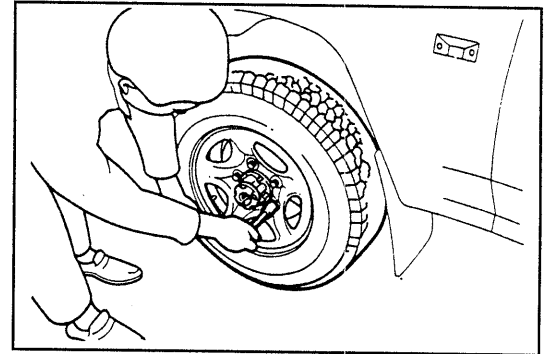
WRU90-SR203

REMOVAL

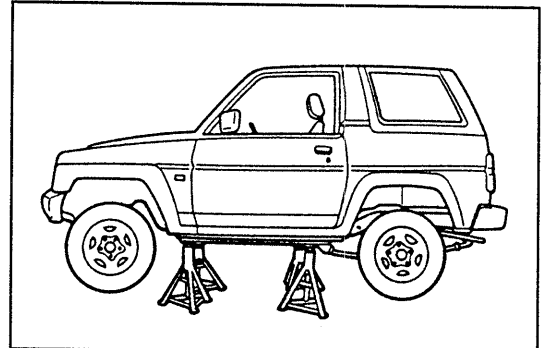
1. Loosen the front wheel attaching bolts.
2. Jack up the vehicle and support it with safety stands.
3. Remove the front wheels. (Both right and left sides)
4. Remove the cotter pin at the connecting section of the tie rod end and the steering knuckle. (Both right and left sides)
5. Loosen the castle nut two or three threads at the connecting section of the tie rod end and the steering knuckle. (Both right and left sides)
6. Disconnect the connecting section of the tie rod end and the steering knuckle, using the following SST.
SST: 09610-20012-000

NOTE:

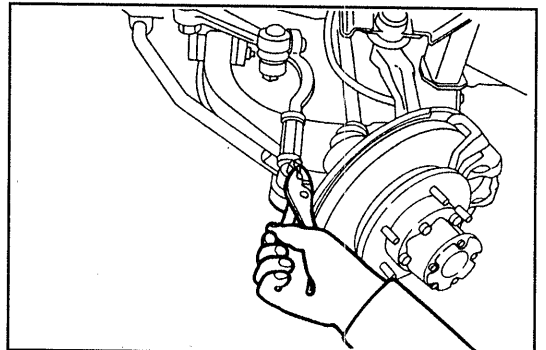
- If any difficulty is encountered during this disconnection, apply a suitable metal rod against the side of the tapered section of the steering knuckle and lightly tap the metal rod with a hammer or the like. This will facilitate the disconnection.



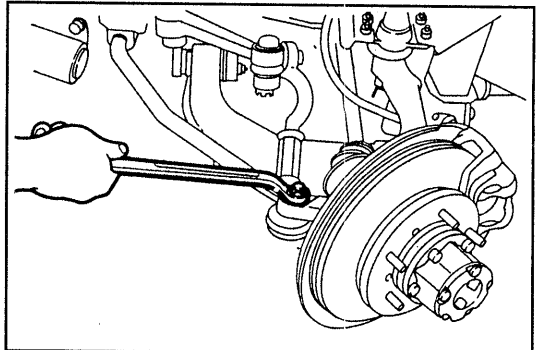
WRU90-SR204



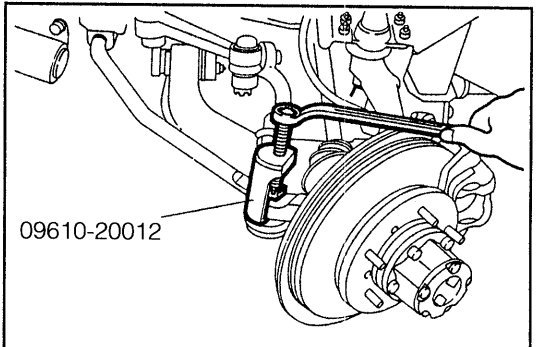
WRU90-SR205



WRU90-SR206



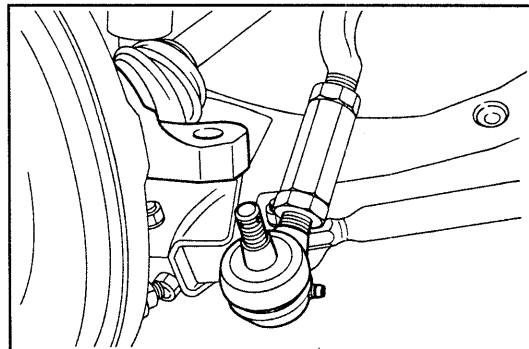
WRU90-SR207



WRU90-SR208

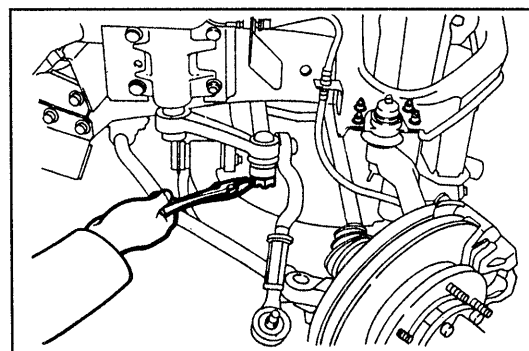
STEERING

7. Remove the castle nut.
8. Separate the tie rod end from the steering knuckle.



WRU90-SR209

9. Remove the cotter pin at the connecting section of the pitman arm and the relay rod.
10. Loosen the castle nut four or five threads which connects the pitman arm with the relay rod.



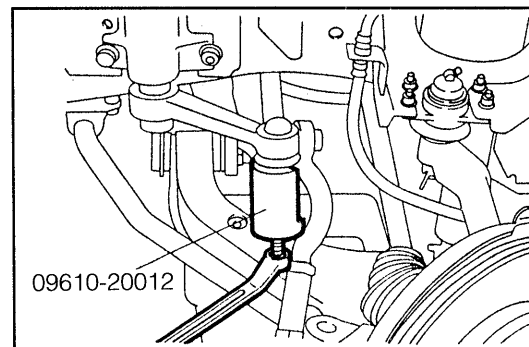
WRU90-SR210

11. Disconnect the connecting section of the pitman arm and the relay rod, using the following SST.

SST: 09610-20012-000

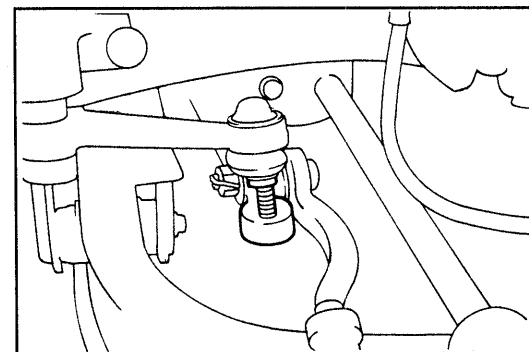
NOTE:

- If any difficulty is encountered during this disconnection, apply a suitable metal rod against the side of the tapered section of the relay rod and lightly tap the metal rod with a hammer or the like to give impact. This will facilitate the disconnection.



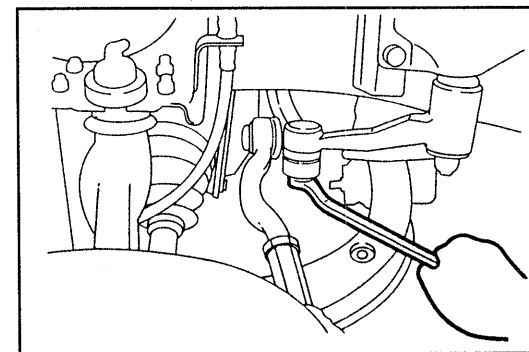
WRU90-SR211

12. Remove the castle nut and separate the pitman arm.



WRU90-SR212

13. Remove the cotter pin at the connecting section of the steering idler arm and the relay rod.
14. Loosen the castle nut four or five threads.



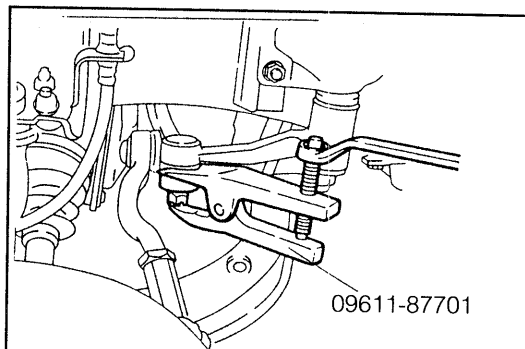
WRU90-SR213

15. Disconnect the connecting section of the steering idler arm and the relay rod, using the following SST.

SST: 09611-87701-000

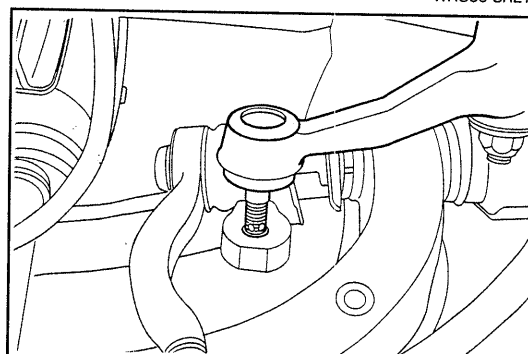
NOTE:

- If any difficulty is encountered during this disconnection, apply a suitable metal rod against the side of the tapered section of the steering relay rod and lightly tap the metal rod with a hammer or the like to give impact. This will facilitate the disconnection.



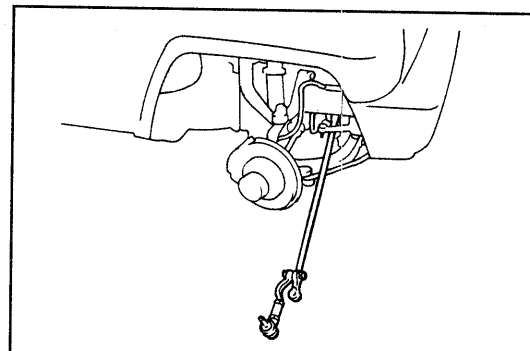
WRU90-SR214

16. Remove the castle nut. Disconnect the idler arm and relay rod.



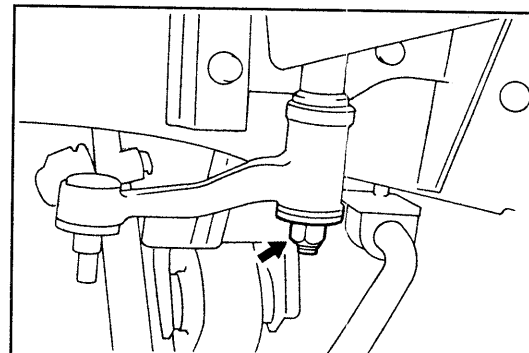
WRU90-SR215

17. Remove the relay rod together with the tie rod end from the vehicle.



WRU90-SR216

18. Remove the idler arm attaching nut. Remove the thrust washer and idler arm.

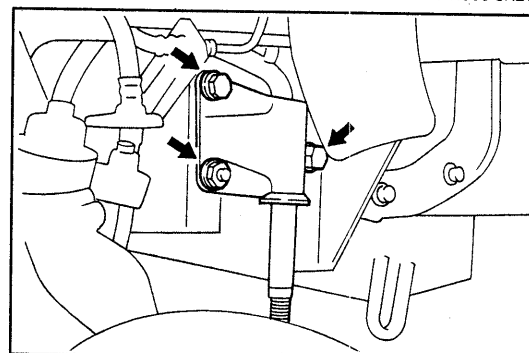


WRU90-SR217

19. Remove the idler arm support pin from the frame. (Never reuse the spring washer.)

NOTE:

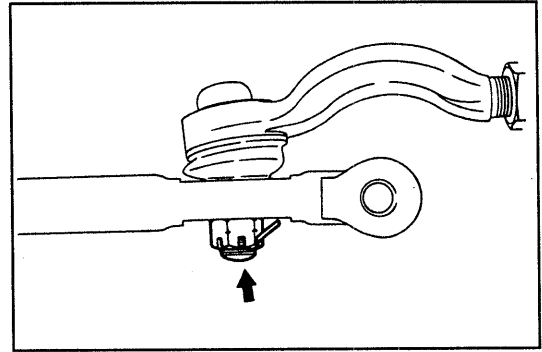
- Do not reuse the used spring washers.



WRU90-SR218

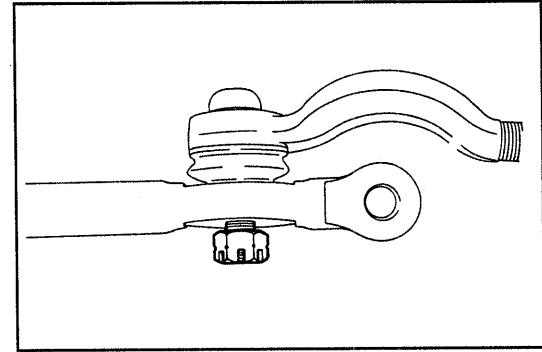
STEERING

20. Remove the cotter pin at the tie rod assembly attaching nut.



WRU90-SR219

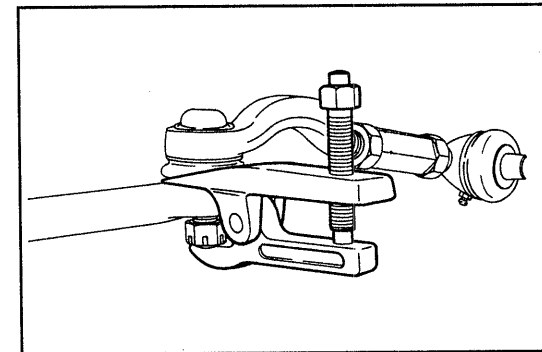
21. Loosen the tie rod assembly attaching nut two or three threads.



WRU90-SR220

22. Remove the tie rod assembly from the steering rod, using the following SST.

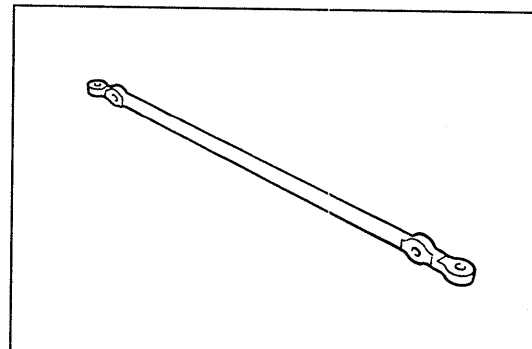
SST: 09611-87701-000



WRU90-SR221

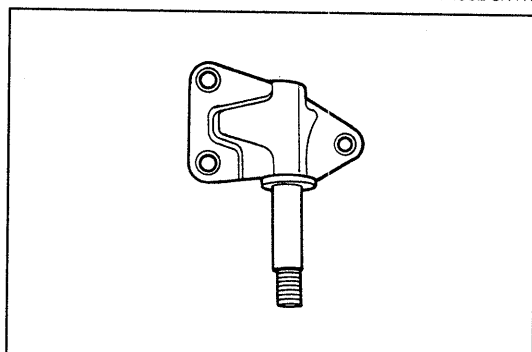
INSPECTION

1. Inspection of steering relay rod
Ensure that the steering relay rod exhibits no defect, such as deformation, wear and/or cracks.



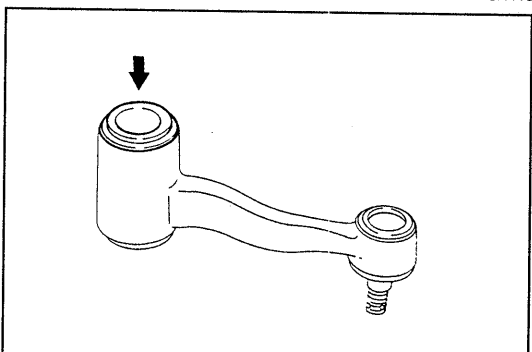
WRU92-SR417

2. Inspection of idler arm support pin
Ensure that the idler arm support pin exhibits no defect, such as deformation, wear and/or cracks.



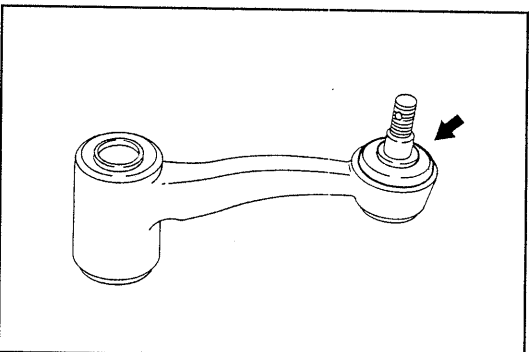
WRU92-SR418

3. Inspection of steering idler arm
 - (1) Ensure that the steering idler arm exhibits no defect, such as deformation, wear and cracks.
 - (2) Ensure that the bush section of the steering idler arm exhibits no damage and/or wear.



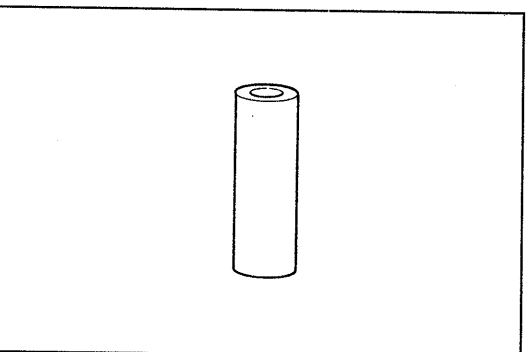
WRU90-SR224

- (3) Ensure that the dust seal of the steering idler arm exhibits no damage, such as cracks and/or rupture. If any damage is present, replace the dust seal.



WRU90-SR225

4. Ensure that the collar exhibits no damage, such as cracks and/or wear.

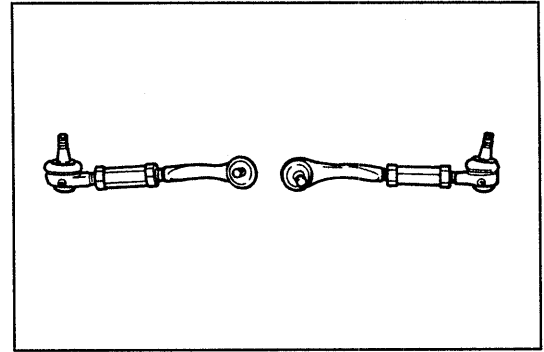


WRU90-SR226

STEERING

5. Inspection of tie rod end

Ensure that each section of the tie rod end exhibits no damage, such as deformation, excessive play and/or cracks.

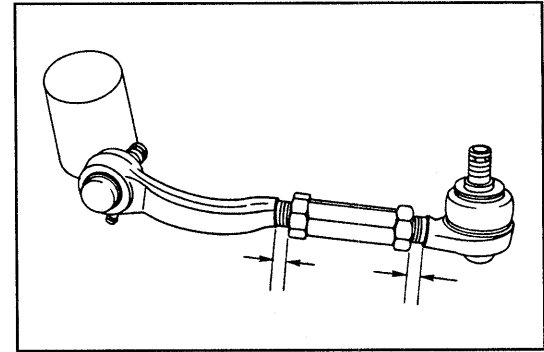


WRU90-SR227

6. Disassembly and assembly of tie rod end (Only cases where such operation is required)

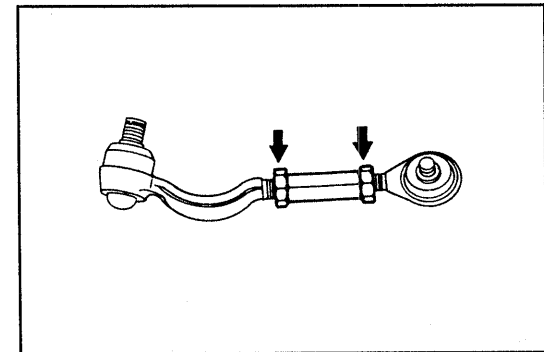
- (1) Measure the distances between the tie rod adjusting tube lock nut and the tie rod end as well as between the tie rod adjusting tube lock nut and the tie rod, respectively.

Reference Value: About 10 mm (0.39 inch)



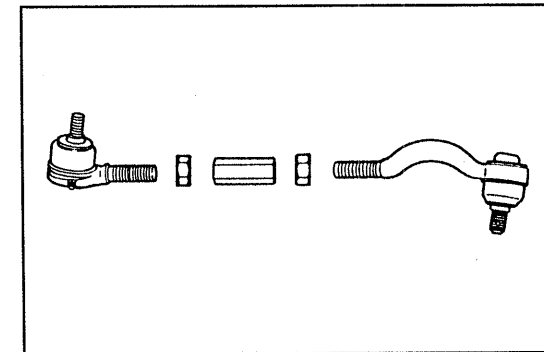
WRU90-SR228

- (2) Loosen the tie rod adjusting tube lock nut.



WRU90-SR229

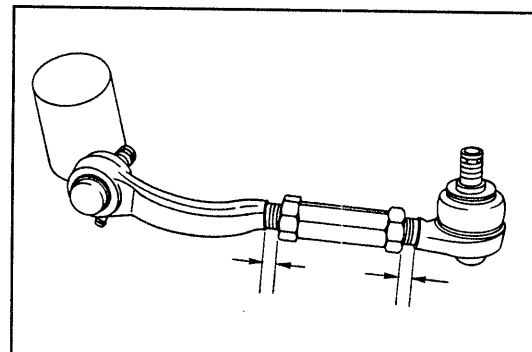
- (3) Remove the tie rod and tie rod end from the tie rod adjusting screw.
- (4) Remove the lock nut from the tie rod and tie rod end.



WRU90-SR230

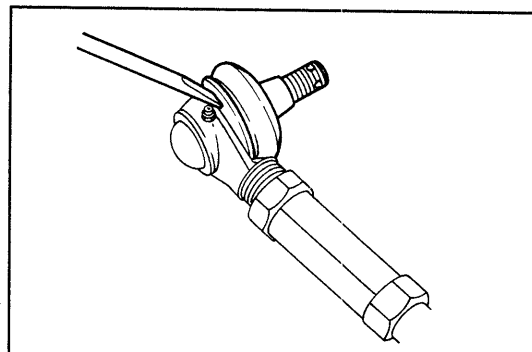
- (5) Install the lock nut to the tie rod and tie rod end, respectively.
- (6) Install the tie rod and tie rod end to the tie rod adjusting screw.

- (7) Adjust the distances between the tie rod adjusting tube lock nut and the tie rod end as well as between the tie rod adjusting tube lock nut and the tie rod to the values measured at the step (1), respectively.
- (8) Temporarily tighten the lock nut.
(After this operation, be sure to adjust the side slip.)



WRU90-SR232

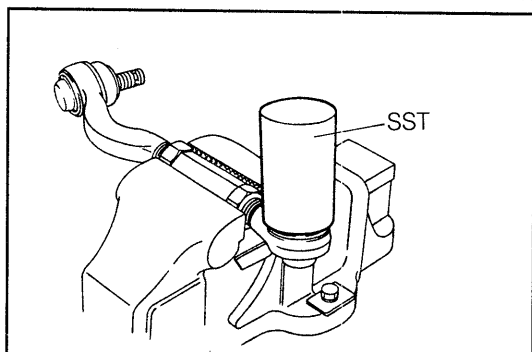
- (9) Replacement of dust seal.
(Only cases where such operation is required)
- ① Remove the steering joint dust seat of the tie rod end by prying it with a standard screwdriver.
- ② Remove old grease.
- ③ Install a new dust seal to the tie rod end.



WRU90-SR233

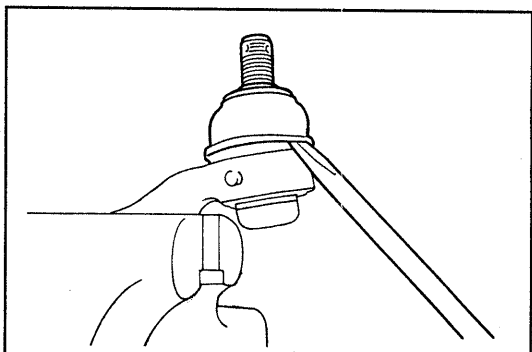
- ④ Drive the new dust seal into position by lightly tapping it with a hammer in combination with the following SST.

SST: 09608-87611-000



WRU90-SR234

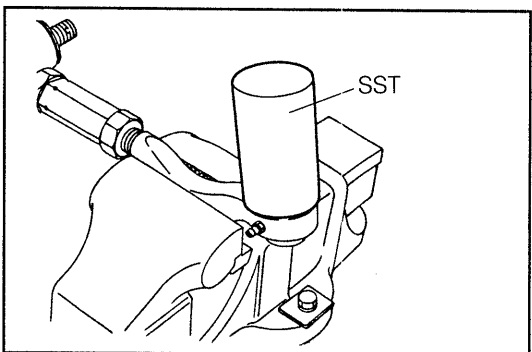
- ⑤ Remove the dust seal of the tie rod by prying it with a standard screwdriver.
- ⑥ Remove old grease.



WRU90-SR235

- ⑦ Install a new dust seal to the tie rod end.
- ⑧ Drive the new dust seal into position by lightly tapping it with a hammer in combination with the following SST.

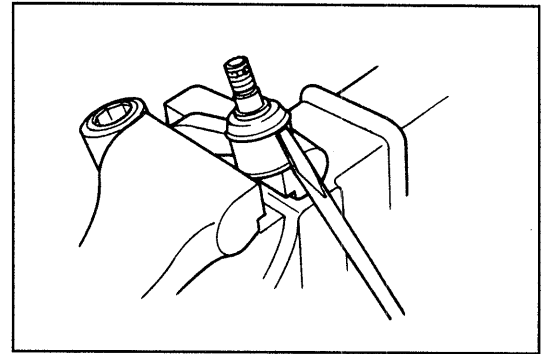
SST: 09608-87613-000



WRU90-SR236

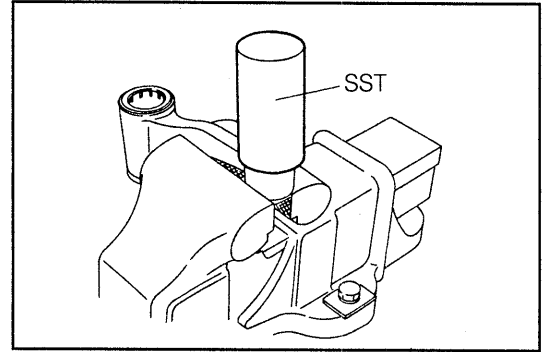
STEERING

7. Replacement of steering idler arm dust seal
(Only cases where such operation is required)
 - (1) Remove the steering idler arm dust seal by prying it with a standard screwdriver or the like.
 - (2) Remove old grease or the like.
 - (3) Pack a new dust seal with rubber grease.



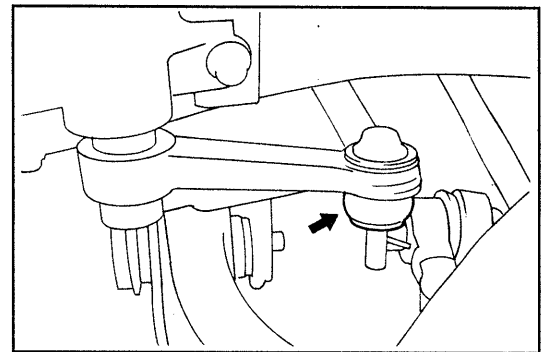
WRU90-SR237

- (4) Install the dust seal to the idler arm.
 - (5) Drive the dust seal into the idler arm by lightly tapping it with a hammer in combination with the following SST.
- SST: 09608-87614-000



WRU90-SR238

8. Ensure that the steering ring joint seal of the pitman arm exhibits no damage.
Replace the joint seal if it is damaged.



WRU90-SR239

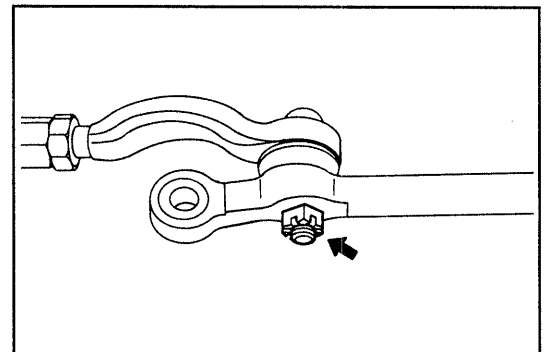
ASSEMBLY

1. Connect the tie rod to the steering relay rod. Install a castle nut.
2. Tighten the castle nut to the specified torque.
Tightening Torque:
7.0 - 14.0 kgf-m (50.6 - 101 ft-lb, 68.6 - 137 N-m)

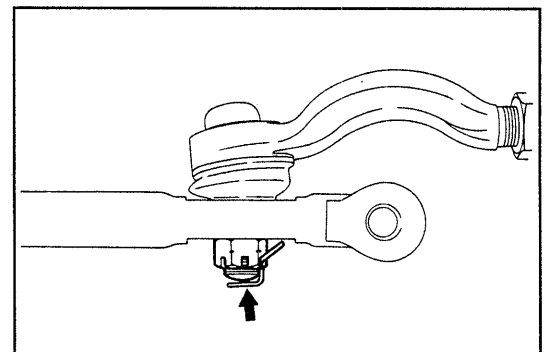
NOTE:

- Be sure to align the cotter pin hole of the tie rod with the cut-out section of castle nut.

3. Insert a cotter pin and bend its legs, as indicated in the right figure.



WRU90-SR240



WRU90-SR241

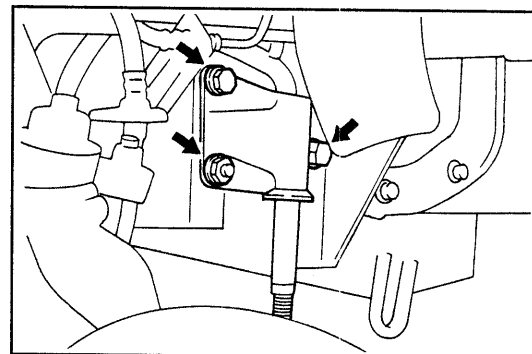
4. Install the idler arm support pin to the frame. Tighten the attaching bolts and nuts to the specified torque with new washer interposed.

Tightening Torque:

3.5 - 5.5 kgf-m (25.4 - 39.8 ft-lb, 34.3 - 53.9 N-m)

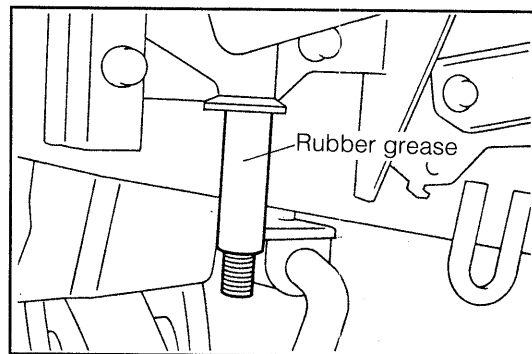
NOTE:

- Do not reuse the washer.



WRU90-SR242

5. Apply rubber grease to the collar. Install it to the idler arm support pin.

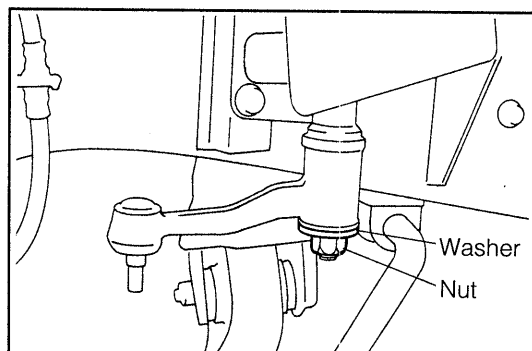


WRU90-SR243

6. Apply rubber grease to the bush section of the idler arm. Install it to the collar with a washer interposed. Tighten the nut to the specified torque.

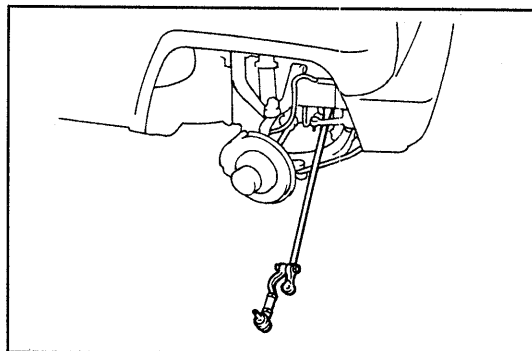
Tightening Torque:

12 - 17 kgf-m (87 - 123 ft-lb, 108 - 167 N-m)



WRU90-SR244

7. Insert the relay rod together with the tie rod onto the vehicle.



WRU90-SR245

8. Connect the relay rod to the idler arm. Install a new castle nut and tighten it to the specified torque.

Tightening Torque:

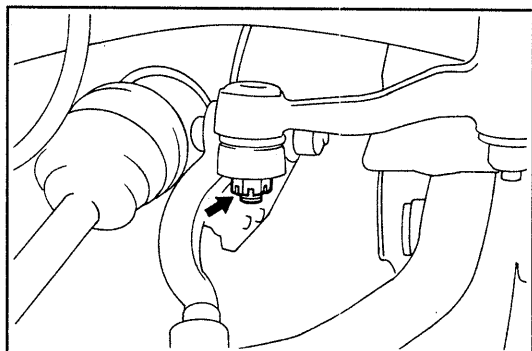
5.0 - 7.0 kgf-m (36.2 - 50.6 ft-lb, 49.0 - 68.6 N-m)

NOTE:

- Be sure to align the cotter pin hole of the idler arm with the cut-out section of the castle nut.

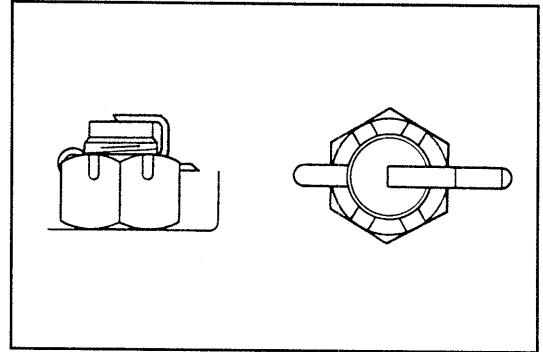
CAUTION:

- Make sure that the tapered and threaded portions of the ball joint are free of grease. If grease exists on these portions, be sure to wipe off the grease prior to reassembling. Failure to observe the caution may cause insufficient tightening torque.



WRU90-SR246

9. Bend the legs of the cotter pin, as indicated in the right figure.



WRU90-SR247

10. Connect the relay rod to the pitman arm. Install a new castle nut and tighten it to the specified torque.

Tightening Torque:

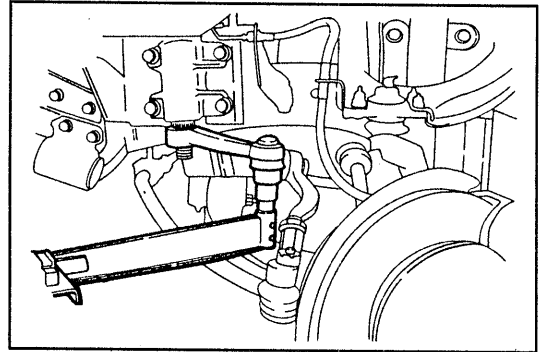
7.0 - 14.0 kgf-m (50.6 - 101 ft-lb, 68.6 - 137 N·m)

NOTE:

- Be sure to align the cotter pin hole of the pitman arm with the cut out section of the castle nut.

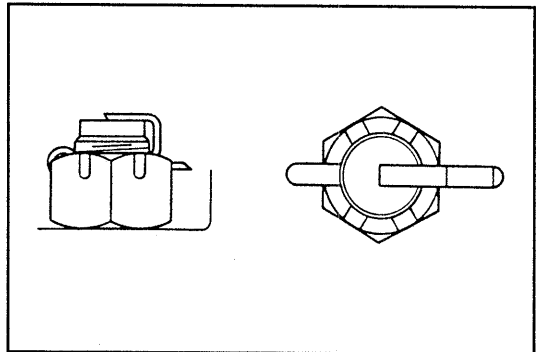
CAUTION:

- Make sure that the tapered and threaded portions of the ball joint are free of grease. If grease exists on these portions, be sure to wipe off the grease prior to reassembling. Failure to observe the caution may cause insufficient tightening torque.



WRU90-SR248

11. Bend the legs of the cotter pin, as indicated in the right figure.



WRU90-SR249

12. Connect the tie rod end to the steering knuckle. Install a new castle nut and tighten it to the specified torque.

Tightening Torque:

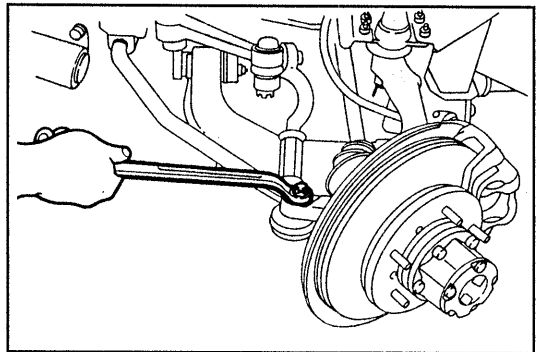
7.0 - 14.0 kgf-m (50.6 - 101 ft-lb, 68.6 - 137 N·m)

NOTE:

- Be sure to align the cotter pin hole of the tie rod end with the cut out section of the castle nut.

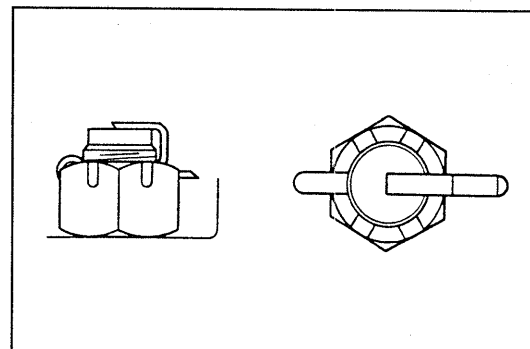
CAUTION:

- Make sure that the tapered and threaded portions of the ball joint are free of grease. If grease exists on these portions, be sure to wipe off the grease prior to reassembling. Failure to observe the caution may cause insufficient tightening torque.



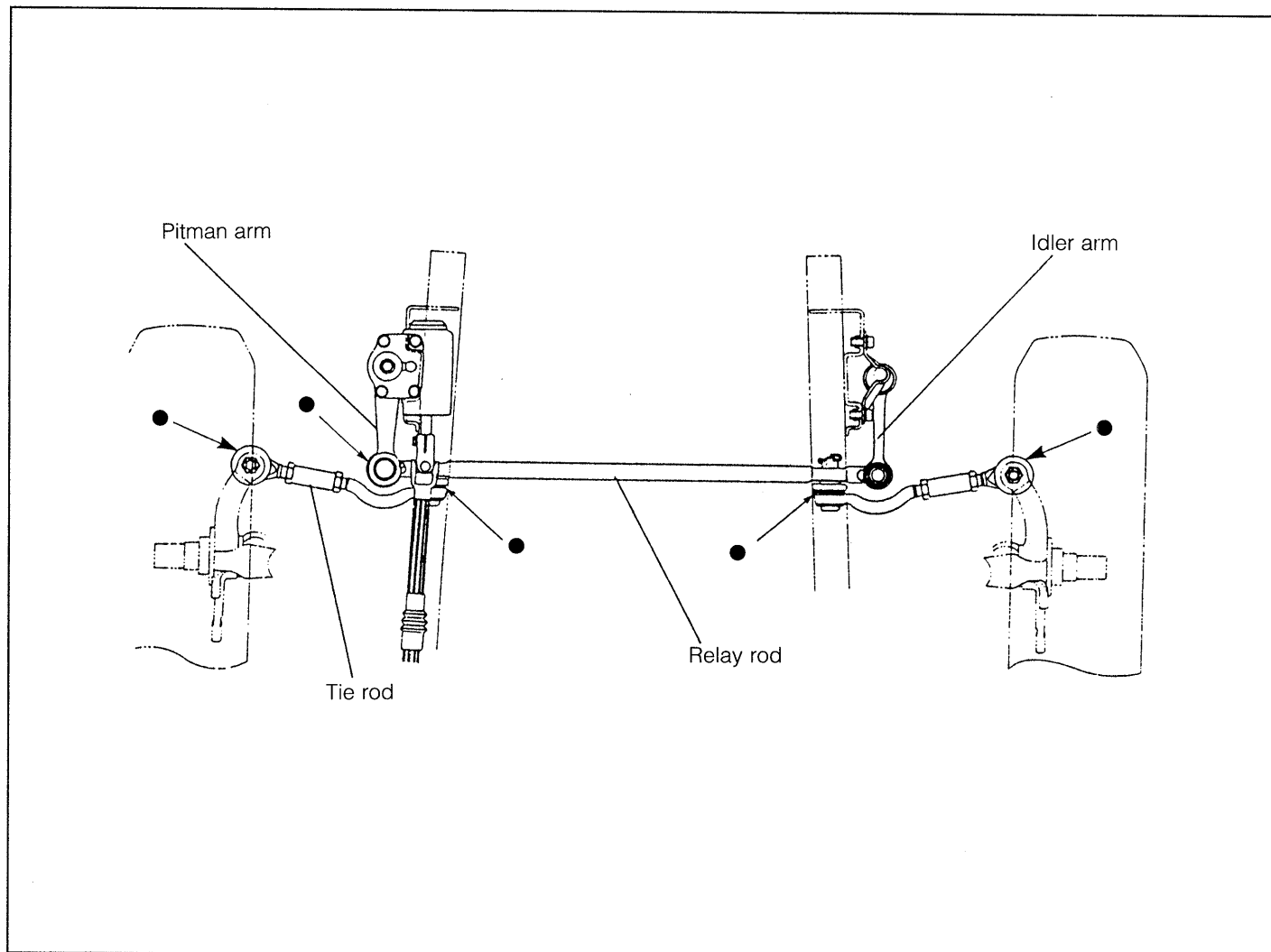
WRU90-SR250

13. Bend the legs of the cotter pin, as indicated in the right figure.



WRU90-SR251

14. Apply chassis grease to the points bearing an asterisk "●" mark, as shown in the illustration below.



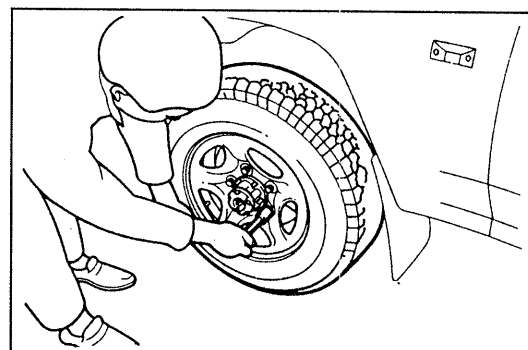
WRU92-SR419

15. Install the front tires and tighten the attaching nuts.
16. Jack down the vehicle.
17. Tighten the front tire attaching nuts to the specified torque evenly over two or three stages.

Tightening Torque:

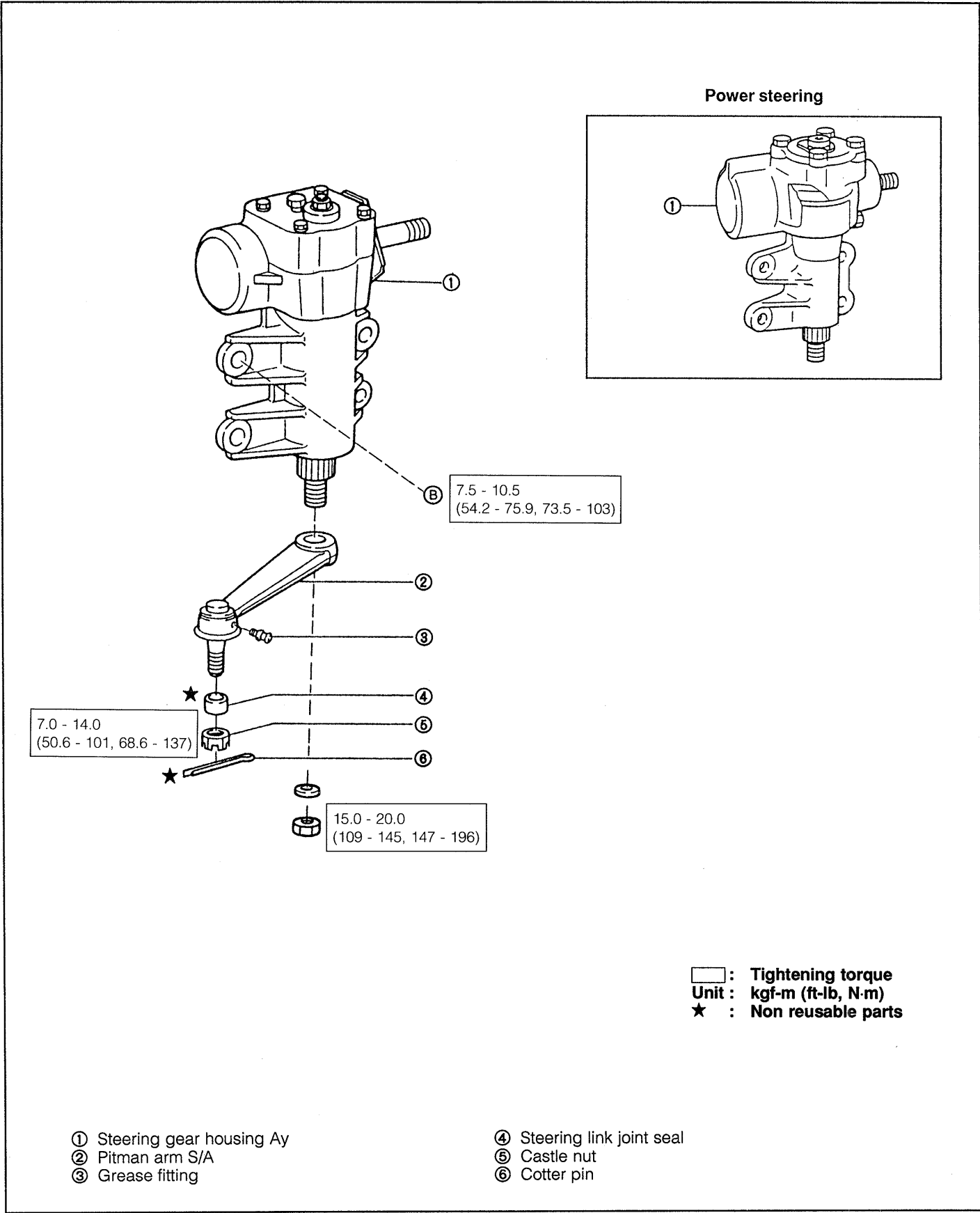
9.0 - 12.0 kgf-m (65.1 - 87.0 ft-lb, 88.3 - 118 N·m)

18. Check and adjust the toe-in and side slip.
(For further details, see front axle and suspension section page FS-21.)



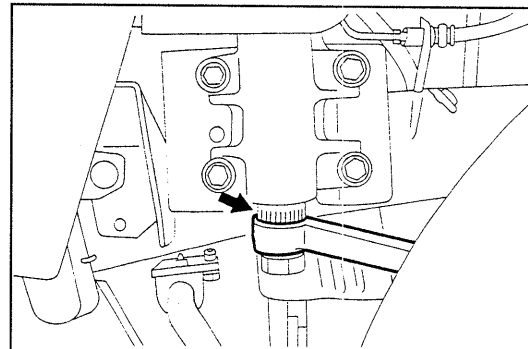
WRU90-SR253

STEERING GEAR HOUSING
COMPONENTS



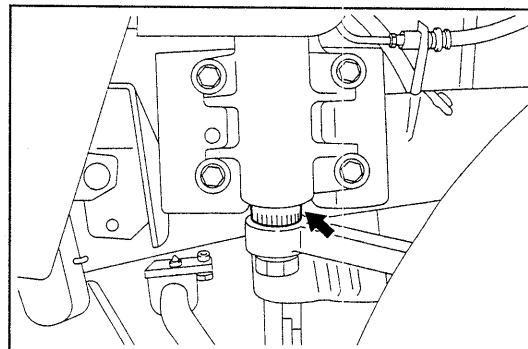
IN-VEHICLE INSPECTION

1. Ensure that the connecting section of the pitman arm and steering gear housing exhibits no defect, such as excessive play and/or looseness.
If any defect is present, check the tightening torque of the nuts and perform retightenings, as required and/or replace defective parts.



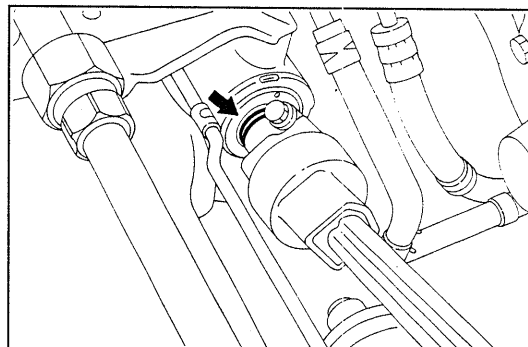
WRU92-SR420

2. Ensure that no excessive play, etc. is present between the steering gear housing and the cross shaft.
If excessive play, etc. is present, replace the steering gear housing assembly.



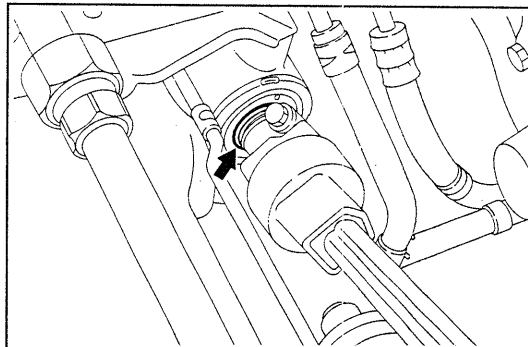
WRU90-SR256

3. Ensure that the connecting section of the steering shaft of the steering gear housing and the intermediate shaft exhibits no defect, such as excessive play and/or looseness.
If any defect is present, perform retightenings or replace defective parts.



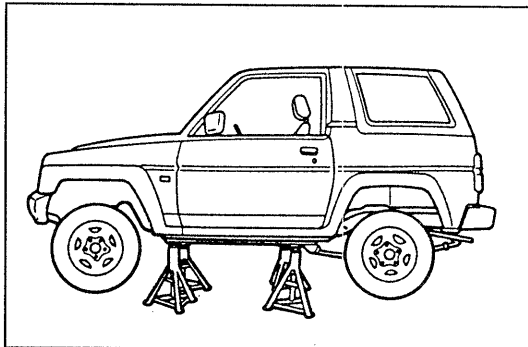
WRU92-SR421

4. Ensure that no defect, such as excessive play, is present between the steering gear housing and the steering shaft.
If any defect is present, replace the steering gear housing assembly.



WRU90-SR258

5. Check of total preload
(1) Jack up the vehicle and support it with safety stands.
(See GI section.)



WRU90-SR259

STEERING

- (2) Pull out the cotter pin from the nut which connects the relay rod with the pitman arm.

- (3) Loosen the castle nut.

NOTE:

- The castle nut should be loosened two or three threads.

- (4) Disconnect the relay rod from the pitman arm, using the following SST.

NOTE:

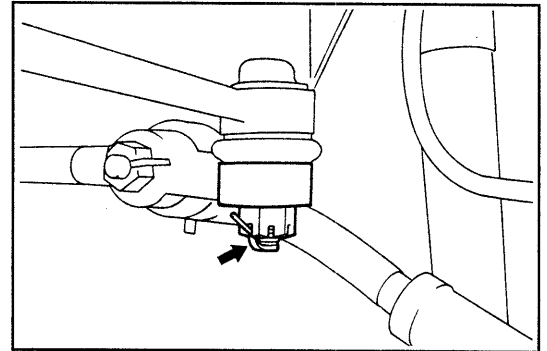
- Be very careful not to apply excessive load, which may lead to damage to the threaded portion and castle nut.
- If the parts will not be disconnected even when load is applied, while applying the load, put a suitable metal rod to the side of the tapered section of the relay rod and tap the rod with a hammer or the like to give impact. This will facilitate the disconnection.

- (5) Remove the attaching bolts and hose bands for the air cleaner and air hose. Also remove the clutch cable clamp bolt. Remove the air cleaner and air hose as an assembly from the vehicle.

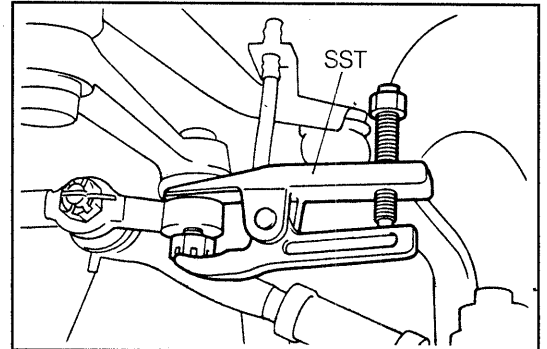
(For details, refer to the Engine section.)

- (6) Put a mating mark on between the intermediate shaft and the steering gear housing.

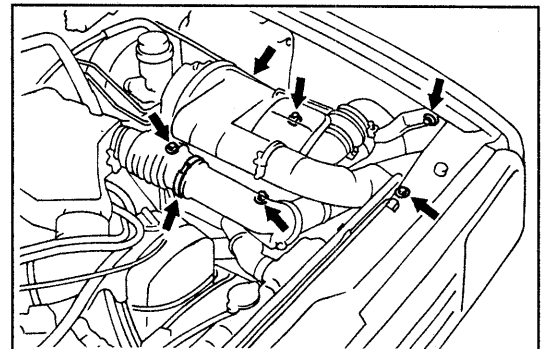
- (7) Remove the bolts connecting the intermediate shaft to the steering gear housing.



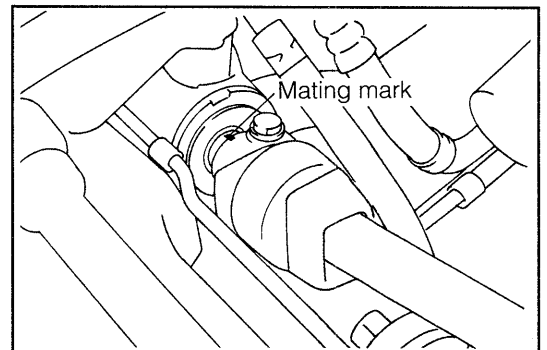
WRU90-SR260



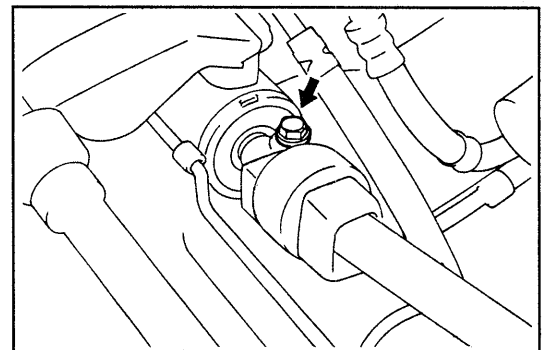
WRU90-SR261



WRU90-SR262

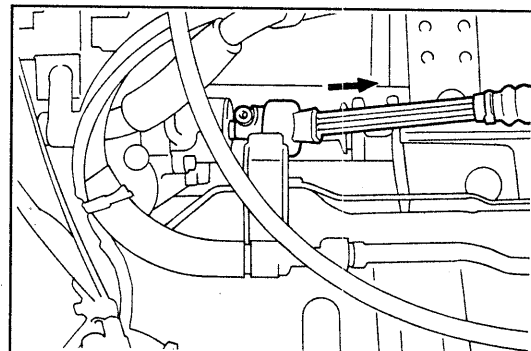


WRU90-SR263



WRU90-SR264

- (8) Disconnect the intermediate shaft from the steering gear housing by contracting the intermediate shaft.



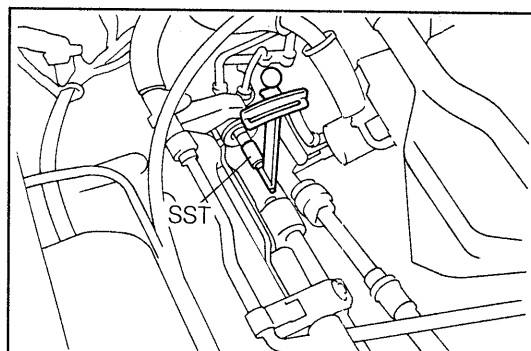
WRU90-SR265

- (9) Install the following SST to the steering shaft with a small-sized torque wrench. Locate the center (center of gear meshing) of the rotation of the cross shaft by turning the steering shaft. Turn the steering shaft in such a way that the cross shaft assumes the center position. Keep the steering shaft in this position.

SST: 09616-00010-000

NOTE:

- At this time, the pitman arm becomes virtually parallel with the chassis.



WRU90-SR266

- (10) Install a small-sized torque wrench to the SST. Turn the SST slowly about 90 degrees clockwise and counterclockwise. Ensure that the maximum torque during this operation is within the specified value.

Specified Pre-load

Standard Steering:

7 - 10 kgf-cm (6.1 - 8.7 inch-lb)

Power Steering:

6 - 9.5 kgf-cm (5.2 - 8.2 inch-lb)

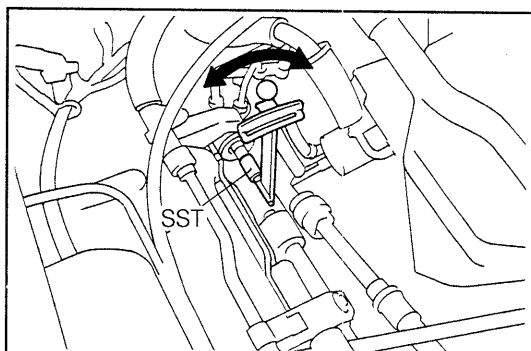
If the maximum torque does not conform to the specified value, loosen the lock nut of the cross shaft adjusting screw. Then, adjust the preload to the specified value by means of the cross shaft adjusting screw. Tighten the lock nut to the specified torque.

Tightening Torque:

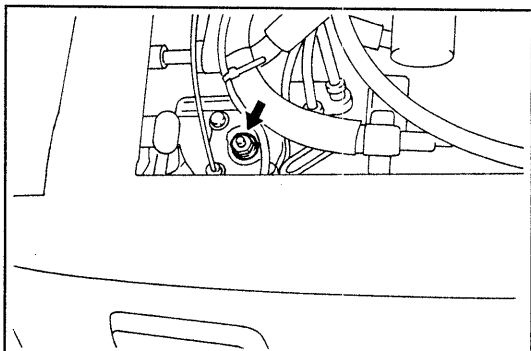
2.0 - 3.5 kgf-m (14.5 - 25.3 ft-lb, 19.6 - 34.3 N·m)

NOTE:

- When tightening the lock nut, prevent the adjusting screw from turning.



WRU90-SR267



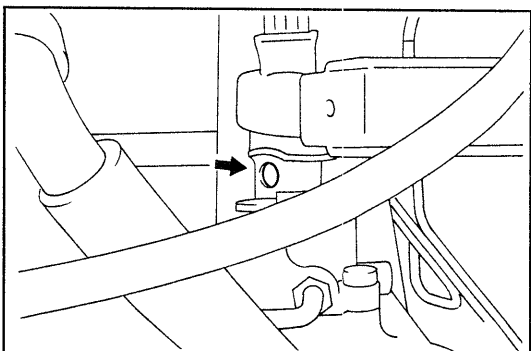
WRU90-SR268

- (11) Remove the SST.

- (12) Connect the intermediate shaft in such a way that the shaft cut-out section of the steering gear housing may be aligned with the bolt hole or in such a way that the mating marks put during the removal may be aligned. Tighten the attaching bolts to the specified torque.

Tightening Torque:

2.5 - 3.5 kgf-m (18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)



WRU90-SR269

STEERING

NOTE:

- Ensure that the steering wheel is installed in the correct direction.
- Be sure to positively connect the universal joint to the serration section as far as it will go, until the serration section of the steering shaft becomes invisible from the edge surface of the intermediate shaft.
- If the steering gear box and intermediate shaft are reused, align the mating mark which was put during the disassembly when these parts are assembled.

- (13) Install the air cleaner and air hose to the vehicle. Tighten the attaching bolts.
- (14) Tighten the hose clamp.
- (15) Install the clutch cable to the air cleaner by means of the clamp bolt.

- (16) Ensure that the boot of the pitman arm exhibits no damage, such as cracks and/or rupture. If any damage is present, replace the boot with a new one.
(See page SR-75.)

- (17) Connect the pitman arm to the relay rod.

CAUTION:

- Ensure that no oil nor grease gets to the tapered section and/or threaded portions.

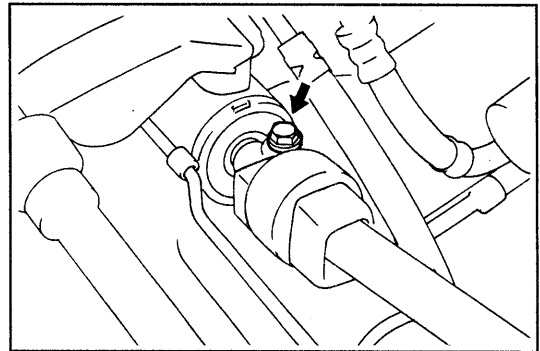
- (18) Install the castle nut and tighten it to the specified torque.

Tightening Torque:

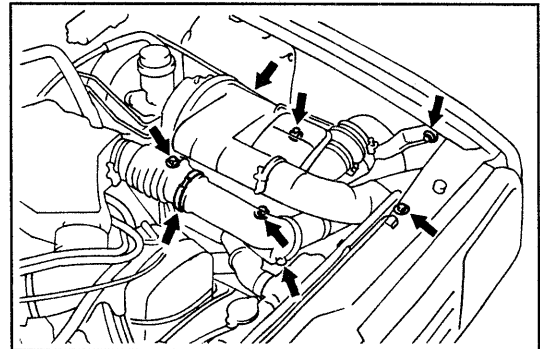
7.0 - 14.0 kgf-m (50.6 - 101 ft-lb, 68.6 - 137 N-m)

NOTE:

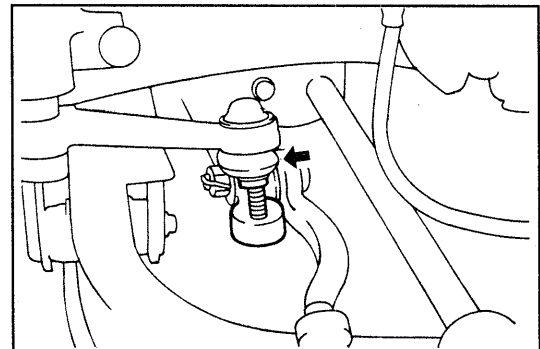
- Be sure to align the cotter pin hole of the pitman arm with cut-out section of castle nut.
- (19) Install a new cotter pin and bend its legs as indicated in the right figure.



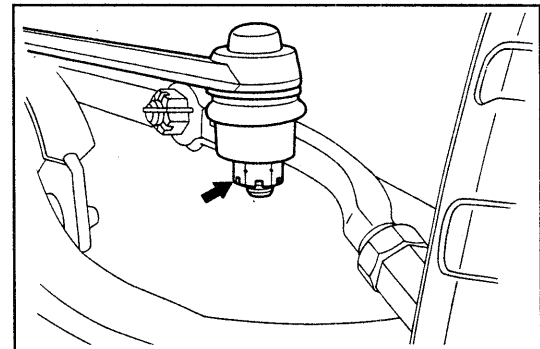
WRU90-SR270



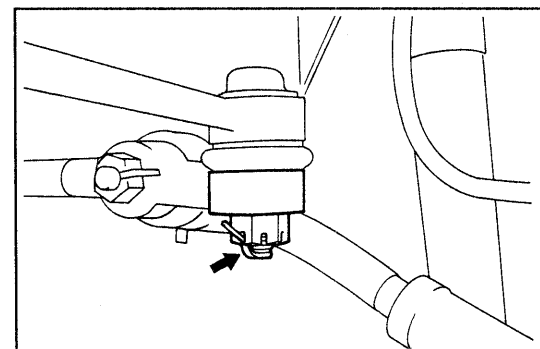
WRU90-SR271



WRU90-SR272



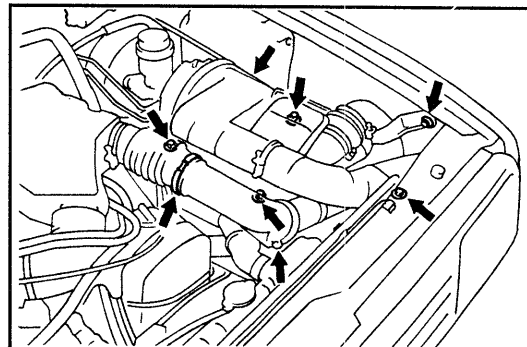
WRU90-SR273



WRU90-SR274

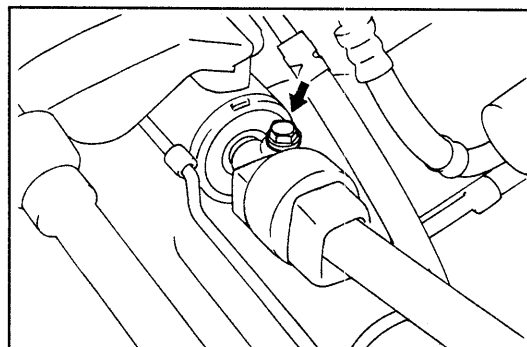
REMOVAL

1. Remove the attaching bolts for the air cleaner and air hose. Also, remove the clutch cable clamp bolts and hose bands. Remove the air cleaner and air hose as an assembly. (For details, refer to the Engine section.)



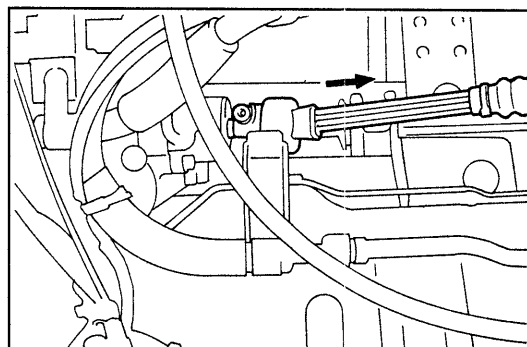
WRU90-SR275

2. Remove the bolts connecting the intermediate shaft to the steering gear housing.



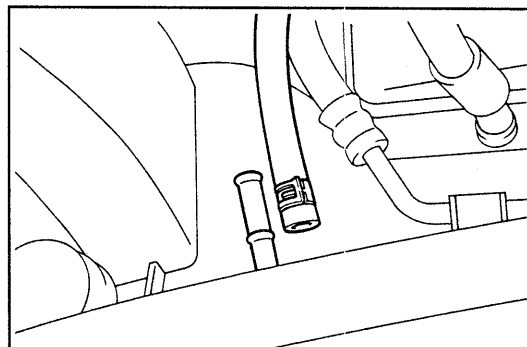
WRU90-SR276

3. Disconnect the intermediate shaft from the steering gear housing by contracting the intermediate shaft.



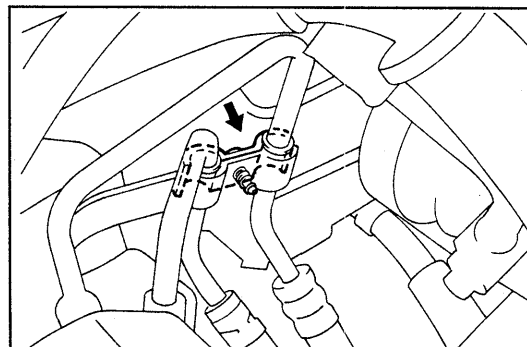
WRU90-SR277

4. Draining of power steering oil
(Power steering-equipped vehicle only)
(As for the draining procedure, see page SR-13 to SR-15.)



WRU90-SR278

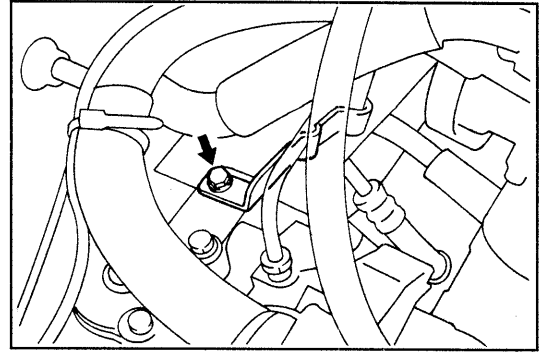
5. Detach the clamp by removing the screw.
(Power steering-equipped vehicle only)



WRU90-SR279

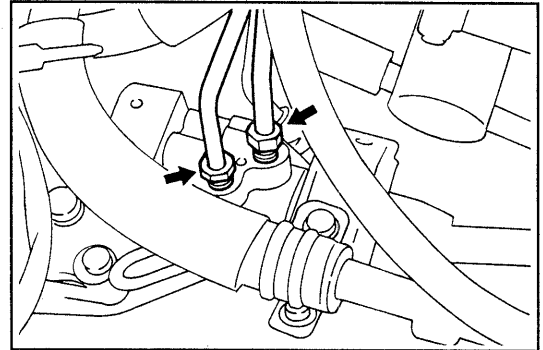
STEERING

6. Remove the pressure feed tube clamp bracket from the steering gear housing.
(Power steering-equipped vehicle only)



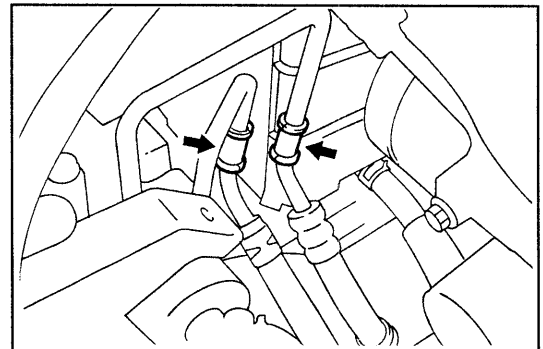
WRU90-SR280

7. Remove the pressure feed tubes from the power steering gear housing.
(Power steering-equipped vehicle only)



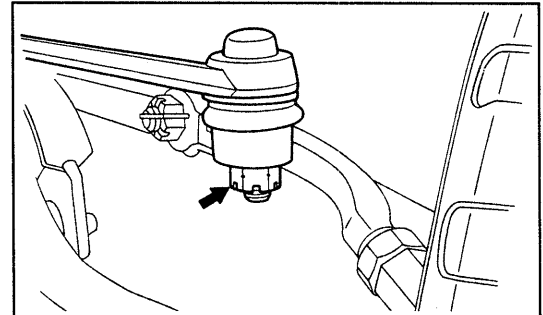
WRU90-SR281

8. Remove the rubber grommet from the pressure feed tube.
(Power steering-equipped vehicle only)



WRU90-SR282

9. Remove the cotter pin.
10. Loosen the castle nut.
NOTE:
- Loosen the castle nut two or three threads.



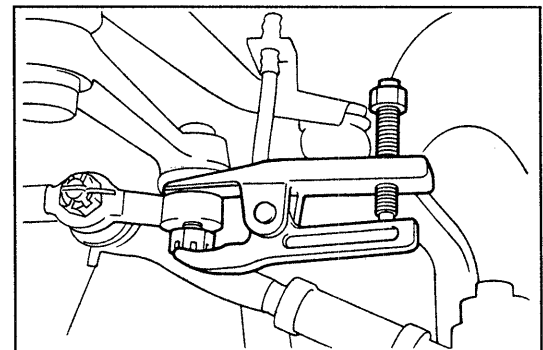
WRU90-SR283

11. Disconnect the pitman arm from the relay rod, using the following SST.

SST: 09611-87701-000

NOTE:

- Be careful not to apply excessive load during the removal.
- If the parts will not be disconnected even if the load is applied, put a suitable metal rod against the side of the tapered section of the relay rod and lightly tap the metal rod with a hammer or the like to give impact. This will facilitate the disconnection.

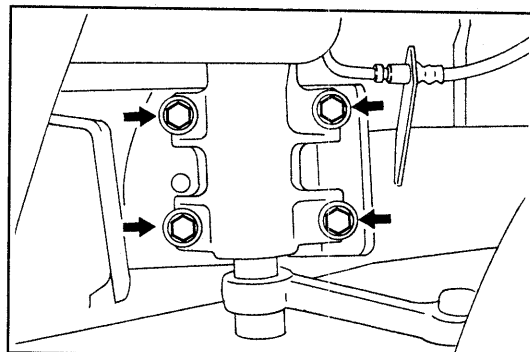


WRU90-SR284

12. Remove the pitman arm attaching nut to the steering gear housing.

WRU90-SR403

13. Loosen the attaching bolts and nuts for the steering gear housing evenly. Remove them.

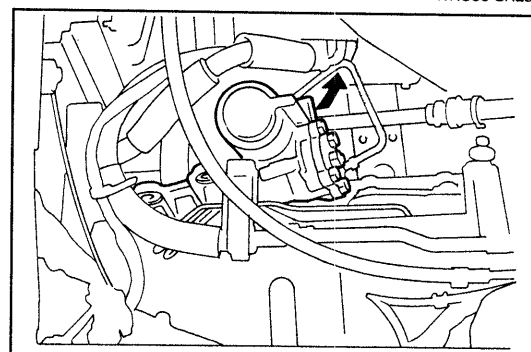


WRU90-SR285

14. Remove the steering gear housing from the vehicle.

NOTE:

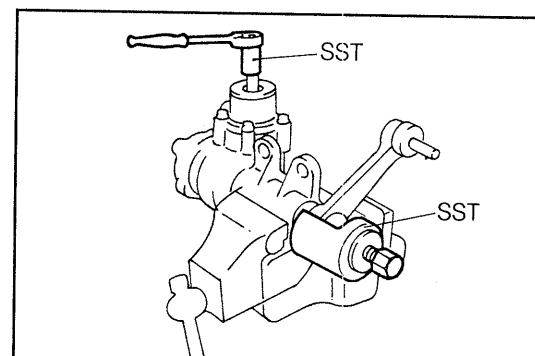
- Be very careful not to damage the brake pipe. Also, prevent the steering gear housing from interfering with other parts strongly.



WRU90-SR286

15. While preventing the steering shaft from turning with the SST given below, remove the pitman arm from the cross shaft, using the following SST.

SSTs: 09616-00010-000
09610-87301-000

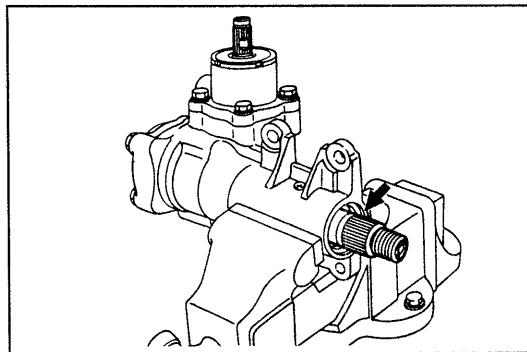


WRU90-SR288

STEERING

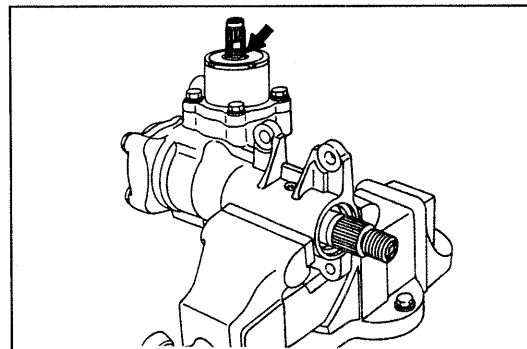
INSPECTION

1. Ensure that no abnormal play is present between the cross shaft and the housing.
If abnormal play is present, replace the steering gear housing assembly.



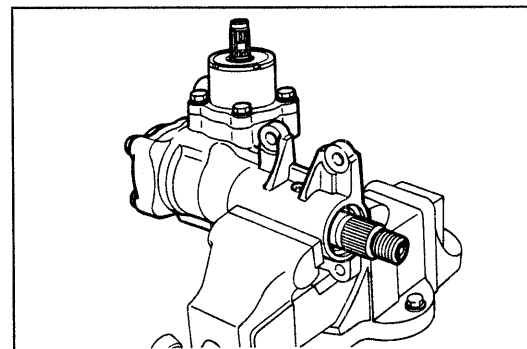
WRU90-SR289

2. Ensure that no excessive play is present between the steering shaft and the housing.
If excessive play is present, replace the steering gear housing.



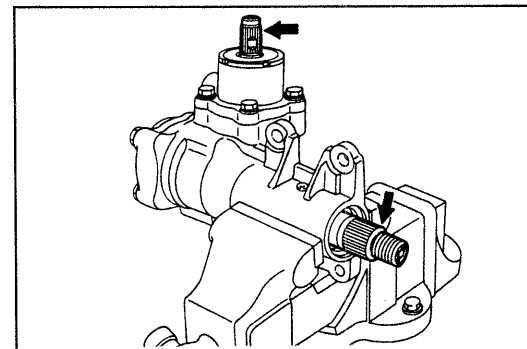
WRU90-SR290

3. Ensure that the steering gear housing assembly exhibits no damage, such as cracks and/or oil leakage.
If any damage is present, replace the steering gear housing assembly.



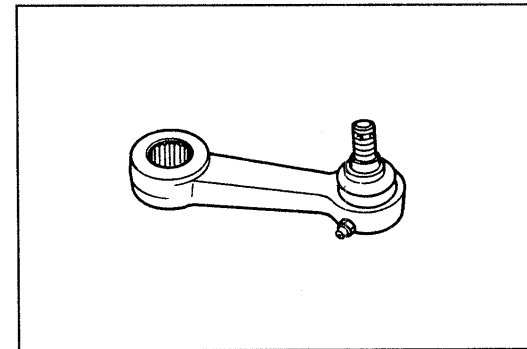
WRU92-SR422

4. Ensure that no damage, such as cracks, wear and/or deformation, is present at the threaded portion and spline section of the steering gear housing assembly.
If any damage is present, replace the steering gear housing assembly.



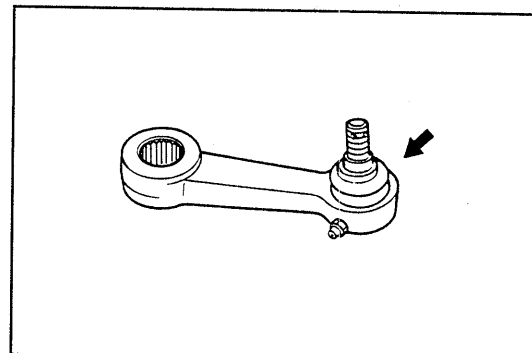
WRU92-SR423

5. Ensure that the pitman arm exhibits no damage, such as cracks and/or deformation.



WRU90-SR293

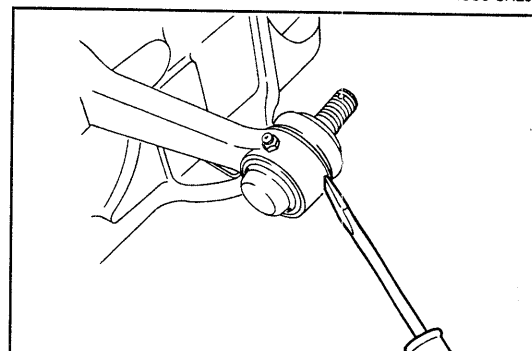
6. Ensure that the ball joint section of the pitman arm exhibits no excessive play.
7. Ensure that no damage is present at the steering link joint seal of the pitman arm ball joint section.
If damage is present, replace the joint seal.



WRU90-SR294

8. Replacement of steering link joint seal
(Only cases where such operation is necessary)

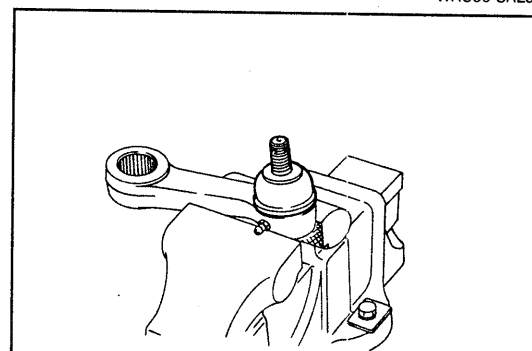
(1) Remove the steering link joint seal from the pitman arm with a chisel or the like.



WRU90-SR295

(2) Remove the old grease.

(3) Install a new steering joint seal to the pitman arm.

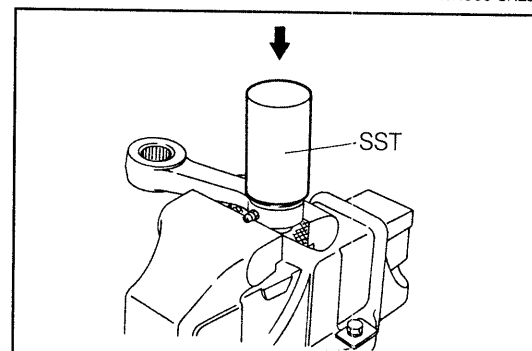


WRU90-SR296

- (4) Install the following SST on the steering joint seal. Press the steering joint seal to the pitman arm by lightly tapping the SST with a hammer.
SST: 09608-87613-000

NOTE:

- Care must be exercised so that the steering joint seal may not be press-fitted in a tilted state.



WRU90-SR297

STEERING

ASSEMBLY

CAUTION:

- As for the power steering tube, be certain to follow the specified procedure to assemble it.
Failure to observe this caution will cause breakage of the power steering tube or fluid leakage.

1. Clamp the steering gear housing in a vice or the like.

NOTE:

- Be very careful not to apply excessive load during the assembly.

2. With the cut-out section of the pitman arm aligned with that of the cross shaft, install the pitman arm to the cross shaft.

NOTE:

- At this time, make sure that the mating mark at the pitman arm side is aligned with that at the gear side.

3. Install a new spring washer and a nut to the cross shaft temporarily.

4. Insert the steering gear housing in the vehicle.

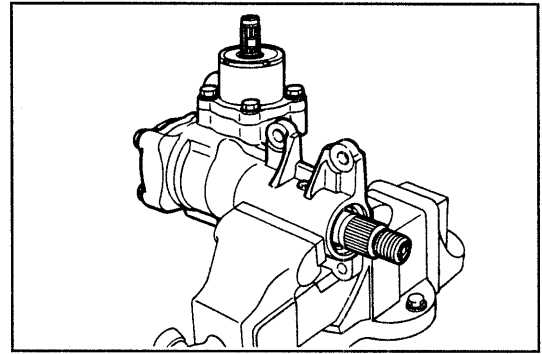
NOTE:

- Be very careful not to damage the brake pipe. Also, prevent the steering gear housing from interfering with other parts strongly.

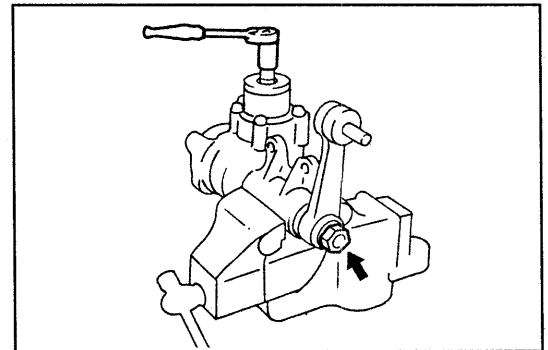
5. Install the steering gear housing in the vehicle. Install the attaching bolts and nuts with new spring washers interposed.
6. Tighten the attaching bolts and nuts of the steering gear housing evenly over two or three stages to the specified torque.

Tightening Torque:

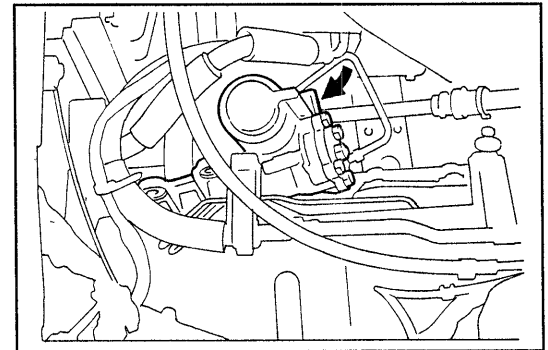
7.5 - 10.5 kgf-m (54.2 - 75.9 ft-lb, 73.5 - 103 N·m)



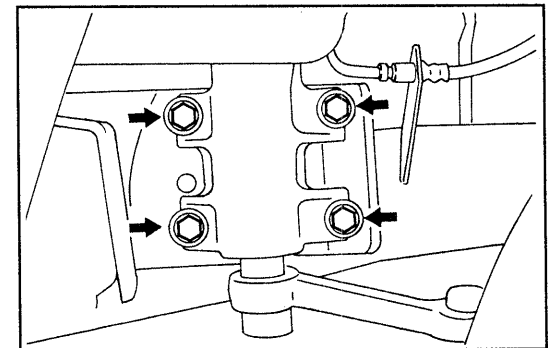
WRU90-SR298



WRU90-SR299



WRU90-SR300



WRU90-SR301

7. Tighten the pitman arm attaching nut to the specified torque.

Tightening Torque:

15 - 20 kgf-m (109 - 145 ft-lb, 147 - 196 N-m)

8. After the pitman arm attaching nut has been tightened, ensure that the shaft is protruding from the nut edge surface by the specified amount given below.

Specified Amount: 2.4 ± 1.5 mm (0.09 ± 0.06 inch)

9. Connect the relay rod to the Pitman arm, and tighten the castle nut to the specified torque:

Tightening Torque:

7.0 - 14 kgf-m (50.6 - 101 ft-lb, 68.6 - 137 N-m)

NOTE:

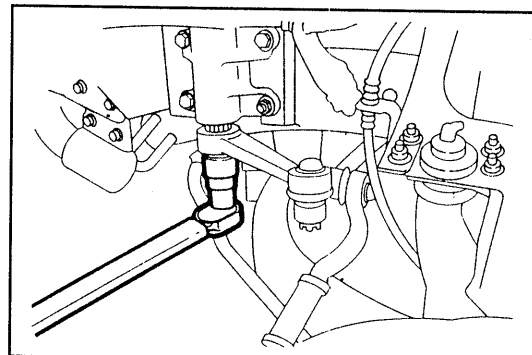
- At this time, align the recess in the castle nut with the hole in the Pitman arm ball joint.

10. Install the cotter pin to the castle nut. Bend the legs as indicated in the right figure.

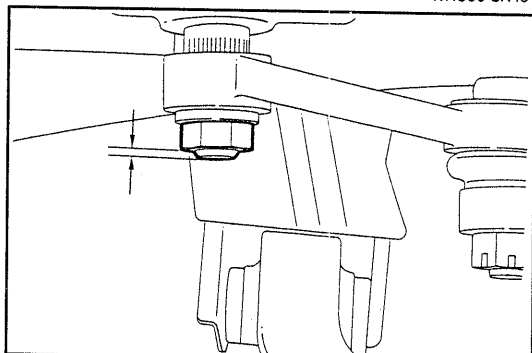
11. Connect the intermediate shaft onto the steering shaft in such a way that the cut-out section of the steering shaft may be aligned with the bolt hole of the intermediate shaft or in such a way that the mating marks put during the removal may be aligned.

NOTE:

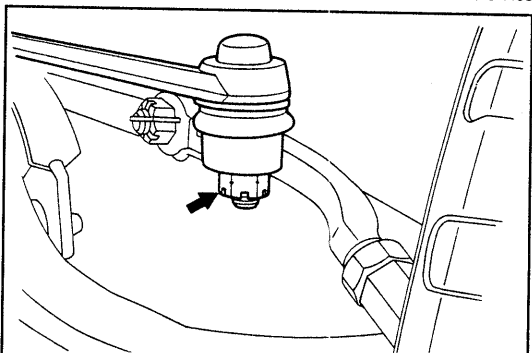
- Ensure that the tires are set to a straight-ahead condition and that the steering wheel assumes the normal straight-ahead position.
- Be sure to positively connect the universal joint to the serration section as far as it will go, until the serration section of the steering shaft becomes invisible from the edge surface of the intermediate shaft.



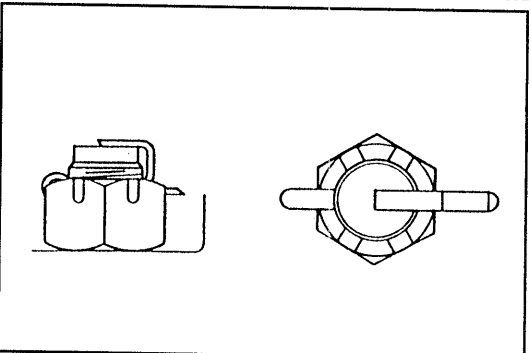
WRU90-SR404



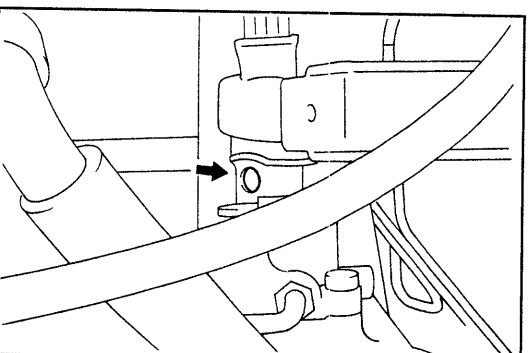
WRU90-SR405



WRU90-SR302



WRU90-SR303



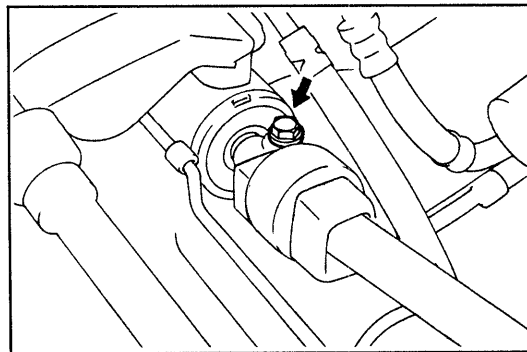
WRU90-SR305

STEERING

12. Insert the connecting bolts of the intermediate shaft and tighten them to the specified torque.

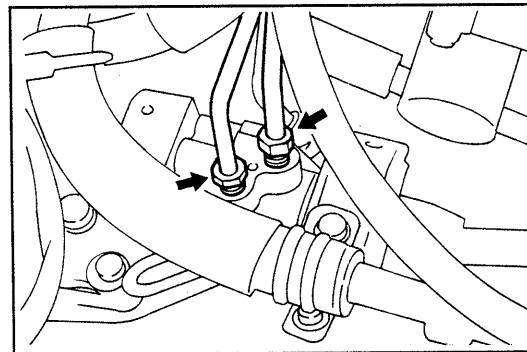
Tightening Torque:

2.5 - 3.5 kgf-m (18.1 - 25.3 ft-lb, 24.5 - 34.3 N·m)



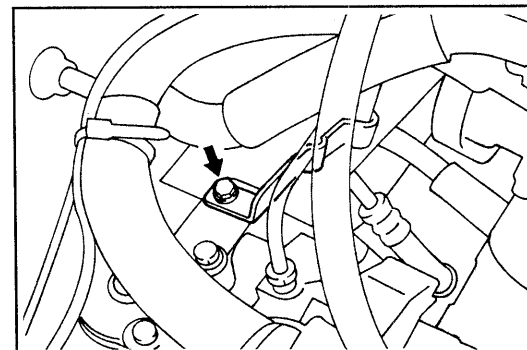
WRU90-SR306

13. Temporarily install the pressure feed tubes to the power steering gear housing.
(Power steering-equipped vehicle only)



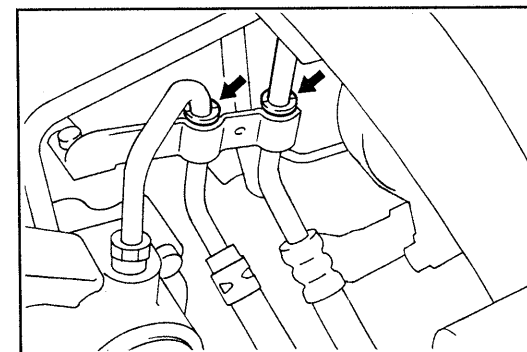
WRU90-SR307

14. Install the pressure feed tube clamp bracket to the power steering gear housing.
(Power steering-equipped vehicle only)



WRU90-SR308

15. Install the rubber grommets to the pressure feed tubes.
(Power steering-equipped vehicle only)

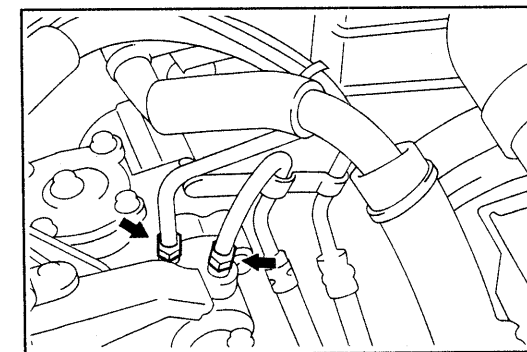


WRU90-SR309

16. Tighten the flare nuts which attach the pressure feed tubes to the pressure feed tube bracket, until the installed rubber grommet section contacts with the pressure feed tube.
(Power steering-equipped vehicle only)

Tightening Torque:

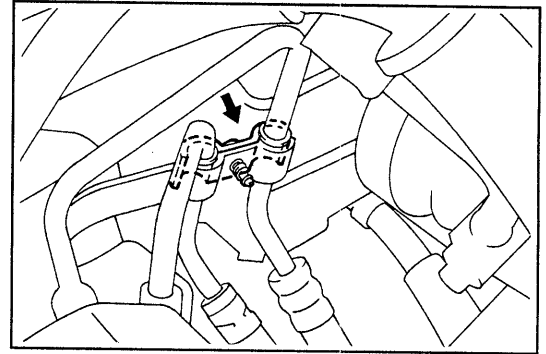
4.0 - 5.0 kgf-m (28.9 - 36.2 ft-lb, 39.2 - 49.0 N·m)



WRU90-SR310

17. Install the pressure feed tube clamp and tighten the attaching screws.

(Power steering-equipped vehicle only)



WRU90-SR311

18. Install the air cleaner and air hose assembly to the vehicle. Tighten the attaching bolts.

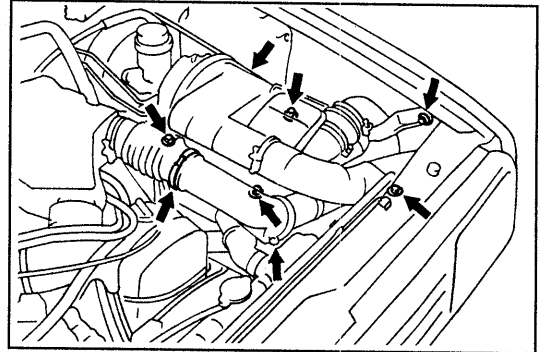
(For details, refer to the Engine section.)

19. Tighten the air cleaner hose band.

(For details, refer to the Engine section.)

20. Clamp the clutch cable to the air cleaner with the clamp bolt.

(For details, refer to the Engine section.)

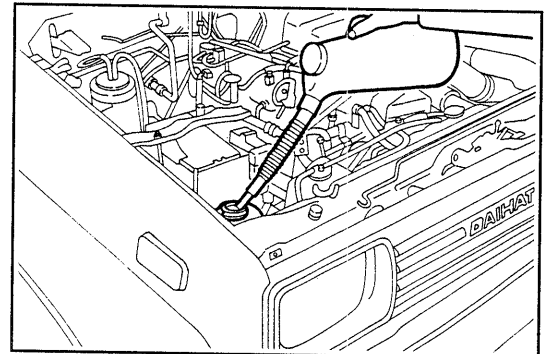


WRU90-SR312

21. Fill power steering fluid.

(Power steering-equipped vehicle only)

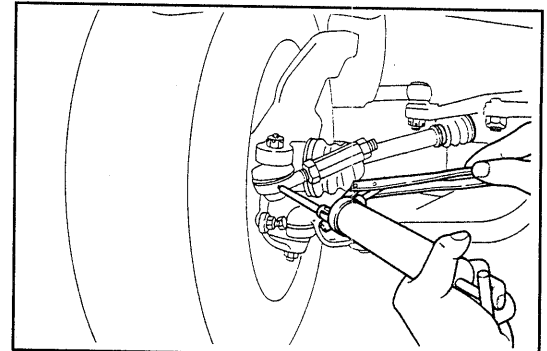
(See page SR-15 to SR-16.)



WRU90-SR313

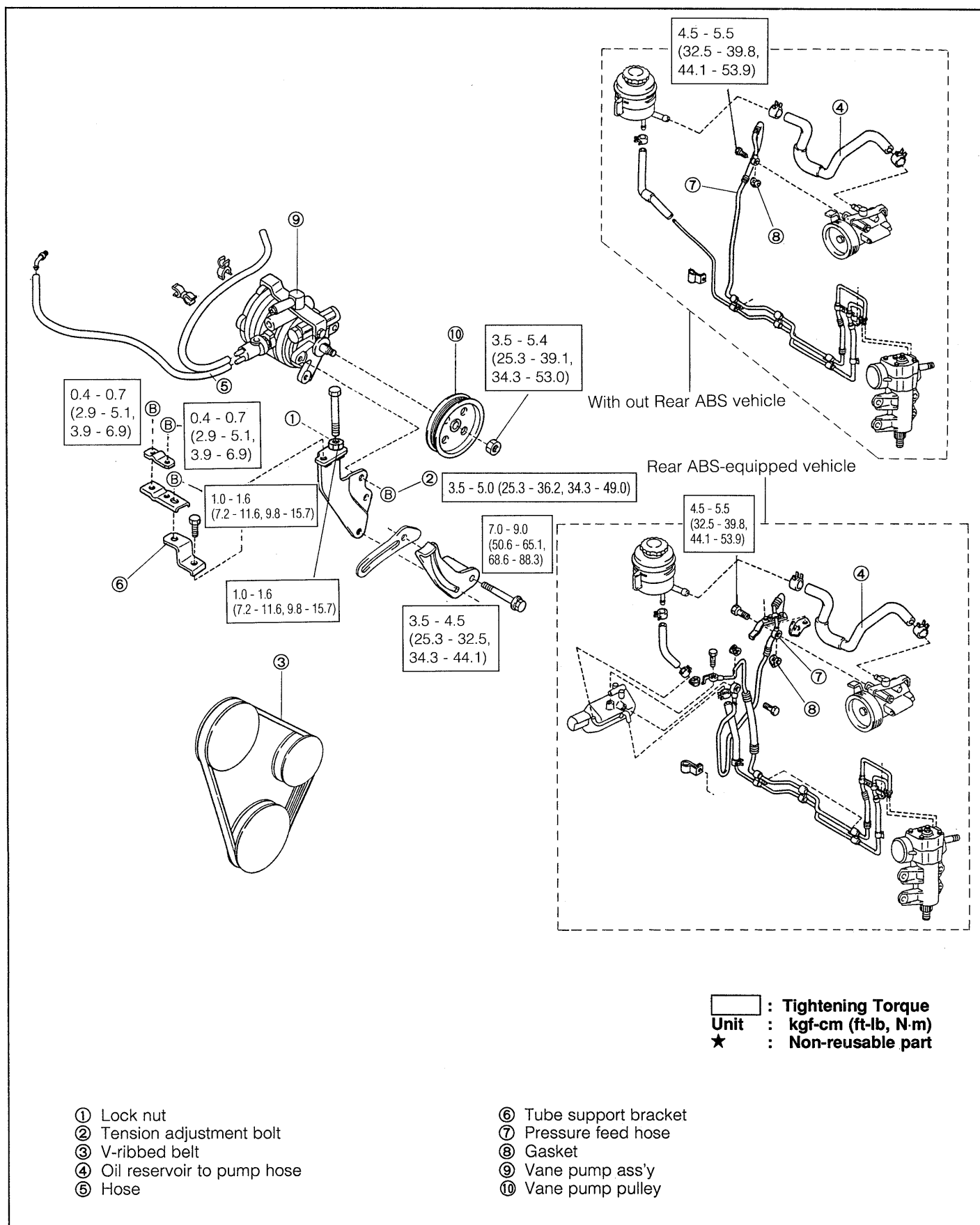
22. Fill lithium based MP grease to the pitman arm.

(See page FS-87.)



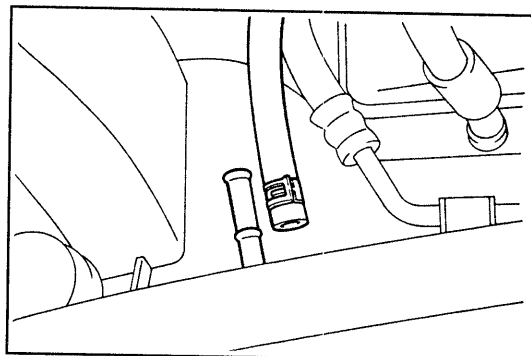
WRU90-SR314

VANE PUMP COMPONENTS



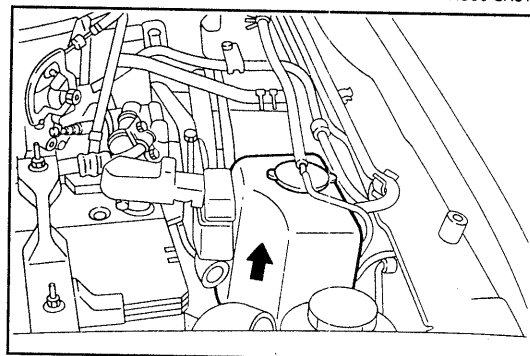
REMOVAL

1. Drain the power steering fluid.
(As for the draining procedure, see page SR-13 to SR-14.)



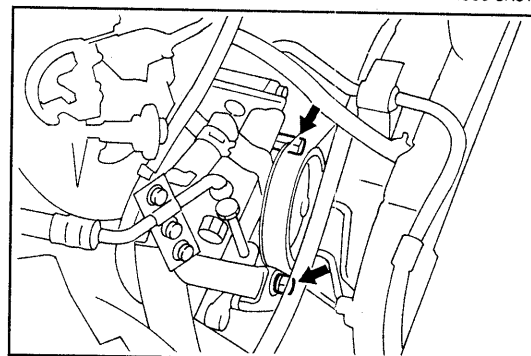
WRU90-SR316

2. Remove the radiator reservoir tank from the vehicle by raising it. Place the tank on the radiator.



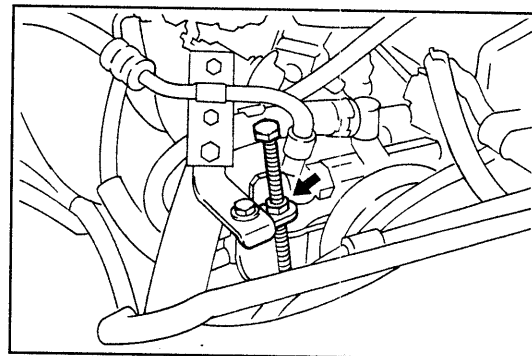
WRU90-SR317

3. Loosen the vane pump attaching bolts.
4. Loosen the vane pump drive belt adjusting set bolt.



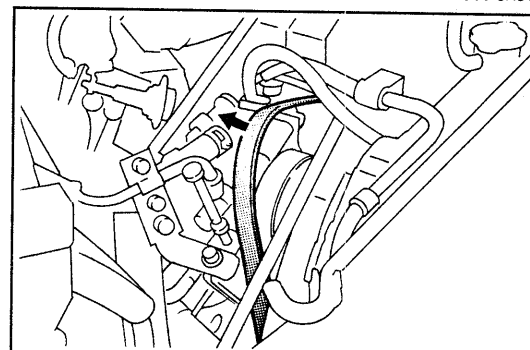
WRU90-SR318

5. Loosen the lock nut of the drive belt adjusting bolt. Loosen the adjusting bolt.



WRU90-SR319

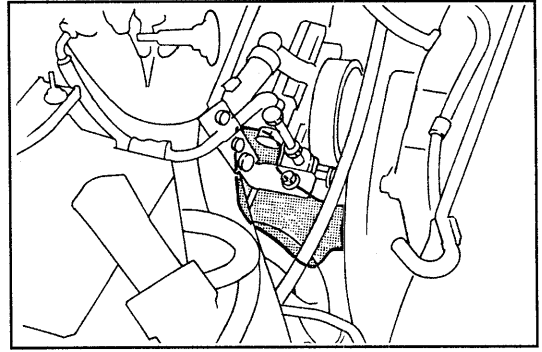
6. Remove the drive belt.



WRU90-SR320

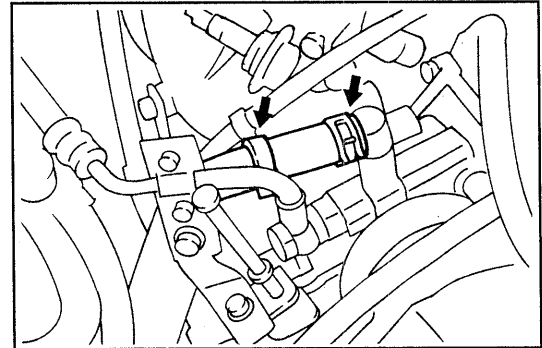
STEERING

7. Place an adequate cloth under the vane pump so as not to soil the alternator and alternator drive belt.



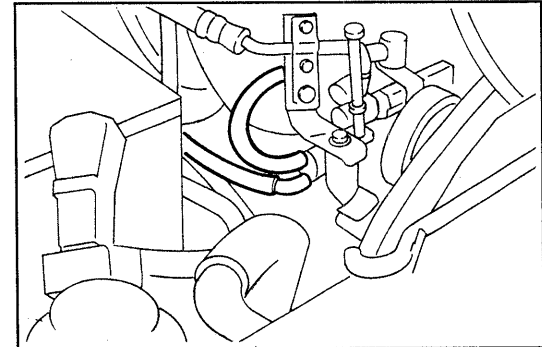
WRU90-SR321

8. Detach the hose clamp from the oil reservoir-to-pump hose.
9. Disconnect the oil reservoir-to-pump hose from the vane pump.



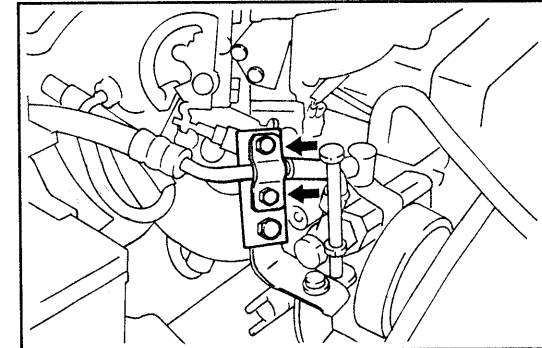
WRU90-SR322

10. Disconnect the air hoses for idle-up use from the air control valve.



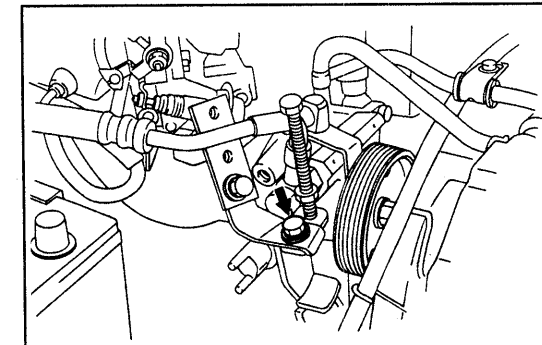
WRU90-SR323

11. Remove the attaching bolt of the pressure feed tube clamp. Detach the clamp.



WRU90-SR324

12. Remove the tube support bracket from the pump front stay.

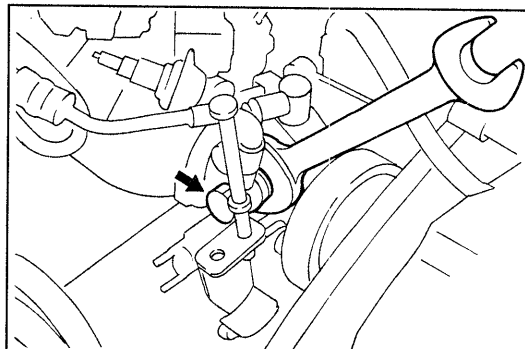


WRU90-SR325

13. Loosen and remove the pressure feed tube attaching union bolts, while preventing them from turning at the nut section of the pressure feed pump side.

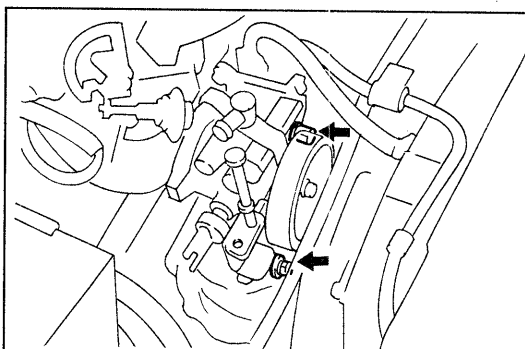
NOTE:

- Never reuse the gasket.



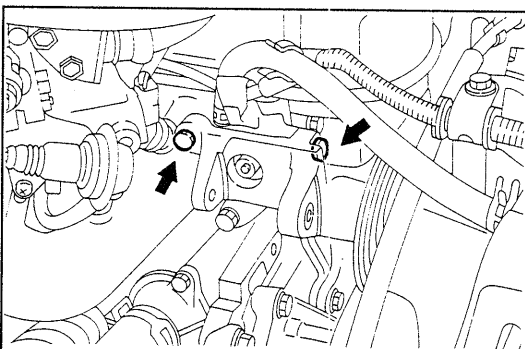
WRU90-SR326

14. Remove the vane pump attaching bolts and set bolt. Remove the vane pump from the engine.



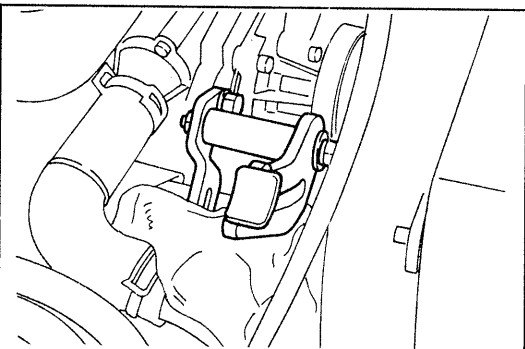
WRU90-SR327

15. Remove the pump bracket attaching bolts.



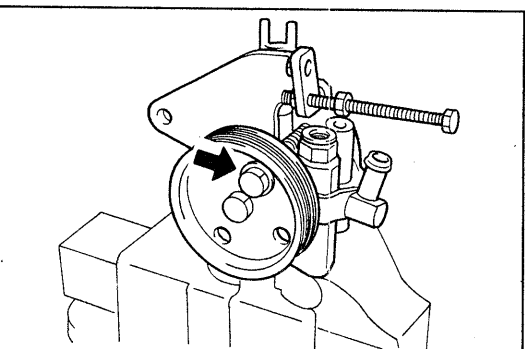
WRU90-SR328

16. Visually inspect the adjusting strut for damage, such as cracks and/or deformation. If any damage is present, remove the adjusting strut by removing the set bolt and nut.



WRU92-SR424

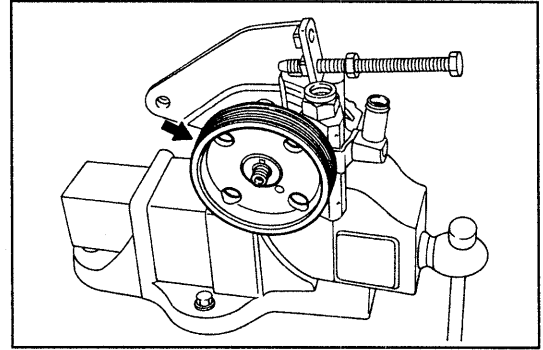
17. Remove the set bolt, while preventing the vane pump pulley from turning by inserting a suitable bolt to the pulley, as indicated in the right figure.



WRU90-SR330

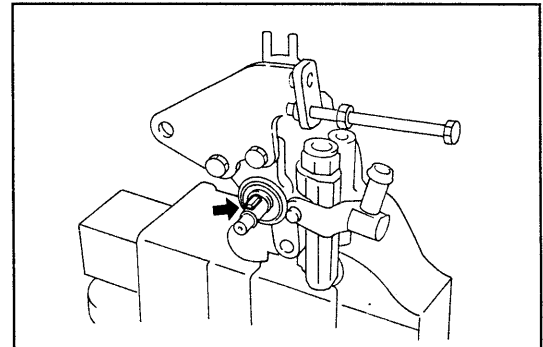
STEERING

18. Remove the pulley from the vane pump.



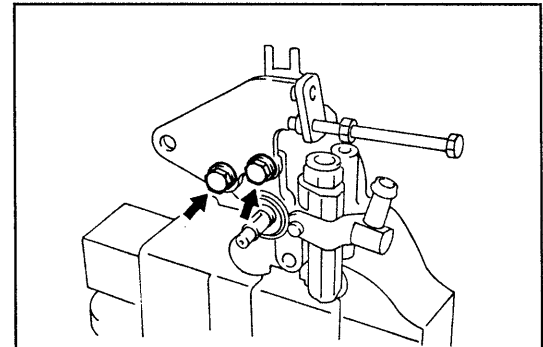
WRU90-SR331

19. Remove the woodruff key from the vane pump.



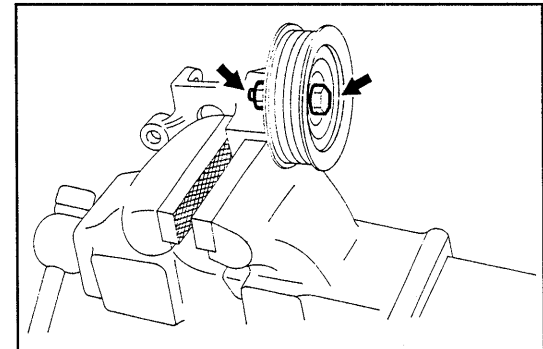
WRU90-SR332

20. Remove the pump front stay from the vane pump.



WRU90-SR333

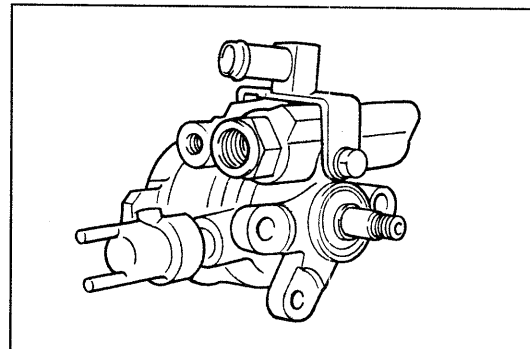
21. Remove the idle pulley from the vane pump bracket.



WRU90-SR334

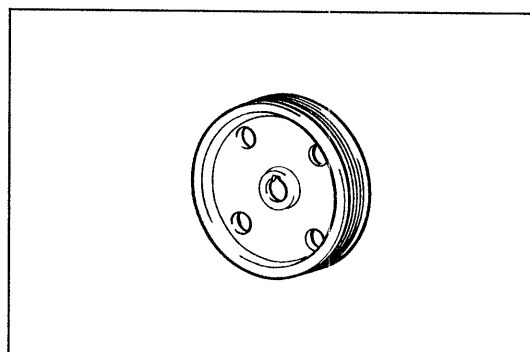
INSPECTIONS

1. Ensure that the vane pump exhibits no damage, such as deformation, breakage and/or oil leakage.



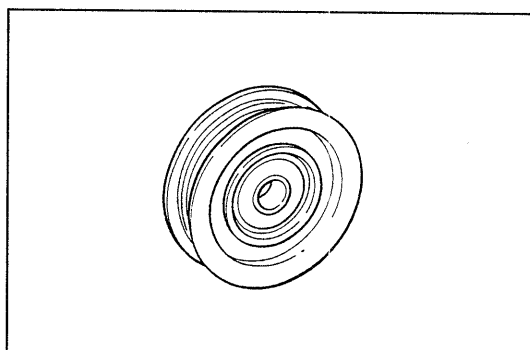
WRU92-SR425

2. Ensure that the vane pump pulley exhibits no damage, such as deformation and/or cracks.



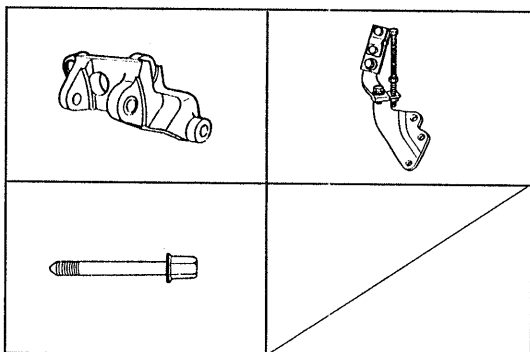
WRU92-SR426

3. Ensure that the idle pulley exhibits no damage, such as deformation and/or cracks. Ensure that the bearing can rotate smoothly.
If not, replace the idle pulley.



WRU92-SR427

4. Ensure that no damage is present at the brackets and attaching bolts.
If any damage is present, replace defective parts.



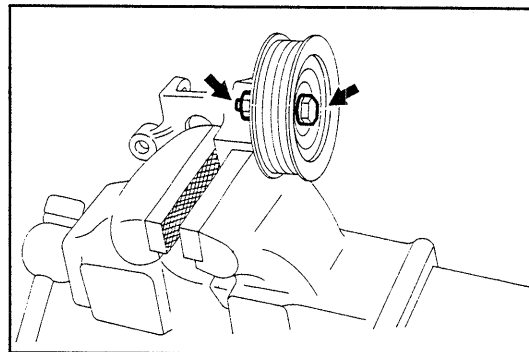
WRU90-SR338

INSTALLATION

1. Install the idle pulley to the vane pump bracket with the bolts and nuts. Tighten the attaching bolts and nuts to the specified torque.

Tightening Torque:

3.5 - 5.0 kgf-m (25.3 - 36.2 ft-lb, 34.3 - 49.0 N-m)

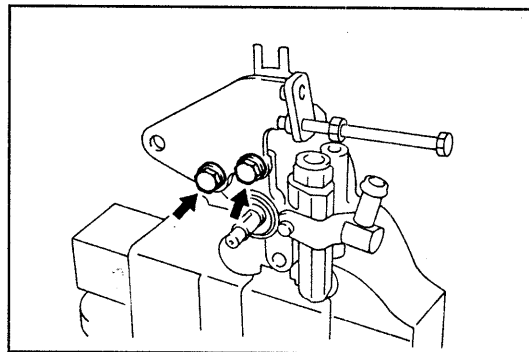


WRU90-SR339

2. Install the pump front stay to the vane pump with the attaching bolts.

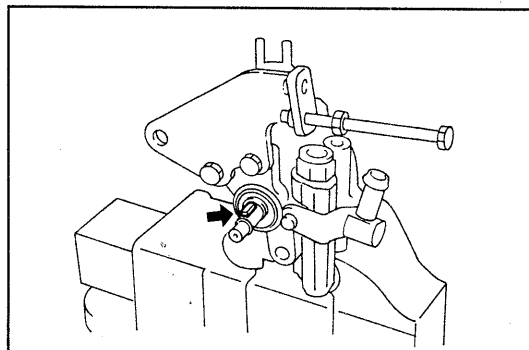
Tightening Torque:

3.5 - 5.0 kgf-m (25.3 - 36.2 ft-lb, 34.3 - 49.0 N-m)



WRU90-SR340

3. Install the woodruff key to the vane pump.

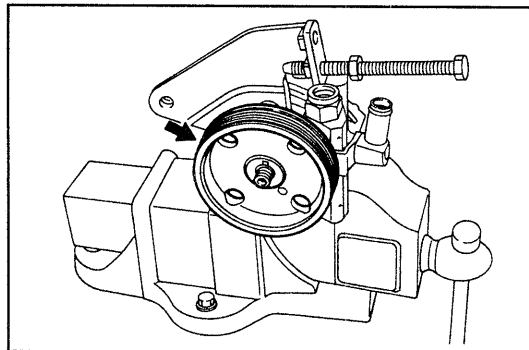


WRU90-SR341

4. Install the pulley to the vane pump.

NOTE:

- Make sure that the woodruff key will not be displaced during the installation.

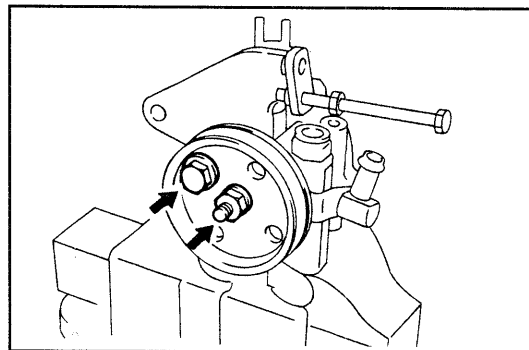


WRU90-SR342

5. Insert a suitable bolt to the vane pump pulley as indicated in the right figure. While preventing the pulley from turning, tighten the set nut to the specified torque.

Tightening Torque:

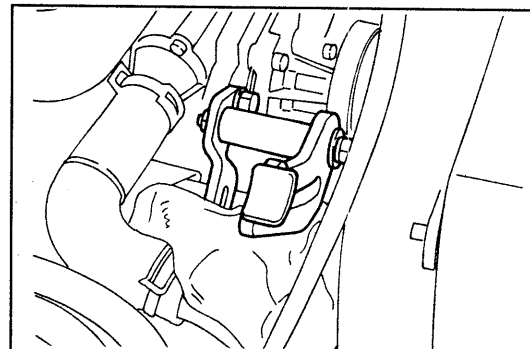
3.5 - 5.4 kgf-m (25.3 - 39.1 ft-lb, 34.3 - 53.0 N-m)



WRU90-SR343

6. Temporarily install the adjusting strut to the alternator adjusting bar.

(Only cases where the adjusting strut was removed)



WRU90-SR344

7. Install the vane pump bracket to the engine. Tighten the attaching bolts to the specified torque.

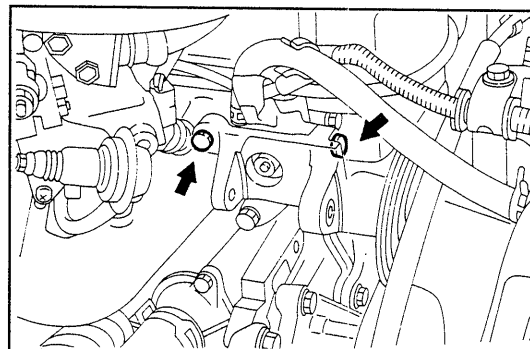
Tightening Torque:

M8 bolt

1.0 - 1.6 kgf-m (7.2 - 11.6 ft-lb, 9.8 - 15.7 N·m)

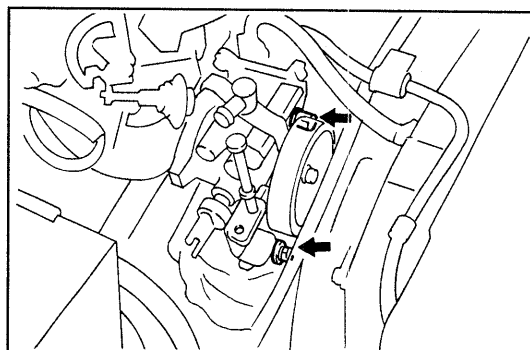
M10 bolt

3.5 - 4.5 kgf-m (25.3 - 32.5 ft-lb, 34.3 - 44.1 N·m)



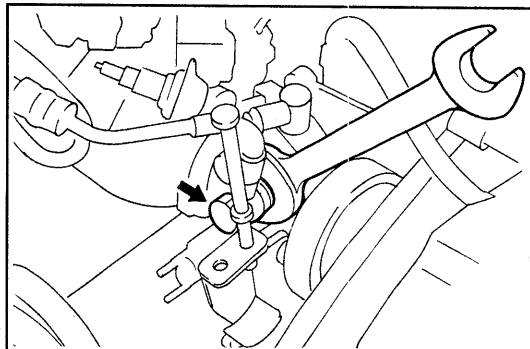
WRU90-SR345

8. Connect the vane pump to the engine. Temporarily tighten the attaching bolt and set bolt.



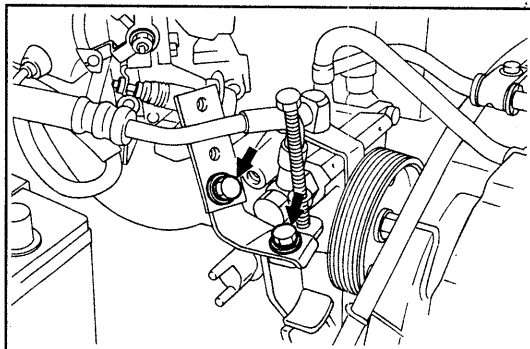
WRU90-SR346

9. Temporarily install the pressure feed tube to the vane pump with a new gasket interposed.



WRU90-SR347

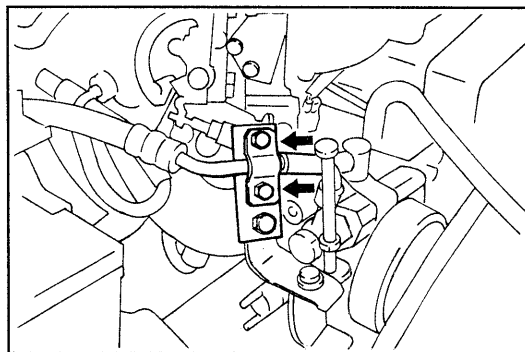
10. Temporarily install the tube support bracket to the pump front stay. Loosen the bolts connecting the tube support bracket to the tube support bracket No. 2.



WRU90-SR348

STEERING

11. Temporarily install the pressure feed tube to the tube support bracket No. 2 with a clamp.

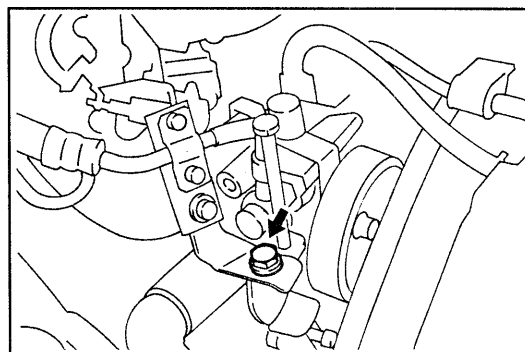


WRU90-SR349

12. Tighten the bolt connecting the tube support bracket to the pump front stay to the specified torque.

Tightening Torque:

1.0 - 1.6 kgf-m (7.2 - 11.6 ft-lb, 9.8 - 15.7 N-m)

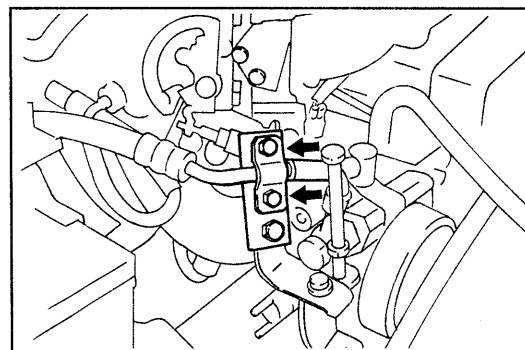


WRU90-SR350

13. Tighten the clamp attaching bolts to the specified torque.

Tightening Torque:

0.4 - 0.7 kgf-m (2.9 - 5.1 ft-lb, 3.9 - 6.9 N-m)



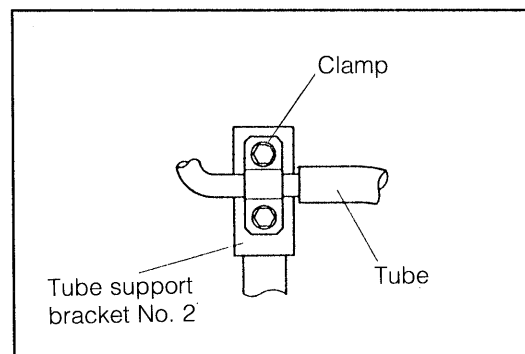
WRU90-SR351

CAUTION:

- Prior to the tightening, make sure that the tube support does not overlap the large diameter section of the tube.

NOTE:

- If the attaching bolts were tightened under the condition that the larger diameter section of the tube rode over the tube support, be sure to replace the tube support bracket and clamp with new parts.

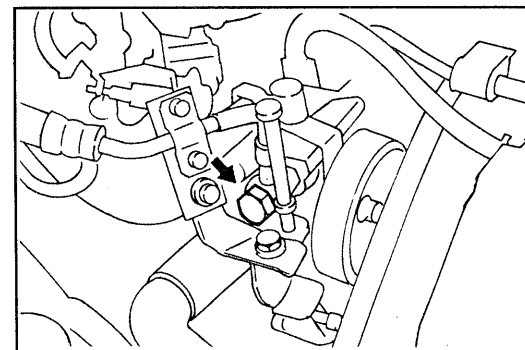


WRU90-SR352

14. Tighten the union bolt to the specified torque, while preventing it from turning at the nut section at the vane pump side.

Tightening Torque:

4.5 - 5.5 kgf-m (32.5 - 39.8 ft-lb, 44.1 - 53.9 N-m)

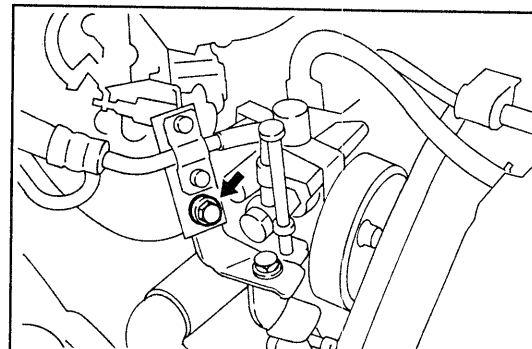


WRU90-SR353

15. Tighten the bolts connecting the tube support bracket No.2 to the tube support bracket to the specified torque.

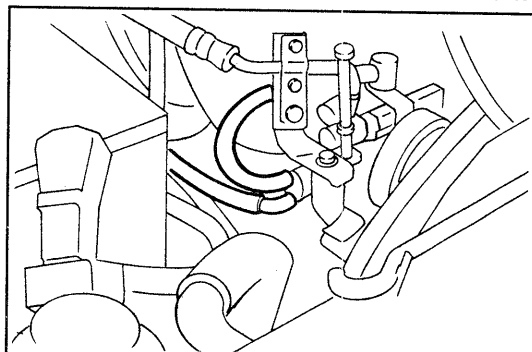
Tightening Torque:

1.0 - 1.6 kgf-m (7.2 - 11.6 ft-lb, 9.8 - 15.7 N-m)



WRU90-SR354

16. Connect the air hoses for idle-up use to the air control valve.

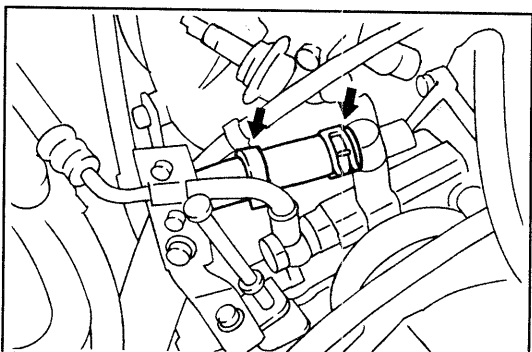


WRU90-SR355

17. Connect the oil reservoir-to-pump hose to the vane pump.

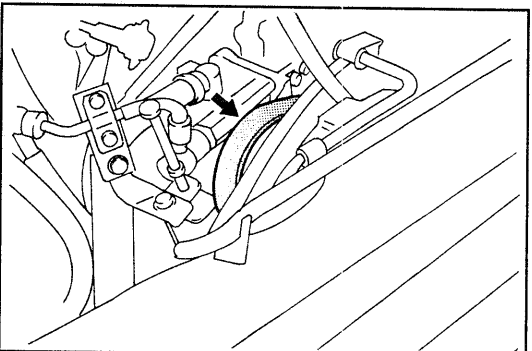
18. Attach the hose clip.

19. Remove the cloth placed during the disassembly.



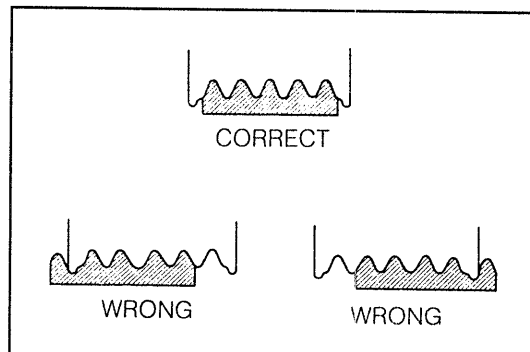
WRU90-SR356

20. Insert the drive belt.



WRU90-SR357

21. Correctly install the drive belt to each pulley.



WRU90-SR358

STEERING

22. Adjust the drive belt tension by tightening the adjusting bolt so that the belt tension may become the specified value. Lock the adjusting bolt with the lock nut.

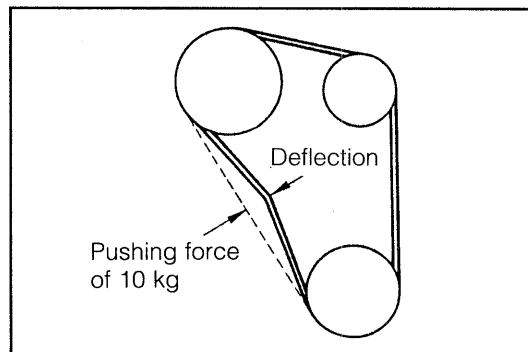
Specified Belt Deflection:

9 - 11 mm (0.36 - 0.43 inch)

[When a force of 10 kgf (22 lb) is applied:]

Tightening Torque (lock nut):

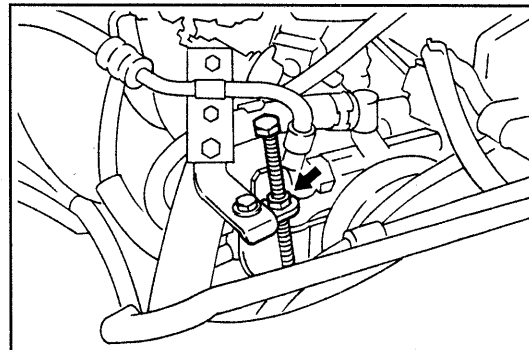
1.0 - 1.6 kgf-m (7.2 - 11.6 ft-lb, 9.8 - 15.7 N-m)



WRU90-SR359

NOTE:

- As for the belt tension of the air conditioner-equipped vehicle, see the Air Conditioner section.

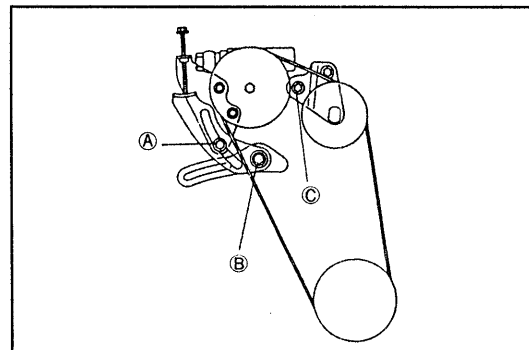


WRU90-SR360

23. Tighten the remaining bolts to the specified torque.

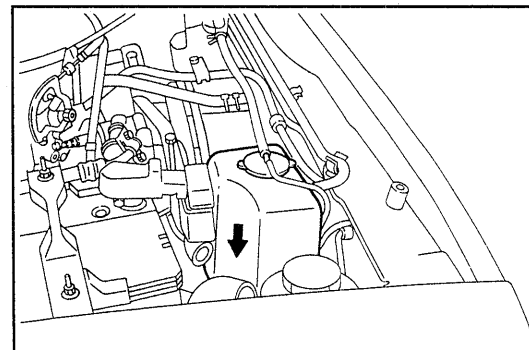
Tightening Torque:

- Ⓐ: 3.5 - 4.5 kgf-m
(25.3 - 32.5 ft-lb, 34.3 - 44.1 N-m)
- Ⓑ: 7.0 - 9.0 kgf-m
(50.6 - 65.1 ft-lb, 68.6 - 88.3 N-m)
- Ⓒ: 5.0 - 7.0 kgf-m
(36.2 - 50.6 ft-lb, 49.0 - 68.6 N-m)



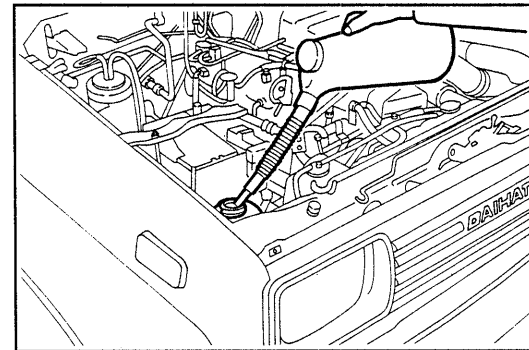
WRU90-SR361

24. Install the radiator reservoir tank by inserting it to the clamp at the vehicle side.



WRU90-SR362

25. Fill power steering fluid.
(See page SR-15 to SR-16.)
26. Carry out the in-vehicle inspection of the power steering.
(See page SR-11.)



WRU90-SR363

DAIHATSU

Rocky

BODY

BODY	BO- 2	RADIATOR GRILLE	BO- 30
PARTS WHERE GALVANIZED STEEL		FRONT FENDER	BO- 32
SHEETS ARE USED	BO- 3	REAR WHEEL OPENING	
PARTS WHERE GALVANIZED STEEL		EXTENSION	BO- 34
SHEETS ARE USED	BO- 4	HOOD LOCK CONTROL CABLE	BO- 35
PARTS WHERE HIGH-TENSILE STEEL		WINDOWS	BO- 36
SHEETS ARE USED	BO- 5	FRONT DOOR	BO- 43
BODY SEALER	BO- 6	BACK DOOR	BO- 48
ALIGNMENT ADJUSTMENTS	BO- 8	REAR ROLL BAR	BO- 54
RESIN TOP VEHICLE	BO- 12	FUEL TANK	BO- 56
RESIN TOP	BO- 13	EXHAUST PIPE	BO- 62
SIMPLE TYPE TARPAULIN		INSTRUMENT PANEL	BO- 66
VEHICLE	BO- 18	TRIMS	BO- 81
TARPAULIN	BO- 19	FRONT SEAT	BO- 85
SUNROOF	BO- 22	REAR SEAT	BO- 93
MUDGUARD	BO- 24	SEAT BELTS	BO-107
FUEL LID OPENER	BO- 25	BODY MOUNTINGS	BO-108
FRONT BUMPER	BO- 27	FRAME	BO-109
REAR BUMPER	BO- 29	BODY DIMENSIONS	BO-110

BO

WRU90-BO001

BODY

There are two kinds of body shapes: They are the resin top specifications and the simple type tarpaulin specifications. These two specifications employ basically the same body construction.

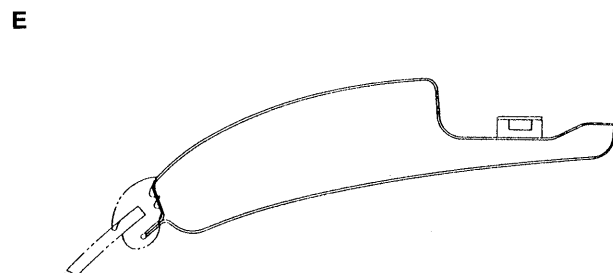
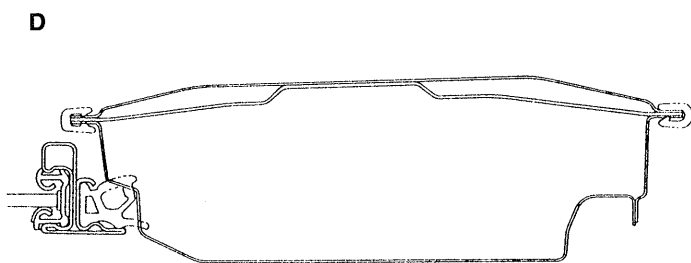
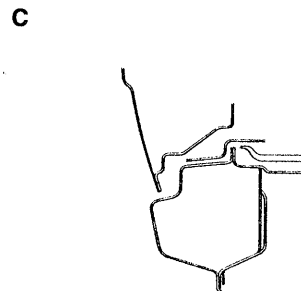
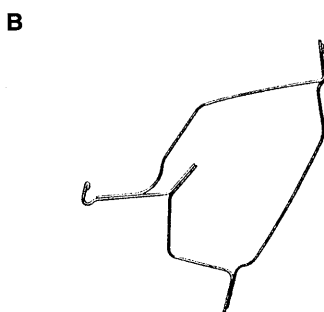
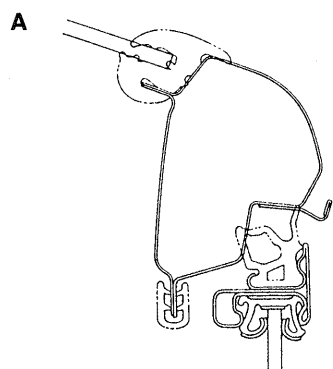
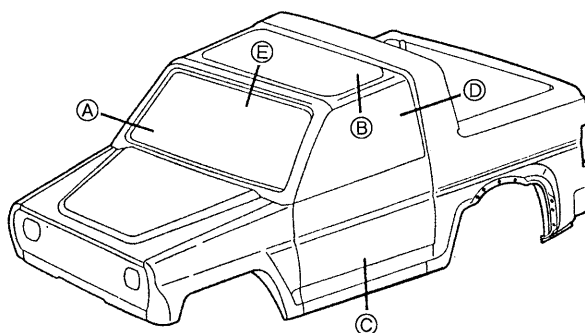
WRU90-BO002

Body Shell

Reinforcements are provided at various parts of the body in order that adequate rigidity may be assured and the noise and vibration levels may be reduced.

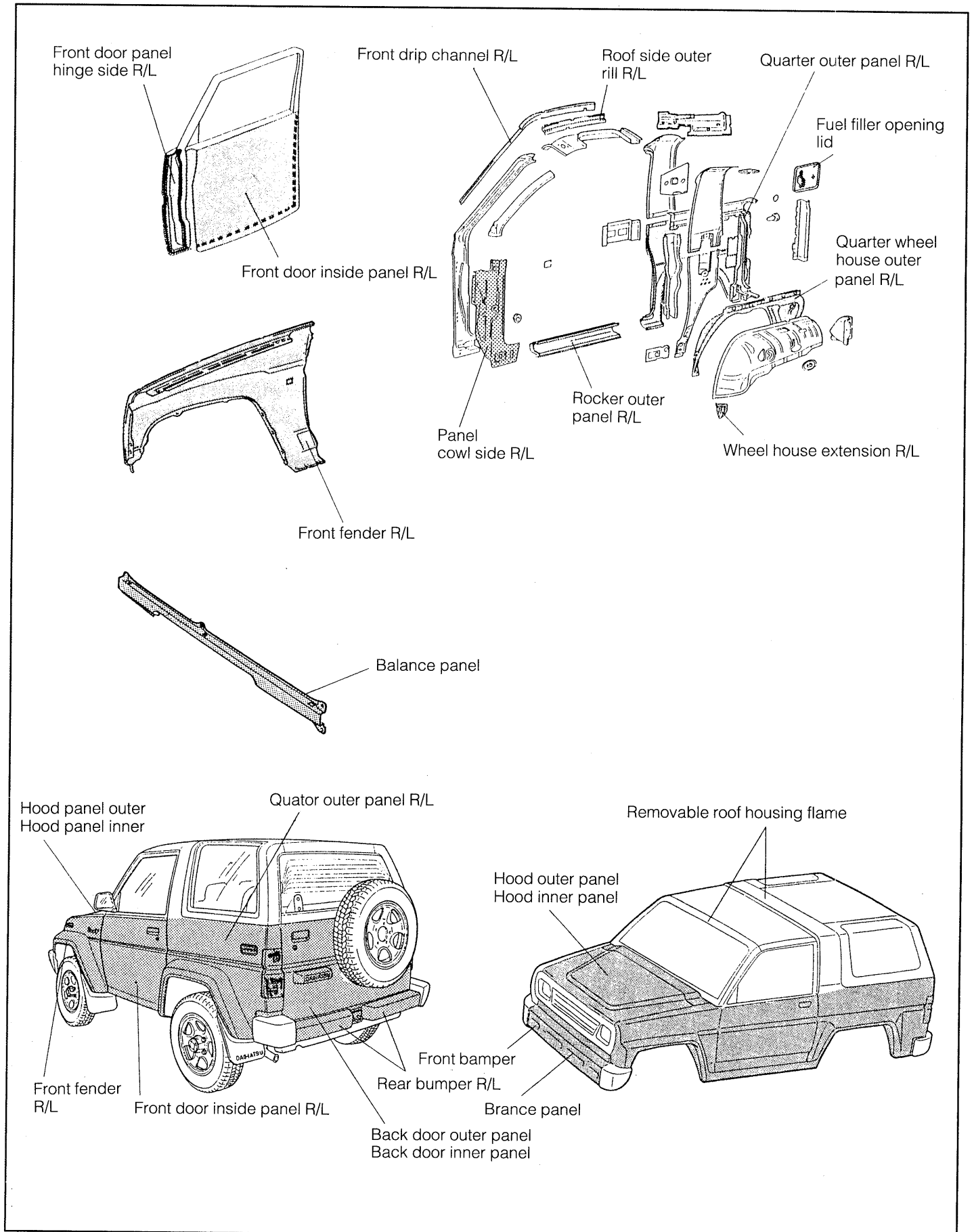
Basically, the resin top vehicle and soft top vehicle share the same shell.

The resin top vehicle (which has the identical body construction with the simple type tarpaulin vehicle) differs from the standard tarpaulin type vehicle in detailed construction.

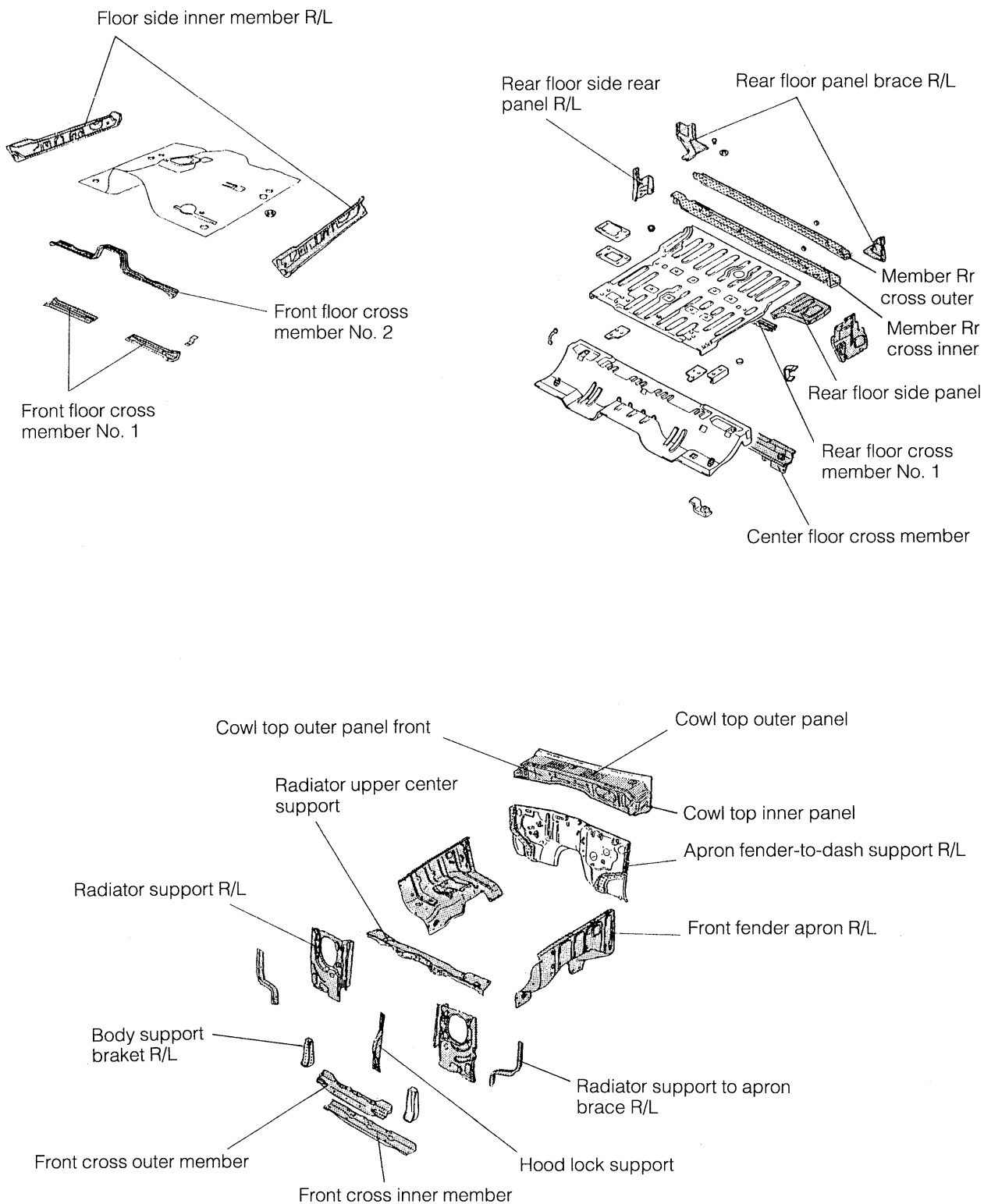


WRU90-BO003

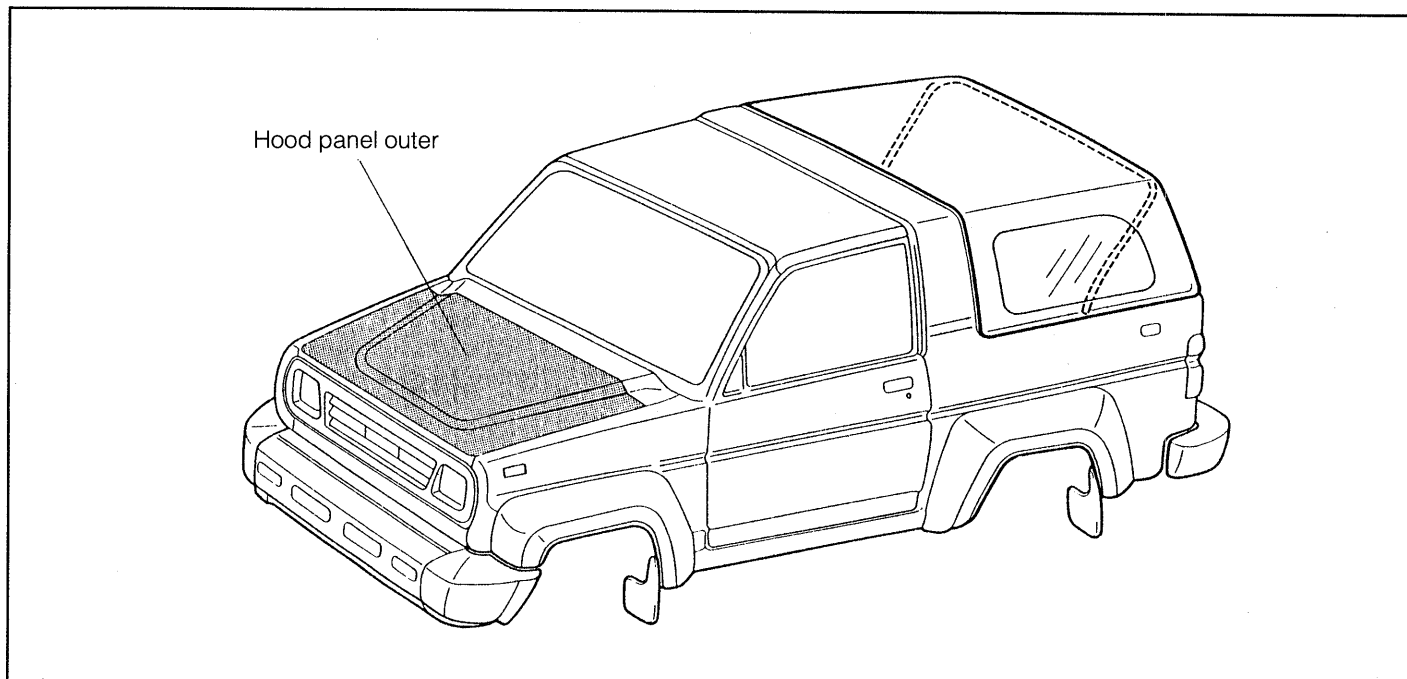
PARTS WHERE GALVANIZED STEEL SHEETS ARE USED



PARTS WHERE GALVANIZED STEEL SHEETS ARE USED



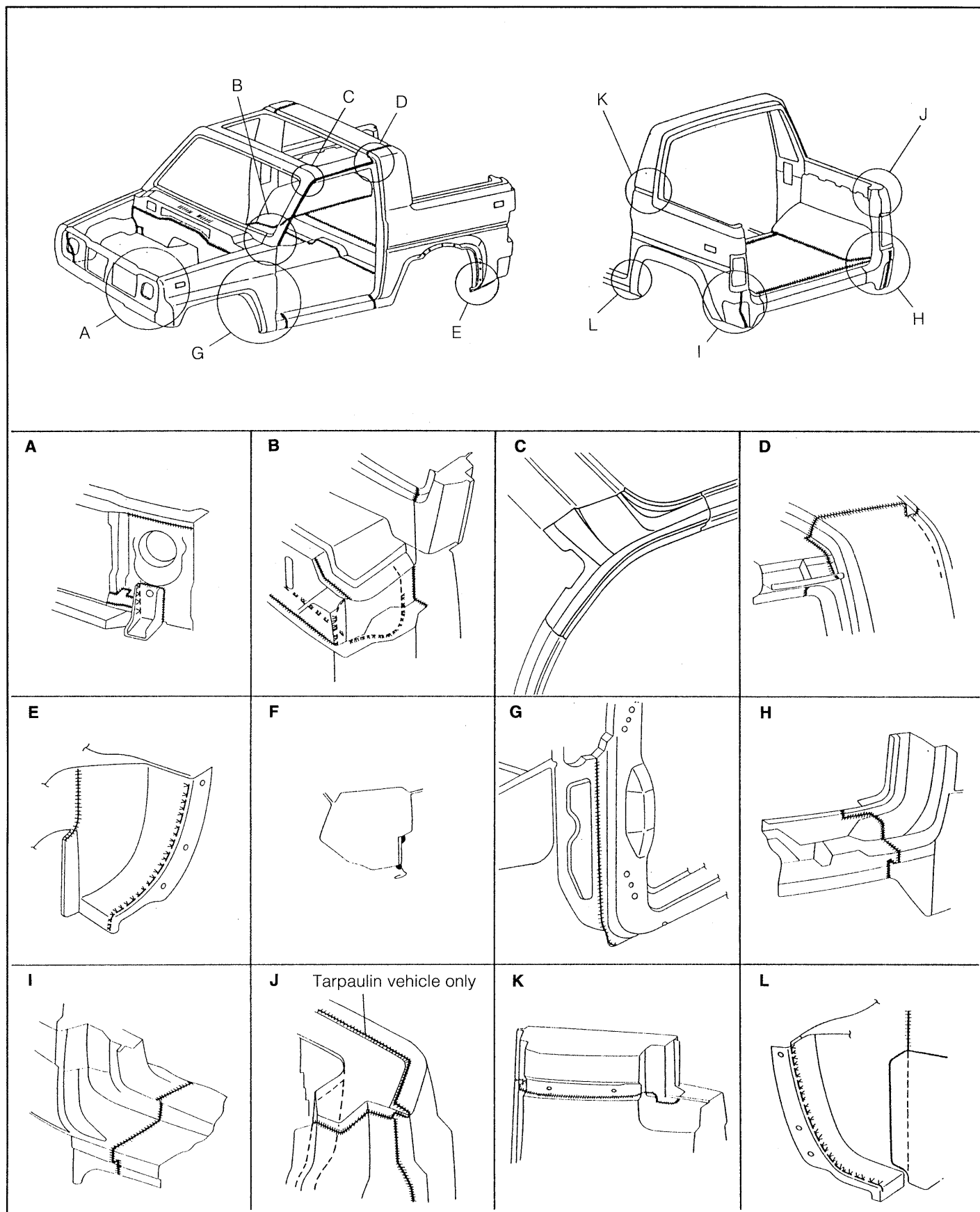
PARTS WHERE HIGH-TENSILE STEEL SHEETS ARE USED



WRU90-BO006

BODY SEALER

Body sealer is applied to the body panel mating surfaces and door-to-hood hemming sections so that rust preventive and water-proof characteristics may be strengthened.



BODY COLOR INFORMATION

Color code	Color	Color code	Color
045	White	25L (3HI/168)	Red Mica/Gray Metallic
3HI	Red Mica	NA5 (6A5/168)	Black Metallic/Gray Metallic
168	Gray Metallic	NB1 (G09/168)	Green/Gray Metallic
6A5	Black Metallic	NB3 (G12/168)	Trad Green Metallic/Grey Metallic
		NB4 (B22/168)	Marine Blue Metallic/Grey Metallic

WRU92-BO404

COLOR CODE OF THE WORLD

Color	CODE					
	DAIHATSU	AKZO	DUPONT	ICI	SPIES HECKER	STANDOX
WHITE	045	DAH045	L8997	NW-80	16067	045
RED MICA	3HI	DAH3HI	G8730	PC86B	97805	3HI
GRAY. M	168	DAH168	N8832	B936B	97728	168
BLACK. M	6A5	DAH6A5	G8742	A403B	97806	6A5
TWO TONE	25L	DAH25L	G8730/N8832	PC86B/B936B	48226	25L
TWO TONE	NA5	DAHNA5	G8742/N8832	B929B/B936B	48233	NA5
TWO TONE	NB1	DAHNB1	N9305/N8832	XW13/B936B	48480	NB1
TWO TONE	NB3	DAHNB3	L9652/N8832	D575B/B936B	48715	NB3
TWO TONE	NB4	DAHNB4	L9651/N8832	D576B/B936B	48716	NB4

WRU92-BO405

Trim informations

F D S1

Trim color code
S1: Gray

Serial code
A code that has been set in alphabetical order.

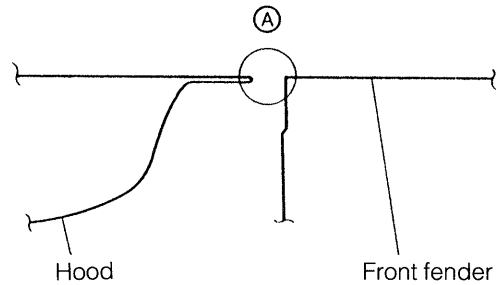
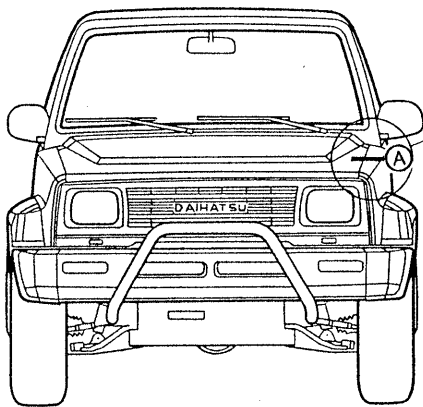
Seat main material
F, Y: Fabric
L: Printed leatherette

WRU92-BO402

ALIGNMENT ADJUSTMENTS

ENGINE HOOD ALIGNMENT ADJUSTMENT

Engine hood-to-front fender gap

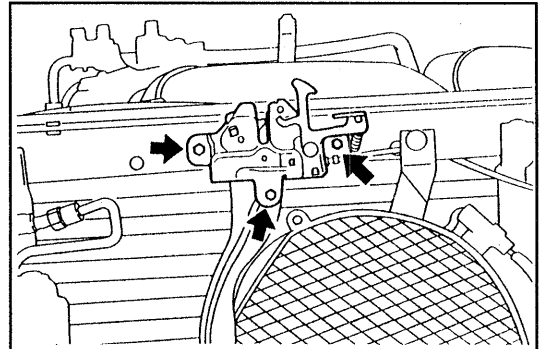


Specified values
 Gap: 3.1 - 6.1 mm (0.12 - 0.24 inch)
 Lateral deviation:
 Not to exceed 1.5 mm (0.06 inch)
 Difference between right and left sides:
 Not to exceed 1.5 mm (0.06 inch)

WRU90-B0009

1. Adjustment of engine hood-to-front fender gap

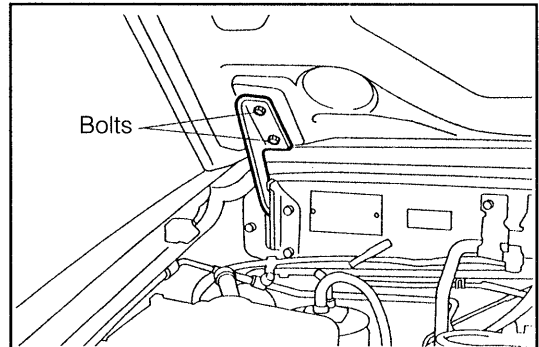
Loosen the bolts. Perform the adjustment by moving the hood.



WRU90-B0010

2. Hood lock adjustment

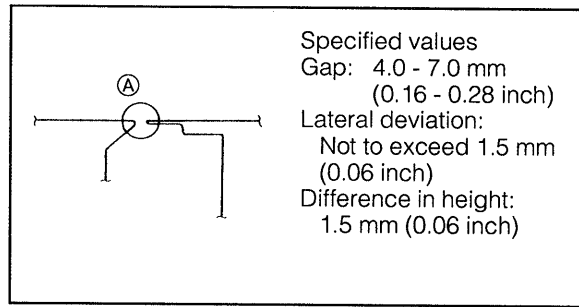
Loosen the three attaching bolts of the hood lock. Perform the adjustment by moving the hood lock.
 (Adjust the hood lock in such a way that you will feel a slight looseness when the center section of the hood end is pushed strongly.)



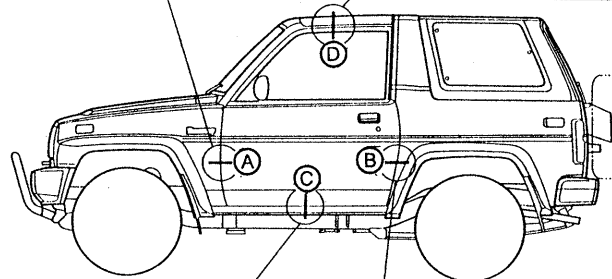
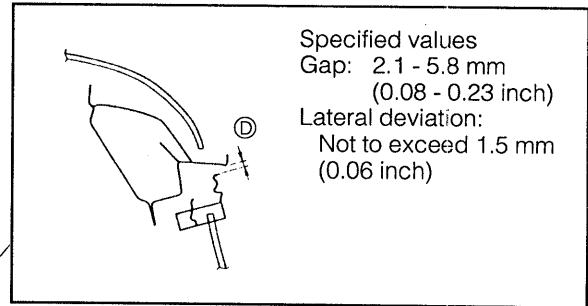
WRU90-B0011

FRONT DOOR ALIGNMENT ADJUSTMENT

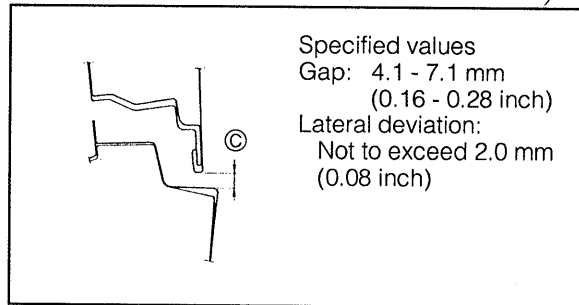
Front door-to-front fender gap



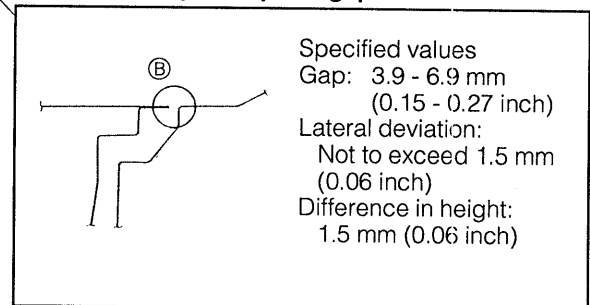
Front door-to-roof panel gap



Front door-to-rocker panel gap



Front door-to-quarter panel gap



1. Adjustment of front door-to-front fender gap and front door-to-quarter panel gap (A and B)

Loosen the bolts (a). Perform the adjustment by moving the door panel in a fore-and-aft direction.

SST: 09812-00010-000

2. Adjustment of front door-to-rocker panel gap and front door-to-roof panel gap (C and D)

Loosen the bolts (a). Perform the adjustment by moving the door panel in an up-and-down direction.

SST: 09812-00010-000

3. Adjust of difference in height between front door and front fender

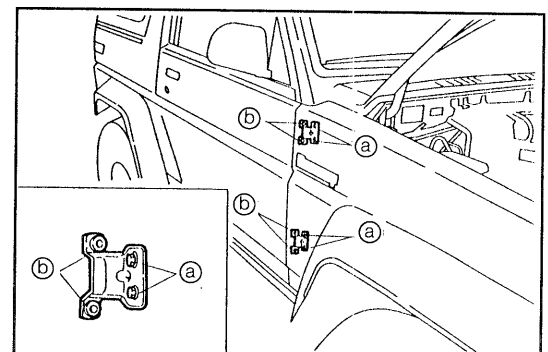
Loosen the bolts (b). Perform the adjustment by moving the door panel in a right-and-left direction.

SST: 09812-00010-000

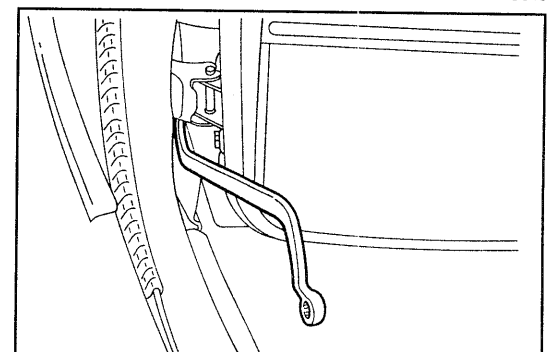
NOTE:

When removing the door, remove the bolts (b).

WRU90-BO012



WRU90-BO013



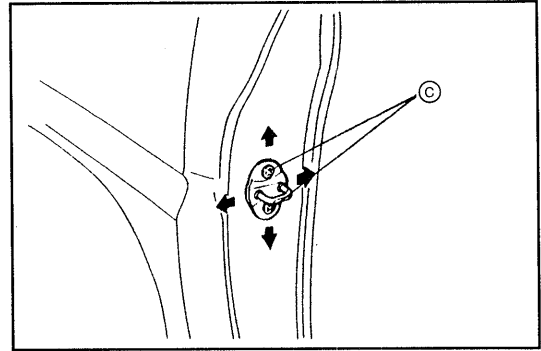
WRU90-BO014

4. Door lock adjustment

Loosen the screws ③ of the lock striker. Perform the adjustment by tapping the striker lightly.

NOTE:

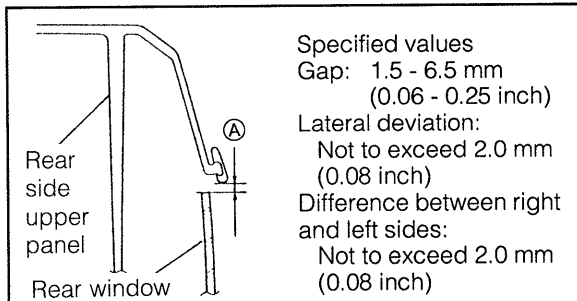
Never attempt to correct the door sagging at its rear part by the adjustment of this lock striker. The correction should be made by adjusting the door hinge section.



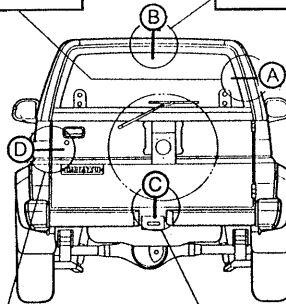
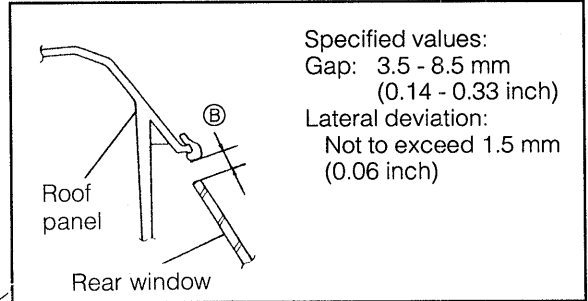
WRU90-BO015

BACK DOOR ALIGNMENT ADJUSTMENT

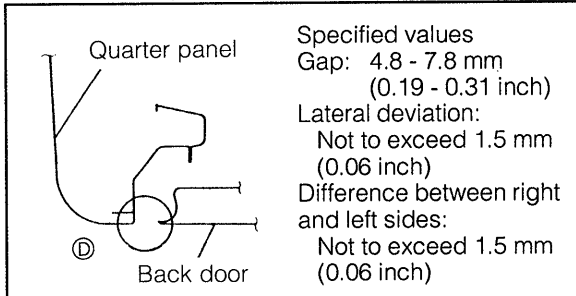
Rear window-to-rear side upper panel gap



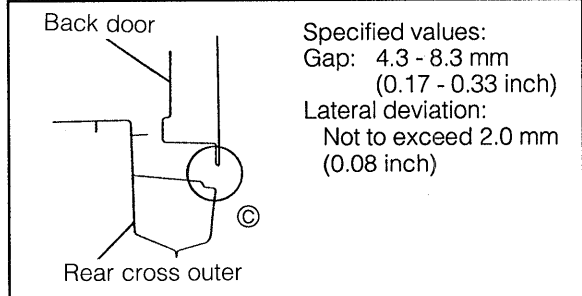
Rear window-to-roof panel gap



Back door-to-quarter panel gap



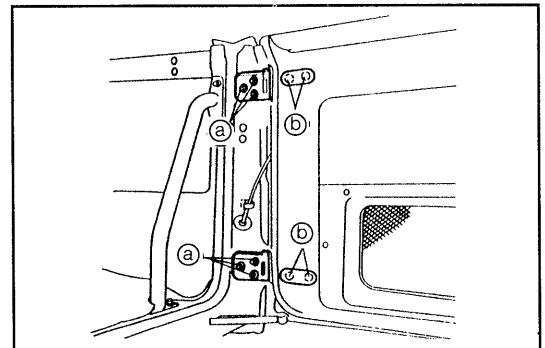
Back door-to-rear cross over



WRU90-BO016

1. Adjustments of rear window-to-rear side upper panel gap, Back window-to-roof panel gap, Back door-to-quarter panel gap, Back door-to-cross over

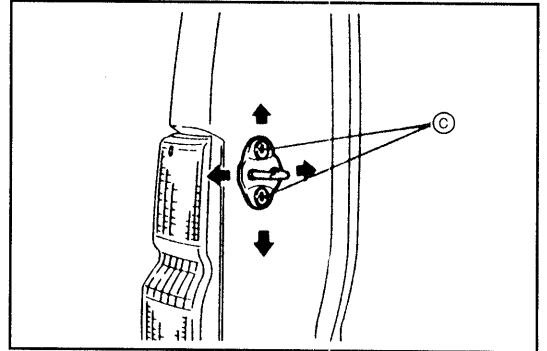
- (1) Loosen the bolts ①. Perform the adjustment.
- (2) If the adjustment can not be performed properly, loosen the nuts ② at the adjustment.



WRU90-BO017

2. Back door lock adjustment

Loosen the screw ③ of the lock striker. Perform the adjustment by tapping the striker lightly.



WRU90-BO018

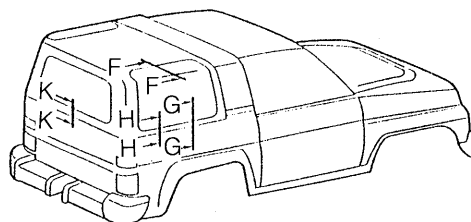
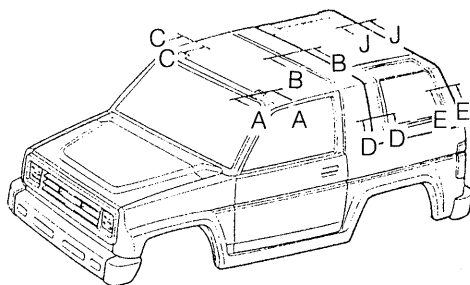
RESIN TOP VEHICLE

The rear upper body made of FRP (fiber glass reinforced plastic) is composed of a roof panel and side panels. The front roof is equipped with an FRP removable type roof.

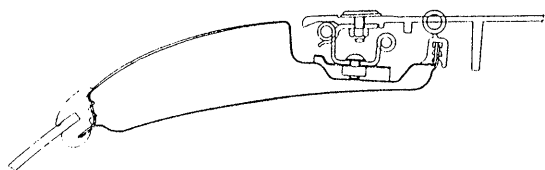
The rear upper body section is attached to the body by means of bolts. Such construction allows easy removal and installation of this section. It is, therefore, possible to replace this section with the simple type tarpaulin which is available as optional equipment.

Furthermore, as regards the front roof, it incorporates a tilt- up mechanism which allows the rear part of the roof to be raised.

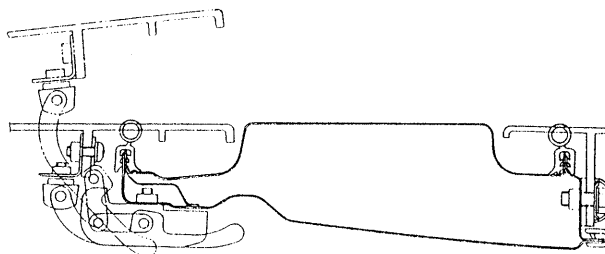
The back door glass has been so designed that it can be removed or installed easily from the back door panel.



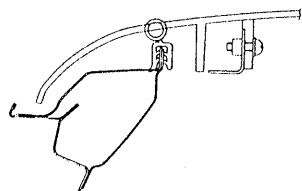
A



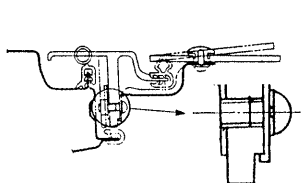
B



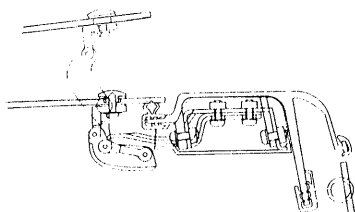
C



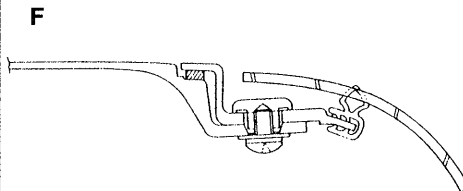
D



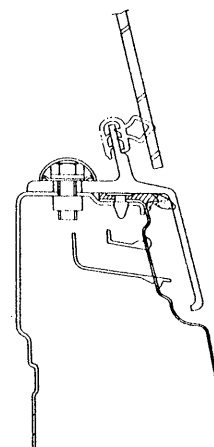
E



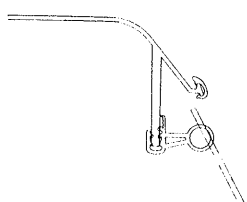
F



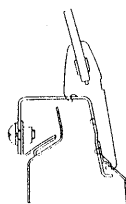
G, H



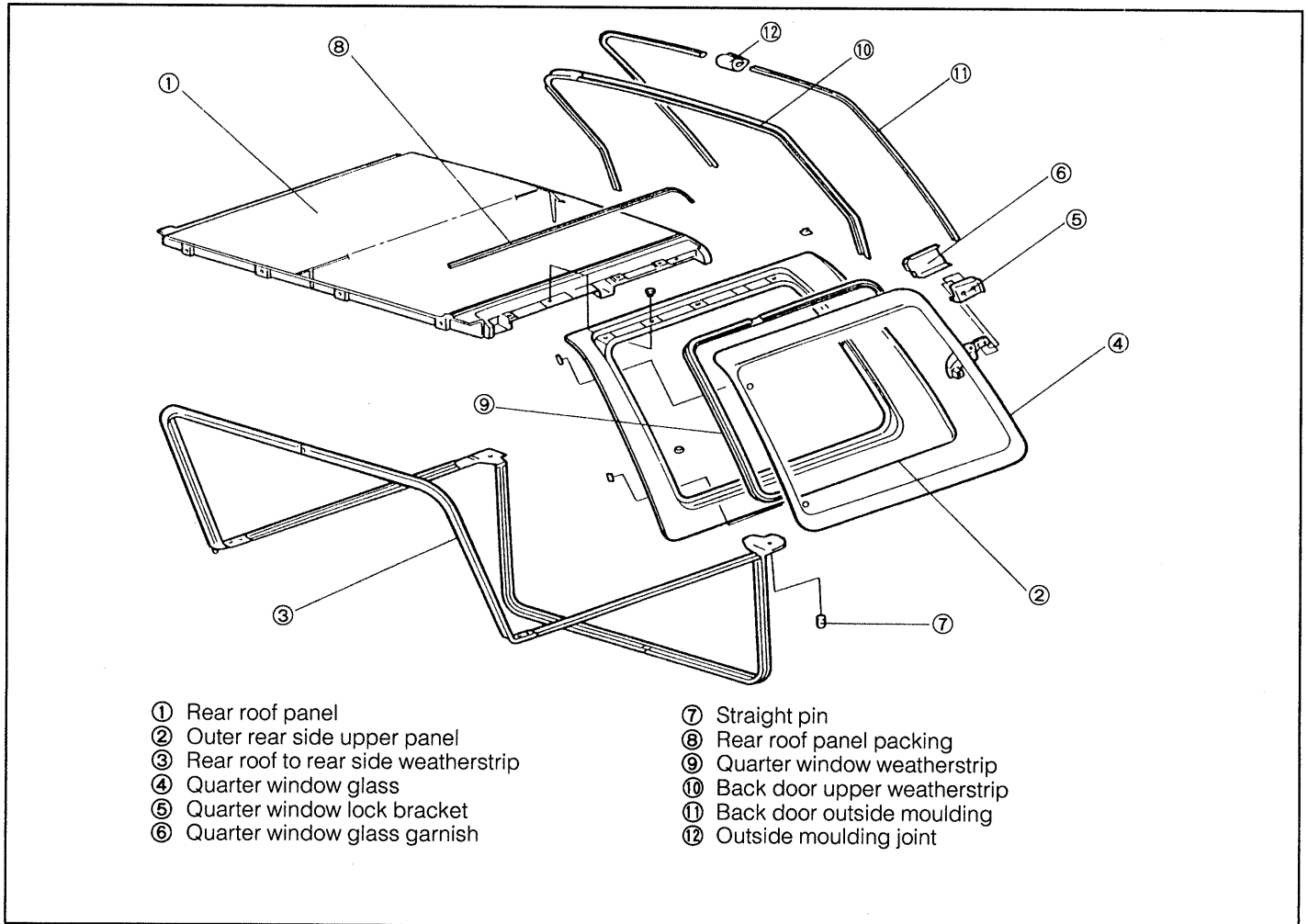
J



K



RESIN TOP COMPONENTS



WRU90-BO020

REMOVAL

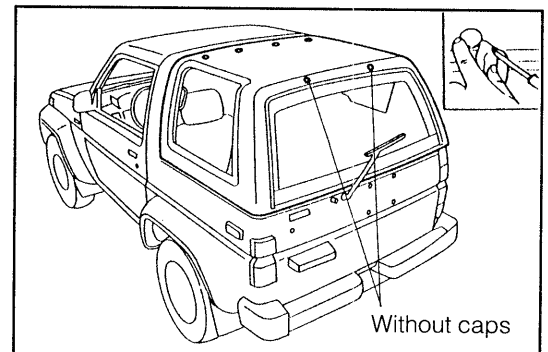
1. Remove the caps for resin panel attaching bolts (10 points). Then remove the resin top panel attaching bolts (12 points).

NOTE:

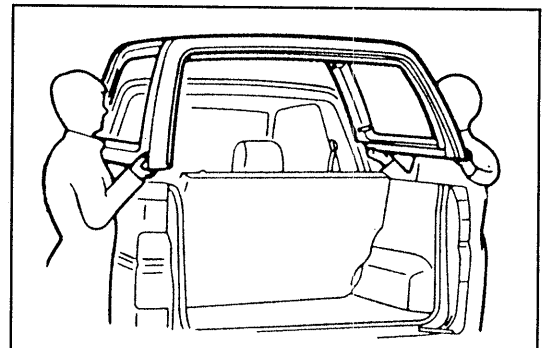
When removing the caps, use a cloth to avoid any damage to the vehicle body.

2. Remove the mounting roll over bracket by removing the screws.

3. Remove the resin top panel from the vehicle.



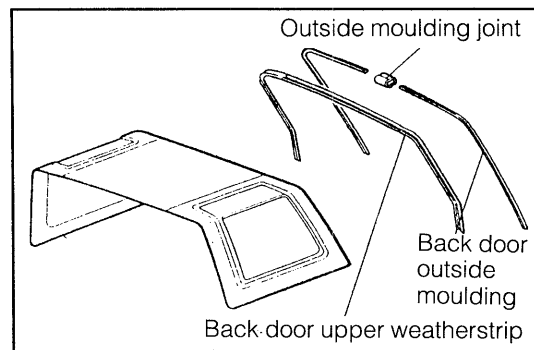
WRU90-BO021



WRU90-BO022

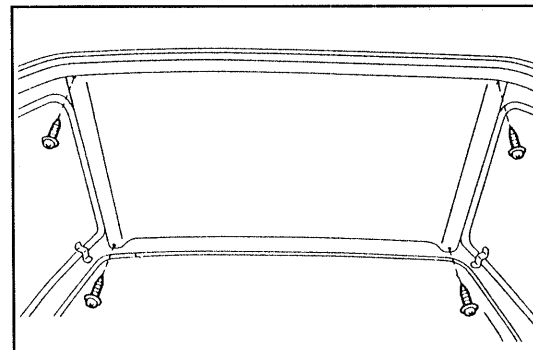
DISASSEMBLY

1. Remove the quarter window glass-related parts.
2. Remove the outside moulding joint, back door outside moulding and back door upper weatherstrip.



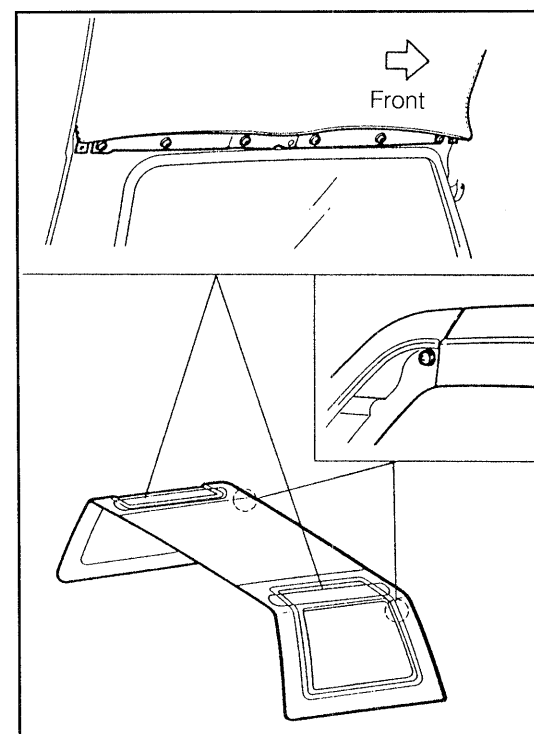
WRU90-BO023

3. Remove the roof headlining trim retainer by removing the screws.



WRU90-BO024

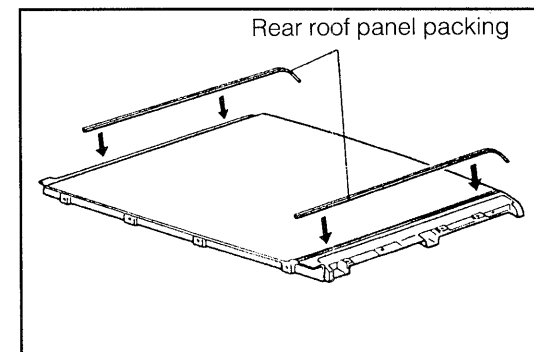
4. Separate the rear roof panel and outer rear side upper panel by removing the screws.
5. Remove the rear roof panel packing.



WRU90-BO025

ASSEMBLY

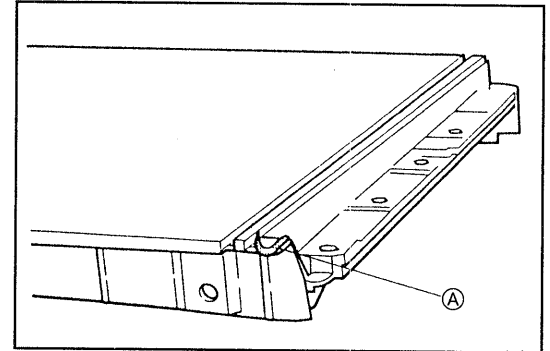
1. Peel off the liner of a two-faced adhesive tape which is installed on the rear roof panel packing. Then, install the rear roof panel packing onto the rear roof panel.



WRU90-BO026

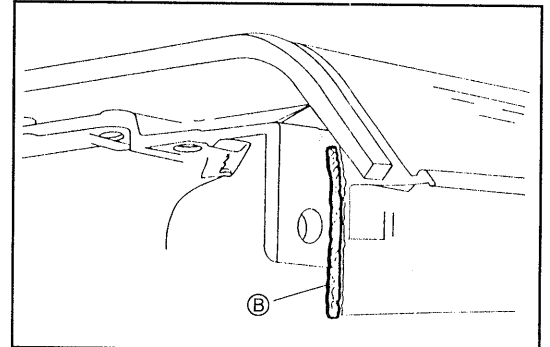
2. Apply the adhesive agent specified below to the section ① (both right and left sides) at the front side of the rear roof panel, as indicated in the right figure.

Adhesive Agent To Be Used: Sunstar-Made Penguin Seal # 255A



WRU90-BO027

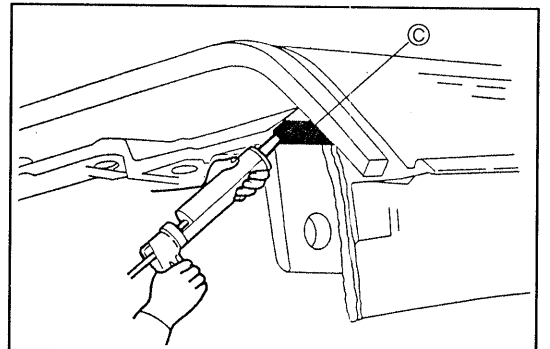
3. Affix the packing to the section ② at the rear side of the rear roof panel.



WRU90-BO028

4. Apply the adhesive agent specified below to the section ③ (both right and left sides) at the rear side of the rear roof panel, as indicated in the right figure.

Adhesive Agent To Be Used: Cemedine 370S

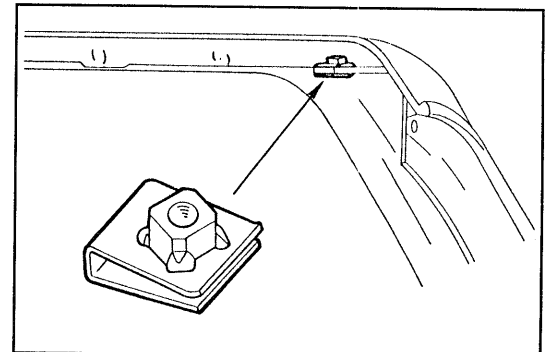


WRU90-BO029

5. Install the plate nut on the outer rear side upper panel.

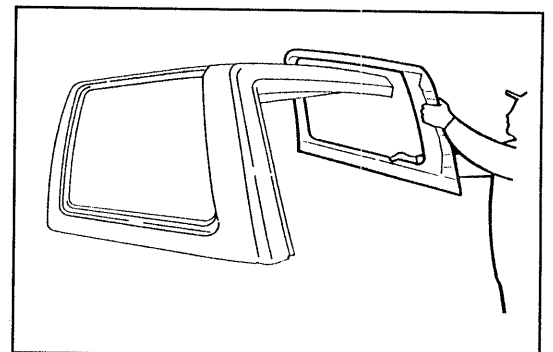
NOTE:

Be sure to install the plate nut in such a direction that the nut side may face upward.



WRU90-BO030

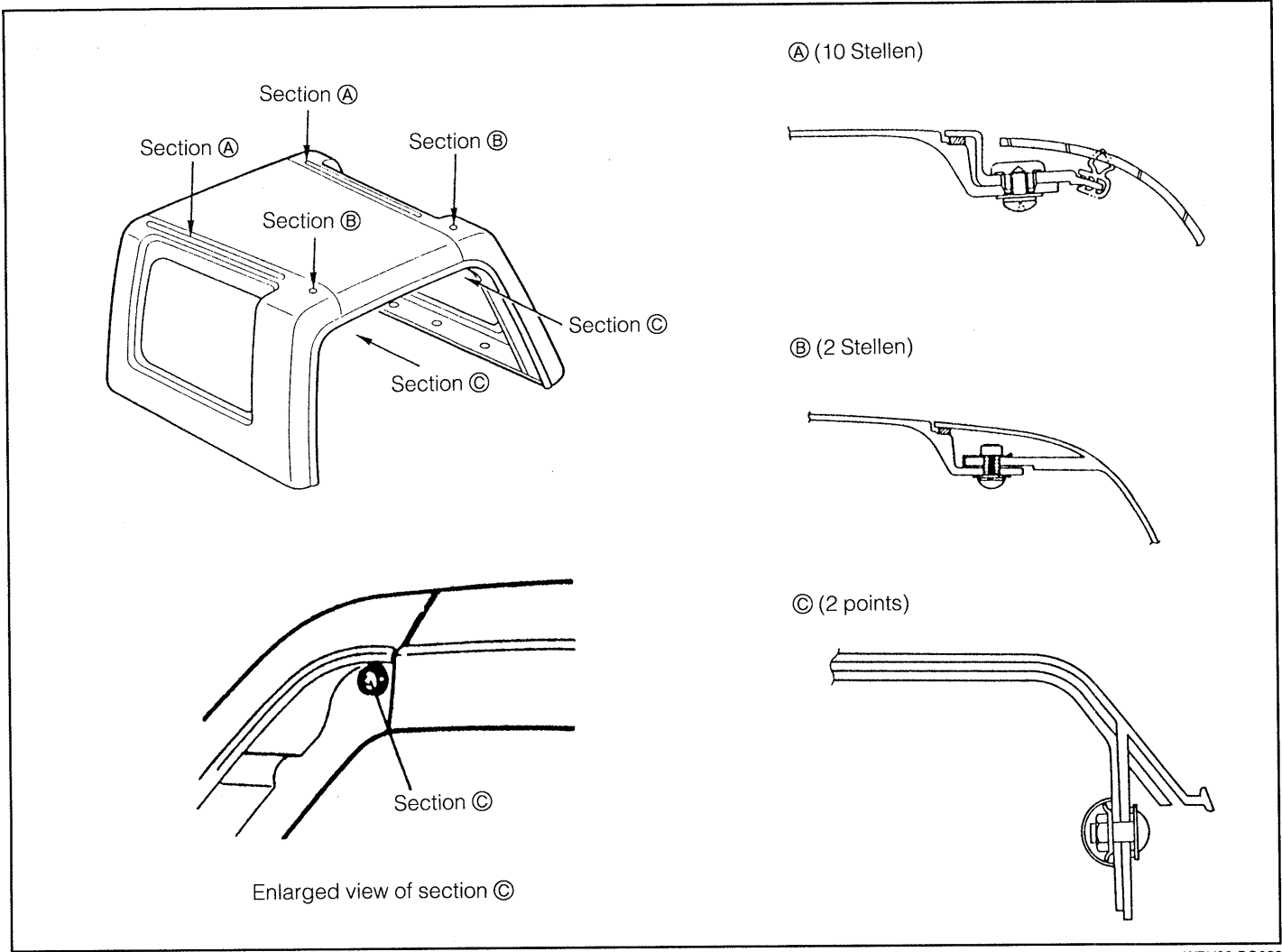
6. Install the outer rear side upper panel on the rear roof panel.



WRU90-BO031

BODY

7. Secure the rear roof panel and outer rear side upper panel, referring to the attachment sectional views below.



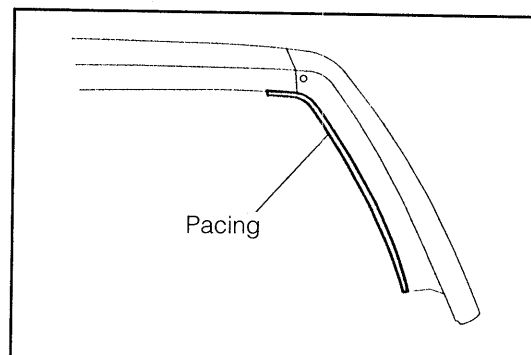
WRU90-BO032

Table of Bolts and Nuts, etc.

Section A	Section B	Section C
<p>① Rear roof-to-rear side upper retainer</p> <p>② Screw with washer Nominal dimension: 15 mm (0.56 inch)</p>	<p>① Plate nut</p> <p>② Screw with washer Nominal dimension: 27 mm (1.06 inches)</p>	<p>① Bolt cap</p> <p>② Nut</p> <p>③ Screw with washer Nominal dimension: 20 mm (0.79 inch)</p> <p>NOTE: Use a screw having the same color as with the rear roof panel.</p> <p>④ Rear side panel upper plate</p> <p>⑤ Gasket</p>

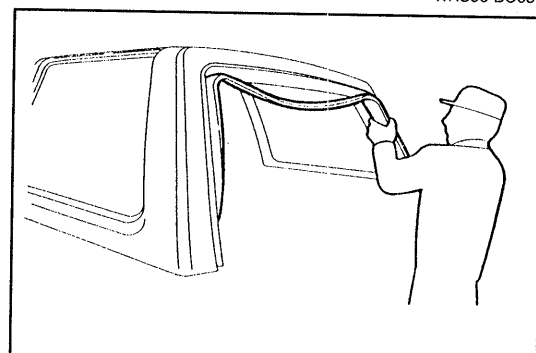
WRU90-BO033

8. Affix the back door opening packing on the rear roof panel.



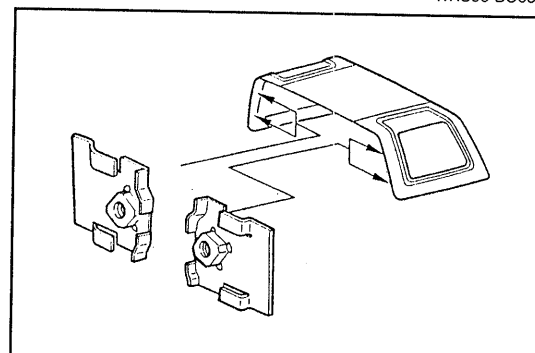
WRU90-BO034

9. Install the back door upper weatherstrip to the rear roof panel.



WRU90-BO035

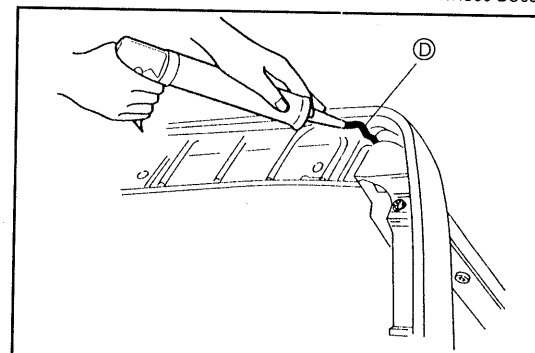
10. Insert the nut plate into the corresponding section of the rear roof panel, as indicated in the right figure.



WRU90-BO036

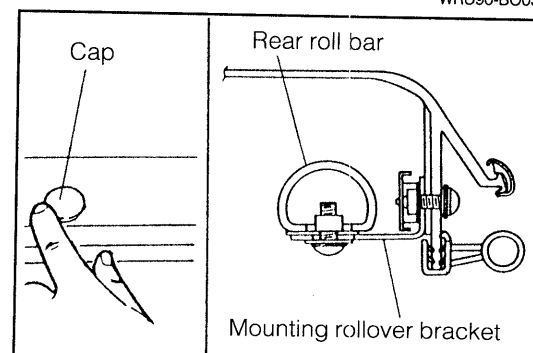
11. Apply the following bonding agent given below to the front side of the rear roof panel at the section D (both right and left sides), as indicated in the right figure.

Bonding Agent: Cemedine 370S



WRU90-BO037

12. Install the resin top panel to the vehicle.
 13. Install the attaching bolts and caps (10 points).
 14. Install the mounting roll over bracket with the screws.
 15. Install the quarter window assembly.



WRU90-BO038

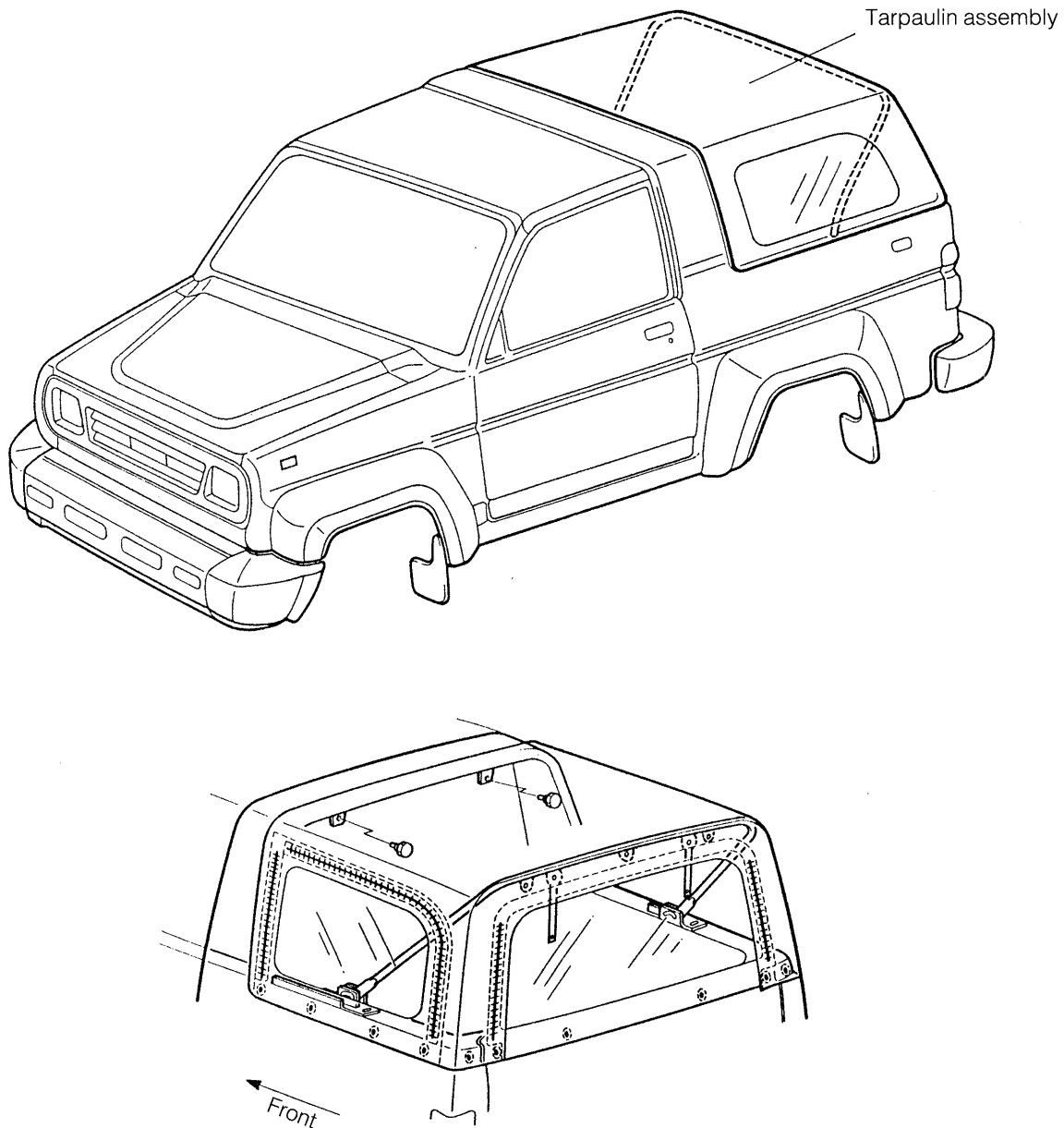
SIMPLE TYPE TARPAULIN VEHICLE

The simple type tarpaulin has been so constructed that it can be mounted easily by the owner after removing the rear upper body of the standard vehicle and resin top vehicle.

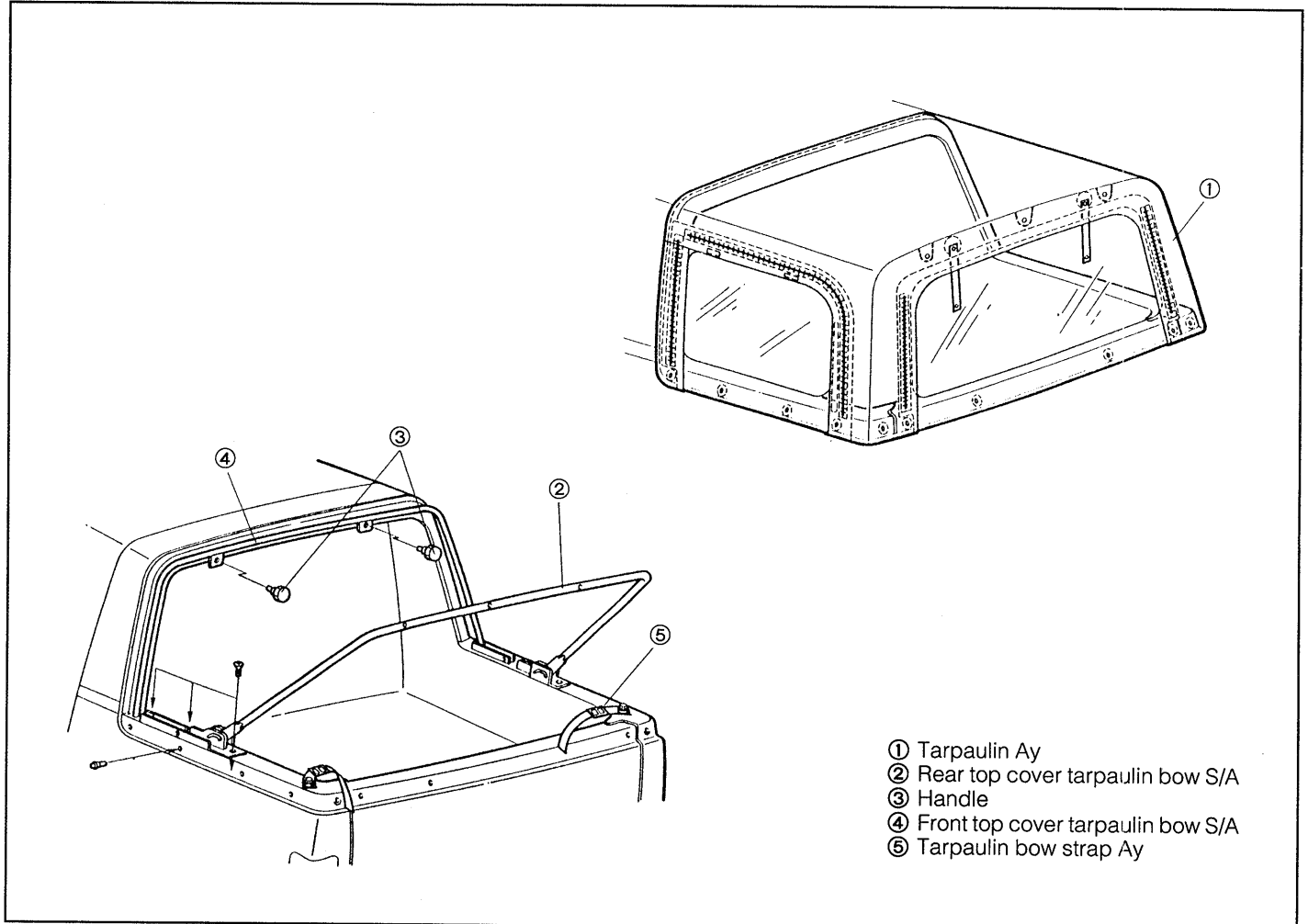
The tarpaulin assembly employs a 0.67 mm (0.026 inch) thick polyester canvas. For enhance water-proof characteristics, it adopts a 0.8 mm (0.031 inch) thick transparent vinyl chloride at the back window and quarter window sections.

Furthermore, the simple type tarpaulin has been so designed that the quarter window section can be removed by opening the fastener and the back window section can be wound up, as required.

As respects the tarpaulin frame, it has been so constructed that it can be folded easily. In addition, the tarpaulin frame can be removed or installed easily from the vehicle body.



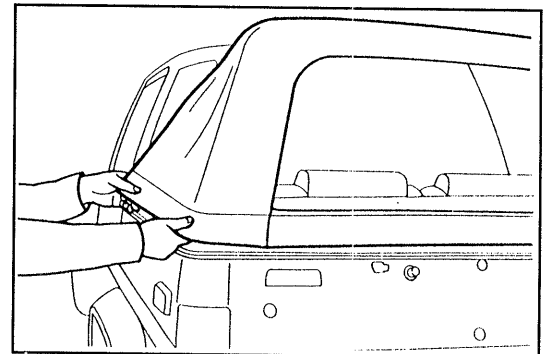
TARPAULIN COMPONENTS



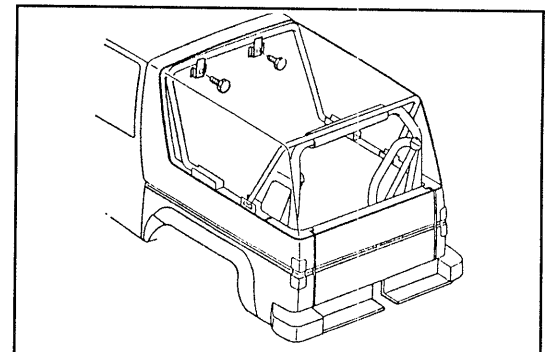
WRU90-BO040

REMOVAL

1. Detach the hooks (14 points) of the tarpaulin.
2. Detach the hooks (3 points) from the rear bow.
3. Remove the two handles that retain the front tarpaulin bow assembly.
4. Remove the tarpaulin assembly from the front tarpaulin bow assembly.



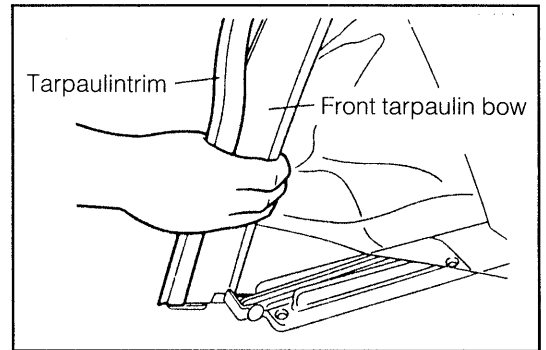
WRU90-BO041



WRU90-BO042

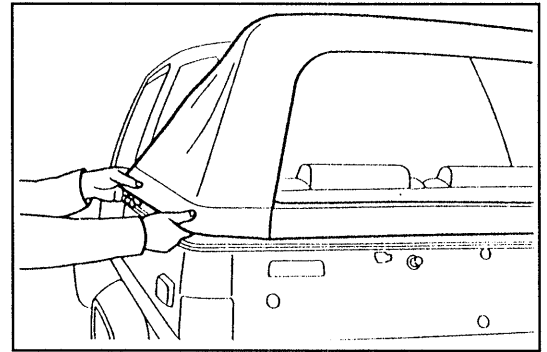
INSTALLATION

1. Install the tarpaulin trim (tarpaulin assembly) to the front tarpaulin bow.
2. Fix the front tarpaulin bow with two handles.



WRU90-BO043

3. Install the hooks (3 points) to the rear bow.
4. Install the hooks (14 points) of the tarpaulin to the male hooks of the vehicle body.



WRU90-BO044

TARPAULIN BOW

REMOVAL

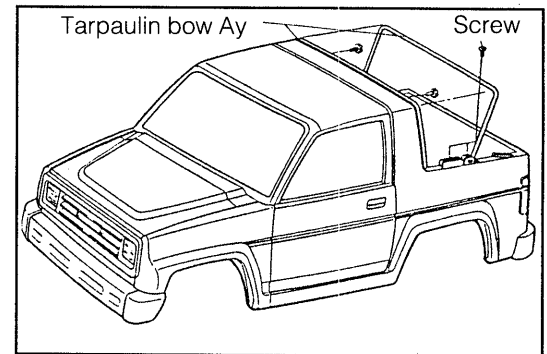
1. Remove the tarpaulin assembly.
2. Remove the tarpaulin bow assembly by removing the six screws.

INSTALLATION

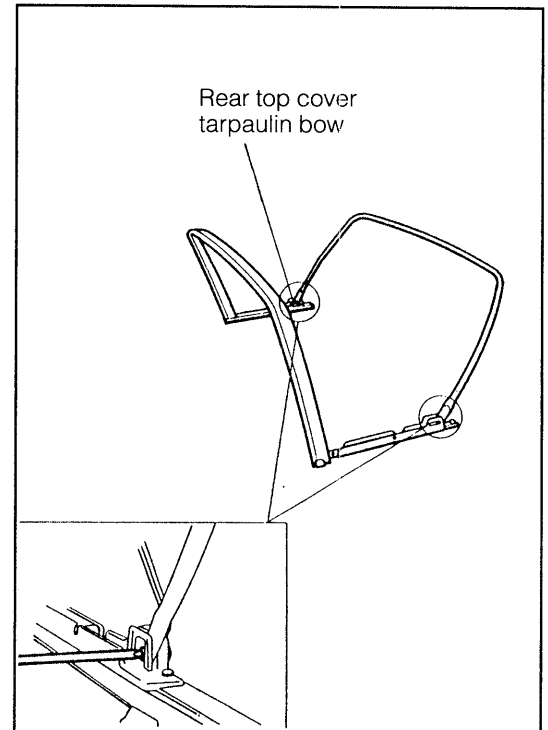
1. Install the tarpaulin bow assembly with the six screws.
2. Install the tarpaulin assembly.

DISASSEMBLY

1. Removal of rear top cover tarpaulin bow subassembly.
 - (1) Remove the nut.
 - (2) Remove the washer and head pin from the tarpaulin bow base.
 - (3) Remove the rear top cover tarpaulin bow subassembly from the tarpaulin bow base.
2. Removal of front top cover tarpaulin bow subassembly
 - (1) Remove the "E" ring.
 - (2) Remove the head pin from the tarpaulin bow base.
 - (3) Remove the front top cover tarpaulin bow subassembly from the tarpaulin bow base.



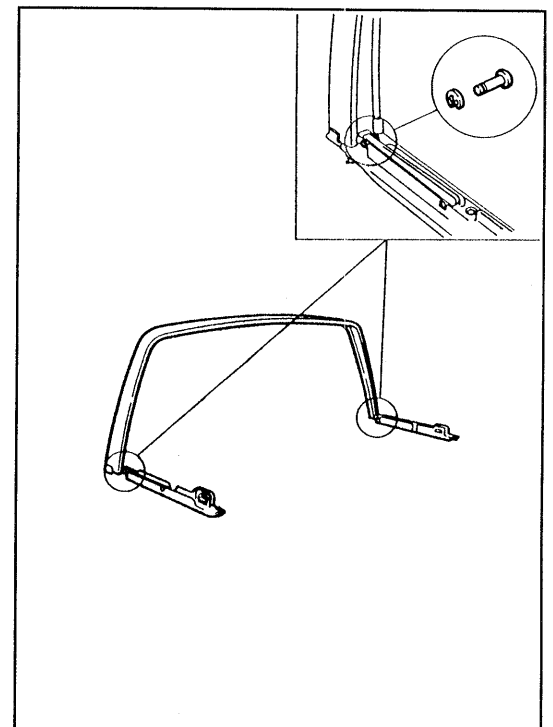
WRU90-BO045



WRU90-BO046

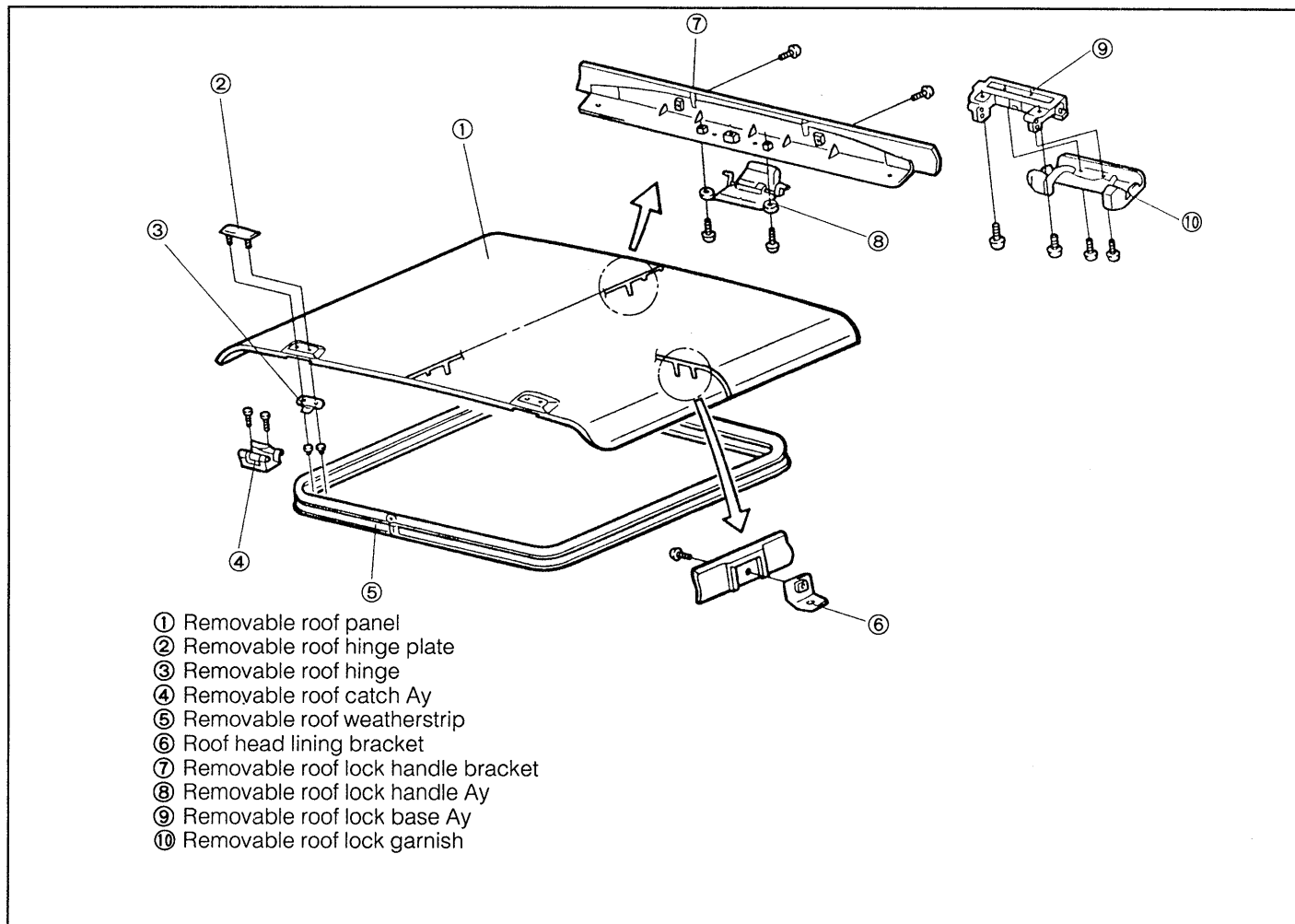
ASSEMBLY

1. Installation of front top cover tarpaulin bow subassembly
 - (1) Install the front top cover tarpaulin bow subassembly to the tarpaulin bow base.
 - (2) Install the head pin and "E" ring.
2. Installation of rear top cover tarpaulin bow subassembly
 - (1) Install the rear top cover tarpaulin bow subassembly to the tarpaulin bow base.
 - (2) Install the head pin, washer and nut.



WRU90-BO047

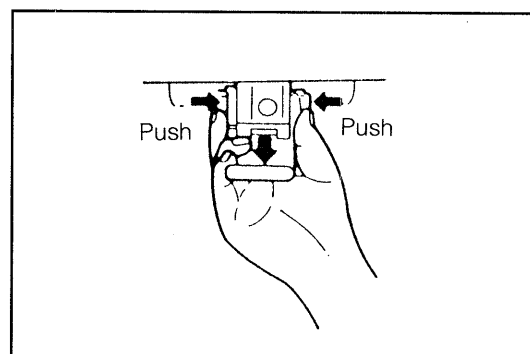
SUNROOF COMPONENTS



WRU90-BO048

REMOVAL

1. Removal of removable roof lock handle assembly
 - (1) Pull the handle toward you while pushing the lock buttons.
 - (2) Remove the handle from the vehicle by pushing the links at the right and left sides.



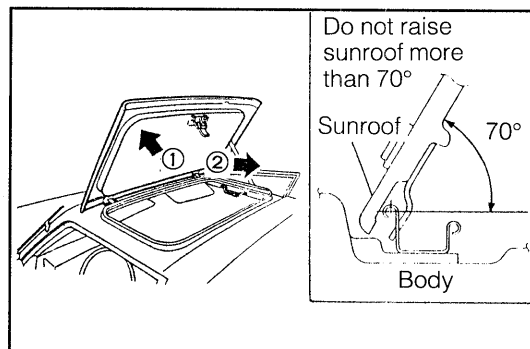
WRU90-BO049

3. Raise the roof. Remove the roof by pulling it upward.

NOTE:

Do not raise the sunroof more than 70 degrees. If the sunroof is raised in excess of 70 degrees, the sunroof will interfere with the body, resulting in hinge deformation or sunroof breakage.

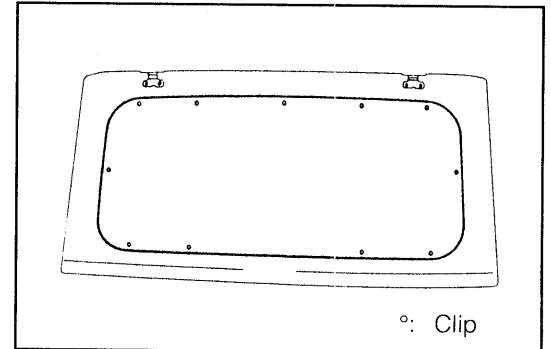
When the sun roof is removed, do not hang on or sit on the sunroof frame.



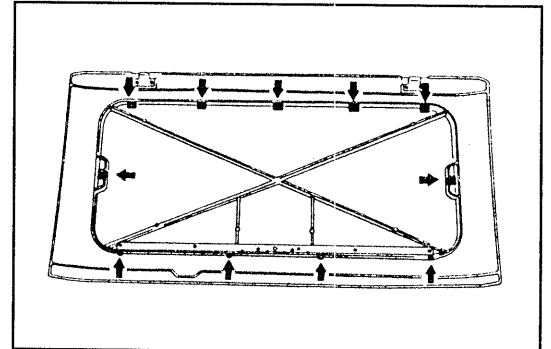
WRU90-BO050

DISASSEMBLY

1. Remove the sunroof headlining assembly by removing the clips.
2. Remove the roof headlining bracket and removable roof lock handle bracket by removing the screws.
3. Remove the removable roof hinge plate and removable roof hinge by removing the nuts.



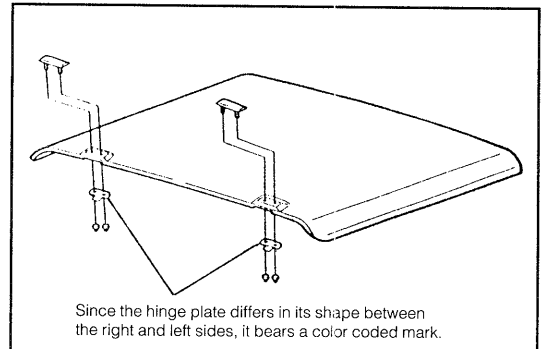
WRU90-BO051



WRU90-BO052

ASSEMBLY

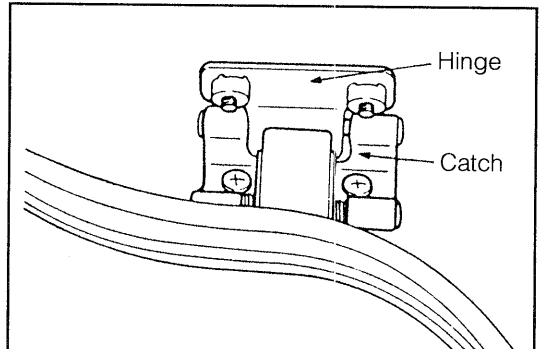
1. Install the removable roof hinge plate and removable roof hinge with the nuts.
2. Install the roof headlining bracket and removable roof lock handle bracket with the screws.
3. Installation of sunroof headlining assembly
 - (1) Ensure that the clips are attached to the sunroof headlining assembly.
 - (2) Install the sunroof headlining assembly to the roof panel.



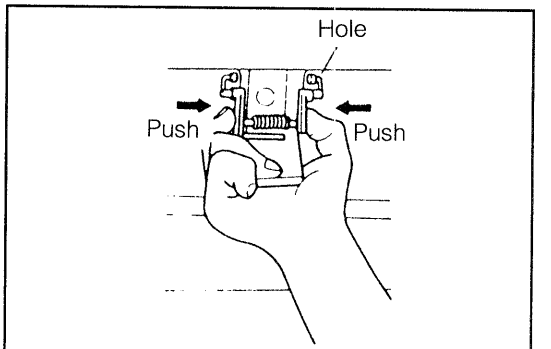
WRU90-BO053

INSTALLATION

1. Align the hinge on the sunroof front end to catch on the roof front open end then push into position from diagonally upper back direction.
2. Close the roof, push the left and right links on the handle and push into the hole on the base securely.
3. Lock the handle by pushing it until clicking sound can be heard. Make sure that the handle is locked.

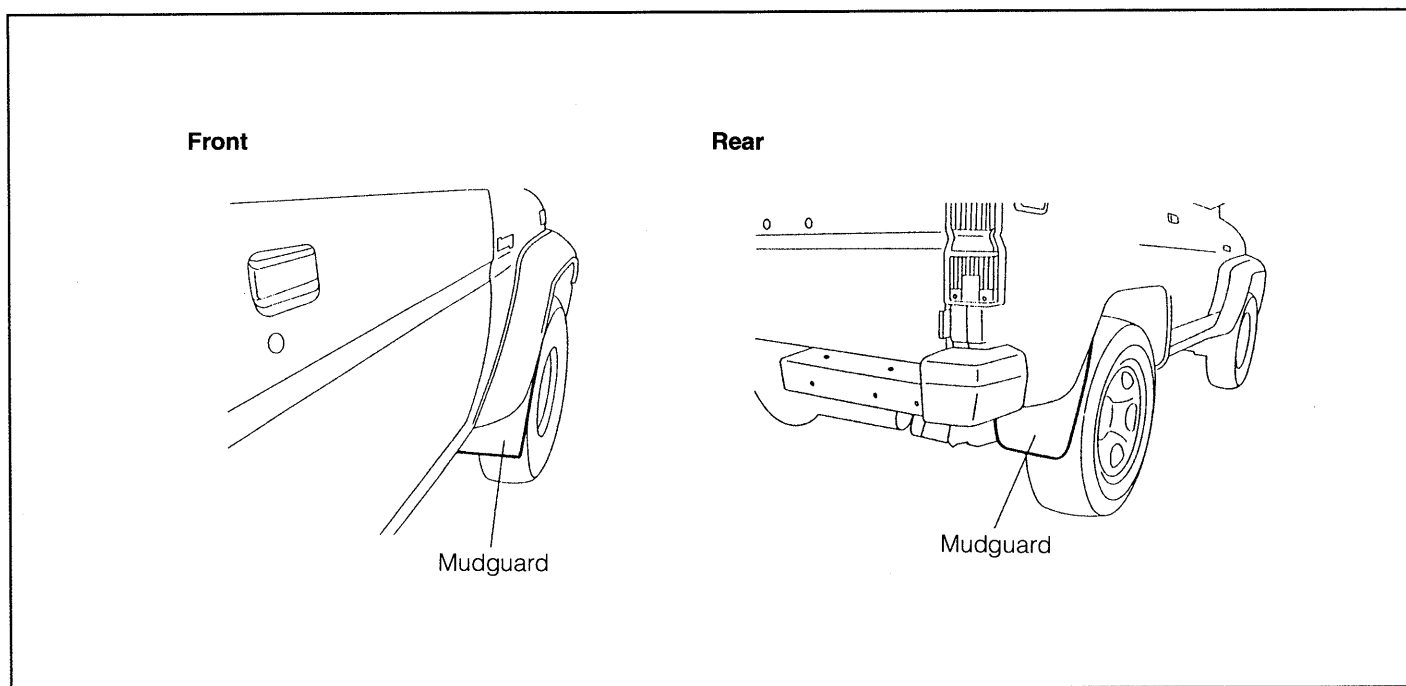


WRU90-BO054



WRU90-BO055

MUDGUARD



WRU90-BO056

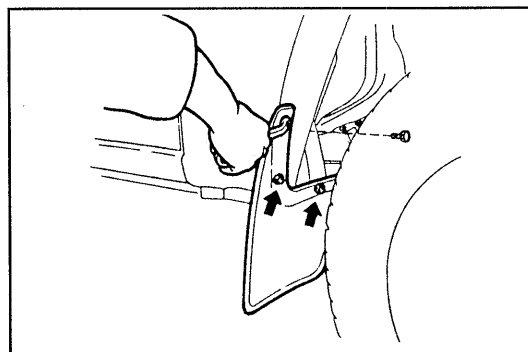
FRONT MUDGUARD

REMOVAL

1. Remove the front mudguard by removing the screws.
2. Remove the front mudguard bracket by removing the bolt.

INSTALLATION

1. Install the front mudguard bracket with the bolt.
2. Install the front mudguard with the screws.

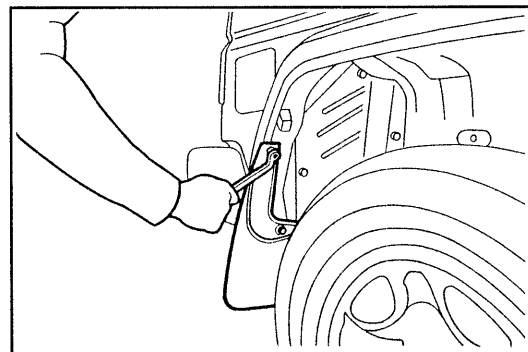


WRU90-BO057

REAR MUDGUARD

REMOVAL

1. Remove the rear mudguard by removing the screws.



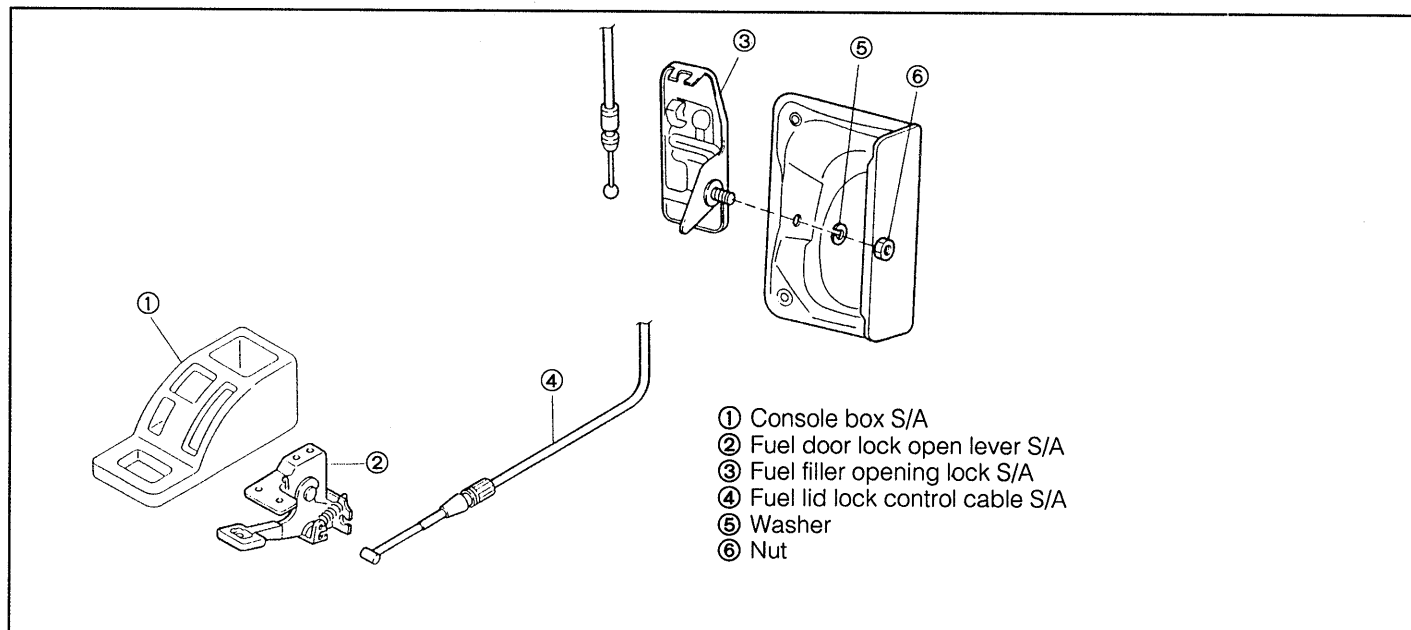
WRU90-BO058

INSTALLATION

1. Install the rear mudguard with the screws.

WRU90-BO059

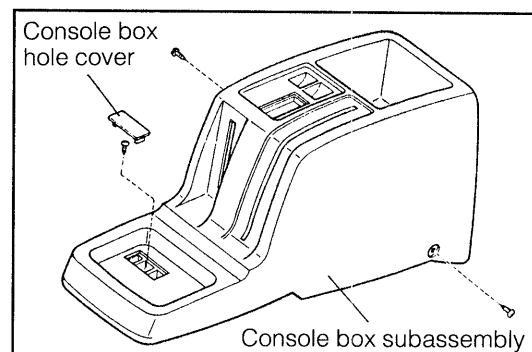
FUEL LID OPENER COMPONENTS



WRU90-BO060

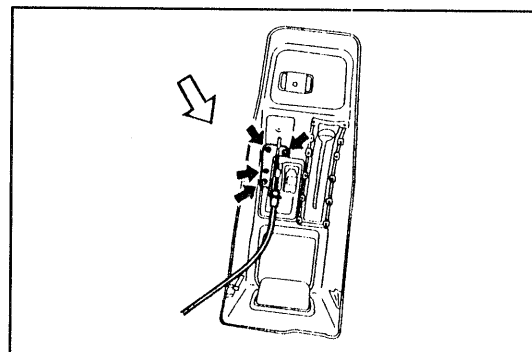
REMOVAL

1. Removal of console box subassembly.
 - (1) Remove the console box hole cover.
 - (2) Remove the console box subassembly by removing the three screws.



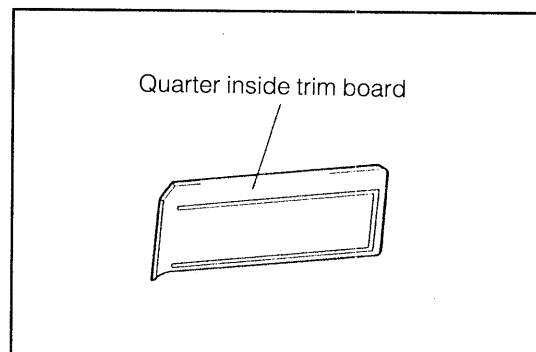
WRU90-BO061

2. Removal of fuel door lock open lever subassembly
 - (1) Remove the fuel door lock open lever subassembly from the console box subassembly removing the four screws.
 - (2) Disconnect the fuel lid lock control cable from the fuel lock open lever subassembly.



WRU90-BO062

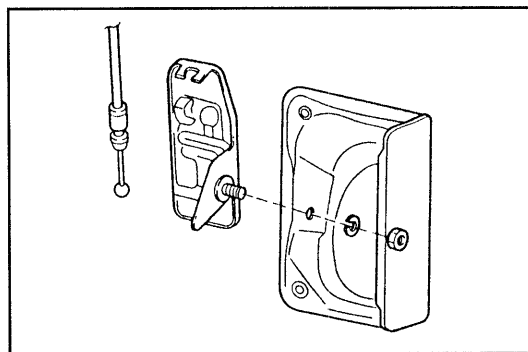
3. Remove the Quarter inside trim board.



WRU90-BO063

BODY

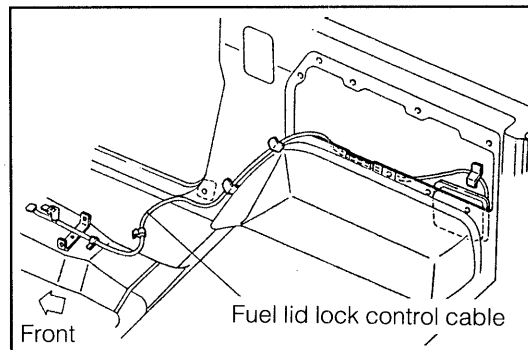
4. Removal of fuel filler opening lock subassembly
 - (1) Remove the rear combination lamp by removing the three screws.
 - (2) Remove the fuel filler opening lock subassembly by removing the nut.
 - (3) Disconnect the fuel lid lock control cable from the fuel filler opening lock subassembly.
5. Remove the fuel lid lock control cable from the body.



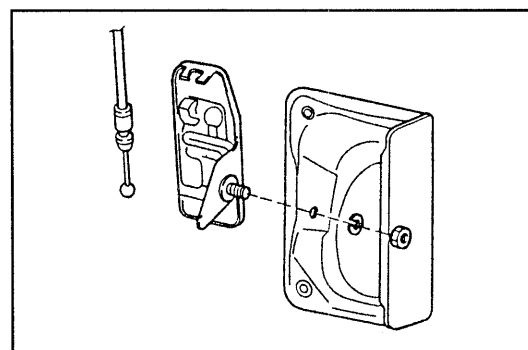
WRU90-BO064

INSTALLATION

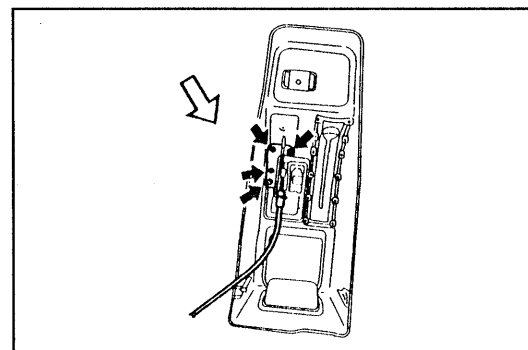
1. Install the fuel lid lock control cable to the body.
2. Installation of fuel filler opening lock subassembly.
 - (1) Connect the fuel lid lock control cable to the fuel filler opening lock subassembly.
 - (2) Install the fuel filler opening lock subassembly with the nut.
 - (3) Install the rear combination lamp with the three screws.
3. Installation of fuel door lock open lever subassembly
 - (1) Connect the fuel lid lock control cable to the fuel lock open lever subassembly.
 - (2) Install the fuel door lock open lever subassembly to the console box subassembly with the four screws.
4. Install the center pillar garnish and Quarter inside trim board.
5. Installation of console box subassembly
 - (1) Install the console box subassembly with the three screws.
 - (2) Install the console box cover.



WRU90-BO065

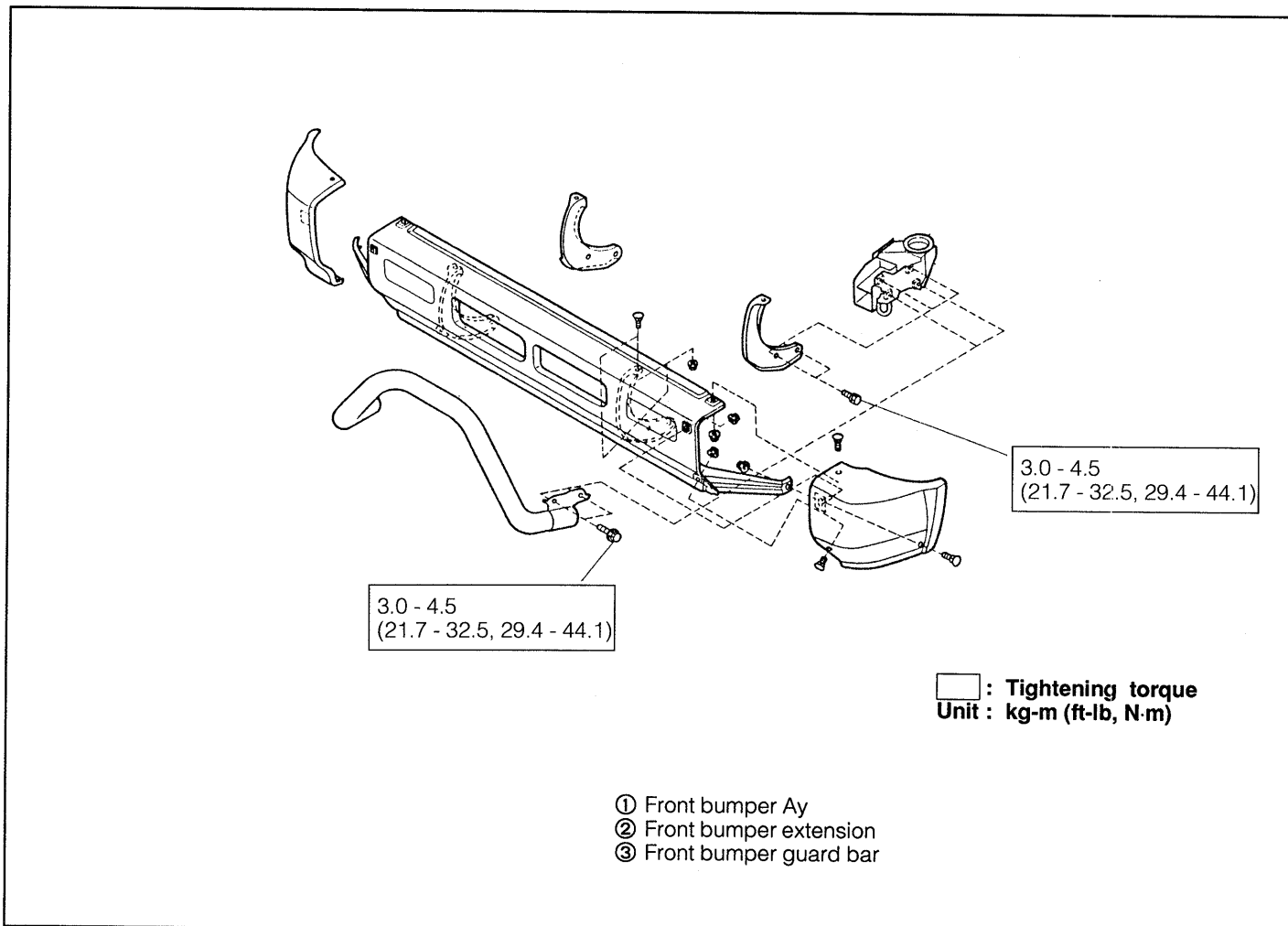


WRU90-BO066



WRU90-BO067

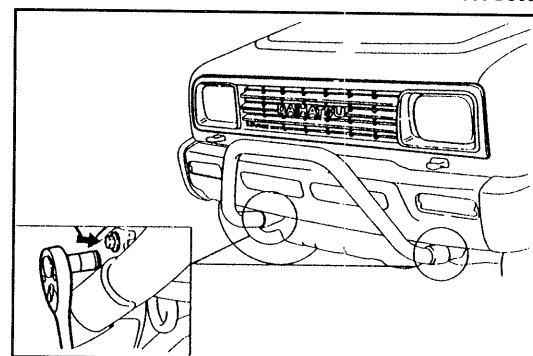
FRONT BUMPER COMPONENTS



WRU90-BO068

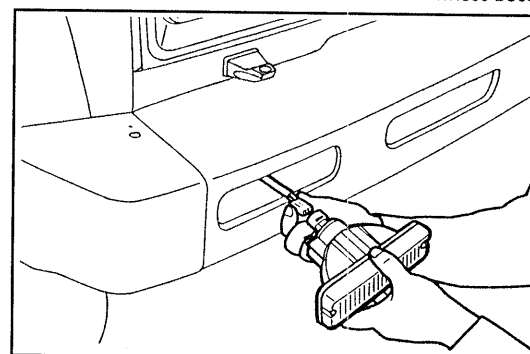
REMOVAL

1. Remove the front bumper guard bar by removing the four bolts.



WRU90-BO069

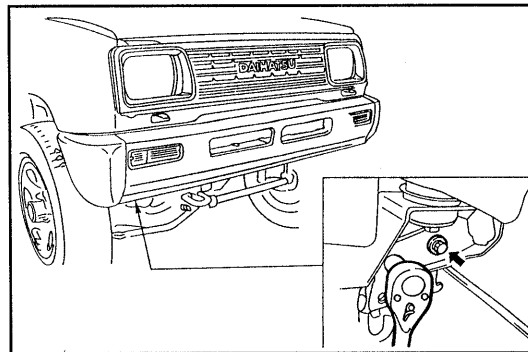
2. Remove the front turn signal lamp assembly by removing the screws and disconnect the connector.



WRU90-BO070

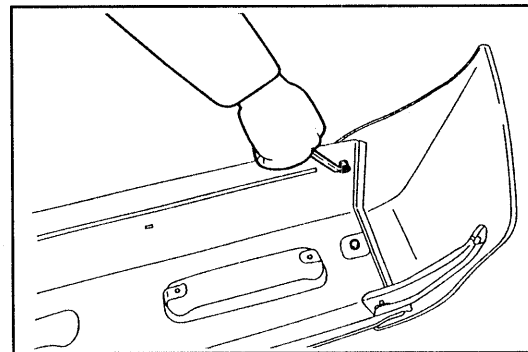
BODY

3. Remove the attaching bolts of the front bumper.



WRU90-BO071

4. Remove the front bumper extension from the front bumper subassembly.



WRU90-BO072

INSTALLATION

1. Install the front bumper extension to the front bumper subassembly.
2. Install the front bumper assembly to the vehicle with the four bolts.

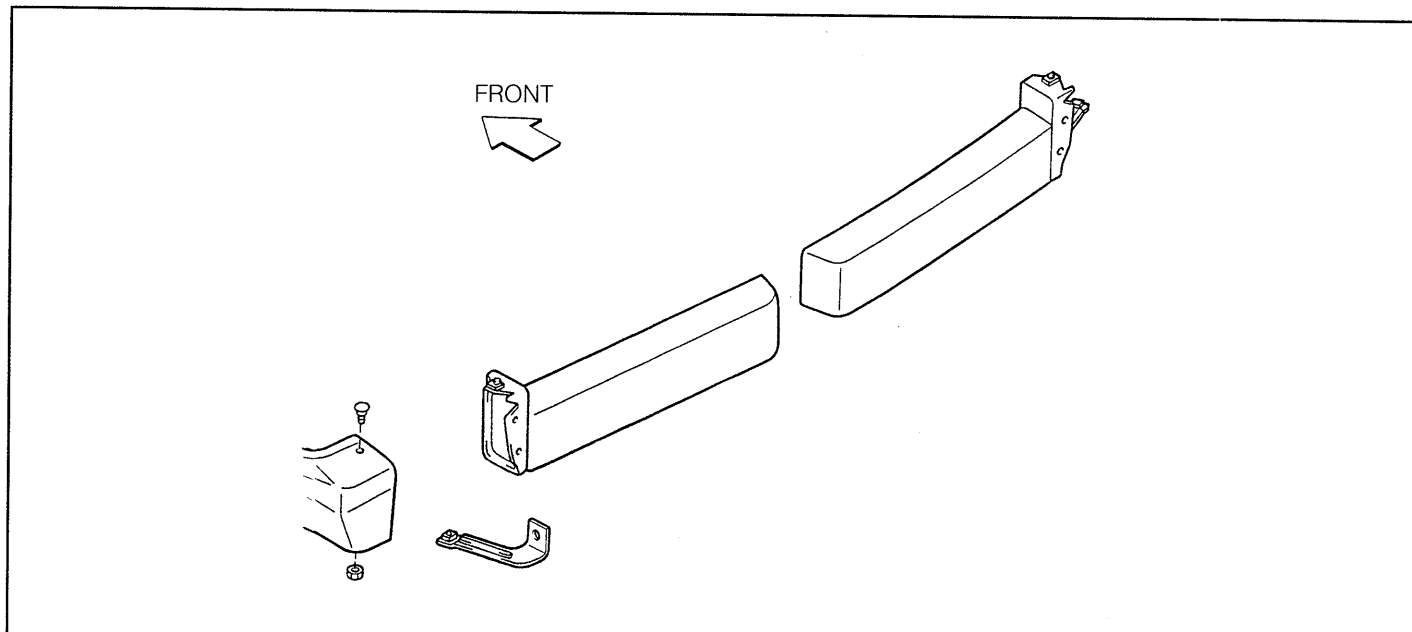
Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)

3. Install the front turn signal lamp assembly.
4. Install the front bumper guard bar with the four bolts.

Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)

WRU90-BO073

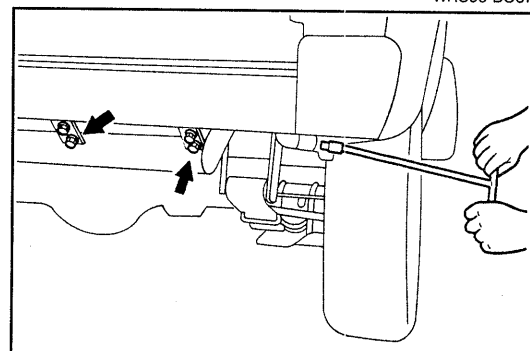
REAR BUMPER COMPONENTS



WRU90-BO074

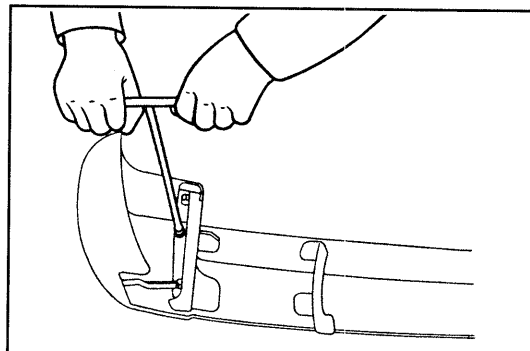
REMOVAL

1. Remove the rear bumper subassembly by removing the five bolts.



WRU90-BO075

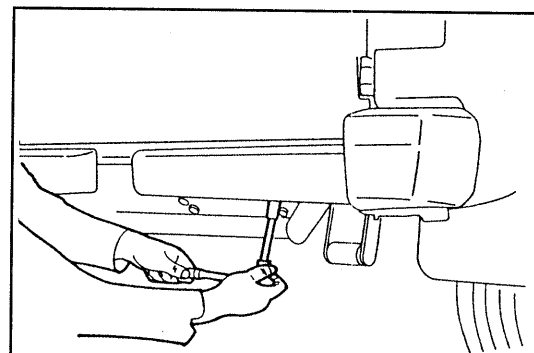
2. Remove the rear bumper extension by removing the three nuts.



WRU90-BO076

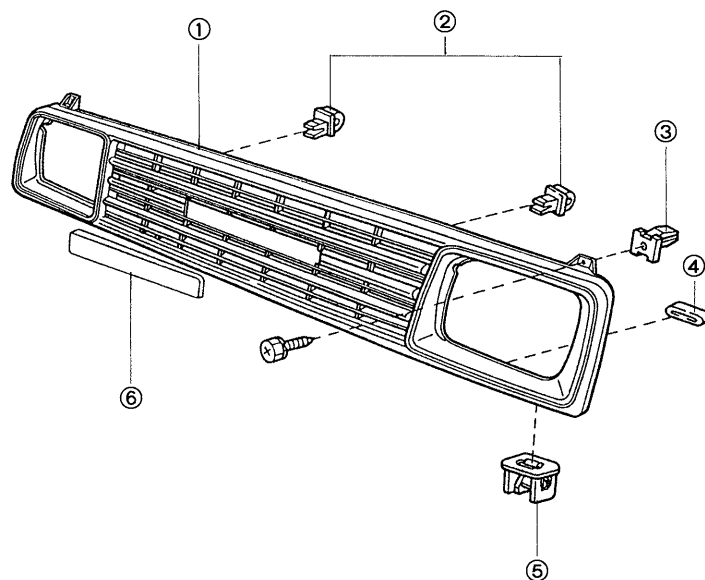
INSTALLATION

1. Install the rear bumper extension with the three nuts.
2. Install the rear bumper subassembly with the five bolts.



WRU90-BO077

RADIATOR GRILLE COMPONENTS



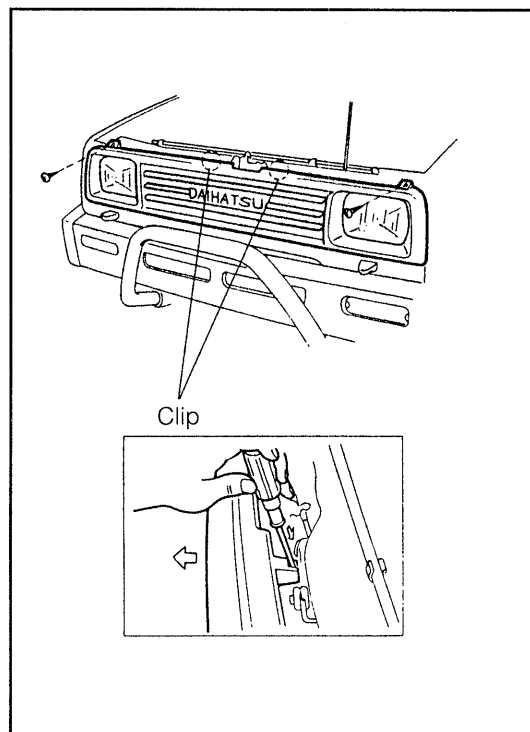
- ① Radiator grille Ay
- ② Clip
- ③ Clip

- ④ Radiator grille to front valance panel cushion
- ⑤ Grommet
- ⑥ Emblem (DAIHATSU)

WRU90-BO078

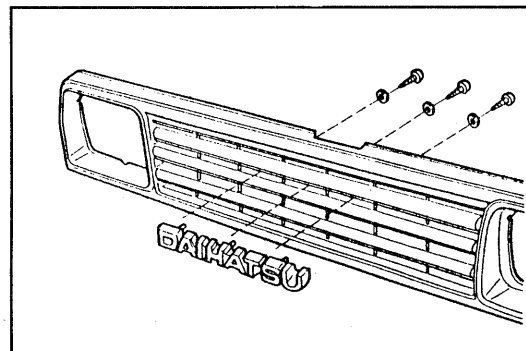
REMOVAL

1. Removal of radiator grille assembly.
 - (1) Remove the two screws.
 - (2) Detaching the clips at two points.
(Push the pawl section at the upper side of the clip, using a screwdriver. Then, pull the radiator grille toward your side.)
 - (3) Remove the radiator grille assembly from the body.



WRU90-BO079

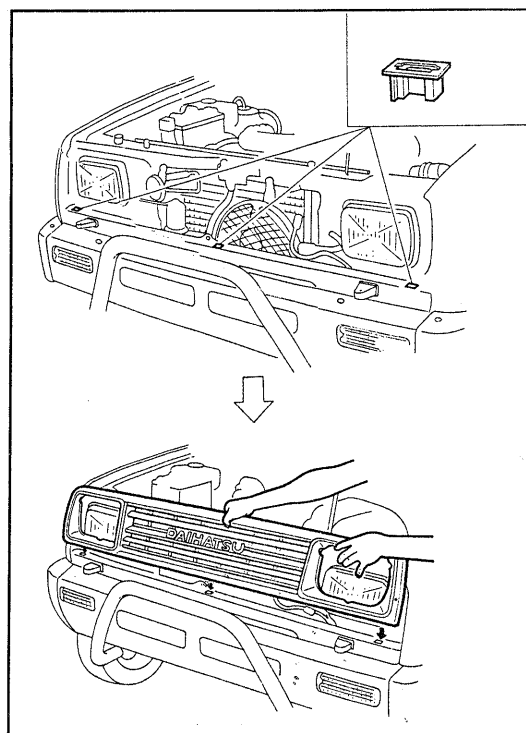
2. Remove the emblems by removing the screws.



WRU90-BO080

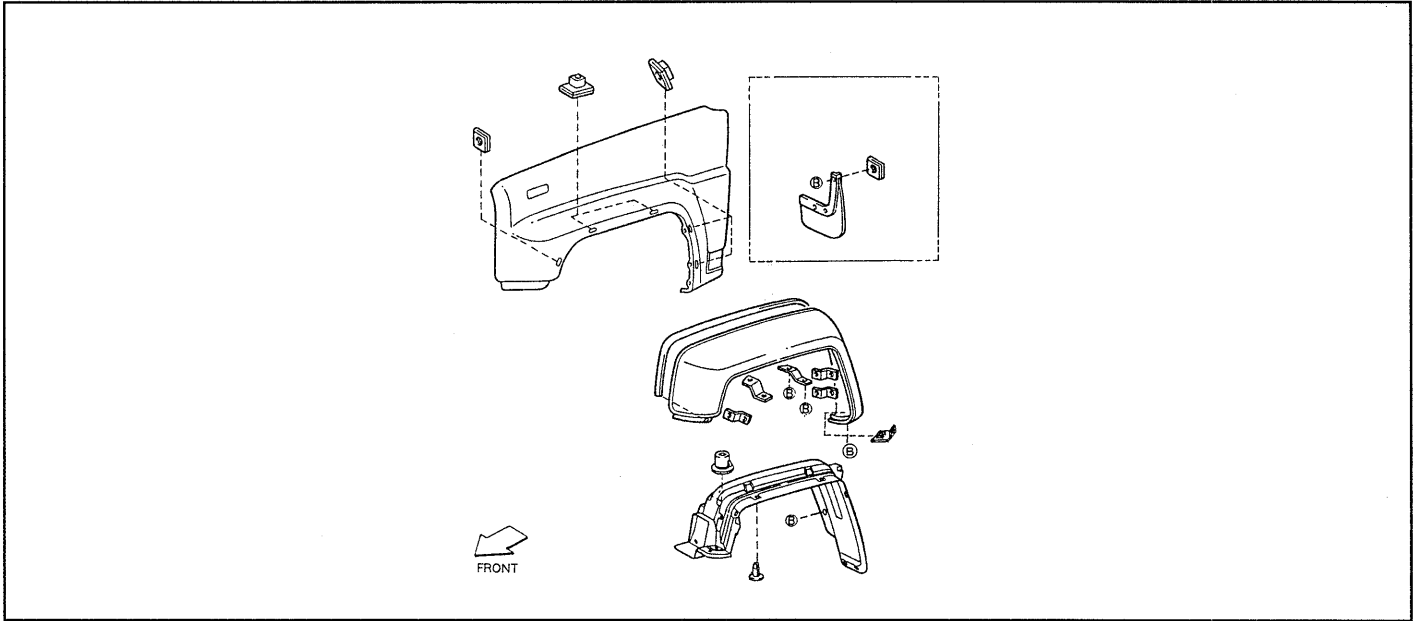
INSTALLATION

1. Install the emblems with the screws.
2. Install the three grommets to the body.
3. Installation of radiator grille assembly.
 - (1) Insert the three protruded position of the radiator grille lower side into the grommets.
 - (2) Attach the two clips at the upper side of the radiator grille.
 - (3) Install the two screws at the upper both side of the radiator grille.



WRU90-BO081

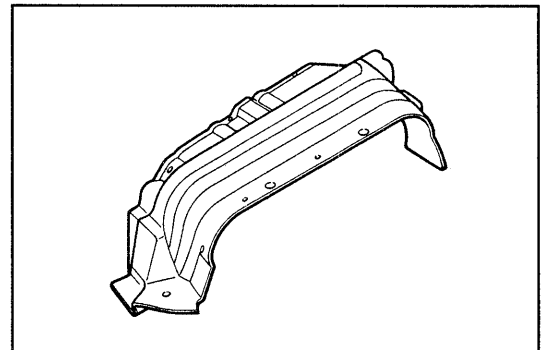
FRONT FENDER COMPONENTS



WRU90-BO082

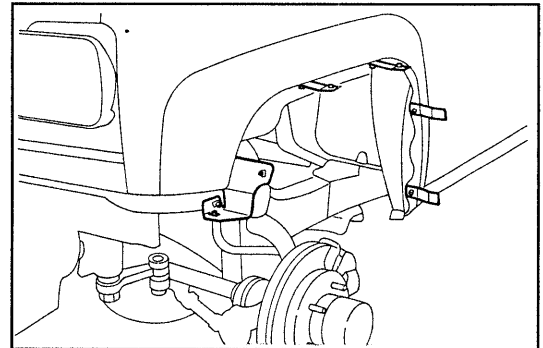
REMOVAL

1. Remove the radiator grille.
2. Remove the front bumper guard bar and front bumper assembly.
3. Remove the front fender liner.

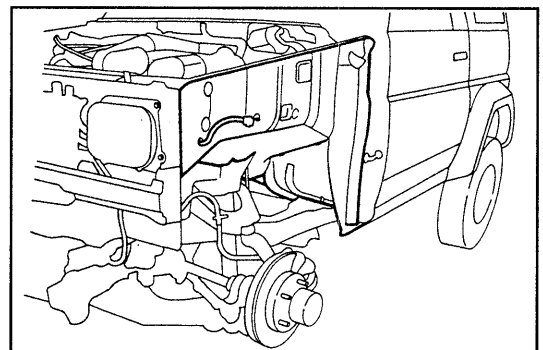


WRU90-BO083

4. Remove the front wheel opening extension.
5. Remove the front marker lamp assembly.
6. Remove the front fender by removing the attaching bolts.



WRU90-BO084



WRU90-BO085

INSTALLATION

1. Install the front fender to the body with the bolts.

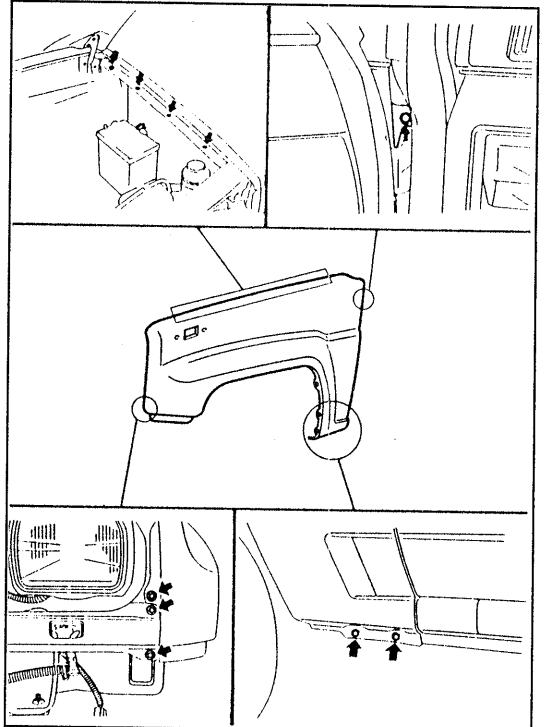
NOTE:

To prevent rust formation, apply rust preventive liquid or paint having the same color as the body to the front fender attaching sections, attaching bolts and so forth.

2. Install the front marker lamp assembly.

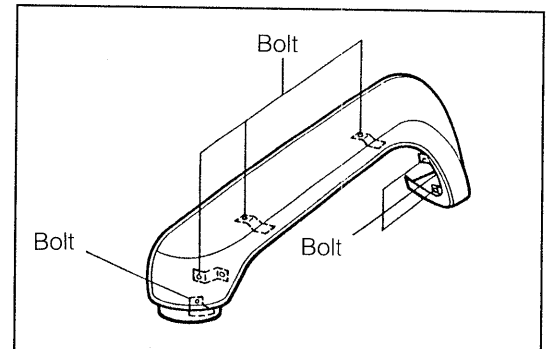
NOTE:

When installing the front marker lamp, the side having a smaller width should face toward the front. It must be noted that the shape differs between the assemblies for the right and left.



WRU90-BO086

3. Install the front wheel opening extension.

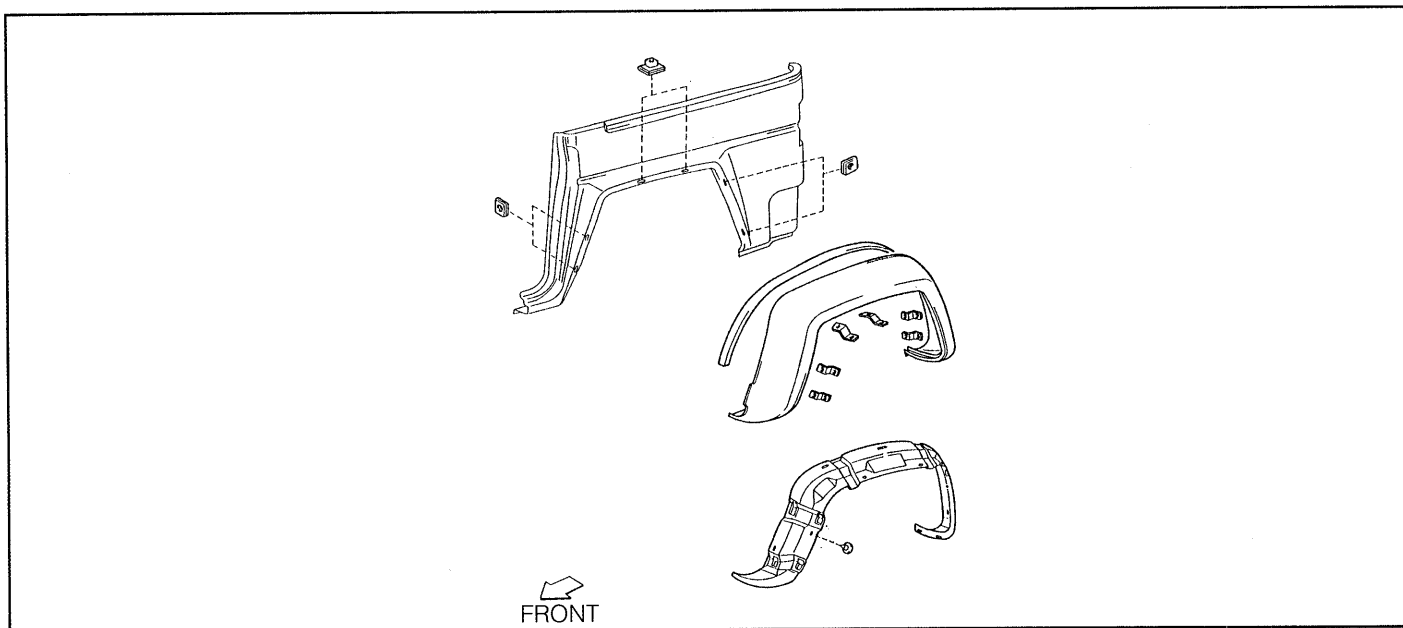


WRU90-BO087

4. Install the front fender liner.
5. Install the front bumper assembly and front bumper guard bar.
6. Install the radiator grille.

WRU90-BO088

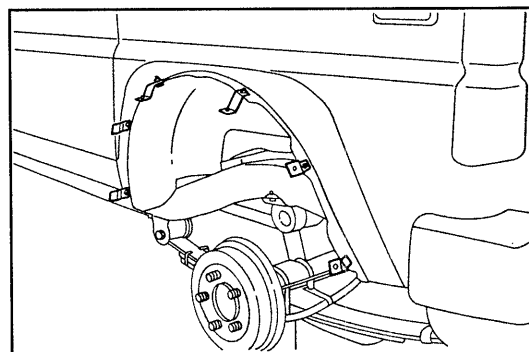
REAR WHEEL OPENING EXTENSION COMPONENTS



WRU90-BO089

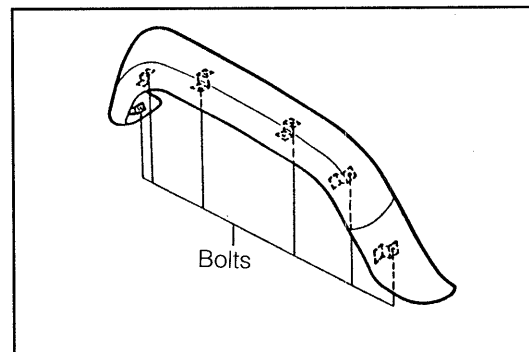
REMOVAL

1. Remove the rear mud guard. (Only vehicle equipped so)
2. Remove the rear fender liner.



WRU90-BO090

3. Remove the rear wheel opening extension.



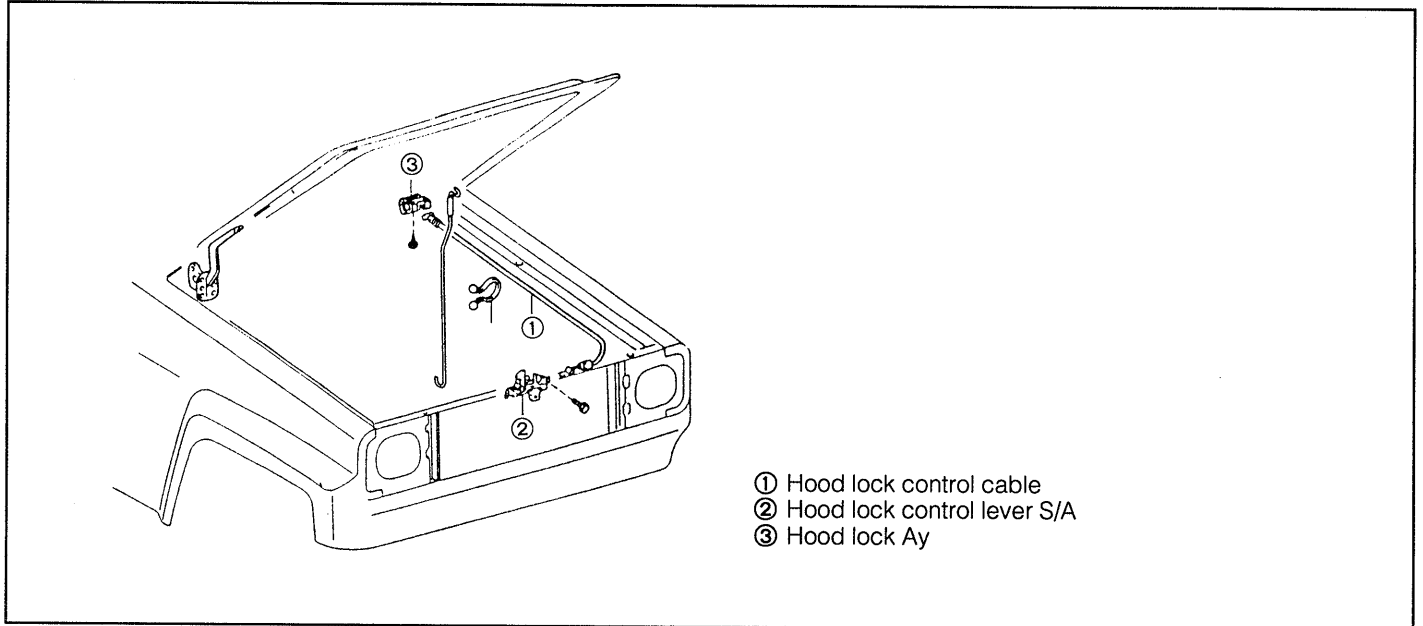
WRU90-BO091

INSTALLATION

1. Install the rear wheel opening extension.
2. Install the rear fender liner.
3. Install the rear mud guard. (Only vehicle equipped so)

WRU90-BO092

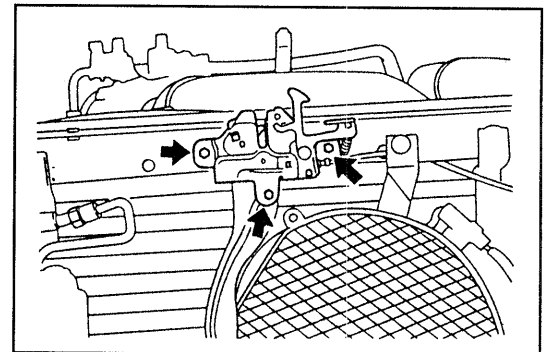
HOOD LOCK CONTROL CABLE COMPONENTS



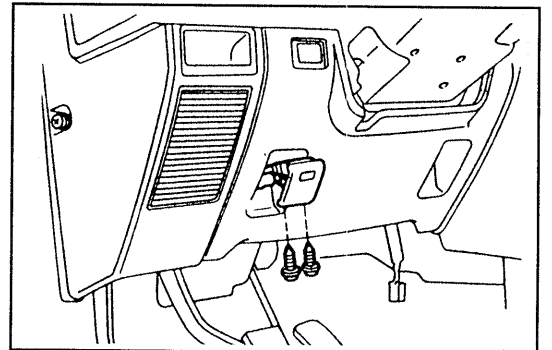
WRU90-BO093

REMOVAL

1. Remove the radiator grille.
2. Removal of hood lock control cable assembly.
 - (1) Remove the hood lock assembly by removing the three bolts.
 - (2) Disconnect the hood lock control cable from the hood lock assembly.
- (3) Remove the hood lock control lever subassembly by removing the two screws.
- (4) Disconnect the hood lock control cable from the hood lock control lever subassembly.
- (5) Remove the hood lock control cable from the body.



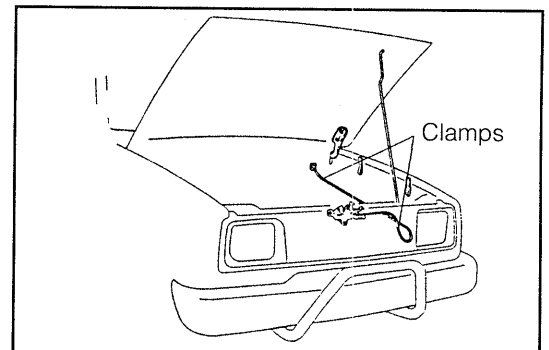
WRU90-BO094



WRU90-BO095

INSTALLATION

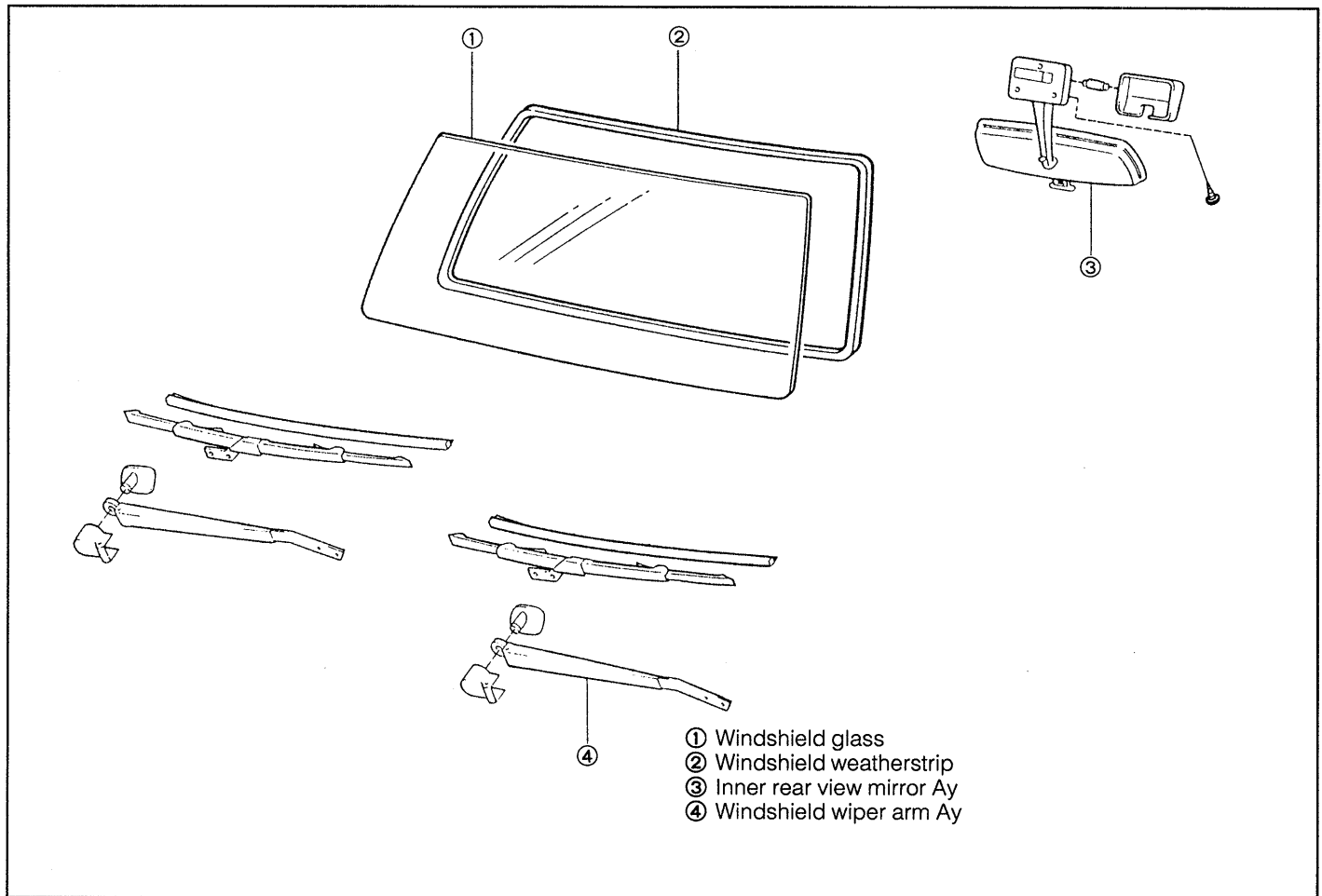
1. Installation of hood lock control cable assembly.
 - (1) Install the hood lock control cable to the body.
 - (2) Connect the hood lock control cable to the hood lock control lever subassembly.
 - (3) Install the hood lock control lever subassembly with the two screws.
 - (4) Connect the hood lock control cable to the hood lock assembly.
 - (5) Install the hood lock assembly with the three bolts.
2. Install the radiator grille.



WRU90-BO096

WINDOWS

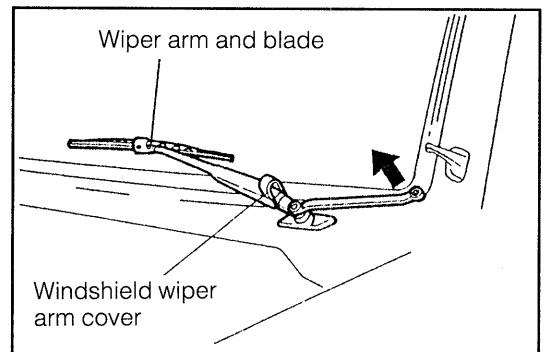
FRONT WINDSHIELD COMPONENTS



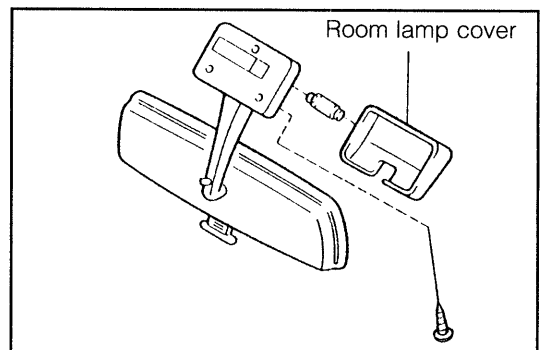
WRU90-BO097

REMOVAL

1. Removal of windshield wiper arm assembly
 - (1) Remove the windshield wiper arm cover.
 - (2) Remove the windshield wiper arm assembly by removing the attaching nut of the front wiper arm assembly.
2. Removal of inner rear-view mirror assembly
 - (1) Remove the room lamp cover.
 - (2) Remove the inner rear-view mirror by removing the three screws, and disconnect the connector.
3. Remove the radio antenna.



WRU90-BO098

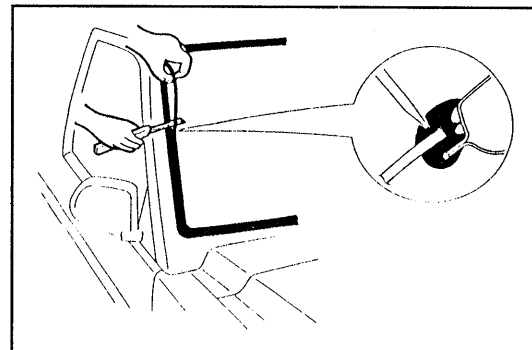


WRU90-BO099

1. Removal of front windshield glass
 - (1) Cut off the weatherstrip lip from the outside, using a knife.
 - (2) Push the glass from the interior, applying a uniform force.
 - (3) Remove the front windshield weatherstrip from the body.

NOTE:

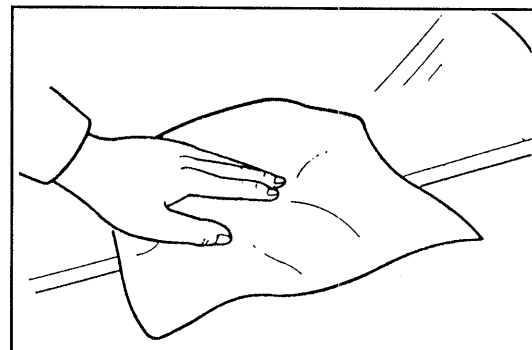
The front windshield employs an adhesive method in its installation. Hence, the weatherstrip is a non-reusable part.



WRU90-BO100

CLEANING

Clean the adhesion sections of the glass and body, using a solvent such as alcohol or white gasoline.



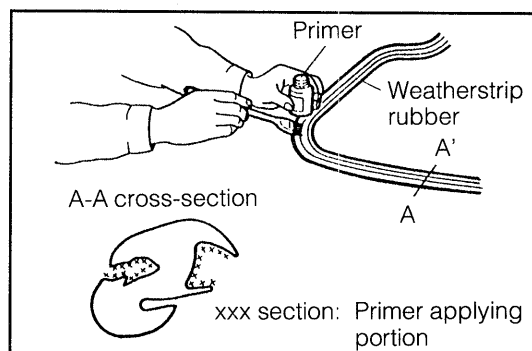
WRU90-BO101

WORK PRIOR TO INSTALLATION

1. Apply primer to the windshield and body attaching sections of the front weatherstrip rubber.

NOTE:

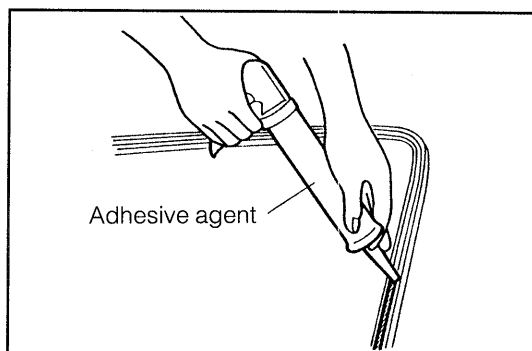
As regards the primer to be applied, use the primer that has been packed as a kit in the urethane U made by ESSEX Speciality Product Company.



WRU90-BO102

2. Fill the adhesive agent to the front windshield attaching section of the weatherstrip rubber.

Adhesive Agent: Urethane U made by ESSEX Speciality Product Company.

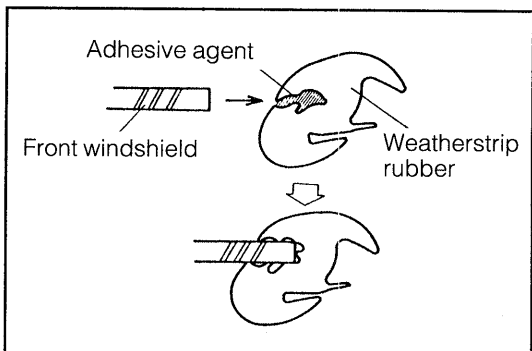


WRU90-BO103

3. Install the weatherstrip rubber to the front windshield.

NOTE:

Upon completion of the installation, if the adhesive agent is oozed out from the weatherstrip, be sure to wipe off such extra agent immediately.

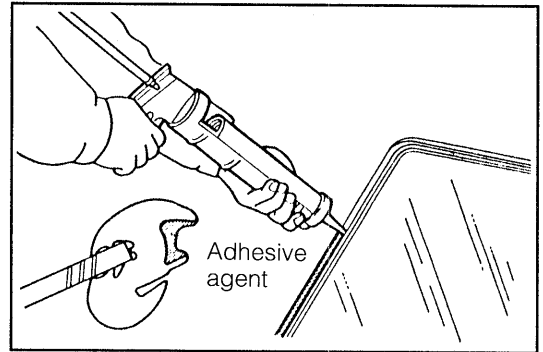


WRU90-BO104

BODY

4. Fill the adhesive agent to the body attaching section of the weatherstrip rubber.

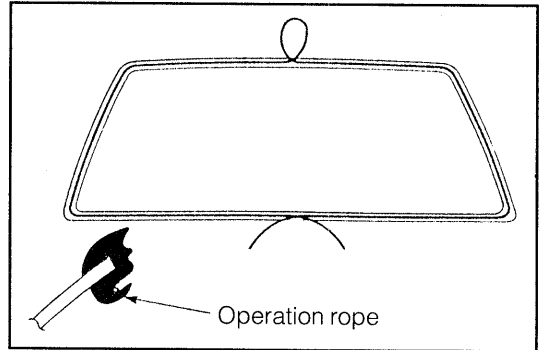
Adhesive Agent: Urethane U made by ESSEX
Speciality Product Company.



WRU90-BO105

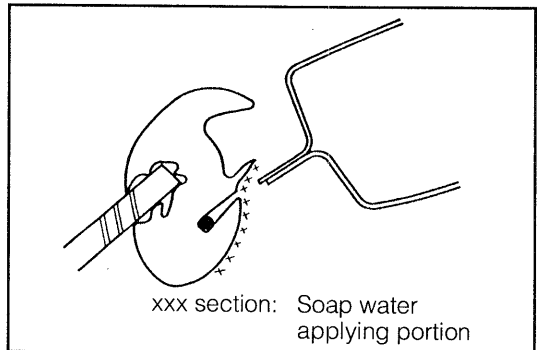
INSTALLATION

1. Installation of front windshield glass.
 - (1) Set an operation rope to the weatherstrip.**NOTE:**
Never reuse any weatherstrip which exhibits deterioration.
Failure to observe this instruction will cause water leakage.



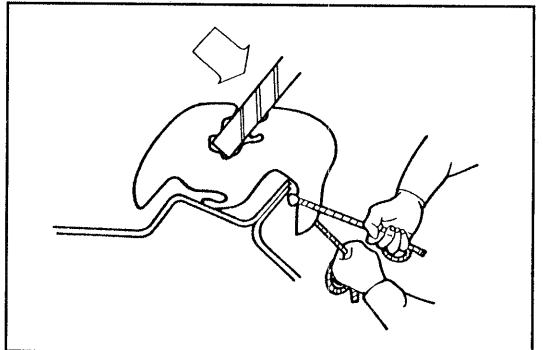
WRU90-BO106

- (2) Apply soap water to the body flange contact sections of the weatherstrip. Also, apply soap water to the body flange.



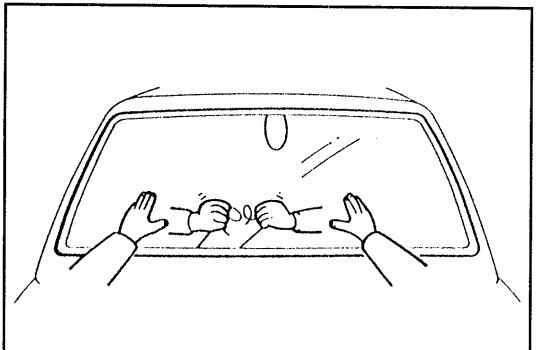
WRU90-BO107

- (3) Place the weatherstrip in such a way that the lower central part of the weatherstrip may be fitted into the body flange. Pull the rope so that the rope may cross over the body flange.



WRU90-BO108

- (4) Hold the one end of the rope suspending in the vehicle interior. Alternately pull the rope in such a way that the weatherstrip may cross over the body flange. While pulling the rope alternately, pound the glass surface at points adjacent to the weatherstrip using one's palm from the vehicle exterior in order that the windshield may be installed into position.

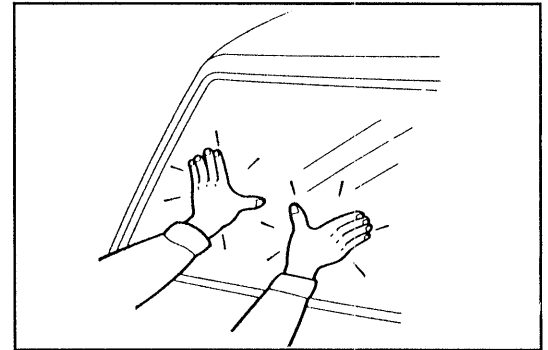


WRU90-BO109

- (5) Pound the glass surface using one's palm from the vehicle exterior so that the windshield may be settled in place.

NOTE:

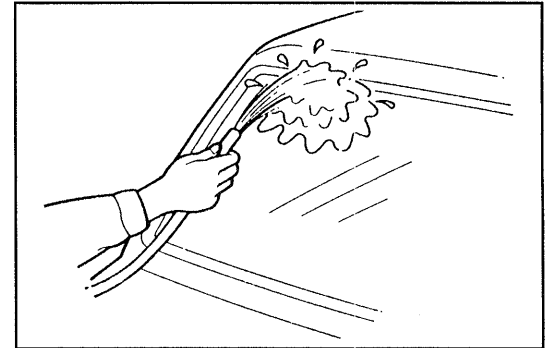
Upon completion of the installation, if the adhesive agent is oozed out from the weatherstrip, be sure to wipe off such extra agent immediately.



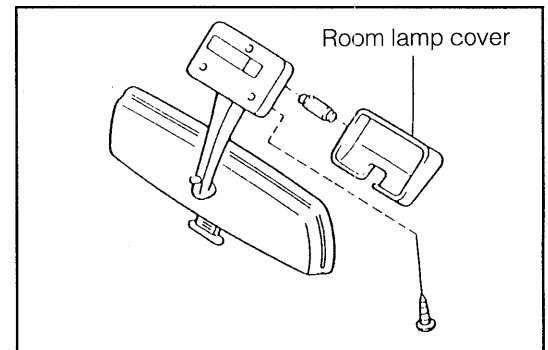
WRU90-BO110

INSPECTION

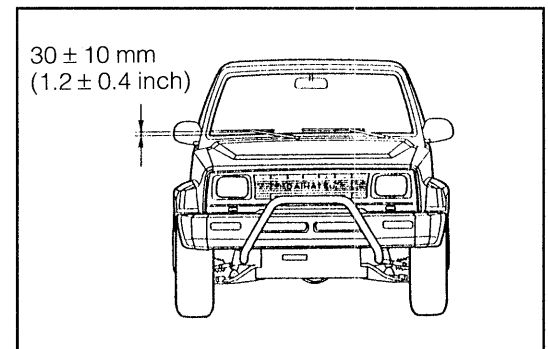
1. Water leakage check
If water leakage exists, dry the leaky point thoroughly.
Then, fill the leaky point with the non-drying sealer.
3. Installation of inner rear-view mirror assembly
 - (1) Connect the connector
 - (2) Install the inner rear-view motor with the three screws.
 - (3) Attach the room lamp cover.
4. Installation of an antenna
5. Installation of windshield wiper arm assembly
 - (1) Operate the wiper motor, until it assumes the automatic stopping position.
 - (2) Set the wiper arms at the positions indicated in the right figure.
 - (3) Tighten the nut and attach the front wiper arm cover.



WRU90-BO111

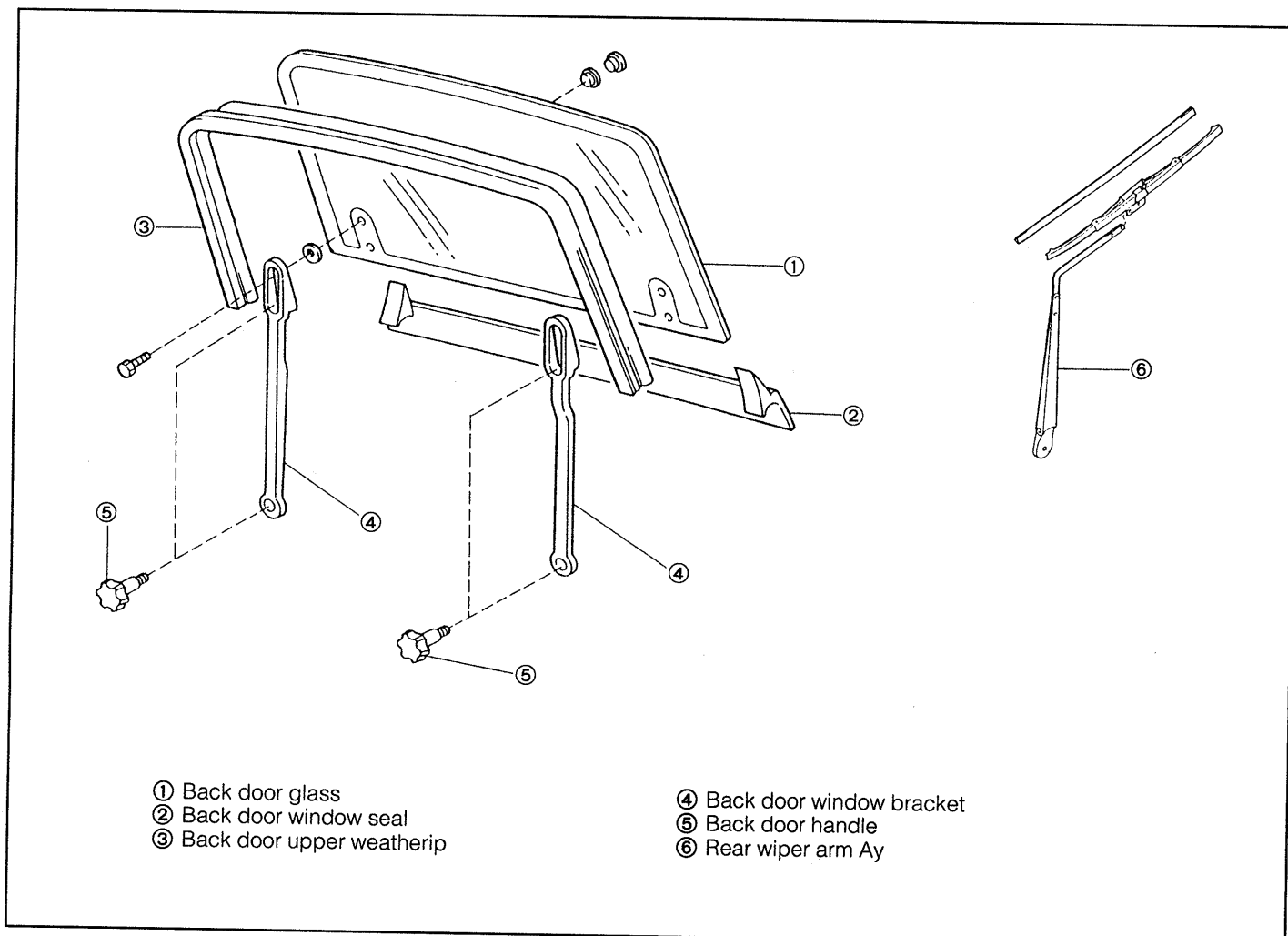


WRU90-BO112



WRU90-BO113

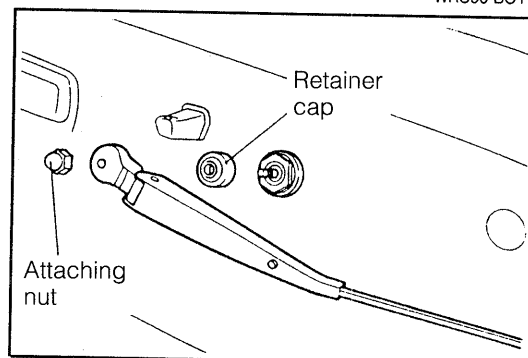
BACK DOOR GLASS COMPONENTS



WRU90-BO114

REMOVAL

1. Remove the spare tire.
2. Remove the rear wiper arm assembly.



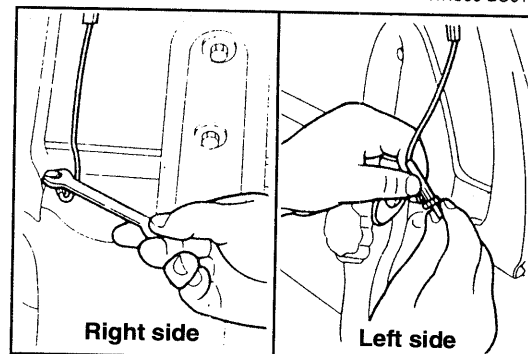
WRU90-BO115

3. Removal the rear window deffogger ground harness
(1) Remove the attaching bolt to disconnect the rear window deffogger ground harness from the back door.

NOTE:

After the harness has been disconnected, reinstall the bolt to the back door for next use.

- (2) Disconnect the connector for the rear window deffogger at left side.

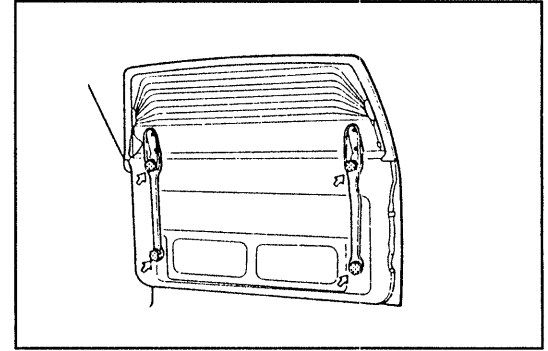


WRU90-BO116

4. Remove the handles (4-points).

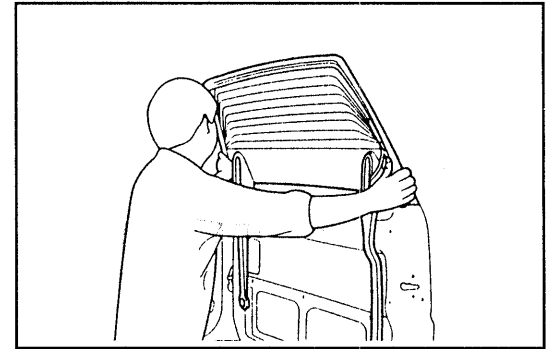
CAUTION:

When installing the back door glass, make sure that the handles have been tightened positively (four points).



WRU90-BO117

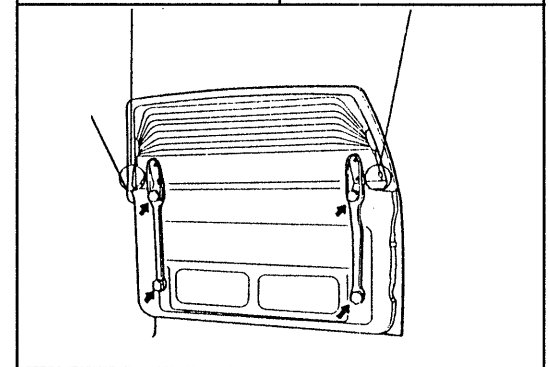
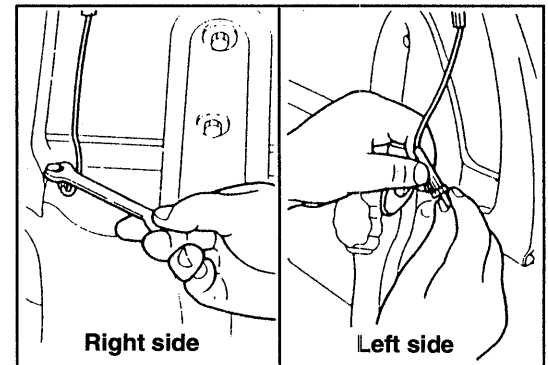
5. Remove the rear window glass.



WRU90-BO118

INSTALLATION

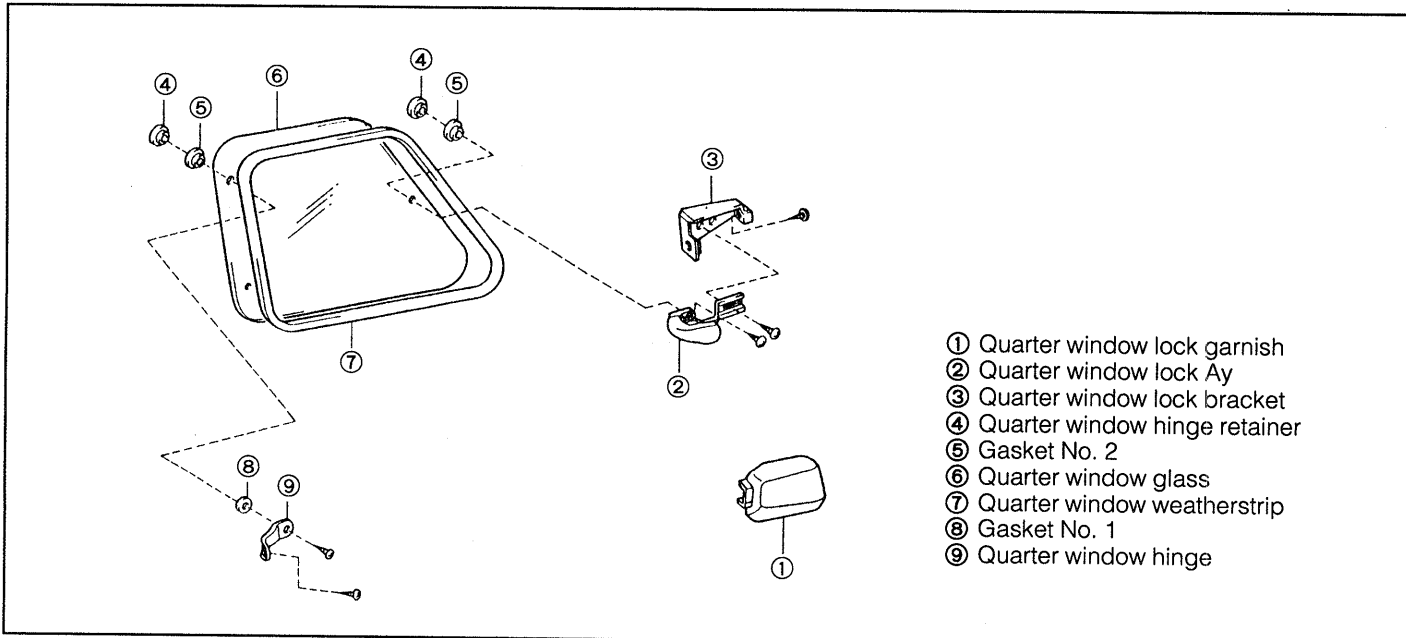
1. Install the back door glass assembly to the body using the four handles.
2. Install the rear window deffogger ground harness.
3. Install the rear wiper arm assembly.
4. Install the speare tire.



WRU90-BO119

QUARTER WINDOW GLASS

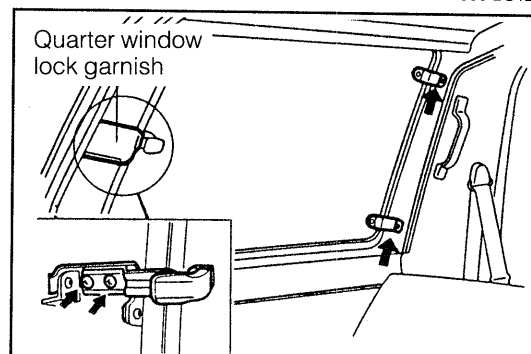
COMPONENTS



WRU90-BO120

REMOVAL

1. Remove the rear roll bar.
2. Removal of quarter window glass assembly
 - (1) Remove the quarter window lock garnish.
 - (2) Remove the screws attaching the quarter window lock to the body.
 - (3) Remove the screws attaching the quarter window hinge to the body.
 - (4) Remove the quarter window assembly from the body.
3. Remove the quarter window lock and quarter window hinge from the quarter window assembly.



WRU90-BO121

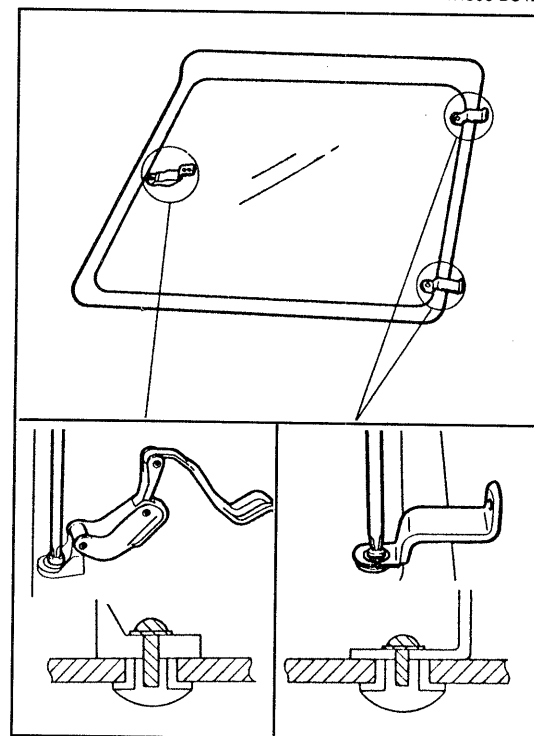
INSTALLATION

1. Install the quarter window lock and quarter window hinge to the quarter window assembly.
2. Install the quarter window assembly to the body, as follows:
 - (1) Install the quarter window hinge to the body with the screws.
 - (2) Install the quarter window lock to the body with the screws.

NOTE:

When tightening the screw, fill the nut with an adhesive agent (instantaneous adhesive agent).

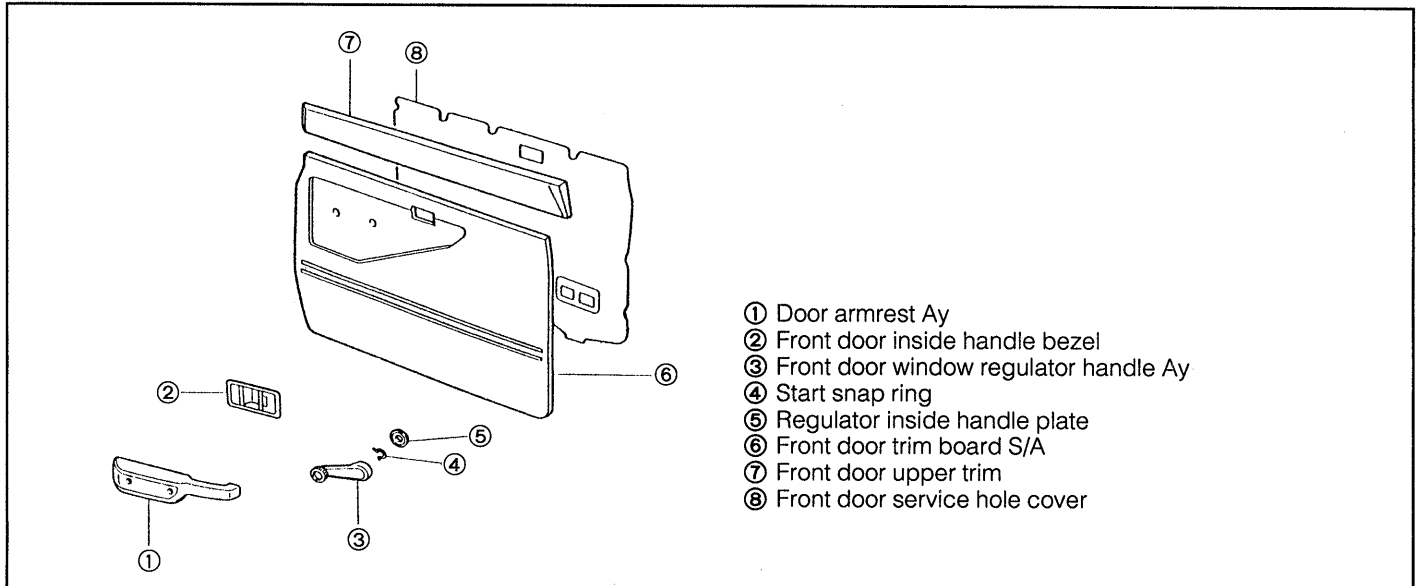
- (3) Install the quarter window lock garnish.
3. Install the rear roll bar.



WRU90-BO122

FRONT DOOR

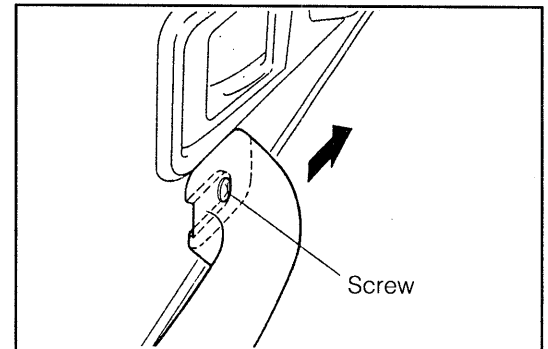
DOOR TRIM AND SERVICE HOLE COVER COMPONENTS



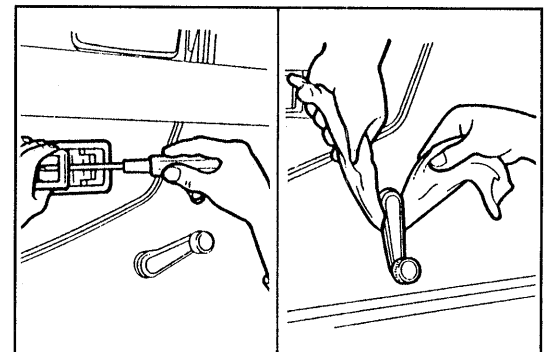
WRU90-BO123

REMOVAL

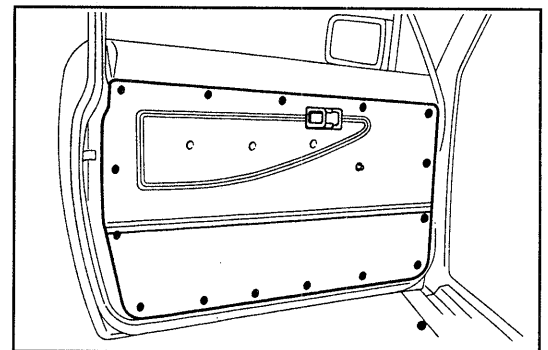
1. Removal of door armrest assembly
 - (1) Remove the two screws.
 - (2) Remove the door armrest assembly from front door.
 - (3) Remove the screw.
2. Remove the front door inside handle bezel by removing the screw.
3. Removal of front door window regulator handle assembly
 - (1) Pull off the snap ring with a cloth as indicated in the figure.
 - (2) Remove the front door window regulator handle and door regulator inside handle plate.
4. Remove the front door trim board subassembly by removing the clips.
5. Remove the front door service hole cover.



WRU90-BO124



WRU90-BO125



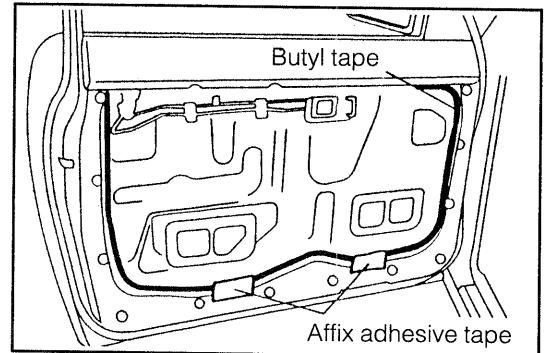
WRU90-BO126

INSTALLATION

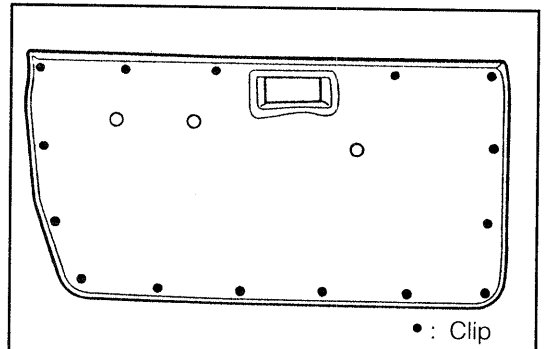
1. Installation of front door service hole cover
 - (1) Affix butyl tape to the points indicated in the right figure.
 - (2) Insert the cover at the lower end into the aperture at the lower side of the door panel. Affix adhesive tape on the holes.

NOTE:

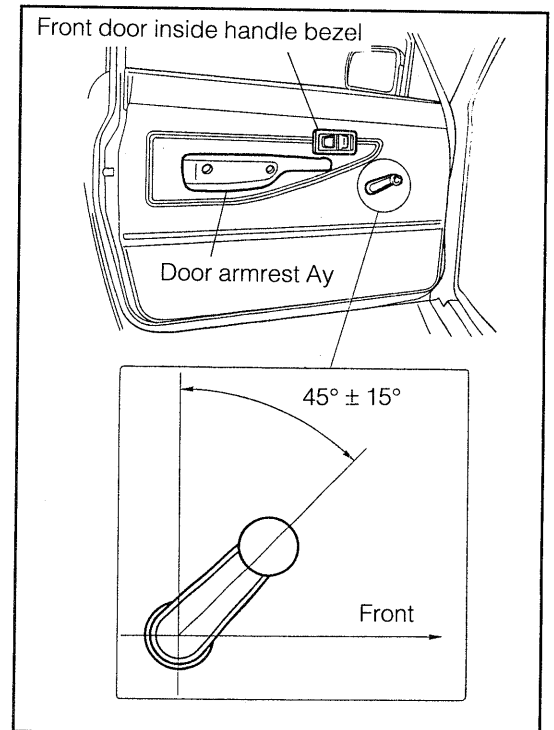
1. Never plug the clip hole of the door trim with adhesive tape.
 2. Replace any service hole cover which exhibits rupture.
2. Installation of front door trim panel assembly
 - (1) Ensure that the clips are attached to the front door trim panel assembly.
 - (2) Install the front door trim panel assembly to the front door.
3. Install the front door inside handle bezel and door armrest assembly.
 4. Installation of front door window regulator handle assembly.
 - (1) Install the door regulator inside handle plate.
 - (2) Set the snap ring to the front door window regulator handle.
 - (3) Install the front door window regulator handle in the angle specified in the right figure.



WRU90-BO127



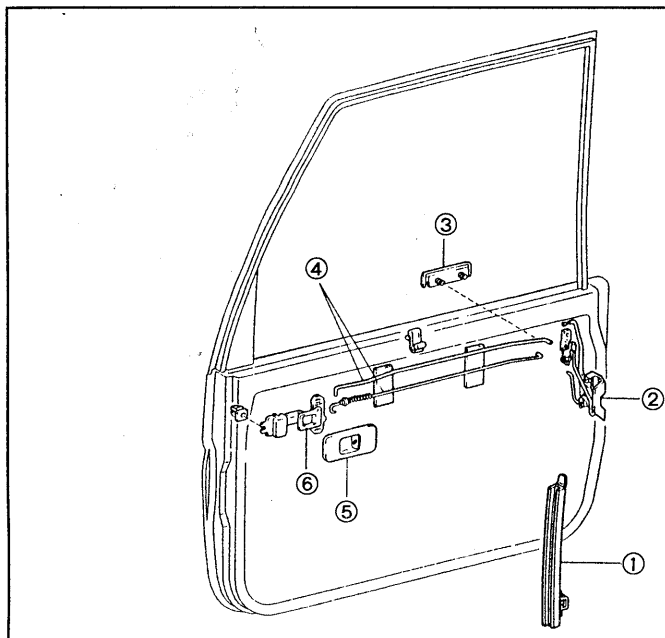
WRU90-BO128



WRU90-BO129

DOOR LOCK AND OUTSIDE DOOR HANDLE

COMPONENTS

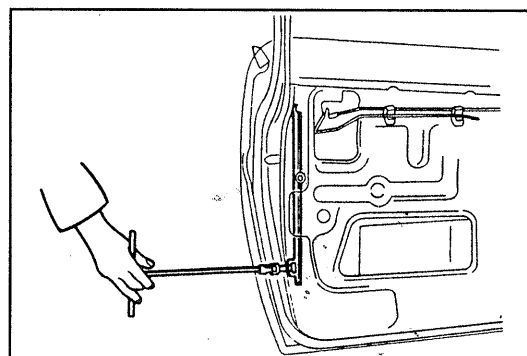


- ① Front door rear lower frame S/A
- ② Front door lock Ay
- ③ Front door outside handle Ay
- ④ Front door control link
- ⑤ Front door inside handle bezel
- ⑥ Front door inside handle S/A

WRU90-BO130

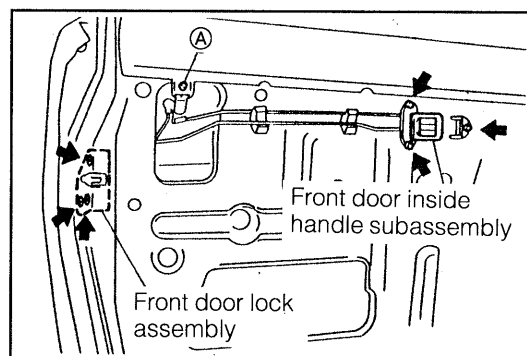
REMOVE

1. Remove the front door trim-related parts.
2. Remove the front door rear lower frame subassembly.



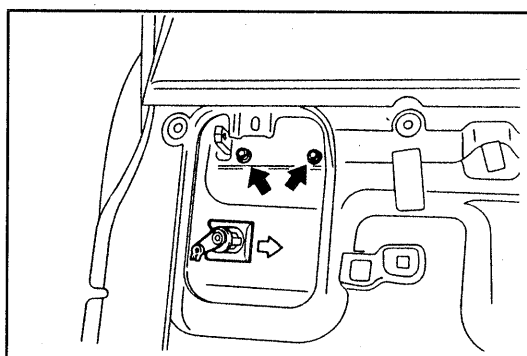
WRU90-BO131

3. Removal of front door lock assembly
 - (1) Remove the front door inside handle subassembly.
 - (2) Remove the bolt (A).
 - (3) Remove the front door lock assembly.



WRU90-BO132

4. Detach the front door outside handle assembly by removing the two nuts.
5. Detach the clip. Remove the key cylinder.

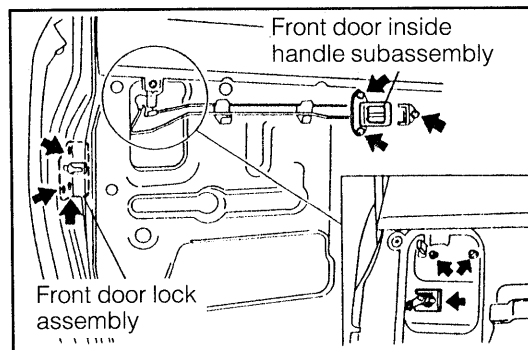


WRU90-BO133

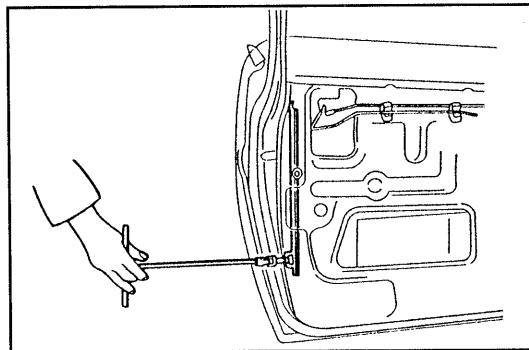
BODY

INSTALLATION

1. Install the front door outside handle assembly with the two nuts.
2. Install the key cylinder into position with the clip.
3. Installation of front door lock assembly.
 - (1) Install the front door lock assembly with the three screws.
 - (2) Set the control links and tighten the bolt **A**.
 - (3) Install the front door inside handle subassembly with three bolts.
4. Install the front door rear lower frame subassembly with bolt.
5. Install the front door trim-related parts.

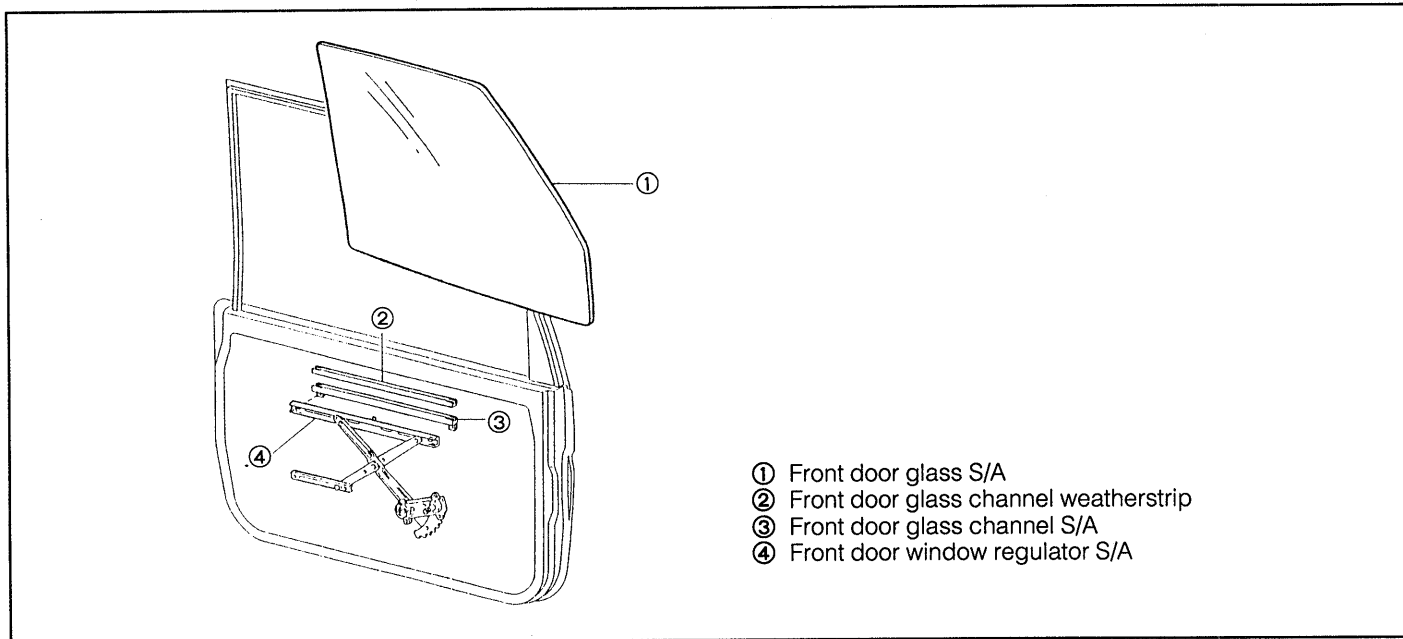


WRU90-BO134



WRU90-BO135

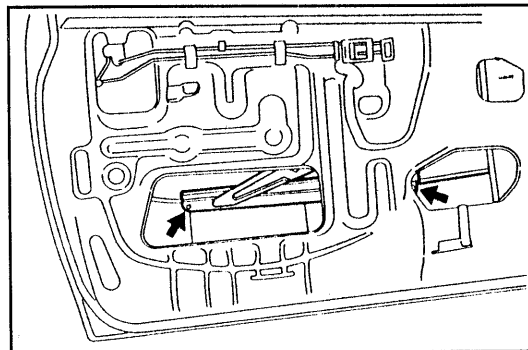
DOOR GLASS AND REGULATOR COMPONENTS



WRU90-BO136

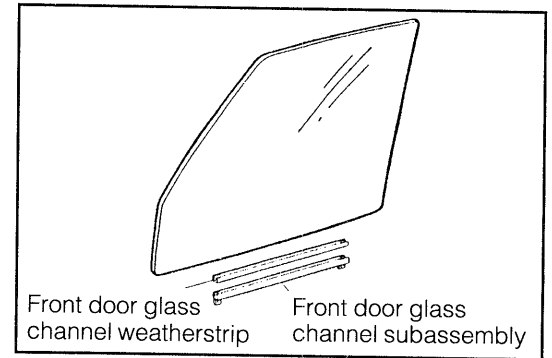
REMOVAL

1. Remove the door trim-related parts.
2. Remove the two attaching bolts of the front door glass subassembly. Remove the front door glass subassembly from the front door.



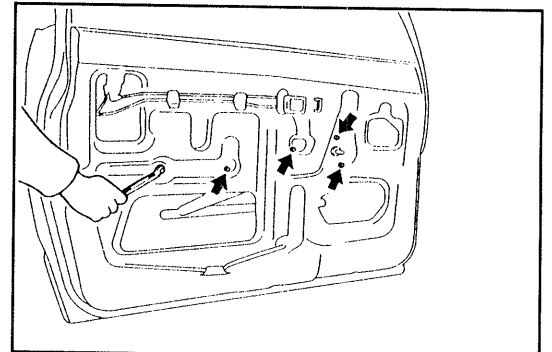
WRU90-BO137

3. Remove the front door glass channel subassembly and front door glass channel weatherstrip.



WRU90-BO138

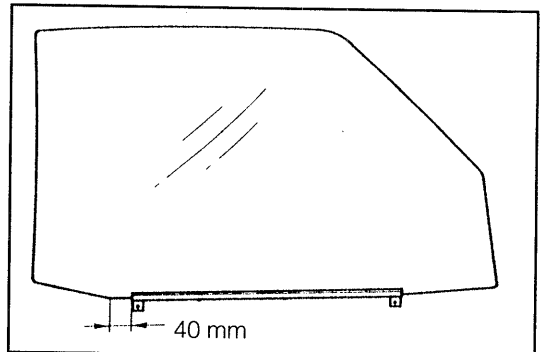
4. Remove the front door window regulator assembly by removing the five bolts.
5. Remove the front door glass weatherstrip outer and inner.
6. Remove the front door glass run.
7. Remove the front door rear lower frame subassembly.



WRU90-BO139

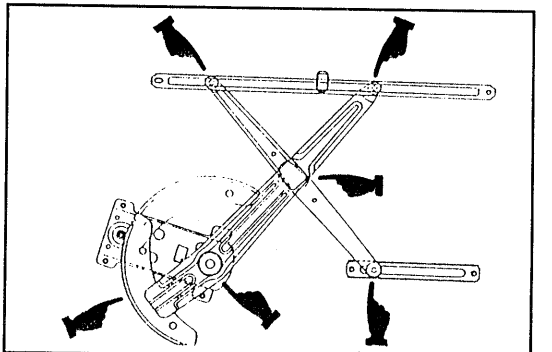
INSTALLATION

1. Install the front door rear lower frame subassembly to the body.
2. Install the front door glass run and front door upper trim to the body.
3. Install the front door glass weatherstrip outer and inner.
4. Install the front door glass channel weatherstrip and front door glass channel subassembly to the front door glass.



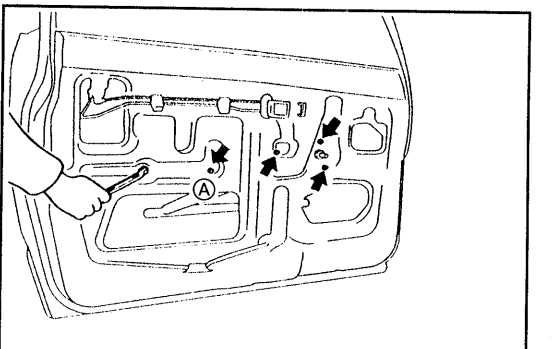
WRU90-BO140

5. Installation of front door window regulator assembly
 - (1) Apply MP grease to the sliding section.



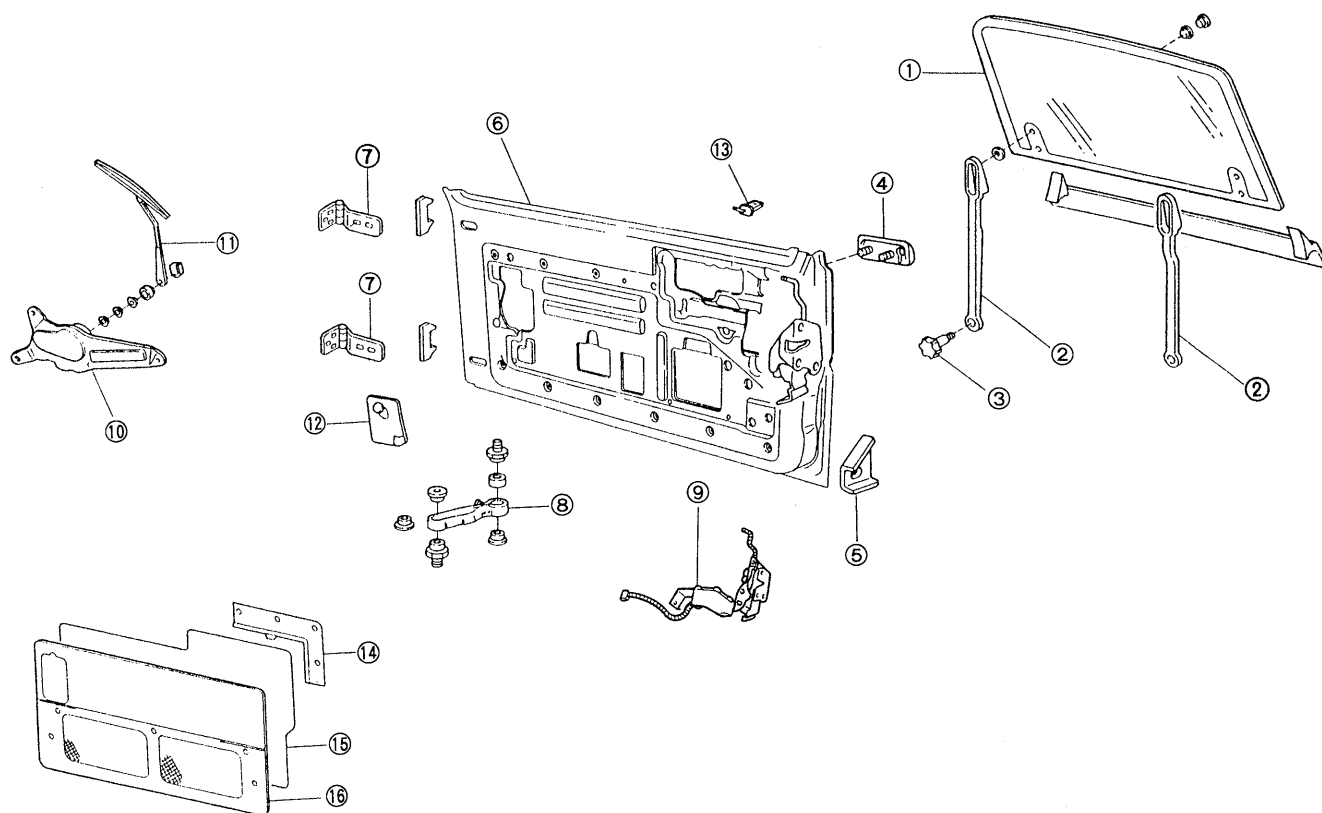
WRU90-BO141

- (2) Install the front door window regulator assembly. (Tighten the bolts other than the bolts **A**. Then, tighten the two bolts **A** at the center section of the elongated hole of the door panel.)
6. Installation of front door glass subassembly
 - (1) Install the front door glass subassembly.
 - (2) Close the front door glass fully. Then, lower the front door glass 40 mm (1.57 inches).
 - (3) First loosen the bolts **A** and then tighten them again.
7. Install the door trim-related parts.



WRU90-BO142

BACK DOOR COMPONENTS



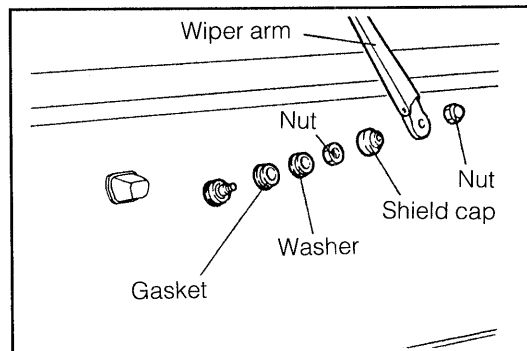
- ① Back door glass
- ② Back door window bracket
- ③ Handle
- ④ Back door handle Ay
- ⑤ Back door down male back stopper
- ⑥ Back door panel
- ⑦ Back door hinge
- ⑧ Back door check

- ⑨ Back door control motor Ay
- ⑩ Rear wiper motor Ay
- ⑪ Rear wiper arm
- ⑫ Rear washer jar Ay
- ⑬ Rear washer nozzle Ay
- ⑭ Back door service hole panel cover
- ⑮ Service hole cover
- ⑯ Back door trim

WRU90-BO143

REMOVAL

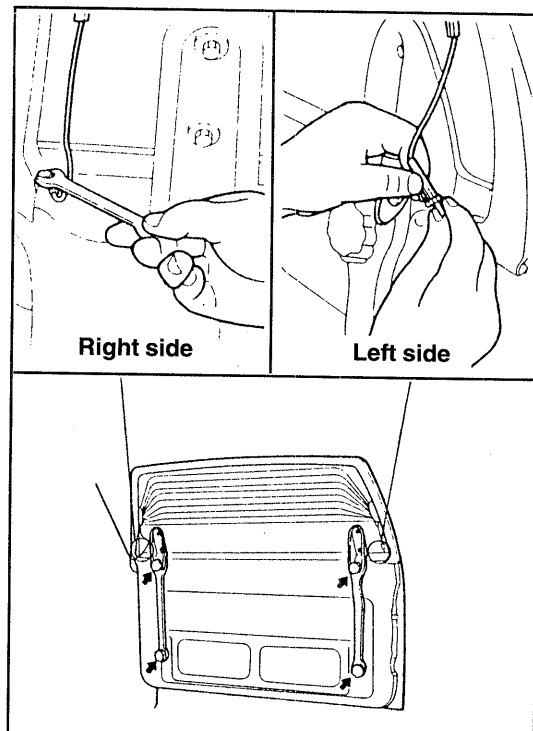
1. Remove the spare tire and spare wheel carrier.
2. Removal of wiper arm and blade
 - (1) Remove the nut wiper arm and shield cap.
 - (2) Remove the nut, washer and gasket.



WRU90-BO144

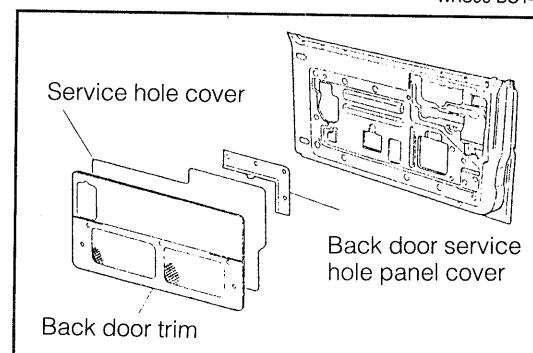
2. Removal of back door glass

- (1) Remove the back door glass deffogger ground harness attaching bolt to disconnect the rear window deffogger ground harness from the back door.
- (2) Disconnect the connector for the rear window deffogger at left side.
- (3) Remove the rear window by removing the four handles.



WRU90-BO145

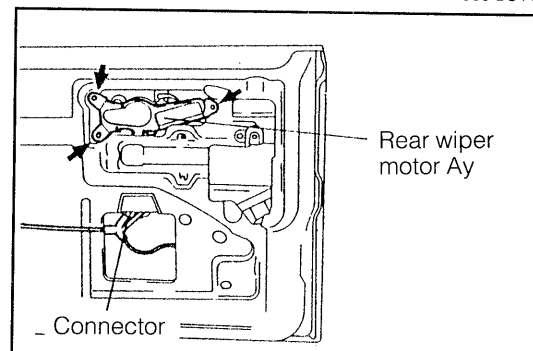
3. Remove the back door trim by removing the clips (14 points).
4. Remove the back door service hole panel cover No. 1 by removing the four screws.
5. Remove the service hole cover.



WRU90-BO146

6. Removal of rear wiper motor assembly

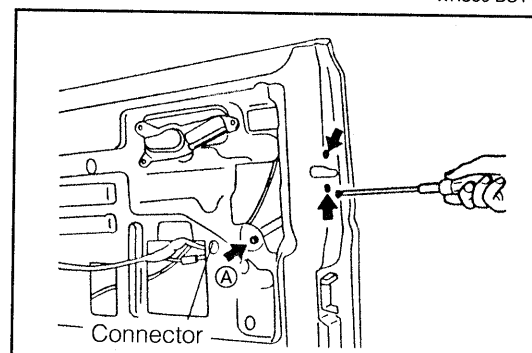
- (1) Disconnect the connector.
- (2) Remove the rear wiper motor assembly by removing the three bolts.



WRU90-BO147

7. Removal of back door lock assembly

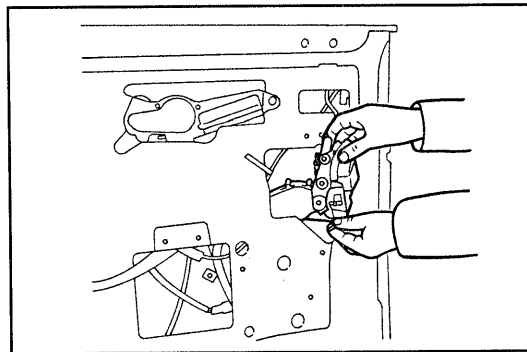
- (1) Remove the link-related parts.
- (2) Remove the three attaching screws of the back door lock assembly. (In the case of the back door opener-equipped vehicle, remove the bolt ① and disconnect the connector.)
- (3) Tack out the back door lock assembly from the back door.



WRU90-BO148

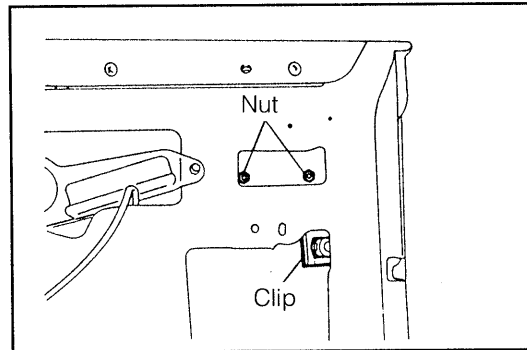
BODY

- (4) Remove the back door control motor assembly from the back door lock assembly. (In the case of the back door opener-equipped vehicle only.)



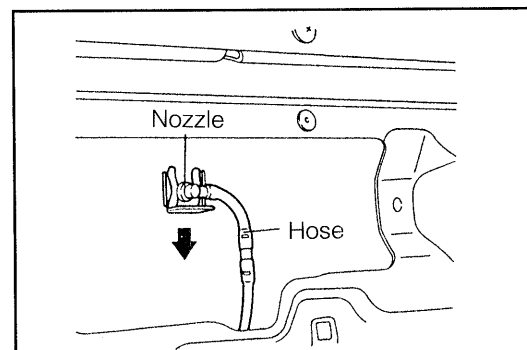
WRU90-BO149

8. Remove the back door outside handle assembly by removing the two nuts.
9. Detach the clip. Remove the key cylinder.



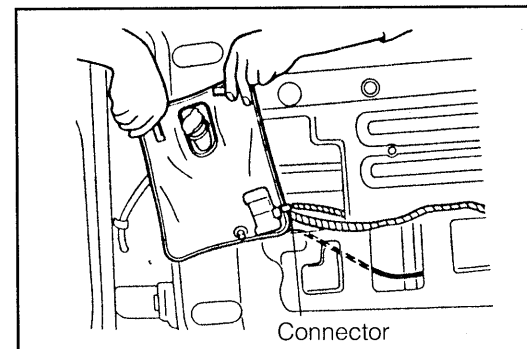
WRU90-BO150

10. Remove the rear window washer-related parts.
- (1) Remove the rear washer nozzle assembly. Detach the hose and clip from the nozzle assembly.



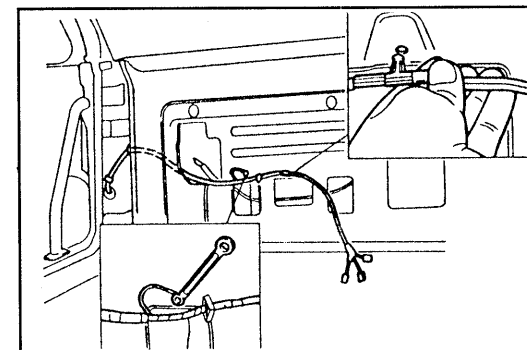
WRU90-BO151

- (2) Remove the rear washer jar assembly with hose. Disconnect the connector.



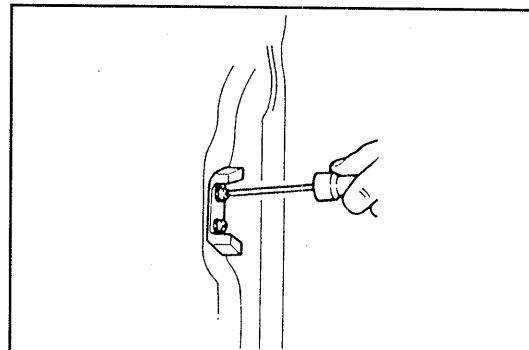
WRU90-BO152

11. Remove the harness and grommet from the back door.



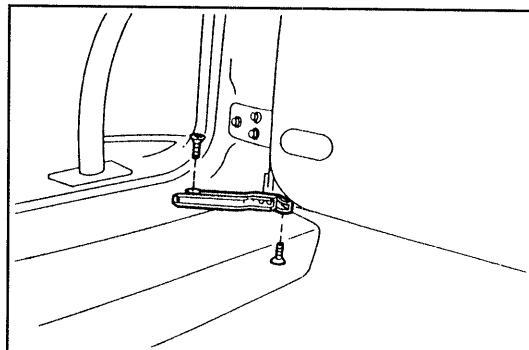
WRU90-BO153

12. Remove the back door down male stopper.



WRU90-BO154

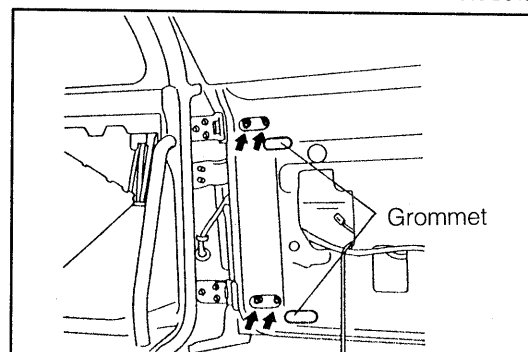
13. Remove the back door check subassembly.



WRU90-BO155

14. Removal of back door panel

- (1) Remove the grommets.
- (2) Remove the back door panel from the vehicle by removing the bolts.

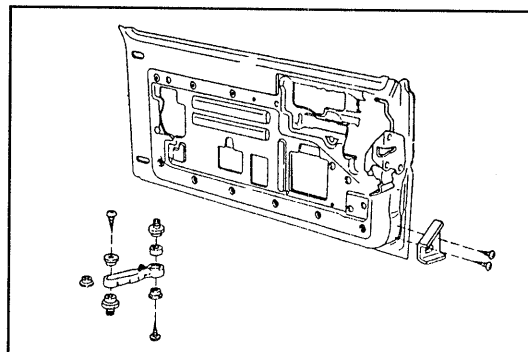


WRU90-BO156

INSTALLATION

1. Installation of back door panel

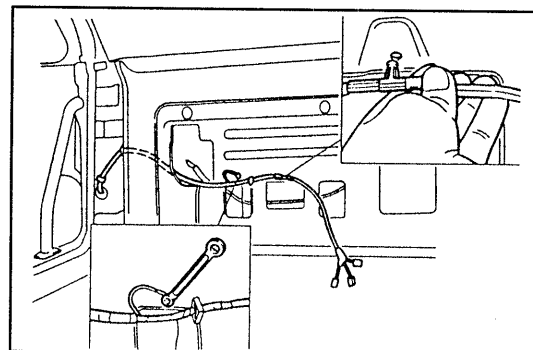
- (1) Install the back door panel to the vehicle with the bolts.
- (2) Install the grommets.
- (3) Install the back door check subassembly.



WRU90-BO157

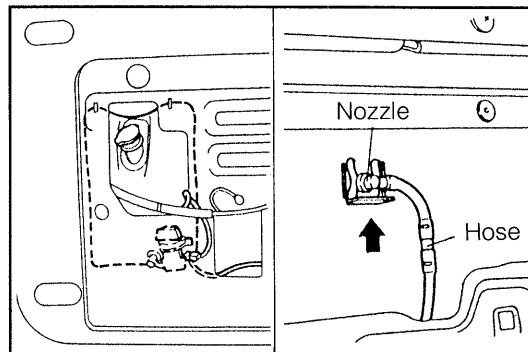
2. Install the back door down male stopper with the two screws.

3. Install the harness to the back door.



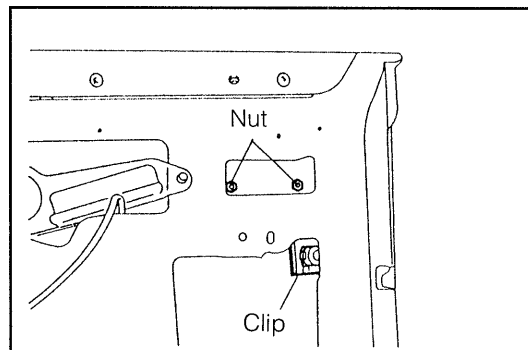
WRU90-BO158

4. Installation of rear window washer-related parts.
 - (1) Install the rear washer jar assembly with hose and connector to the rear washer jar.
 - (2) Install the rear washer nozzle assembly, attached hose and clip to the nozzle assembly.



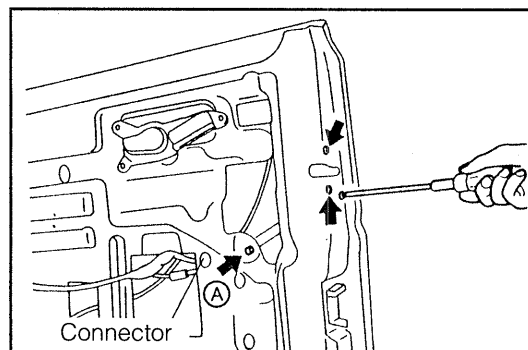
WRU90-BO159

5. Place the key cylinder on the back door. Secure the lock cylinder with the clip.



WRU90-BO160

6. Installation of back door lock assembly
 - (1) Install the back door control solenoid assembly in the back door lock assembly. (In the case of the back door opener-equipped vehicle only)
 - (2) Install the back door lock assembly with the three screws. (In the case of the back door opener-equipped vehicle, install the bolt (A) and connect the connector.)
 - (3) Install the link-related parts.

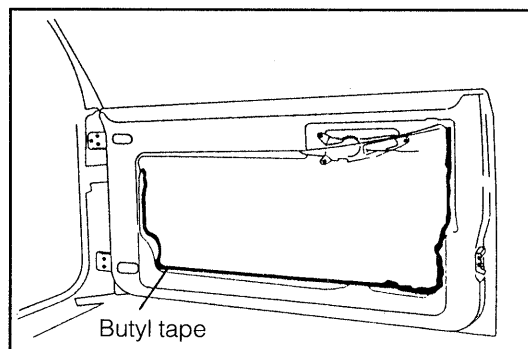


WRU90-BO161

7. Install the service hole cover.

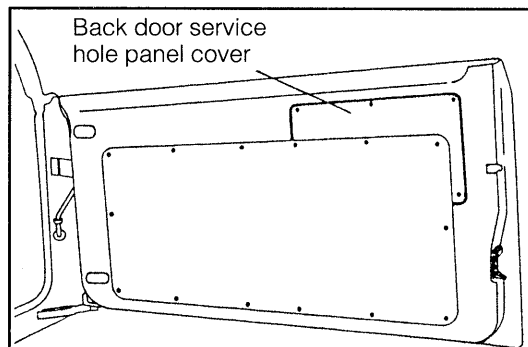
NOTE:

1. Affix butyl tape to the points indicated in the right figure.
2. Replace any service hole cover which exhibits rupture.



WRU90-BO162

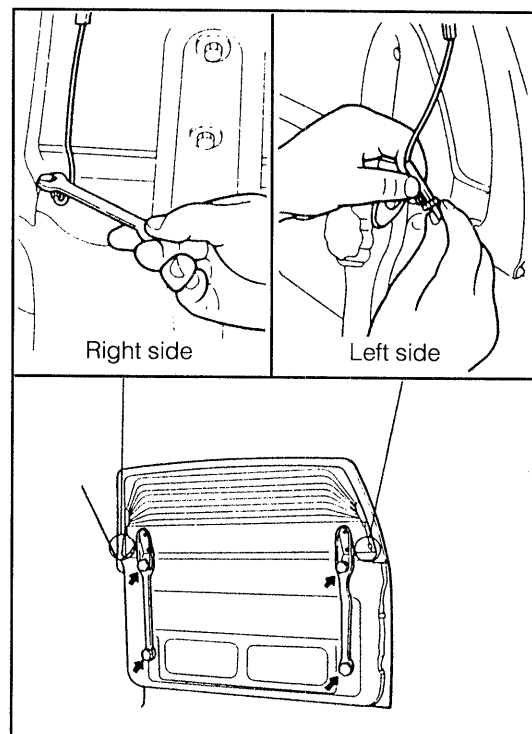
8. Install the back door service hole panel cover No. 1 by with the four screws.
9. Installation of back door trim
 - (1) Ensure that the clips are attached to the back door trim.
 - (2) Install the back door trim to the back door.



WRU90-BO163

10. Installation of back door glass

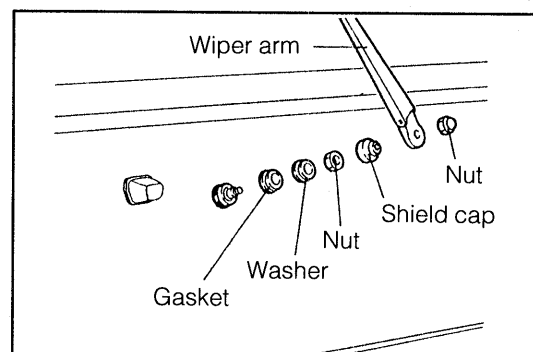
- (1) Install the back door glass with the for handles.
- (2) Install the rear window deffogger ground harness.



WRU90-BO164

11. Installation of wiper arm and blade.

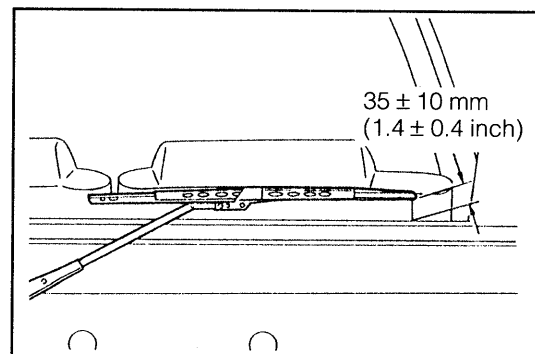
- (1) Install the Gasket, washer, net and shield cap.
- (2) Install the wiper arm and nut.



WRU90-BO165

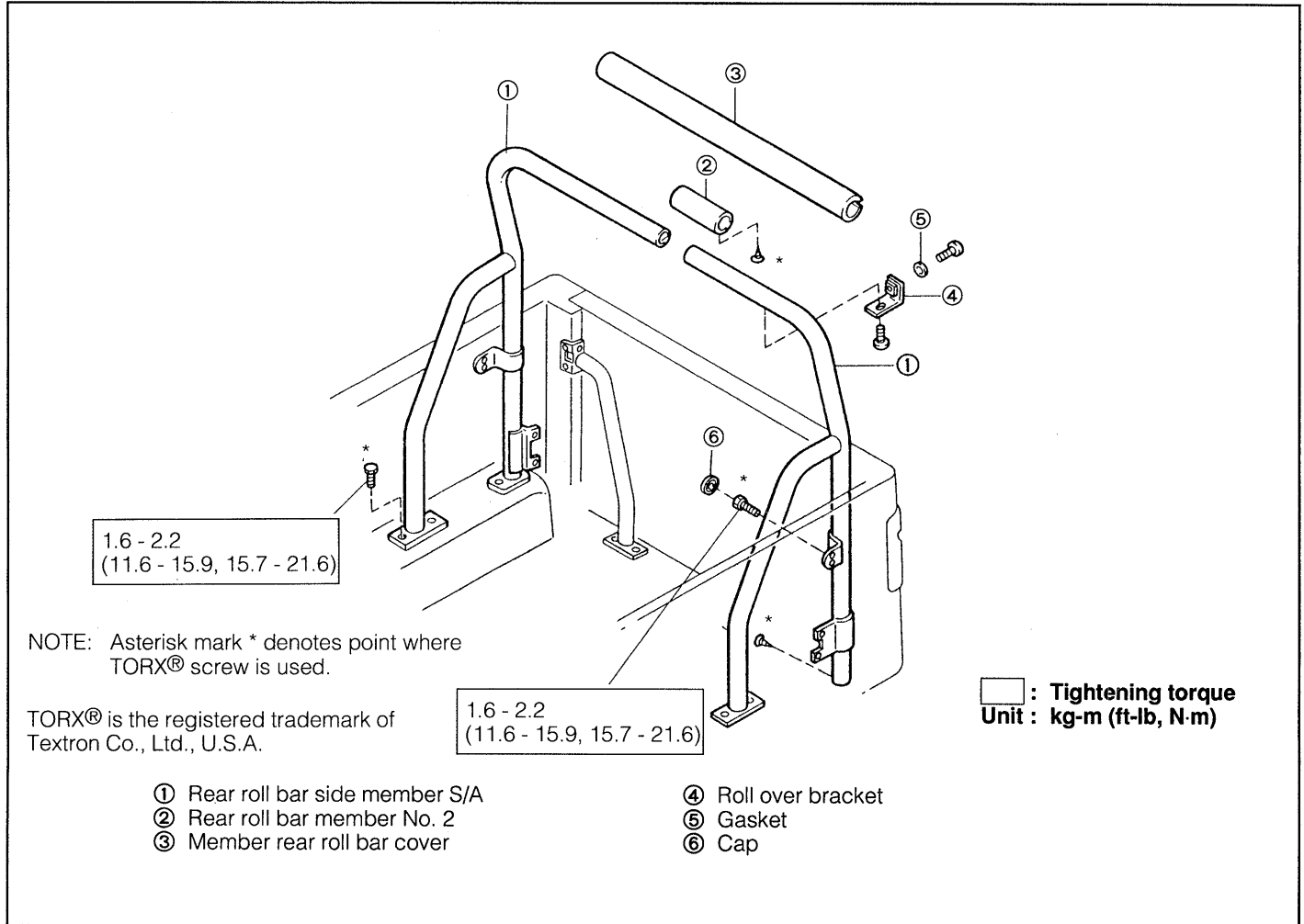
NOTE:

1. Operate the wiper motor and set the wiper arm to the automatic stopping position.
2. Set the wiper arm to the position as indicated in the right figure.



WRU90-BO166

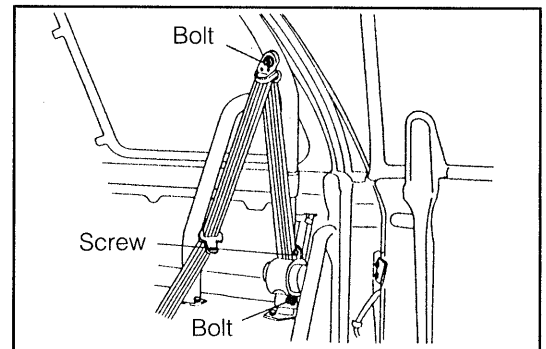
REAR ROLL BAR COMPONENTS



WRU90-BO167

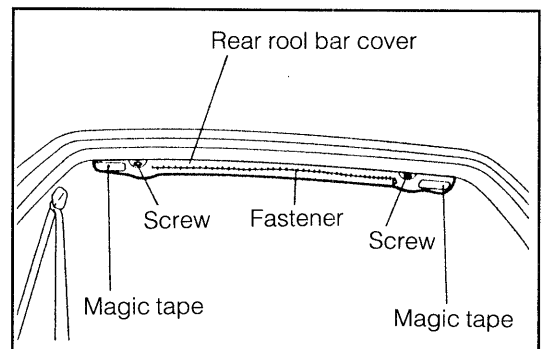
REMOVAL

1. Removal the three point rear seat belts.



WRU90-BO168

2. Removal of rear roll bar cover
 - (1) Remove the magic tapes.
 - (2) Remove the fastener.
 - (3) Remove the rear roll bar cover from the rear roll bar.
 - (4) Remove the two screws.

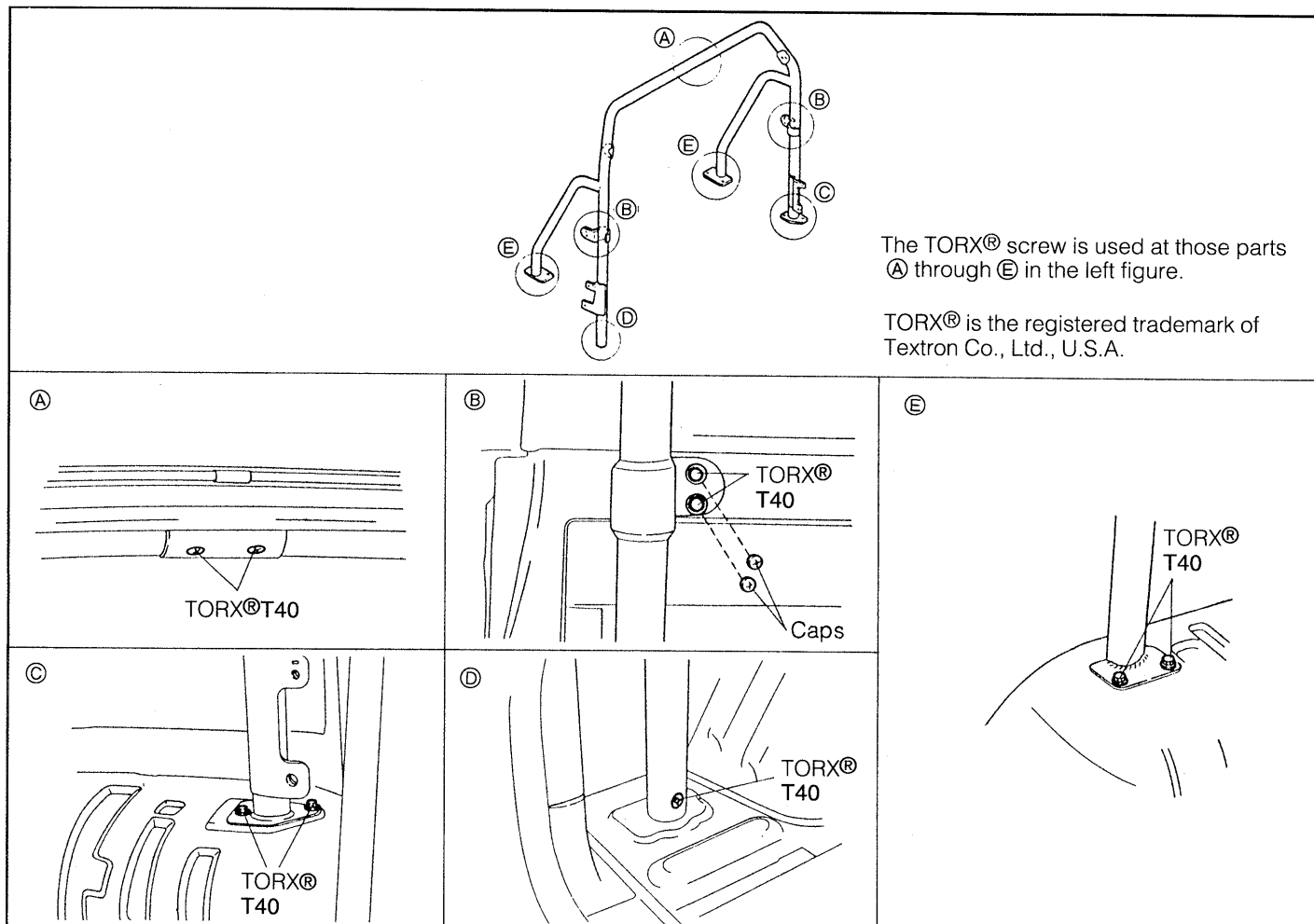


WRU90-BO169

3. Remove the rear roll bar.

NOTE:

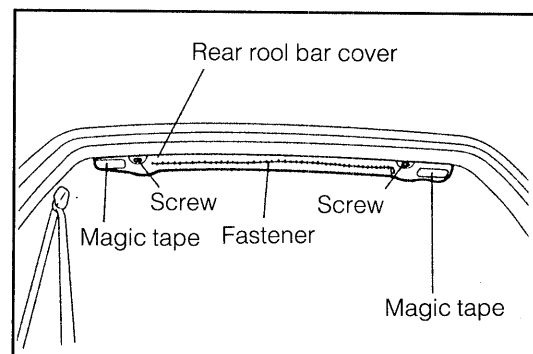
The rear roll bar employs the TORX® screw so that the owner may not detach the roller bar easily.



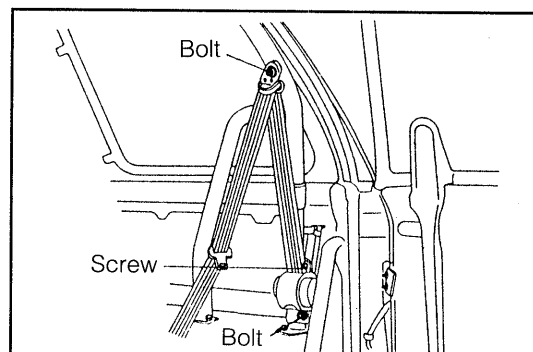
WRU90-BO170

INSTALLATION

1. Install the rear roll bar to the body.
Tightening Torque: 1.6 - 2.2 kg-m
(11.6 - 15.7 ft-lb, 15.7 - 21.6 N-m)
2. Installation of rear roll bar cover
 - (1) Install the two screws.
 - (2) Install the rear roll bar cover to the rear roll bar with the fastener and magic tapes.
3. Install the three point rear seat belts.
Tightening torque: 2.9 - 5.4 kg-m
(21 - 39 ft-lb, 28.4 - 53.0 N-m)

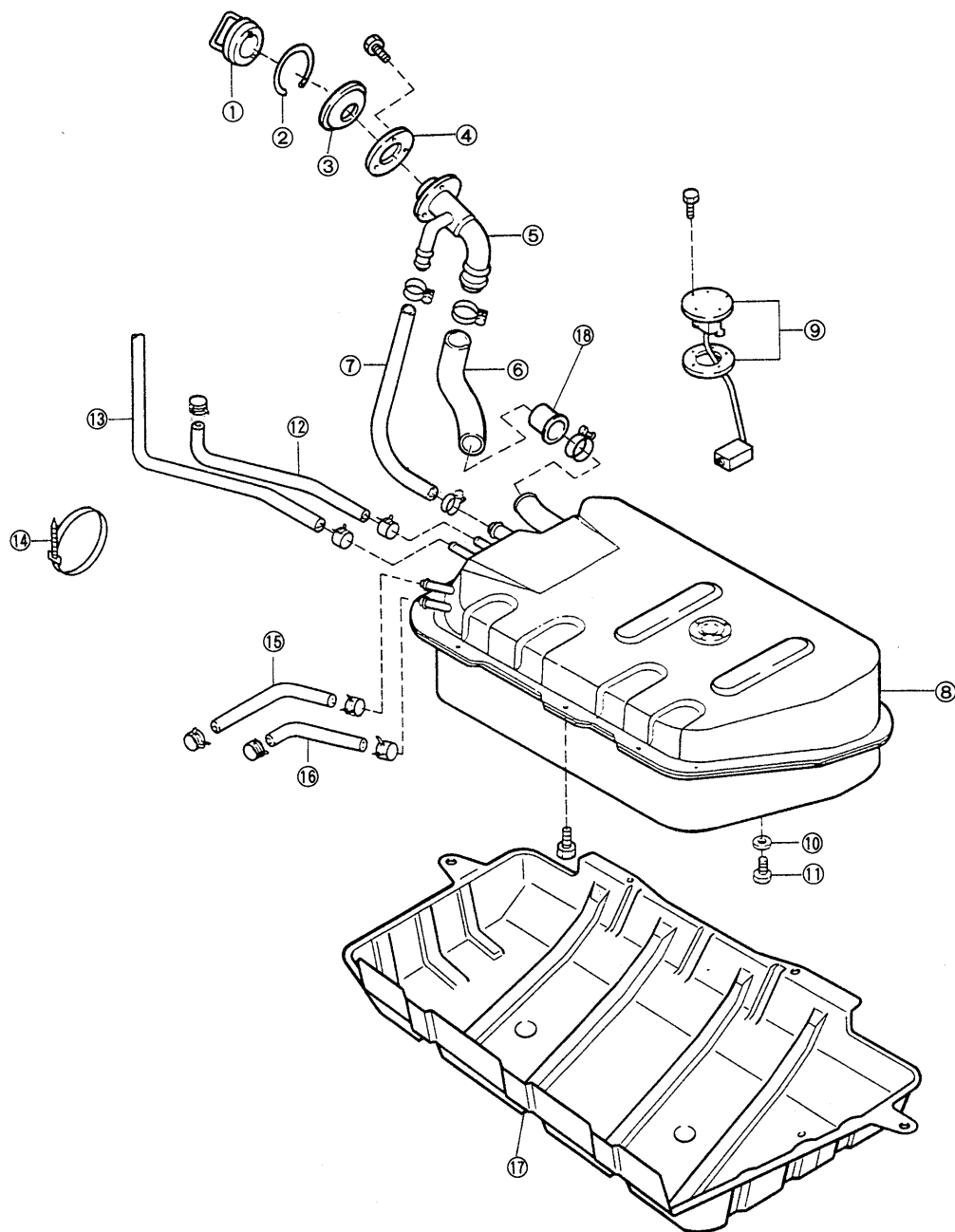


WRU90-BO171



WRU90-BO172

FUEL TANK COMPONENTS



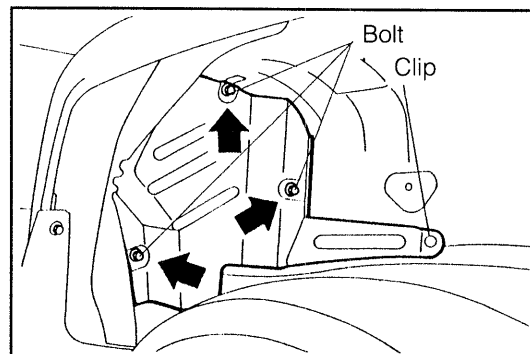
- ① Fuel tank cap Ay
- ② Inlet box ring
- ③ Fuel tank filler pipe shield No. 2
- ④ Inlet shield fuel tank No. 1
- ⑤ Fuel tank inlet pipe S/A
- ⑥ Inlet fuel tank sub hose
- ⑦ Breather tube hose
- ⑧ Fuel tank Ay
- ⑨ Fuel sender gauge Ay

- ⑩ Gasket
- ⑪ Drain plug
- ⑫ Hose
- ⑬ Hose
- ⑭ Clamp
- ⑮ Fuel return hose
- ⑯ Fuel hose
- ⑰ Fuel tank protector S/A
- ⑱ Fuel shutter valve assembly

FUEL INLET PIPE

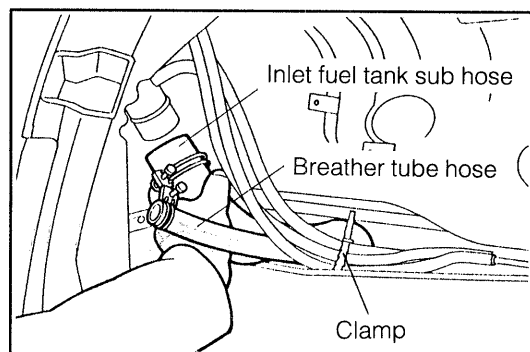
REMOVAL

1. Remove the inlet fuel protector by removing the three bolts and one clip.



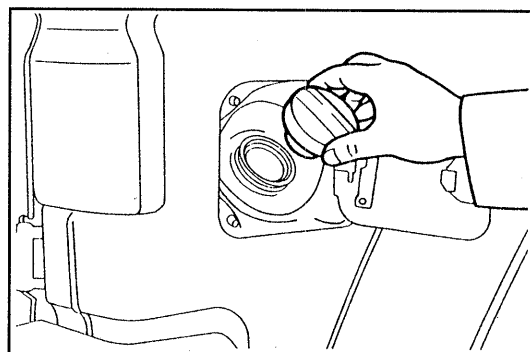
WRU90-BO174

2. Remove the inlet fuel tank sub hose and breather hose.



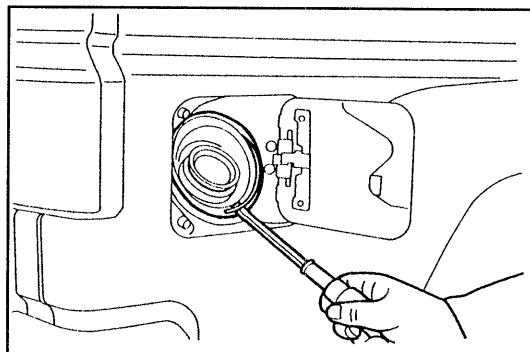
WRU90-BO175

3. Remove the fuel tank cap assembly.



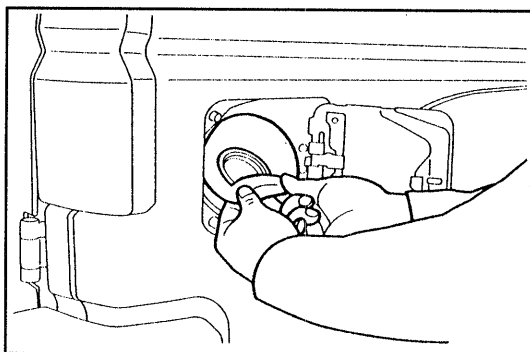
WRU90-BO176

4. Remove the inlet box ring.



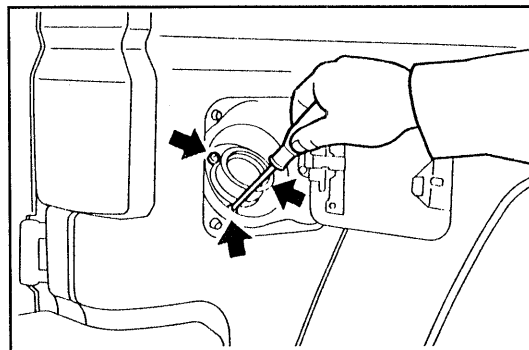
WRU90-BO177

5. Remove the fuel tank filler pipe shield No. 2.



WRU90-BO178

6. Remove the fuel tank inlet pipe subassembly by removing the three screws.



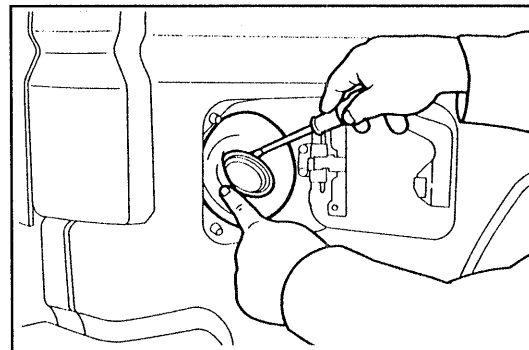
WRU90-BO179

INSTALLATION

1. Install the fuel tank inlet pipe subassembly and inlet shield fuel tank No. 1 with the three screws.
2. Install the fuel tank filler pipe shield No. 2.

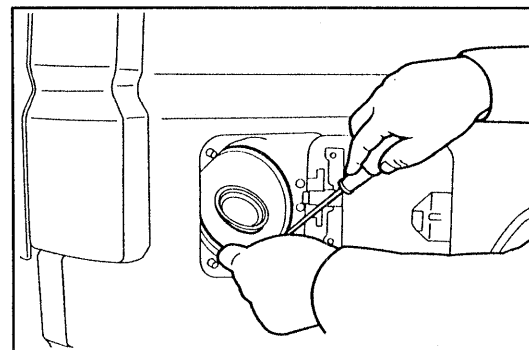
NOTE:

The cut-out section should face toward the lower side.



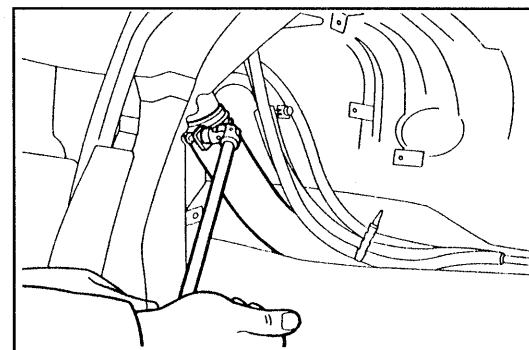
WRU90-BO180

3. Install the inlet box ring.
4. Install the tank cap assembly.



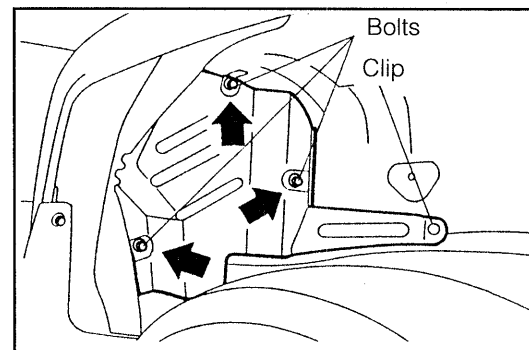
WRU90-BO181

5. Attach the inlet fuel tank sub hose and breather hose to the fuel tank inlet pipe.



WRU90-BO182

6. Install the inlet fuel protector with the three bolts and one clip.

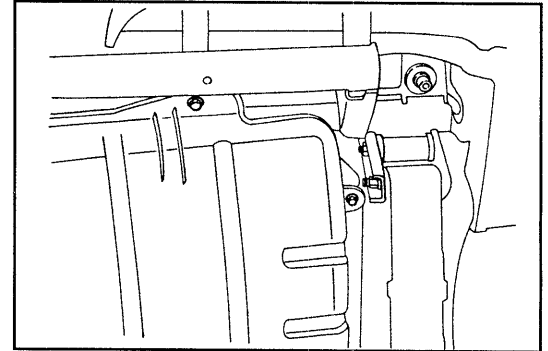


WRU90-BO183

FUEL TANK

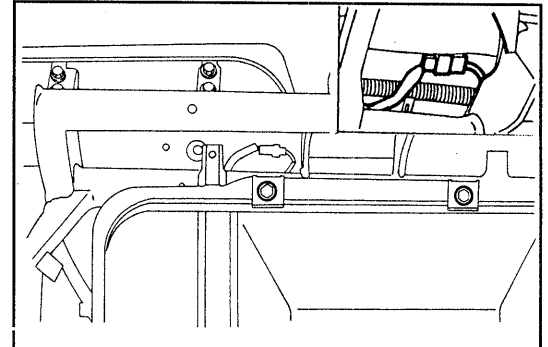
REMOVAL

1. Drain the fuel from the fuel tank by removing the drain plug.
After the fuel has been drained, install the drain plug.
2. Remove the fuel tank protector subassembly.



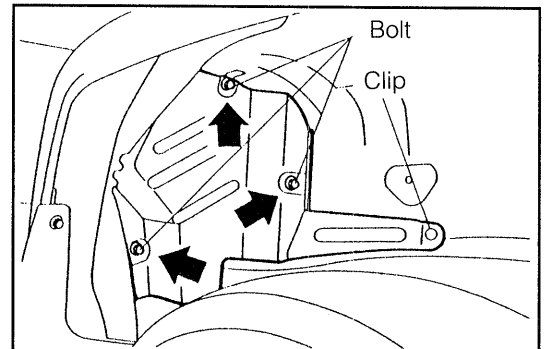
WRU90-BO184

3. Disconnect the fuel sender gauge connector.



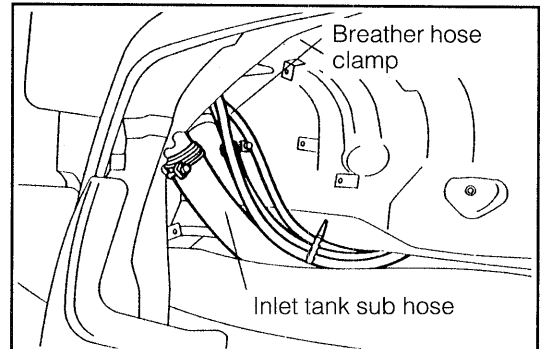
WRU90-BO185

4. Remove the inlet fuel protector by removing the three bolts and one clip.



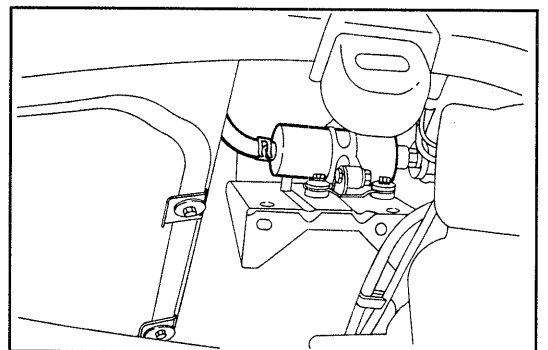
WRU90-BO186

5. Remove the inlet tank sub hose, breather hose and clamp.



WRU90-BO187

6. Removal of fuel hose and fuel return hose
 - (1) Remove the fuel pump bracket subassembly by removing the three bolts.
 - (2) Remove the clamps and separate the fuel hose and fuel return hose.

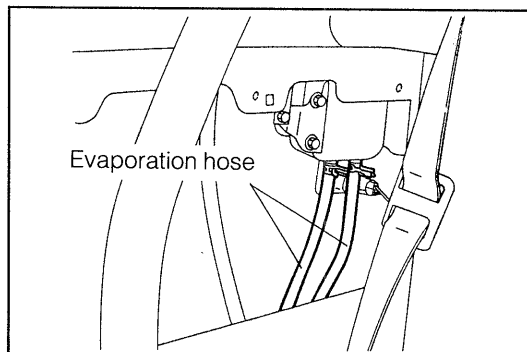


WRU90-BO188

7. Remove the clamps and disconnect the evaporation hoses.

NOTE:

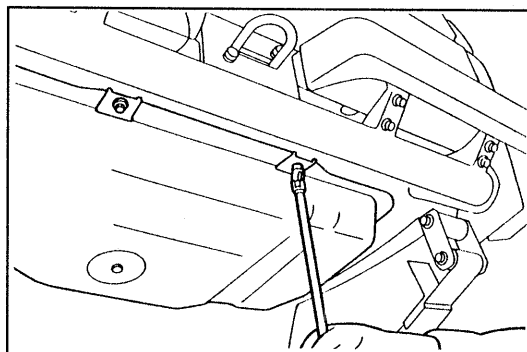
It is not necessary to disconnect the black hose.



WRU90-BO189

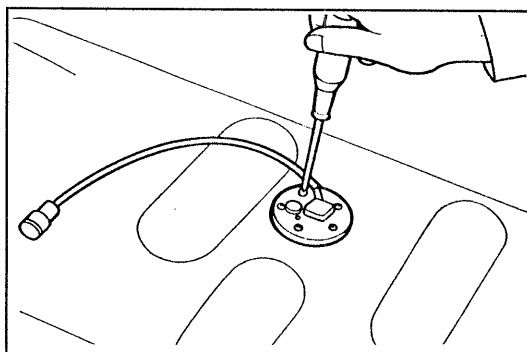
8. Removal of fuel tank assembly

- (1) Support the fuel tank assembly with a jack.
- (2) Remove the five attaching bolts of the fuel tank.



WRU90-BO190

9. Remove the fuel hoses.
10. Remove the fuel sender gauge assembly by removing the five screws.



WRU90-BO191

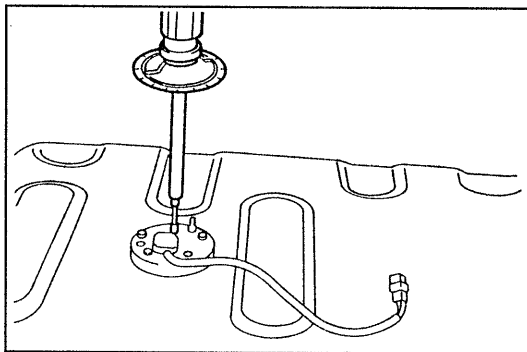
INSTALLATION

1. Install of fuel tank assembly

- (1) Install the fuel sender gauge assembly with the five screws.

Tightening torque: 2kg-cm (0.14 ft-lb, 0.2 N·m)

- (2) Install the evaporation hoses.

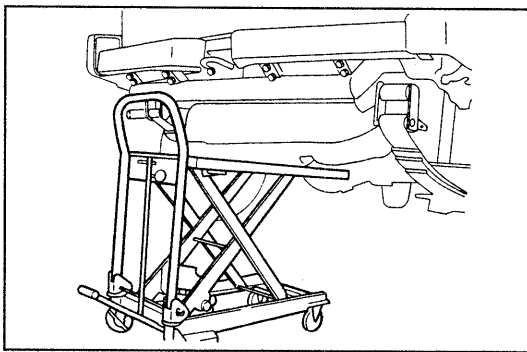


WRU92-BO406

- (3) Install the fuel hoses to the fuel tank assembly.
- (4) Install the fuel tank assembly with the five bolts.

NOTE:

The wire harness of the fuel sender gauge should be brought outside.



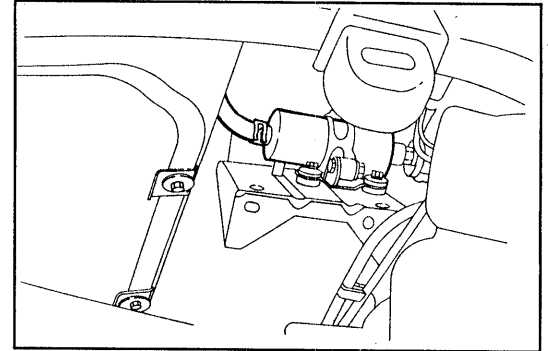
WRU90-BO193

2. Install of fuel hose and fuel return hose
 - (1) Attach the fuel hose and fuel return hose to the fuel tank assembly. Secure it with the clamps.

CAUTION:

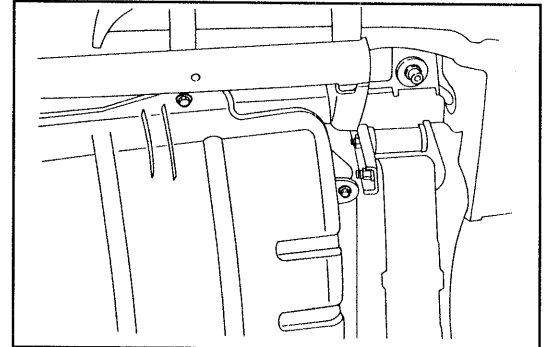
When installing the fuel hose, ensure that the filter is attached at the magnetic pump side.

- (2) Install the fuel pump bracket subassembly with the three bolts.



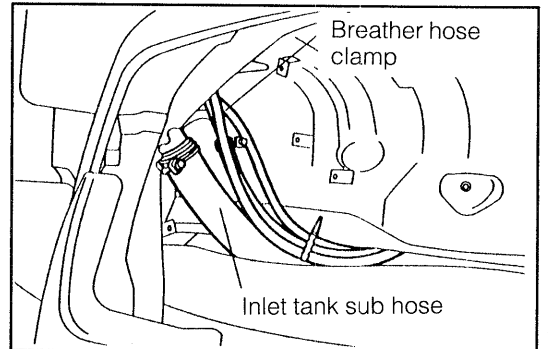
WRU90-BO194

3. Connect the fuel sender gauge connector.



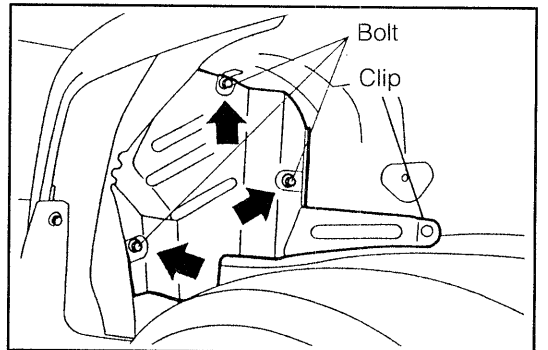
WRU90-BO195

4. Attach the inlet tank sub hose, breather hose and clamp.



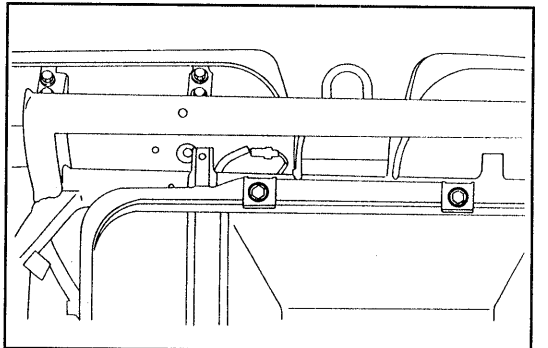
WRU90-BO196

5. Install the inlet fuel protector with the three bolts and one clip.



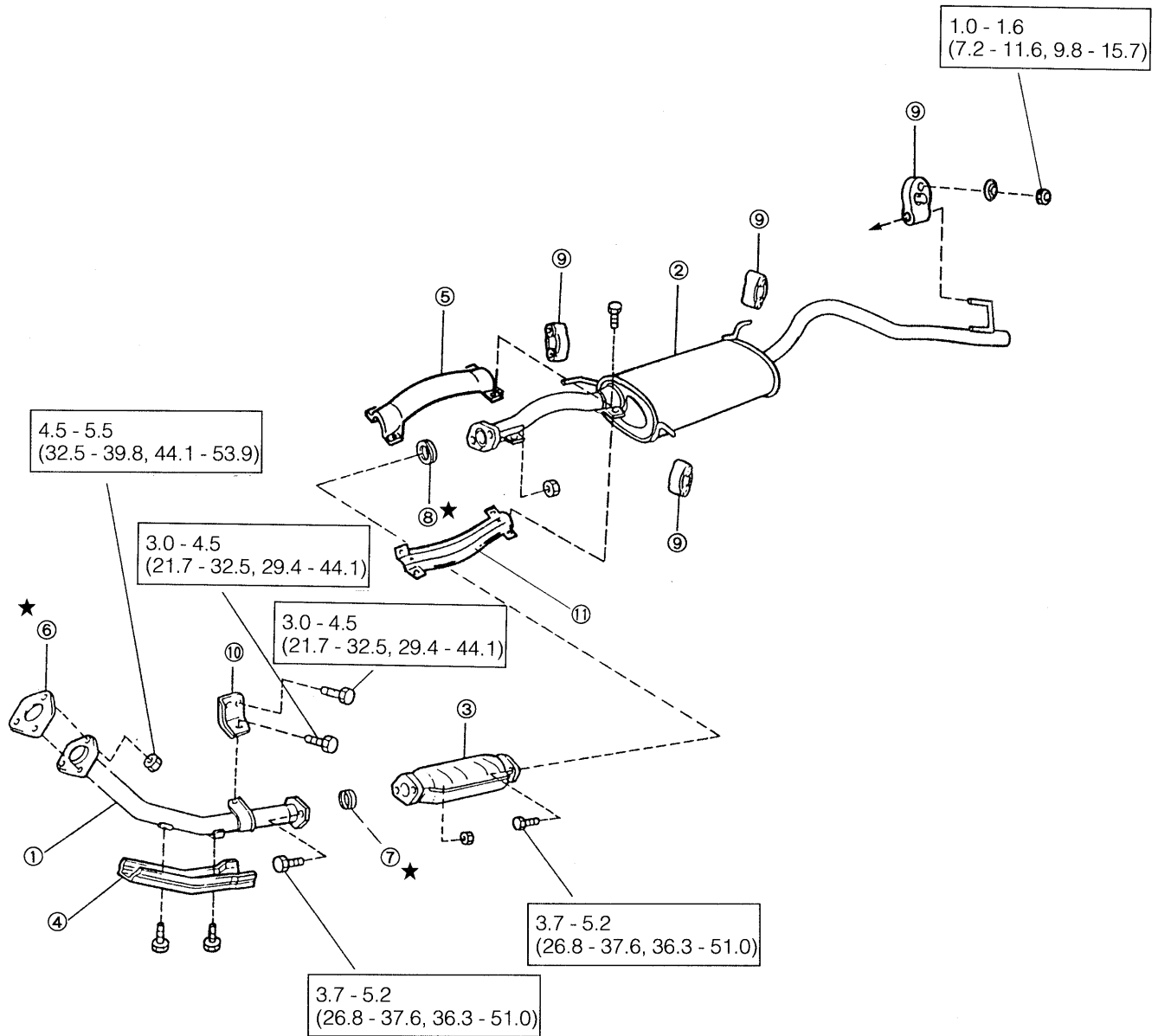
WRU90-BO197

6. Install the fuel tank protector subassembly with the four bolts.



WRU90-BO198

EXHAUST PIPE COMPONENTS



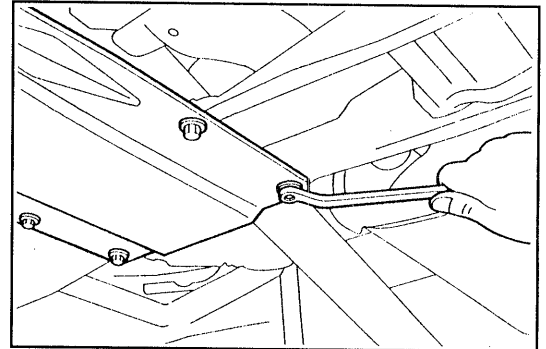
T : Tightening torque
Unit : kg-m (ft-lb, N-m)
★ : Non-reusable parts

- ① Front exhaust pipe Ay
- ② Tail pipe Ay
- ③ Catalyst converter Ay
- ④ Exhaust pipe heat insulator
- ⑤ Exhaust pipe upper insulator No. 1
- ⑥ Gasket

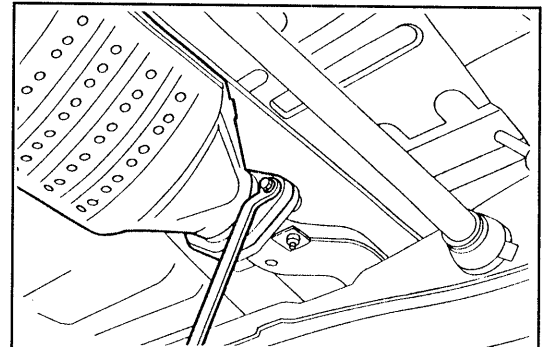
- ⑦ Gasket
- ⑧ Gasket
- ⑨ Exhaust pipe support
- ⑩ Exhaust pipe support bracket No. 1
- ⑪ Exhaust pipe lower insulator No. 1

REMOVAL

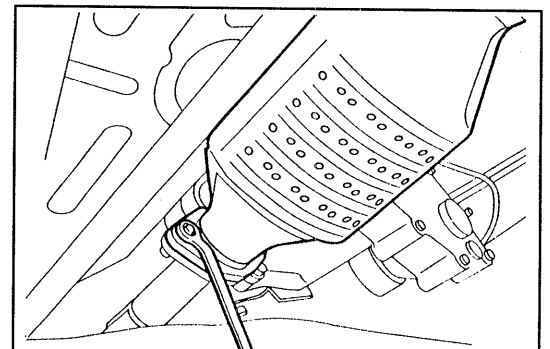
1. Remove the transmission undercover.
2. Separate the tail pipe assembly from the catalyst converter assembly.
3. Separate the catalyst converter assembly from the front exhaust pipe assembly.
4. Remove the exhaust pipe support of the tail pipe assembly.
5. Remove the muffler support of the tail pipe assembly from the vehicle body hanger. Remove the tail pipe assembly.



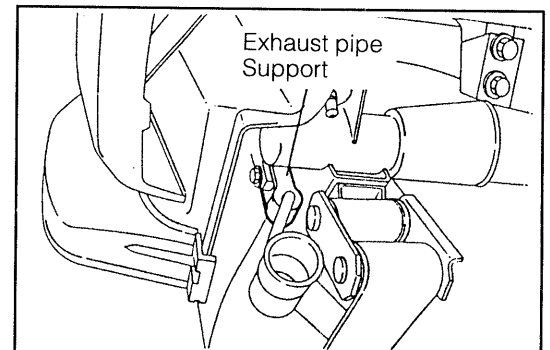
WRU90-BO200



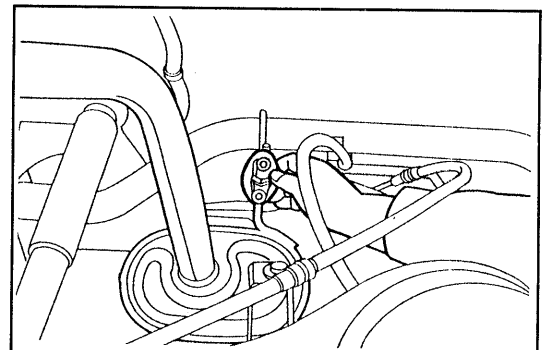
WRU90-BO201



WRU90-BO202



WRU90-BO203



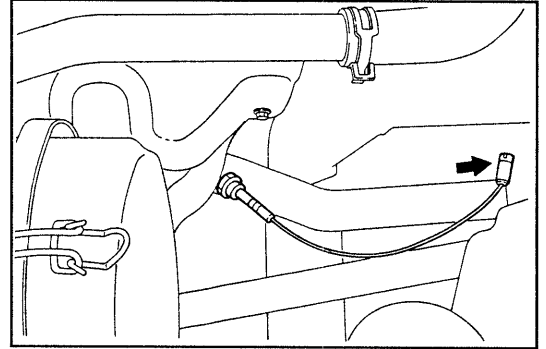
WRU90-BO204

BODY

6. Disconnect the coupler of the O₂ sensor.

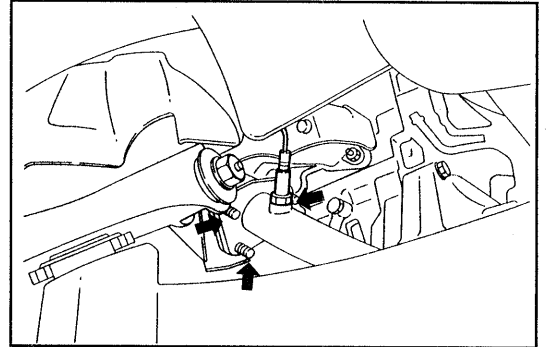
NOTE:

Do not disconnect the O₂ sensor from the exhaust pipe, for the gasket of the O₂ sensor is a non-reusable part and the gasket alone is not available.



WRU90-BO205

7. Remove the nuts of the front exhaust pipe assembly.

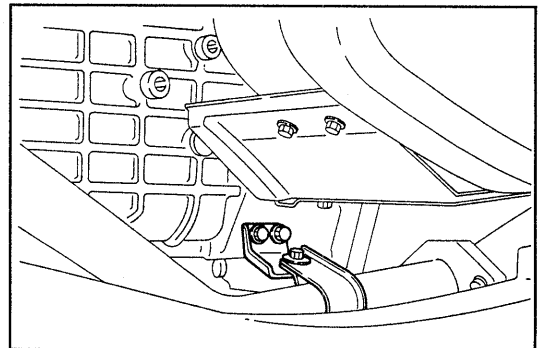


WRU90-BO206

8. Remove the exhaust pipe support bracket No. 1 of the front exhaust pipe assembly.
9. Remove the front exhaust pipe assembly.

CAUTION:

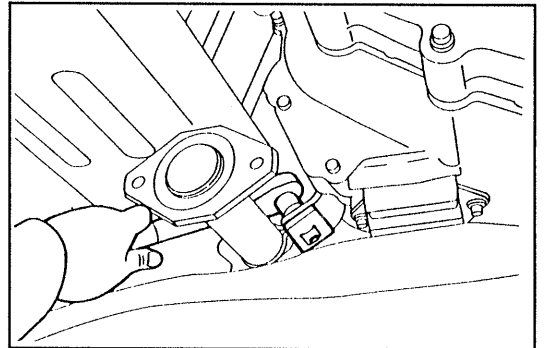
While removing the front exhaust pipe assembly, be very careful not to damage the O₂ sensor.



WRU90-BO207

INSTALLATION

1. Temporarily install the exhaust pipe support bracket No. 1 to the transfer adaptor bracket.



WRU90-BO208

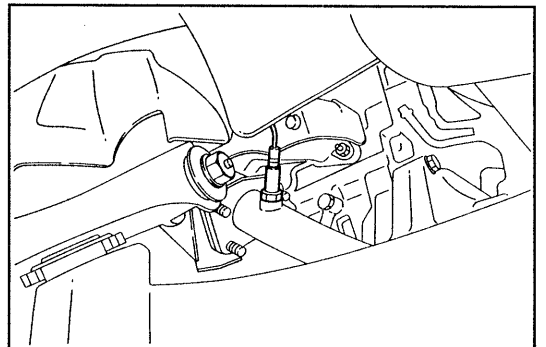
2. Install the front exhaust pipe assembly to the exhaust manifold.

NOTE:

- Be sure to install a new gasket, for it is a non-reusable part.

Tightening Torque: 4.5 - 5.5 kg-m
(32.5 - 39.8 ft-lb, 44.1 - 53.9 N-m)

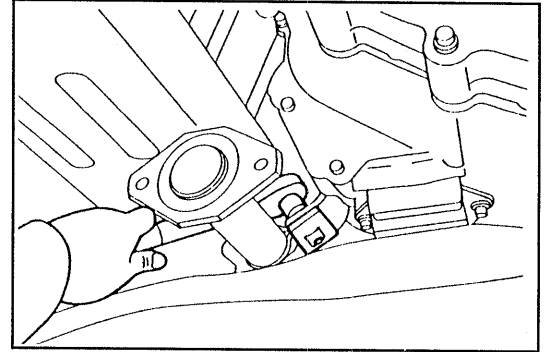
- Be sure to tighten the three nuts evenly and progressively.



WRU92-BO411

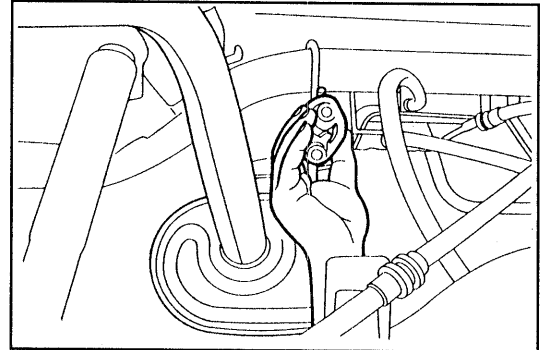
3. Tighten the bolt for the exhaust pipe support bracket No. 1 of the front exhaust pipe assembly.

Tightening Torque: 3.0 - 4.5 kg-m
(21.7 - 32.5 ft-lb, 29.4 - 44.1 N·m)



WRU90-BO210

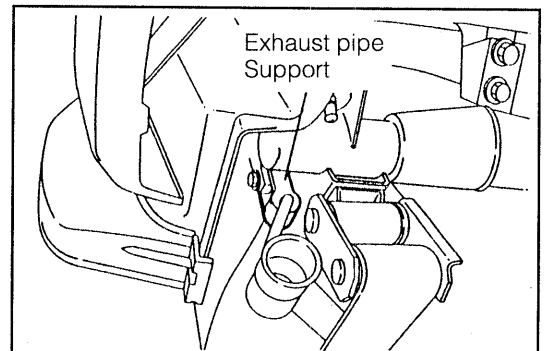
4. Attach the muffler support of the tail pipe assembly to the vehicle body hangers at the three points.



WRU90-BO211

5. Install the exhaust pipe support of the tail pipe assembly.

Tightening Torque: 1.0 - 1.6 kg-m
(7.2 - 11.6 ft-lb, 9.8 - 15.7 N·m)



WRU90-BO212

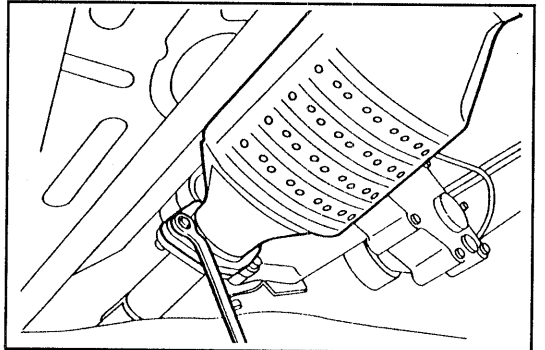
6. Install the catalyst converter assembly to the front exhaust pipe assembly.

NOTE:

- Be sure to install a new gasket, for it is a non-reusable part.

Tightening Torque: 3.7 - 5.2kg-m
(26.8 - 37.6 ft-lb, 36.3 - 51.0 N·m)

- Be sure to tighten the two bolts and nuts evenly and progressively.



WRU90-BO213

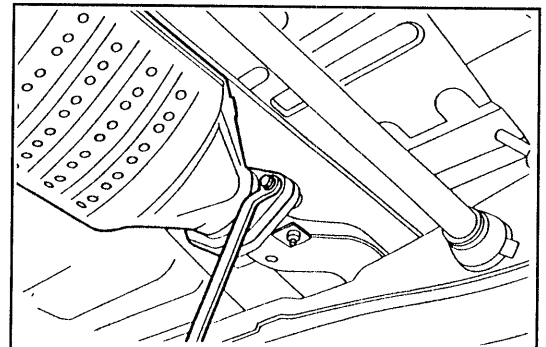
7. Install the tail pipe assembly to the catalyst converter assembly.

NOTE:

- Be sure to install a new gasket, for it is a non-reusable part.

Tightening Torque: 3.7 - 5.2kg-m
(26.8 - 37.6 ft-lb, 36.3 - 51.0 N·m)

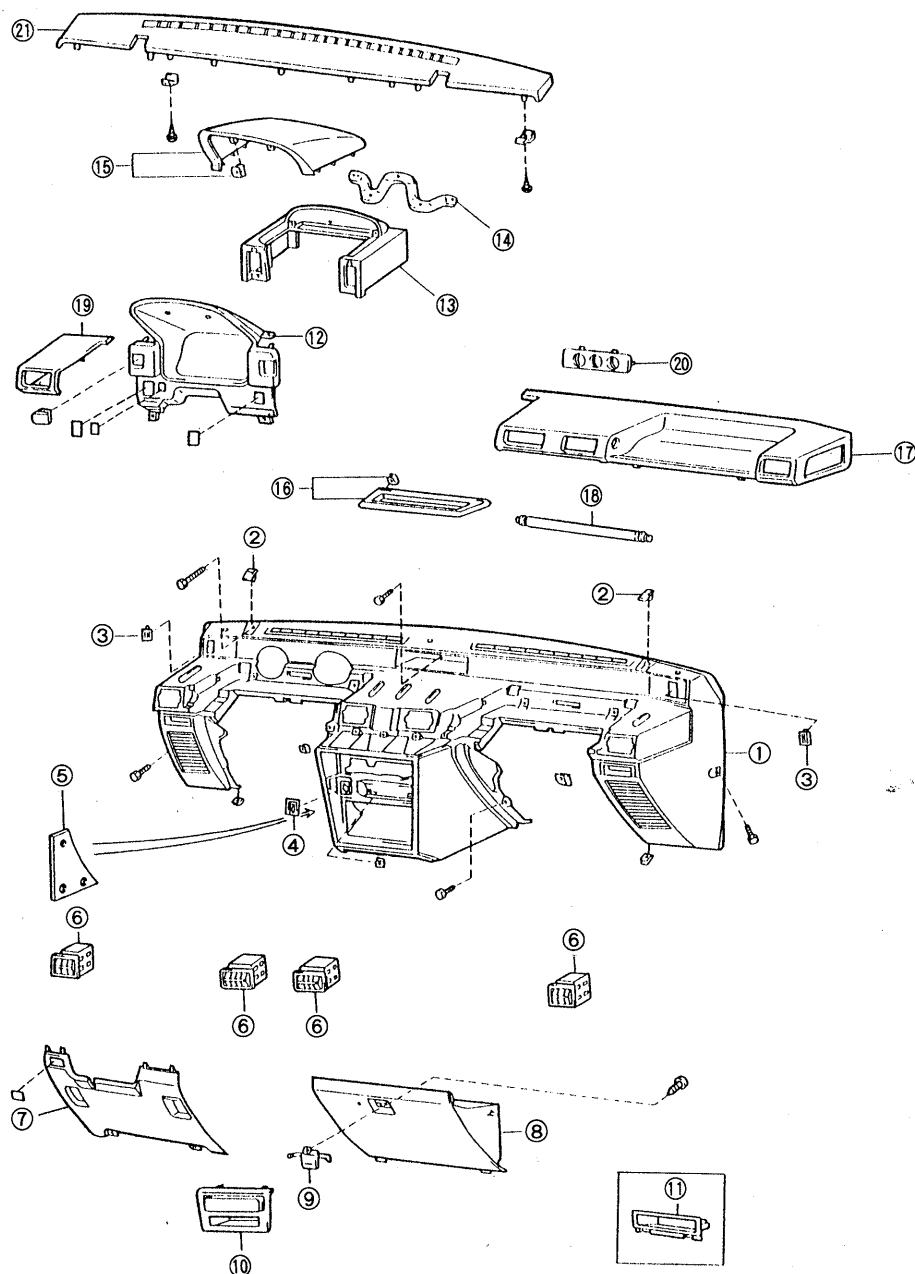
- Be sure to tighten the two bolts and nuts evenly and progressively.



WRU90-BO214

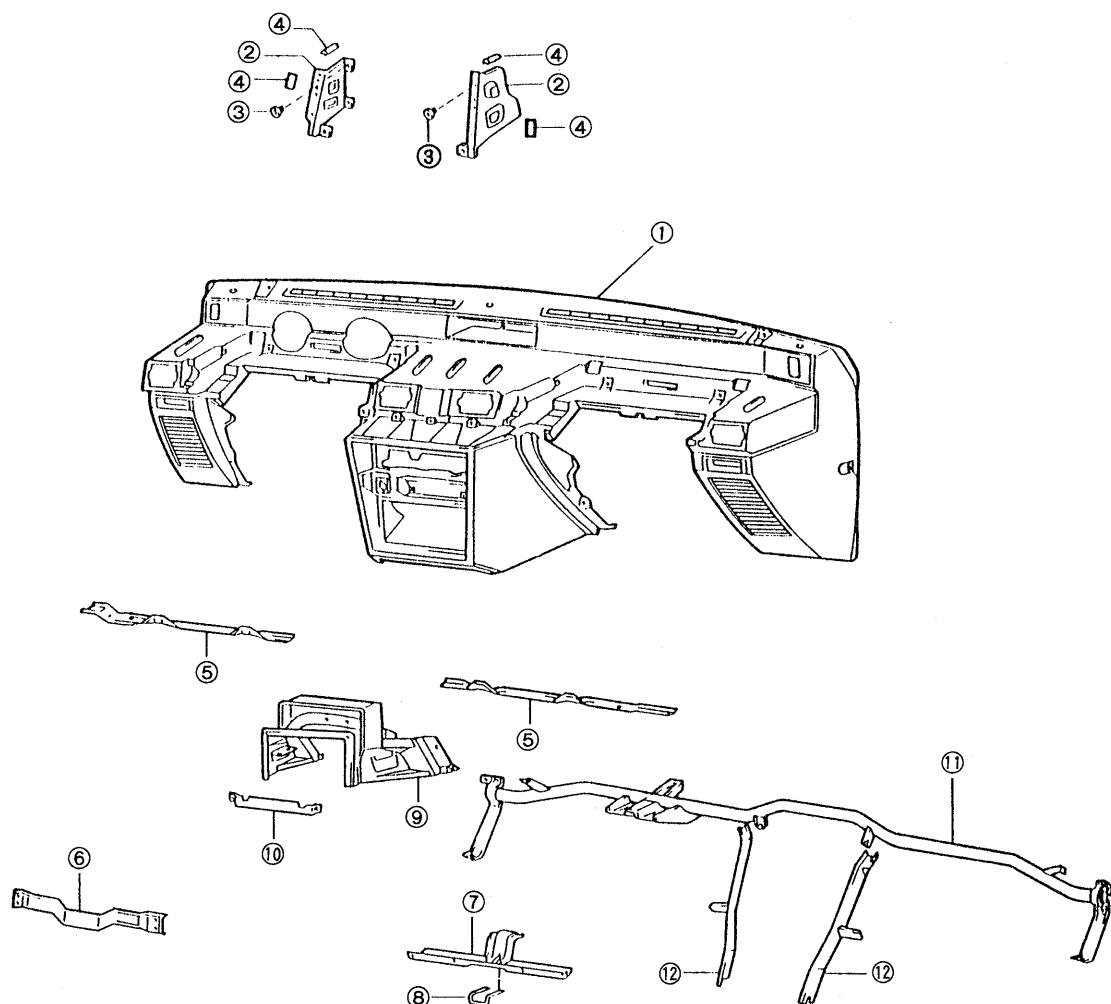
8. Connect the coupler of the O₂ sensor.
9. Install the transmission undercover.

INSTRUMENT PANEL COMPONENTS (PART 1)



- | | |
|---------------------------------------|---|
| ① Instrument panel S/A | ⑫ Rear panel instrument cluster finish |
| ② Instrument panel hole cover | ⑬ Front panel instrument cluster finish |
| ③ Defroster nozzle Ay | ⑭ Meter hood set bracket No. 3 |
| ④ Cigarette lighter bezel | ⑮ Upper instrument cluster finish panel |
| ⑤ Instrument panel center pad Ay | ⑯ Center instrument panel tray |
| ⑥ Instrument panel register Ay | ⑰ Instrument panel safety pad S/A |
| ⑦ Instrument panel finish panel lower | ⑱ Side instrument panel safety pad S/A |
| ⑧ Glove compartment S/A | ⑲ Upper instrument panel finish panel |
| ⑨ Glove compartment door lock Ay | ⑳ Defroster nozzle opening cover |
| ⑩ Radio cover | |
| ⑪ Stereo opening cover | |

COMPONENTS (PART 2)



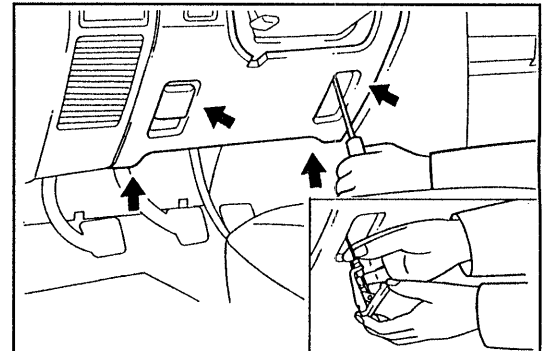
- | | |
|--|---|
| ① Instrument panel S/A | ⑦ Glove compartment door lock retainer S/A |
| ② Meter hood set bracket | ⑧ Glove compartment door lock striker |
| ③ Clip No. 1 | ⑨ Instrument panel center reinforcement |
| ④ Edge protector | ⑩ Instrument panel lower center reinforcement |
| ⑤ Instrument panel reinforcement | ⑪ Pillar to pillar member Ay |
| ⑥ Instrument panel finish panel retainer No. 1 | ⑫ Instrument panel brace S/A |

REMOVAL OF INSTRUMENT PANEL

NOTE:

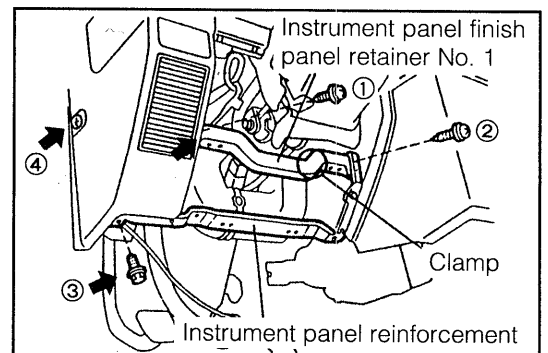
1. This installation and removal procedure has been described for those vehicles equipped with no air conditioner. As for those vehicles equipped with air conditioner, see the AC section.
2. The instrument panel, together with the heater control unit and cable, should be removed from the body.

1. Disconnect the battery cable from the negative \ominus terminal.
2. Remove the steering wheel assembly.
3. Removal of lower instrument panel finish panel
 - (1) Remove the hood lock control lever and wire.
 - (2) Remove the screws retaining the rheostat.
 - (3) Remove the two lower screws retaining the lower instrument panel finish panel.
 - (4) Disconnect the rear heater switch connector and the rheostat connector.



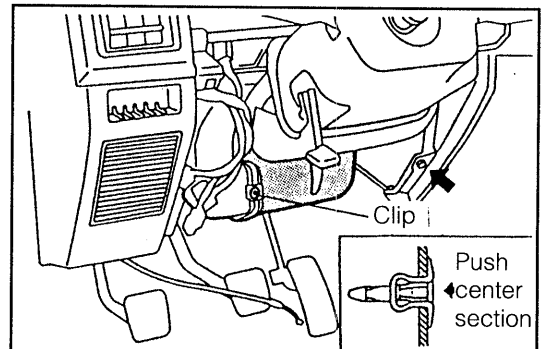
WRU90-BO217

4. Remove the screws ① and ② which retain the instrument panel finish panel retainer No. 1 at the right and left sides. (It is not necessary to remove the multi-use lever switch connector. Also, do not disconnect the connector.)
5. Remove the screws ③ and ④ located at the left side of the instrument panel. (It is not necessary to remove the instrument panel reinforcement.)



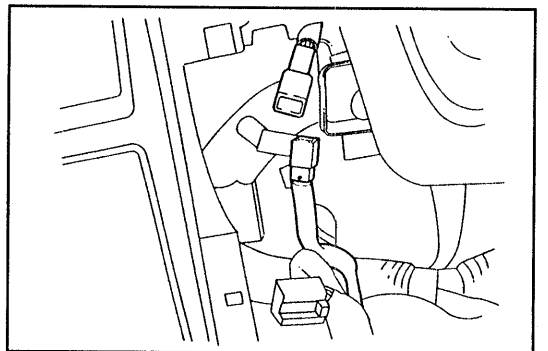
WRU90-BO218

6. Detach the clip retaining the air No. 1 duct subassembly. Remove the duct.
7. Remove the bolt connecting the instrument panel to the brace.



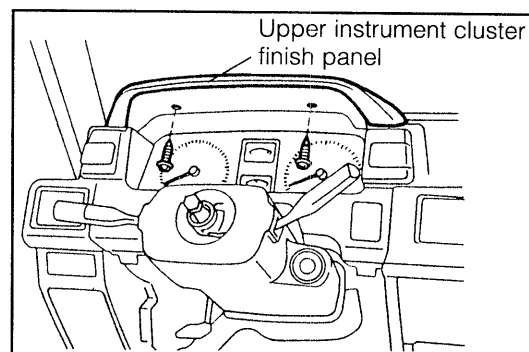
WRU90-BO219

8. Disconnect the connector of the instrument panel wire.



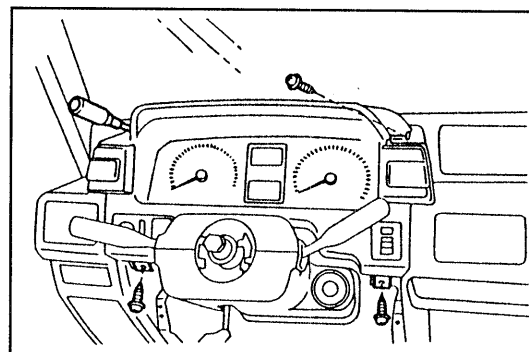
WRU90-BO220

9. Remove the upper instrument cluster finish panel by removing the two screws.



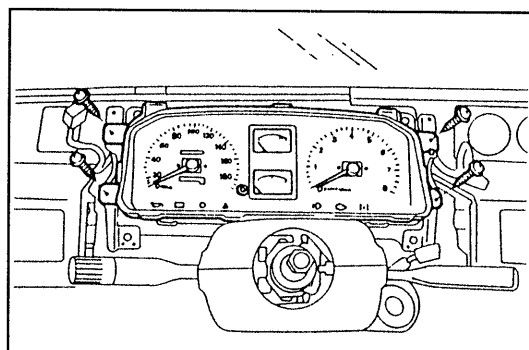
WRU90-BO221

10. Removal of instrument cluster finish panel subassembly
 - (1) Remove the instrument cluster finish panel subassembly by removing the four screws.
 - (2) Disconnect the connectors for the rear window defogger switch, hazard warning signal switch and rear wiper switch.



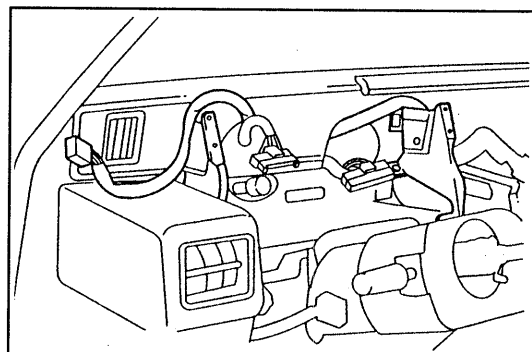
WRU90-BO222

11. Removal of combination meter assembly
 - (1) Remove the four attaching screws of the combination meter assembly.
 - (2) Pull out the combination meter assembly toward your side. Disconnect the speedometer cable and the two couplers of the wire harness. Remove the combination meter assembly.



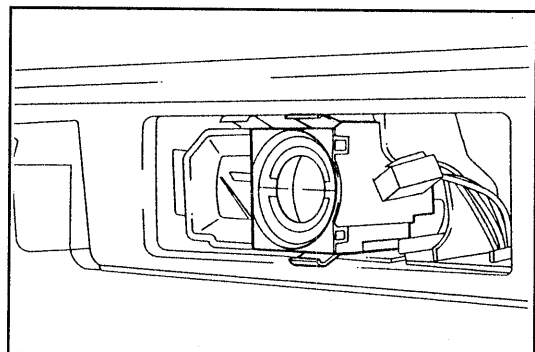
WRU90-BO223

12. Disconnect the clamp of the wire harness.



WRU90-BO224

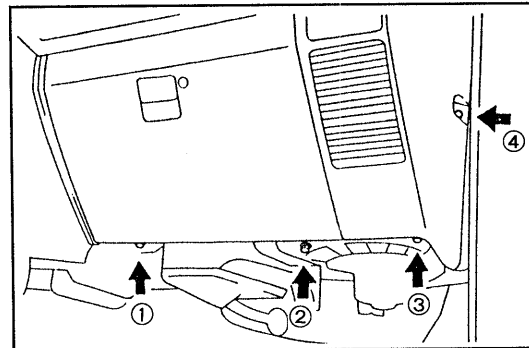
13. Removal of triple meter
 - (1) Remove the upper instrument panel finish by means of a bamboo spatula wrapped with a cloth.
 - (2) Pull out the voltmeter, clinometer and clock toward your side, while pushing the upper and lower claws by means of a spatula or the like.
 - (3) Disconnect the connectors.



WRU90-BO225

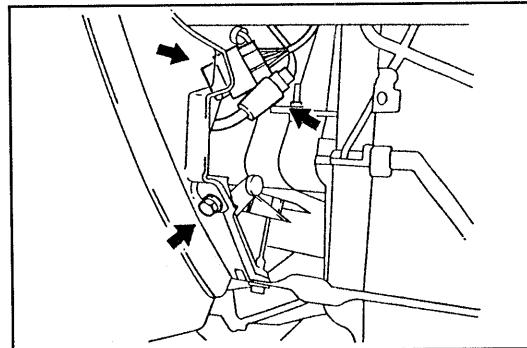
BODY

14. Remove the glove compartment door subassembly (screws ① and ②).
15. Remove the screws ③ and ④.
(It is not necessary to remove the instrument panel reinforcement.)



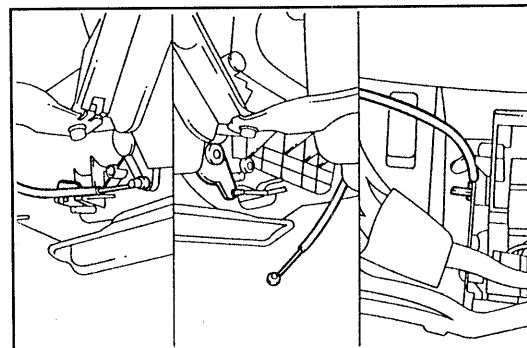
WRU90-BO226

16. Disconnect the connectors of the wire harnesses of the heater control switch (and the air conditioner switch).
17. Remove the attaching screw of the instrument panel and brace.



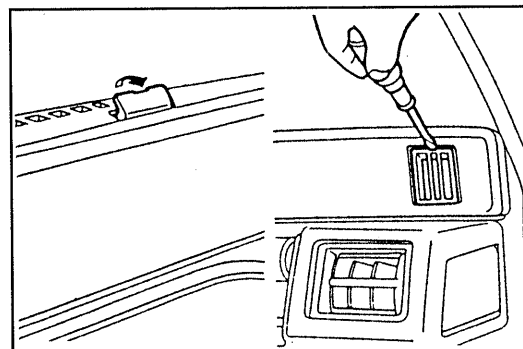
WRU90-BO227

18. Disconnect the heater control cable.



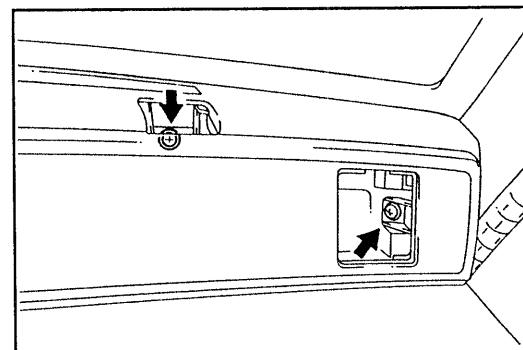
WRU90-BO228

19. Remove the defroster nozzles (at the left and right sides).
20. Remove the instrument panel hole covers (at the right and left sides).



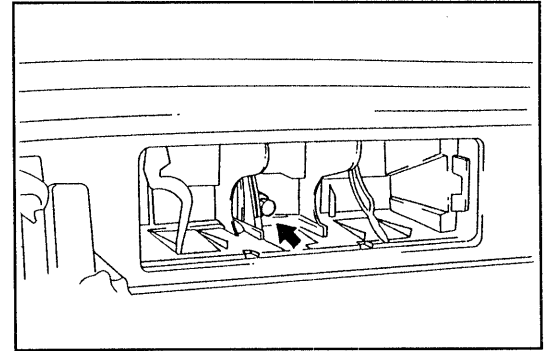
WRU90-BO229

21. Remove the attaching screws of the instrument panel (at the right and left sides).



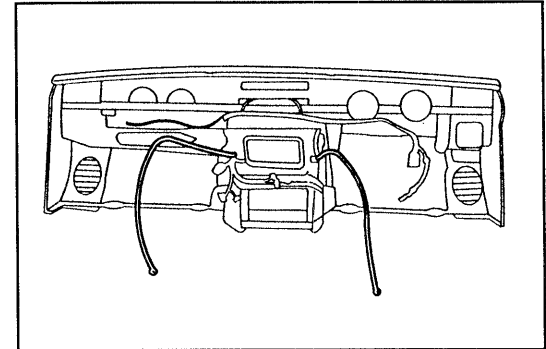
WRU90-BO230

22. Remove the attaching screws of the instrument panel (center).



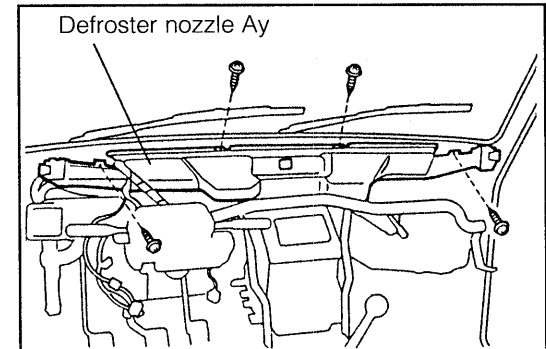
WRU90-BO231

23. Remove the instrument panel from the body.



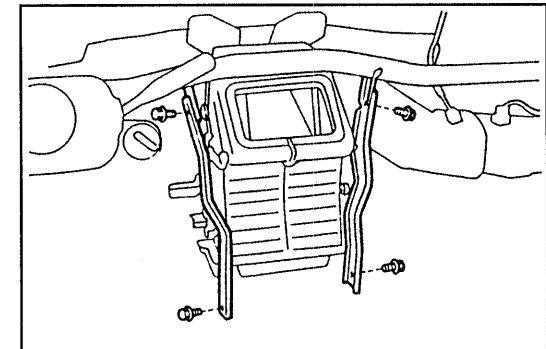
WRU90-BO232

24. Remove the defroster nozzle assembly.



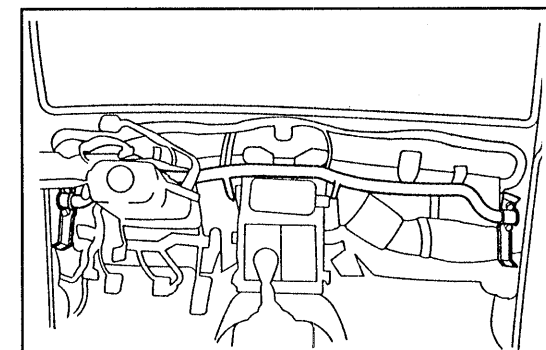
WRU90-BO233

25. Remove the instrument panel panel brace subassembly.
 26. Remove the following parts.
 (1) Bracket of key reminder buzzer, heater relay and horn relay
 (2) Sub-fuse box



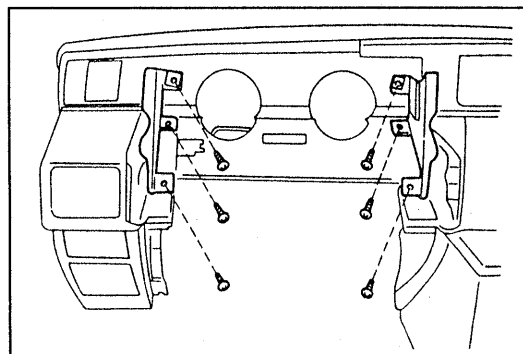
WRU90-BO234

27. Remove the steering column from the pillar-to-pillar member subassembly.
 28. Remove the pillar-to-pillar member subassembly from the pillar.



WRU90-BO235

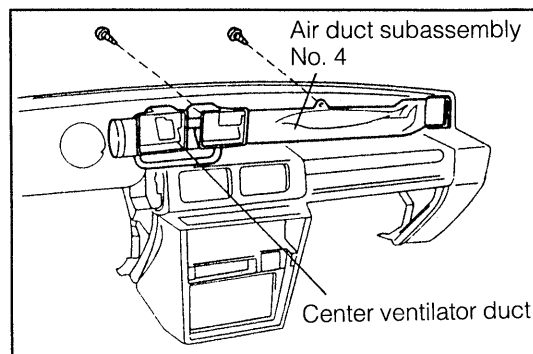
29. Remove the meter hood set bracket (right and left side) by removing the six screws.



WRU90-BO236

30. Remove the air duct subassembly No. 4 by removing the screw.

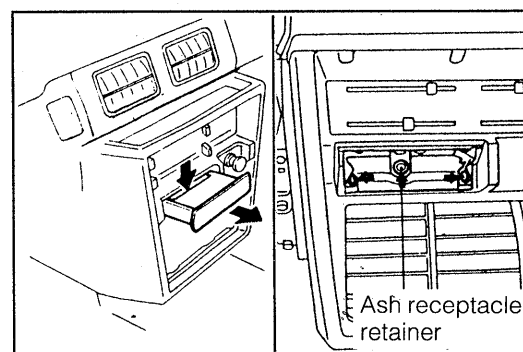
31. Remove the center ventilator duct by removing the screw.



WRU90-BO237

32. Removal of ash receptacle box and ash receptacle retainer

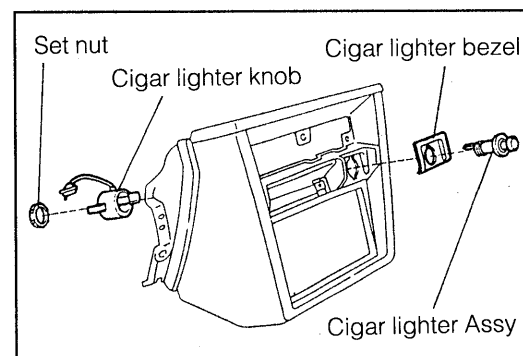
- (1) Pull out the ash receptacle box.
- (2) Remove the ash receptacle retainer by removing the three screws, Disconnect the optical cord.



WRU90-BO238

33. Removal of cigar lighter

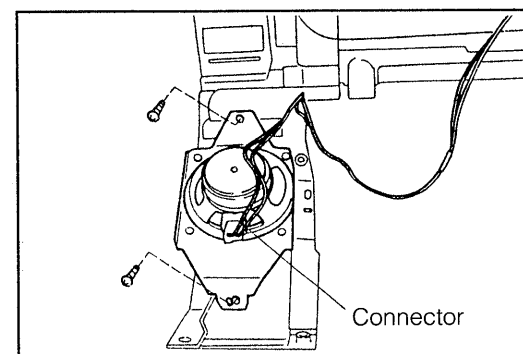
- (1) Disconnect the connectors.
- (2) Remove the set nut.
- (3) Remove the cigar lighter knob.
- (4) Remove the cigar lighter assembly.
- (5) Remove the cigar lighter bezel.



WRU90-BO239

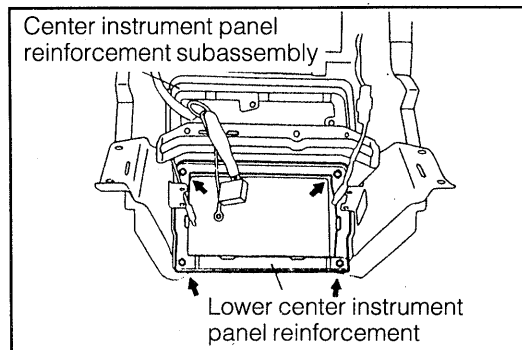
34. Removal of speaker (right and left side)

- (1) Disconnect the connectors.
- (2) Remove the speaker by removing screws.



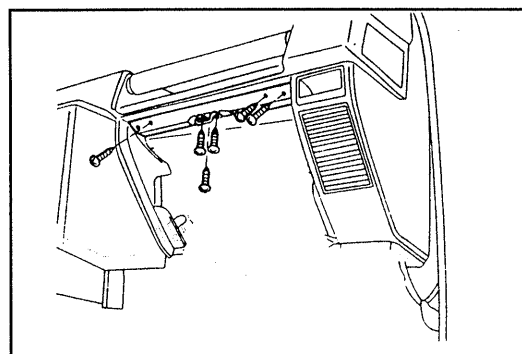
WRU90-BO240

35. Remove the center instrument panel reinforcement subassembly and lower center instrument reinforcement by removing the four bolts.



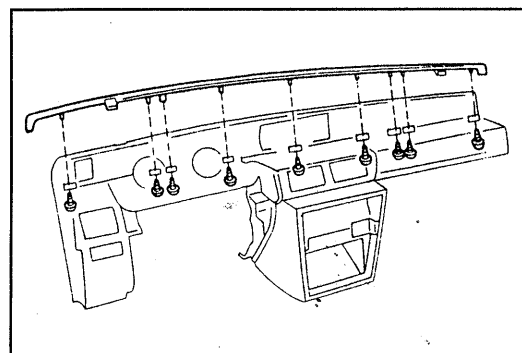
WRU90-BO241

36. Removing the glove compartment door lock striker by removing the two screws.
37. Removing the glove compartment door lock retainer subassembly by removing the five screws.



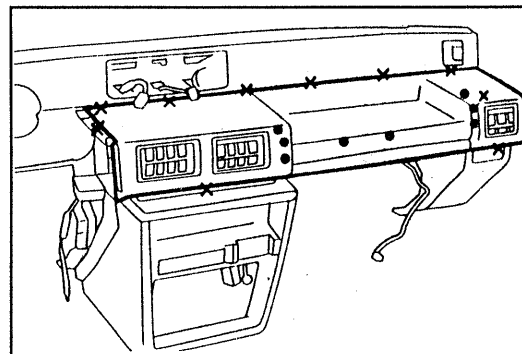
WRU90-BO242

38. Remove the defroster nozzle opening cover by removing the nine screws.



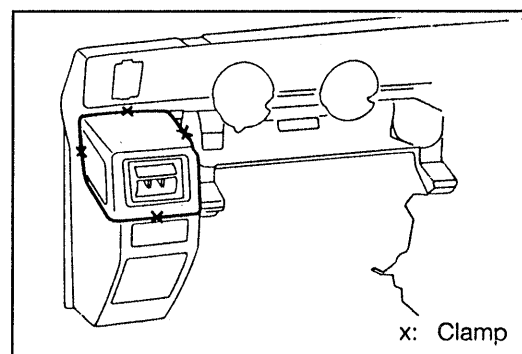
WRU90-BO243

39. Remove the instrument panel safety pad subassembly by removing the eight bolts and ten clamps.



WRU90-BO244

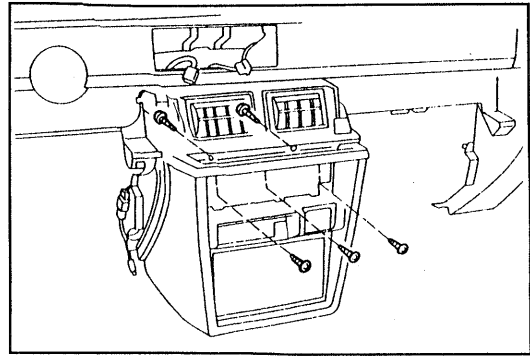
40. Remove the side instrument panel safety pad subassembly by removing the four clamps.



WRU90-BO245

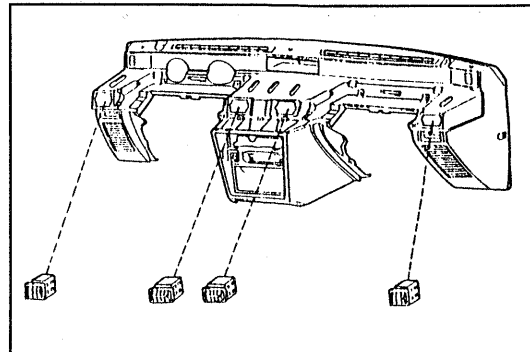
BODY

41. Remove the center instrument panel tray by removing the five screws.



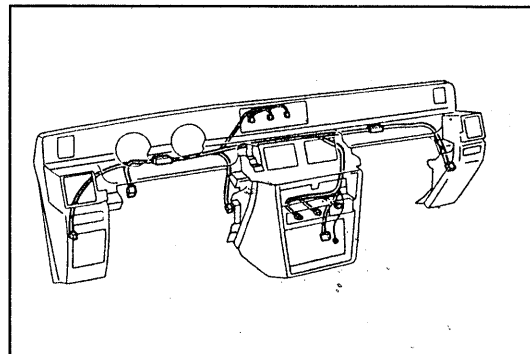
WRU90-BO246

42. Remove the side and center instrument panel register assy.



WRU90-BO247

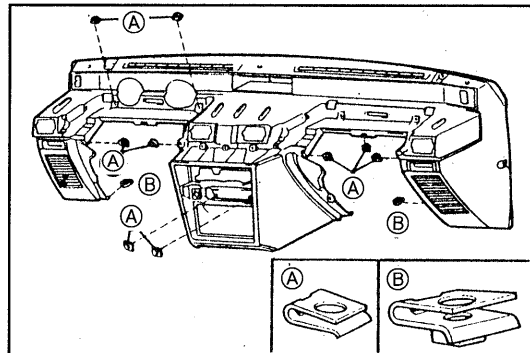
43. Remove the instrument panel wire from instrument panel.



WRU90-BO248

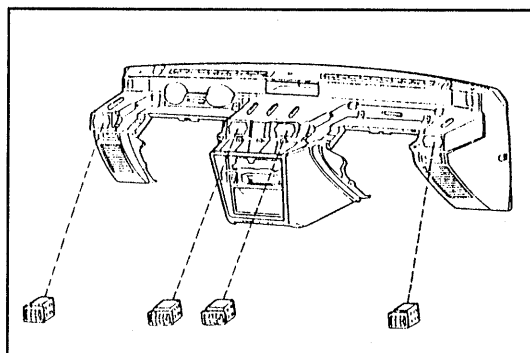
INSTALLATION

1. Install the snapping nuts.
2. Install the instrument panel wire.



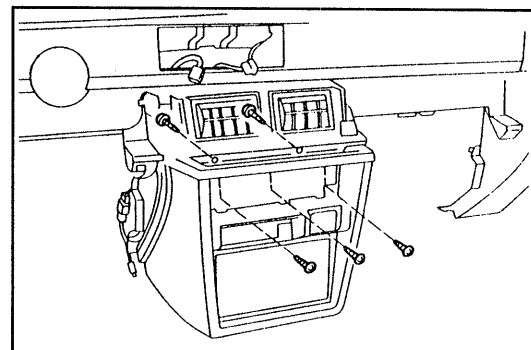
WRU90-BO249

3. Install the side and center instrument panel register assy.



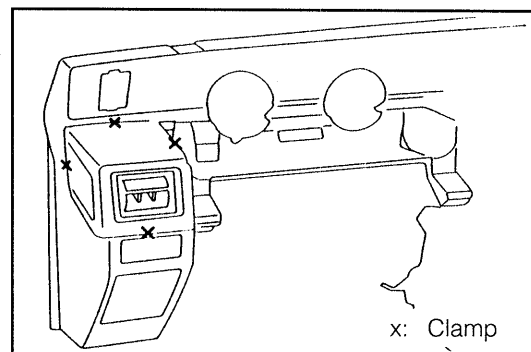
WRU90-BO250

4. Install the center instrument panel tray with the five screws.



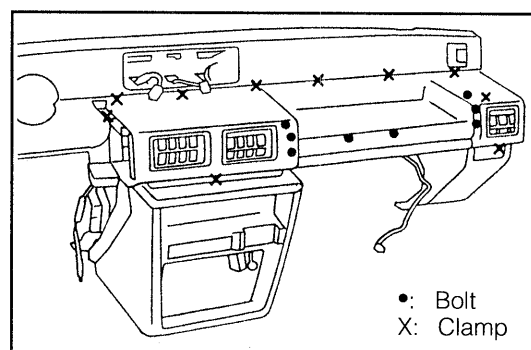
WRU90-BO251

5. Install the side instrument panel safety pad subassembly with the four clamps.



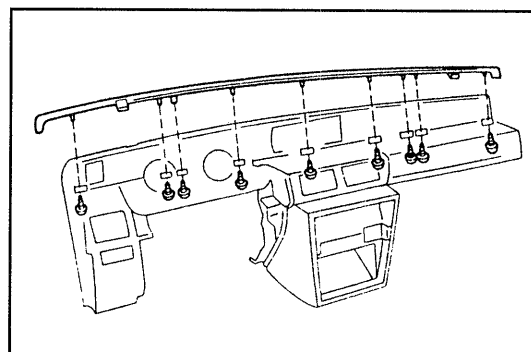
WRU90-BO252

6. Install the instrument panel safety pad subassembly with eight bolts and ten clamps.



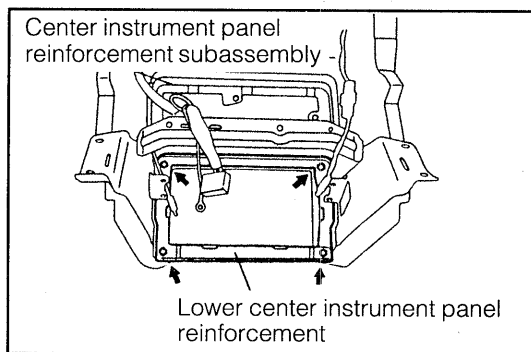
WRU90-BO253

7. Install the defroster nozzle opening cover with the nine screws.



WRU90-BO254

8. Install the center instrument panel reinforcement subassembly and lower center instrument reinforcement with the four bolts.

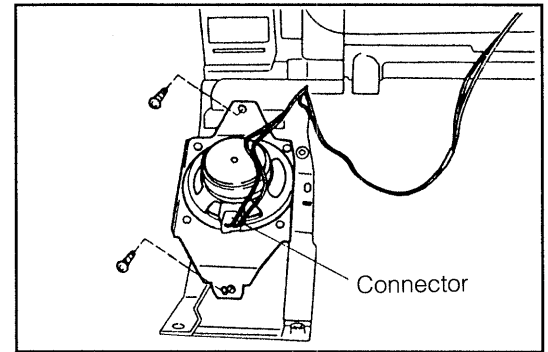


WRU90-BO255

BODY

9. Installation of speaker (right and left side)

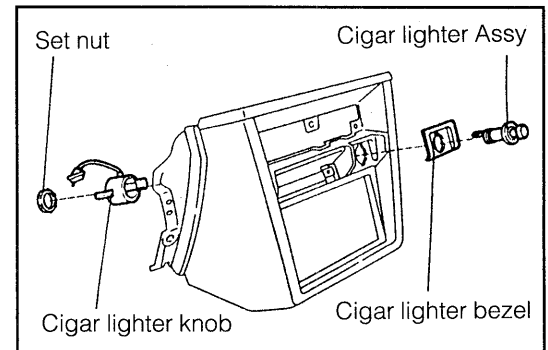
- (1) Install the speaker with the screws.
- (2) Connect the connectors.



WRU90-BO256

10. Installation of cigar lighter

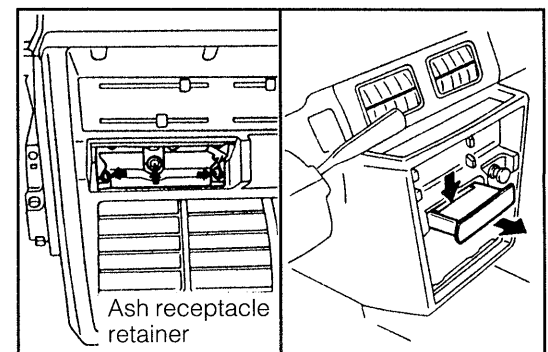
- (1) Install the cigar lighter bezel, cigar lighter Assy, cigar lighter knobs and set nut.
- (2) Connect the connectors.



WRU90-BO257

11. Installation of ash receptacle box and ash receptacle retainer.

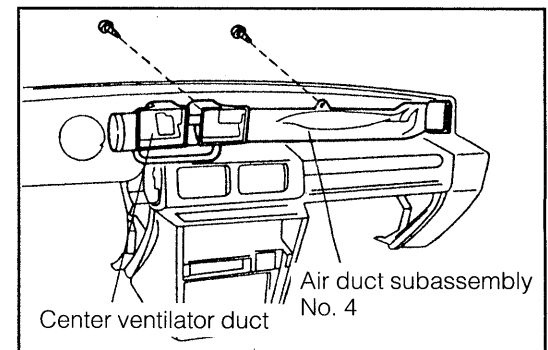
- (1) Install the optical cord to the ash receptacle retainer.
- (2) Install the ash receptacle retainer with the three screws.
- (3) Install the ash receptacle box.



WRU90-BO258

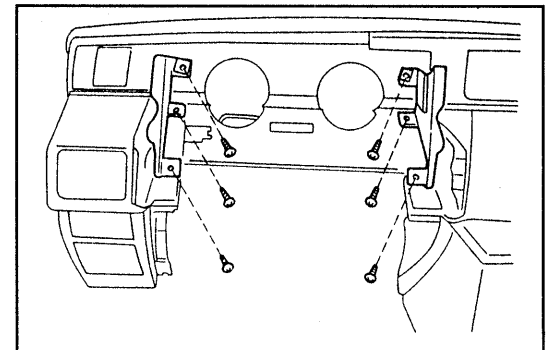
12. Install the center ventilator duct with the screw.

13. Install the air duct subassembly No. 4 with the screw.



WRU90-BO259

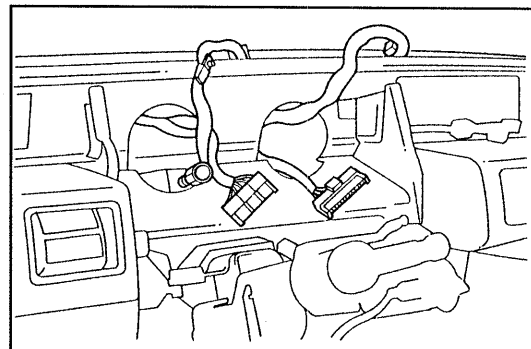
14. Install the meter hood set bracket (right and left side) with the six bolts.



WRU90-BO260

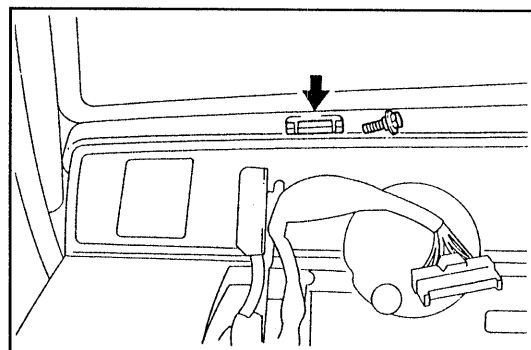
INSTALLATION OF INSTRUMENT PANEL

1. Put the instrument panel in place.
2. Draw out the wire harnesses and speedometer cable from the hole for the combination meter.



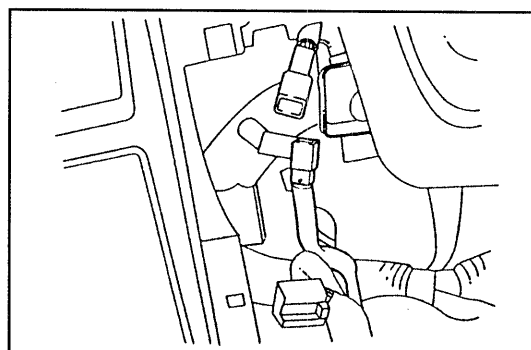
WRU90-BO261

3. Temporarily install the instrument panel with two bolts at upper right and left points.




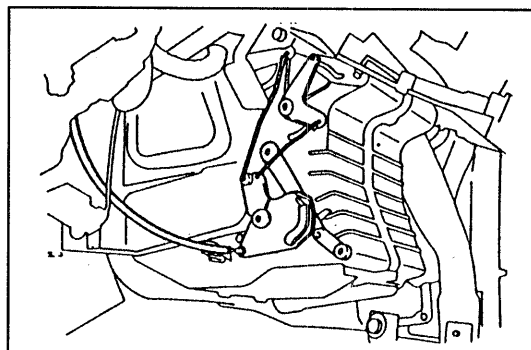
WRU90-BO262

4. Connect the coupler of the wire harness.
 - (1) Wire, instrument panel
 - (2) Wire, heater control switch
 - (3) Wire, air conditioner switch
5. Clamp of wire harness
 - (1) Wire cowl in left figure (for instrument panel wire)
 - (2) Wire harnesses for hazard of combination meter section and rear wiper switch




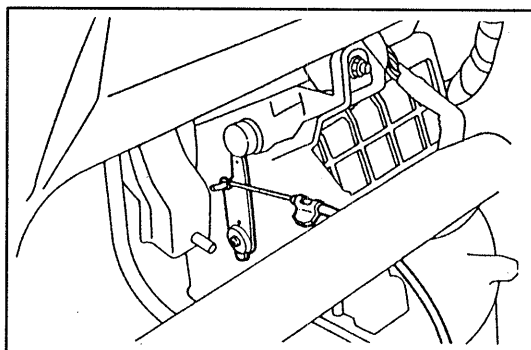
WRU90-BO263

6. Connect the wire of the heater control unit to the lever of the heater/blower unit.
 - (1) Install the mode switching cable, as follows:
 - 1) Set the mode switching lever of the heater control to the  (DEF) side; the mode switching lever of the heater unit to the DEF side.
 - 2) Connect the mode switching cable. Insert it into the clamp securely.




WRU90-BO264

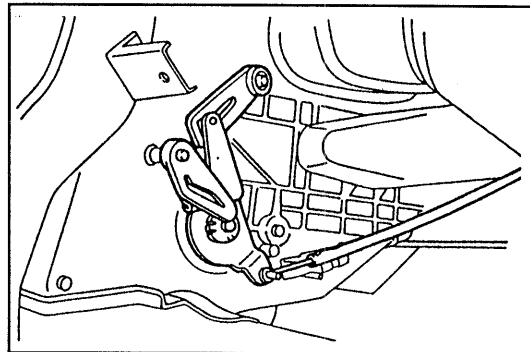
- (2) Install the temperature regulating cable, as follows:
 - 1) Set the temperature regulating lever of the heater control to the  (COOL) side; the temperature regulating lever of the heater unit to the COOL side.
 - 2) Connect the temperature regulating cable. Insert it into the clamp securely.



WRU90-BO265

(3) Install the inside air/outside air switching cable, as follows:

- 1) Set the inside air/outside air switching lever of the heater control to the  (RECIRC) side; the inside air/outside air switching lever of the blower assembly to the RECIRC side.
- 2) Connect the inside air/outside air switching cable. Insert it to the clamp securely.

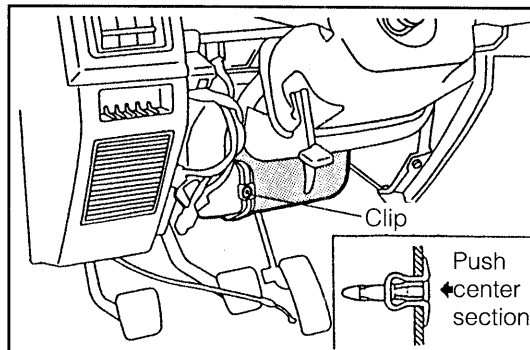


WRU90-BO266

7. Install the air No. 1 duct subassembly. Install the clip.

NOTE:

Before the instrument panel is tightened securely, make sure that the wire harnesses, clamps and connectors are installed without applying undue force.



WRU90-BO267

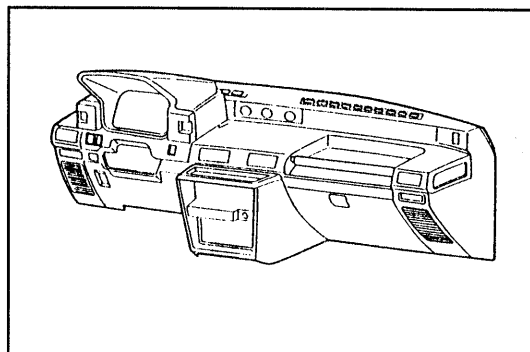
8. Tighten all screws which have been removed during the removal operation.

NOTE:

Refer to the sequence numbers 4, 5, 17, 21 and 22.

9. Install the defroster nozzle assembly.

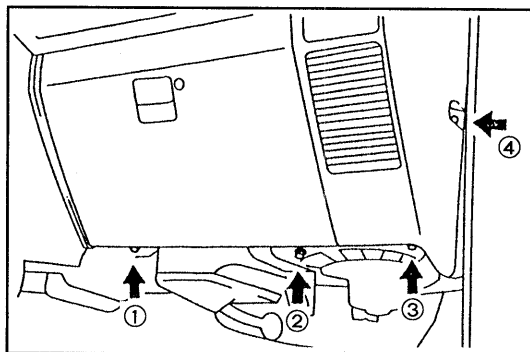
10. Install the instrument panel hole cover.



WRU90-BO268

11. Install the glove compartment door subassembly. (Tighten the screws ① and ②.)

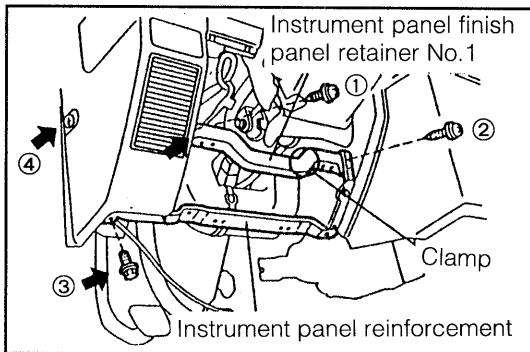
12. Tighten the screws ③ and ④.



WRU90-BO269

13. Install the instrument panel finish panel retainer No. 1. (Tighten the screws ① and ②.)

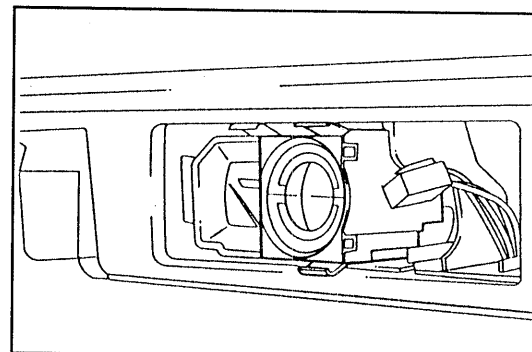
14. Tighten the screws ③ and ④.



WRU90-BO270

15. Install the triple meter.

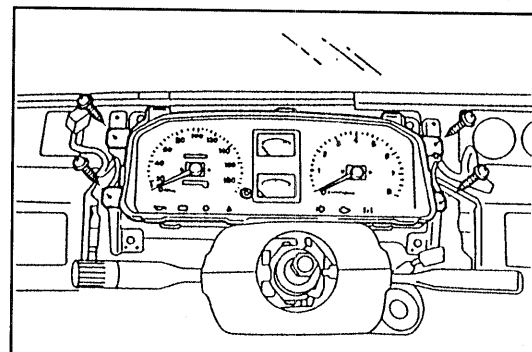
- (1) Connect each connector to the respective meters. Press the meter into the groove by hands.
- (2) Press the upper instrument panel finish into position by hands.



WRU90-BO271

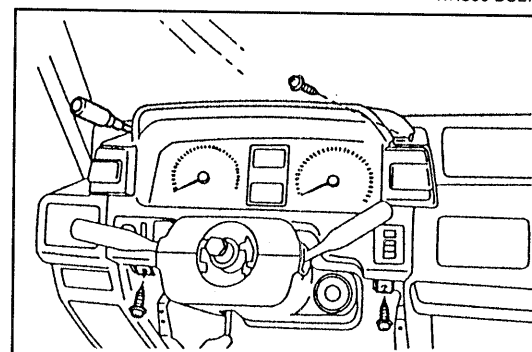
16. Installation of combination meter

- (1) Connect the connector of the speedometer cable and the couplers of the wire harnesses.
- (2) Tighten the attaching screws.



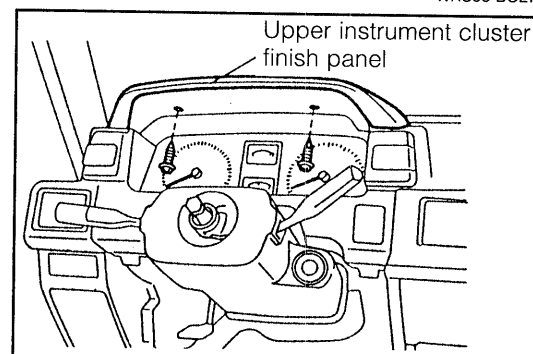
WRU90-BO272

17. Install the instrument cluster finish panel subassembly with the attaching screws.



WRU90-BO273

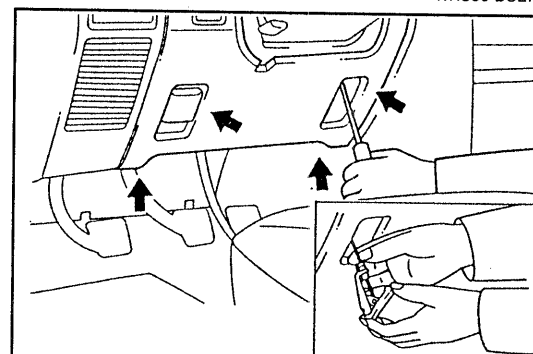
18. Install the upper instrument cluster finish panel with the attaching screws.



WRU90-BO274

19. Installation of lower instrument panel finish panel.

- (1) Connect the connector for the rear heater switch and rheostat.
- (2) Tighten the attaching screws of the lower instrument panel finish panel.
- (3) Tighten the attaching screws of the rheostat.
- (4) Connect the wire for the hood lock control lever and tighten the attaching screws.



WRU90-BO275

BODY

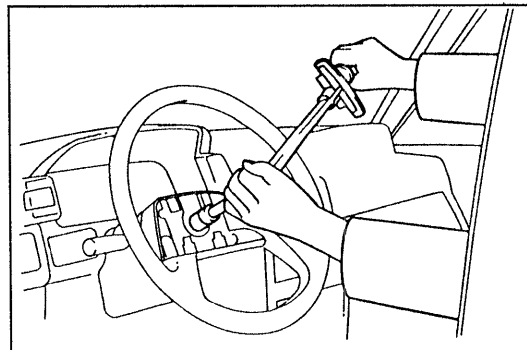
20. Install the steering wheel.

Tightening Torque:

3.0 - 5.0 kg-m (21.7 - 36.2 ft-lb, 29.4 - 49.0 N·m)

21. Connect the horn wire and install the horn pad.

22. Tighten the screw of the horn pad.



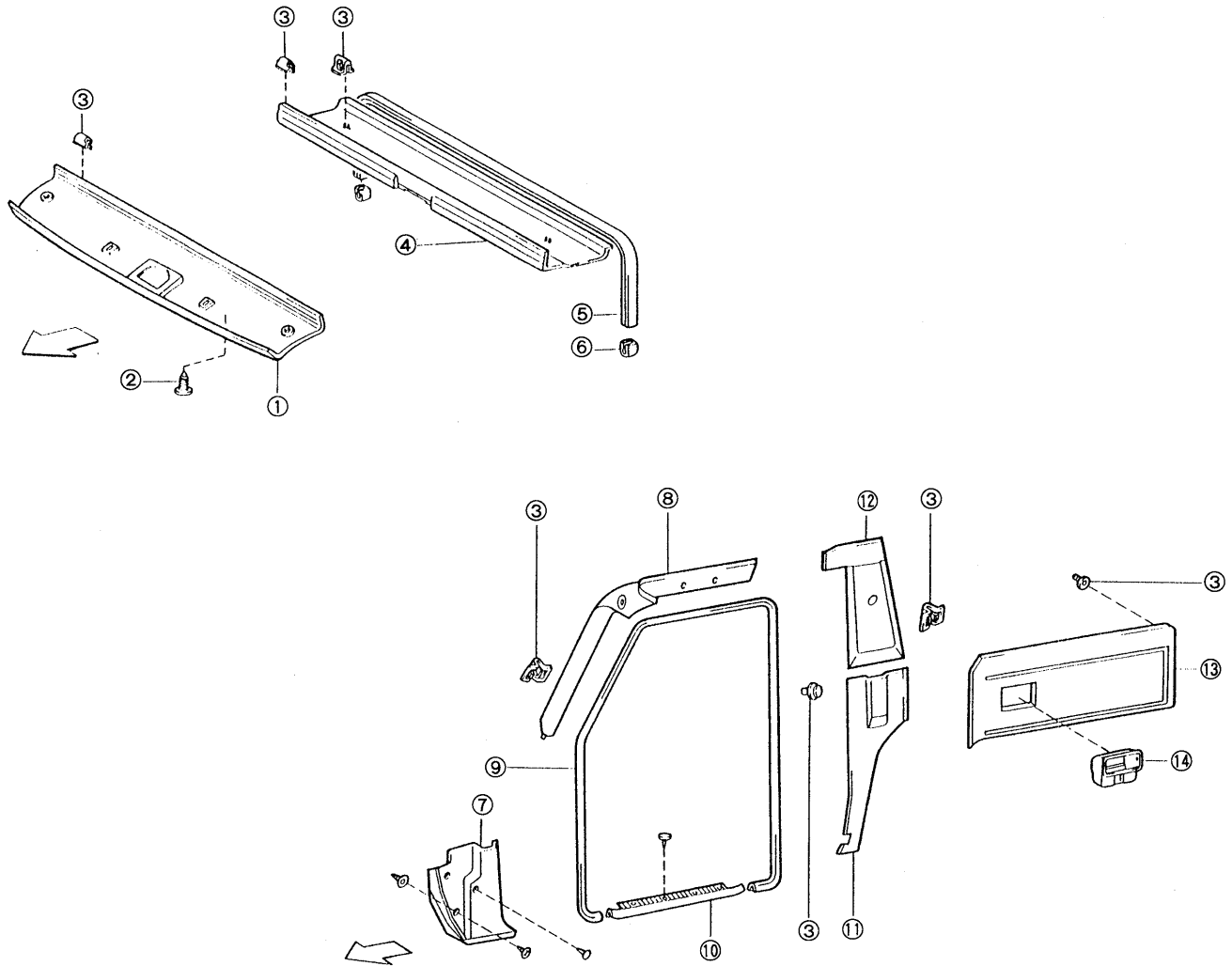
WRU92-BO407

OPERATION AFTER INSTALLATION

1. Connect the battery.
2. Ensure that each switch of the instrument panel functions properly.
3. Ensure that all of the electrical system functions properly.

WRU90-BO277

TRIMS COMPONENTS



- ① Roof headlining trim No. 1
- ② Clip
- ③ Clip
- ④ Center roll over garnish
- ⑤ Rear roll over edge protector
- ⑥ Protector roll over edge cover
- ⑦ Cowl side trim board

- ⑧ Front pillar inner garnish
- ⑨ Front door opening trim
- ⑩ Front door scuff plate
- ⑪ Center pillar garnish
- ⑫ Center pillar upper garnish
- ⑬ Quarter inside trim board
- ⑭ Quarter vent louver S/A

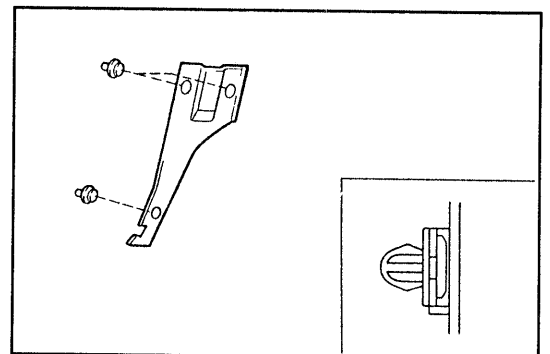
CENTER PILLAR GARNISH

REMOVAL

1. Disengage the clips, using a screw driver.
2. Remove the center pillar garnish.

INSTALLATION

1. Align the clips in place. Install the center pillar garnish by lightly tapping around the clips by hand.



WRU90-BO278

WRU90-BO279

BODY

CENTER PILLAR UPPER GARNISH

REMOVAL

1. Remove the attaching bolt of the front seat outer belt shoulder anchor.
2. Remove the assist grip.
3. Disengage the clip, using a screwdriver.
4. Remove the center pillar garnish.

INSTALLATION

1. Align the clips in place. Install the center pillar garnish by lightly tapping around the clips by hand.
2. Install the assist grip.
3. Install the attaching bolt of the front seat outer belt shoulder anchor.

Tightening Torque:

2.9 - 5.4 kg-m (21.0 - 39.1 ft-lb, 28.4 - 53.0 N·m)

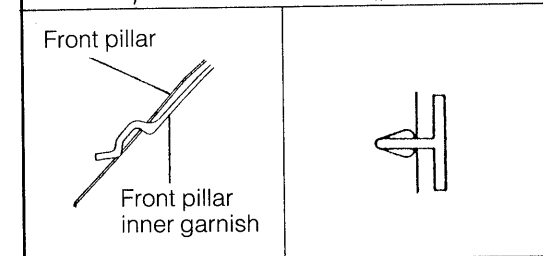
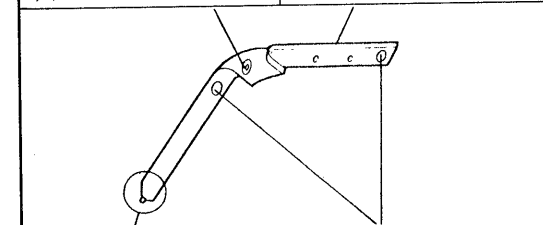
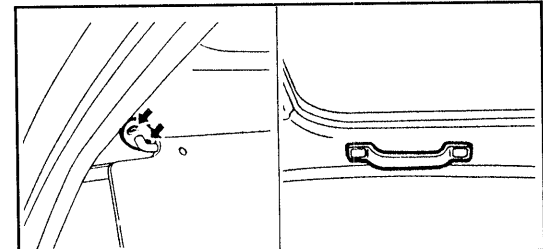
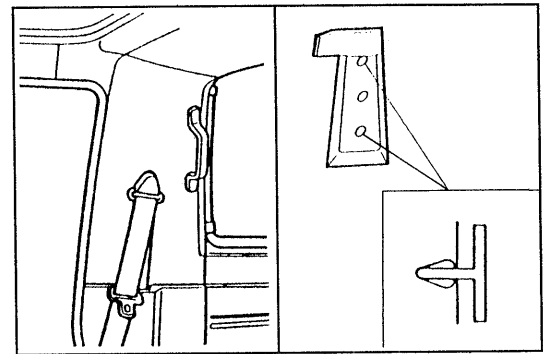
FRONT PILLAR INNER GARNISH

REMOVAL

1. Remove the sun visor assembly.
2. Remove the assist grip or two clips.
3. Disengage the clips, using a screwdriver.
4. Remove the front pillar inner garnish.

INSTALLATION

1. Hang the hanger located at the lower part of the front pillar inner garnish to the body.
2. Align the two clips in place. Install the front pillar garnish by tapping it lightly by your hand.
3. Install the assist grip or two clips.
4. Install the sun visor assembly.



WRU90-BO281

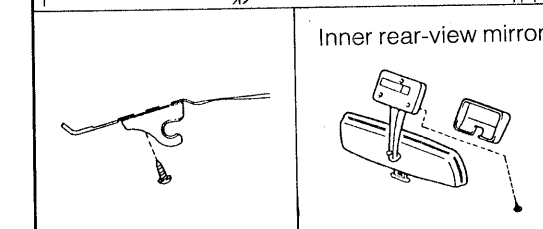
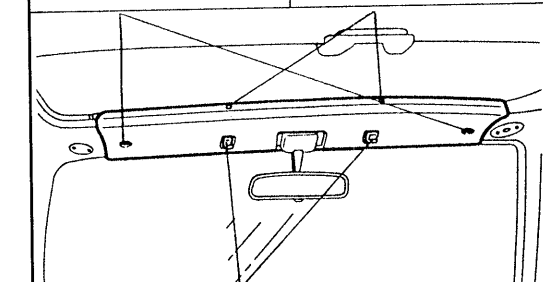
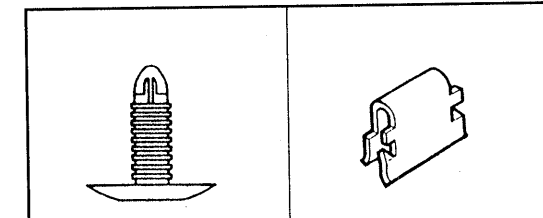
ROOF HEADLINING TRIM No. 1

REMOVAL

1. Remove the inner rear-view mirror.
2. Remove the visor holders.
3. Disengage the clips, using a screwdriver.
4. Remove the roof headlining trim No. 1.

INSTALLATION

1. Install the roof headlining trim No. 1 with the four clips.
2. Install the visor holders with the screws.
3. Install the inner rear-view mirror.



WRU90-BO282

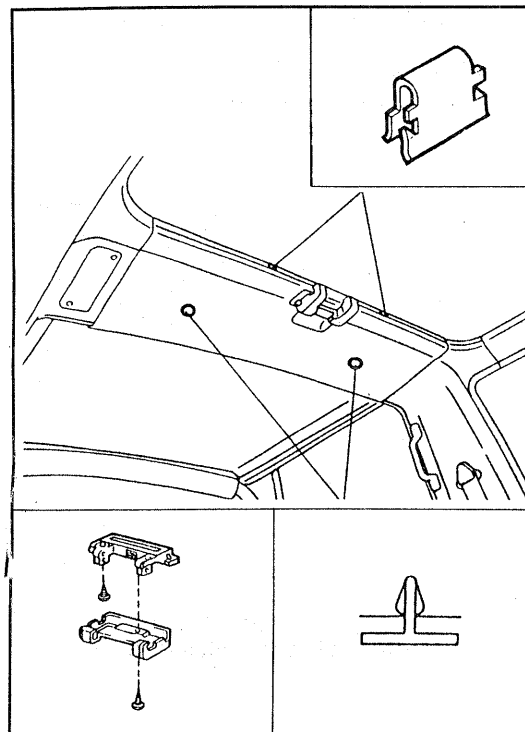
ROLL OVER CENTER GARNISH

REMOVAL

1. Remove the removable roof lock garnish and removable roof lock base assembly.
2. Disengage the clips.
3. Remove the roll over center garnish

INSTALLATION

1. Install the roll over center garnish with the four clips.
2. Install the removable roof lock garnish and removable roof lock base assembly.



WRU90-BO283

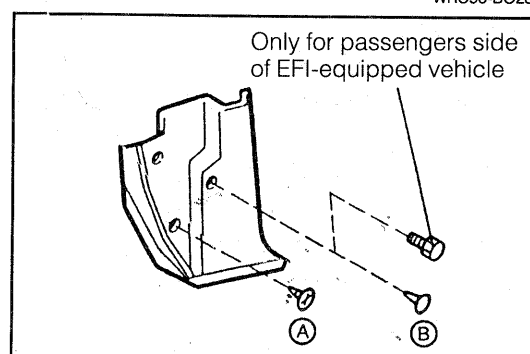
COWL SIDE TRIM BOARD

REMOVAL

1. Disengage the clips (A), using a screwdriver.
2. Disengage the clip (B) or remove the bolt.
3. Remove the cowl side trim board.

INSTALLATION

1. Install the cowl side trim board with the clip (A) and clip (B) of bolt.



WRU90-BO284

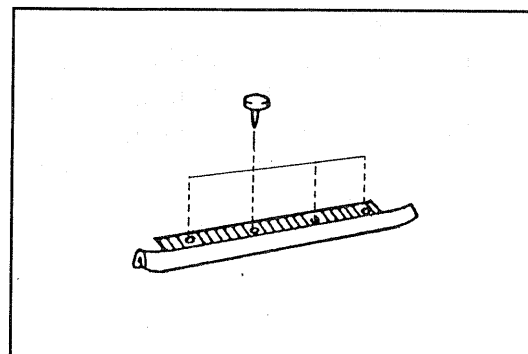
FRONT DOOR SCUFF PLATE

REMOVAL

1. Disengage the clips, using a screwdriver.
2. Remove the front door scuff plate.

INSTALLATION

1. Install the front door scuff plate with the clips.



WRU90-BO285

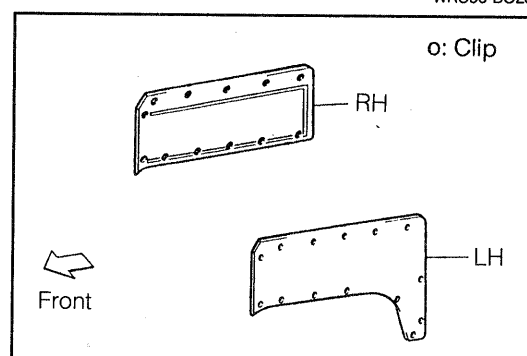
QUARTER INSIDE TRIM BOARD

REMOVAL

1. Disengage the clips, using a screwdriver.
2. Remove the quarter inside trim board.

INSTALLATION

1. Align the clip in place. Install the quarter inside trim board by lightly tapping around the clips by hand.

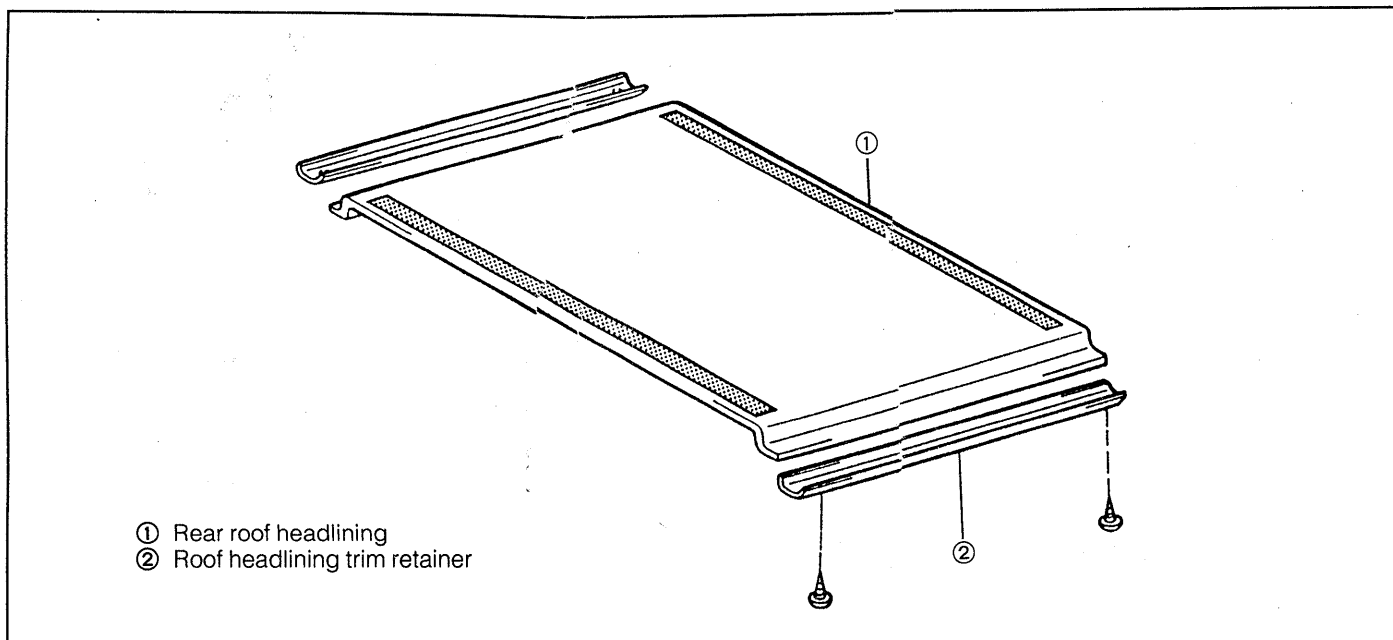


WRU90-BO286

BODY

REAR ROOF HEADLINING

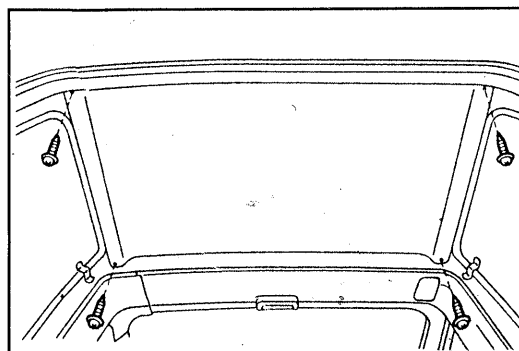
COMPONENTS



WRU90-BO287

REMOVAL

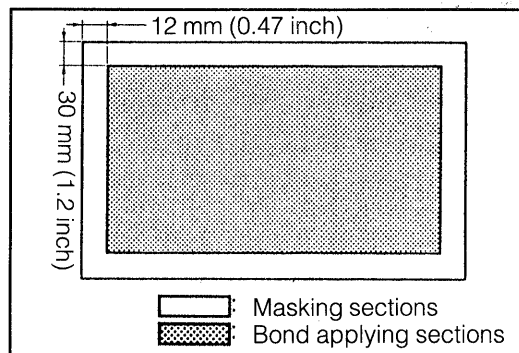
1. Remove the rear roll bar.
2. Remove the roof headlining trim retainer by removing the screws.
3. Remove the roof headlining.



WRU90-BO288

INSTALLATION

1. Mask the periphery of the rear roof headlining. Apply the bond. (Sunstar-Made Penguin cement #386)
2. Affix the rear roof headlining.
3. Install the rear headlining trim retainer by the screws.
4. Install the rear roll bar.



WRU90-BO289

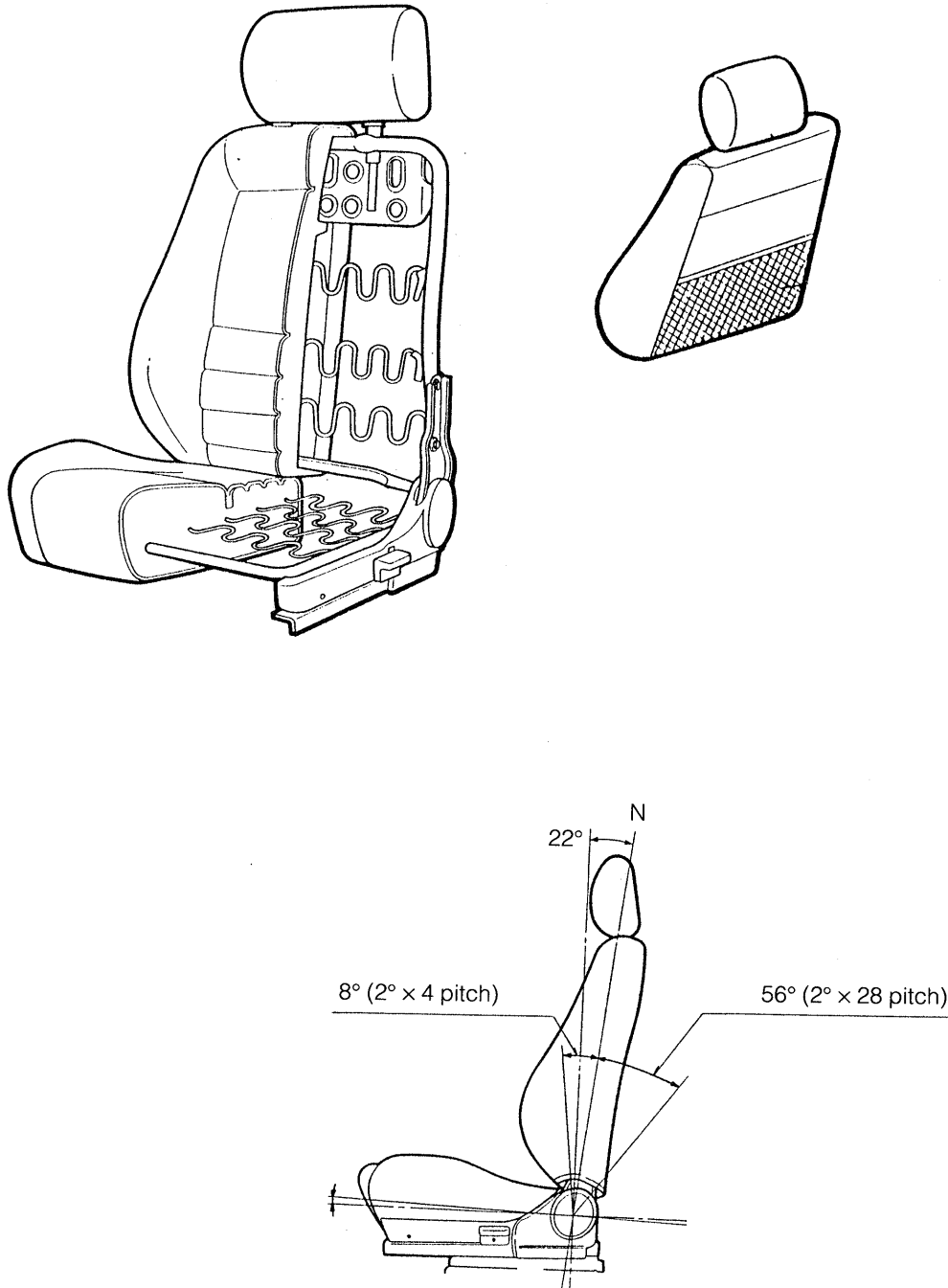
FRONT SEAT

For enhanced rigidity and reduced weight, the seat frame of the front seat adopts a pipe frame and an "S" spring structure.

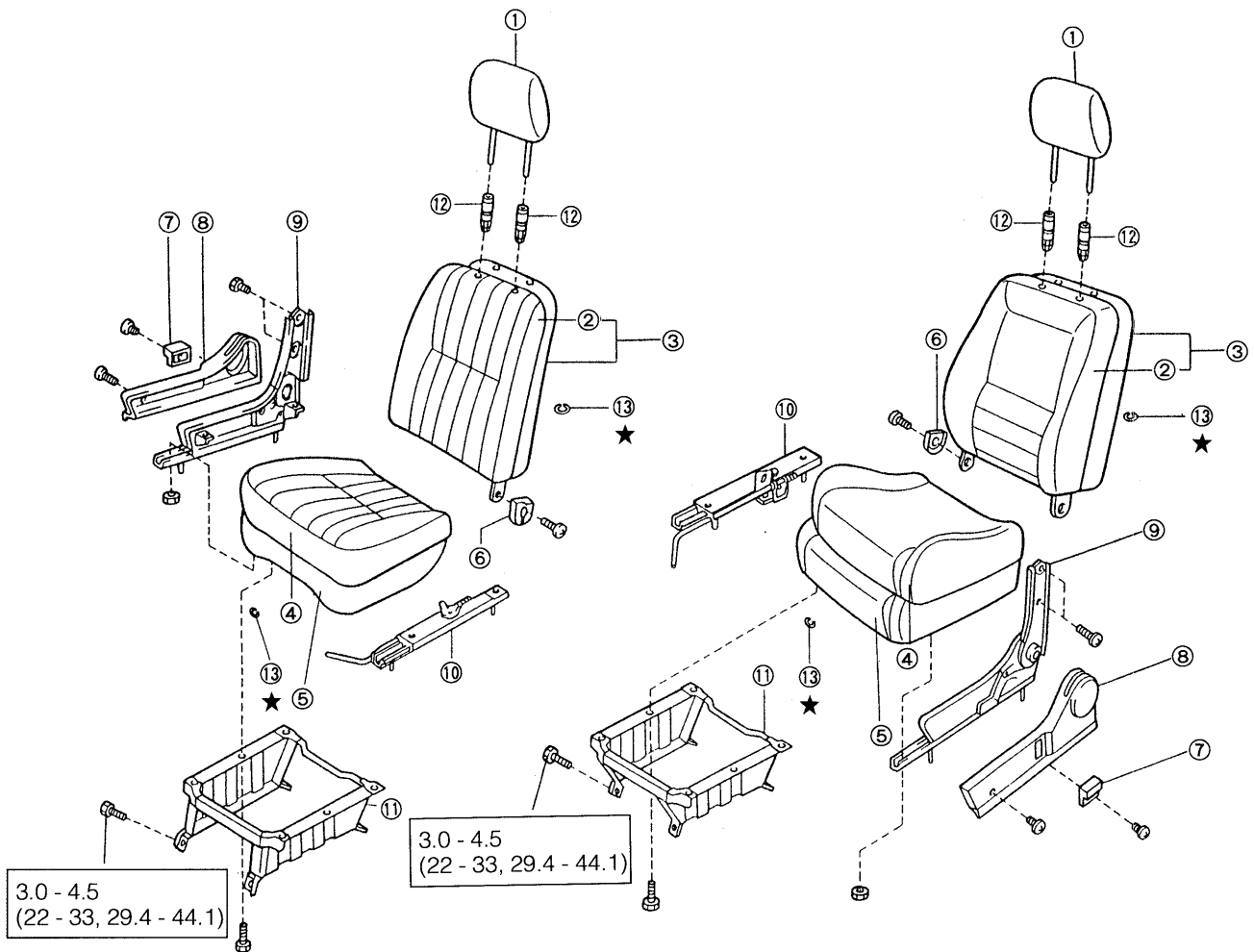
The front seat uses urethane having an adequate hardness as the seat pad material.

The front seat is so constructed that the seat sliding pitch is 15 mm (0.59 inch), whereas the reclining (pitch) angle can be adjusted in increments of 2 degrees. Consequently, it is possible to make fine adjustments in accordance with the body size of the driver or passenger.

The headrest has been so designed that its height can be adjusted in accordance with the driver or passenger.



COMPONENTS



T : Tightening torque
Unit : kg-m (ft-lb, N-m)
★ : Non-reusable parts

- ① Front seat headrest
- ② Front seat back cover
- ③ Front seat back Ay
- ④ Front seat cushion cover
- ⑤ Front seat cushion Ay
- ⑥ Front seat hinge cover
- ⑦ Adjusting reclining release handle

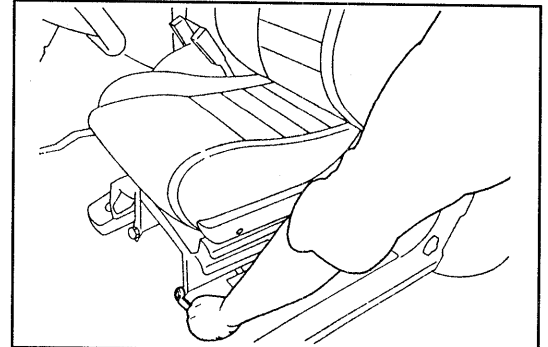
- ⑧ Front seat cushion shield
- ⑨ Reclining seat adjuster Ay
- ⑩ Seat track
- ⑪ Front seat cushion leg Ay
- ⑫ Seat headrest support
- ⑬ Hook snap ring

REMOVAL

NOTE:

The following disassembly and assembly procedures have been described primarily based on a model seat.

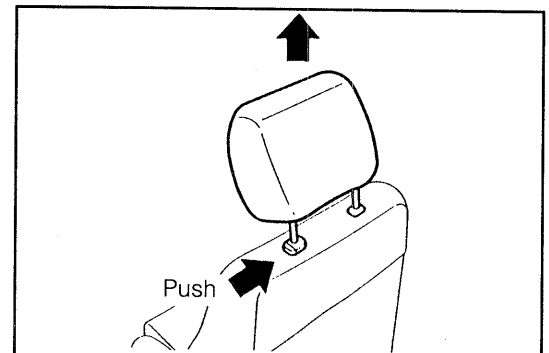
1. Remove the front seat from the vehicle by removing the four bolts.



WRU90-BO292

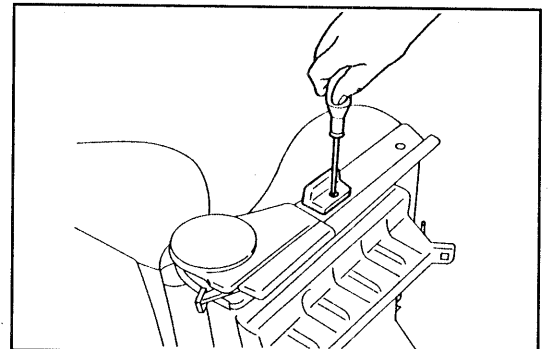
DISASSEMBLY

1. Remove the headrest with the stopper pushed toward "Unlock" direction.



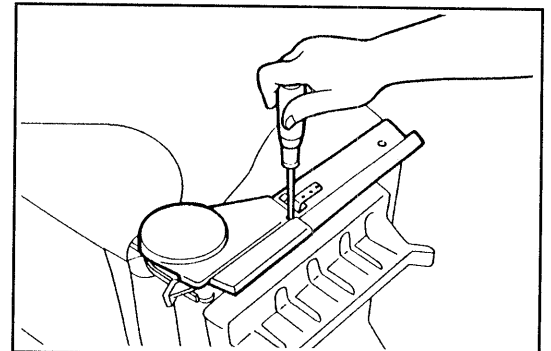
WRU90-BO293

2. Remove the adjusting reclining release handle.



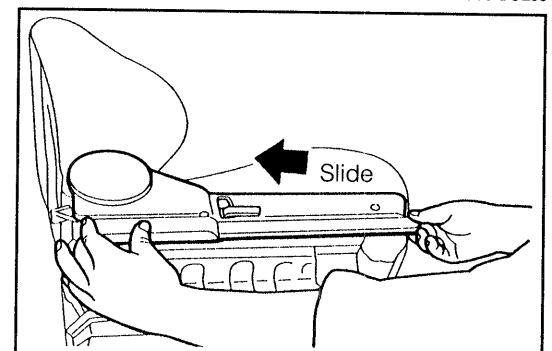
WRU90-BO294

3. Remove the front seat cushion shield, following the procedure given below.
 - (1) Remove the three attaching screws.



WRU90-BO295

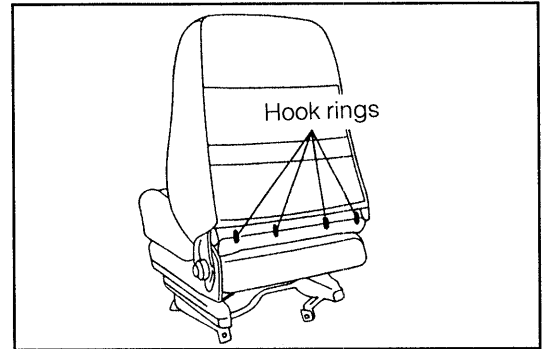
- (2) Remove the front seat cushion shield by sliding it, as indicated in the right figure.



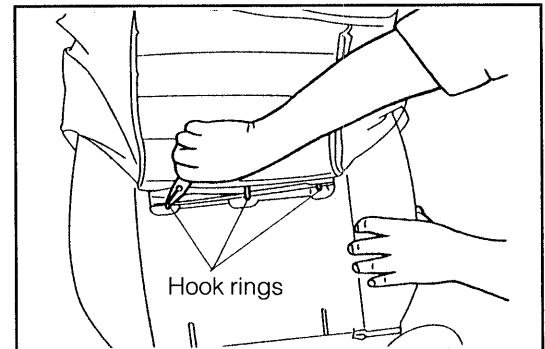
WRU90-BO296

BODY

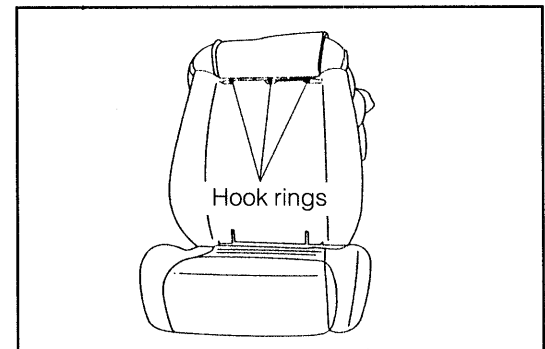
4. Detach the four hook rings of the front seatback cover, as indicated in the right figure.
5. Detach the three hook rings of the front seatback cover, as indicated in the right figure.
6. Detach the three hook rings of the front seatback cover, as indicated in the right figure.
7. Detach the three hook rings provided at the rear side of the front seatback cover, as indicated in the right figure.
8. Remove the seat headrest support.



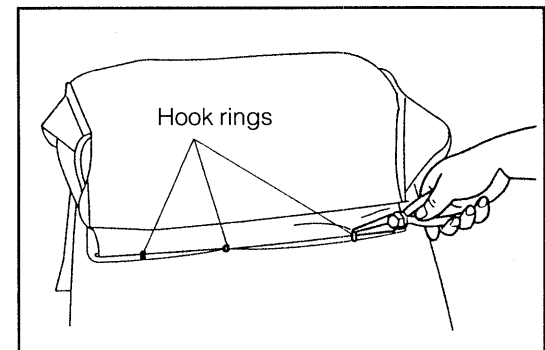
WRU90-BO297



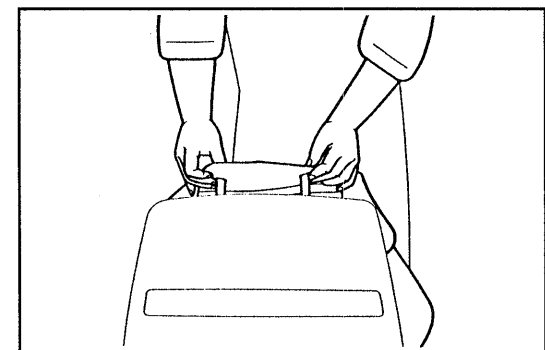
WRU90-BO298



WRU90-BO299

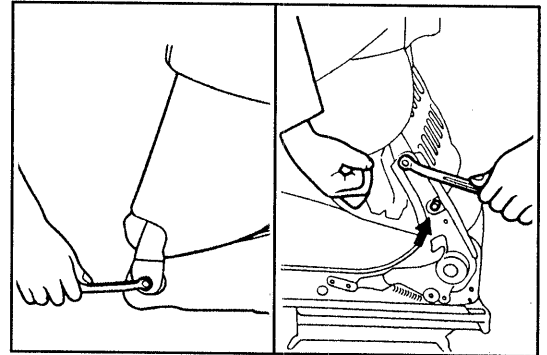


WRU90-BO300



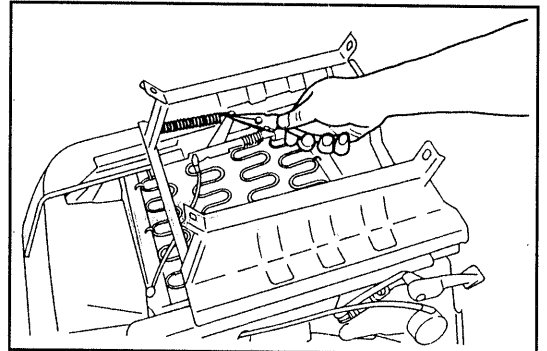
WRU90-BO301

9. Remove the front seatback assembly.
 - (1) Remove the seatback by removing the one small bolt and two bolts which are attaching the seatback.
 - (2) Remove the front seat hinge cover from the seatback.



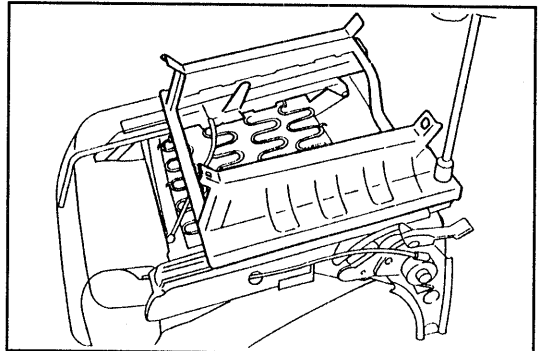
WRU90-BO302

10. Detach the return spring.



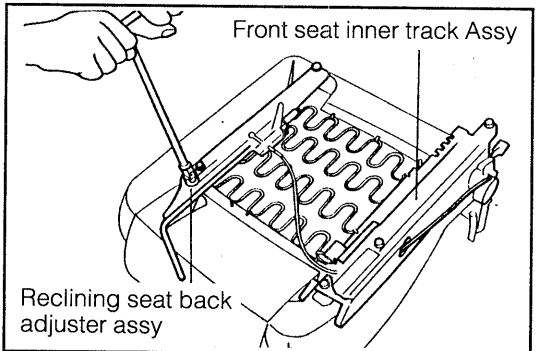
WRU90-BO303

11. Remove the front seat cushion leg assembly by removing the four bolts.



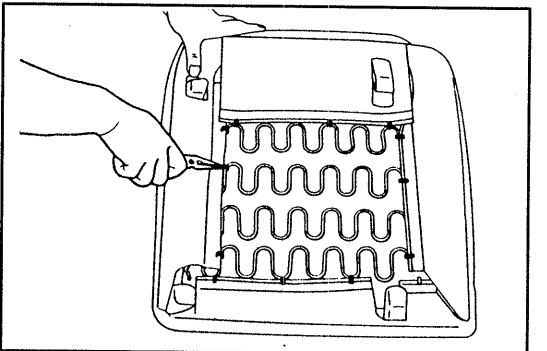
WRU90-BO304

12. Remove the reclining seat back adjuster assembly by removing the two bolts.
13. Remove the front seat inner track assembly by removing the two bolts.



WRU90-BO305

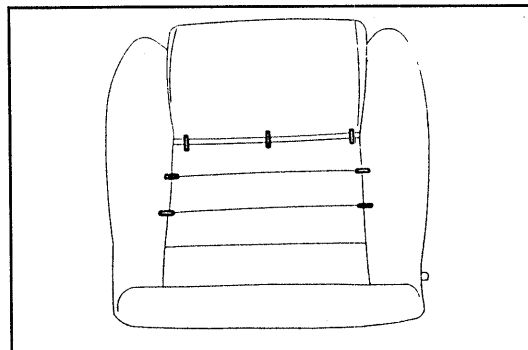
14. Detach the hook rings of the front seat cushion cover at the 13 points, as indicated in the right figure.



WRU90-BO306

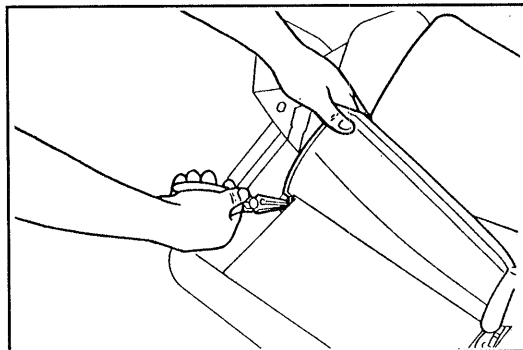
BODY

15. Detach the seven hook rings provided at the front side of the front seatback cover, as indicated in the right figure.



WRU90-BO307

16. Remove the front seat cushion cover from the front seat cushion assembly.



WRU90-BO308

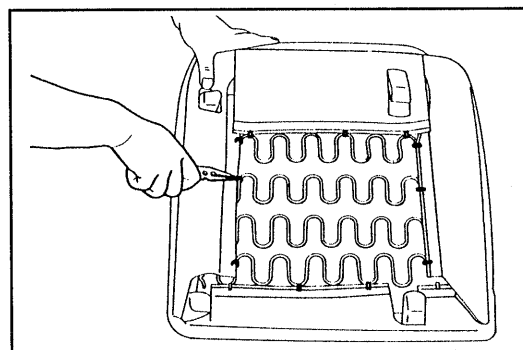
ASSEMBLY

1. Installation of front sea cushion cover

- (1) Install the new hook rings at the back side of the front seat cushion.
- (2) Install the new hook rings at the back side of the front seat cushion.

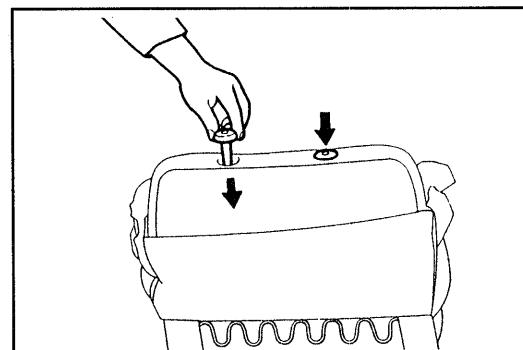
NOTE:

- Be very careful not to smear or scratch the seat cover during the assembly.
- When installing the hook rings, make sure that no wrinkle is formed on the front seat cushion cover wherever possible.



WRU90-BO309

2. Install the front seatback cover to the front seatback. Also, install the headrest support.



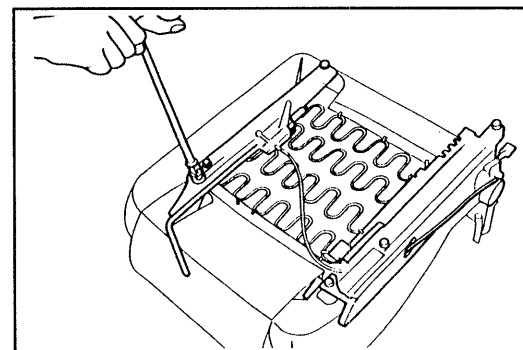
WRU90-BO310

3. Install the reclining seatback adjuster assembly by installing the two bolts.

Tightening Torque: 0.6 - 1.0 kg-m
(4.3 - 7.2 ft-lb, 5.9 - 9.8 N-m)

4. Install the front seat inner track assembly by installing the two bolts.

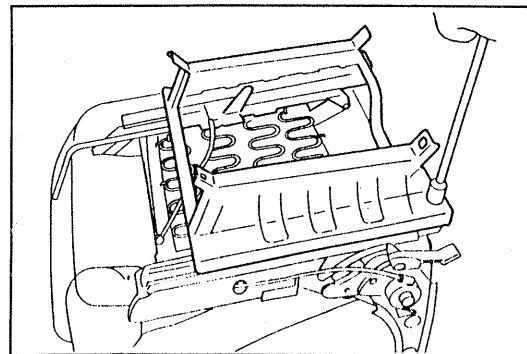
Tightening Torque: 0.6 - 1.0 kg-m
(4.3 - 7.2 ft-lb, 5.9 - 9.8 N-m)



WRU90-BO311

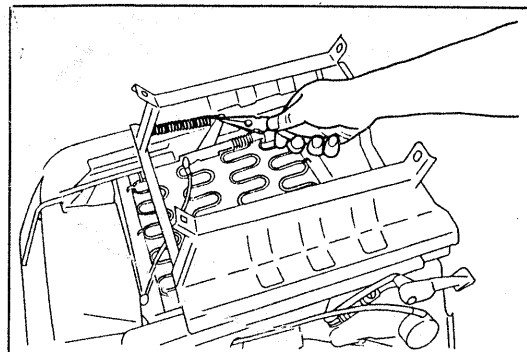
5. Install the front seat cushion leg assembly with the four bolts.

Tightening Torque: 0.9 - 1.5 kg-m
(6.5 - 10.8 ft-lb, 8.8 - 14.7 N·m)



WRU90-BO312

6. Install the return spring.



WRU90-BO313

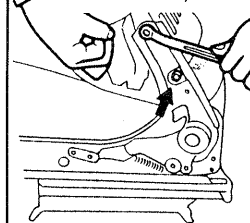
7. Installation of front seatback assembly

(1) Install the front seat hinge cover to the front seatback assembly. Then, install them to the seat cushion with the two bolts and one small bolt.

(2) Install new hook rings to the back side of the seatback.

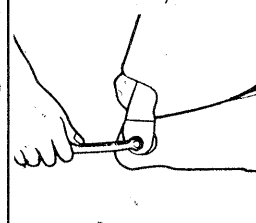
Tightening Torque:

1.7 - 3.1 kg-m
(12.3 - 22.1 ft-lb,
16.7 - 30.4 N·m)



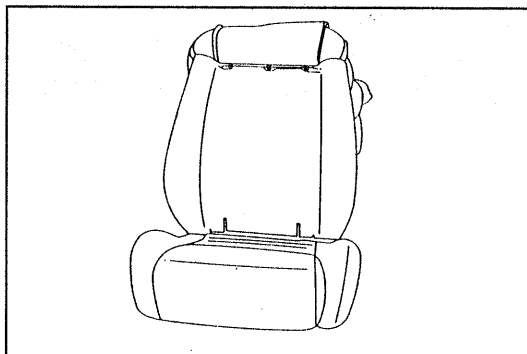
Tightening Torque:

0.6 - 1.0 kg-m
(4.3 - 7.2 ft-lb,
5.9 - 9.8 N·m)



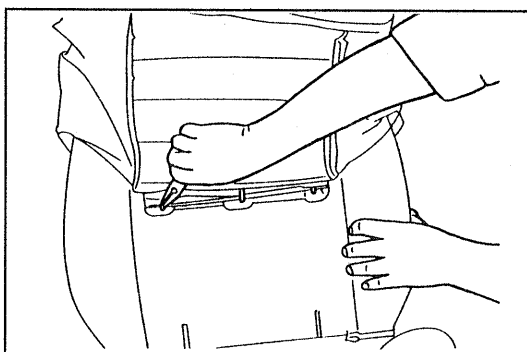
WRU92-BO409

8. Install new hook rings to the front seatback cover at the three points, as indicated in the right figure.



WRU90-BO315

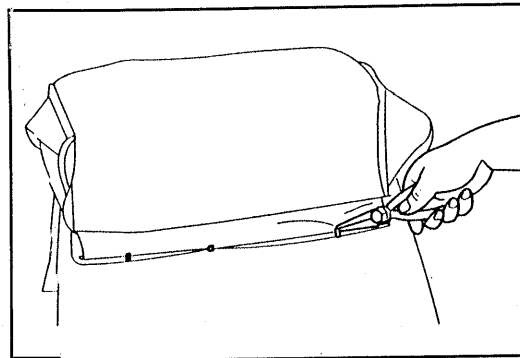
9. Install new hook rings to the front seatback cover at the three points, as indicated in the right figure.



WRU90-BO316

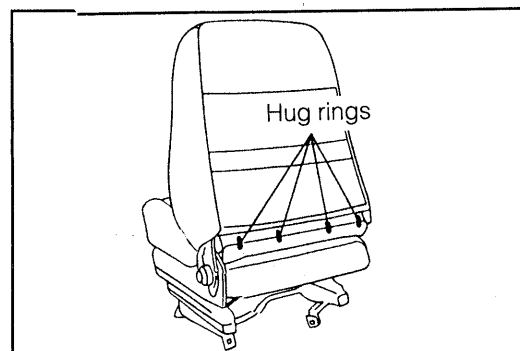
BODY

10. Install new hook rings to the rear side of the front seatback cover at the three points, as indicated in the right figure.



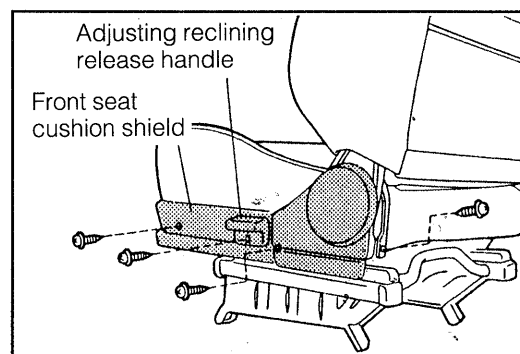
WRU90-BO317

11. Install new hook rings to the front seatback cover at the four points, as indicated in the right figure.



WRU90-BO318

12. Install the front seat cushion shield with the three screws.
13. Install the adjusting reclining release handle with the one screw.
14. Install the headrest.

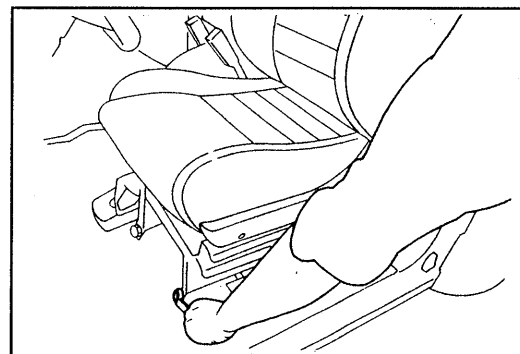


WRU90-BO319

INSTALLATION

Install the front seat with the four bolts.

Tightening torque: 3.0 - 4.5 kg-m
(22 - 33 ft-lb, 29.4 - 44.1 N-m)

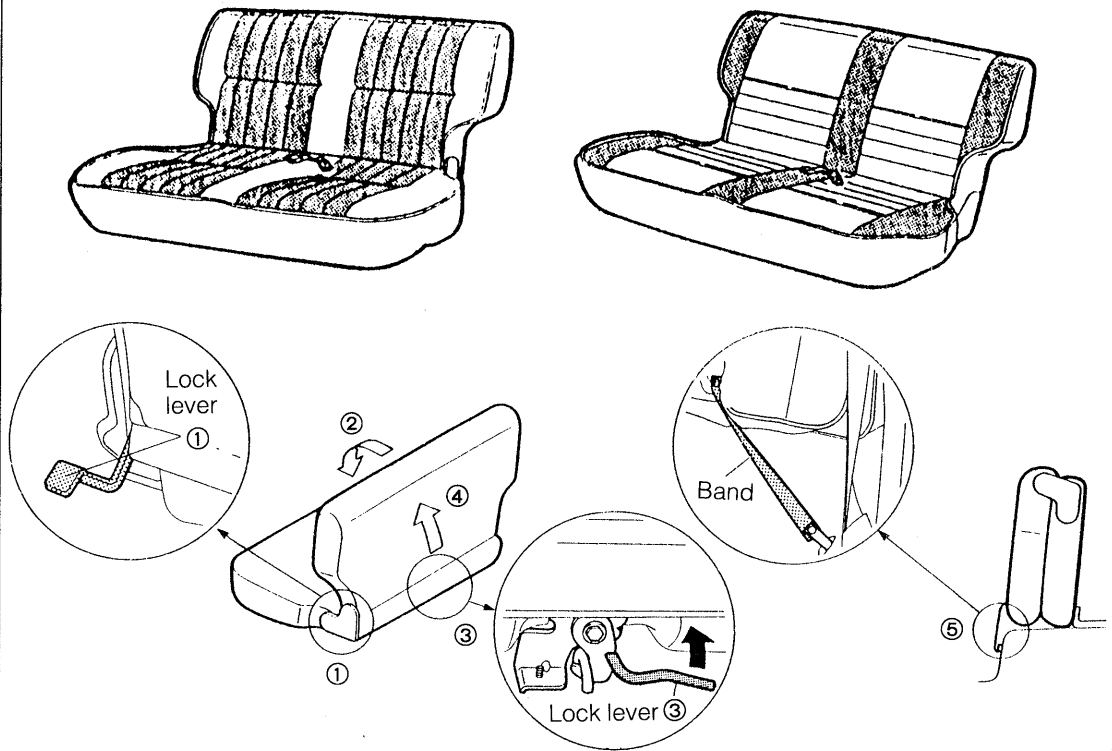


WRU90-BO320

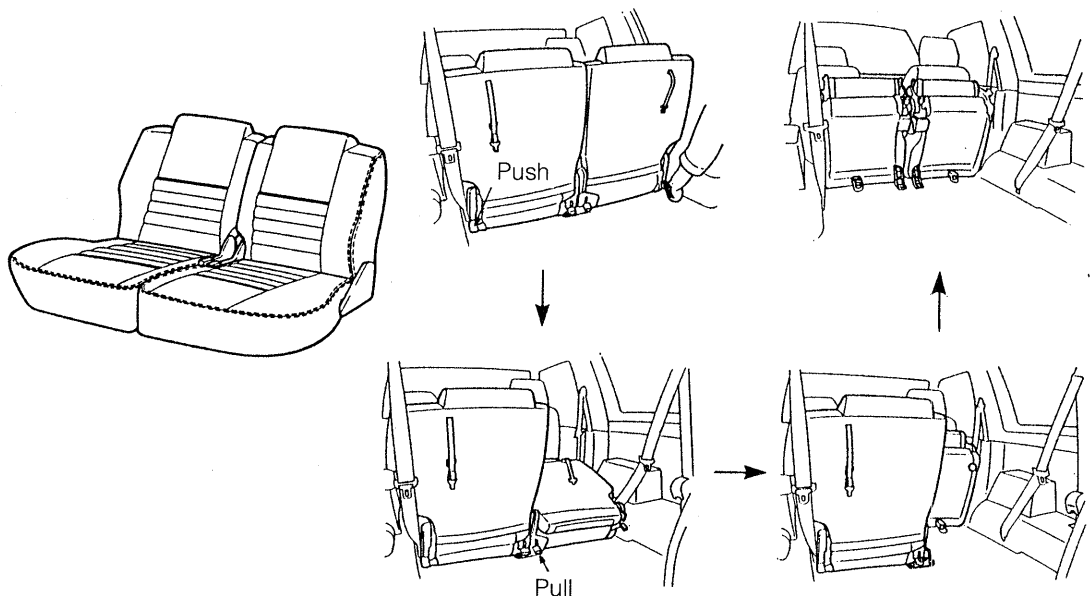
REAR SEAT

For enhanced rigidity and reduced weight, the seat cushion frame of the rear seat adopts a pipe frame and an "S" spring structure. On the other hand, the seatback frame employs a pipe frame and a wire structure. The rear seat uses urethane having an adequate hardness as the seat pad material. Moreover, the rear seat employs a foldable construction. In addition, the separate type rear seat is available as optional equipment.

Bench type rear seat



Separate type rear seat

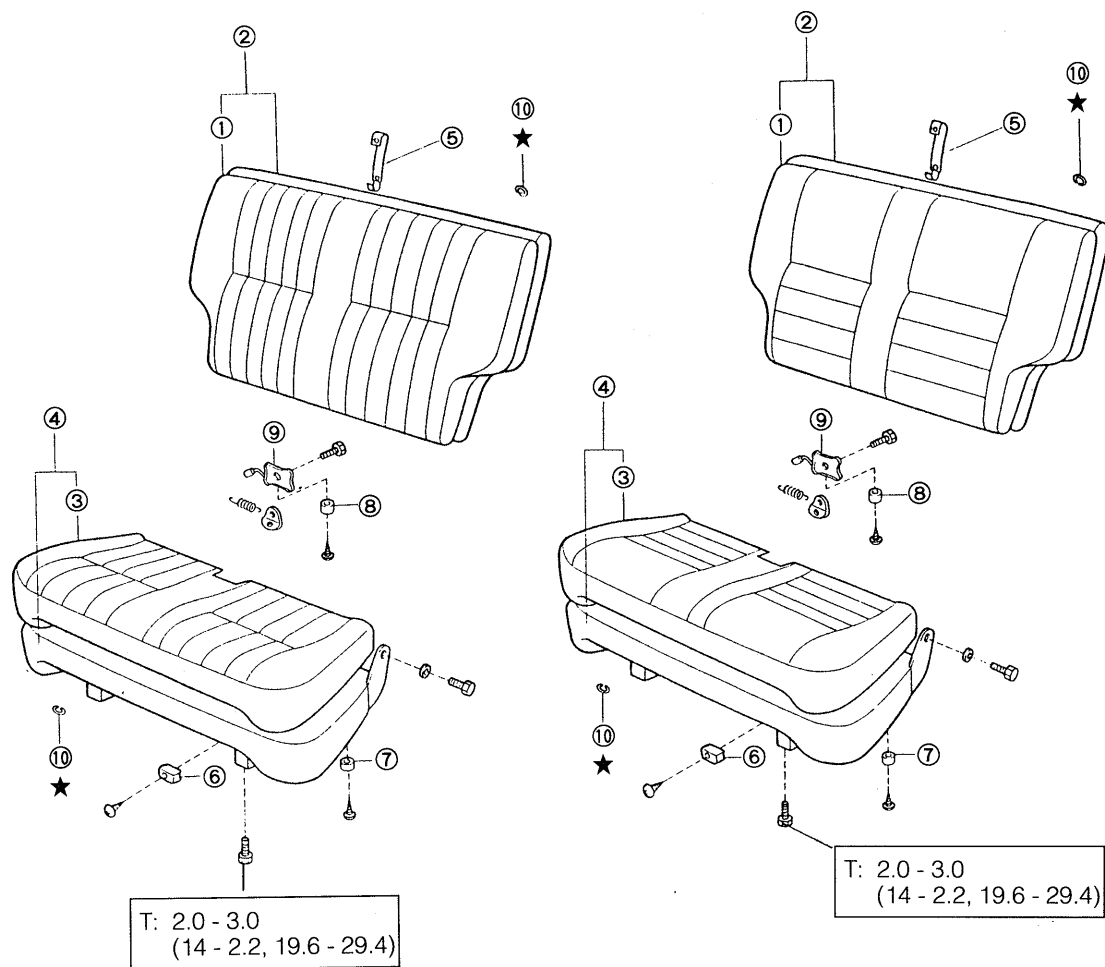


WRU90-BO321

BODY

BENCH TYPE REAR SEAT

COMPONENTS



T : Tightening torque
Unit : kg-m (ft-lb, N-m)
★ : Non-reusable parts

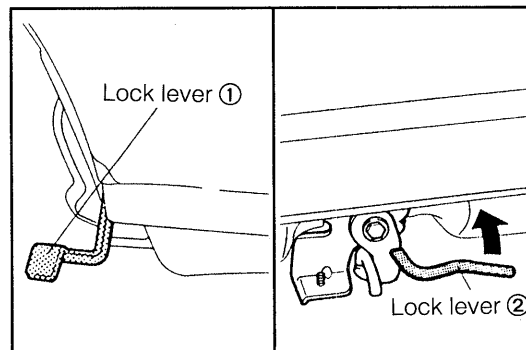
- ① Rear seat back cover
- ② Rear seat back Ay
- ③ Rear seat cushion cover
- ④ Rear seat cushion Ay
- ⑤ Rear seat stop band

- ⑥ Cushion
- ⑦ Cushion No. 3
- ⑧ Cushion No. 4
- ⑨ Hook rear
- ⑩ Hook ring

WRU90-BO322

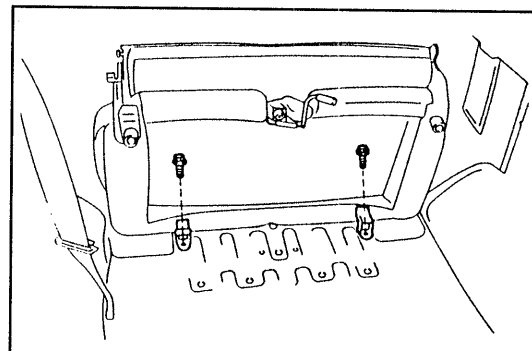
REMOVAL

1. Removal of rear seat
 - (1) Push the lock lever ①
 - (2) Pull up the lock lever ②
 - (3) Raise the entire seat forward



WRU90-BO323

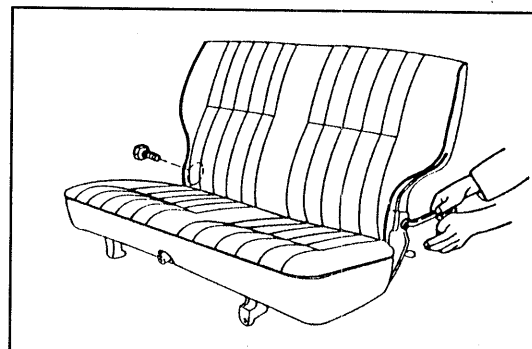
- (4) Remove the rear seat by removing the two bolts.



WRU90-BO324

DISASSEMBLY

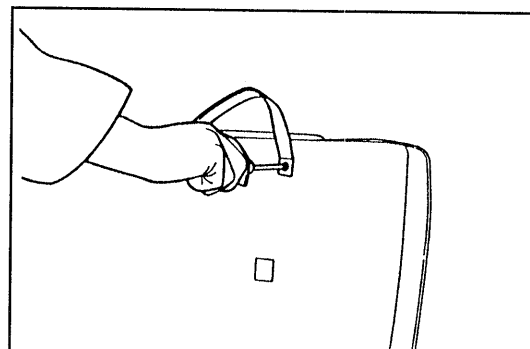
1. Remove the rear seatback by removing the two bolts.



WRU90-BO325

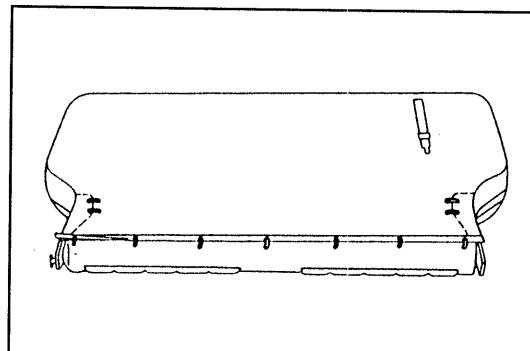
2. Removal of rear seatback cover

- (1) Remove the band by removing the one screw.



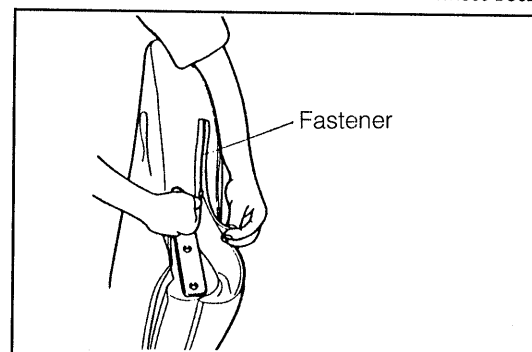
WRU90-BO326

- (2) Remove the hook ring at the back side of the seatback.



WRU90-BO327

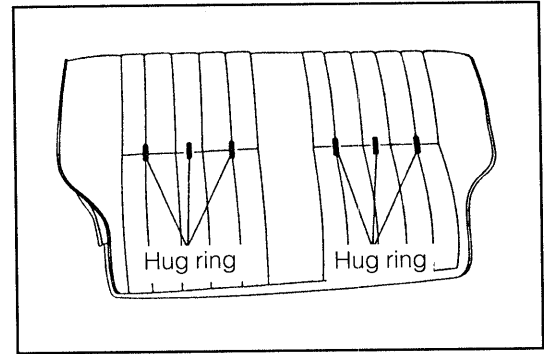
- (3) Raise the fasteners.



WRU90-BO328

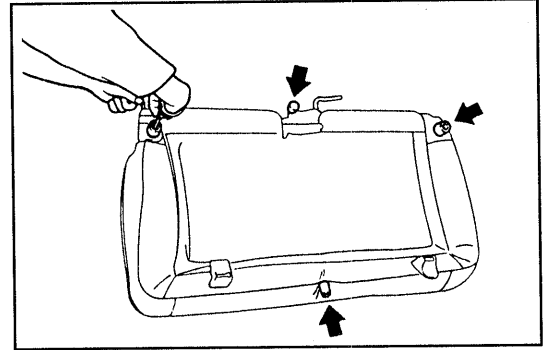
BODY

- (4) Turn over the rear seatback cover.
Remove the rear seatback over by removing the hook rings at the front section of the seatback.
- (5) Remove the rear seatback cover.



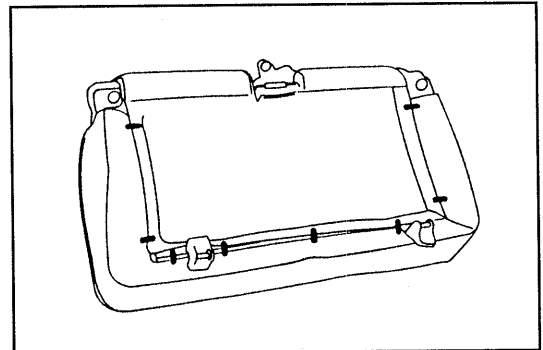
WRU90-BO329

3. Removal of rear seat cushion cover
 - (1) Remove the four cushion by removing the screws.



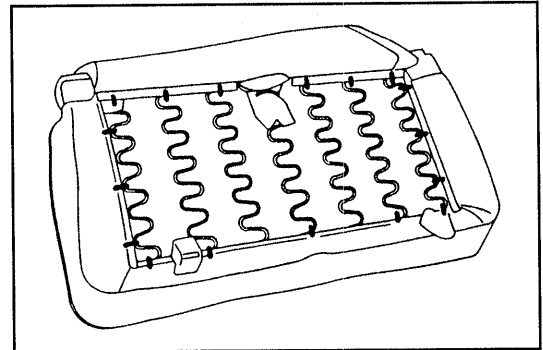
WRU90-BO330

- (2) Remove the hook ring at the back side of the rear seat cushion.

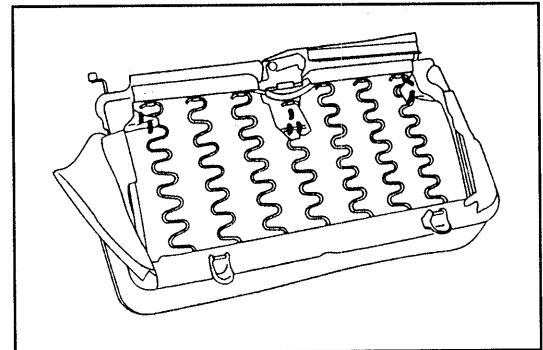


WRU90-BO331

- (3) Turn over the rear seat cushion cover.
Remove the hook ring at the back side of the rear seat cushion.

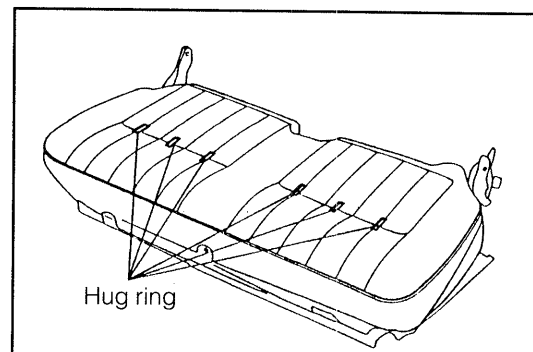


WRU90-BO332



WRU90-BO333

- (4) Turn over the rear seat cushion cover.
Remove the rear seat cushion cover by removing the hook rings at the front section of the rear seat cushion.
- (5) Remove the rear seat cushion cover.

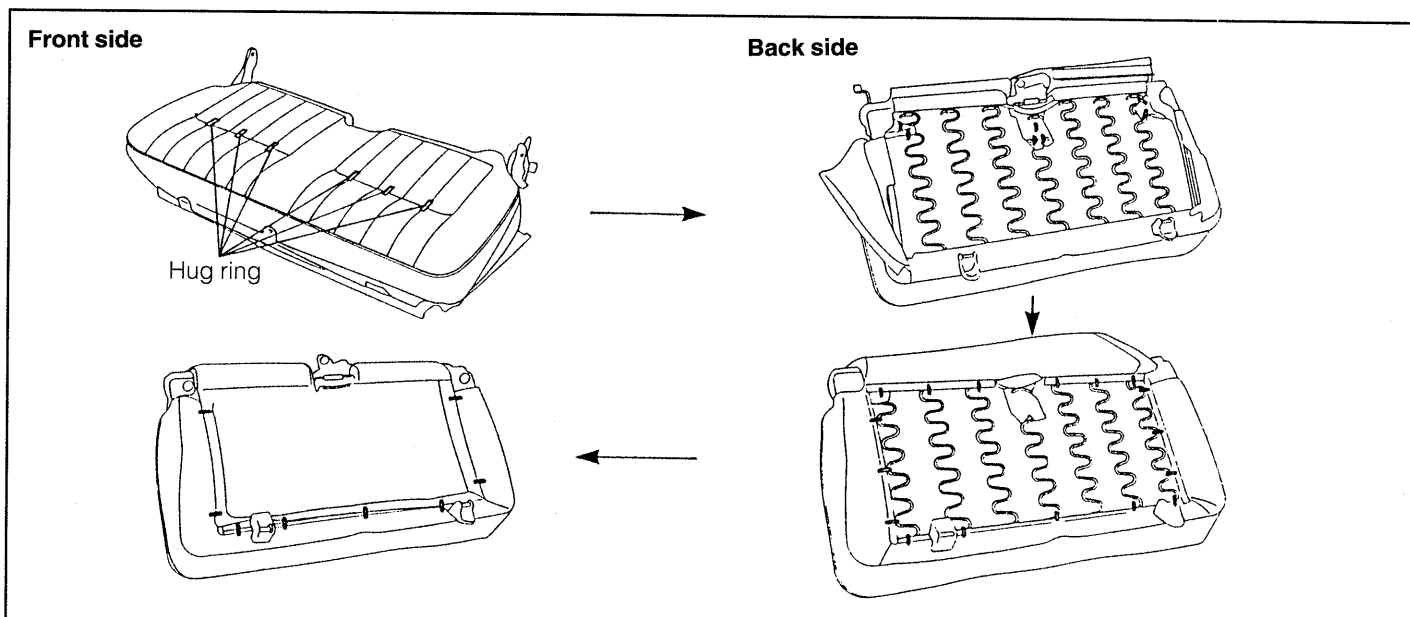


WRU90-BO334

ASSEMBLY

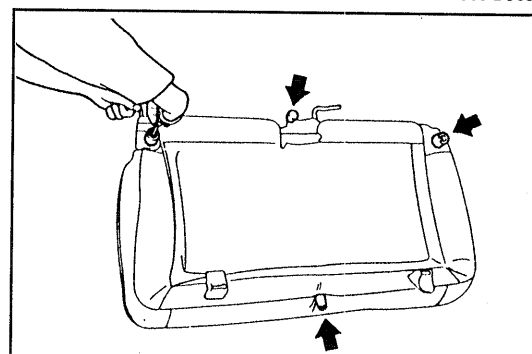
1. Installation of rear seat cushion cover

- (1) Install the new hook rings at the rear seat cushion cover.



WRU90-BO335

- (2) Install the four cushion with the screws.



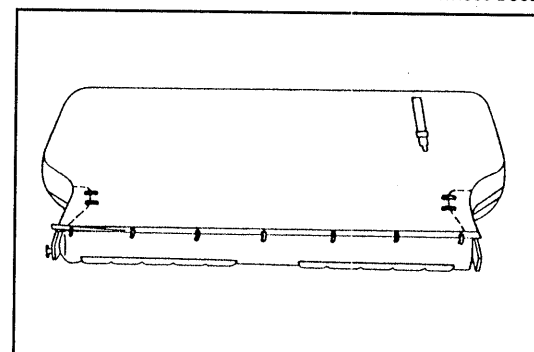
WRU90-BO336

2. Installation of rear seatback cover

- (1) Install the new hook rings at the front side of the rear seatback.
- (2) Lower all the fasteners.
- (3) Install the new hook rings at the back side of the rear seatback.

NOTE:

- Be very careful not to smear or scratch the rear seatback cover during the assembly.
- When installing the hook rings, make sure that no wrinkle is formed on the rear seatback cover whenever possible.



WRU90-BO337

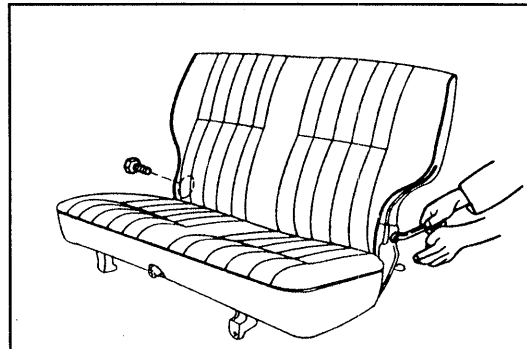
BODY

3. Install the rear seatback to the rear seat cushion with the two bolts.

Tightening Torque: 1.8 - 3.2 kg-m
(13 - 23 ft-lb, 17.7 - 31.4 N·m)

NOTE:

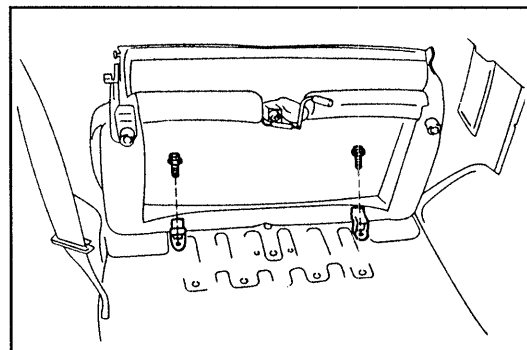
Make sure that the rear seat cushion bolts at the right and left are tightened securely.



WRU90-BO338

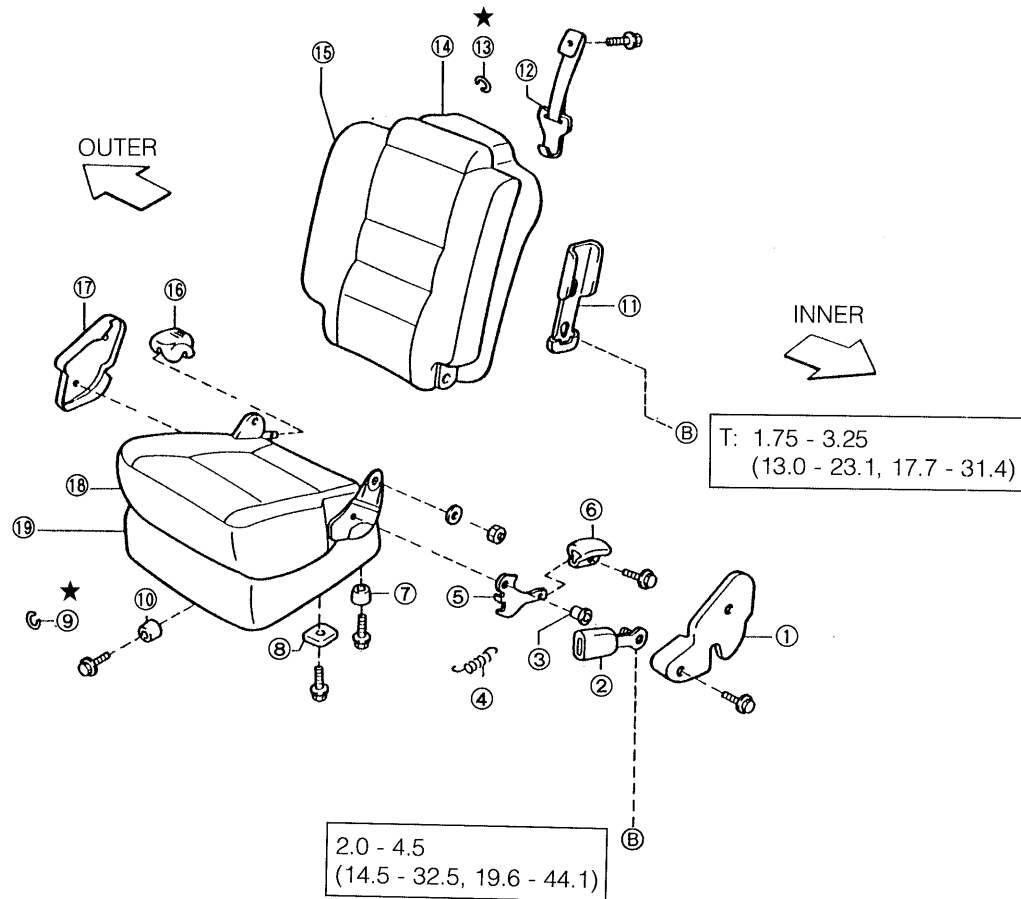
4. Install the rear seat with the two bolts.

Tightening Torque: 2.0 - 3.0 kg-m
(14 - 22 ft-lb, 19.6 - 29.4 N·m)



WRU90-BO339

SEPARATE TYPE REAR SEAT COMPONENTS

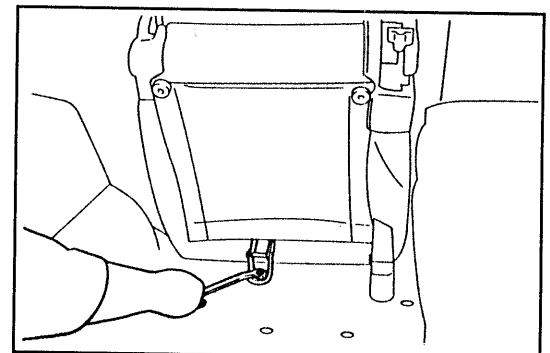


T : Tightening torque
Unit : kg-m (ft-lb, N-m)
★ : Non-reusable parts

- | | | |
|--------------------------|--------------------------|------------------------|
| ① Rear seat lock cover | ⑨ Hook ring | ⑰ Rear seat lock cover |
| ② Rear seat inner belt | ⑩ Cushion | ⑱ Rear seat cover |
| ③ Bush | ⑪ Rear seatback blanket | ⑲ Rear seat assembly |
| ④ Tension spring | ⑫ Rear seat stop band | |
| ⑤ Rear seat lock blanket | ⑬ Hook ring | |
| ⑥ Rear seat lock handle | ⑭ Rear seatback assembly | |
| ⑦ Cushion | ⑮ Rear seat cover | |
| ⑧ Cushion | ⑯ Rear seat lock handle | |

REMOVAL

1. Remove the rear seat by removing the two bolts.



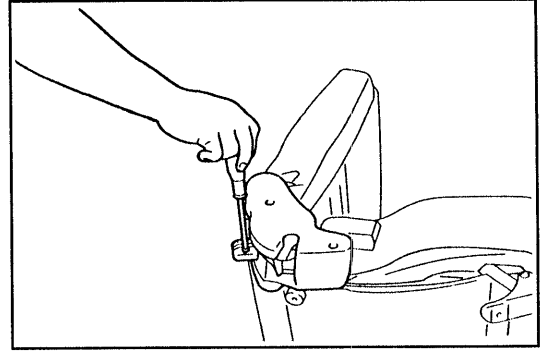
WRU90-BO340

WRU90-BO341

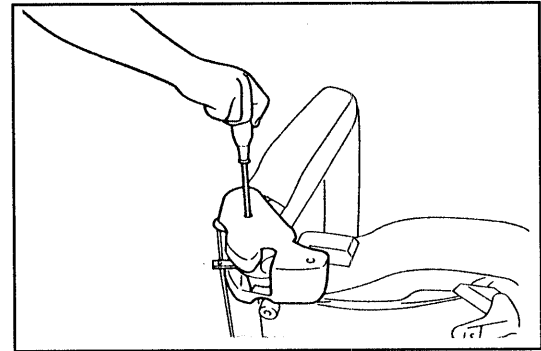
BODY

DISASSEMBLY

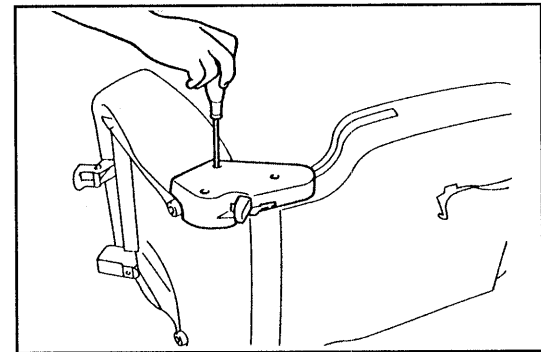
1. Remove the rear seat lock handle.



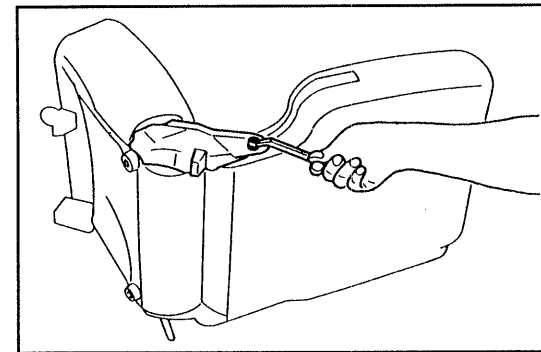
2. Remove the rear seat lock cover.



3. Remove the rear seatback lower cover.

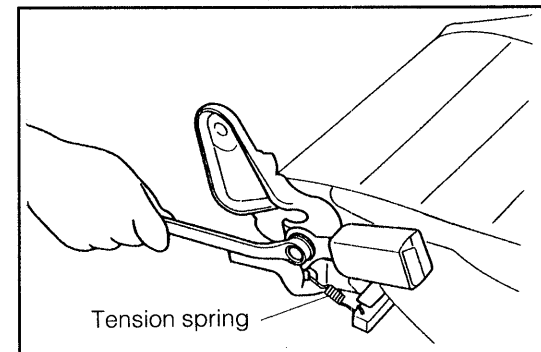


4. Remove the rear seatback assembly from the rear seat cushion assembly.

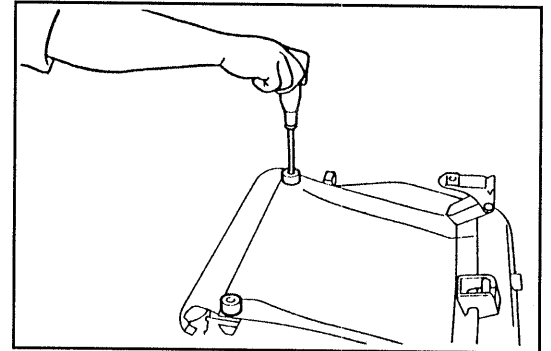


5. Remove the rear seat inner belt assembly.

6. Remove the tension spring.

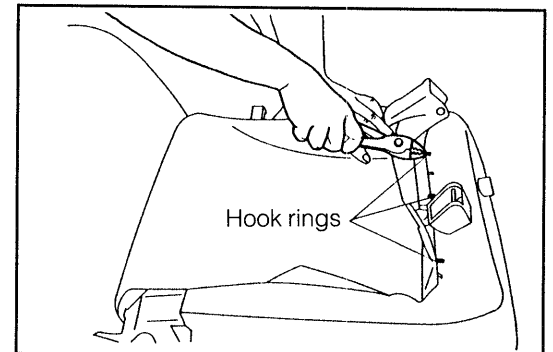


7. Remove the two cushions.



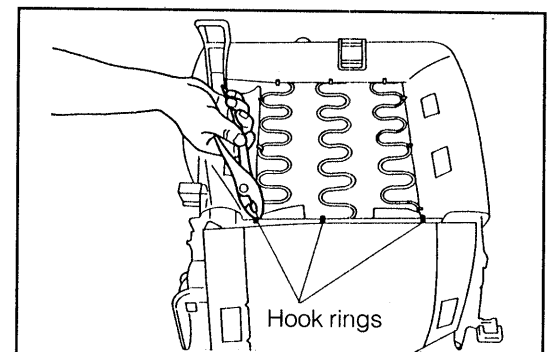
WRU90-BO347

8. Detach the three hook rings of the rear seat cushion, as indicated in the right figure.



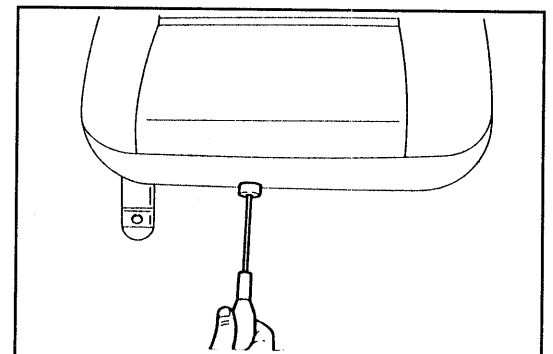
WRU90-BO348

9. Detach the three hook rings of the rear seat cushion, as indicated in the right figure. Remove a part of the rear seat cushion cover.



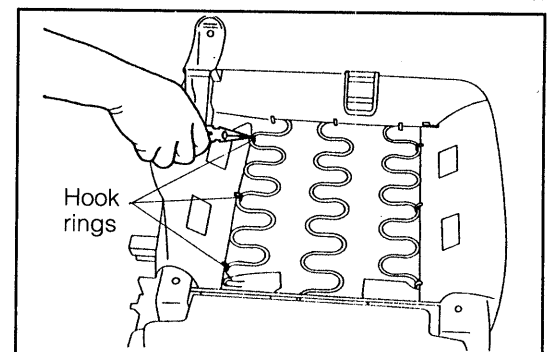
WRU90-BO349

10. Remove the cushion.



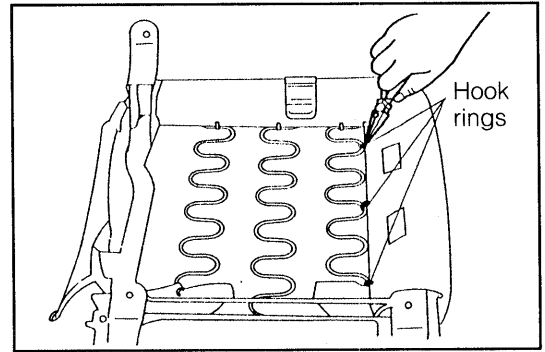
WRU90-BO350

11. Detach the three hook rings of the rear seat cushion cover, as indicated in the right figure.



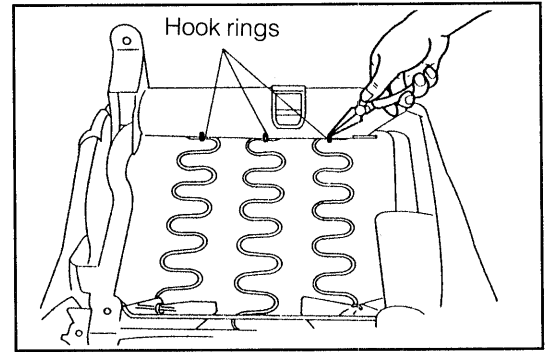
WRU90-BO351

12. Detach the three hook rings of the rear seat cushion cover, as indicated in the right figure.



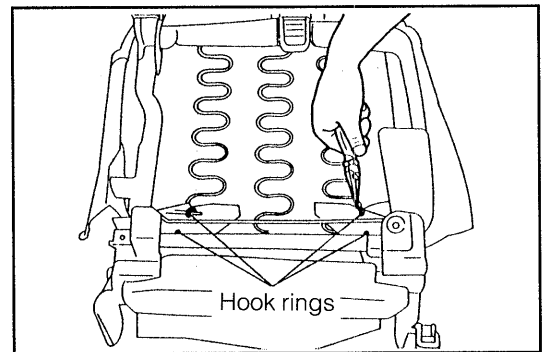
WRU90-BO352

13. Detach the three hook rings of the rear seat cushion cover, as indicated in the right figure.



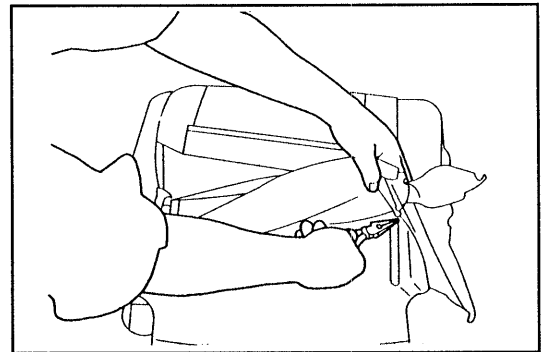
WRU90-BO353

14. Detach the four hook rings of the rear seat cushion cover, as indicated in the right figure.

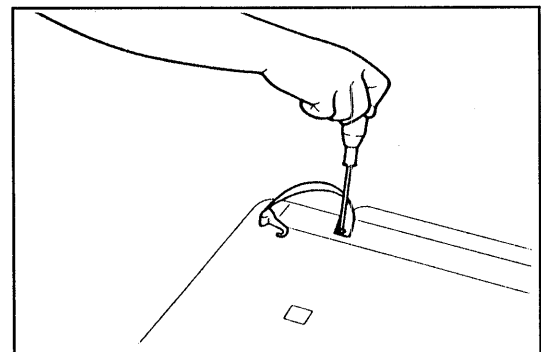


WRU90-BO354

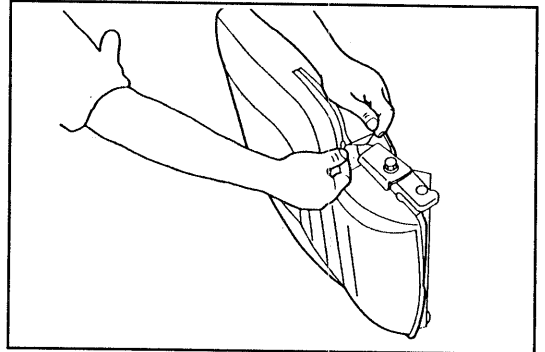
15. Detach the seven hook rings of the rear seat cushion cover. Remove the rear seat cushion cover from the rear seat cushion.



16. Remove the rear seat stop band from the rear seatback assembly.

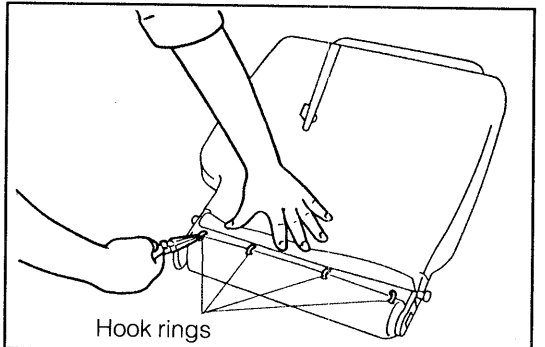


17. Raise the fastener of the rear seatback cover.



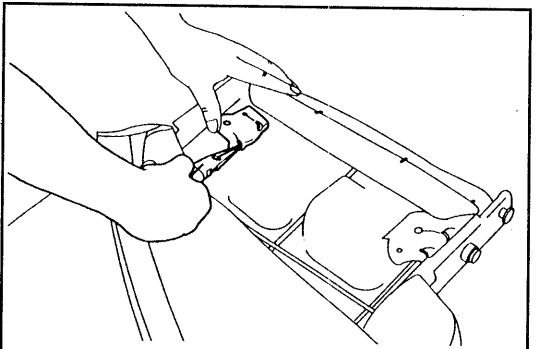
WRU90-BO357

18. Detach the four hook rings of the rear seatback cover, as indicated in the right figure.



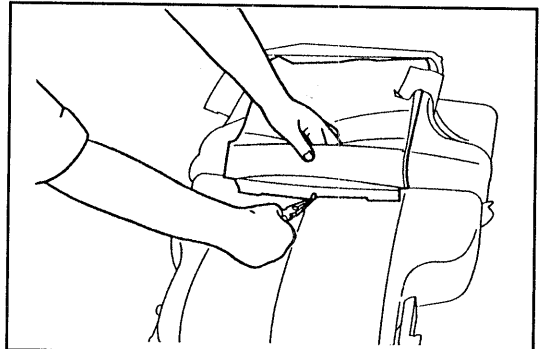
WRU90-BO358

19. Detach the four hook rings of the rear seatback cover, as indicated in the right figure.



WRU90-BO359

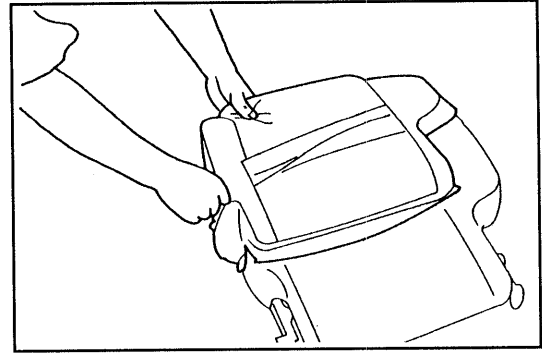
20. Detach the three hook rings of the rear seatback cover, as indicated in the right figure. Remove the rear seatback cover from the rear seatback assembly.



WRU90-BO360

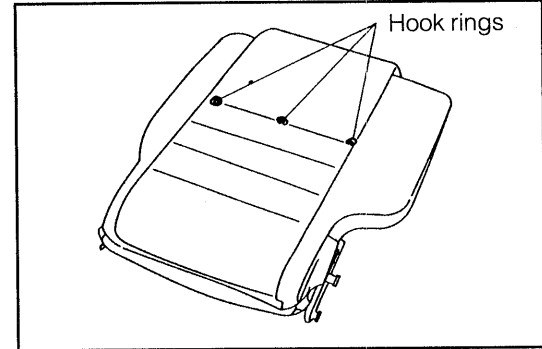
ASSEMBLY

1. Install the rear seat cover to the rear seatback assembly.



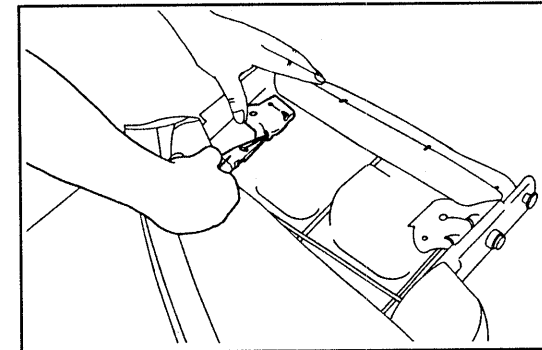
WRU90-BO361

2. Install new hook rings to the rear seatback cover, as indicated in the right figure.



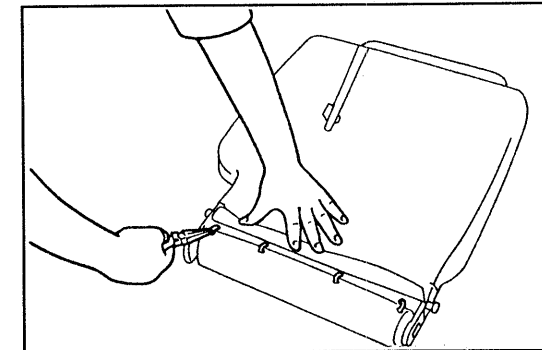
WRU90-BO362

3. Install new hook rings to the rear seatback cover at the four points, as indicated in the right figure.



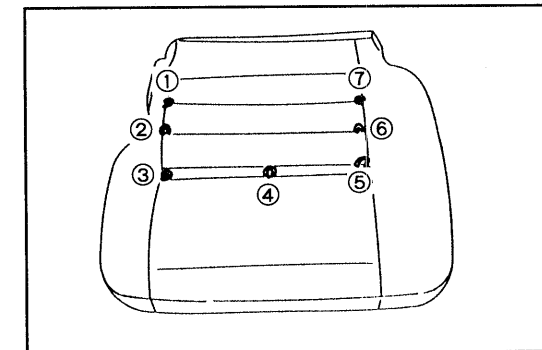
WRU90-BO363

4. Install new hook rings to the rear seatback cover at the four points, as indicated in the right figure.
5. Lower the fastener of the rear seatback.
6. Install the rear seat stop band.



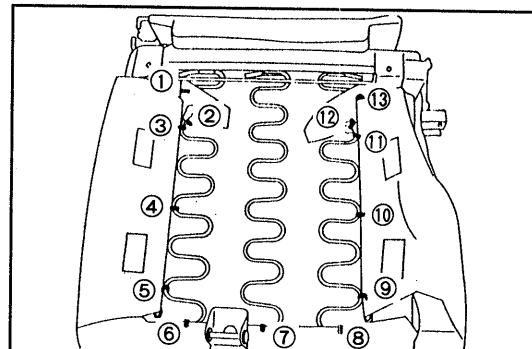
WRU90-BO364

7. Install the rear seat cushion cover to the rear seat cushion assembly. Install new hook rings at the seven points, as indicated in the right figure.



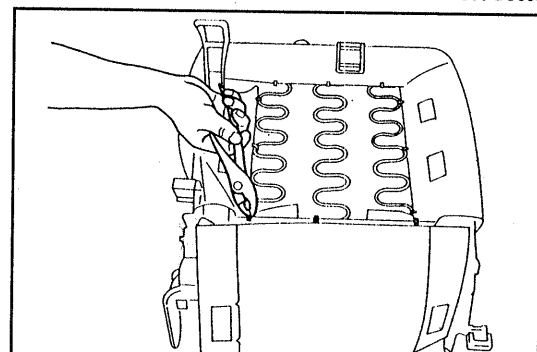
WRU90-BO365

8. Install new hook rings to the rear seat cushion cover at the 13 points, as indicated in the right figure.



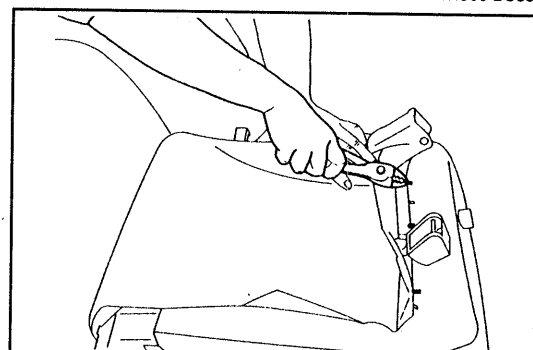
WRU90-BO366

9. Install new hook rings to the rear seat cushion cover at the three points, as indicated in the right figure.



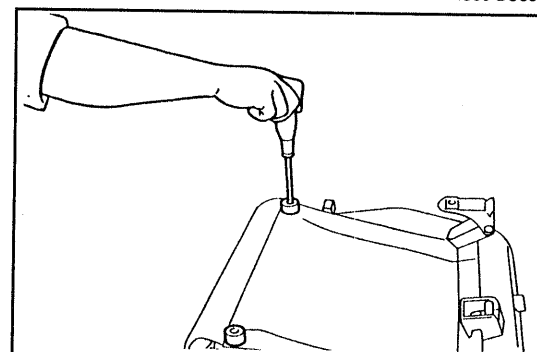
WRU90-BO367

10. Install new hook rings to the rear seat cushion cover at the three points, as indicated in the right figure.



WRU90-BO368

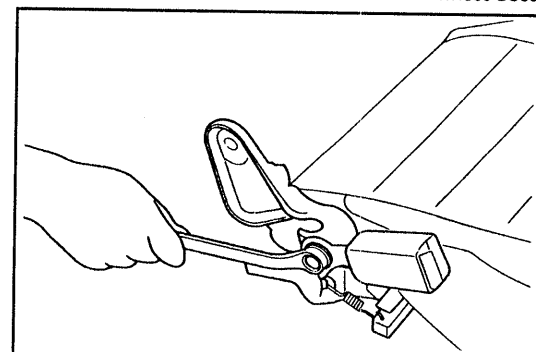
11. Install the rear seat cushion at the three points, as indicated in the right figure.



WRU90-BO369

12. Install the rear seat inner belt assembly.

Tightening Torque: 2.0 - 4.5 kg-m
(14.5 - 32.5 ft-lb, 19.6 - 44.1 N·m)



WRU90-BO370

13. Install the tension spring.

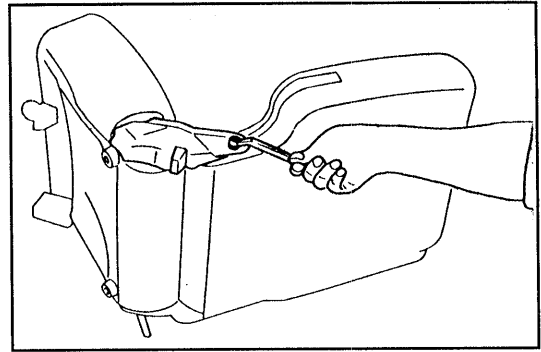
BODY

14. Install the rear seat cushion assembly to the rear seatback assembly.

Tightening Torque: 1.75 - 3.25 kg-m
(13.0 - 23.1 ft-lb, 17.7 - 31.4 N·m)

NOTE:

Make sure that the rear seatback attaching bolts at the right and left are tightened securely.



WRU90-BO371

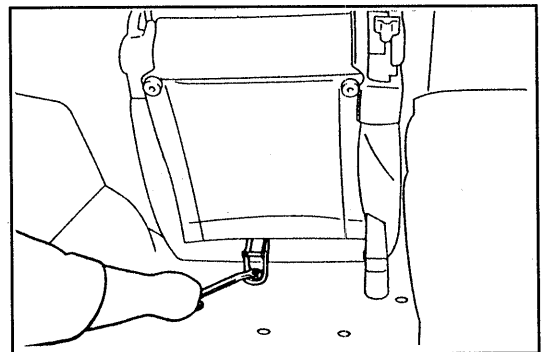
15. Install the rear seatback lock cover.
16. Install the rear seat lock cover.
17. Install the rear seat lock handle.

WRU90-BO372

INSTALLATION

1. Install the rear seat by installing the two bolts.

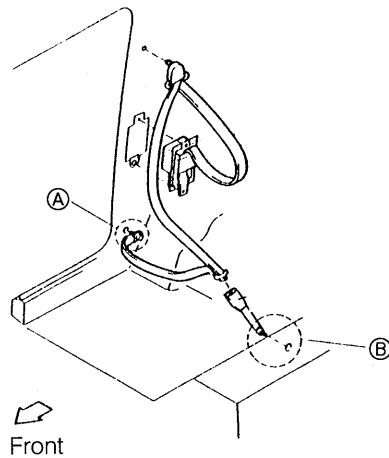
Tightening Torque: 2.0 - 3.0 kg-m
(14 - 22 ft-lb, 19.6 - 29.4 N·m)



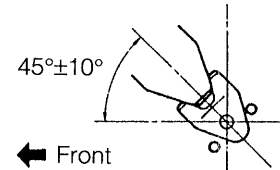
WRU90-BO373

SEAT BELTS COMPONENTS

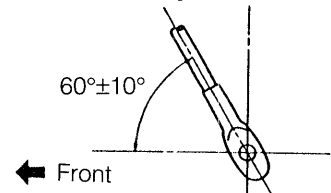
Front



(A) Installing direction of front seat belt lap outer anchor



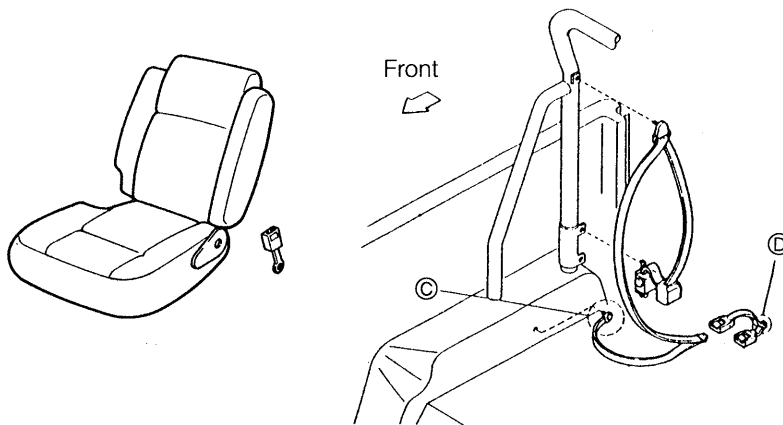
(B) Installing direction of front inner belt Ay



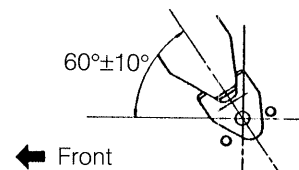
Bolt Tightening Torque T: 2.9 - 5.4 kg-m
21.0 - 39.1 ft-lb, 28.4 - 53.0 N-m

Rear

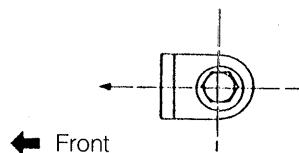
3-point (ELR) X 2



(C) Installing direction of front seat belt lap outer anchor



(D) Installing direction of rear inner belt Ay



Bolt Tightening Torque T: 2.9 - 5.4 kg-m
21.0 - 39.1 ft-lb, 28.4 - 53.0 N-m

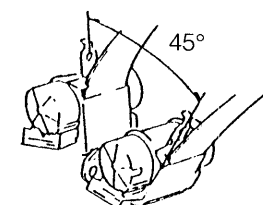
INSPECTION

ELR Locking check

Slowly tilt the retractor from the installation angle. Ensure that no belt locking takes place within 15 degrees in all directions. Also, ensure that the locked state is retained when the retractor is tilted 45 degrees or more.

NOTE:

- Never attempt to disassemble the retractor.
- After the anchor bolts have been tightened, make sure that each anchor can move in the bolt's circumferential direction.
- Be sure that the belt in the installed state can be pulled out smoothly and also it can be retracted smoothly into position.

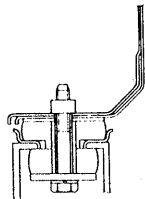
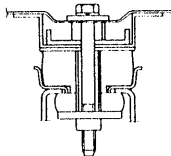
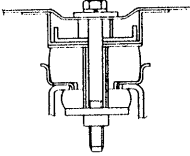
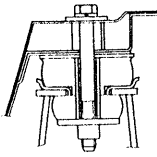
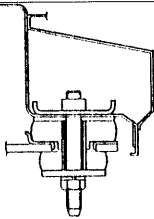


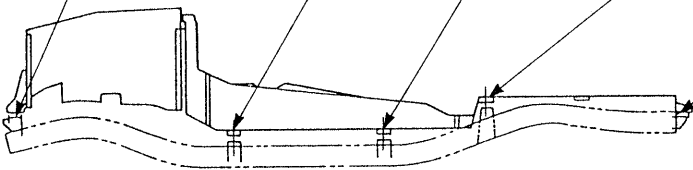
WRU90-BO374

WRU90-BO375


BODY MOUNTINGS

The mountings used for connecting the vehicle body to the frame have been further improved so that the transmission of noise from the suspensions and power train system to the vehicle body may be kept at a minimum level.

No	1	2	3	4	5
Hardness (Hs)	46	Upper 60 Lower 44	60	Upper 40 Lower 44	60
Identification	Yellow	Black	White	Black	White
Shape					
Tightening torque kg-m (ft-lb, N-m)	4.2 - 6.5 (30.4 - 47.0, 41.2 - 63.7)	4.2 - 6.5 (30.4 - 47.0, 41.2 - 63.7)	4.2 - 6.5 (30.4 - 47.0, 41.2 - 63.7)	4.2 - 6.5 (30.4 - 47.0, 41.2 - 63.7)	4.2 - 6.5 (30.4 - 47.0, 41.2 - 63.7)



Mounting cushion

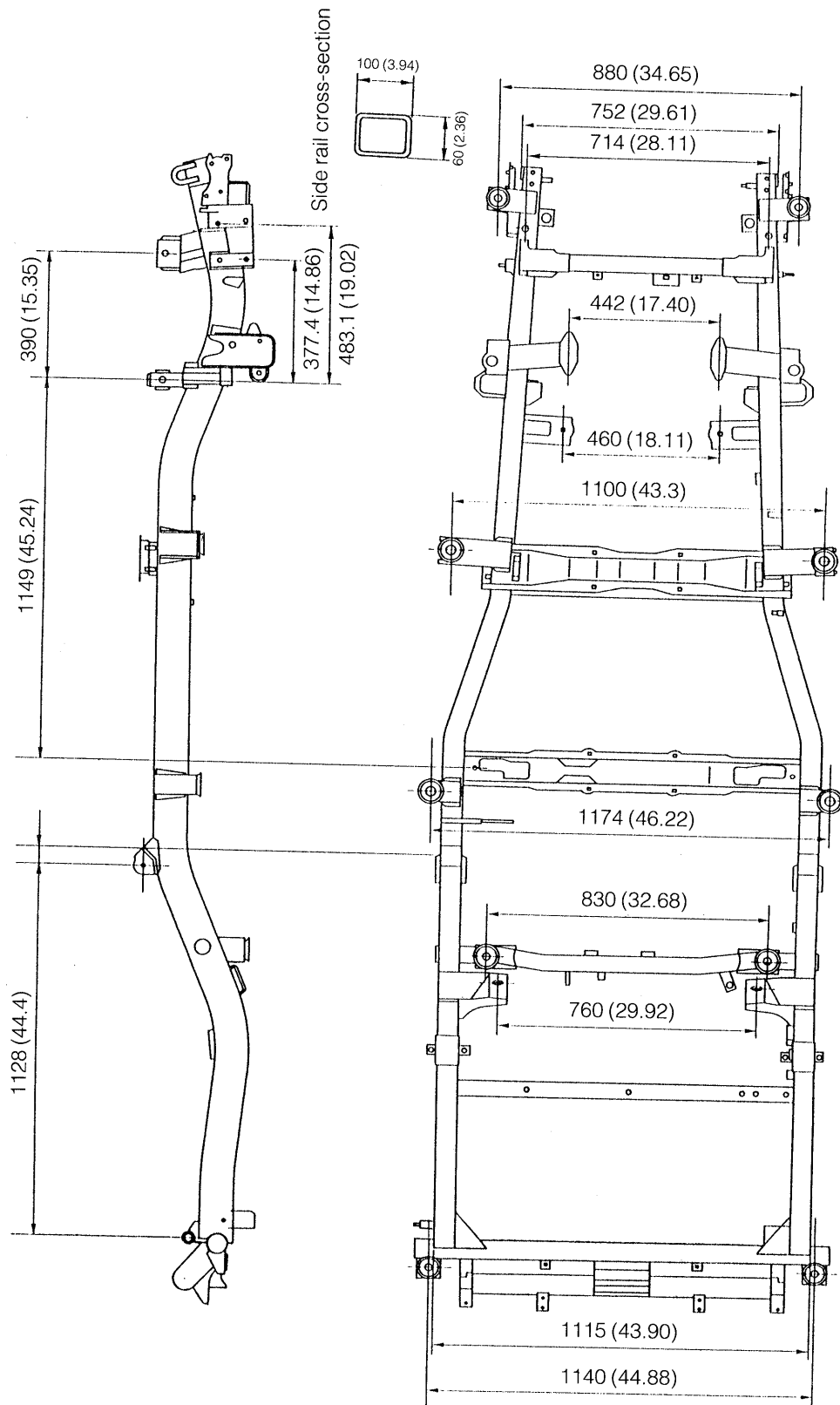


Identification

WRU90-BO376

The frame employs a ladder type frame which retards the transmission of vibrations and noises from the road or engine to the body. Furthermore, the ladder type frame contributes to soft riding comfort and quieter vehicle interior.

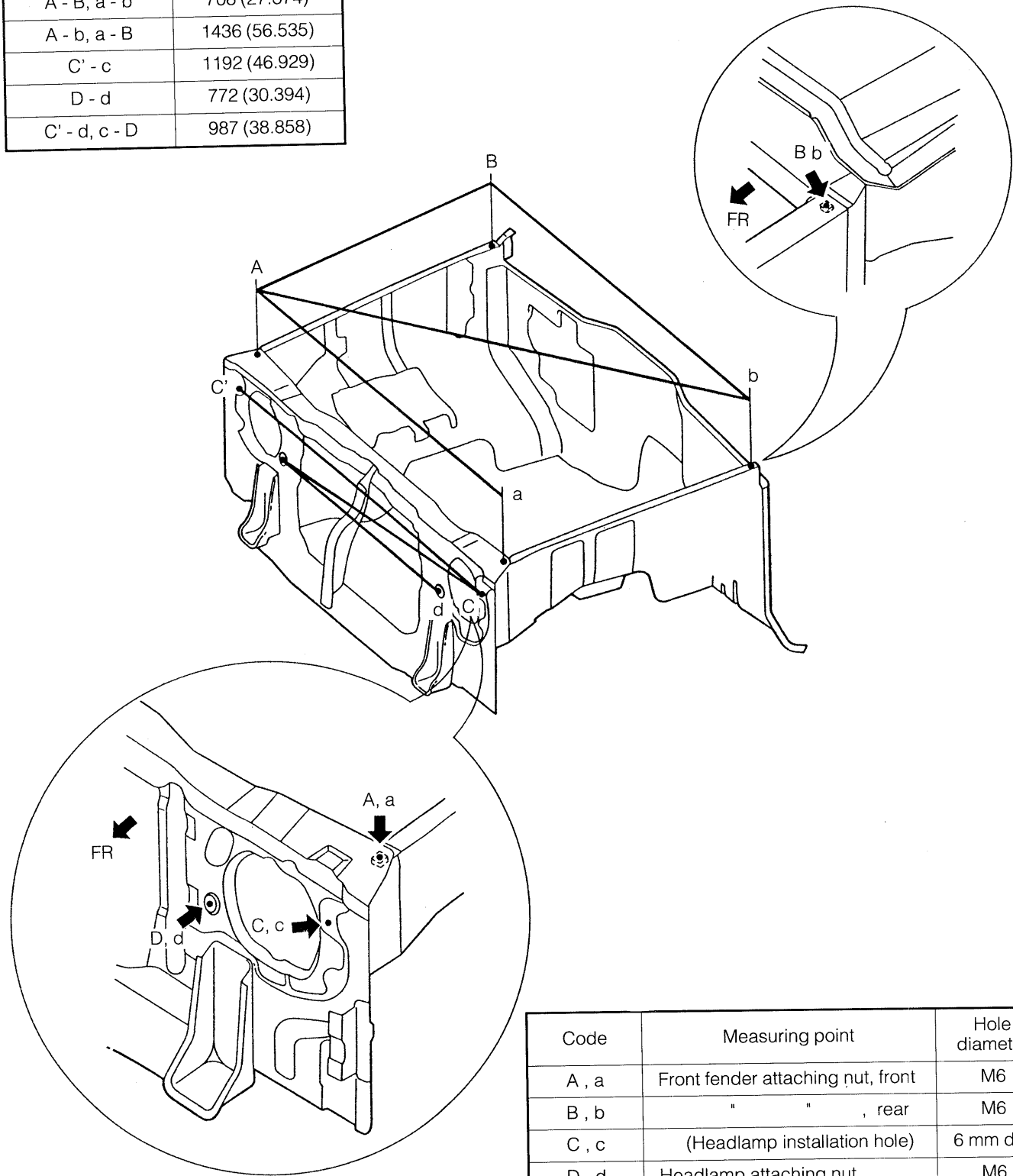
The frame has box shaped cross-section.



BODY DIMENSIONS

<Engine Compartment>

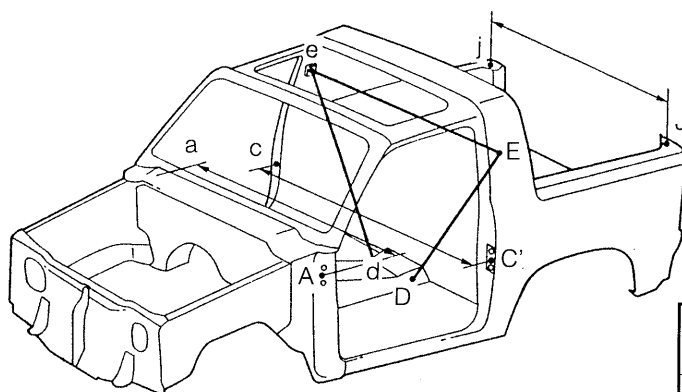
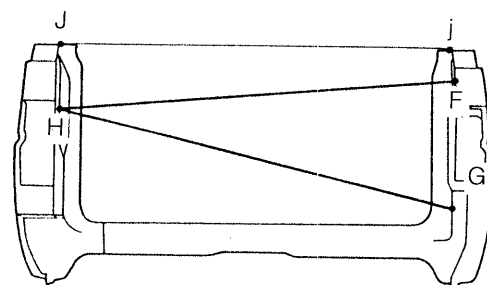
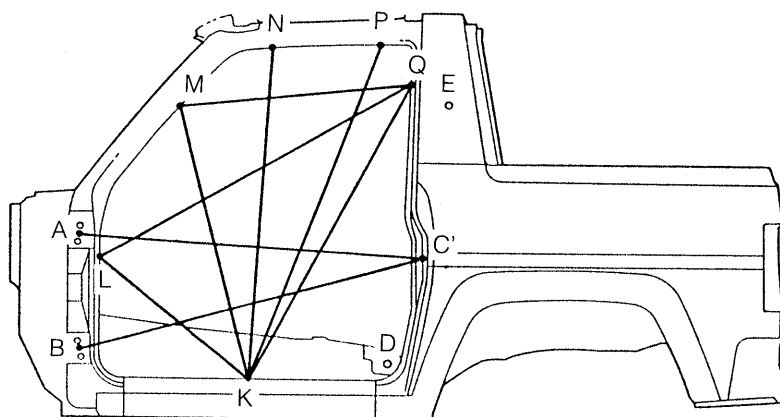
Code	Dimensions mm (inches)
A - a	1225.2 (48.236)
B - b	1275.6 (50.220)
A - B, a - b	708 (27.874)
A - b, a - B	1436 (56.535)
C' - c	1192 (46.929)
D - d	772 (30.394)
C' - d, c - D	987 (38.858)



Code	Measuring point	Hole diameter
A , a	Front fender attaching nut, front	M6
B , b	" " , rear	M6
C , c	(Headlamp installation hole)	6 mm dia.
D , d	Headlamp attaching nut	M6

WRU90-B0378

<Main Body Subassembly>

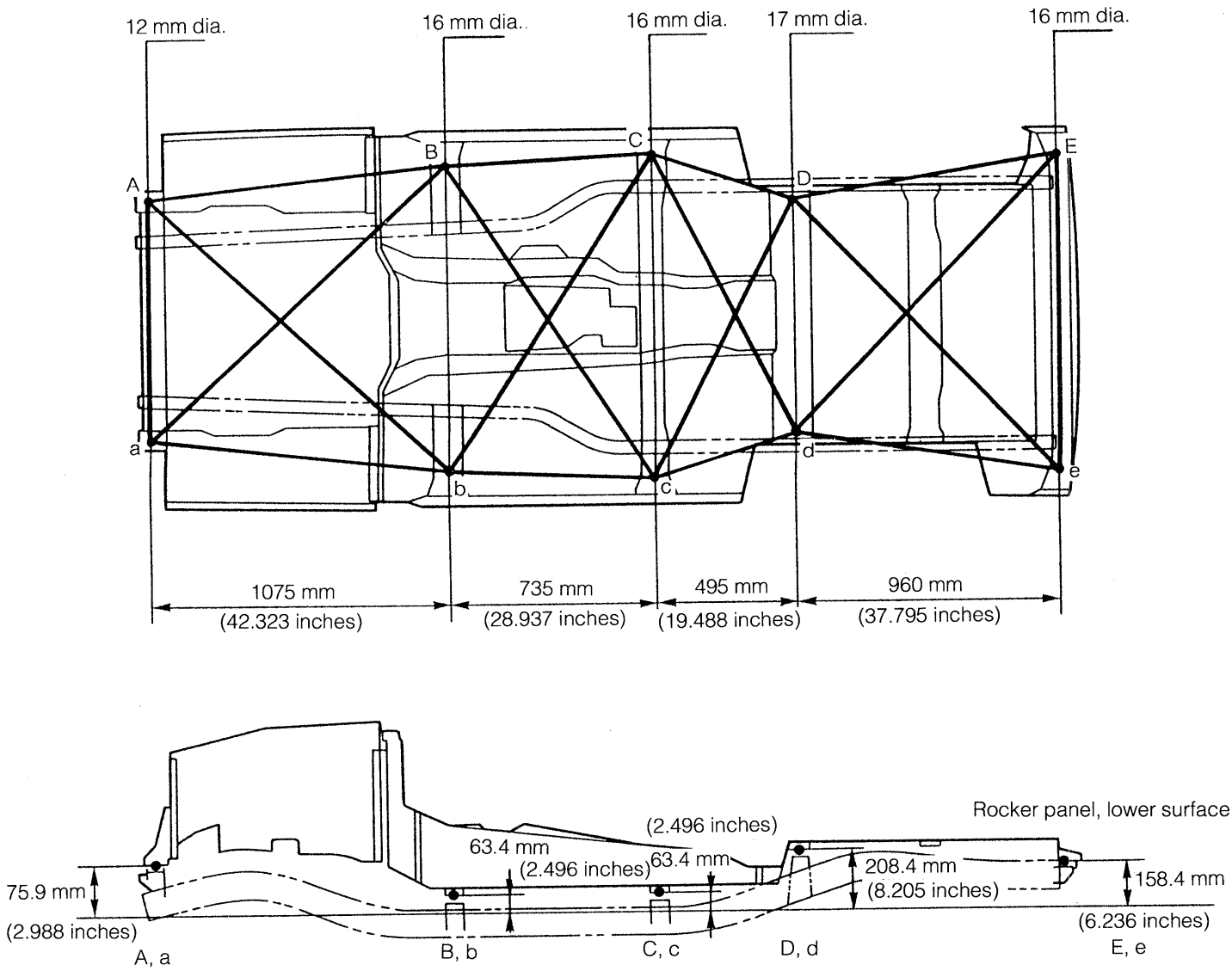


Code	Dimensions mm (inches)
A - C'	1120 (44.094)
B - C'	1159 (45.630)
C' - C	1387 (54.606)
D - E	1001 (39.409)
E - e	1206 (47.480)
A - a	1310 (51.575)
F - H	1274 (50.157)
H - G	1312 (51.653)
L - K	627 (24.685)
L - Q	1167 (45.945)
K - M	921 (36.260)
K - N	1103 (43.425)
K - P	1176 (46.299)
K - Q	1103 (43.425)
M - Q	752 (29.606)
J - j	1260 (49.606)

Code	Measuring point	Hole diameter
A, a	Front door hinge installation reference hole (upper hinge)	10 mm dia.
B, b	Front door hinge installation reference hole (lower hinge)	10 mm dia.
C', d	Front door lock striker installation reference hole	9 mm dia.
D, d	Front floor seat belt installation hole	16 mm dia.
E, e	Rear pillar upper seat belt installation hole	15.5 dia.
F	Back door hinge installation hole (upper hinge)	13 mm dia.
G	Back door hinge installation hole (lower side)	13 mm dia.
H	Back door hinge installation hole (upper side)	13 mm square
J, j	Side panel top rail assembling reference hole	7 mm dia.
K	Rocker panel flange cut-out	7 mm wide
L	Front body pillar, lower cut-out	—
M	Front body pillar, upper cut-out	—
N	Roof side rail cut-out (front)	8 mm wide
P	Roof side rail cut-out (rear)	—
Q	Rear pillar, upper	—

BODY

<Underbody>



Code	Dimensions mm (inches)
A - a	880 (34.646)
B - b	1100 (43.307)
C' - c	1174 (46.220)
D - d	830 (32.677)
E - e	1140 (44.882)
A - B, a - b	1081 (42.559)
A - b, a - B	1461 (57.520)
B - C', b - c	736 (28.976)
B - C', b - c	1354 (53.307)
C' - D, c - d	544 (21.417)
C' - d, c - D	1127 (44.370)
D - E, d - e	974 (38.346)
D - e, d - E	1376 (54.173)

Code	Measuring point	Hole diameter
A , a	Body mounting No. 1 installation hole	12 mm dia.
B , b	" No. 3 "	16 mm dia.
C , c	" No. 4 "	16 mm dia.
D , d	" No. 5 "	17 mm dia.
E , e	" No. 6 "	16 mm dia.

DAIHATSU

Rocky

AIR CONDITIONING SYSTEM

GENERAL DESCRIPTION	AC- 2	CONDENSER	AC-38
PRECAUTIONS	AC- 4	RECEIVER	AC-39
SPECIAL TOOLS AND EQUIPMENT	AC- 4	COOLING UNIT	AC-40
TROUBLE SHOOTING	AC- 5	EVAPORATOR	AC-42
CHECKING OF REFRIGERATION SYSTEM		REFRIGERANT LINES	AC-43
WITH MANIFOLD GAUGE	AC- 6	THERMISTOR	AC-44
IN-VEHICLE INSPECTION	AC-11	DUAL PRESSURE SWITCH	AC-45
REFRIGERATION SYSTEM	AC-12	A/C SWITCH	AC-46
CHECKING OF REFRIGERANT		CONDENSER FAN MOTOR	AC-47
CHARGE	AC-12	CONDENSER FAN RELAY	AC-47
INSTALLATION OF MANIFOLD		FUSIBLE LINK	AC-47
GAUGE SET	AC-12	WATER TEMPERATURE SWITCH	AC-48
EVACUATING AND CHARGING OF		AIR CONDITIONER AMPLIFIER	AC-49
REFRIGERATION SYSTEM	AC-13	AIR CONDITIONER CUT-OFF	
WIRING DIAGRAM	AC-21	AMPLIFIER	AC-51
SYSTEM COMPONENTS	AC-23	VACUUM SWITCHING VALVE (VSV) ...	AC-52
COMPRESSOR	AC-24	ADJUSTMENT OF ENGINE A/C RPM ..	AC-53

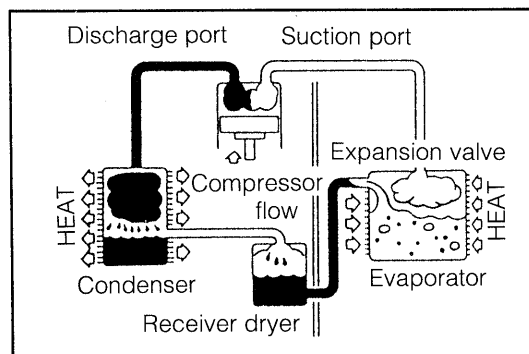
WRU90-AC001

AC

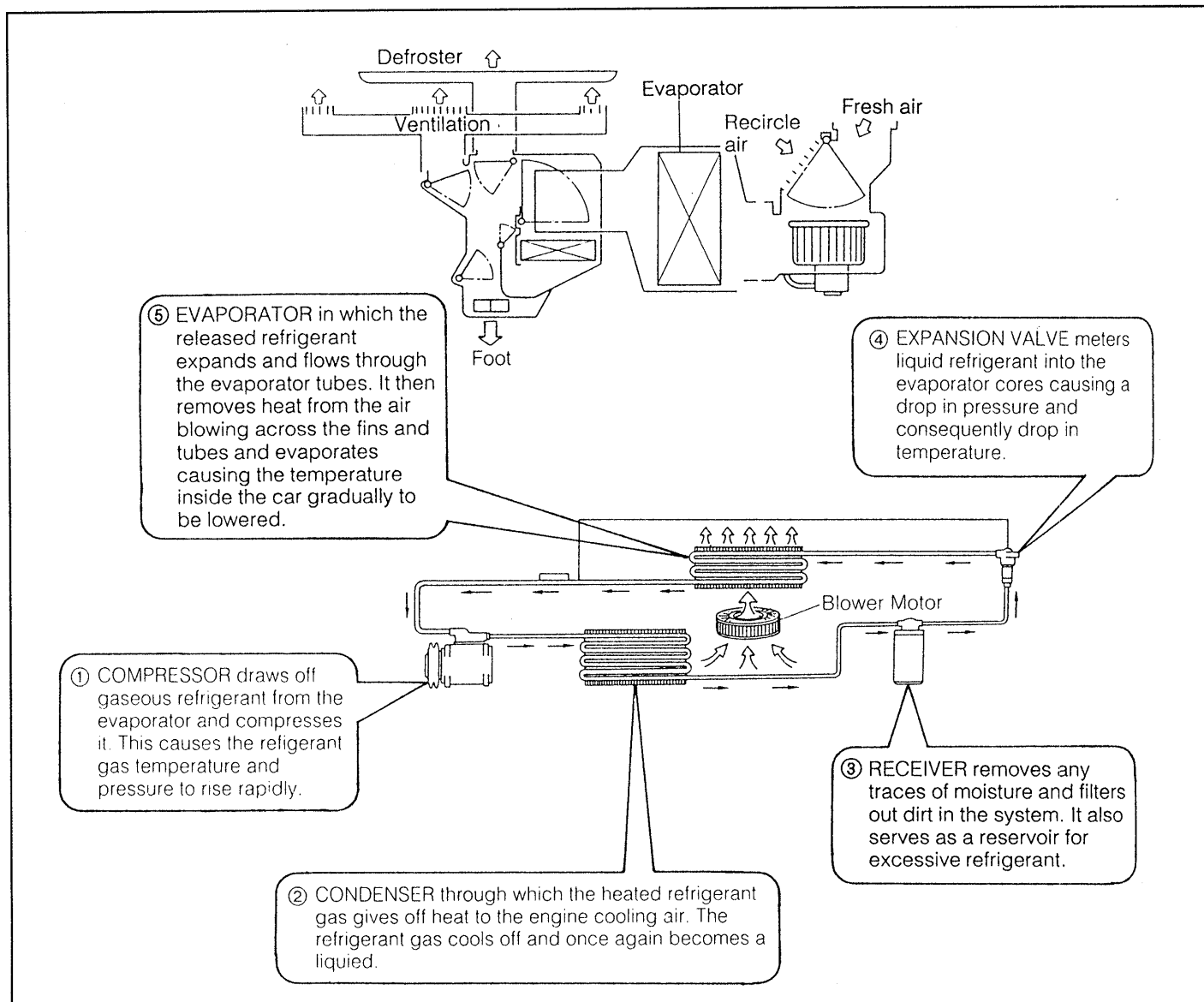
GENERAL DESCRIPTION

REFRIGERATION CYCLE

1. The compressor discharges high temperature and high pressure refrigerant that contains the heat absorbed from the evaporator plus the heat created by the compressor in the discharge stroke.
2. This gaseous refrigerant flows into the condenser. In the condenser the gaseous refrigerant condenses into liquid refrigerant.
3. This liquid refrigerant flows into the receiver which stores and filters the liquid refrigerant till the evaporator requires the refrigerant.
4. At the expansion valve the liquid refrigerant changes into low temperature low pressure liquid and refrigerant mixture.
5. This cold refrigerant flows into the evaporator. The heat from the warm air stream passing through the evaporator core is transferred to the refrigerant. All the liquid is changed into the gaseous refrigerant in the evaporator and only heat-laden gaseous refrigerant is drawn into the compressor. Then the process is repeated again.

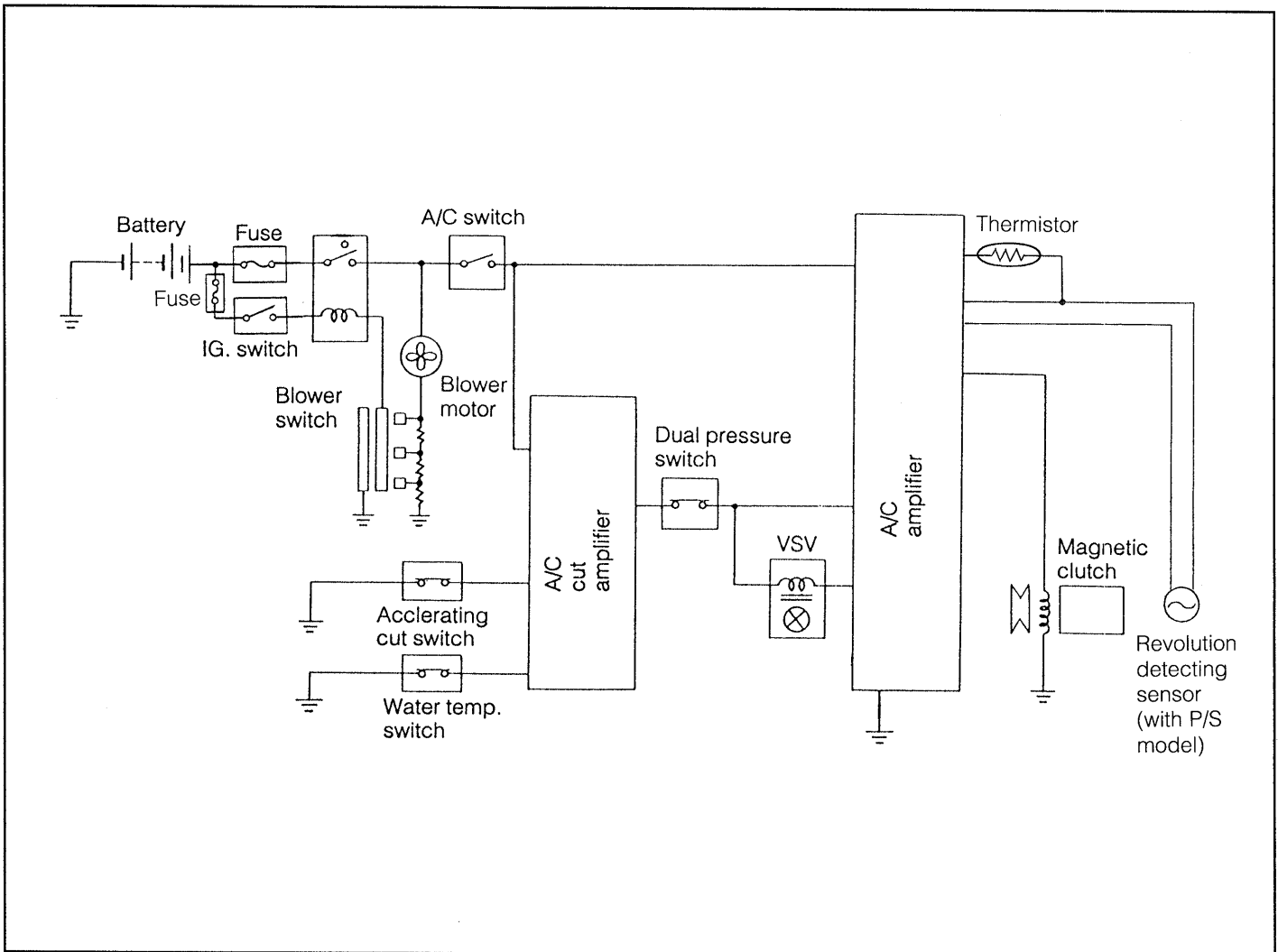


WRU90-AC002



WRU90-AC003

1. PRINCIPLE OF A/C ELECTRICAL CIRCUIT



WRU90-AC004

2. HOW MAGNETIC CLUTCH BE ENERGIZED

The general process until magnetic clutch is energized is shown below.

1. Ignition Switch "ON"
2. Blower Switch "ON"
Heater Relay "ON" (Blower Motor "RUN")
3. A/C Switch "ON"
A/C Cut Amplifier "ON"
A/C Amplifier "ON"
4. Dual Pressure Switch "ON"
Refrigerant Condition: 2.1 kg/cm^2 (30 psi) - 27 kg/cm^2 (384 psi)
5. Thermistor supplies the signal for temperature of evaporator to amplifier.
6. VSV "ON" Engine idle up.
7. Magnetic Clutch "ON"

WRU90-AC005

PRECAUTIONS

1. When handling refrigerant (R-12), the following precautions should be observed:
 - (1) Always wear goggles.
 - (2) Keep the refrigerant container (service drum) below 40°C (104°F).
 - (3) Do not handle refrigerant in an enclosed area where there is an open flame.
 - (4) Discharge refrigerant slowly when purging the system.
 - (5) Be careful that liquid refrigerant does not get on your skin.
2. If liquid refrigerant gets in the eyes or on the skin:
 - (1) Do not rob.
 - (2) Wash the area with a lot of cool water.
 - (3) Rush to physician or hospital for immediate professional treatment.
 - (4) Do not attempt to treat yourself.
3. When connecting the refrigerant lines:
 - (1) Apply a few drops of compressor oil onto the O-ring fittings.
 - (2) Tighten the nut using two wrenches to avoid twisting the tube.
 - (3) Tighten the O-ring fitting to the specified torque.

WRU90-AC006

Tightening torque for O-ring fittings and bolted type fittings.:

Fitting size		Tightening torque
0.31 inch Tube		1.4 kg-m (10.1 ft-lb, 13.7 N-m)
0.50 inch Tube		2.3 kg-m (16.6 ft-lb, 22.6 N-m)
0.62 inch Tube		3.3 kg-m (23.9 ft-lb, 32.4 N-m)
Bolted Type	(For Compressor)	2.5 kg-m (18.1 ft-lb, 24.5 N-m)
	5.4(For Receiver)	0.55 kg-m (4.0 ft-lb, 5.4 N-m)

WRU90-AC007

SPECIAL TOOLS AND EQUIPMENT

	Name	SST No.	Use
Tool	Air-conditioner magnet clutch stopper	09802-87702-000	To remove and install pressure plate
	Air-conditioner magnet clutch remover	09802-87701-000	To remove pressure plate
	Air-conditioner bit set	09801-87701-000	To remove service valve and front housing
	Air-conditioner seal plate replacer	09953-87701-000	To replace seal plate
	Air-Conditioner seal plate remover	09956-87701-000	To remove seal plate
Equipment	Manifold gauge set	—	To evacuate and charge system
	Ohm meter	—	To diagnosis electrical system
	Voltage meter	—	To diagnosis electrical system

WRU90-AC008

TROUBLE SHOOTING

You will find the troubles easier using the table well shown below. In this table, each number shows the priority of causes in trouble. Check each part in order.

See page	Part name	Trouble								
		No blower operation	No compressor operation	Compressor operate intermittently	No condenser fan operation	No cool air comes out	Cool air comes out intermittently	Cool air comes out only at high engine r.p.m.	Insufficient cooling	No engine idle up when A/C switch on
—	Volume of refrigerant		1	1		1	1	1	1	
AC-11	Drive belt tension					2	2	2	2	
AC-47	Fusible link				1					
BE-111	Heater relay	1	2							
BE-109	Blower switch	2								
AC-46	A/C switch		3							
AC-47	Condenser fan relay			2	2					
AC-47	Condenser fan motor			3	3					
AC-24	Compressor		11			7	5	4	7	
AC-24	Magnetic clutch		10			8	6	5	8	
AC-28	Revolution detecting Sensor (With P/S model)		12							
AC-45	Dual pressure switch		4	4						
AC-44	Thermistor		5	5						
AC-48	Water temperature switch		6							
—	Throttle switch		7							
AC-49	A/C amplifier		8	6	4					2
AC-51	A/C cut-off amplifier		9	7						3
AC-38	Condenser					3		3	3	
AC-39	Receiver					6	3		6	
AC-41	Evaporator					4			5	
AC-41	Expansion valve					5	4		4	
AC-52	Vacuum switching valve (VSV)									1
AC-21 to AC-23	Wiring & its connection		12	8						4

CHECKING OF REFRIGERATION SYSTEM WITH MANIFOLD GAUGE

This is a method in which the trouble is located by using a manifold gauge.

Read the manifold gauge pressure with the following established conditions:

- (1) Temperature at the air inlet is 30 - 35°C (86 - 95°F)
- (2) Engine running at 1,500 rpm
- (3) Blower speed set at high
- (4) Temperature control lever set at cool

NOTE:

- It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.

WRU90-AC010

1. Normally functioning refrigeration system

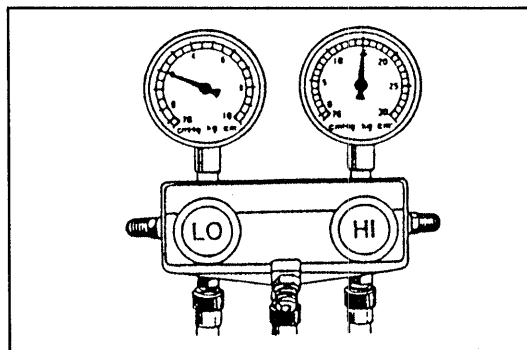
Gauge Reading:

Low pressure side

15 - 20 kg/cm² (21 - 28 psi)

High pressure side

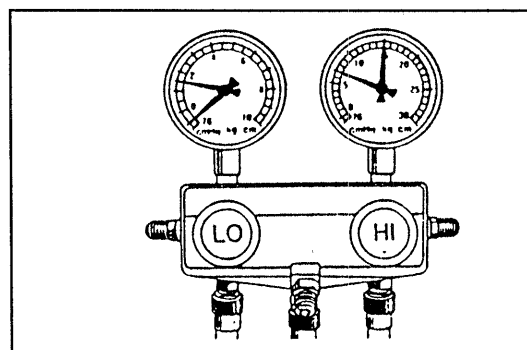
13.0 - 15.0 kg/cm² (182 - 213 psi)



2. Moisture present in refrigeration system

Condition:

Periodically cools and then fails to cool



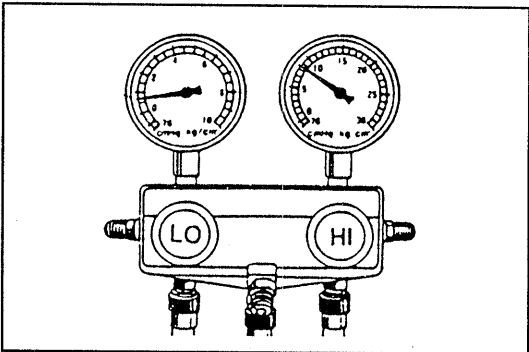
WRU90-AC011

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure at low pressure side sometimes becomes a vacuum and sometimes normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	Drier in oversaturated state Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	(1) Replace receiver and drier (2) Remove moisture in cycle through repeated vacuum purging (3) Charge refrigerant to proper amount

WRU90-AC012

3. Insufficient refrigerant

Condition: Insufficient cooling



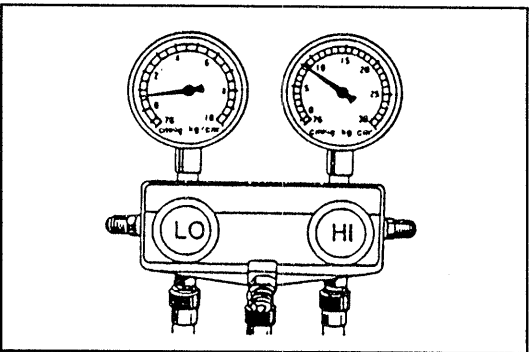
WRU90-AC013

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure low at both low and high pressure sides Bubbles seen in sight glass Insufficient cooling performance	Gas leakage at some place in refrigeration system	Insufficient refrigerant in system Refrigerant leaking	(1) Check with leak detector and repair (2) Charge refrigerant to proper amount

WRU90-AC014

4. Poor circulation of refrigerant

Condition: Insufficient cooling



WRU90-AC015

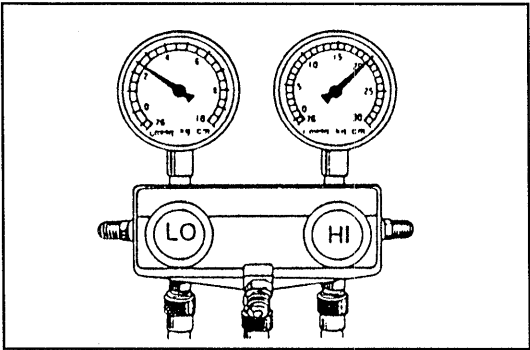
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure low at both low and high pressure sides Frost on tubes from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Receiver clogged	Replace receiver

WRU90-AC016

AIR CONDITIONING SYSTEM

5. Refrigerant overcharge or insufficient cooling of condenser

Condition: Does not cool sufficiently



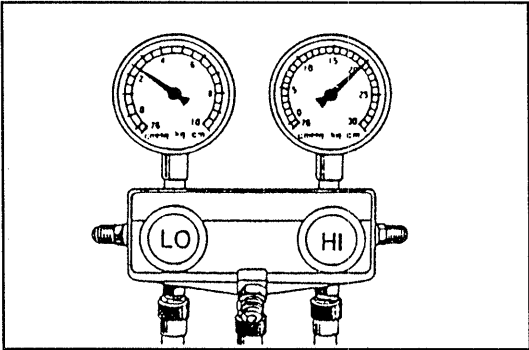
WRU90-AC017

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at both low and high pressure sides	Unable to develop sufficient performance due to excessive refrigerant in system Condenser cooling insufficient	Excessive refrigerant in cycle → refrigerant overcharged Condenser cooling insufficient → condenser fins clogged or fan motor faulty	(1) Clean condenser (2) Check fan motor operation (3) If (1) and (2) are normal, check amount of refrigerant NOTE: Vent out refrigerant through gauge manifold low pressure side by gradually opening valve.

WRU90-AC018

6. Expansion valve improperly mounted/heat sensing tube defective (opens too wide)

Condition: Insufficient cooling



WRU90-AC019

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at both low and high pressure sides Frost or large amount of dew on piping at low pressure side	Trouble in expansion valve or heat sensing tube not installed correctly Refrigerant flow out of adjustment	Excessive refrigerant in low pressure piping Expansion valve opened too wide	(1) Check heat sensing tube installed condition (2) If (1) is normal, test expansion valve in unit Replace if defective

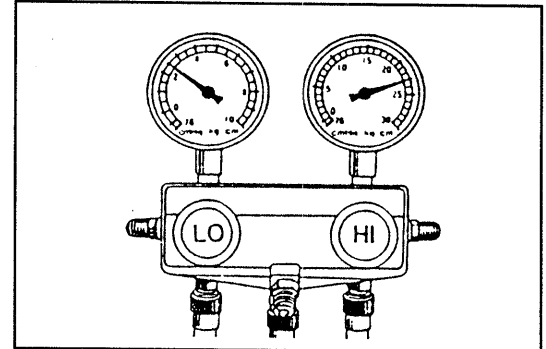
WRU90-AC020

7. Air present in refrigeration system

Condition: Does not cool sufficiently

NOTE:

- These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.



WRU90-AC021

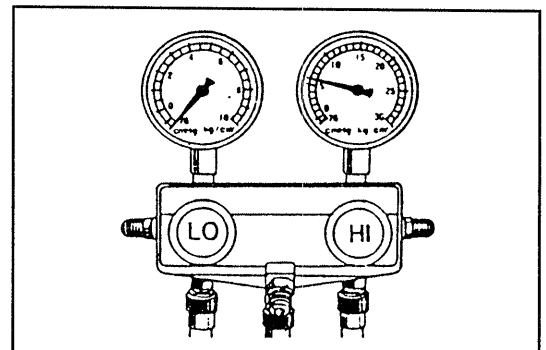
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at both low and high pressure sides	Air entered refrigeration system	Air present in refrigeration system Insufficient vacuum purging	(1) Replace receiver and drier (2) Check compressor oil to see if dirty or insufficient (3) Vacuum purge and Charge new refrigerant

WRU90-AC022

8. Refrigerant does not circulate

Condition:

Does not cool (Cools from time to time in some cases)



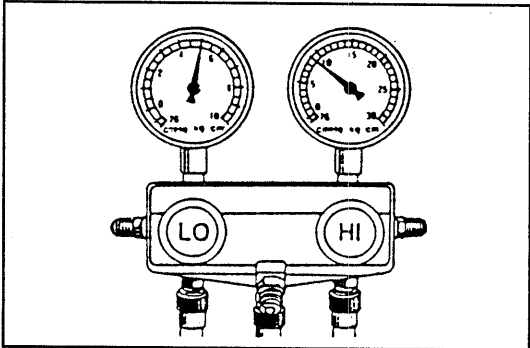
WRU90-AC023

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Vacuum indicated at low pressure side and very low pressure indicated at high pressure side Frost or dew seen on piping before and after receiver and drier or expansion valve	Refrigerant flow obstructed by moisture or dirt in refrigerant freezing or adhering to expansion valve orifice Refrigerant flow obstructed by gas leakage from expansion valve heat sensing tube	Expansion valve orifice clogged Refrigerant cues not few	Allow to stand for some time and then restart operation to determine if trouble is caused by moisture or dirt. If caused by moisture refer to step 2 on page AC-6. If caused by dirt, remove expansion valve and clean off dirt by blowing with air. If unable to remove dirt, replace valve. Vacuum purge and charge new refrigerant to proper amount. For gas leakage from heat sensing tube, replace expansion valve.

WRU90-AC024

9. Insufficient compression

Condition: Does not cool



WRU90-AC025

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at low Pressure side Pressure too low at high Pressure side	Internal leak in compressor	Compression defective Valve leaking or broken sliding parts (Piston, cylinder, gasket, etc.,) broken	Repair or replace compressor

WRU90-AC026

IN-VEHICLE INSPECTION

1. Check the condenser fins for blockage or damage.
If the fins are clogged, clean them with pressurized water

CAUTION:

- Be careful not to damage the fins.

2. Check the drive belt tension.

Using a belt tension gauge, check the drive belt tension.

Belt Tension Gauge:

Nippondenso BTG-20 (95506-00020) or

Burroughs No. BT-33-73F

Drive Belt Tention:

New belt $75 \pm 12\text{kg}$ ($165 \pm 26\text{ lb}$)

Used belt $60 \pm 10\text{ kg}$ ($132 \pm 22\text{ lb}$)

NOTE:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

3. Start the engine.

4. Turn on the A/C switch.

Check that the A/C operates at each position of the blower switch.

If blower does not operate, check fuse.

5. Check the magnetic clutch operation.

6. Check that idle increases.

When the magnetic clutch engages, engine revolution should increase.

Standard Idle-up rpm: $1100 \pm 50\text{ rpm}$

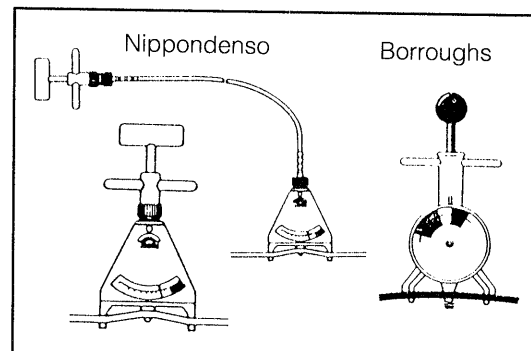
7. Check the condenser fan motor rotates.

8. Check amount of refrigerant.

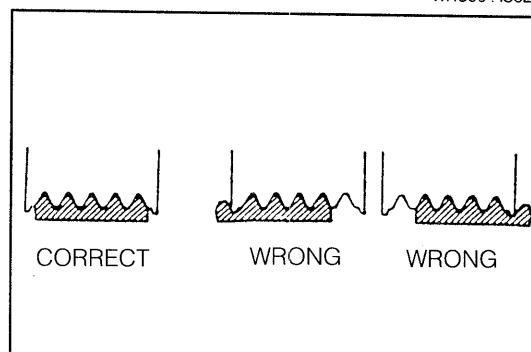
If you can see bubbles in the sight glass, additional refrigerant is needed.

9. If no or insufficient cooling, inspect for leakage.

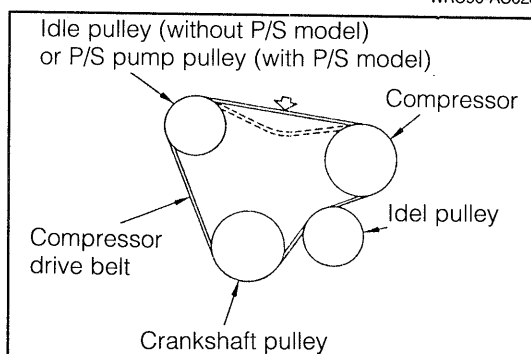
Using a gas leak detector, inspect each component of the refrigeration system.



WRU90-AC027



WRU90-AC028



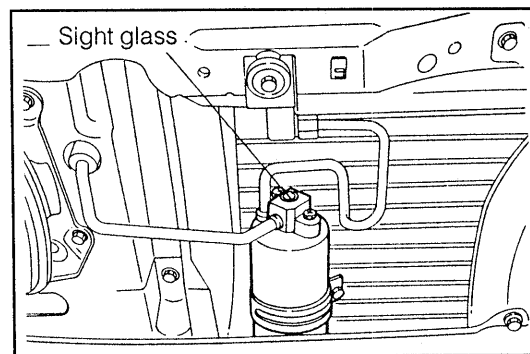
WRU90-AC029

AIR CONDITIONING SYSTEM

REFRIGERATION SYSTEM

Checking of refrigerant charge

1. Run the engine at fast idle.
2. Operate the air conditioner at maximum cooling for a few minutes.
3. Check amount of refrigerant.
Remove the air cleaner and observe the sight glass.



WRU90-AC030

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient	Check for leak with gas leak detector
2	No bubbles present in sight glass	Empty, proper or too much	Refer to items 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	Evacuate and charge system. Then check for leak with gas leak detector
4	Temperature between compressor inlet and outlet is noticeably different	Proper or too much	Refer to items 5 and 6
5	Immediately after air conditioner is turned off, refrigerant in sight glass stays clear	Too much	Discharge excess refrigerant to specified amount
6	When air conditioner is turned off, refrigerant foams and then stays clear	Proper	—

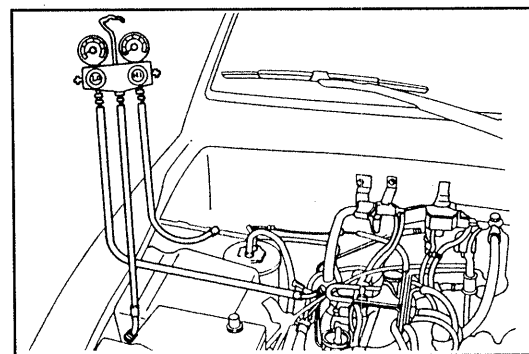
WRU90-AC031

INSTALLATION OF MANIFOLD GAUGE SET

1. Close both hand valves of manifold gauge set.
2. Installation of charging hoses of gauge set to charging valves.
 - (1) Connect the low pressure hose to the low pressure charging valve and the high pressure hose to the high pressure charging valve. Tighten the hose nuts by hand.

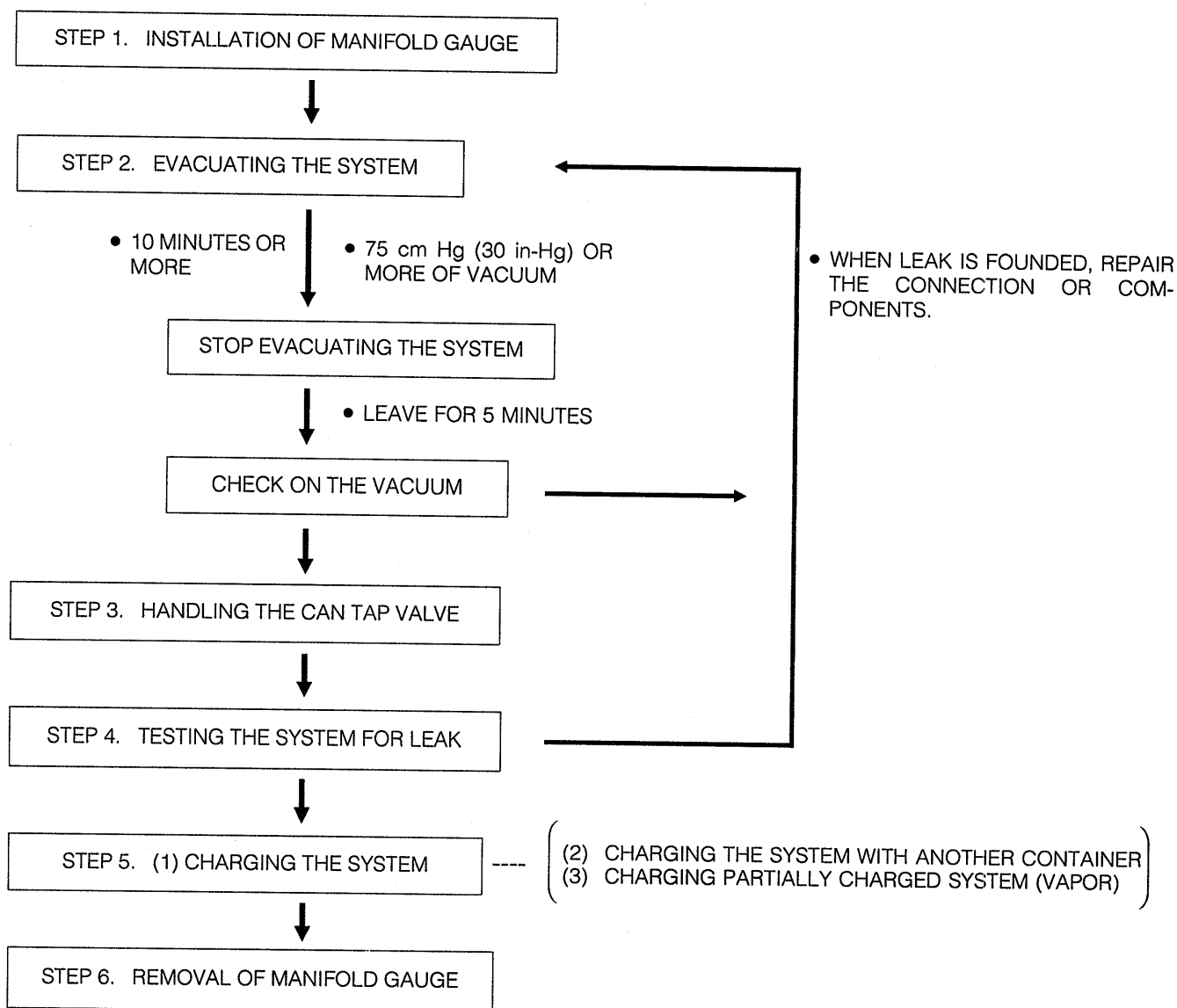
NOTE:

- Do not apply compressor oil to the seat of the connection.



WRU90-AC032

EVACUATING AND CHARGING OF REFRIGERATION SYSTEM



CAUTIONS FOR HANDLING THE REFRIGERANT

WRU90-AC033

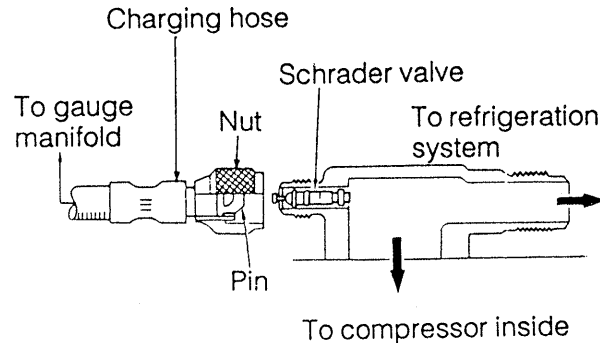
1. When handling refrigerant, the following precautions must be observed.
 - (1) Always wear eye protection while handling refrigerant.
 - (2) The refrigerant container must never be heated.
Store the refrigerant container below 40°C (104°F).
 - (3) Do not handle refrigerant in an enclosed area where it is exposed to an open flame.
 - (4) Care must be taken to protect eyes and skin from refrigerant.
2. If refrigerant strike eyes or skin.
 - (1) Do not rub the affected areas.
 - (2) Splash large quantities of cool water on the eyes or skin.
 - (3) Do not attempt to treat the patient by yourself, rush the patient to a doctor or hospital for immediate professional treatment.

WRU90-AC034

STEP 1. INSTALLATION OF MANIFOLD GAUGE

NOTE:

- Each service valve fitting has a schrader type valve as shown.
- The charging hose end, with pin attached, should be fitted to the service valve to open this valve.

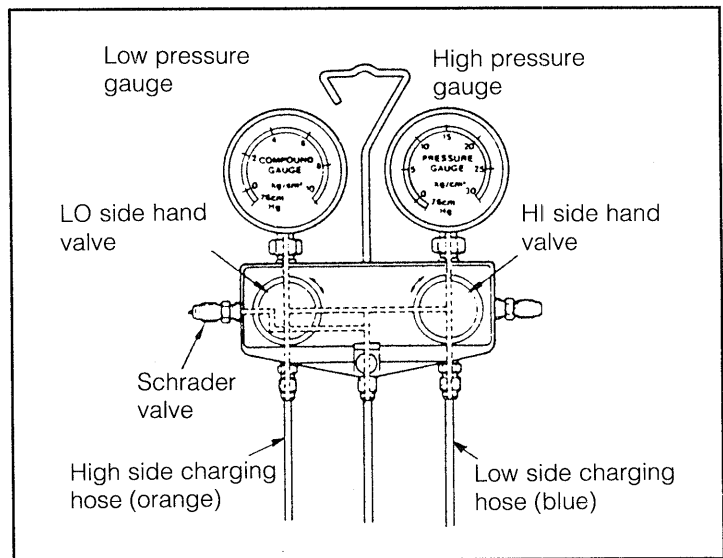


WRU90-AC035

1. Close both hand valves of manifold gauge.
2. Remove the valve caps from the service valve fittings.
3. Connect the low side charging hose (blue) of the manifold gauge to the suction service valve and high side charging hose (red) to the discharge service valve.

NOTE:

- Do not apply compressor oil to the seat of the connection.
- Discharge service valve is smaller in size and requires an adaptor to the red high side charging hose.



WRU90-AC036

STEP 2. EVACUATING THE SYSTEM

NOTE:

- Whenever the air conditioner system has been opened (exposed to atmosphere), it must be evacuated using a vacuum pump.

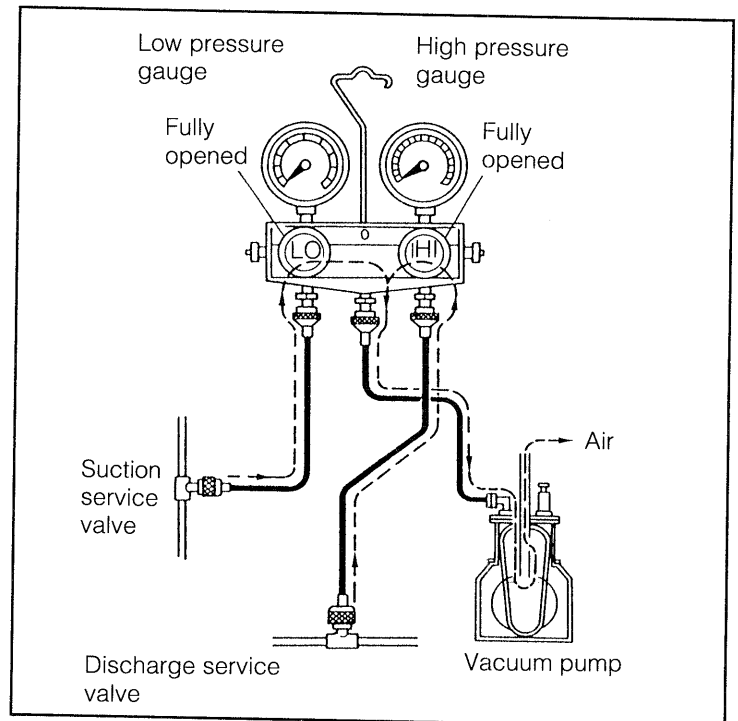
1. Install the manifold gauge to the service valves as in step 1.
2. Connect the center charging hose of manifold gauge to the vacuum pump inlet.
3. Run the vacuum pump, then open both hand valves.
4. Evacuate the system for 10 minutes or more, confirm that the low pressure gauge should read 75 cm-Hg (30 in-Hg) or more of vacuum, then close both hand valves and stop the vacuum pump.
5. Check the low side pressure gauge for needle movement for 5 minutes.

NOTE:

- The low pressure gauge should read 75 cm-Hg (30 in-Hg) or more of vacuum. This will occur if there is no leak.
- An increase in low pressure gauge reading means that there is a leak. This must be repaired and then repeat item 3 thru 5.

6. Disconnect the center charging hose from the vacuum pump inlet.

The system is now ready for charging.



WRU90-AC037

STEP 3. HANDLING CAN TAP VALVE

1. Before putting the can tap valve on the refrigerant container, thru the handle out counterclockwise until the valve needle is fully retracted.
2. Turn the plate nut (locking disc) counterclockwise until it reaches its highest position and then screw down the can tap valve onto the refrigerant container.
3. Holding the body of the can tap valve, install the can tap valve to the refrigerant container and turn the plate nut clockwise fully.
4. Connect the center charging hose to the valve fitting of can tap valve.
5. Turn the handle clockwise to pierce a hole in the top of the container.
6. Turn the handle counterclockwise fully to fill the center charging hose with refrigerant.

CAUTION:

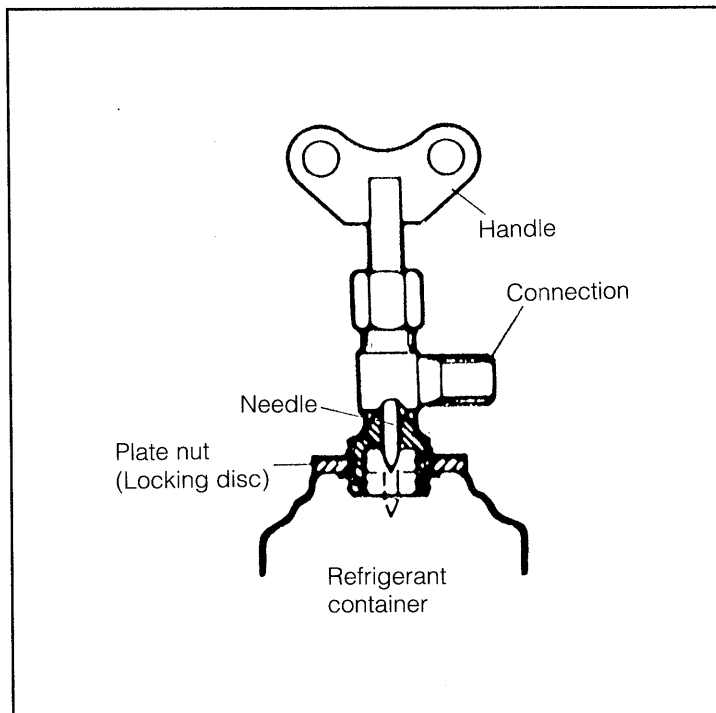
- Do not open the high and low side hand valves.

7. Open the schrader valve of the manifold gauge to allow air to escape for a few second until a hiss can be heard.

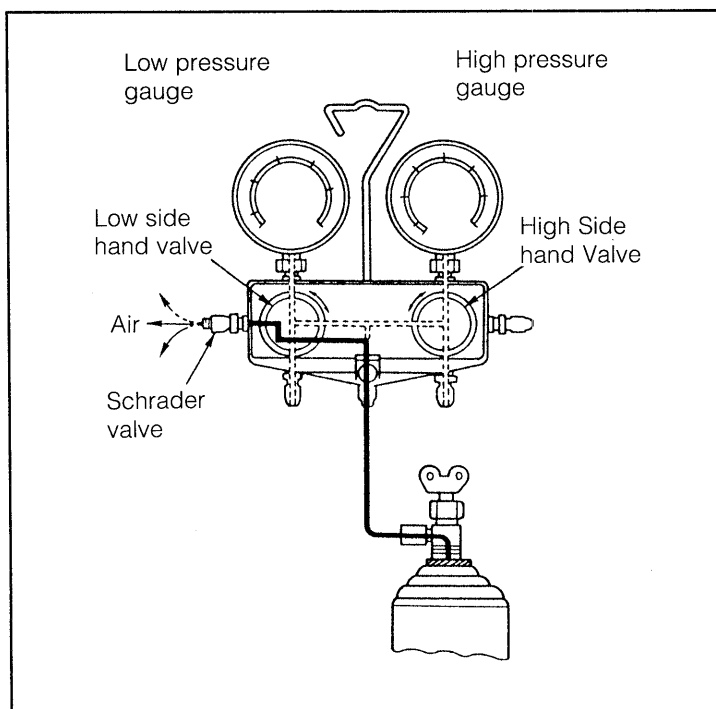
WARNING:

Refrigerant will escape from the schrader valve of the manifold gauge hoses so care must be taken to protect eyes and skin when purging air.

The refrigerant container is ready for charging.



WRU90-AC038



WRU90-AC039

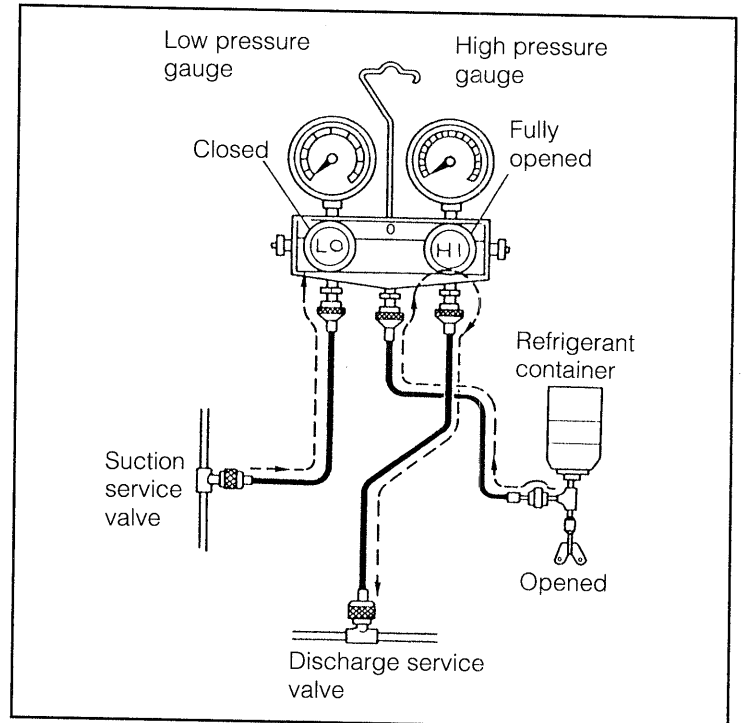
STEP 4. TESTING THE SYSTEM FOR LEAKS

NOTE:

- After finishing the evacuation of the system, check the system for leaks using an electronic leak detector as described below.

1. Attach the can tap valve to a refrigerant container and connect the center charging hose to the can tap valve as in step 3.
2. Open the high side hand valve to charge the system with refrigerant vapor.
3. When the low pressure gauge reads 1kg/cm^2 14 psi, close the high side hand valve.
4. Check the system for leaks.
When a leak is found, repair the defective components or connection.

The system is now ready ready for charging.



WRU90-AC040

AIR CONDITIONING SYSTEM

STEP 5. (1) CHARGE THE SYSTEM

NOTE:

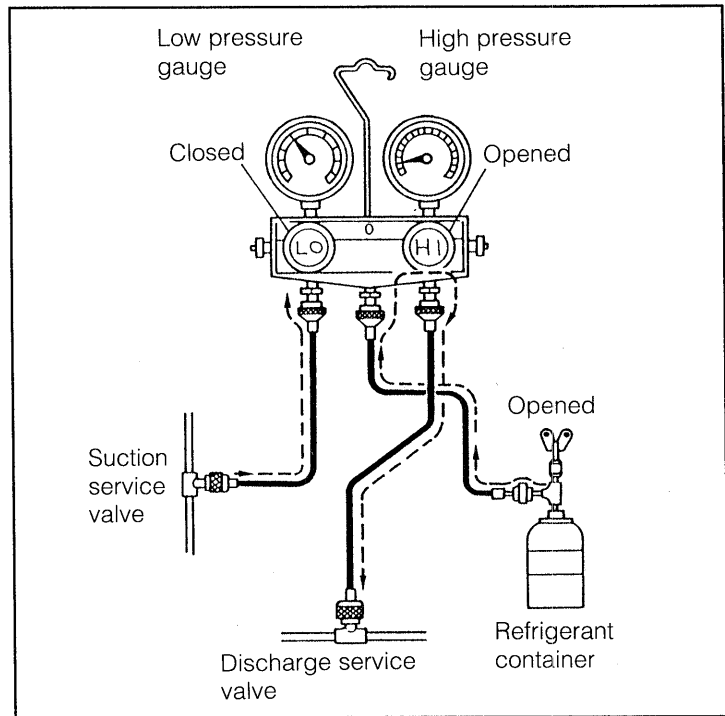
- This step is for charging an empty system through the high pressure side with refrigerant in a liquid state, after testing the system for leaks.
- When the refrigerant container is held upside down, refrigerant will enter the system as a liquid.

CAUTION:

- Never run the engine when charging the system through the high pressure side.
 - Do not open the low side hand valve when the refrigerant is being charged in a liquid state (refrigerant container up side down).
1. Open the high side hand valve fully, and keep the container upside down.
 2. Charge the system with specified amount of the refrigerant. Then close the high side hand valve.
 3. When the container becomes empty in the middle of charging the refrigerant, close the high side hand valve and exchange the container as in step 5. (2)

CAUTION:

- Be careful not to overcharge the system with refrigerant because it could failure of the compressor and magnetic clutch.



WRU90-AC041

(2) CHARGING SYSTEM WITH ANOTHER CONTAINER

NOTE:

- This step is for exchanging an empty container for a full container.

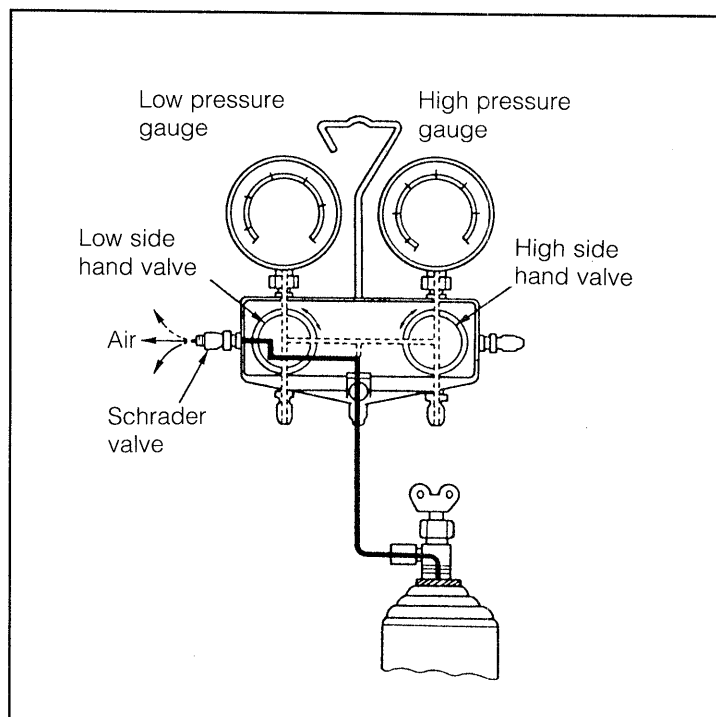
1. When the refrigerant container is empty, close the manifold gauge hand valve.
2. Remove the can tap valve from the container.

WARNING:

Refrigerant will escape from the manifold gauge hoses so care must be taken to protect eyes and skin when removing the hoses.

3. Attach the can tap valve to a new refrigerant container as in step 3 item 1 thru 3.
4. Make a hold in the sealed top of the new container as in step 3 item 5 thru 6.
5. Purge the air from the center charging hose as in step 3 item 7.

The system is now ready for charging.



WRU90-AC042

AIR CONDITIONING SYSTEM

(3) CHARGING PARTIALLY CHARGED SYSTEM (VAPOR)

NOTE:

- This step is for partially charging a system through the low pressure side with the refrigerant in a vapor state, when a specified amount of refrigerant could not be charged into the system from high pressure side.

1. Run the engine at 1500rpm, and operate the air conditioner.
2. Open the low side hand valve.

CAUTION:

- Never open the high side hand valve.
- Be sure to keep the container upright to prevent liquid refrigerant from being charged into the system through the suction side, resulting in possible damage the compressor.

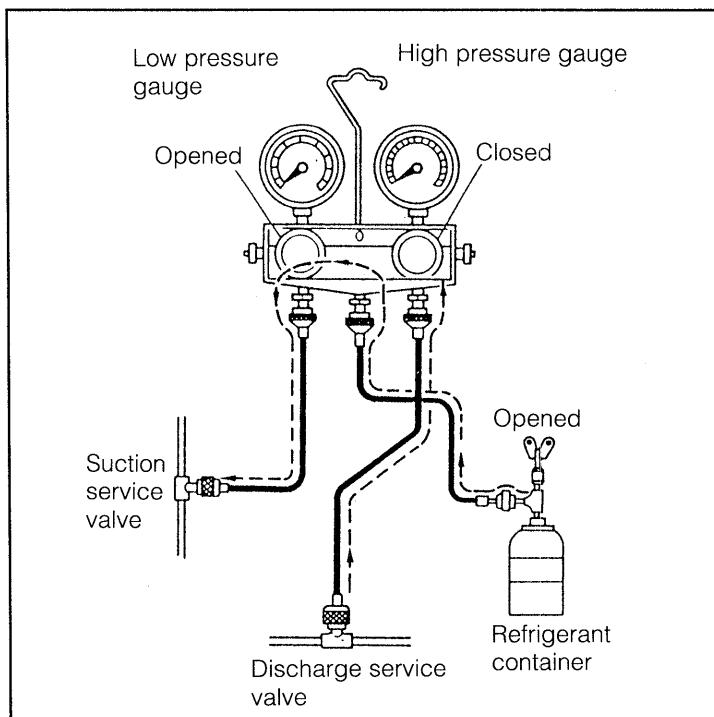
Filling Amount of Refrigerant Gas:
750 ± 50 grams

CAUTION:

- Be careful not to overcharge the system with refrigerant because it could cause failure of the compressor and magnetic clutch.

REMARKS:

- When the sight glass is free of any bubbles, close the low side hand valve and stop the engine.



WRU90-AC043

STEP 6. REMOVAL OF MANIFOLD GAUGE

NOTE:

- This step is for removing a manifold gauge, after charging the system with refrigerant.

1. Turn the handle of the can tap valve clockwise to close the valve attached to the refrigerant container.
2. Using a shop towel, push the low side charging hose fitting to the suction service valve and loosen the fitting nut of the charging hose then quickly remove the charging hose from the service valve.
3. Perform item 2 to remove the high side charging hose from the discharge service valve.

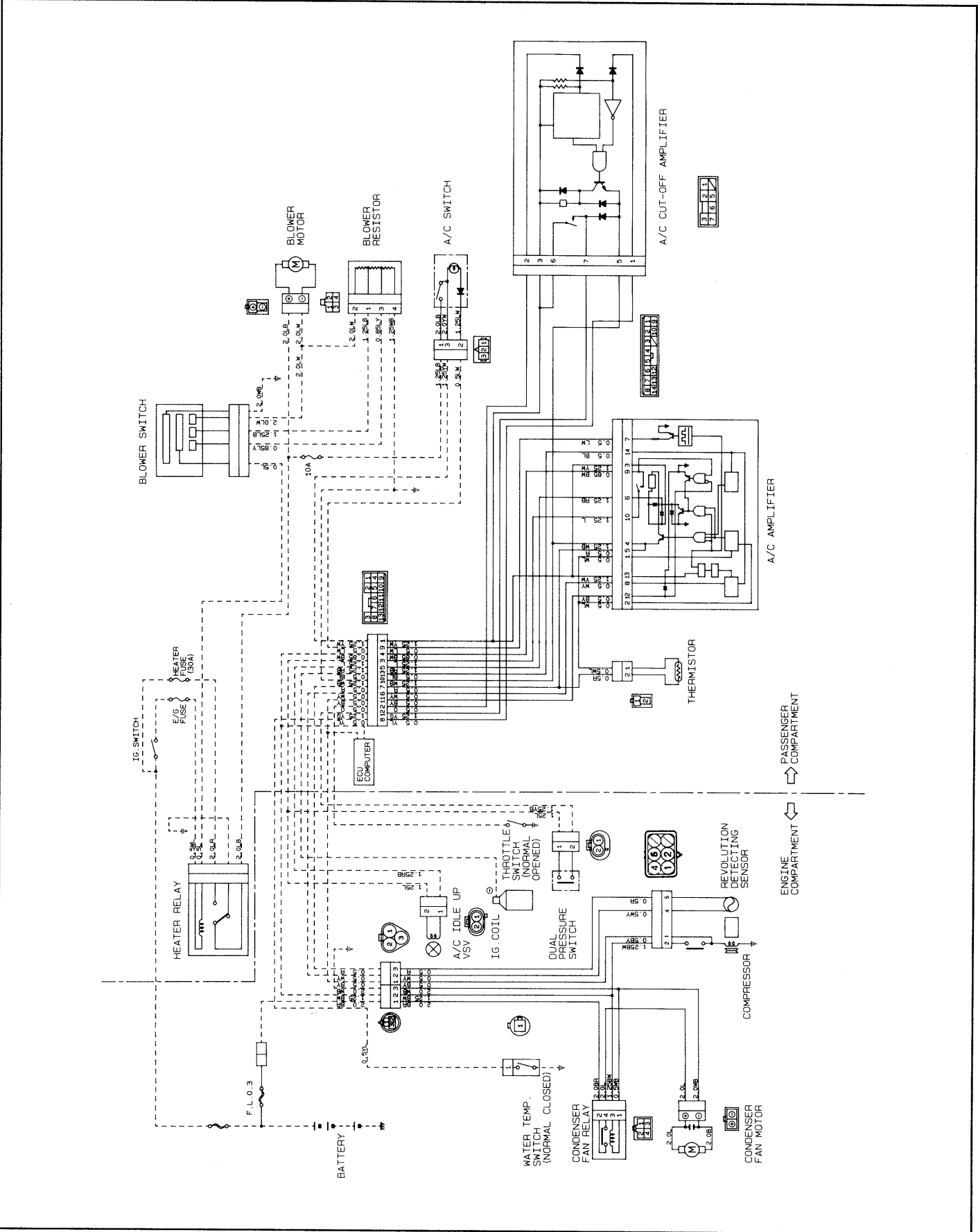
WARNING:

The refrigerant will escape from the manifold gauge hoses during the operation above. Hence, utmost care must be taken to protect your eyes and skin when removing the hoses.

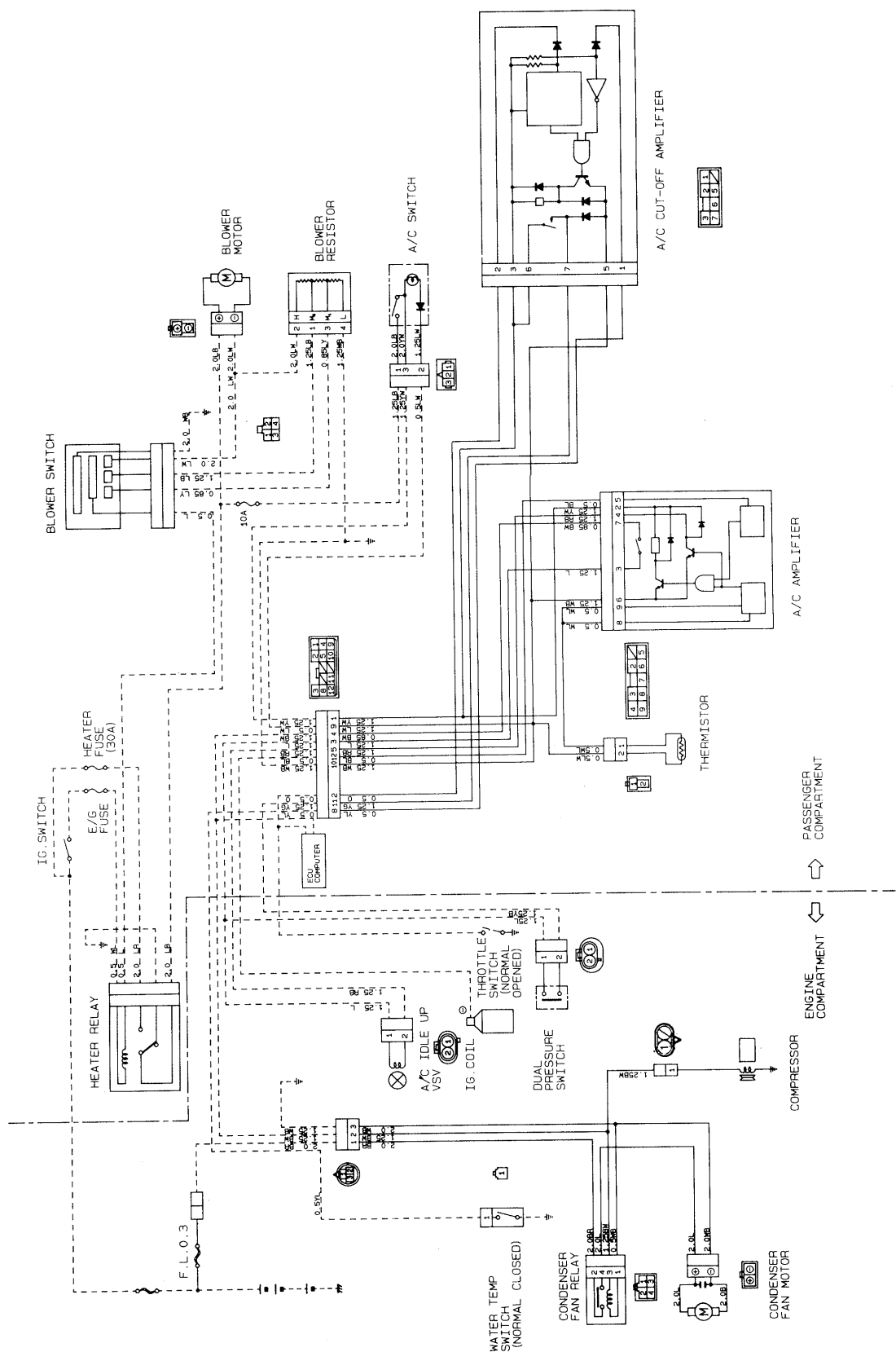
4. Reinstall the valve caps to the service valve fittings.

WRU90-AC045

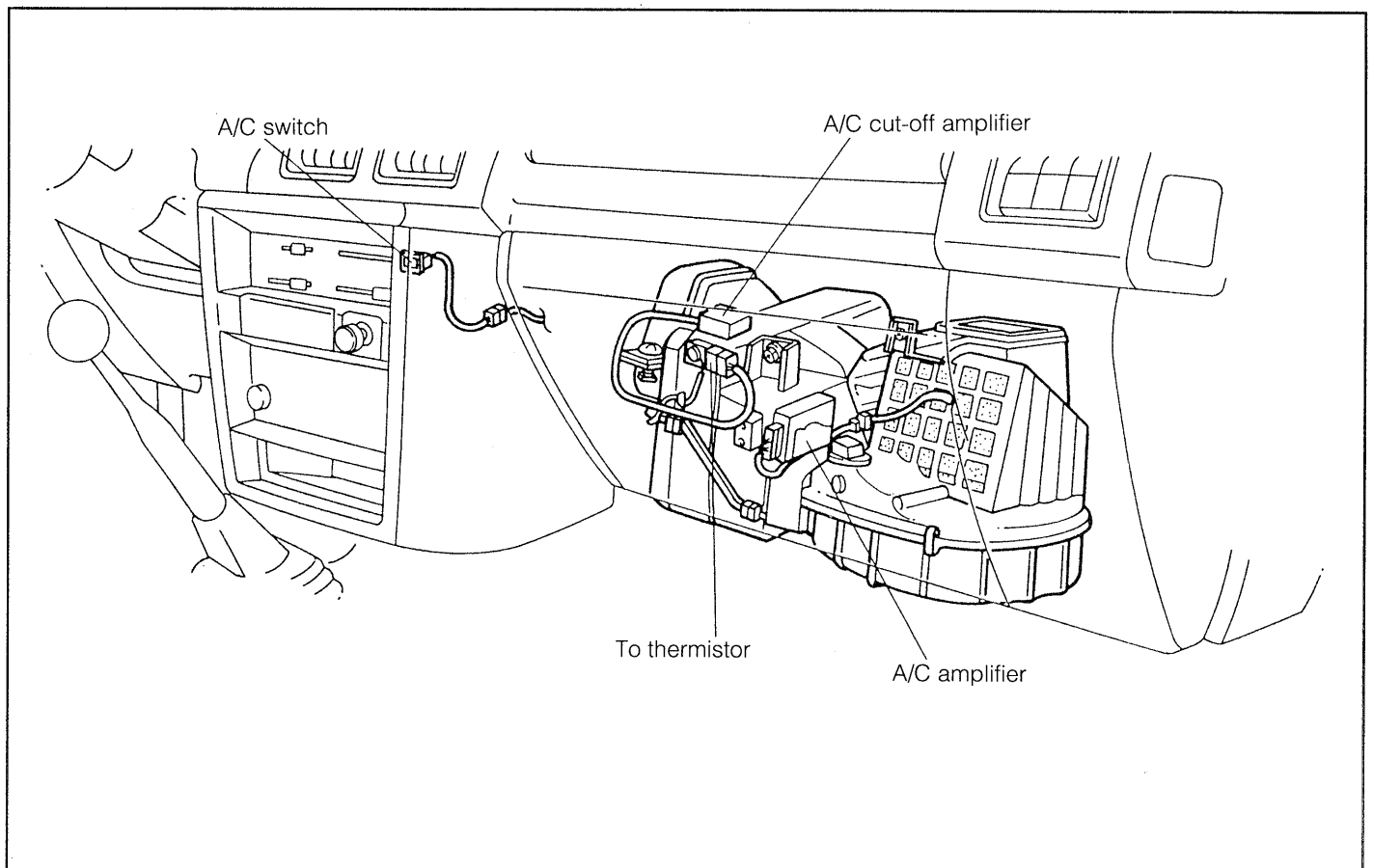
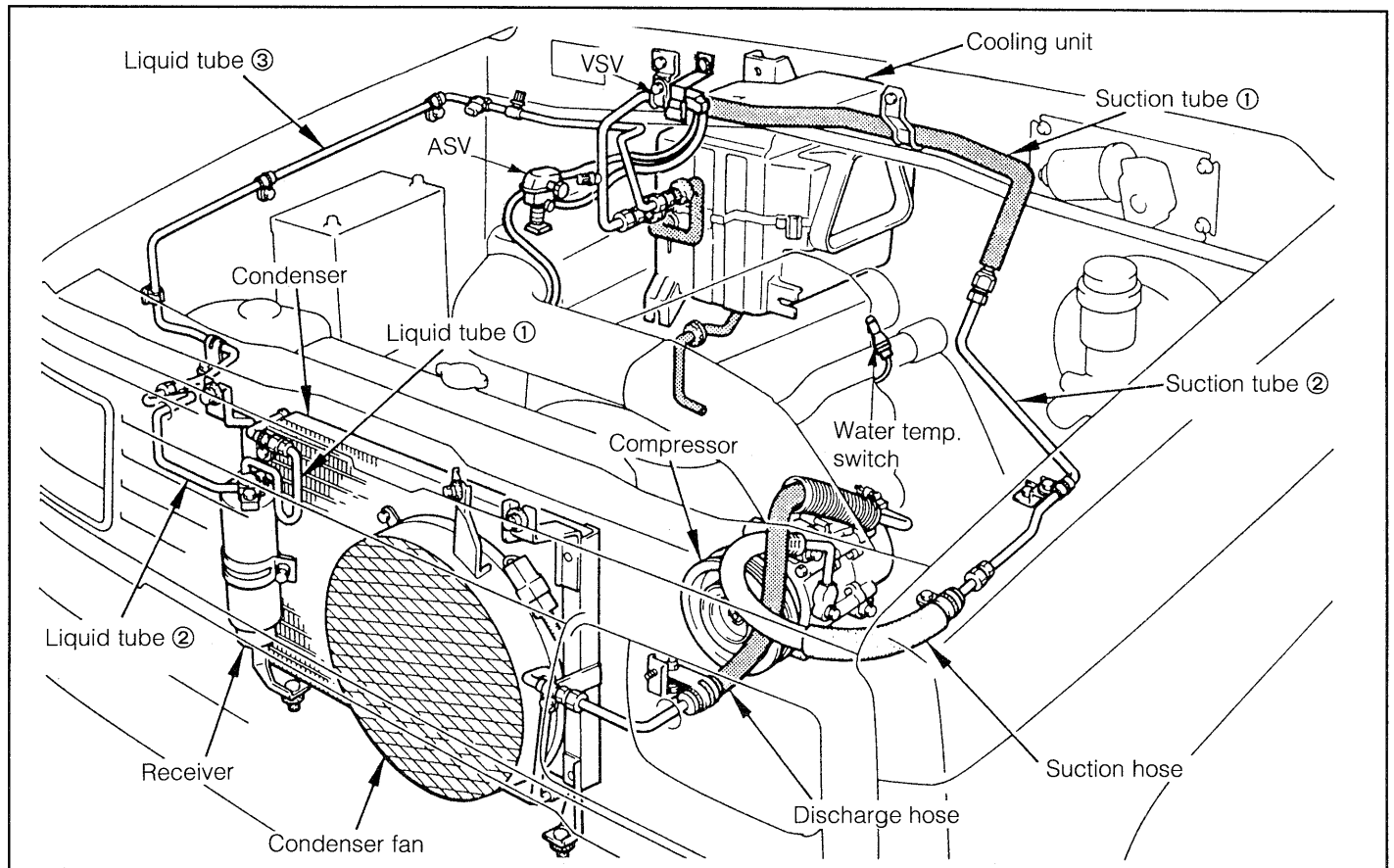
WIRING DIAGRAM
VEHICLE WITH POWER STEERING



VEHICLE WITHOUT POWER STEERING



SYSTEM COMPONENTS

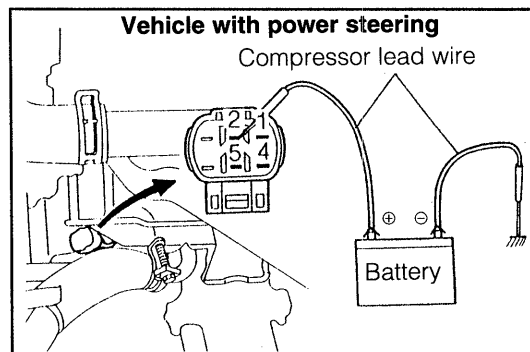


COMPRESSOR

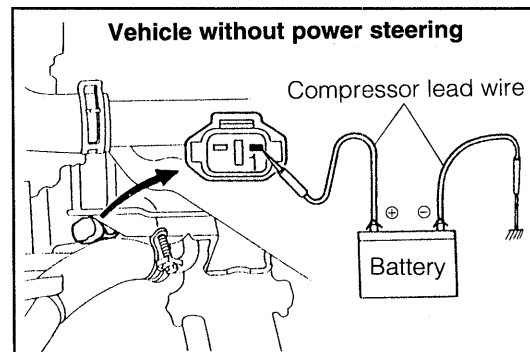
IN-VEHICLE INSPECTION (MAGNETIC CLUTCH)

1. Inspect magnetic clutch for following
 - (1) Inspect the pressure plate and the rotor for signs of oil.
 - (2) Check the clutch bearings for noise and grease leakage.

- (3) Connect the positive (+) lead from the battery to the terminal on the magnetic clutch connector and the negative (-) lead to the body ground.
- (4) Check that the magnetic clutch is energized.
If the magnetic clutch is not energized, replace the magnetic clutch.



WRU90-AC049



WRU90-AC050

(COMPRESSOR)

1. Install manifold gauge set.
2. Run engine at the first idle.
3. Inspect compressor for following.
 - (1) High pressure gauge reading is not lower and low pressure gauge reading is not higher than normal.
 - (2) Check that the metallic sound.
 - (3) Check that the leakage from shaft seal.If defects are found, replace the compressor.

WRU90-AC051

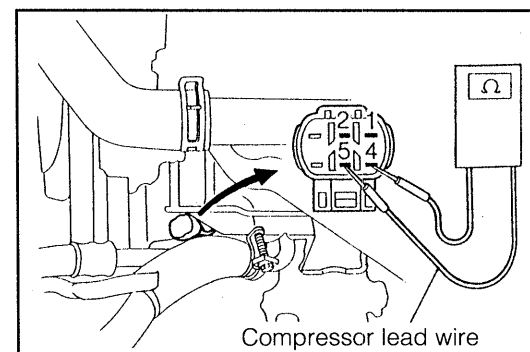
4. Inspect revolution detecting sensor.

(VEHICLE WITH POWER STEERING)

Using an ohmmeter, measure the resistance between terminals 1 and 2 of the sensor.

Specified Resistance: 200 - 260 Ω at 20°C (68°F)

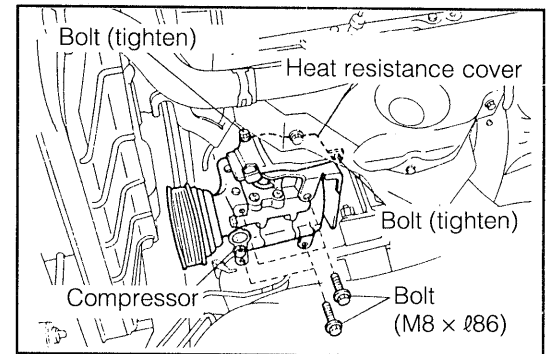
If the resistance value is not as specified, replace the revolution detecting sensor.



WRU90-AC052

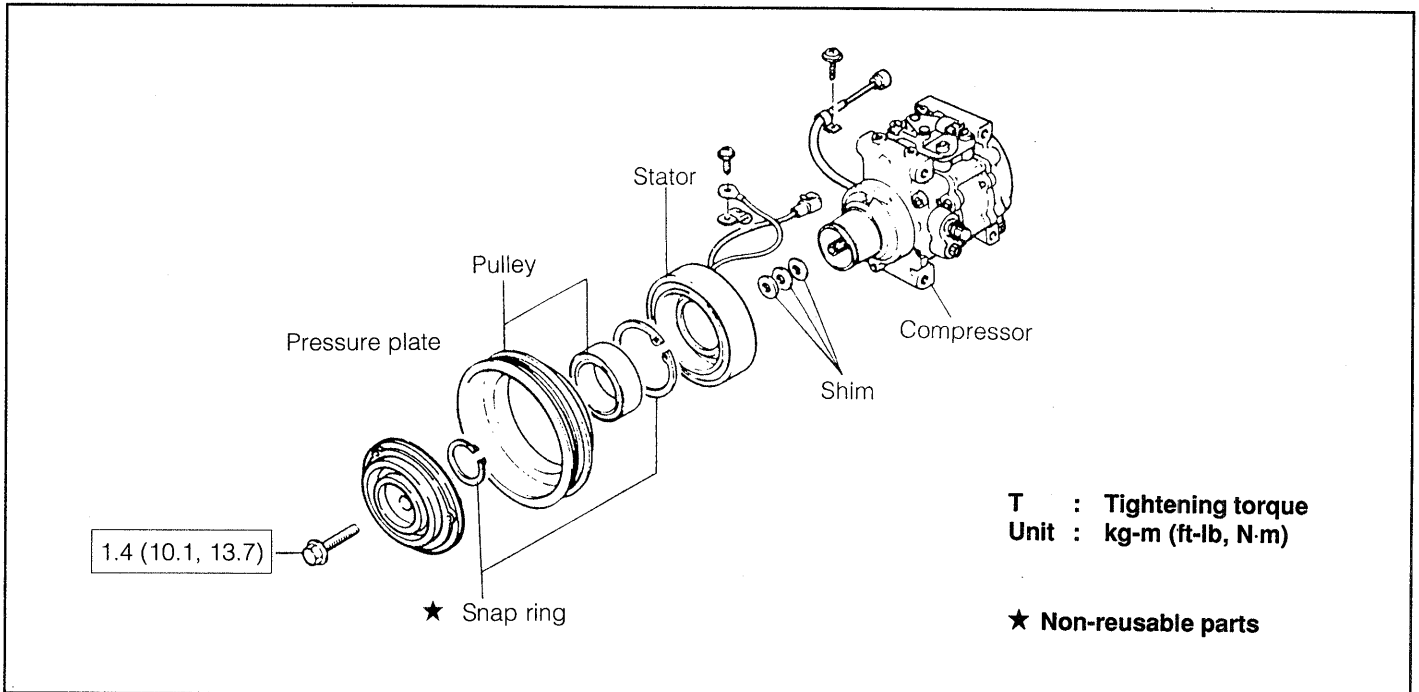
REMOVAL

1. Run the engine at idle with air conditioning on for 10 minutes.
2. Disconnect the negative cable from battery.
3. Discharge the refrigerant from refrigeration system.
4. Remove the front grille and the air cleaner & duct.
5. Disconnect the compressor lead wire.
6. Disconnect the suction hose from the compressor service valve and the discharge hose from the condenser inlet fitting.
Cap the open fitting immediately to keep moisture out of the system.
7. Loosen the drive belt.
8. Remove the compressor.
9. Disconnect the discharge hose from the compressor service valve.



WRU90-AC053

DISASSEMBLY OF MAGNETIC CLUTCH



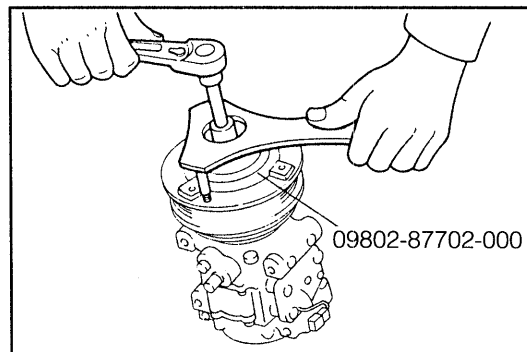
WRU90-AC054

AIR CONDITIONING SYSTEM

1. Removal of the pressure plate

- (1) Remove the shaft bolt, using the socket and following SST.

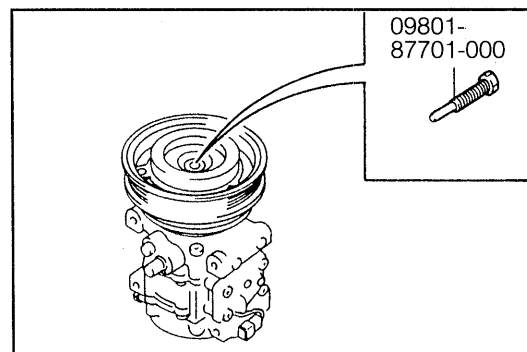
SST: 09802-87702-000



WRU90-AC055

- (2) Install the SST to the pressure plate.

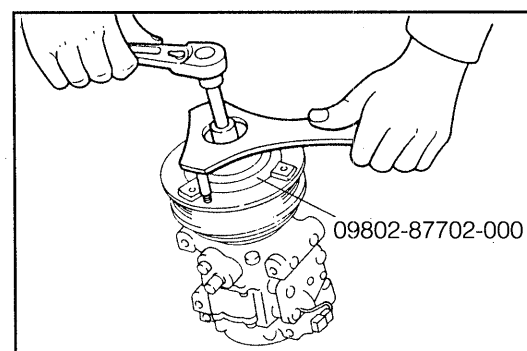
SST: 09801-87701-000



WRU90-AC056

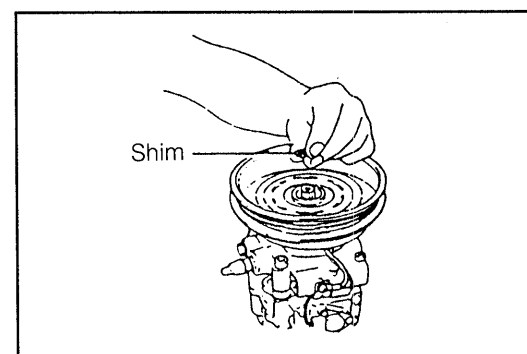
- (3) Remove the pressure plate, using the socket and following SST.

SST: 09802-87702-000



WRU90-AC057

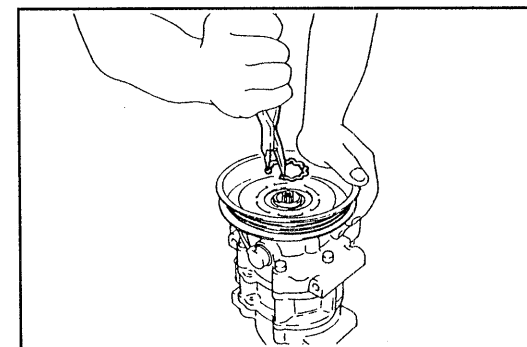
- (4) Remove the shims from the shaft.



WRU90-AC058

2. Removal of the rotor

- (1) Remove the snap ring, using the snap ring plier.

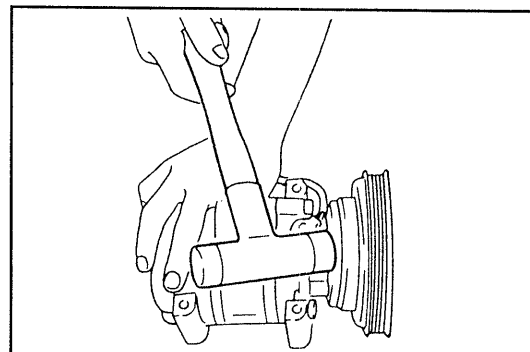


WRU90-AC059

(2) Using a plastic hammer, tap the rotor off the shaft.

CAUTION:

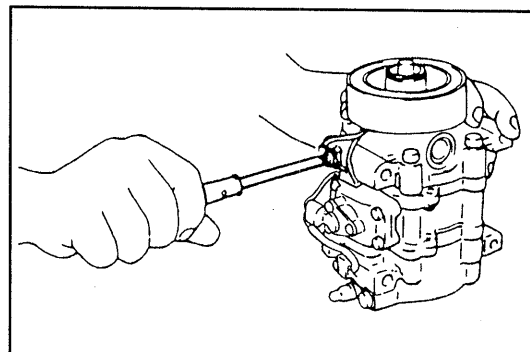
- Be careful not to damage the pulley when tapping on the rotor.



WRU90-AC060

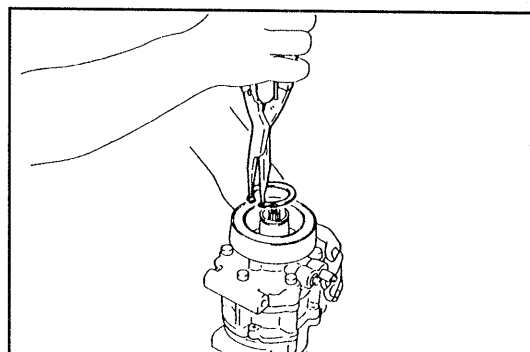
3. Removal of the stator

(1) Disconnect the stator lead wires from the compressor housing.



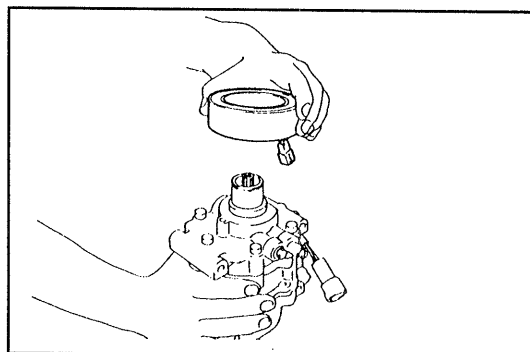
WRU90-AC061

(2) Using the snap ring plier, remove the snap ring.



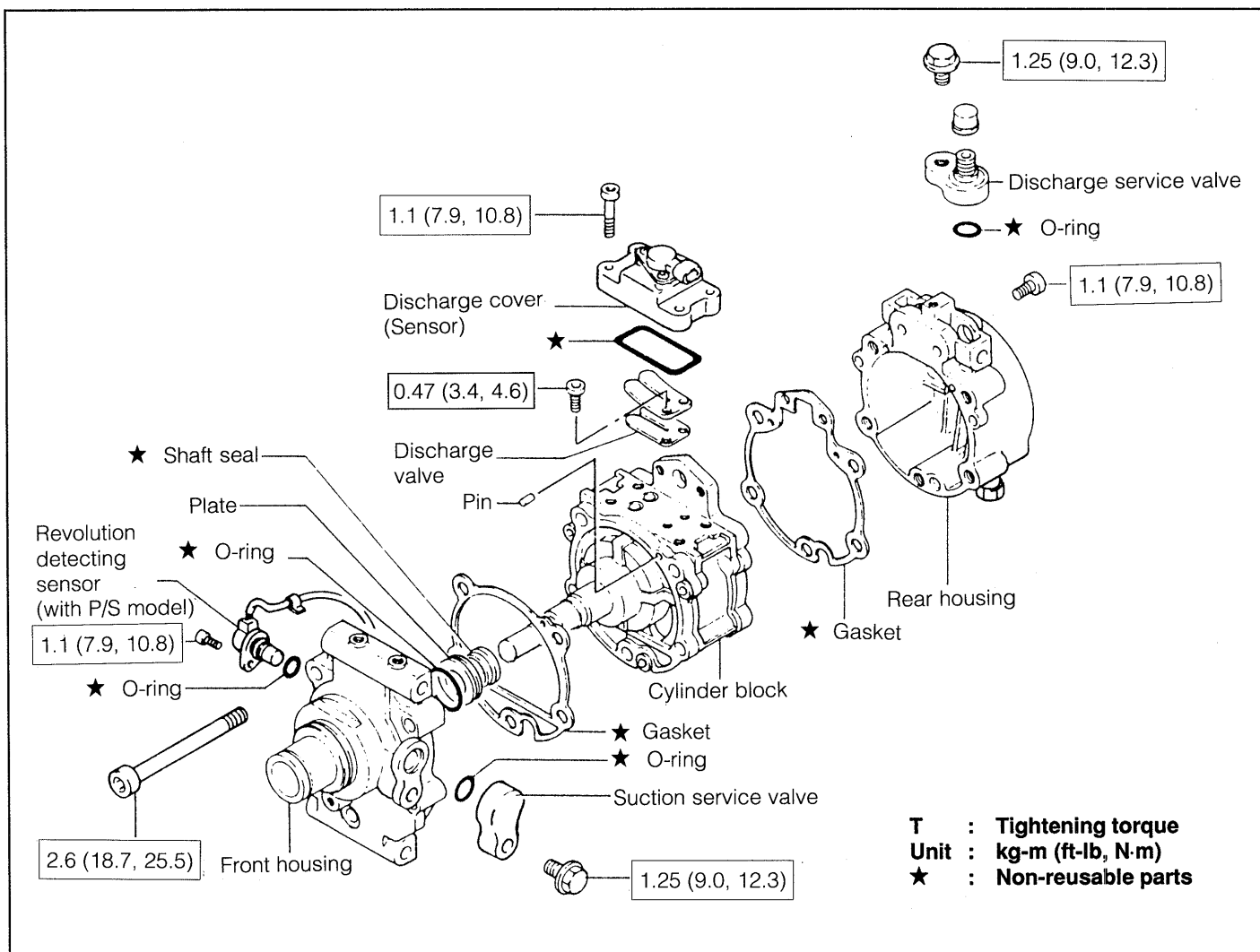
WRU90-AC062

(3) Remove the stator.



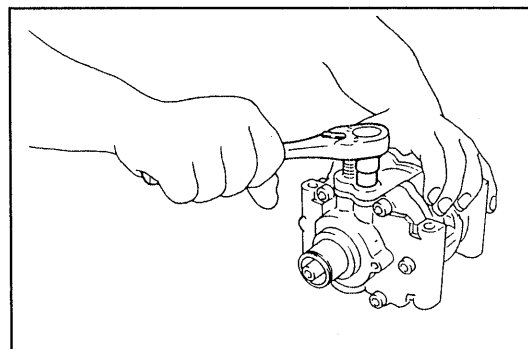
WRU90-AC063

DISASSEMBLY



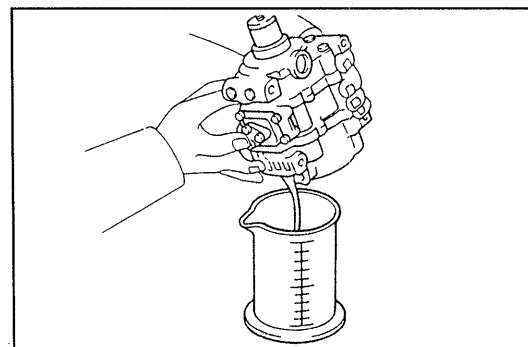
WRU92-AC151

1. Remove the suction service valve.
2. Remove the discharge service valve.



WRU90-AC065

3. Drain compressor oil into measuring flask
 (1) Measure the quantity of drained oil because the same amount should be replace later.



WRU90-AC066

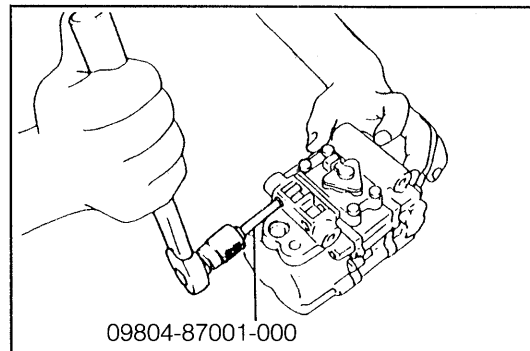
4. Removal of the discharge cover

(1) Remove the two through bolts, using the following SST.

SST: 09804-87701-000

CAUTION:

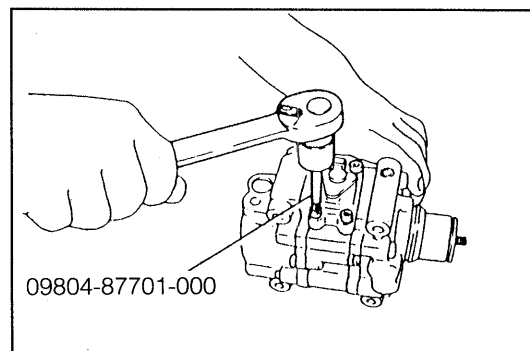
- Do not remove three screws.



WRU90-AC067

(2) Remove the four bolts, using the following SST.

SST: 09804-87701-000



WRU90-AC068

5. Check refrigerant temperature switch

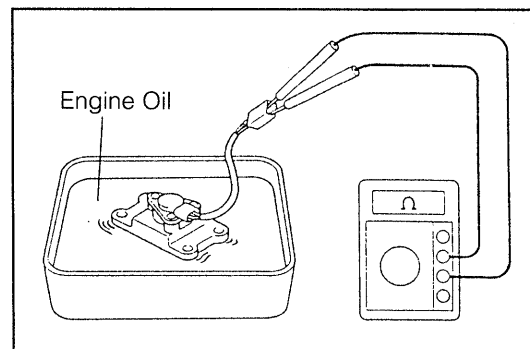
(1) Check refrigerant temperature switch operation.

Oil Temperature	—
~ 120°C (248°F)	Continuity
180°C (356°F) ~	No continuity

If operation is not as specified, replace the switch.

NOTE:

- After inspection, thoroughly clean the switch before assembly.

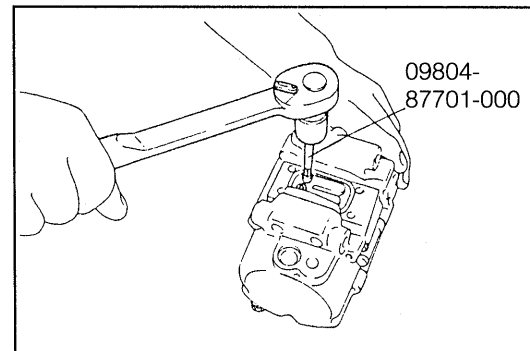


WRU92-AC152

6. Removal of the discharge valve

(1) Remove the two bolts and the discharge valve, using the following SST.

SST: 09804-87701-000



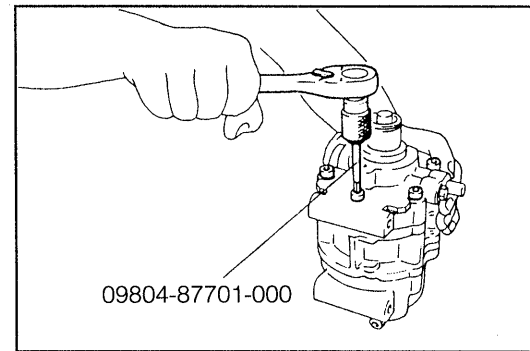
WRU90-AC070

7. Removal of the front housing

(1) Remove the five through bolts, using the following SST.

SST: 09804-87701-000

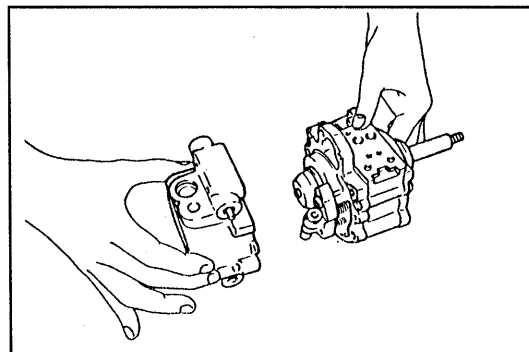
(2) Remove front housing



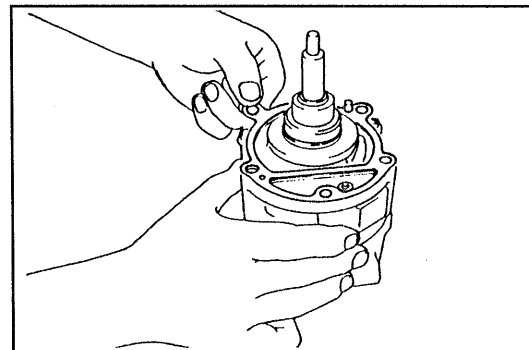
WRU90-AC071

AIR CONDITIONING SYSTEM

8. Remove the rear housing.

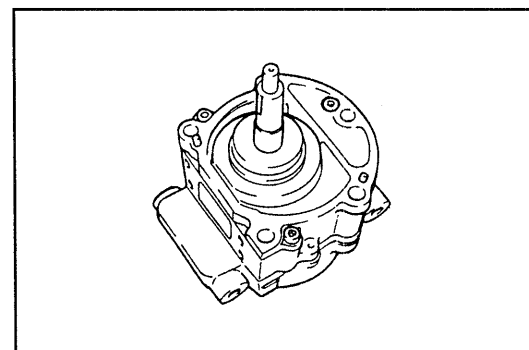


9. Remove the gasket.

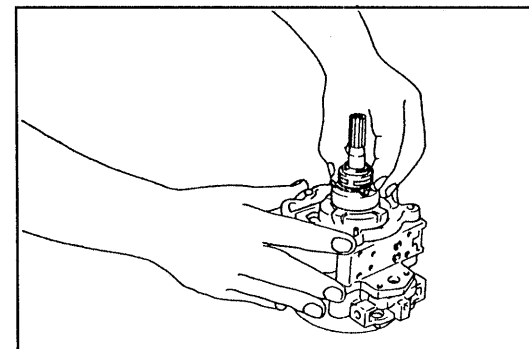


CAUTION:

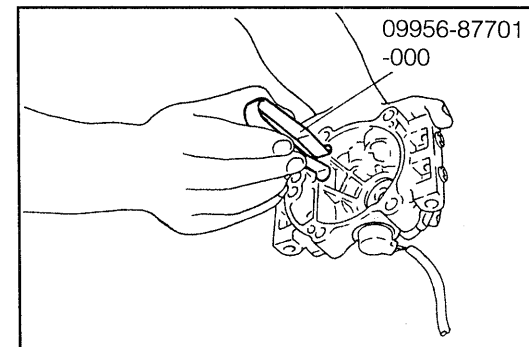
- Do not disassemble pump subassembly.



10. Remove the shaft seal from shaft.

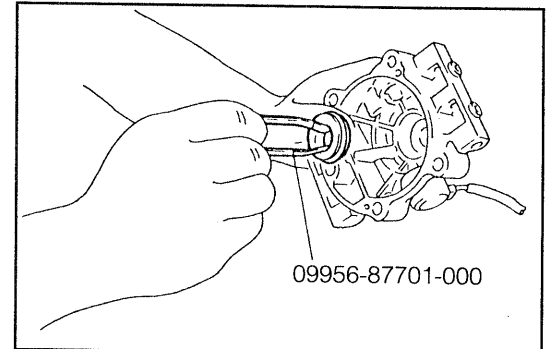


11. Removal of the seal plate
(1) Set SST on the seal plate.
SST: 09956-87701-000



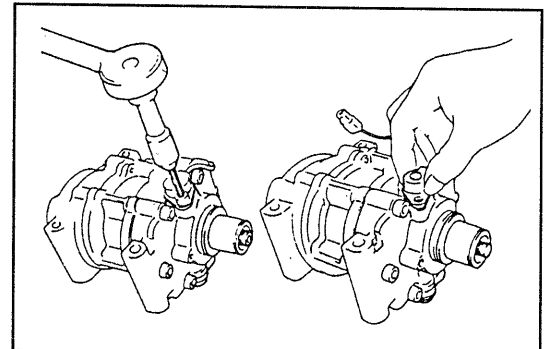
- (2) Pull the seal plate out of the front housing, using the following SST.

SST: 09956-87701-000



WRU90-AC077

12. Removal of the revolution detecting sensor.
 - (1) Remove the bolt
 - (2) Remove the revolution detecting sensor.

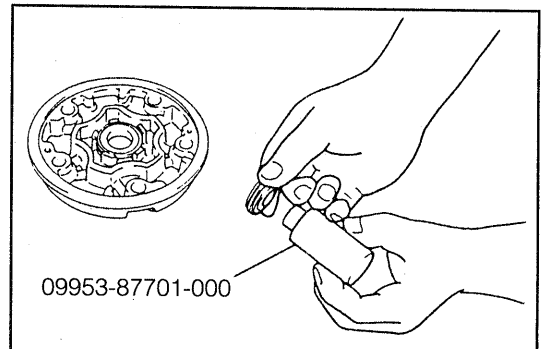


WRU90-AC078

ASSEMBLY

1. Install new seal plate if seal plate was removed.
 - (1) Fit new seal plate on SST.

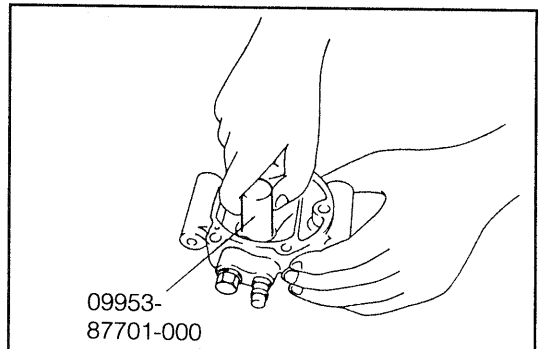
SST: 09953-87701-000



WRU90-AC079

- (2) Install the seal plate, using the following SST.

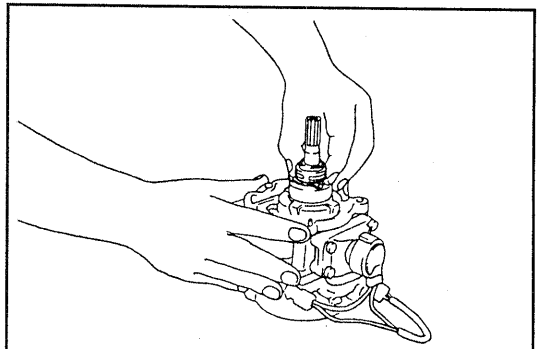
SST: 09953-87701-000



WRU90-AC080

2. Install the shaft seal.

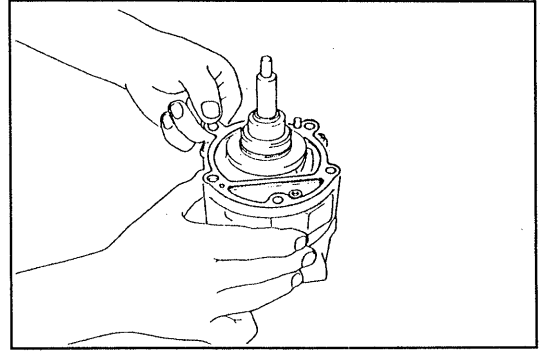
Lubricate shaft seal with compressor oil. Fit the shaft seal on the shaft.



WRU90-AC081

AIR CONDITIONING SYSTEM

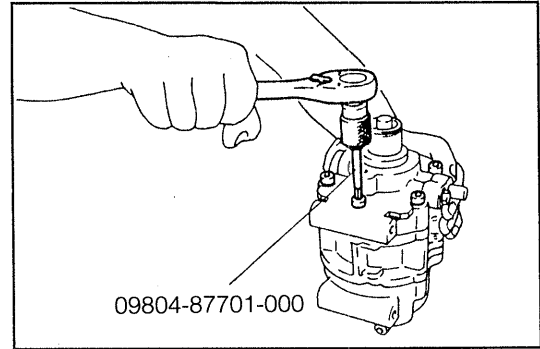
3. Install the pins and gasket on pump subassembly.
4. Fit the front and rear housings on pump subassembly.



WRU90-AC082

5. Installation of the five through bolts
 - (1) Tighten the five through bolts loosely, using the following SST.

SST: 09804-87701-000



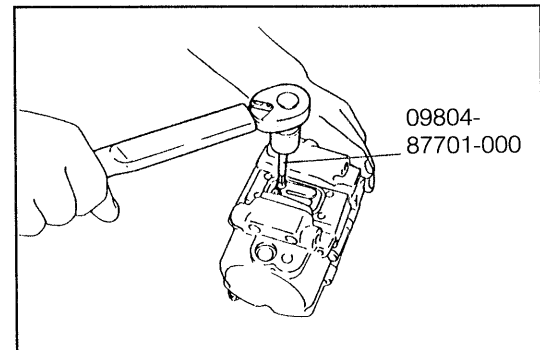
09804-87701-000

WRU90-AC083

6. Installation of the discharge valves
 - (1) Using a torque wrench and SST, gradually tighten the two bolts.

SST: 09804-87701-000

Tightening Torque: 0.47 kg-m (3.4 ft-lb, 4.6 N-m)

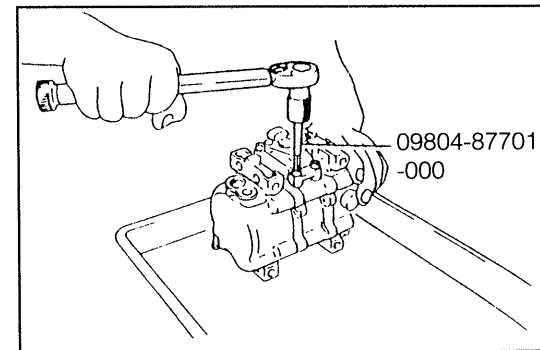


09804-87701-000

WRU92-AC153

7. Installation of the discharge cover
 - (1) Tighten the four bolts loosely, using the following SST.

SST: 09804-87701-000

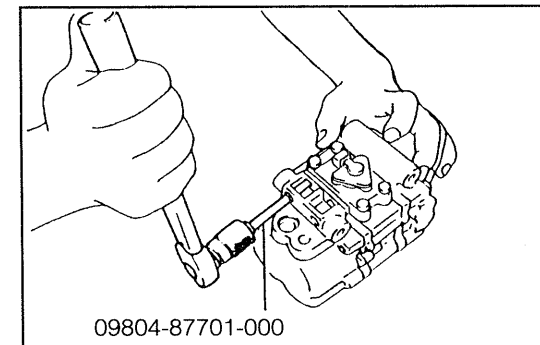


09804-87701-000

WRU90-AC085

- (2) Tighten the two through bolts, using the following SST.

SST: 09804-87701-000



09804-87701-000

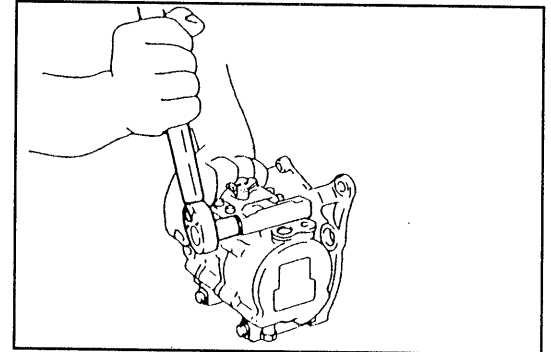
WRU90-AC086

8. Installation of the compressor to compressor bracket
Attach the compressor to the compressor bracket with four bolts.

Tightening Torque: 2.6 kg-m (18.7 ft-lb, 25.5 N-m)

CAUTION:

- Be sure to use the compressor bracket for assembling. Otherwise, correct compressor alignment cannot be obtained, causing compressor lock.

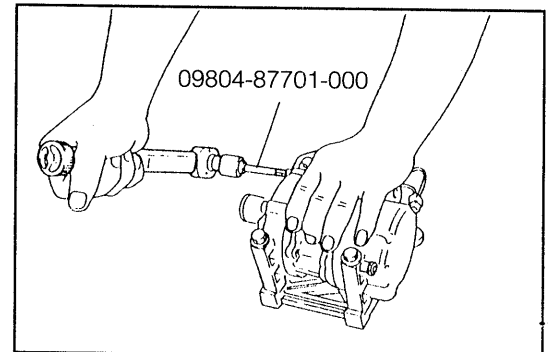


WRU90-AC087

9. Tighten the through bolts.
Using a torque wrench and SST, tighten the five through bolts.

SST: 09804-87701-000

Tightening Torque: 2.6 kg-m (18.7 ft-lb, 25.5 N-m)

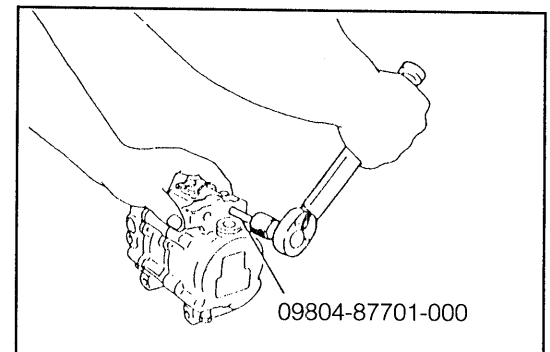


WRU90-AC088

10. Tightening of the two through bolts
(1) Remove the compressor from the compressor bracket.
(2) Using a torque wrench and SST, tighten the two through bolts.

SST: 09804-87701-000

Tightening Torque: 1.1 kg-m (7.9 ft-lb, 10.8 N-m)

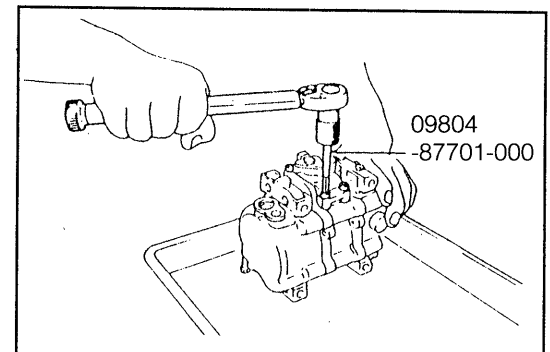


WRU90-AC089

11. Tighten bolts of discharge cover.
Using a torque wrench and SST, tighten the four bolts.

SST: 09804-87701-000

Tightening Torque: 1.1 kg-m (7.9 ft-lb, 10.8 N-m)

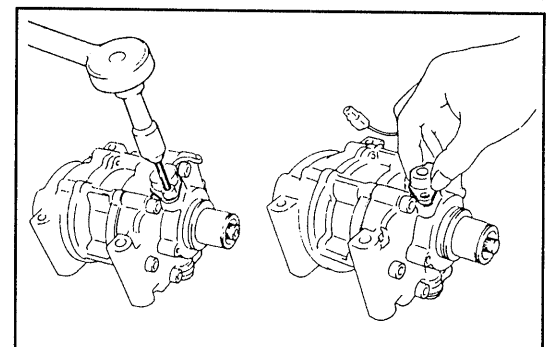


WRU90-AC090

12. Install revolution detecting sensor.
Using a torque wrench and SST, tighten the bolt.

SST: 09804-87701-000

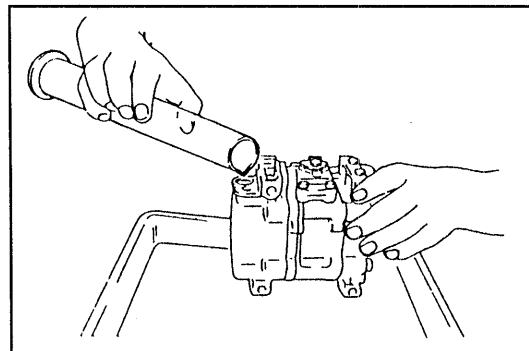
Tightening Torque: 1.1 kg-m (7.9 ft-lb, 10.8 N-m)



WRU90-AC091

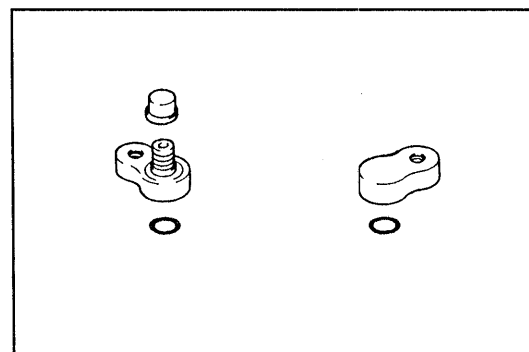
AIR CONDITIONING SYSTEM

13. Pour compressor oil into compressor
Compressor oil: DENSO OIL 7
(1) Add the same quantity plus 20 cc of oil into compressor.



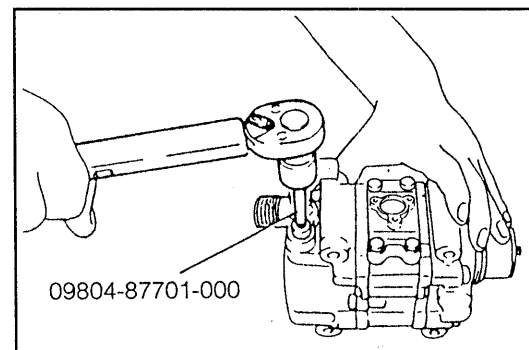
WRU90-AC092

14. Installation of the discharge and suction service valves
(1) Lubricate new O-rings with compressor oil. Install the O-rings in the service valves.



WRU90-AC093

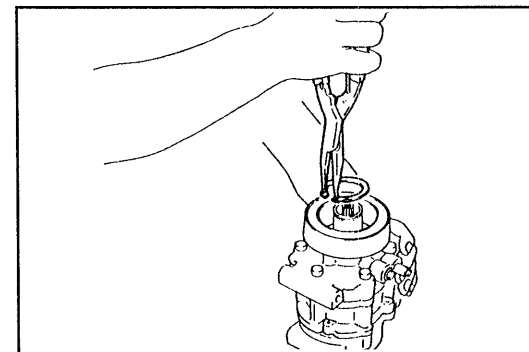
- (2) Install the service valves on the compressor. Using a torque wrench and SST, tighten the bolts.
SST: 09804-87701-000
Tightening Torque: 1.25 kg-m (9.0 ft-lb, 12.3 N-m)



WRU90-AC094

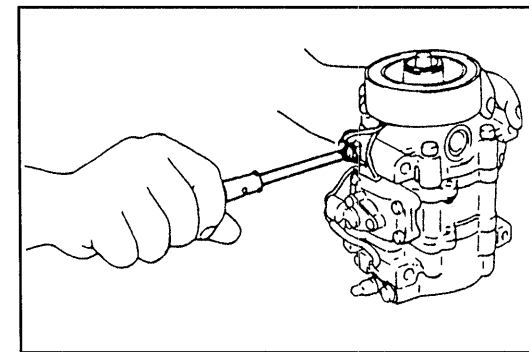
ASSEMBLY OF MAGNETIC CLUTCH

1. Installation of the stator
(1) Install the stator on the compressor.
(2) Using the snap ring plier, install the snap ring.



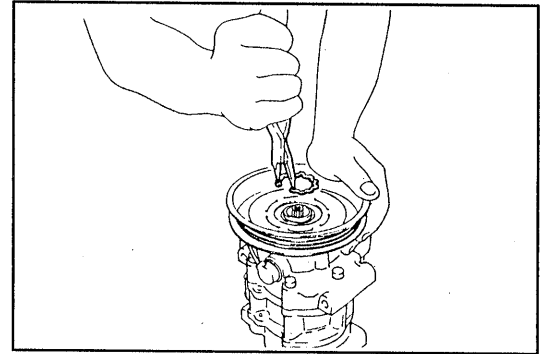
WRU90-AC095

- (3) Connect the stator lead wires to the compressor housing.



WRU90-AC096

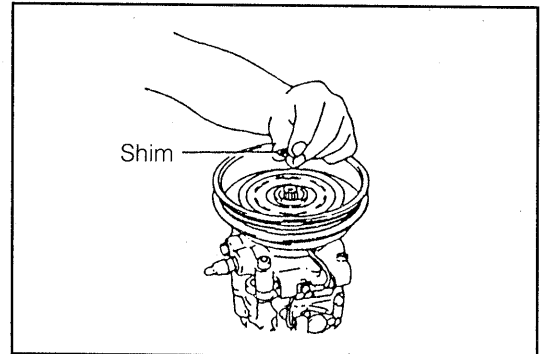
2. Installation of the rotor
 - (1) Install the rotor on the compressor shaft.
 - (2) Using the snap ring plier, install the snap ring.



WRU90-AC097

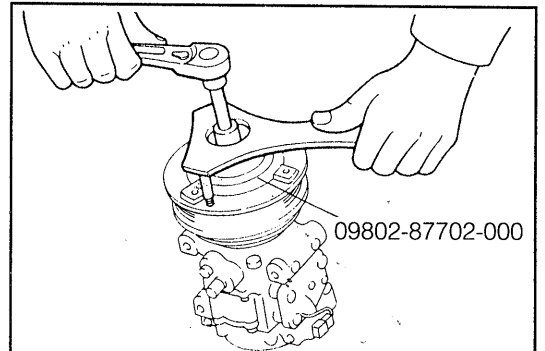
3. Installation of the pressure plate
 - (1) Adjust the clearance between the pressure plate and rotor by putting shims on the compressor shaft.
Standard Clearance: $0.5 \pm 0.15 \text{ mm}$
 $(0.020 \pm 0.006 \text{ inch})$

If the clearance is not with tolerance, and or reduce the number of shims to obtain the standard clearance.



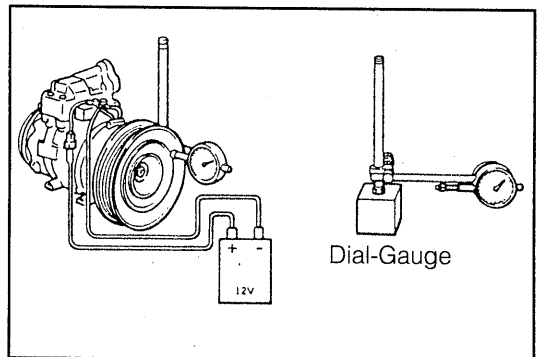
WRU90-AC098

- (2) Using SST and torque wrench, install the shaft nut.
SST: 09802-87702-000
Tightening Torque: 1.4 kg-m (10.1 ft-lb, 13.7 N-m)



WRU90-AC099

4. Check clearance of magnetic clutch
 - (1) Set the dial-gauge to the pressure plate of the magnetic clutch.
 - (2) Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.
 - (3) Check the clearance between the pressure plate and rotor, when connect the negative (-) terminal of the battery, using the standard tool of feeler gauge.
Standard Clearance: $0.5 \pm 0.15 \text{ mm}$
 $(0.020 \pm 0.006 \text{ inch})$



WRU90-AC100

If the clearance is not within standard clearance adjust the clearance using shims to obtain the standard clearance.

PERFORMANCE TEST

1. Perform gas leakage test
 - (1) Install the inspection service valve on the service valve.

NOTE:

- Use only the specified service valve for the perform gas leakage test.

Thread Specification: Suction side 7/6-20 UNF
 Discharge side 3/8-24 UNF

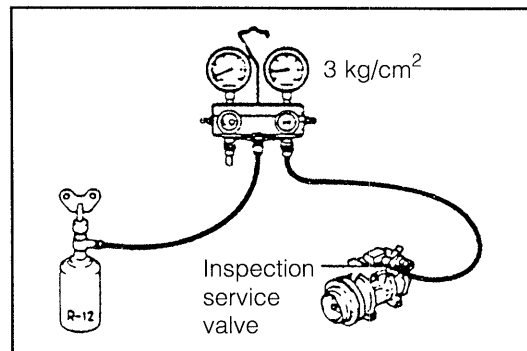
- (2) Charge the compressor with refrigerant through the charge valve until the pressure is 3 kg/cm^2 (43 psi).
 - (3) Using gas leak detector, check the compressor for leaks.

If leaks are found, check and replace the gasket, O-ring or shaft seal.

2. Evacuate compressor and charge with refrigerant
Make sure the caps are tight and free from the moisture and contamination.

NOTE:

- When storing a compressor for an extended period, charge the compressor with refrigerant or dry nitrogen gas to prevent corrosion.



WRU90-AC101

WRU90-AC102

INSTALLATION

1. Connect the discharge hose to the compressor service valve.

Tightening Torque: 2.5 kg-m (18.0 ft-lb, 24.5 N-m)

2. Install the compressor together with the heat resistance cover with mounting bolts.

Tightening Torque: 2.5 kg-m (18.0 ft-lb, 24.5 N-m)

3. Installation of the drive belt

(1) Adjust installing the drive belt, check that it fits properly in the ribbed grooves.

(2) Tighten the belt with adjusting bolts.

4. Check drive belt tension

Using a belt tension gauge, check the drive belt tension.

Belt Tension Gauge:

Nippondenso BTG-20(95506-00020) or

Burroughs No. BT-33-73F

Drive Belt Tension:

New belt 75 ± 12 kg (165 ± 26 lb)

Used belt 60 ± 10 kg (132 ± 22 lb)

NOTE:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

5. Make sure that drive belt is installed correctly.

After installing the drive belt, check that it fits properly in the ribbed grooves.

6. Connect the discharge hose to condenser inlet fitting.

Tightening Torque: 2.30 kg-m (16.6 ft-lbs, 22.6 N-m)

7. Connect the suction hose to the compressor service valve.

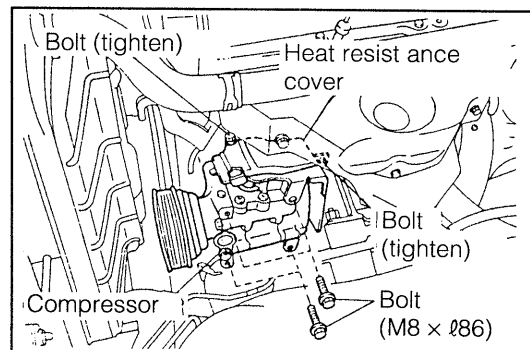
Tightening Torque: 2.50 kg-m (18.0 ft-lbs, 24.5 N-m)

8. Connect the compressor lead wire to wiring harness.

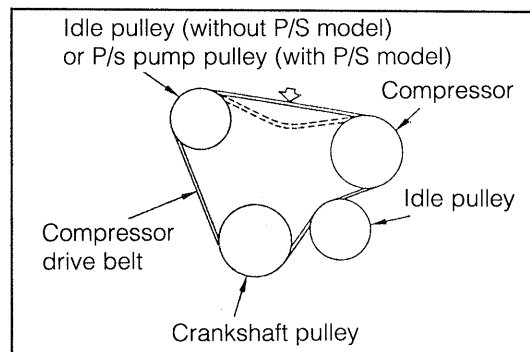
9. Install the air cleaner & duct and the front grille.

10. Connect the negative cable to battery.

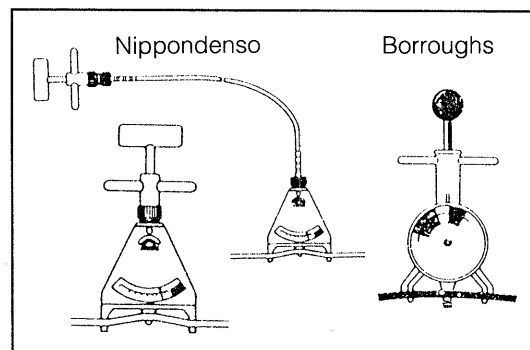
11. Evacuate and charge refrigerant system.



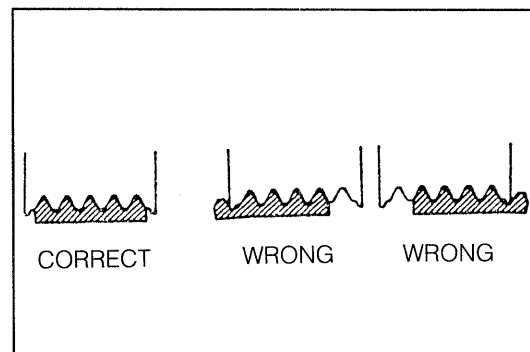
WRU92-AC154



WRU90-AC104



WRU90-AC105



WRU90-AC106

CONDENSER

IN-VEHICLE INSPECTION

1. Check condenser fins for blockage or damage.
If the fins are clogged, wash them with water and dry with compressed air.

CAUTION:

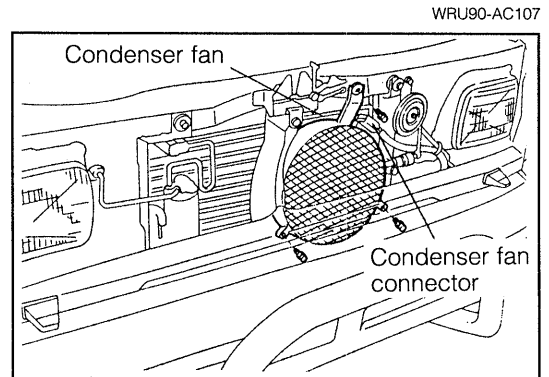
- Be careful not to damage the fins.

If the fins are bent, straighten them with a screwdriver or pliers.

2. Check condenser fittings for leakage.
Repair as necessary.

REMOVAL

1. Discharge refrigeration system.
2. Disconnect negative cable from battery.
3. Remove front grille, hood lock and center brace.
4. Disconnect the connector for condenser fan motor.
5. Remove the condenser fan.
6. Disconnect the discharge hose from condenser inlet fitting.



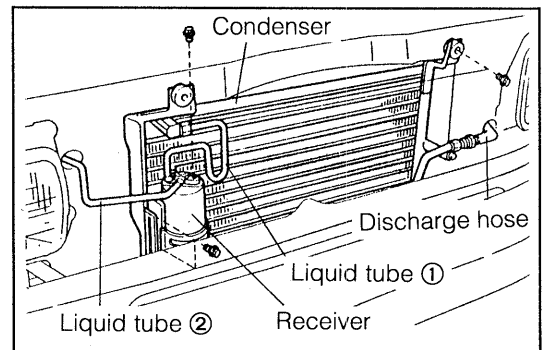
WRU90-AC107

7. Disconnect the liquid tube ② from receiver and from liquid tube ①.

NOTE:

- Cap the open fittings immediately to keep moisture out of the system.

8. Disconnect the liquid tube ① from condenser outlet fitting and remove the receiver from the condenser.
9. Remove the condenser.



WRU90-AC108

WRU92-AC155

INSTALLATION

1. Installation of the condenser
Install the two bolts making sure the rubber cushions fit on the mounting flanges correctly.
2. Install the receiver with bracket to the condenser.
3. Connect the liquid tube and discharge hose to condenser.

Tightening Torques:

Receiver	0.55 kg-m (4.0 ft-lb, 5.4 N-m)
Liquid tube	1.40 kg-m (10.1 ft-lb, 13.7 N-m)
Discharge hose	1.85 kg-m (13.3 ft-lb, 18.1 N-m)

4. Installation of the condenser fan.
5. Install the three bolts making sure the rubber cushions fit on the mounting flanges correctly.
6. Connect the connector to the condenser fan motor.
7. Install hood lock, center brace and front grille.
8. Connect negative cable to battery.
9. Connect negative cable to battery.
10. If condenser was replaced, add compressor oil to compressor.

Add 40 - 50 cc (1.4 - 1.7 fl.oz.)

11. Evacuate, charge and test refrigeration system

WRU92-AC156

RECEIVER

IN-VEHICLE INSPECTION

Check sight glass and fittings for leakage.

Use a gas leak detector. Repair as necessary.

WRU90-AC111

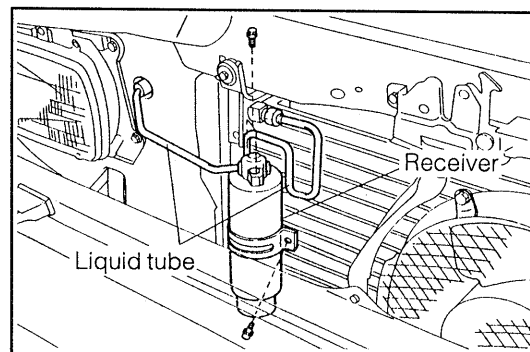
REMOVAL

1. Discharge the refrigeration system.
2. Remove the front grille and bumper.
3. Disconnect the two liquid tubes from receiver.

NOTE:

- Cap the open fittings immediately to keep moisture out of the system.

4. Remove the receiver from receiver holder.



WRU90-AC112

INSTALLATION

1. Install the receiver in receiver holder.

NOTE:

- Do not remove the blind plugs until ready for connection.

2. Connect the two liquid tubes to receiver.

Tightening Torque: 0.55 kg-m (4.0 ft-lb, 5.4 N·m)

3. Install the front grille and bumper.
4. If receiver was replaced, add compressor oil to compressor.

Add 20 cc (0.7 fl.oz.)

5. Evacuate, charge and test refrigeration system.

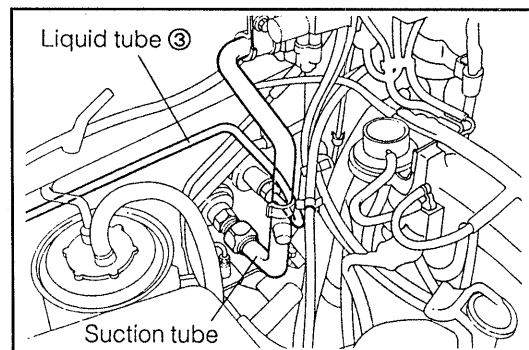
WRU90-AC113

COOLING UNIT

IN-VEHICLE INSPECTION OF EXPANSION VALVE

1. Check the quantity of gas during refrigeration cycle.
 2. Install the manifold gauge set.
 3. Run the engine.
Run the engine at 1,500 rpm for at least 5 minutes.
4. Check the expansion valve.
If the expansion valve is clogged, the low pressure reading will drop to 0 psi (0 kg/cm²), otherwise it is OK.

WRU90-AC114

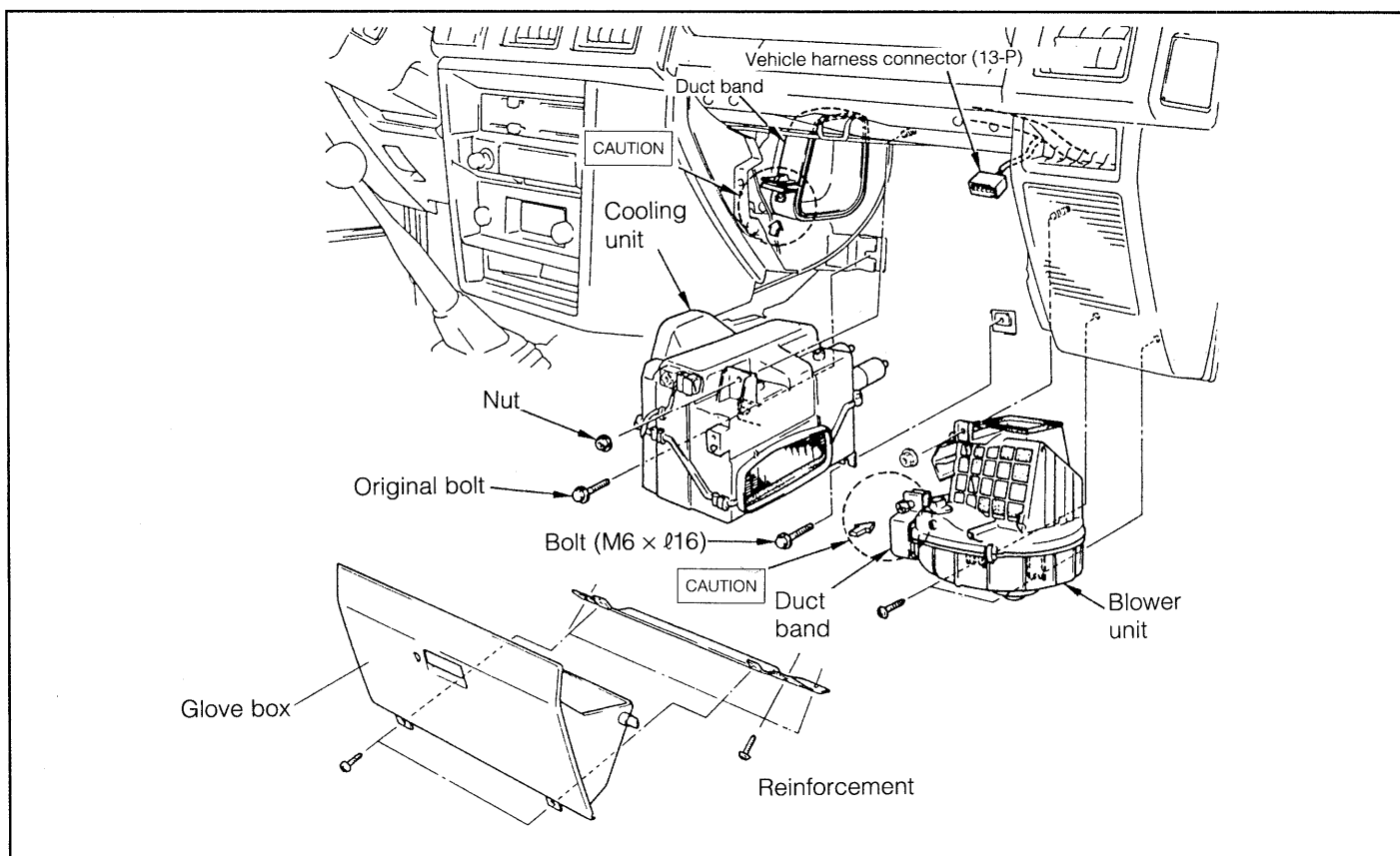


WRU90-AC115

REMOVAL

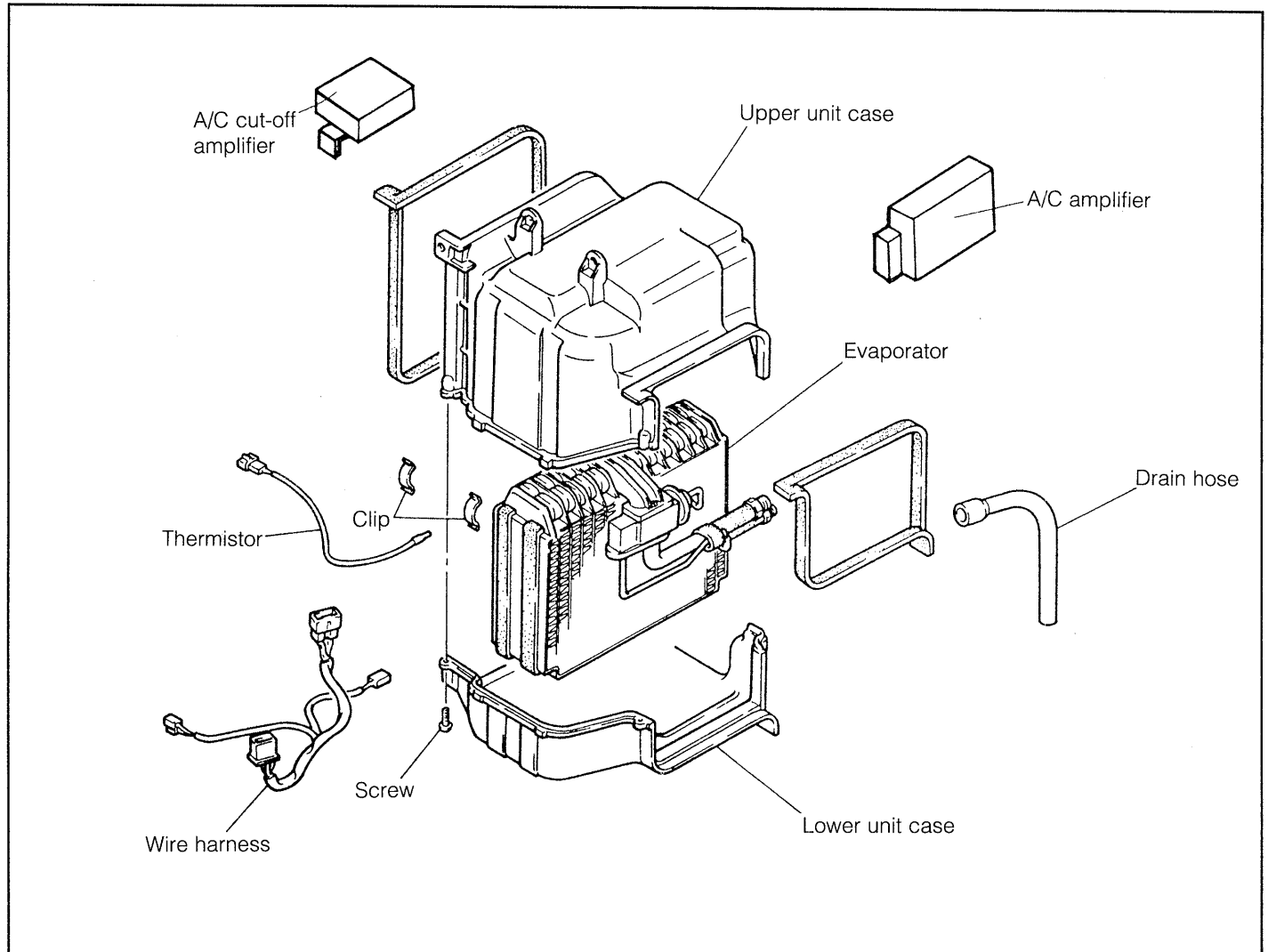
1. Disconnect negative cable from battery.
 2. Discharge refrigeration system.
 3. Disconnect suction tube from cooling unit outlet fitting.
 4. Disconnect liquid tube from cooling unit inlet fitting.
- NOTE:**
- Cap the open fittings immediately to keep moisture out of the system.
5. Remove grommets from inlet and outlet fittings.
 6. Remove the glove box, reinforcement and blower unit.
 7. Disconnect the unit harness connector.
 8. Remove the cooling unit.

WRU90-AC116



WRU90-AC117

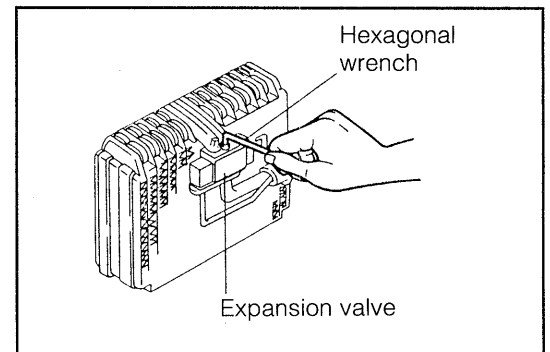
COMPONENTS



WRU90-AC118

DISASSEMBLY

1. Removal of the lower and upper cases
 - (1) Remove wire harness.
 - (2) Remove A/C amplifier and A/C cut-off amplifier.
 - (3) Remove three screws and clips.
 - (4) Remove upper unit case.
 - (5) Remove lower unit case.
2. Removal of expansion valve
 - (1) Remove of expansion valve from evaporator.



WRU90-AC119

EVAPORATOR

INSPECTION

1. Check evaporator fins for blockage.
If the fins are clogged, clean them with compressed air.

CAUTION:

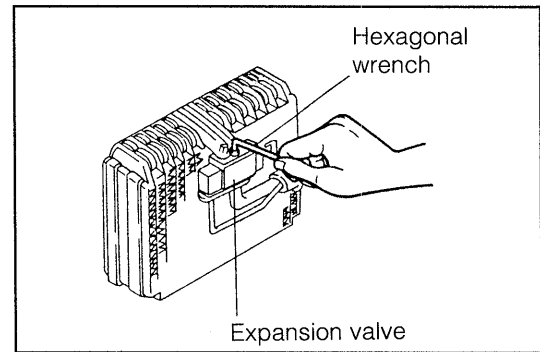
- Never use water to clean the evaporator.

2. Check fittings for cracks or scratches.
Repair as necessary.

ASSEMBLY

1. Installation of the components on evaporator.
 - (1) Install the expansion valve to the evaporator.
Tightening Torque: 0.55 - kg-m (4.0 ft-lb, 5.4 N-m)
 - (2) Install the lower unit case to the evaporator.
 - (3) Install the thermistor to the evaporator.
 - (4) Install the upper unit case.
 - (5) Install the three screws.
 - (6) Install three clips.
 - (7) Install the connector of thermistor.
 - (8) Install the A/C amplifier and A/C cut-off amplifier.
 - (9) Connect the wire harness.

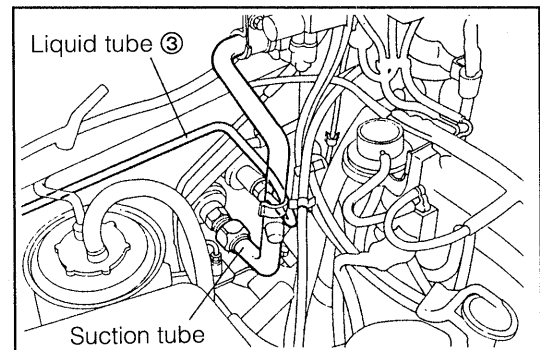
WRU90-AC120



WRU92-AC157

INSTALLATION

1. Install the cooling unit.
Install the cooling unit with two bolts and nut.
2. Connect the connectors.
3. Install glove box, under cover and reinforcement.
4. Install grommets on inlet and outlet fittings.
5. Connect liquid tube to cooling unit inlet fittings.
Torque the nut.
Tightening Torque: 1.4 kg-m (10.1 ft-lb, 13.7 N-m)
6. Connect suction tube to cooling unit outlet fitting.
Torque the nut
Tightening Torque: 2.3 kg-m (16.6 ft-lb, 22.6 N-m)
7. If evaporator was replaced, add compressor oil to compressor.
Add 40 - 50 cc (1.4 - 1.7 fl.oz.)
8. Connect negative cable to battery.
9. Evacuate, charge and test refrigeration system.



WRU90-AC122

REFRIGERANT LINES

IN-VEHICLE INSPECTION

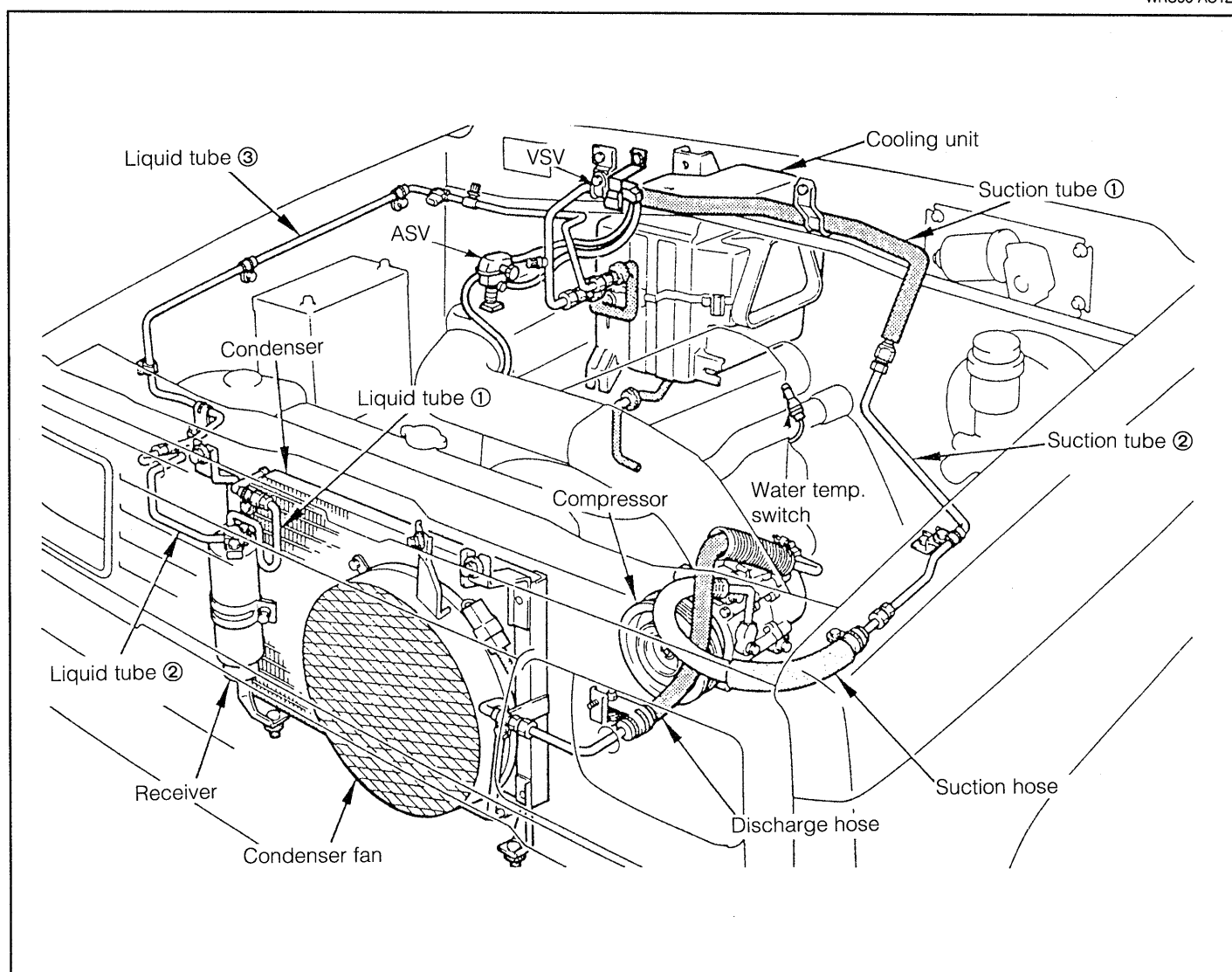
1. Inspect hoses and tubes for leakage.
Use a gas leak detector. Replace if necessary.
2. Check that hose and tube clamps are not loose.
Tighten or replace, as necessary.

WRU90-AC123

REPLACEMENT

1. Discharge refrigeration system.
 2. Replace faulty tube or hose.
- NOTE:**
- Cap the open fittings immediately to keep moisture out of the system.
3. Tightening torque for "O"-ring and bolted type fittings.
 4. Evacuate charge and test refrigeration system.

WRU90-AC124



WRU90-AC125

THERMISTOR

REMOVAL AND INSPECTION

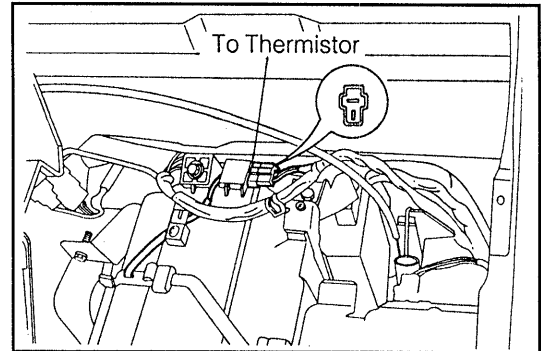
1. Disconnect the negative cable from battery.
2. Remove the glove box, and glove box reinforcement.
3. Check the thermistor installed operation.
Using an ohmmeter, measure the resistance between the terminals 1 and 2.

Resistance: $1,500\ \Omega$ at 25°C (77°F)

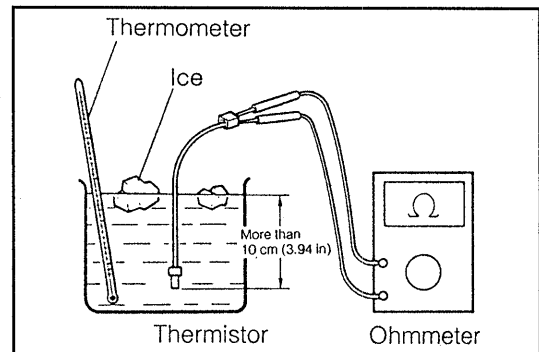
4. Removal of the thermistor
 - (1) Remove the cooling unit.
 - (2) Disassembly the cooling unit and remove thermistor.
5. Check the thermistor operation.
 - (1) Place the thermistor in cold water. While varying the temperature of the water, measure the resistance at the connector and, at the same time, measure the temperature of the water with a thermometer.
 - (2) Compare the two readings on the chart.
If the intersection is not between the two lines, replace the thermistor.

INSTALLATION

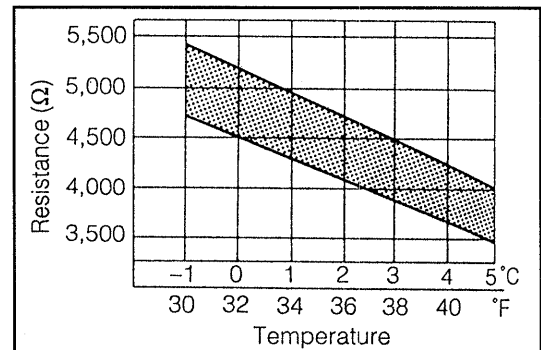
1. Installation of the thermistor
 - (1) Install thermistor and assemble the cooling unit.
 - (2) Install the cooling unit.
2. Install the glove box, and glove box reinforcement.
3. Connect the negative cable to battery.



WRU90-AC126



WRU90-AC127



WRU90-AC128

DUAL PRESSURE SWITCH

INSPECTION OF DUAL PRESSURE SWITCH

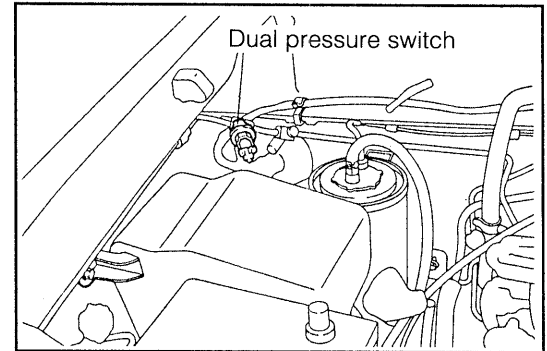
1. Disconnect negative cable from battery.
2. Check the refrigerant pressure
 - (1) Connect the hoses of the manifold gauge set to the service valves and observe the gauge reading.
 - (2) The gauge reading must be more than 0.21 kg-m (3.0 psi), when the ambient temperature is higher than 0°C (32°F).

If the pressure is less than 2.1 kg/cm² (30 psi), charge the refrigerant.

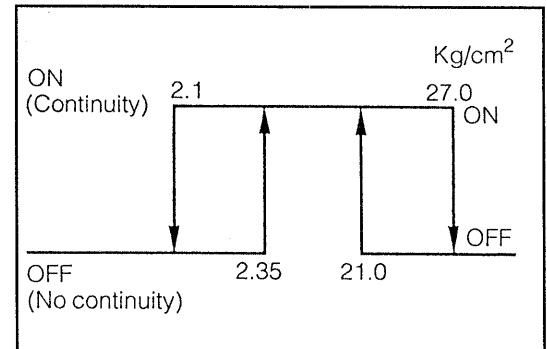
3. Check the dual pressure switch
 - (1) Observe the gauge reading.
 - (2) Check the continuity between the two terminals of the dual pressure switch.

If the gauge pressure is between 30 - 38 psi, the dual pressure switch should have continuity. If it does not, replace the dual pressure switch.

4. Removal of the dual pressure switch
 - (1) Disconnect the connector.
 - (2) Remove the dual pressure switch.
5. Connect the negative cable to battery.



WRU90-AC129



WRU90-AC130

A/C SWITCH

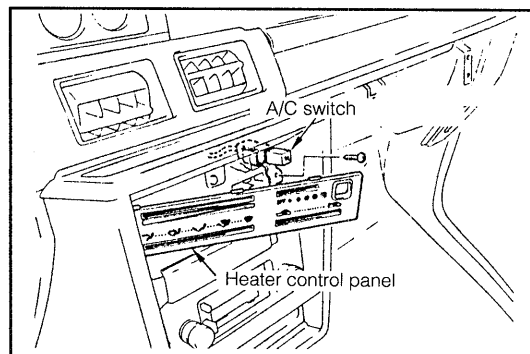
IN-VEHICLE INSPECTION

1. Disconnect the negative cable from battery.
2. Remove the A/C switch.
Remove one tapping screw.
3. Disconnect the A/C switch connector.
4. Check the A/C switch for continuity.
Inspect the switch continuity between terminals.

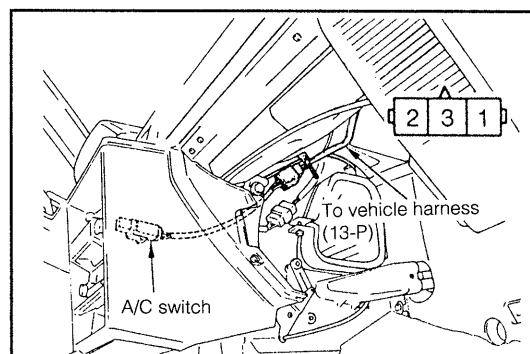
Switch position \ Terminal	1	2	3
ON		○	○
OFF	○	○	○

If continuity is not as specified, replace the switch.

5. Check the indicator lamp operation
When applying battery voltage between terminals 1 and 2
check that the indicator light light.
6. Connect the A/C switch connector.
7. Install the A/C switch.
8. Install one tapping screw.
9. Connect the negative cable to battery.



WRU90-AC131

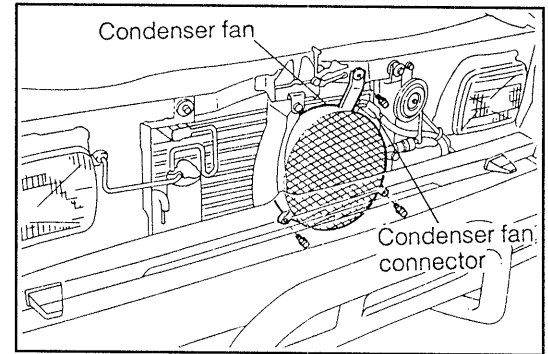


WRU90-AC132

CONDENSER FAN MOTOR

INSPECTION OF CONDENSER FAN MOTOR

1. Disconnect the negative cable from battery.
 2. Disconnect the connector of fan motor.
 3. Check fan motor
 - (1) Apply 12V battery voltage to the connector using the wire harness.
 - (2) Confirm smooth rotation of the motor within the specified current flow.
- Standard Current: 6.7 ± 0.7 A
 (Motor Revolution: $2,700 \pm 300$ rpm)



WRU90-AC133

If defective, replace the motor.

4. Connect the connector of fan motor.
5. Connect the negative cable to battery.

CONDENSER FAN RELAY

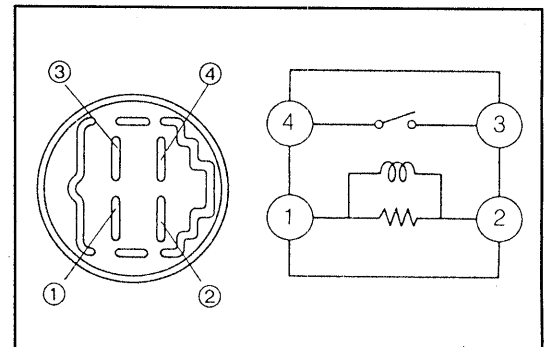
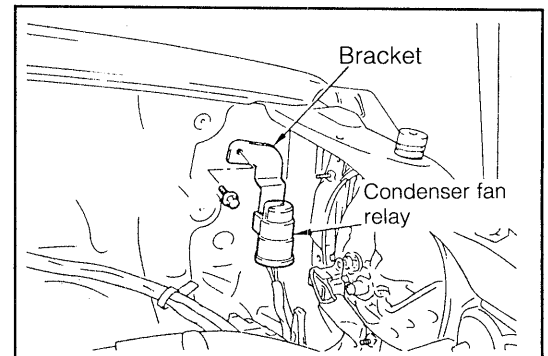
INSPECTION

Inspect relay continuity.

○—○ Continuity exists.

Terminal	1	2	3	4
Condition	○—○	○—○		
Apply battery voltage to terminal 1 and 2			○—○	○—○

If continuity is not as specified, replace the relay.



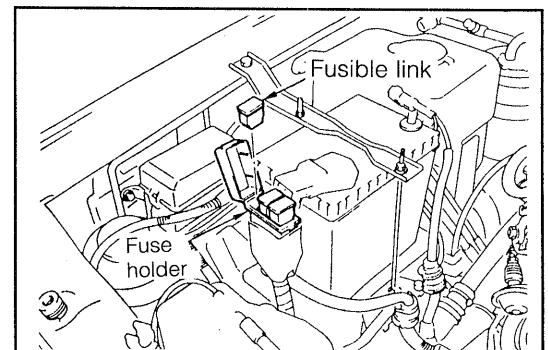
WRU90-AC134

FUSIBLE LINK

INSPECTION OF FUSIBLE LINK

1. Disconnect the negative cable from battery.
2. Disconnect the fusible link.
3. Check the fusible link for continuity.

Using an ohmmeter, check continuity of the fusible link. If there is no continuity, replace the fusible link.
4. Connect the fusible link.
5. Connect the negative cable to battery.



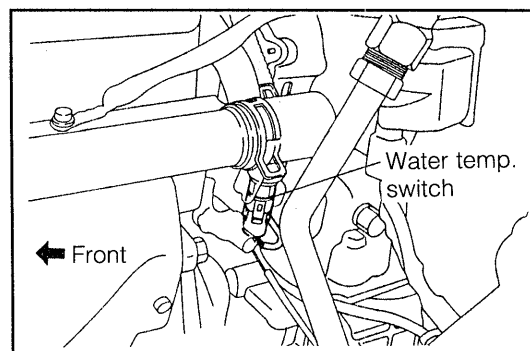
WRU90-AC135

WATER TEMPERATURE SWITCH

INSPECTION

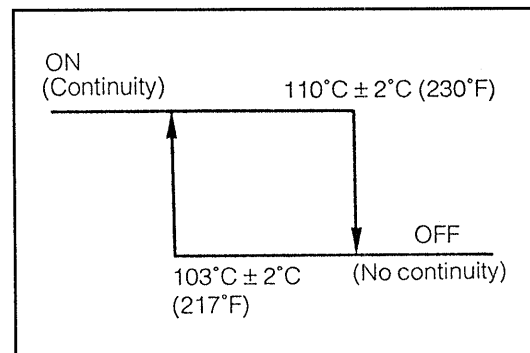
Inspect switch continuity.

Inspect the switch continuity between each terminal at each water temperature.



WRU90-AC136

If defective, replace the water temperature switch.



WRU90-AC137

AIR CONDITIONER AMPLIFIER

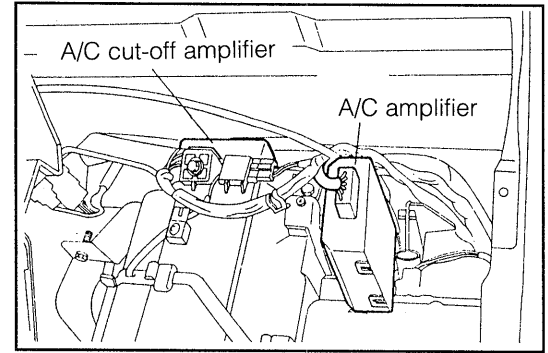
INSPECTION

Inspect the amplifier circuit.

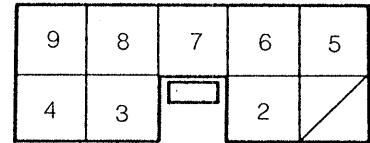
Disconnect the amplifier and inspect the connector on the wire harness side as shown in the chart below.

Test conditions:

- (1) Ignition switch: ON
- (2) Temperature control lever: MAX COOL
- (3) Blower switch: HI



Wire harness side
Without power steering model

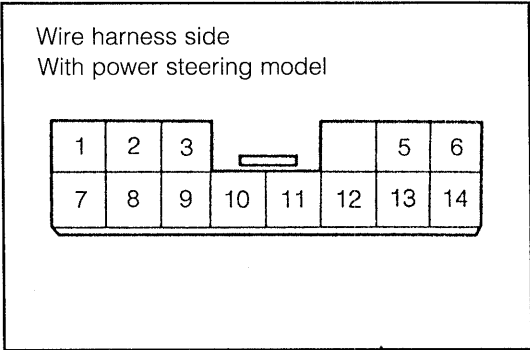


WRU90-AC138

Without power steering model

Check for	Tester Connection	Condition	Specified Value
Voltage	5 - Ground	Start the engine	Approx. 10 to 14 V
		Stop the engine	No voltage
	2 - Ground	A/C switch on	Battery voltage
		A/C switch off	No voltage
Continuity	6 - Ground	Constant	Continuity
Resistance	4 - 3	Constant	37 - 44 Ω at 20°C (68°F)
	7 - Ground	Constant	3.4 - 3.8 Ω at 20°C (68°F)
	6 - 8	Constant	Approx. 1.5 k Ω at 25°C (77°F)
	6 - 9	Constant	

WRU90-AC139



WRU90-AC140

With power steering model

Check for	Test Connection	Condition	Specified Value
Voltage	1 - Ground	Start the engine	Approx. 10 to 14 V
		Stop the engine	No voltage
	2 - Ground (Fan on)	A/C switch on	Battery voltage
		A/C switch off	No voltage
	8 - Ground (Fan on)	A/C switch on	Battery voltage
		A/C switch off	No voltage
	12 - Ground (Fan on)	A/C switch on	Battery voltage
		A/C switch off	No voltage
Continuity	11 - Ground	Constant	Continuity
Resistance	10 - 13	Constant	Approx. 1.5 kΩ at 25°C (77°F)
	10 - 14	Constant	
	7 - 10	Constant	200 - 260 Ω at 20°C (68°F)
	5 - 9	Constant	33 - 44 Ω at 20°C (68°F)
	3 - Ground	Constant	3.4 - 3.8 Ω at 20°C (68°F)
	6 - Ground	Constant	

WRU90-AC141

AIR CONDITIONER CUT-OFF
AMPLIFIER

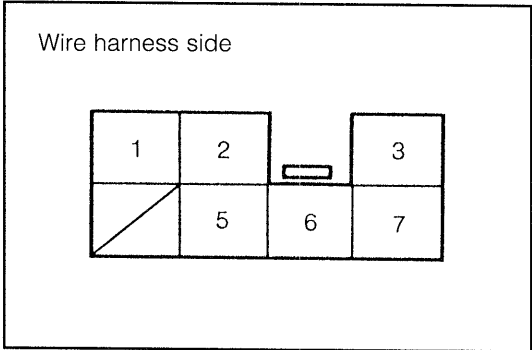
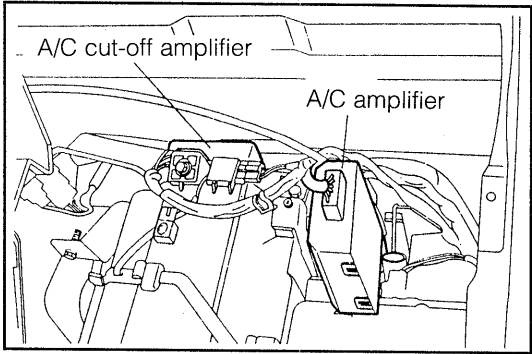
INSPECTION

Inspect the amplifier circuit.

Disconnect the amplifier and inspect the connector on the wire harness side as shown in the chart below.

Test conditions:

- (1) Ignition switch: ON
- (2) Temperature control lever: MAX COOL
- (3) Blower switch: HI



WRU90-AC142

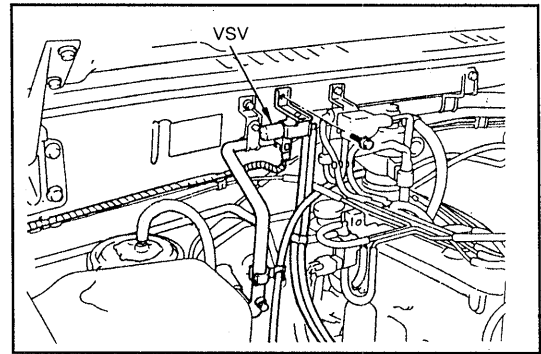
Check for	Test Connection	Condition	Specified Value
Voltage	3 - Ground (Fan on)	A/C switch on	Battery voltage
		A/C switch off	No voltage
	6 - Ground (Fan on)	A/C switch on	Battery voltage
		A/C switch off	No voltage
Continuity	2 - Ground	No depress of acceleration pedal	No continuity
		Depress the acceleration pedal fully	Continuity
	1 - Ground	Water temp. 110°C or less	Continuity
		Water temp. 110°C or more	No continuity
	5 - Ground	Constant	Continuity

WRU90-AC143

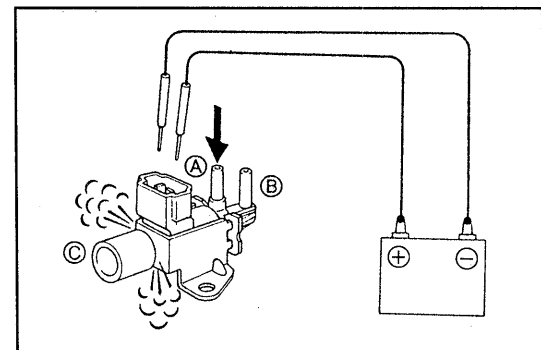
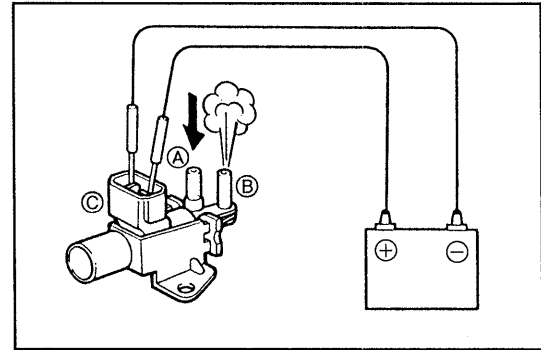
VACUUM SWITCHING VALVE (VSV)

INSPECTION

1. Check vacuum circuit continuity in VSV by blowing air into pipes
 - (1) Connect the VSV terminals to the battery terminals as illustrated.
 - (2) Blow into pipe "F" and check that air comes out of pipe "E".
 - (3) Disconnect the battery.
 - (4) Blow into pipe "F" and check that air comes out of filter "G".
 If a problem is found, replace the VSV.

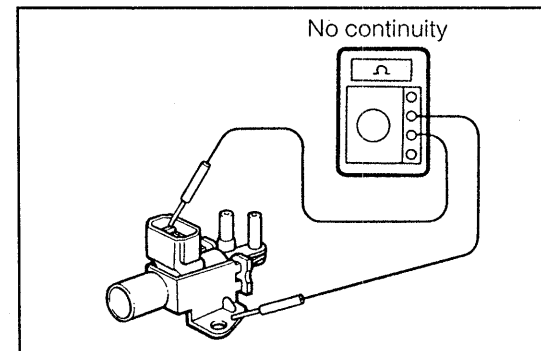


WRU90-AC144



WRU90-AC145

2. Check for short circuit
Using an ohmmeter, check that there is no continuity between each terminal and the VSV body.
If there is continuity, replace the VSV.

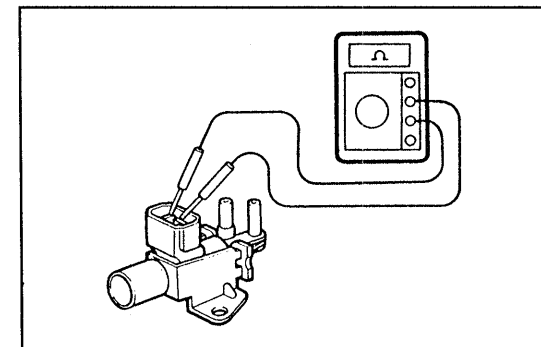


WRU90-AC146

3. Check for open circuit
Using an ohmmeter, measure the resistance between the two terminals.

Resistance: 37 - 44 Ω at 20°C (68°F)

If resistance is not as specified, replace the VSV.



WRU90-AC147

ADJUSTMENT OF ENGINE A/C RPM

Engine idle rpm should be adjusted by operating the air conditioner as described below:

- (1) Start engine and allow it to reach operating temperature before adjusting the idle RPM.
- (2) Check the initial ignition timing and initial idle RPM. Adjust as necessary.
- (3) Place the blower motor in the high position and turn off the head light.
- (4) Turn the air conditioner on.
- (5) With the engine running, remove the connector cap and install the Engine Control System Inspection Sub Harness (SST 09991-87702-000), then short the check terminal to the ground terminal.
- (6) Raise engine speed quickly to 2,000 RPM two or three times.

NOTE:

- Do not exceed 2,000 rpm.

- (7) Turn the A/C idle speed adjusting screw to adjust A/C idle speed.

A/C Idle Speed Specification: 1050 ± 50 rpm

- (8) Disconnect the check and ground terminals at the inspection sub harness and raise the engine speed to 2,000 RPM quickly two or three times, then verify that engine speed is within the specified RPM.

NOTE:

- Do not exceed 2,000 RPM
Idle Speed Specification: 1100 ± 50 rpm

Repeat Steps (e) thru (h) as necessary.

- (9) Remove the inspection sub harness from the check terminal, the reinstall the check terminal cap.

NOTE:

- The cut off revolution speed of the air conditioner amplifier has been already adjusted at the time when the product is shipped from the factory. Hence, never tamper the adjusting screw.

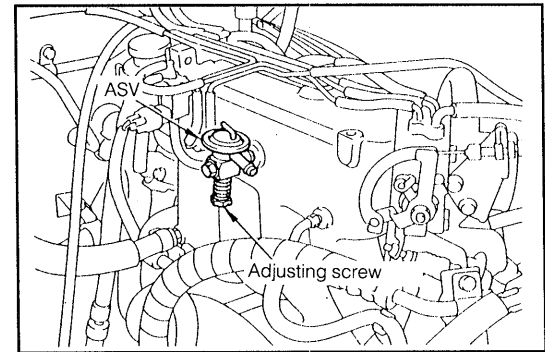
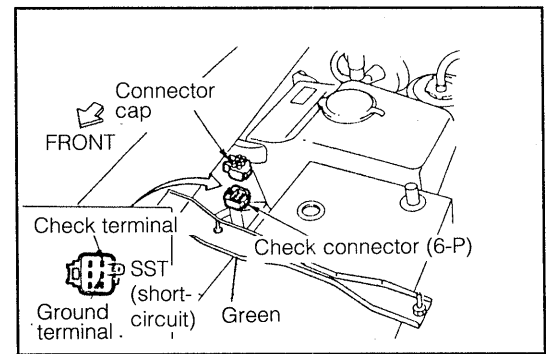
(Reference)

Cut Off Revolution Speed: 600 rpm

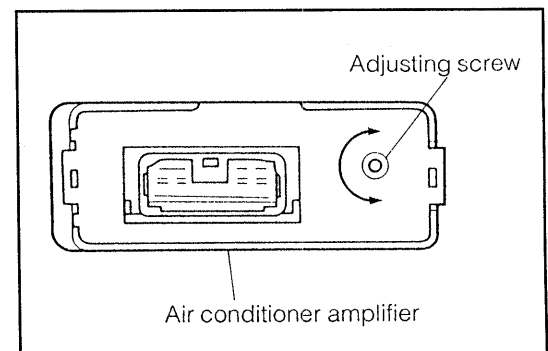
DRIVE BELT TENSION

CAUTION:

- The new compressor drive belt is given extra tension when installed because it will loosen after several minutes running. Recheck that its tension is within the standard specification after operation and performance test (five minutes or operation).



WRU90-AC148



WRU90-AC149

DAIHATSU

Rocky

BODY ELECTRICAL SYSTEM

1. COMBINATION METER	BE- 7	7. REAR WIPER & WASHER	BE- 60
1- 1. WIRING DIAGRAM	BE- 8	7-1. WIPER & WASHER SWITCH	BE- 61
1- 2. REMOVAL AND INSTALLATION	BE- 9	7-2. REAR WIPER MOTOR AND BLADE	BE- 62
1- 3. SPEEDOMETER	BE- 12	7-3. REAR WASHER TANK	BE- 66
1- 4. TACHO-METER	BE- 12	8. REAR WINDOW DEFOGGER	BE- 67
1- 5. GAUGES	BE- 13	8-1. DEFOGGER SWITCH	BE- 67
2. WARNING & INDICATOR	BE- 17	8-2. DEFOGGER WIRE	BE- 69
2- 1. WARNING & INDICATOR	BE- 17	9. HEADLAMP CLEANER	BE- 70
2- 2. HAZARD WARNING	BE- 18	9-1. CONTROL RELAY	BE- 71
2- 3. BRAKE WARNING	BE- 20	9-2. NOZZLE	BE- 73
2- 4. SEAT BELT WARNING	BE- 22	10. FRONT HEATER	BE- 75
2- 5. CHECK ENGINE WARNING	BE- 23	10-1. HEATER UNIT	BE- 75
2- 6. CHARGE WARNING	BE- 23	11. REAR HEATER	BE- 86
2- 7. OIL PRESSURE WARNING	BE- 23	11-1. REAR HEATER SWITCH	BE- 86
2- 8. O2 SENSOR WARNING	BE- 25	11-2. REAR HEATER RELAY	BE- 87
2- 9. 4WD INDICATOR LAMP	BE- 26	11-3. HEATER UNIT	BE- 88
2-10. DIFFERENTIAL LOCK INDICATOR LAMP	BE- 27	12. CIGARETTE LIGHTER	BE- 90
2-11. KEY REMINDER BUZZER	BE- 28	13. REMOTE CONTROL MIRROR	BE- 91
3. IGNITION KEY SWITCH	BE- 31	13-1. REMOTE CONTROL SWITCH	BE- 91
4. HORN	BE- 33	13-2. REMOTE CONTROL MOTOR	BE- 91
4- 1. HORN RELAY	BE- 34	14. POWER WINDOW	BE- 93
5. LIGHTING	BE- 35	14-1. CIRCUIT DIAGRAM	BE- 93
5- 1. TROUBLE SHOOTING	BE- 35	14-2. MASTER SWITCH (Driver's switch)	BE- 93
5- 2. WIRING DIAGRAM	BE- 36	14-3. WINDOW SWITCH (Passenger's switch)	BE- 94
5- 3. MULTI-USE LEVER SWITCH	BE- 37	15. POWER FRONT DOOR LOCK	BE- 95
5- 4. LAMP CONTROL RELAY	BE- 42	15-1. DOOR LOCK CONTROL MOTOR (Passenger side door)	BE- 95
5- 5. STOP LAMP SWITCH	BE- 43	15-2. DOOR LOCK CONTROL SWITCH (Driver side door)	BE- 96
5- 6. HEADLAMP	BE- 44	15-3. DOOR LOCK CONTROL RELAY	BE- 96
5- 7. HEADLAMP RELAY	BE- 45	16. BACK DOOR OPENER	BE- 97
5- 8. FRONT TURN AND CLEARANCE LAMPS	BE- 46	16-1. BACK DOOR OPENER SWITCH	BE- 97
5- 9. REAR COMBINATION LAMPS	BE- 46	17. INCLINOMETER	BE- 99
5-10. FRONT AND REAR SIDE MARKER LAMPS	BE- 47	18. VOLTMETER	BE-103
5-11. LICENSE PLATE LAMP	BE- 48	19. CLOCK	BE-104
5-12. ROOM LAMP	BE- 48		
5-13. LUGGAGE ROOM LAMP	BE- 49		
5-14. RHEOSTAT	BE- 50		
6. FRONT WIPER & WASHER	BE- 52		
6- 1. WIPER SWITCH	BE- 53		
6- 2. WASHER SWITCH	BE- 54		
6- 3. INTERMITTENT WIPER RELAY	BE- 55		
6- 4. WIPER MOTOR & BLADE	BE- 57		

BE

INTRODUCTION

1. Handling of Connectors with Lock

(1) Disconnection

While pushing the lock lever as shown in the right figure, disconnect the connector. Do not pull the harness during this operation.

(2) Connection

Connect the male connector to the female connector. Ensure that the lock is engaged completely.

(3) Removal of terminal

Housing lance type

Insert a miniature screwdriver through the opening section of the connector into between the locking lug and the terminal. While prying up the locking lug with the screwdriver, pull the terminal backward.

Metal lance type

While pushing the lance with the screwdriver, pull the terminal backward.

(4) Installation of terminal

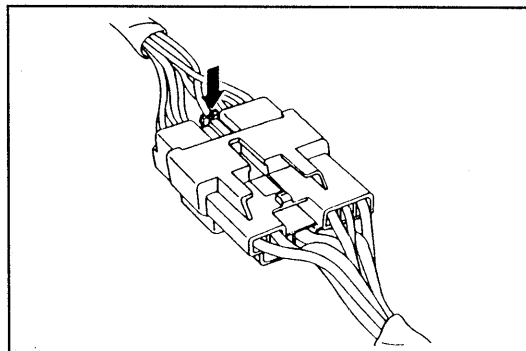
Housing lance type

Push the terminal into the protruding section of the connector, until the lock is engaged completely. Lightly pull the harness to assure that the locking has been made completely.

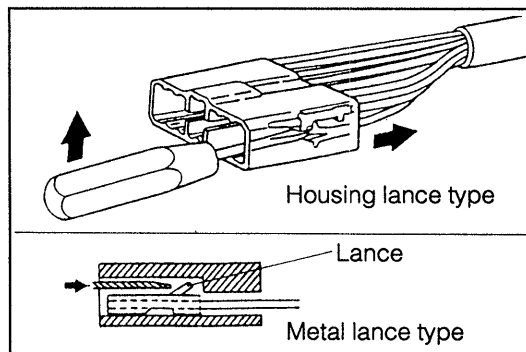
Metal lance type

Insert the terminal into the connector, until lance is locked completely.

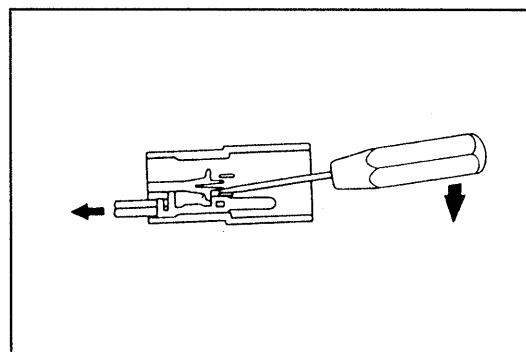
Lightly pull the harness to assure that the locking has been made completely.



WRU90-BE300



WRU90-BE301



WRU90-BE302

CAUTION

• HANDLING INSTRUCTIONS ON LOCK TYPE CONNECTOR

Do not disconnect or connect the lock type connector, unless such operation is absolutely necessary. If the connector should be disconnected or connected, be sure to follow the procedure given below.

WRU90-BE303

2. Disconnection

The lock type of the connector comes in a push release type, a pull release type, a spring lock type, an one-way lock type and so on.

After confirming the shape of the lock, unlock the lock. Disconnect the connector while holding the connector by hand.

NOTE:

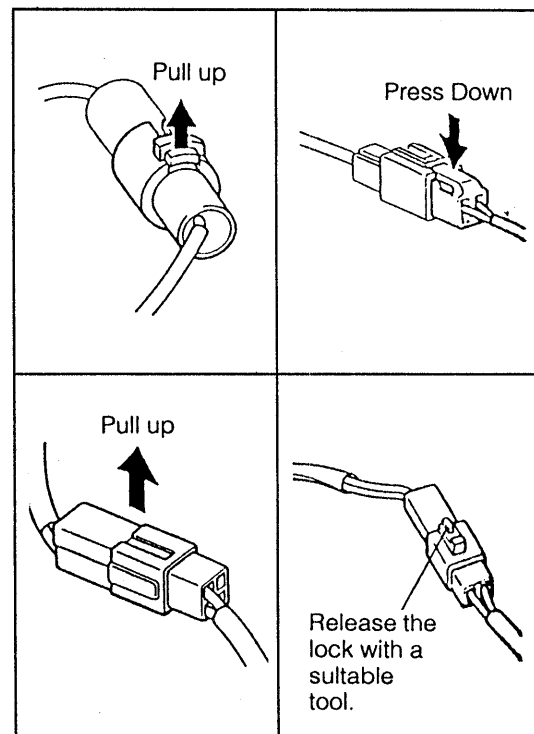
- Never pull the harness during the disconnection.
- Be sure to pull out the connector straight so as not to damage the terminal.

3. Connection

Perform the connection, until the lock is completely engaged.

NOTE:

- To confirm whether the connector has been locked or not, lightly pull the connector. Make sure that the connector will not be disconnected. Be sure to press the connector again before finishing the confirmation.

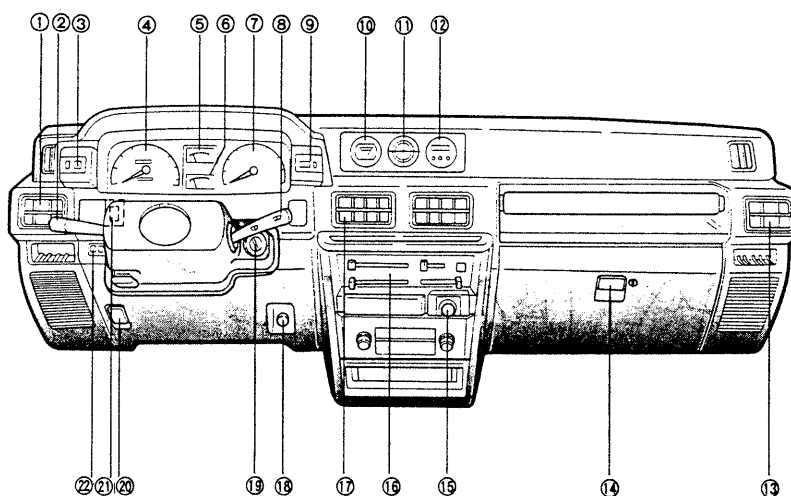


WRU90-BE200

LOCATION OF THE PARTS

ARRANGEMENT DIAGRAM OF SWITCHES AND RELAY

Instrument panel-related parts



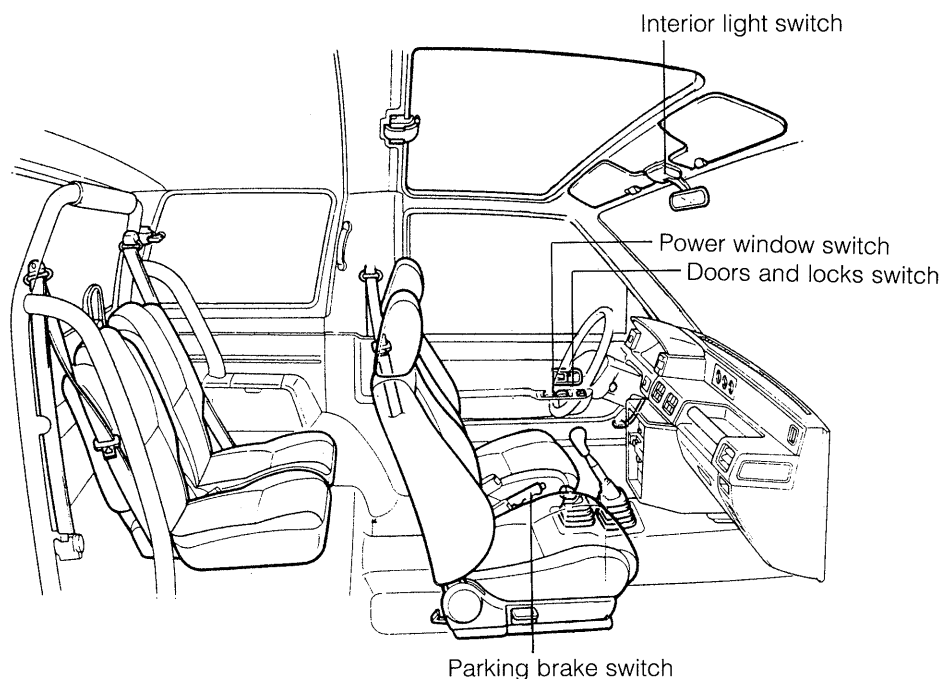
- ① Left vent
- ② Multi-function switch
- ③ Rear window deffogger switch
- ④ Speedometer
- ⑤ Water temperature gauge
- ⑥ Fuel gauge
- ⑦ Tachometer
- ⑧ Front wiper switch

- ⑨ Hazard warning signal switch
- ⑩ Voltmeter
- ⑪ Inclinator
- ⑫ Digital clock
- ⑬ Right vent
- ⑭ Glove box
- ⑮ Cigarette lighter
- ⑯ Heater control panel

- ⑰ Center vent
- ⑱ Light control rheostat
- ⑲ Ignition switch
- ⑳ Engine hood release
- ㉑ Rear wiper switch
- ㉒ Rear heater switch

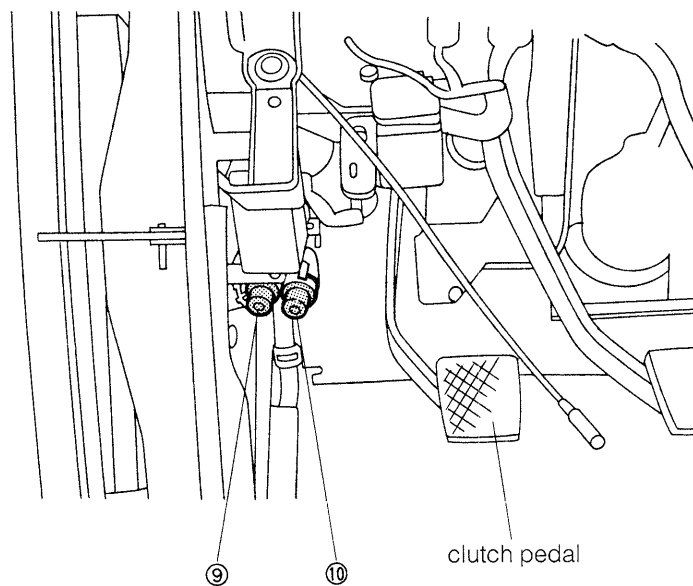
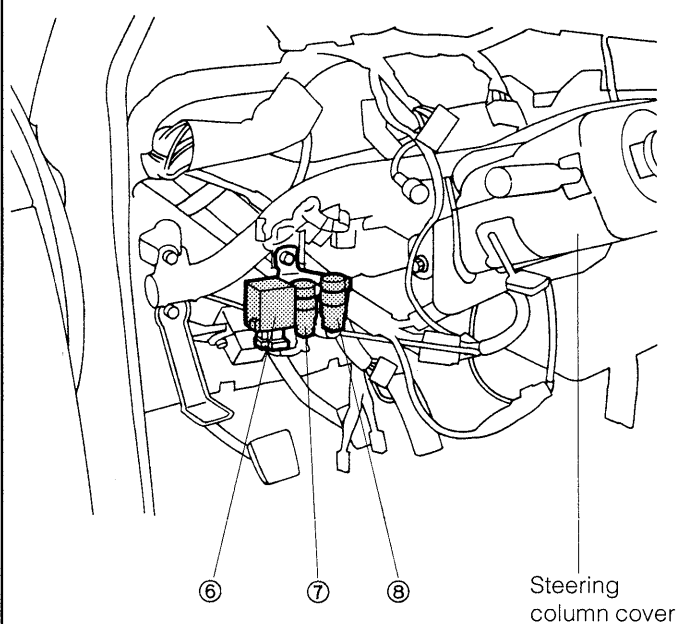
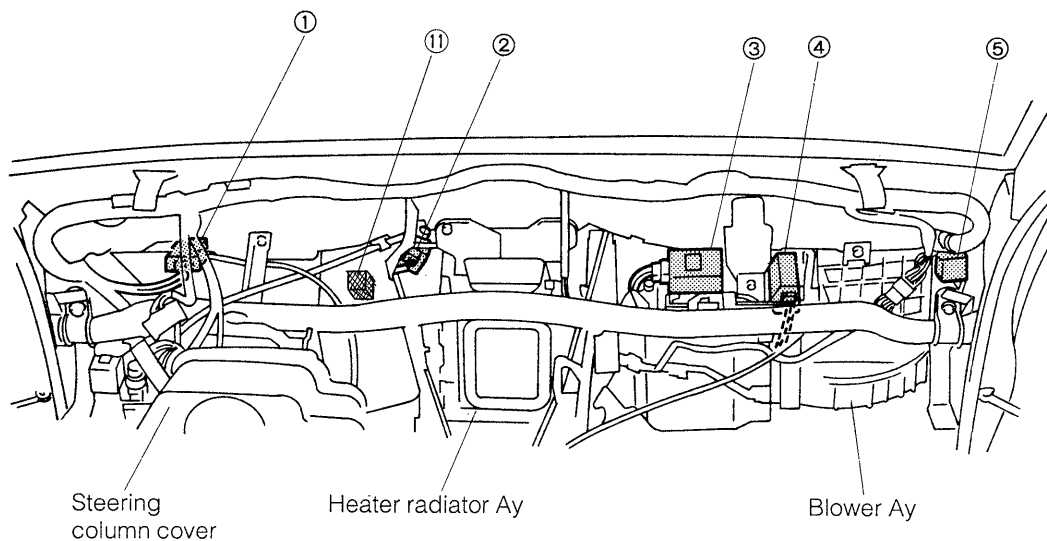
WRU90-BE002

Interior-related parts



WRU90-BE003

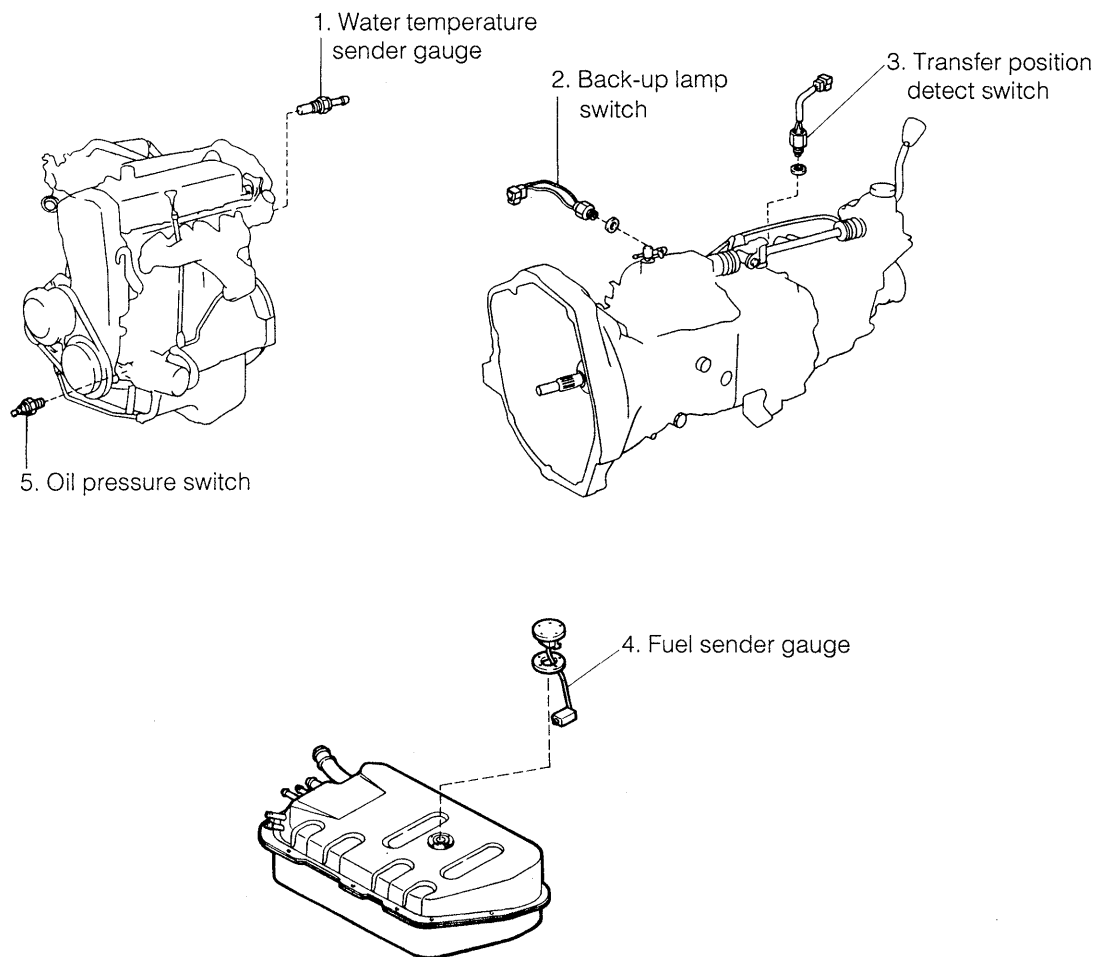
Instrument panel-related parts



- ① Light control relay
- ② Intermittent wiper relay
- ③ A/C acceleration cut amplifier
- ④ A/C amplifier
- ⑤ Headlamp cleaner relay
- ⑥ Key reminder buzzer

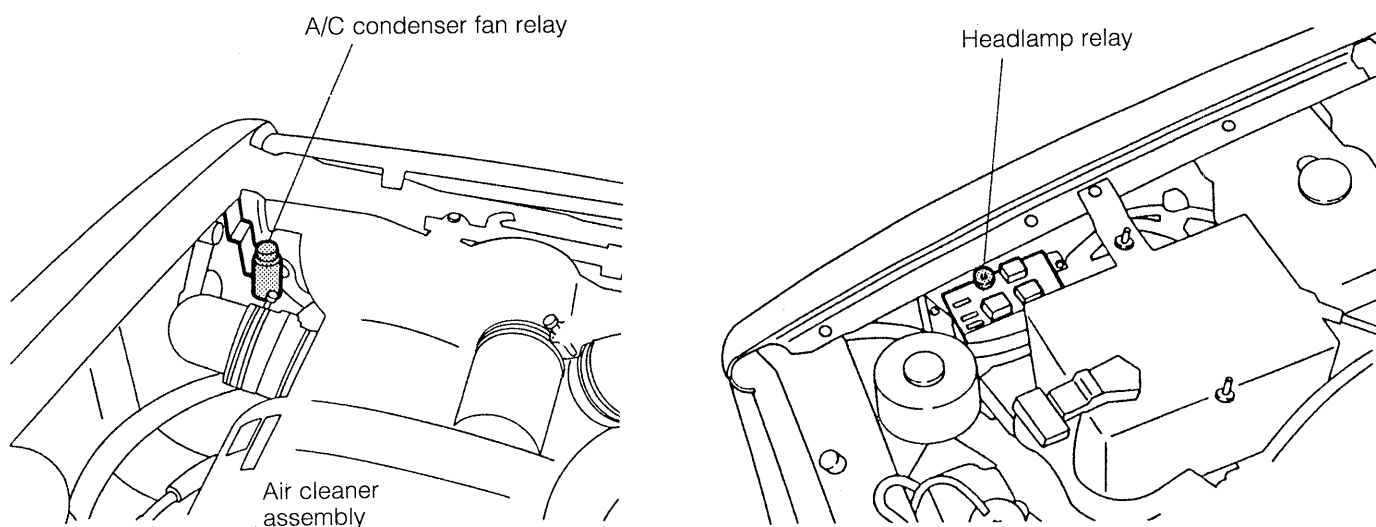
- ⑦ Horn relay
- ⑧ Front heater relay
- ⑨ Starter relay
- ⑩ Rear heater relay
- ⑪ Door lock control relay

Parts related to engine, transmission with transfer, and fuel tank



WRU90-BE005

Engine room-related parts

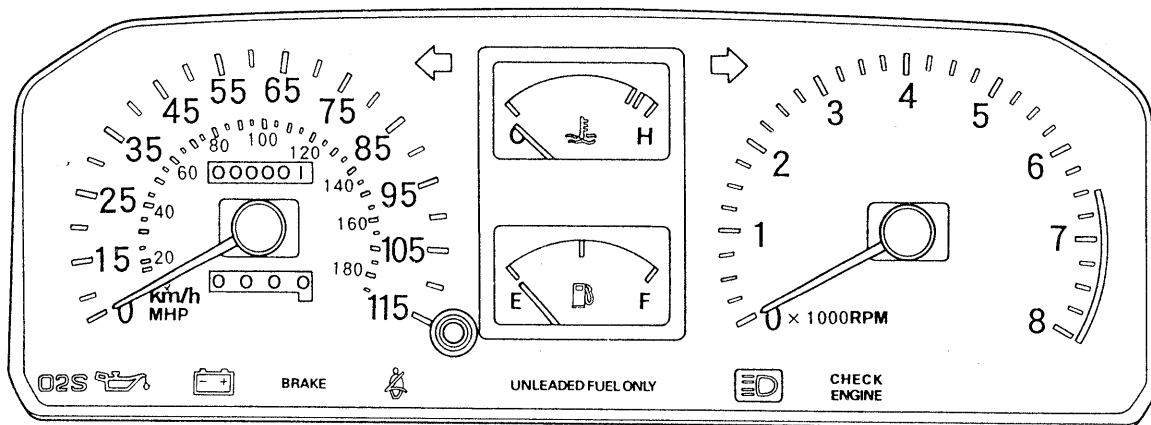


WRU90-BE006

1. COMBINATION METER

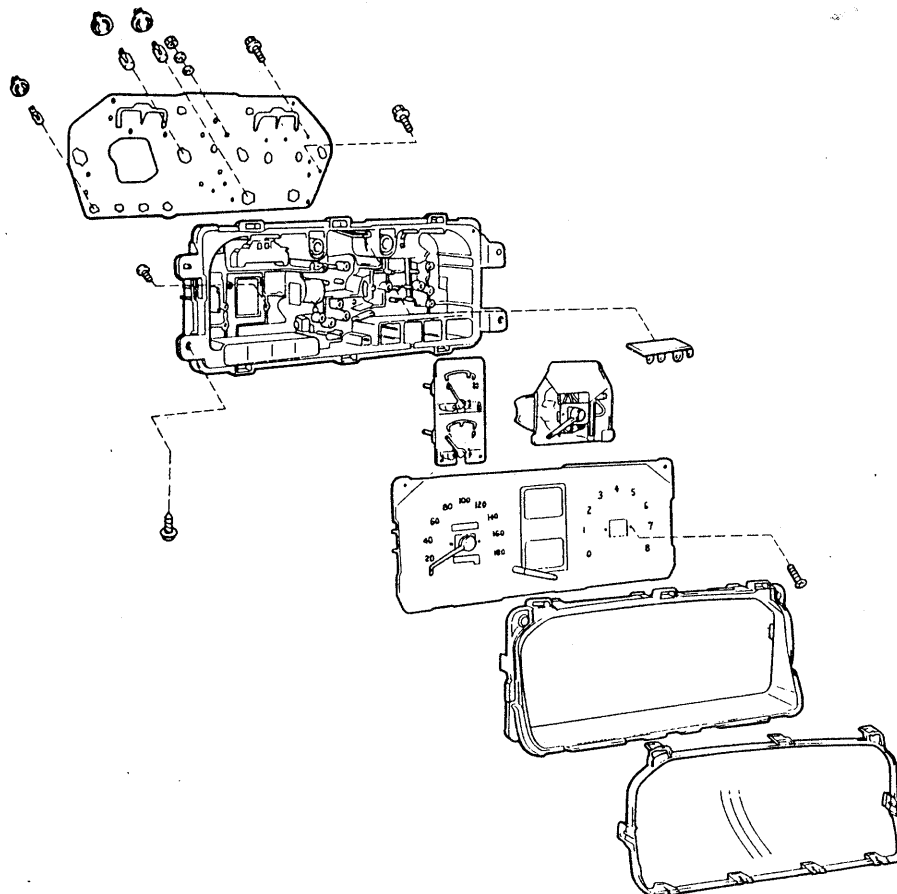
A two-meter type combination meter is mounted on all models. As regards the meter dial plate, the speedometer and tachometer shares the same integral dial plate.

The speedometer and tachometer employs a transillumination. The gauges are illuminated indirectly.



COMPONENTS

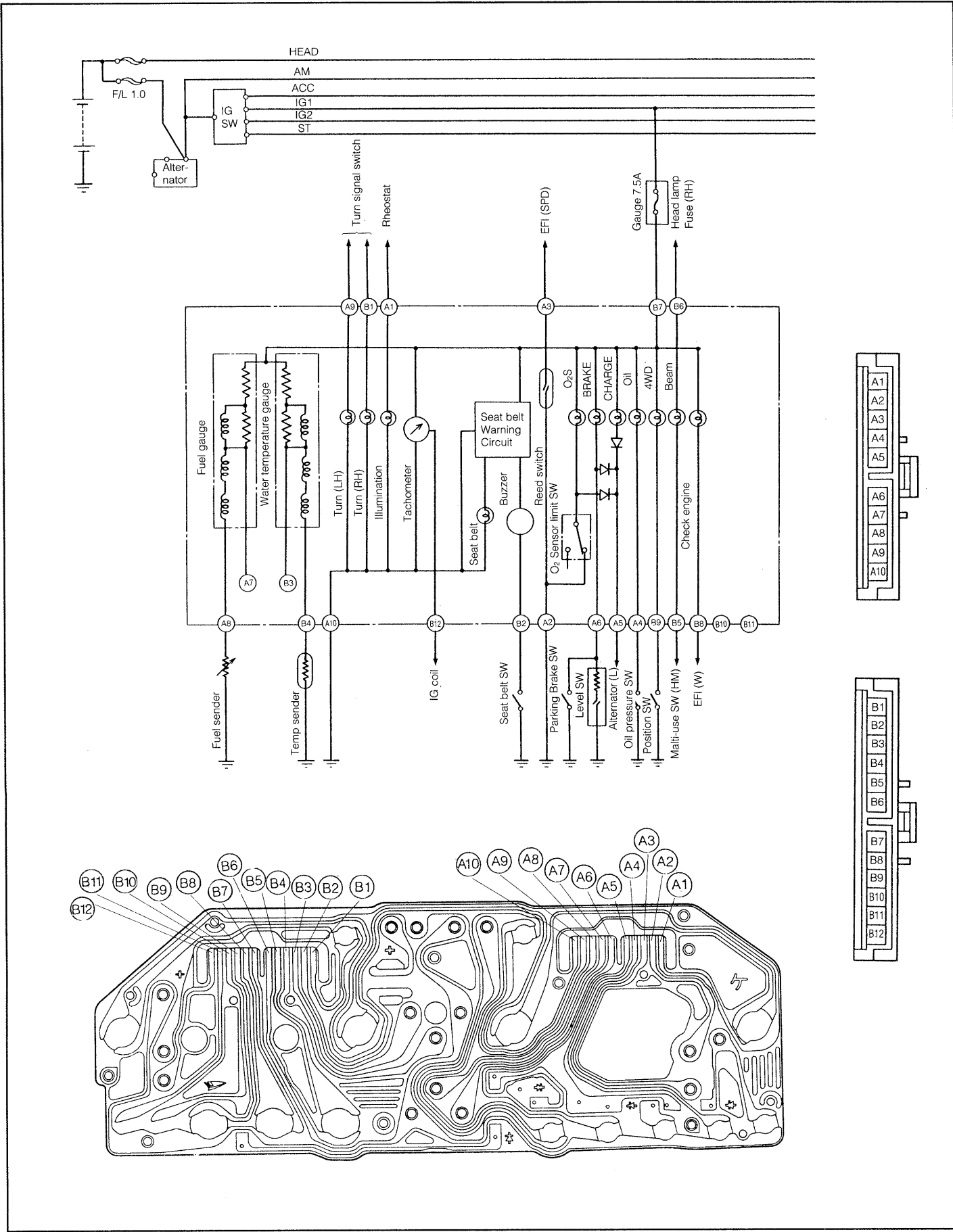
WRU92-BE453



WRU90-BE304

BODY ELECTRICAL SYSTEM

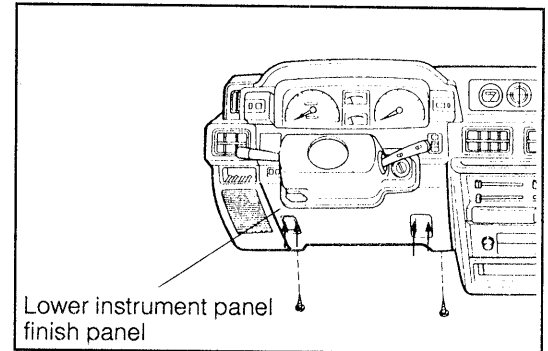
1-1. WIRING DIAGRAM



1-2. REMOVAL AND INSTALLATION

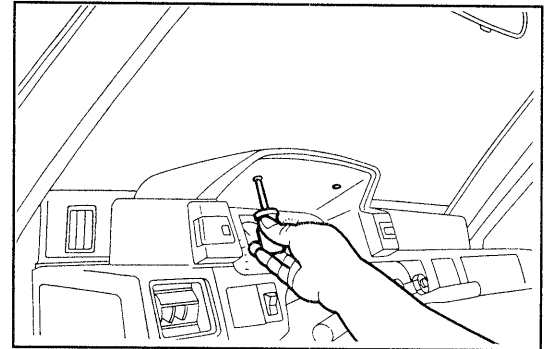
REMOVAL

1. Disconnect the battery cable from the negative (-) terminal.
2. Remove the steering wheel assembly.
3. Remove the lower instrument panel finish panel by removing the six screws.



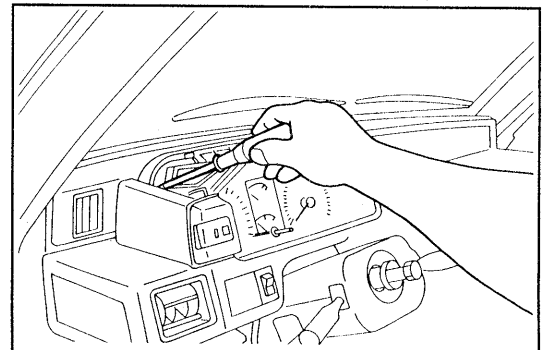
WRU90-BE009

4. Remove the instrument cluster finish upper panel by removing the two screws.



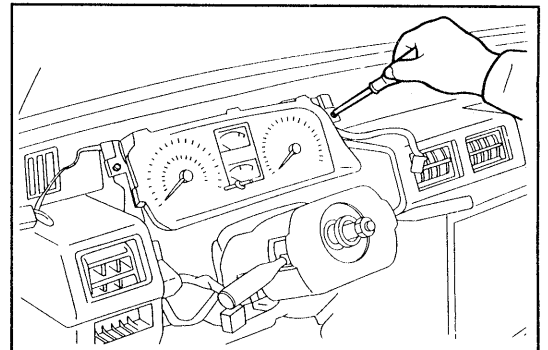
WRU90-BE305

5. Remove the instrument cluster finish panel by removing the four screws.
Remove the coupler for the rear window defogger switch and hazard warning switch.



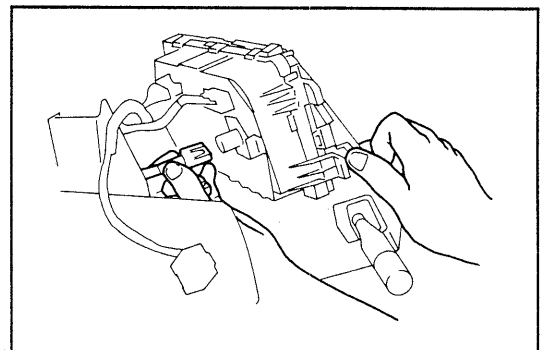
WRU90-BE201

6. Remove the combination meter assembly.



WRU90-BE010

7. Remove the speedometer cable.
8. Remove the coupler of the combination meter.

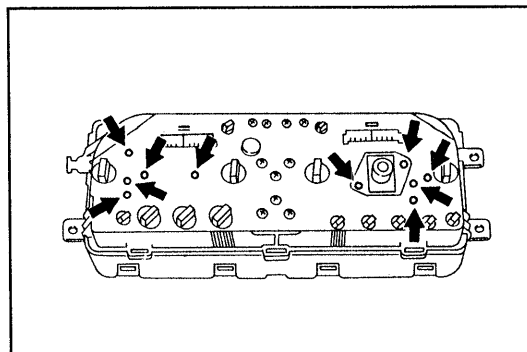


WRU90-BE306

BODY ELECTRICAL SYSTEM

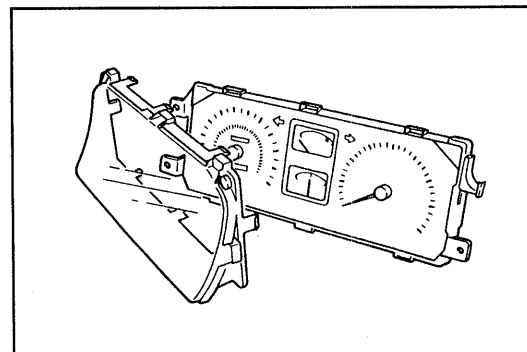
DISASSEMBLY

1. Remove the screws.



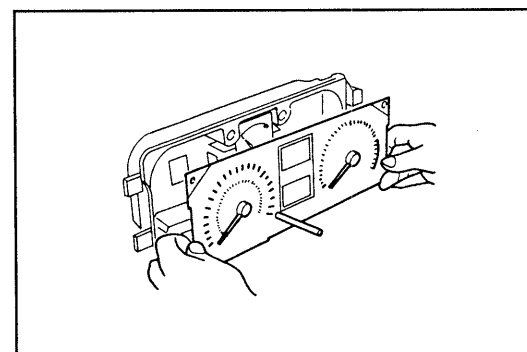
WRU90-BE011

2. Remove the combination meter cover with glass.



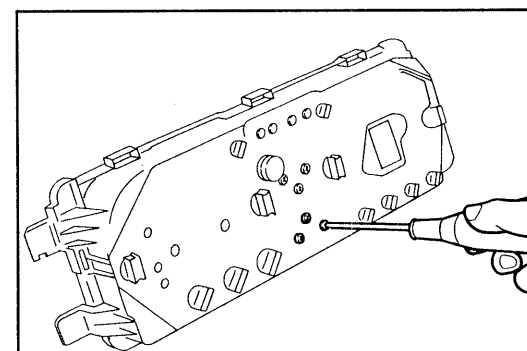
WRU90-BE012

3. Remove the speedometer/tacho-meter panel.



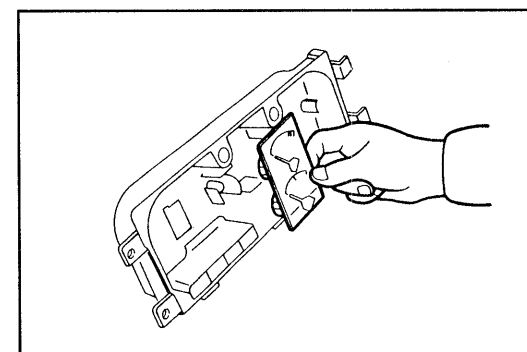
WRU90-BE013

4. Remove the attaching screws of the fuel/temp. gauge.



WRU90-BE014

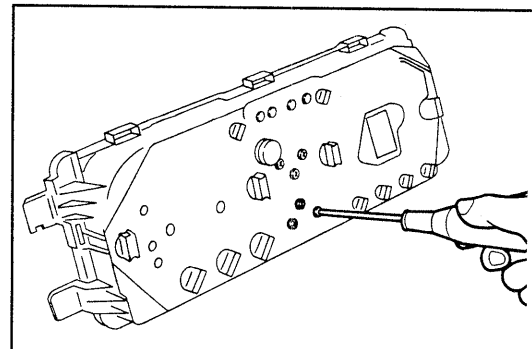
5. Remove the gauge.



WRU90-BE015

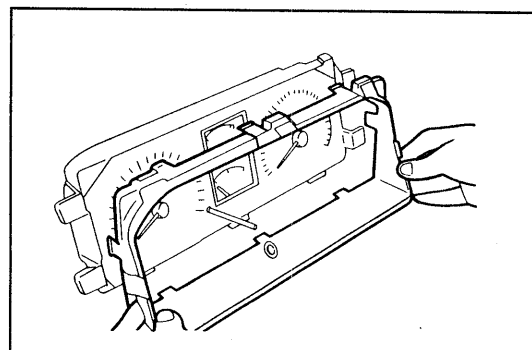
ASSEMBLY

1. Install the fuel/temp. gauge.
2. Install the speedometer/tacho-meter panel.



WRU90-BE016

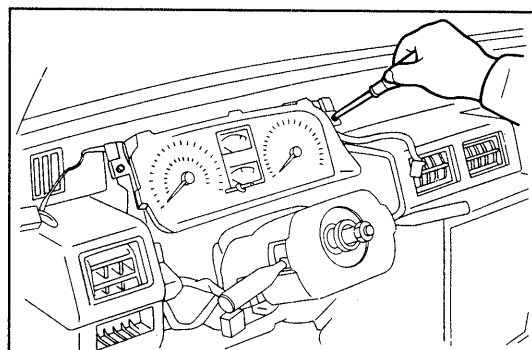
3. Attach the meter cover with glass to the combination cover. Install it to the meter case.



WRU90-BE017

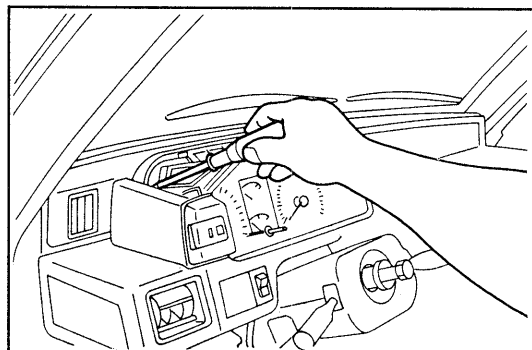
INSTALLATION

1. Installation of combination meter assembly
 - (1) Connect the two couplers of the wiring harness and speedometer cable to the combination meter assembly.
 - (2) Install the combination meter assembly with the four screws.



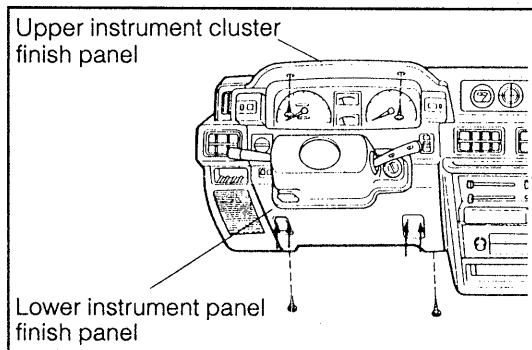
WRU90-BE018

2. Connect the couplers for the rear window defogger switch and hazard warning switch.
3. Install the instrument cluster finish panel with four screws.



WRU90-BE202

4. Install the upper instrument cluster finish panel with two screws.
5. Install the lower instrument panel finish panel with six screws.
6. Install the steering wheel assembly.
7. Install the negative terminal \ominus of the battery.



WRU90-BE019

1-3. SPEEDOMETER

1. In vehicle check

Using a speedometer tester, check the speedometer for any indication error, pointer fluctuation and abnormal noise. Furthermore, check to see if the odometer is functioning properly.

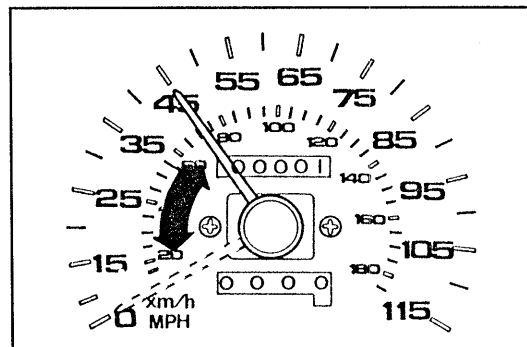
NOTE:

1. It should be noted that excessive tire wear, over-inflation or under-inflation will cause indication errors of the speedometer.
2. Fluctuations of the meter pointer are often attributable to a faulty meter cable.
3. The meter contains a mechanism using contact points. Hence, there will be instances where the pointer slightly fluctuates in the neighborhood of operating points of contacts points (changeover points between ON and OFF). However, this does not constitute any malfunction.

Indication error:

MPH indication

Standard indication (mph)	Allowable indication (mph)
40	39 - 45
60	62 - 67
80	83 - 90

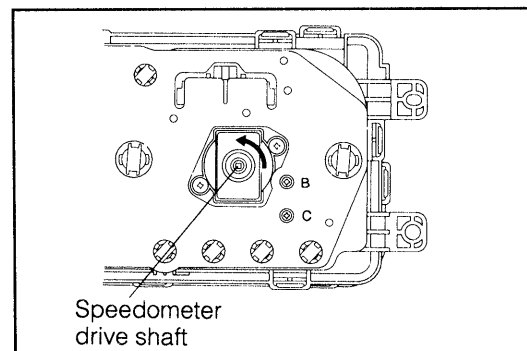


WRU90-BE020

WRU90-BE021

2. Checking of reed switch for vehicle speed sensor use

Ensure that continuity occurs four times at the reed switch (between ⑧ and ⑨) while the speedometer drive shaft completes a turn.



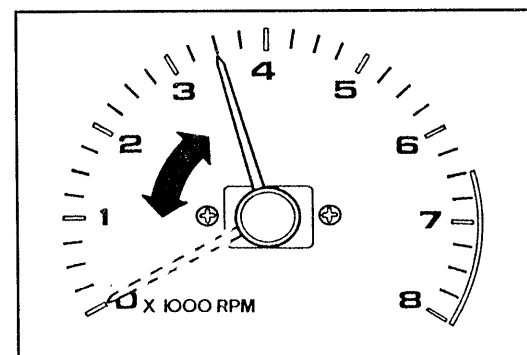
WRU90-BE022

1-4. TACHO-METER

In vehicle check

- (1) Connect a tachometer. Start the engine.
- (2) Compare the indication of the tester with that of the tachometer.

Standard indication (rpm)	Allowable indication (rpm)	Test conditions
1000	880 - 1120	13.5V 25°C
2000	1850 - 2150	
3000	2850 - 3150	
4000	3850 - 4150	
5000	4850 - 5150	
6000	5800 - 6200	



WRU90-BE023

1-5. GAUGES

FUEL GAUGE AND WATER TEMPERATURE GAUGE

CROSS COIL GAUGE

A pointer-zero-position-returning type cross coil gauge is employed for the water temperature gauge, whereas a pointer remaining type cross coil gauge is employed for the fuel gauge.

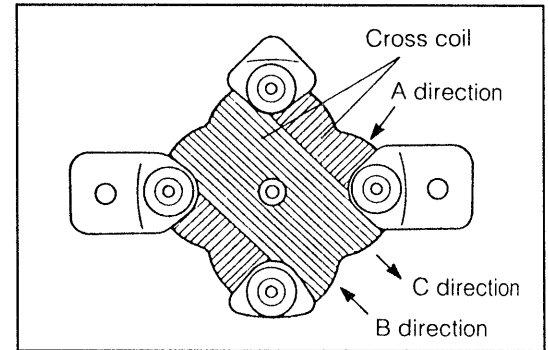
WRU90-BE307

Pointer-zero-position-returning type cross coil gauge

In this gauge, coils are wound around the outer periphery of the magnet armature in three directions, spaced 90 degrees from each other. The armature is actuated by the change in the magnetic field generated by this coil.

When the engine switch is turned OFF, the returning of the gauge's pointer to the zero-position is carried out by the locating magnet.

Furthermore, silicon oil for control use is filled at the lower shaft of the armature.

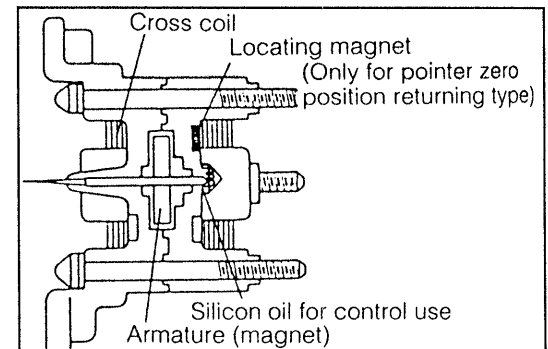


WRU90-BE308

Pointer-remaining type cross coil gauge

In this gauge, even after the engine switch is turned OFF, the pointer remains at the position where the pointer registered during the operation, rather than it returns to the zero-position. Such design has been made possible by eliminating the locating magnet of the pointer-zero-position-returning type and by increasing the viscosity and amount of the silicon oil for control use.

Compared with the pointer-zero-position-returning type cross coil gauge, the pointer-remaining type cross gauge is slightly slow in the movement of the pointer.

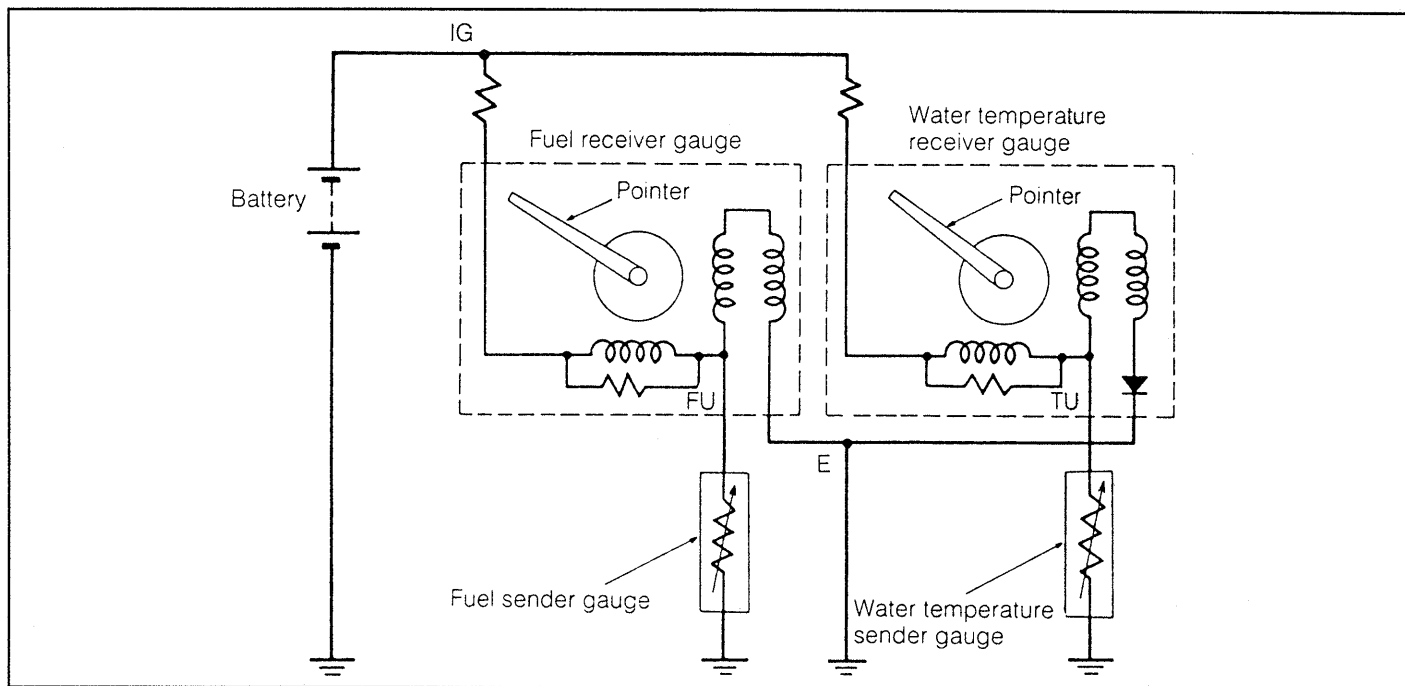


WRU90-BE024

NOTE:

1. Even after the ignition switch is turned OFF, the pointer will not return down to the "E" position completely. This does not mean that the gauge is malfunctioning.
2. There are cases where the indication of the pointer at the time when the ignition switch is turned OFF may be deviated because of mechanical vibrations or after the lapse of time.
3. After the fuel tank has been filled with fuel to the full and the ignition switch is turned ON, it will take a little while (about two minutes) before the pointer's indication stabilizes.

GAUGE CIRCUIT

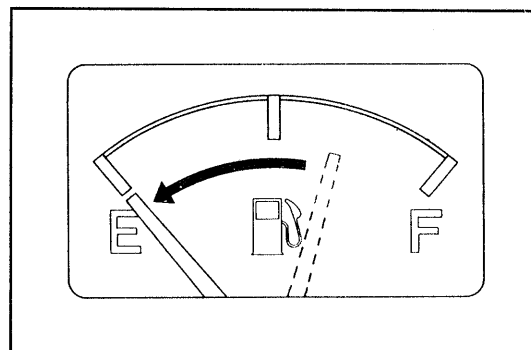


WRU90-BE025

FUEL RECEIVER GAUGE

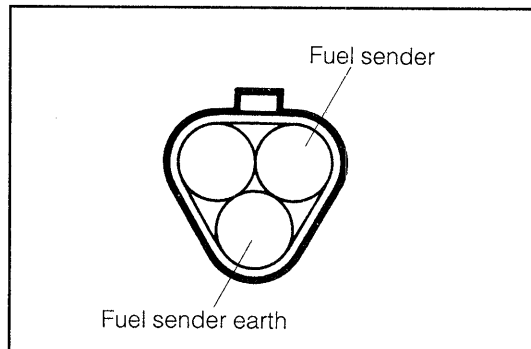
1. In-vehicle inspection

- (1) Disconnect the connector of the fuel sender gauge located at the upper part of the fuel tank. Under this condition, turn ON the engine switch. Ensure that the pointer of the receiver gauge returns to the position "E".



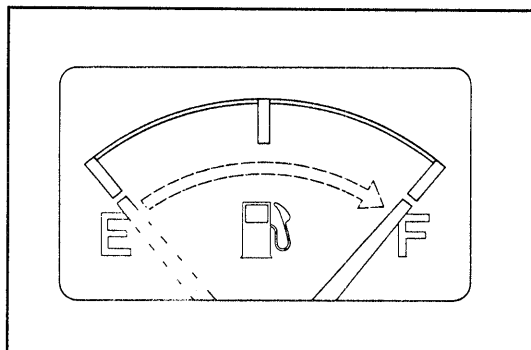
WRU90-BE026

- (2) Turn OFF the engine switch. Ground the harness connector of the fuel sender gauge. Under this condition, turn ON the engine switch. Ensure that the pointer of the receiver gauge rises gradually and registers the position "F".



WRU90-BE309

- (3) Turn OFF the engine switch. Ensure that the pointer of the receiver gauge remains stationary and registers the position "F".

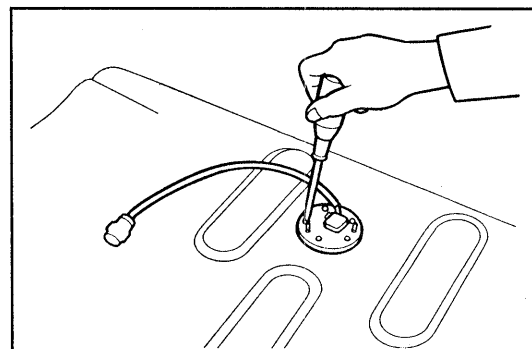


WRU90-BE027

FUEL SENDER GAUGE

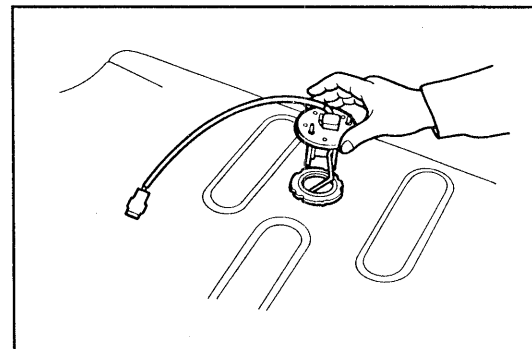
Removal

1. Remove the fuel tank assembly.
2. Remove the five attaching screws of the fuel sender gauge.



WRU90-BE028

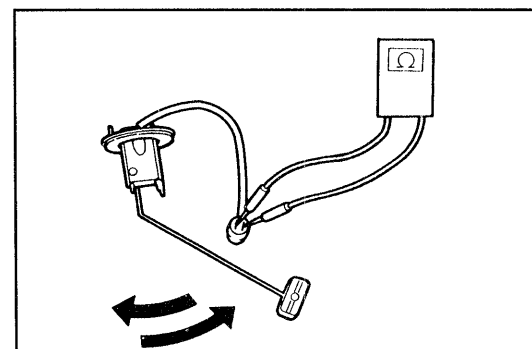
3. Remove the fuel sender gauge from the fuel tank.



WRU90-BE310

Inspection

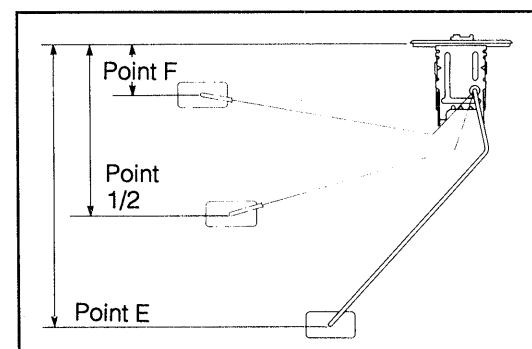
1. Ensure that the resistance varies when the float is moved from the upper position to the lower position.



WRU90-BE311

2. Ensure that the resistance conforms to the standard value for each float position specified in the table below.

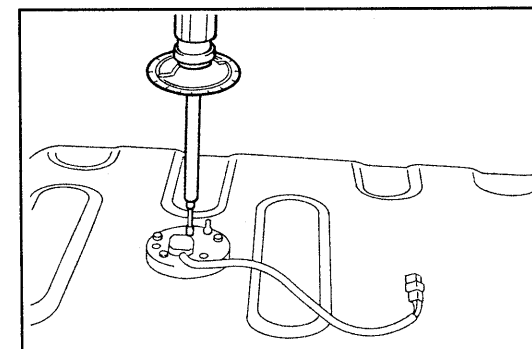
Float position	Resistance (Ω)	Reference dimension mm (inch)
F	6	48 ± 3 (1.9 \pm 0.12)
1/2	32.5	144 (5.7)
E	97	221 ± 3 (8.7 - 0.12)



WRU90-BE312

Installation

1. Install the fuel sender gauge to the fuel tank.
Tightening torque: 1.8 - 2.0 kg-cm (0.18 - 0.20 N·m)
2. Install the fuel tank assembly to the vehicle body.

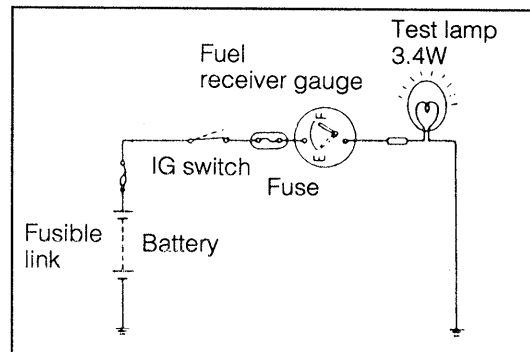


WRU90-BE029

WATER TEMPERATURE RECEIVER GAUGE

1. In-vehicle inspection

- (1) Disconnect the connector from the harness of the water temperature sender gauge. Ground the gauge through a test lamp (12V - 3.4W).
- (2) Turn ON the engine switch. Ensure that the test lamp goes on and the pointer of the receiver gauge starts to rise gradually.

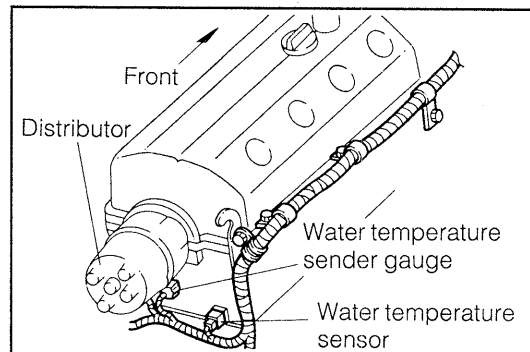


WATER TEMPERATURE SENDER GAUGE

The water temperature sensor gauge is located at the rear end of the cylinder head.

Removal

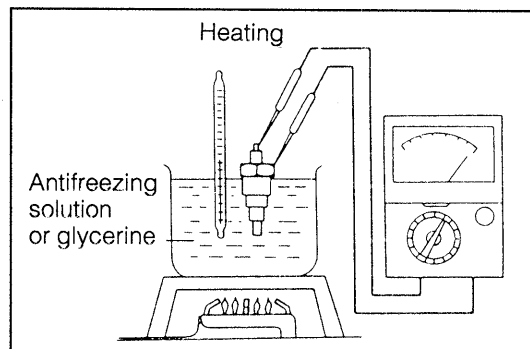
1. Drain the cooling water
2. Remove the water temperature sender gauge.



Unit inspection

Measure the resistance between the terminal and the earth, as indicated in the right figure.

Temperature (°C)	Resistance (Ω)
50	232
115	26.8



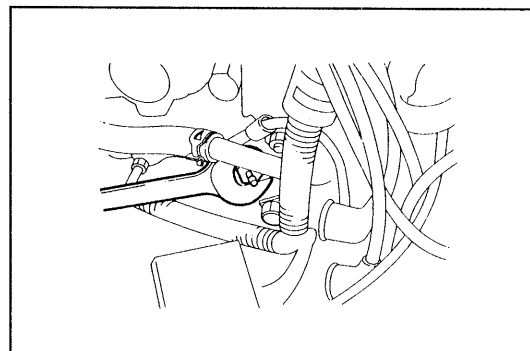
Installation

1. Installation of water temperature Sender gauge.
 - (1) Wind sealing tape to the water temperature sender gauge and install it to the cylinder.
Tightening Torque: 1.2 - 2.0 kg-m
(8.7 - 14.5 ft-lb, 11.8 - 19.6 N·m)

NOTE:

- The new sensor is corted with sealer, therefore seal tape is unnecessary if the gauge is replaced with new one.

- (2) Connect the connector.
2. Fill the coolant



WRU90-BE316











WRU90-BE317

2. WARNING & INDICATOR

CHECK WARNING LAMPS

1. Set the ignition switch to the ON position. Ensure that the warning lamps given below are illuminated.
2. Set the ignition switch to the START position. Start the engine. Ensure that the warning lamps given below are extinguished. (With the parking lever not applied)
3. Stop the engine. Set the ignition switch to the START position again. Start the engine. Ensure that, four to eight seconds later, the seat belt warning buzzer ceases its operation and the seat belt warning lamp goes out.

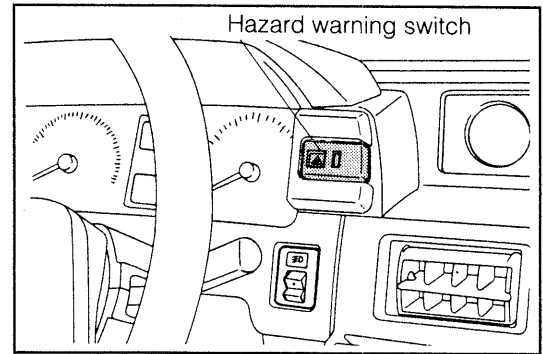
2-1. WARNING & INDICATOR

Kind		Indication	Function
Warning lamp	Hazard warning		Flashes when hazard switch is turned ON. Indicating color: Red
	Brake warning		Glow when brake fluid becomes too low or empty, or when parking brake is applied while the engine is running. Indicating color: Red
	Seat belt warning		Glow for about six seconds when driver fails to buckle up seat belt at driver's seat after ignition switch has been turned ON or engine has started. Indicating color: Red
	Check engine warning		Glow when CPU detects malfunction of Electronic Fuel Injection system. Indicating color: Amber
	Charge warning		Glow when engine charging system is encountered with abnormality while engine is running. Indicating color: Red
	Oil pressure warning		Glow when engine oil pressure system is encountered with abnormality while engine is running. Indicating color: Red
	Oxygen sensor warning		Glow when vehicle reaches 80,000 miles. Indicating color: Red
Indicator lamp	4WD indicator		Glow when the transfer shift lever is moved to the 4H or 4L position with the engine switch turned ON. Indicating color: Green
	High beam indicator		Glow when upper beams of headlamps are turned ON. Indicating color: Blue
	Turn signal indicator		Flashes when turn signal switch or hazard warning switch is turned ON. Indicating color: Green

WRU92-BE455

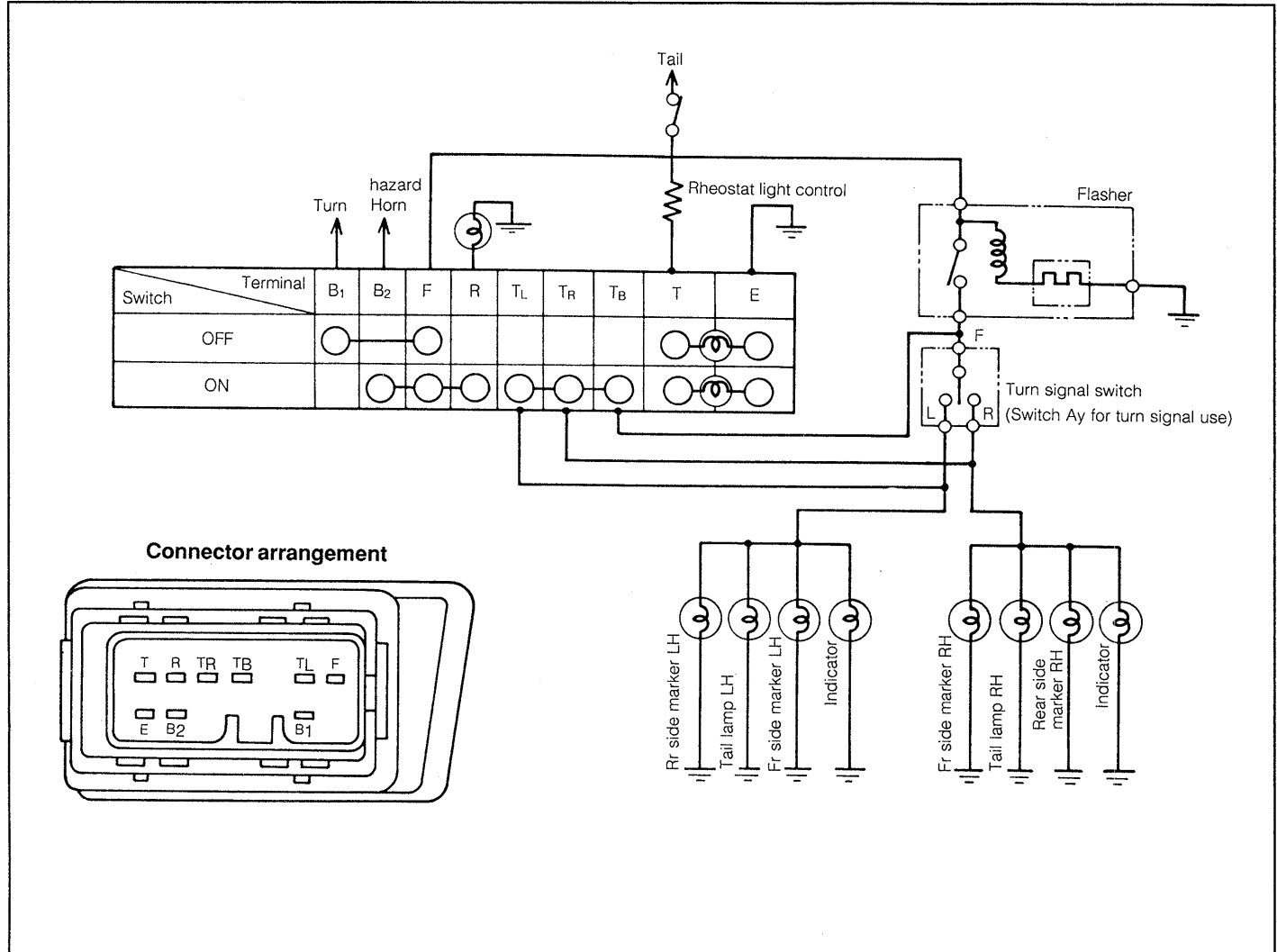
2-2. HAZARD WARNING

The hazard warning switch is a seesaw type switch which incorporates a symbol mark showing night illumination. Furthermore, the switch is installed in the meter cluster toward the inboard side of the vehicle.



WRU90-BE031

CIRCUIT DIAGRAM



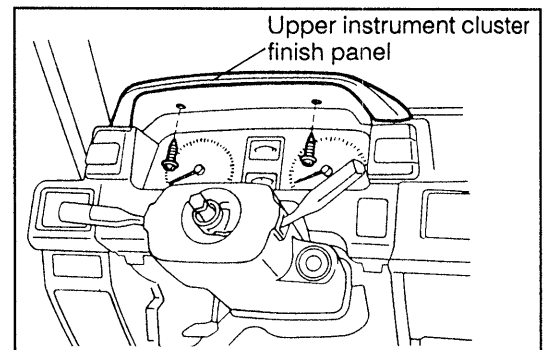
WRU90-BE318

REMOVAL

1. Remove the upper instrument cluster finish panel by removing the two screws.
2. Remove the instrument panel finish lower panel.

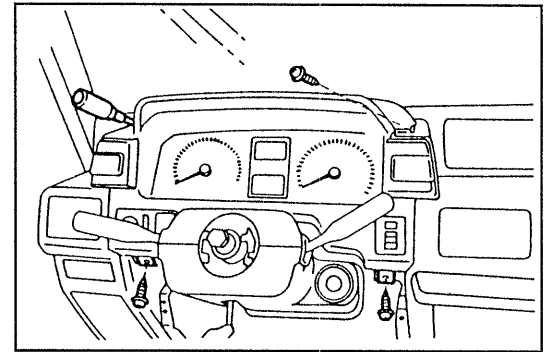
NOTE:

- The removal of the steering wheel in advance will facilitate this removal operation.



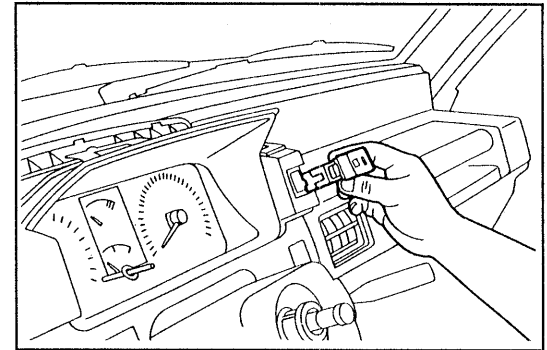
WRU90-BE032

- Remove the instrument cluster finish panel subassembly by removing the four screws.



WRU90-BE033

- Remove the hazard warning switch assembly.



WRU90-BE319

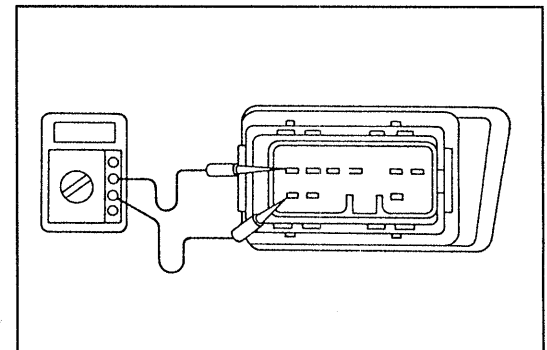
INSPECTION

Ensure that continuity exists between the respective terminals as indicated in the continuity table below.

Continuity table

○—○ Continuity exists.
○●○ Bulb in installed state

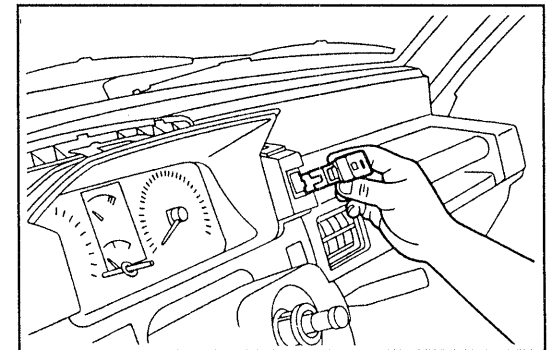
Terminal	B ₁	B ₂	F	R	T _L	T _R	T _B	T	E
Switch									
OFF	○		○					○●○	○
ON		○	○	○	○	○	○	○●○	○



WRU90-BE320

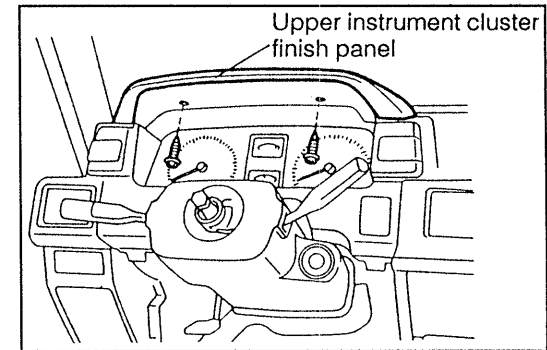
INSTALLATION

- Connect the coupler of the hazard warning switch and install it to the instrument cluster finish panel subassembly.



WRU90-BE321

- Install the instrument cluster finish panel subassembly.
- Install the instrument cluster finish upper panel.
- Install the instrument panel finish lower panel.



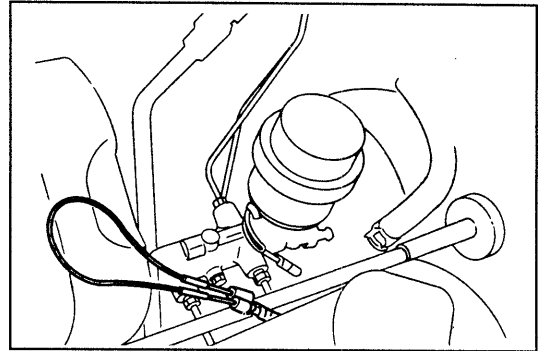
WRU90-BE322

2-3. BRAKE WARNING

BRAKE FLUID LEVEL SWITCH

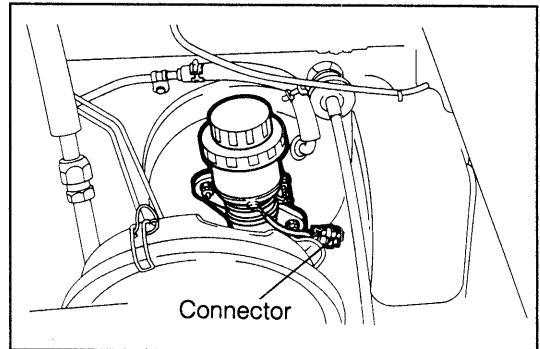
Inspection

1. Start the engine.
2. Return the parking brake lever to the original position.
3. Disconnect the connector of the brake level warning switch. Short the connector terminals at the wire harness side with each other, as indicated in the right figure. Ensure that the brake warning lamp glows.



WRU90-BE034

4. Pull out the connector of the brake fluid level warning switch and connect a tester.

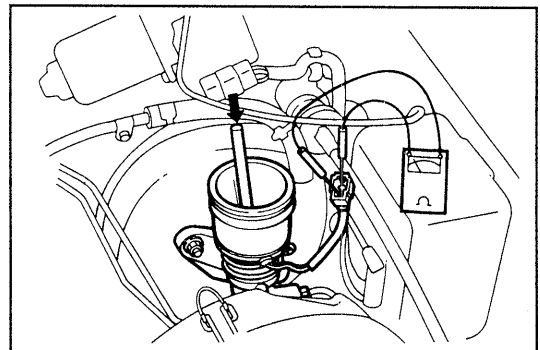


WRU90-BE035

5. Press down the brake fluid level warning switch (float) with a rod. Ensure that continuity exists between the connector terminals.

NOTE:

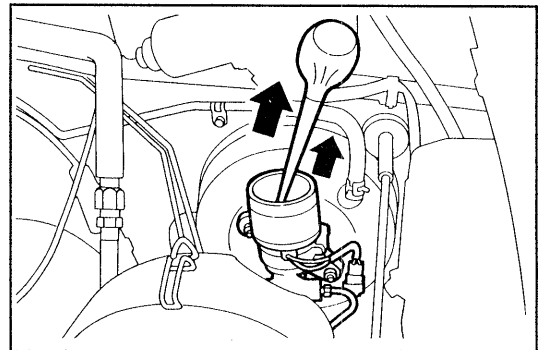
- As for a rod to be used for pressing down the float, be sure to thoroughly clean it. Special care must be exercised to ensure that no dust nor water gets into the reservoir.



WRU90-BE036

Removal

1. Detach the reservoir tank cap.
2. Suck the brake fluid in the reservoir tank, using a syringe.
3. Remove the master cylinder reservoir assembly.



WRU90-BE037

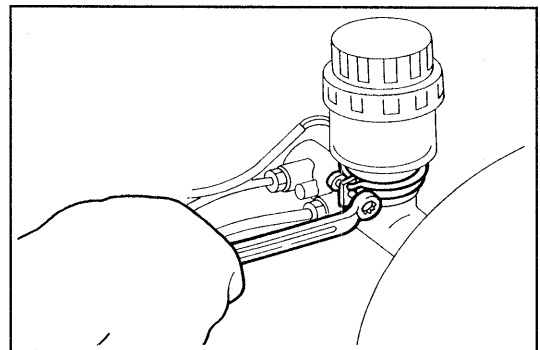
Installation

1. Install the master cylinder reservoir assembly to the master cylinder.

Tightening Torque: 0.55 - 0.70 kg-m
(4.0 - 5.0 ft-lb, 4.9 - 6.9 N-m)

2. Fill the reservoir tank with brake fluid up to the MAX level mark.

Brake Fluid to Be Used: DOT3 or SAE J1703

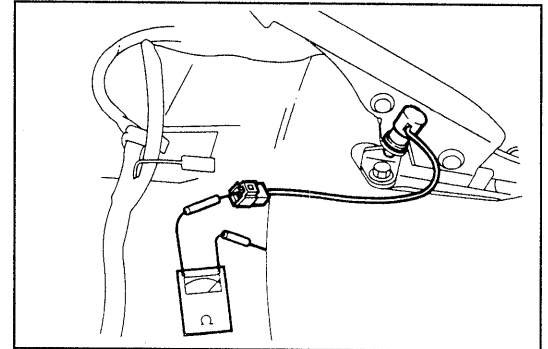


WRU90-BE323

PARKING BRAKE SWITCH

Inspection

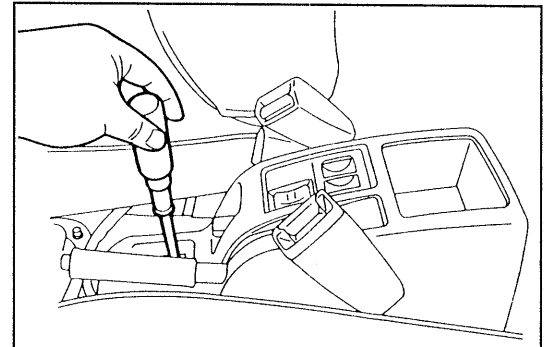
1. Pull out the connector of the parking brake switch and conduct continuity checks between the terminal and the body earth.
 - (1) Ensure that continuity exists between the terminals when the parking brake lever is pulled upward.
 - (2) Ensure that no continuity exists between the terminals when the parking brake lever is returned.



WRU90-BE038

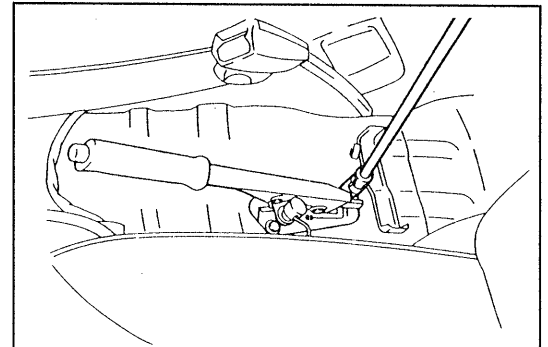
Removal

1. Remove the rear console box.



WRU90-BE324

2. Remove the parking brake lever. Remove the parking brake switch.



WRU90-BE325

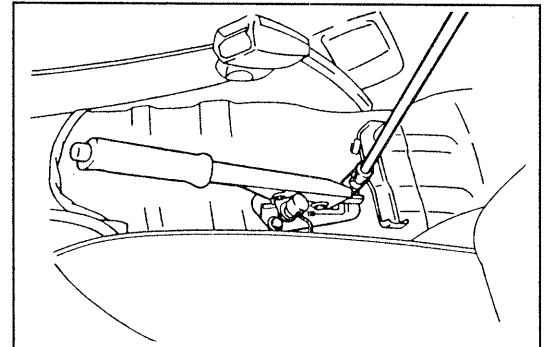
Installation

1. Install the parking brake switch and parking brake lever.

NOTE:

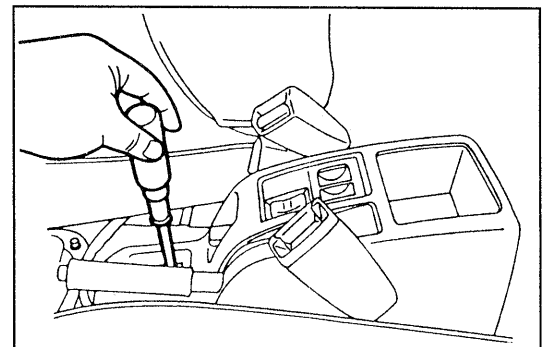
 - Ensure that the parking brake switch operates normally. If the switch is installed improperly, the switch may malfunction.

Tightening Torque: 1.0 - 1.6 kg-m
(7.2 - 11.5 ft-lb, 9.8 - 15.7 N·m)



WRU90-BE326

2. Install the rear console box.

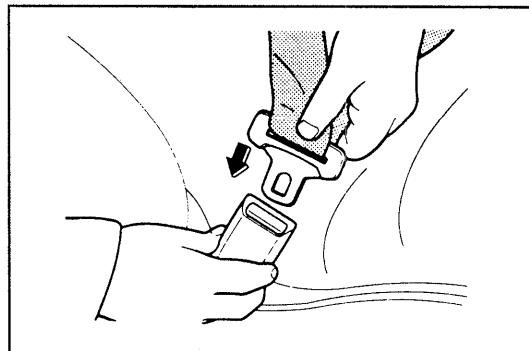


WRU90-BE327

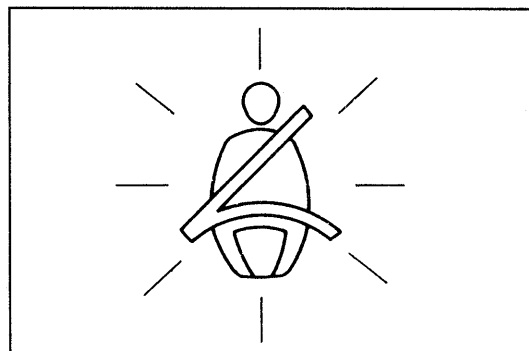
2-4. SEAT BELT WARNING

OPERATION CHECK

1. Seat belt warning buzzer
 - (1) Ensure that the buzzer is set off for the specified time when the ignition switch is turned ON.
Specified Set-off Time: 4 - 8 seconds
 - (2) Ensure that the buzzer is not set off when the ignition switch is turned ON with the seat belt locked.
2. Seat belt warning lamp
 - (1) Ensure that, when the ignition switch is turned ON, the lamp glows for the specified time regardless of the seat belt lock.
Specified Set-off Time: 4 - 8 seconds



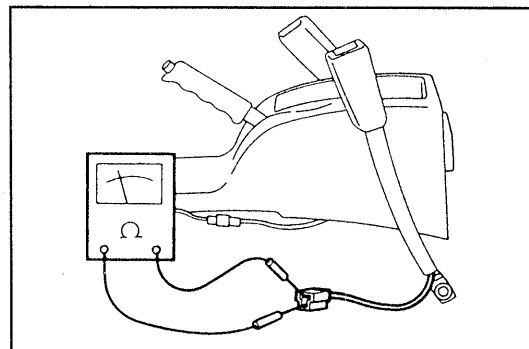
WRU90-BE039



WRU90-BE328

INSPECTION OF SEAT BELT SWITCH

1. Pull out the connector of the seat belt switch and connect a tester.
2. Buckle the seat belt. Ensure that continuity exists between the connector terminals.

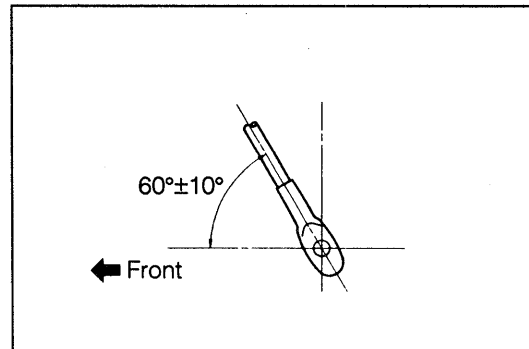


WRU90-BE040

REMOVAL AND INSTALLATION

Install the seat belt so that the installation angle of the front/inner seat belt may become 50 - 70 degrees.

Tightening Torque: 2.9 - 5.4 kg-m
(21.0 - 39.1 ft-lb, 28.4 - 53.0 N-m)



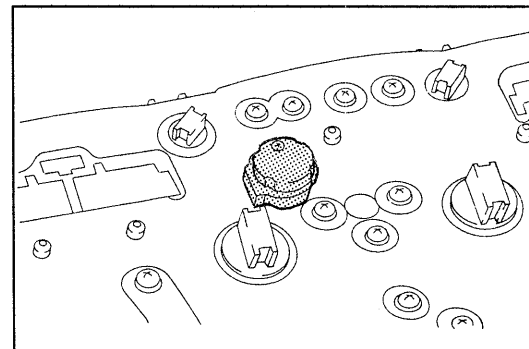
WRU90-BE329

INSPECTION OF BUZZER

1. Remove the buzzer.
2. Apply a voltage of 12V between the terminals of the buzzer.
3. Ensure that the buzzer is set off.

NOTE:

- It must be noted that the buzzer will not be set off if the positive ⊕ and negative ⊖ terminals are connected reversely.

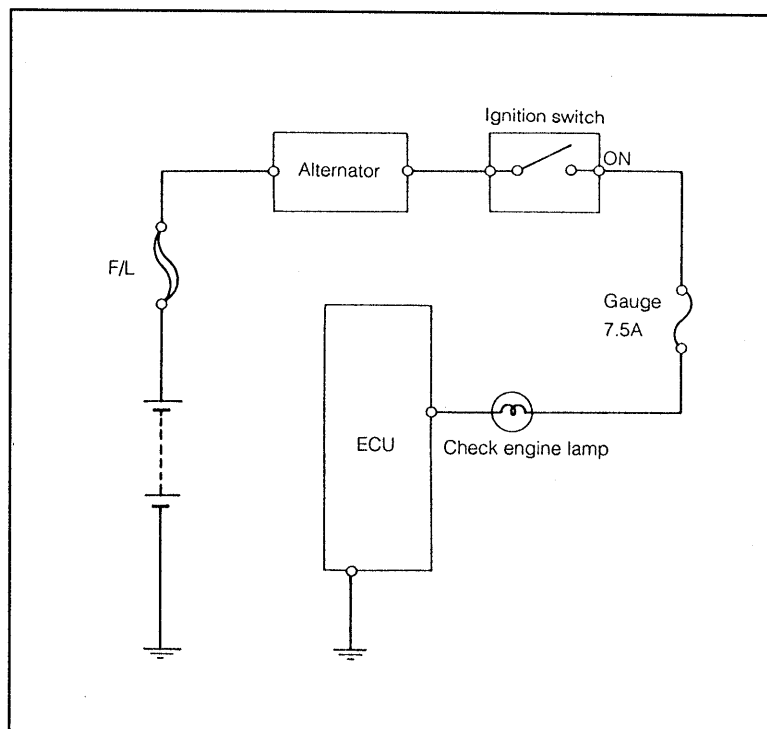


WRU90-BE041

2-5. CHECK ENGINE WARNING

INSPECTION

The inspection of the check engine lamp is performed under the inspection of the EFI system.

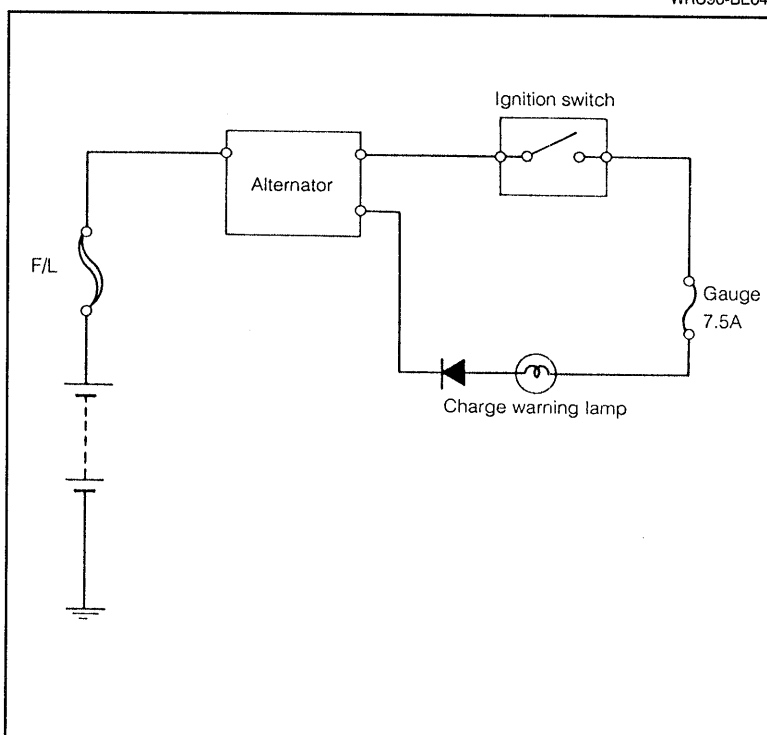


WRU90-BE042

2-6. CHARGE WARNING

INSPECTION

The inspection of the charge warning lamp is performed under the inspection of the charge system.

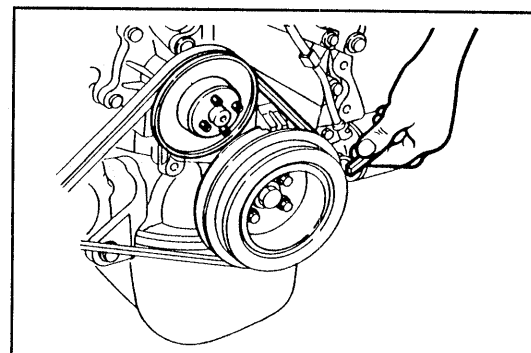


WRU90-BE043

2-7. OIL PRESSURE WARNING

INSPECTION

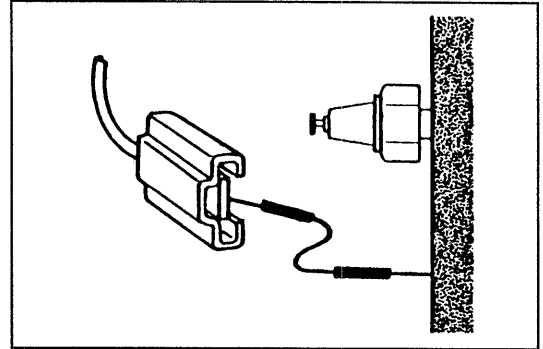
1. Disconnect the oil pressure switch connector.



WRU90-BE044

BODY ELECTRICAL SYSTEM

2. Ground the connector at the harness side.
3. Ensure that the oil pressure warning lamp glows when the engine switch is turned ON.

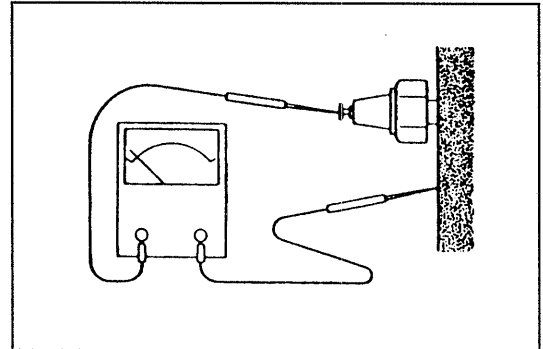


WRU90-BE330

4. Pull out the connector located at the front/left part of the oil filter bracket.
5. Ensure that continuity exists between the oil pressure switch terminal and the earth.

NOTE:

- It should be noted that continuity exists while the engine is stopped, whereas no continuity exists while the engine is running.



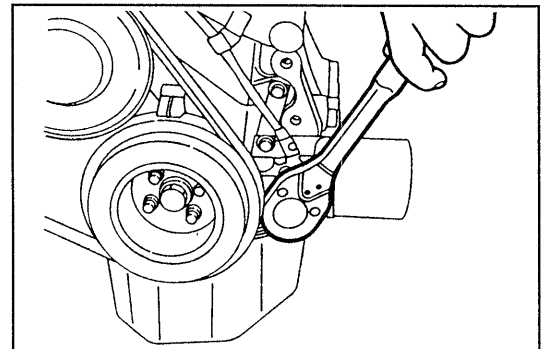
WRU90-BE045

REMOVAL

1. Disconnect the oil pressure switch connector.
2. Remove the oil pressure switch.

NOTE:

- Use a hexagonal long box wrench for the removal.



WRU90-BE331

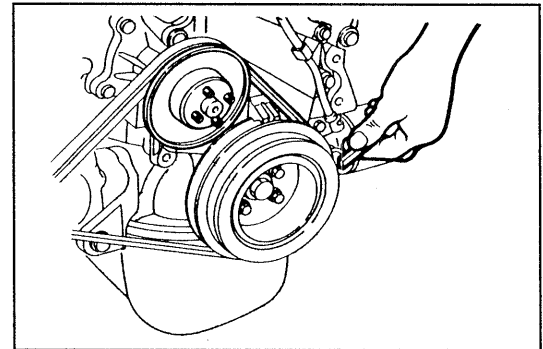
INSTALLATION

1. Clean the threaded portion of the oil pressure switch. Wind seal tape around the threaded portion. Install the oil pressure switch in the oil pump.

Tightening Torque: 1.2 - 2.0 kg-m (8.7 - 14.5 ft-lb)

NOTE:

- (1) Use a hexagonal long box wrench for the installation.
- (2) The new oil pressure switch is coated with sealing materials.



WRU90-BE332

2. Connect the connector of the oil pressure switch.
3. Start the engine and check it for oil leakage. Repair the leaky point if oil leakage exists.

WRU90-BE333

2-8. O₂ SENSOR WARNING

NOTICE

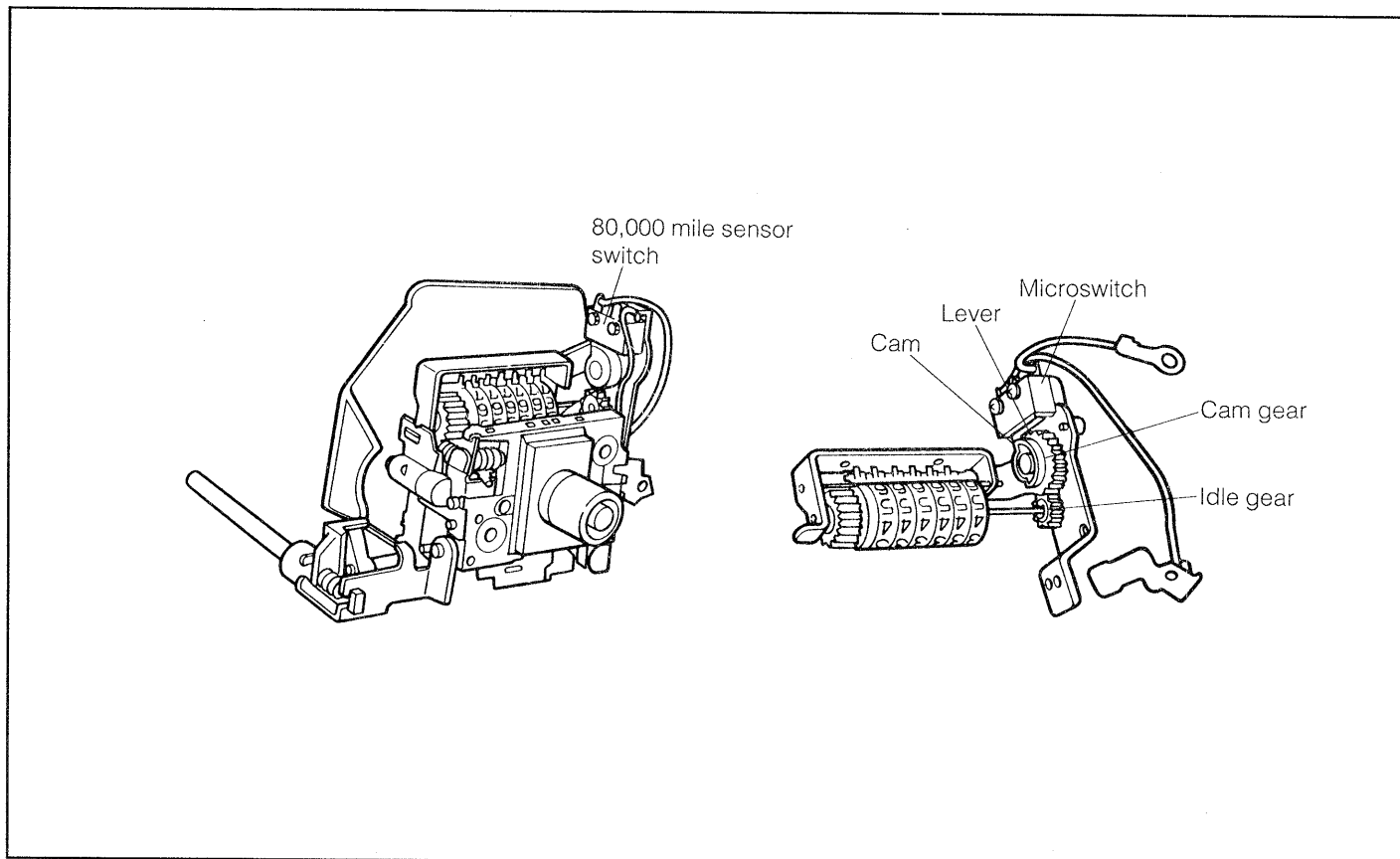
1. In conformity to the exhaust emission control standard of the US, the O₂ sensor warning system tells the customer that the vehicle is due for the replacement of the O₂ sensor when the cumulative running distance reaches 80,000 miles.
2. When the cumulative running distance has reached 80,000 miles, the O₂S warning lamp goes on. This reminds the customer of the necessity of O₂ sensor replacement. Then, the customer must bring the vehicle to an authorized Daihatsu dealer.
3. The 80,000s mile sensor switch has been so constructed that it is necessary to remove the bulb of the O₂S warning lamp to extinguish the O₂S warning.

WRU92-BE456

OPERATION OF 80,000 MILE SENSOR SWITCH

The place of ten-thousand of the odometer is connected directly to the pivot and idle gear. Each time the odometer counts 10,000 miles, the idle gear is turned one tooth.

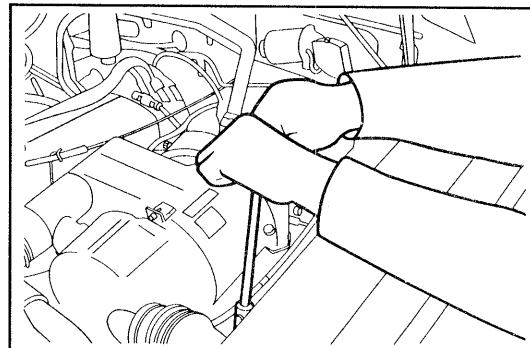
This operation is repeated, until the odometer reaches 80,000 miles, when the lever section of the microswitch rides on the cam of the cam gear, thereby energizing the microswitch. As a result, a circuit is formed for the O₂ sensor warning system and the O₂S warning lamp glows.



WRU90-BE048

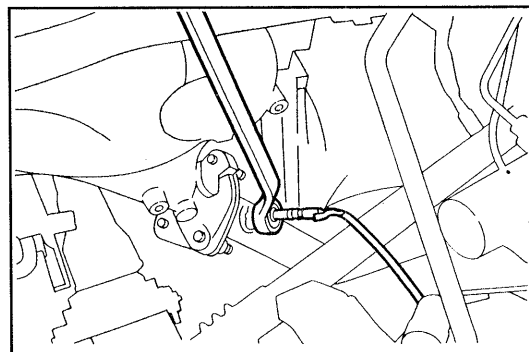
REMOVAL

1. Remove the air cleaner case assembly.



WRU90-BE334

2. Remove the O₂ sensor.

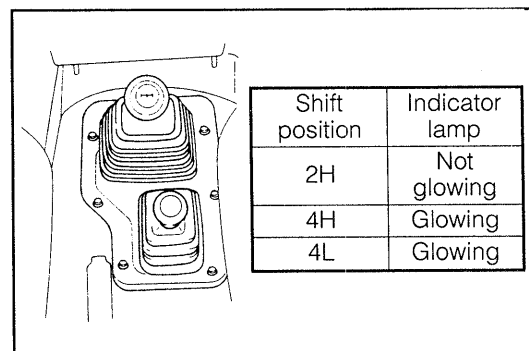


WRU90-BE335

2-9. 4WD INDICATOR LAMP

IN-VEHICLE CHECK

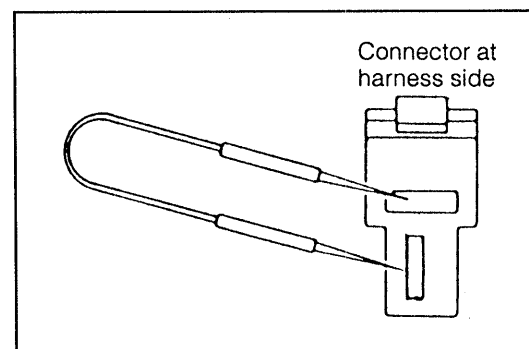
1. Turn ON the ignition switch.
2. Place the transfer shift lever in the 4H or 4L position. Ensure that the indicator lamp glows.
3. Place the transfer shift lever in the 2H position. Ensure that the indicator lamp is extinguished.



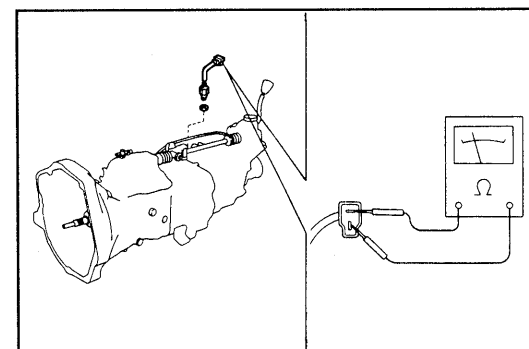
WRU92-BE457

INSPECTION

1. Pull out the connector located at the top side part of the transfer front case.
2. Short the connector at the harness side.
3. Ensure that the 4WD indicator glows when the engine switch is turned on.
4. Pull out the connector of the transfer position detect switch and connect a tester.
5. Shift the transfer shift lever to 4H and 4L. Ensure that continuity exists between the connector terminals.



WRU90-BE050

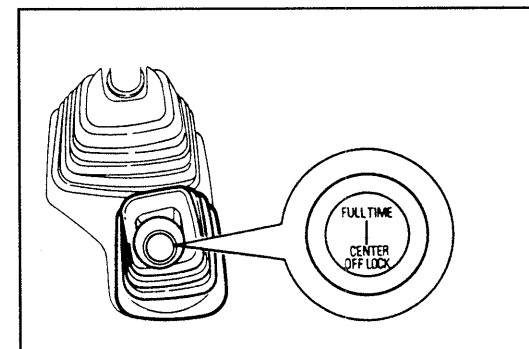


WRU90-BE051

2-10. DIFFERENTIAL LOCK INDICATOR LAMP

IN-VEHICLE CHECK

1. Turn ON the ignition switch.
2. Place the transfer shift lever in the CENTER DIFF LOCK position. Ensure that the indicator lamp glows.



WRU92-BE458

INSPECTION

1. Pull out the connector located at the top side part of the transfer front case.
2. Short the connector at the harness side.
3. Ensure that the DIFF-LOCK indicator glows when the engine switch is turned on.
4. Pull out the connector of the transfer position detect switch and connect a circuit tester.
5. Shift the transfer shift lever to CENTER DIFF LOCK. Ensure that continuity exists between the connector terminals.

WRU90-BE053

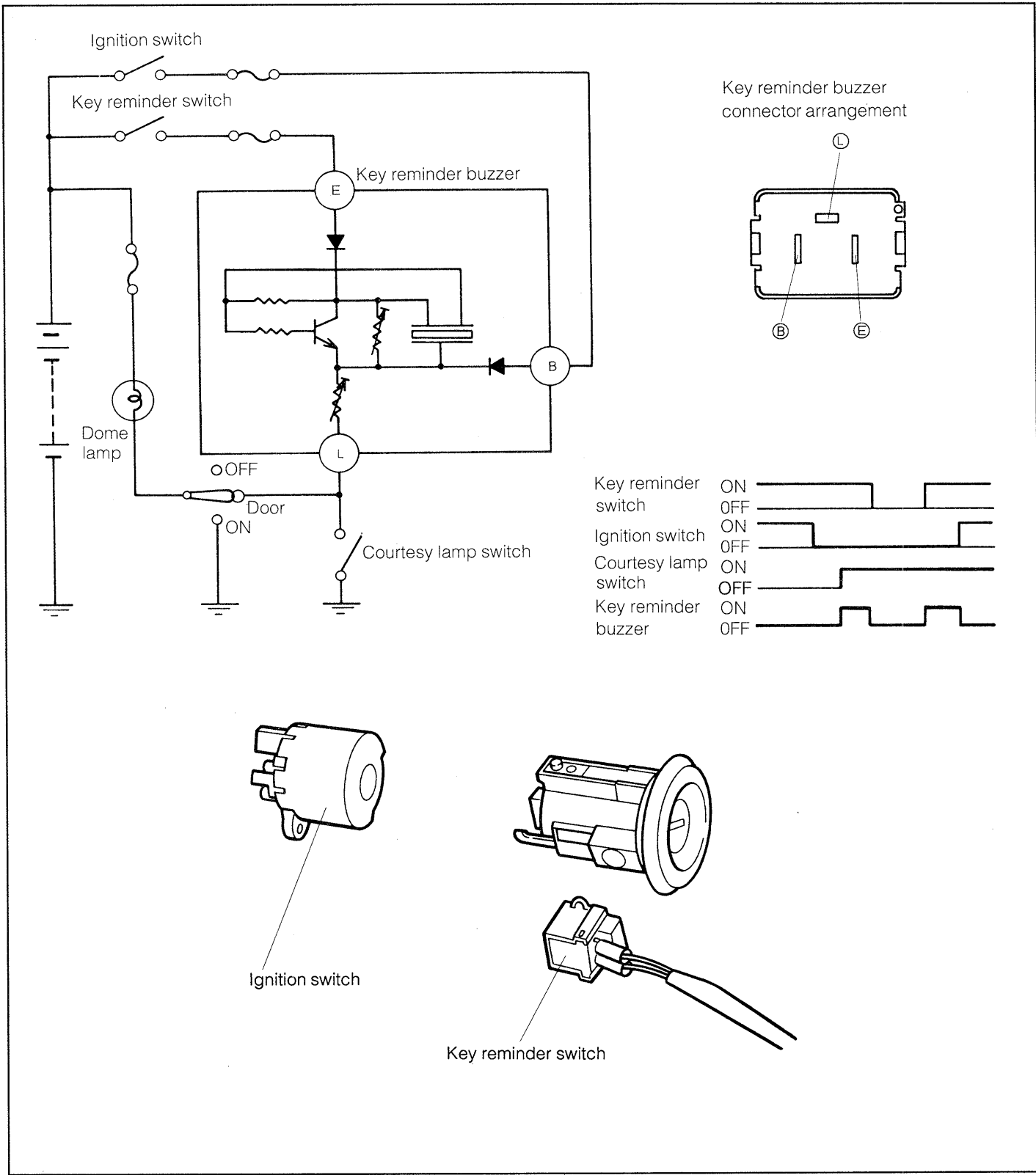
2-11. KEY REMINDER BUZZER

A key reminder buzzer is provided on all models in order that the ignition key may not be left inadvertently in the vehicle.

Furthermore, the key reminder buzzer system is actuated with the ignition key switch set to the ACC or Lock position when either the right door or the left door is opened.

WRU92-BE459

CIRCUIT DIAGRAM

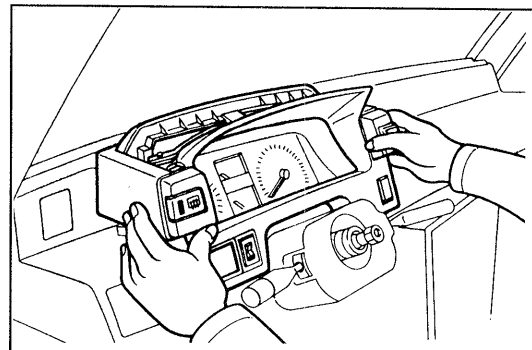


WRU90-BE336

KEY REMINDER SWITCH

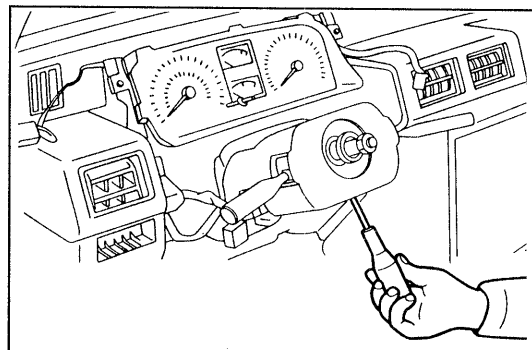
Removal

1. Remove the instrument panel finish lower panel.
- NOTE:**
- The removal of the steering wheel in advance will facilitate this removal operation.



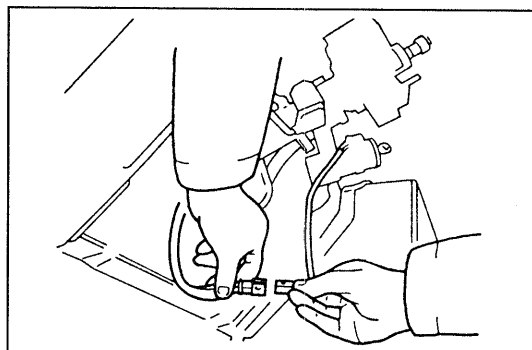
WRU90-BE055

2. Remove the instrument cluster finish panel subassembly.



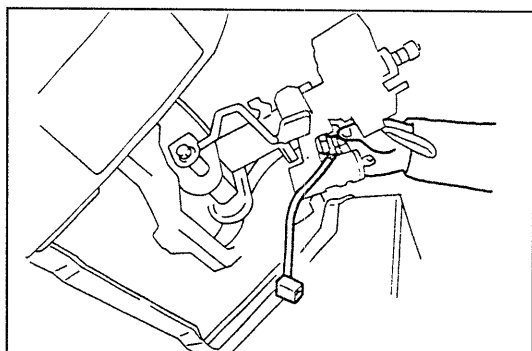
WRU90-BE056

3. Remove the steering column lower/upper cover.



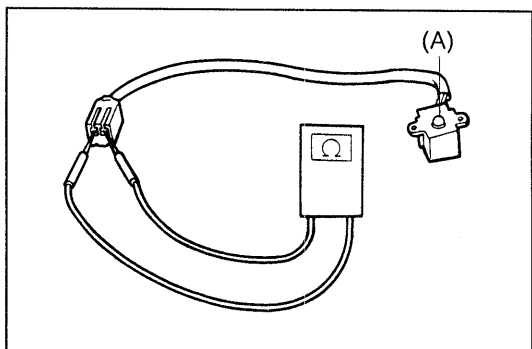
WRU92-BE449

4. Remove the coupler of the key reminder buzzer switch.



WRU92-BE450

5. Remove the key reminder buzzer switch.



WRU90-BE337

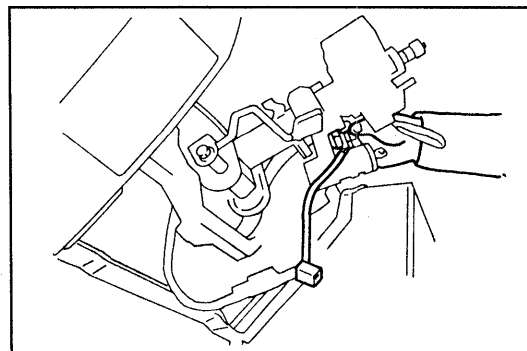
Inspection

1. Continuity check
 - (1) Ensure that no continuity exists when the section (A) in the right figure is held in a pushed state.
 - (2) Ensure that continuity exists when the section (A) in the right figure is not held in a pushed state.

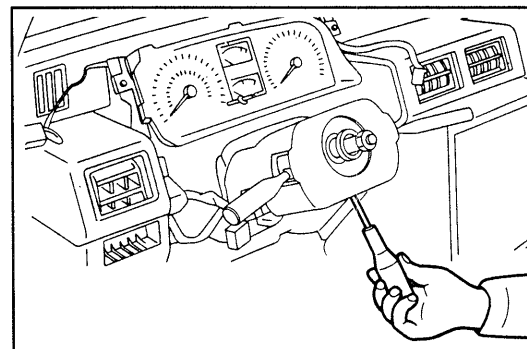
BODY ELECTRICAL SYSTEM

Installation

1. Connect the coupler of the key reminder buzzer switch.
2. Install the key reminder buzzer switch to the ignition key cylinder.
3. Install the steering column lower/upper cover.
4. Install the instrument cluster finish panel subassembly.
5. Install the steering wheel subassembly.
6. Install the instrument panel finish lower panel.



WRU90-BE338

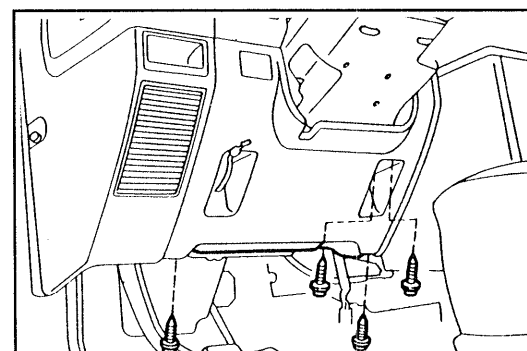


WRU90-BE059

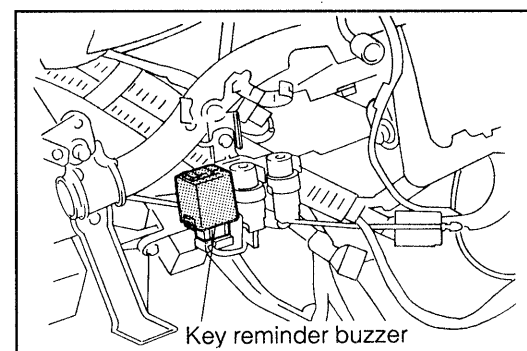
KEY REMINDER BUZZER

Removal

1. Removal of instrument panel finish lower panel
 - (1) Remove the hood lock control lever by removing the two screws. Disconnect the hood lock control cable from the hood lock control lever.
 - (2) Remove the instrument panel finish lower panel by removing the four screws.
 - (3) Disconnect the connector of the rear heater switch.
 - (4) Remove the rear heater switch from the instrument panel finish lower panel.
2. Remove the key reminder buzzer.



WRU90-BE060



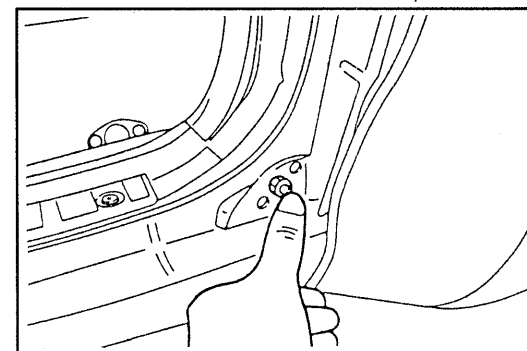
WRU90-BE061

Inspection

1. If the key reminder buzzer system is malfunctioning when the key reminder switch is functioning properly, replace the key reminder buzzer.
2. If the key reminder buzzer system is malfunctioning when the key reminder switch and key reminder buzzer are functioning properly, replace either the right or left courtesy lamp switch.

Installation

1. Install the key reminder buzzer.
2. Install the instrument panel finish lower panel.

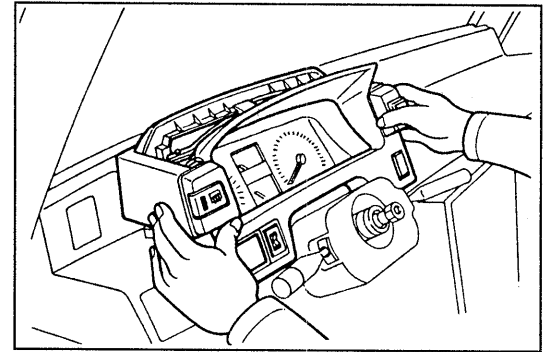


WRU90-BE062

3. IGNITION KEY SWITCH

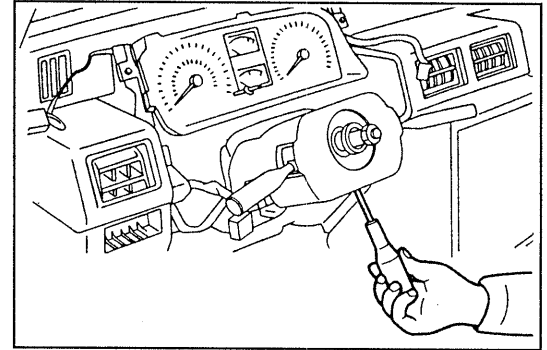
REMOVAL

1. Remove the instrument panel finish lower panel.
 2. Remove the instrument cluster finish panel subassembly.
- NOTE:**
- The removal of the steering wheel in advance will facilitate this removal operation.



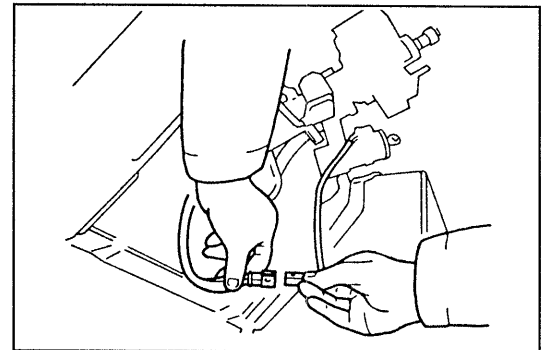
WRU90-BE063

3. Remove the steering column lower/upper cover.



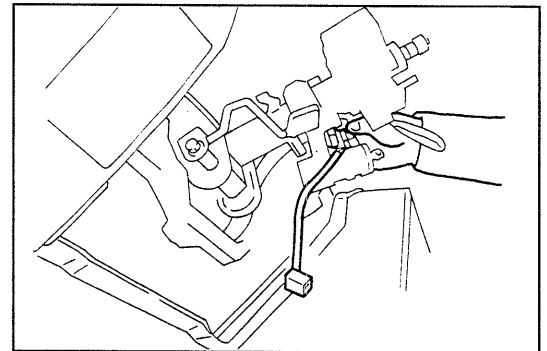
WRU90-BE064

4. Pull out the coupler of the key reminder buzzer switch.



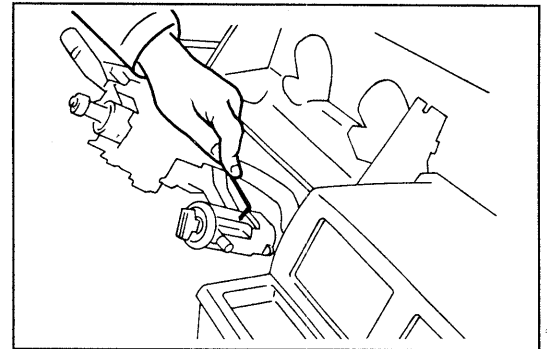
WRU92-BE451

5. Remove the key reminder buzzer switch.



WRU92-BE452

6. Remove the ignition key cylinder.
 - (1) Set the key to the ACC position.
 - (2) Push in the knock button, using a piece of wire, as indicated in the right figure.
 - (3) Draw out the ignition key cylinder.



WRU90-BE067

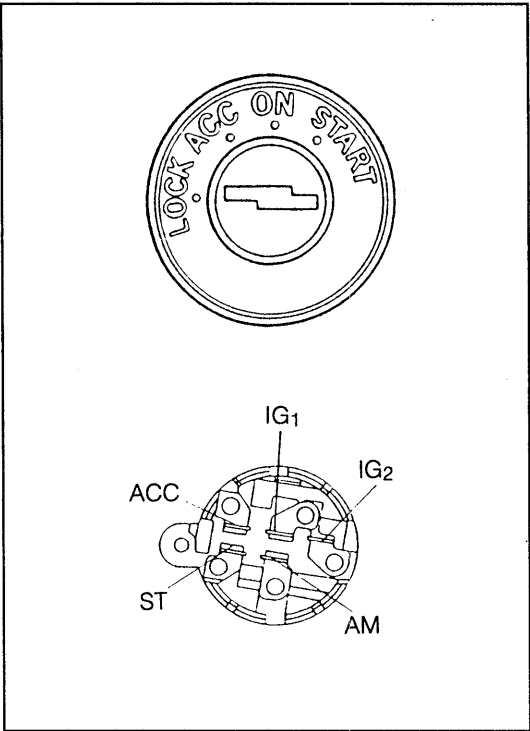
INSPECTION

Ensure that continuity exists between the respective terminals as indicated in the continuity table.

Continuity table

○ — ○ Continuity exists.

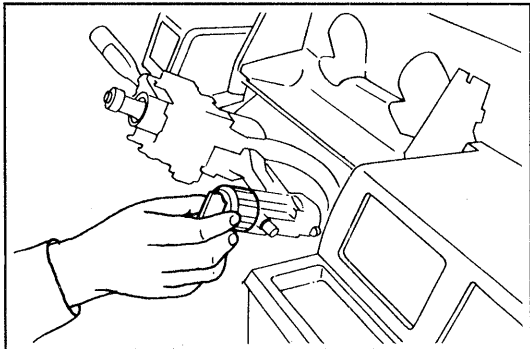
	AM	ACC	IG ₁	IG ₂	ST
LOCK					
↕					
ACC	○ — ○				
↕	○ — ○				
ON	○ — ○	○ — ○	○ — ○		
↕	○ — ○	○ — ○	○ — ○		
START	○ — ○		○ — ○	○ — ○	○ — ○



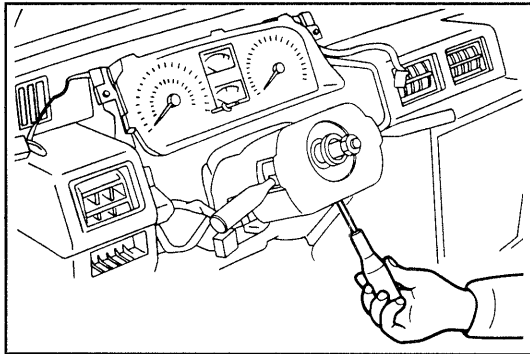
WRU90-BE339

INSTALLATION

1. Install the ignition key cylinder
 - (1) Set the key to the ACC position.
 - (2) Insert the ignition key cylinder.
2. Install the ignition key cylinder.
3. Connect the coupler of the ignition switch.
4. Install the steering column lower/upper cover.
5. Install the instrument cluster finish panel subassembly.
6. Install the instrument panel finish lower panel.
7. Install the steering wheel subassembly.



WRU90-BE340

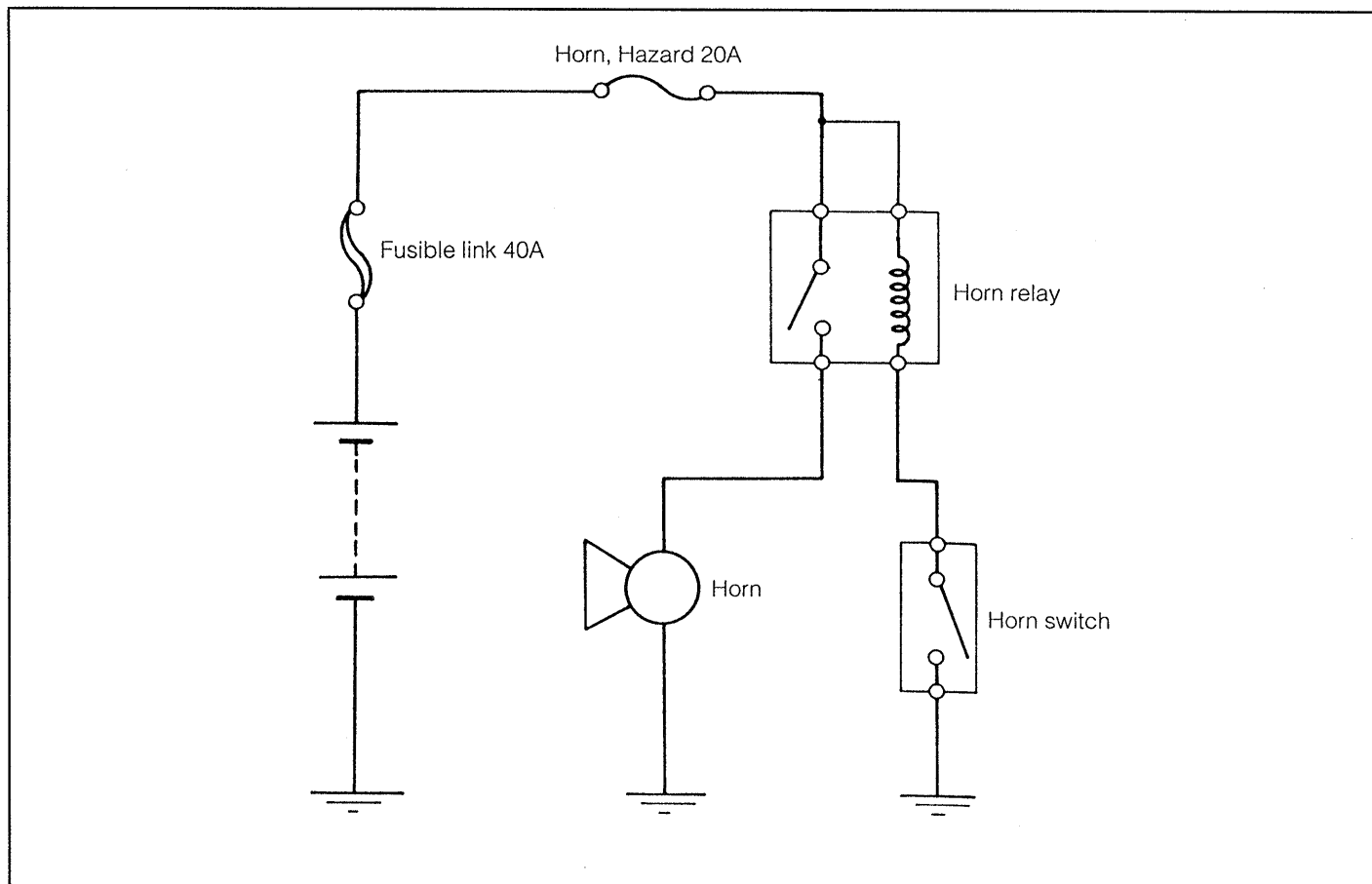


WRU90-BE068

4. HORN

The horn is installed at the front of the radiator support panel. A single horn is provided on all models.

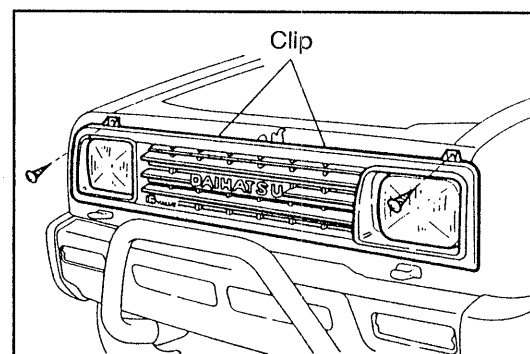
CIRCUIT DIAGRAM



WRU90-BE069

REMOVAL

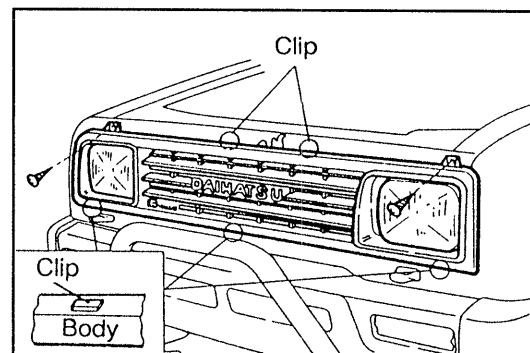
1. Removal of radiator grille
 - (1) Remove the two screws.
 - (2) Detach the two clips, using a screwdriver.
 - (3) Remove the radiator grille from the vehicle body by raising it diagonally toward you.
2. Removal of horn assembly



WRU90-BE341

INSTALLATION

1. Install the horn assembly.
2. Installation of headlamp grille
 - (1) Ensure that three clips are provided at the body side.
 - (2) Set the headlamp grille on the body. Secure the headlamp grille with the two clips at the upper side.
 - (3) Attach the headlamp grille to the body with the two screws.



WRU90-BE342

BODY ELECTRICAL SYSTEM

4-1. HORN RELAY

INSPECTION

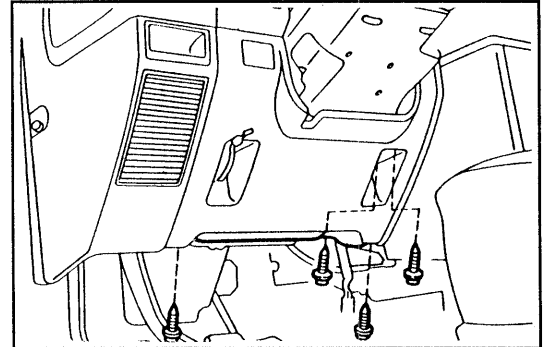
If the sound quality and/or sound level is abnormal when the following unit inspection reveals no malfunction, replace the horn relay.

- (1) Fuse 20A (Horn, Hazard)
- (2) Horn switch
- (3) Horn assembly

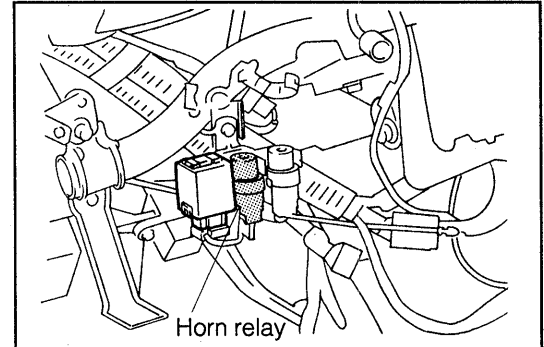
REMOVAL

1. Removal of instrument panel finish lower panel
 - (1) Remove the hood lock control lever by removing the two screws. Disconnect the hood lock control cable from the hood lock control lever.
 - (2) Remove the instrument panel finish lower panel by removing the four screws.
 - (3) Disconnect the connector of the rear heater switch.
 - (4) Remove the rear heater switch from the instrument panel finish lower panel.
2. Remove the horn relay.

WRU90-BE070



WRU90-BE343



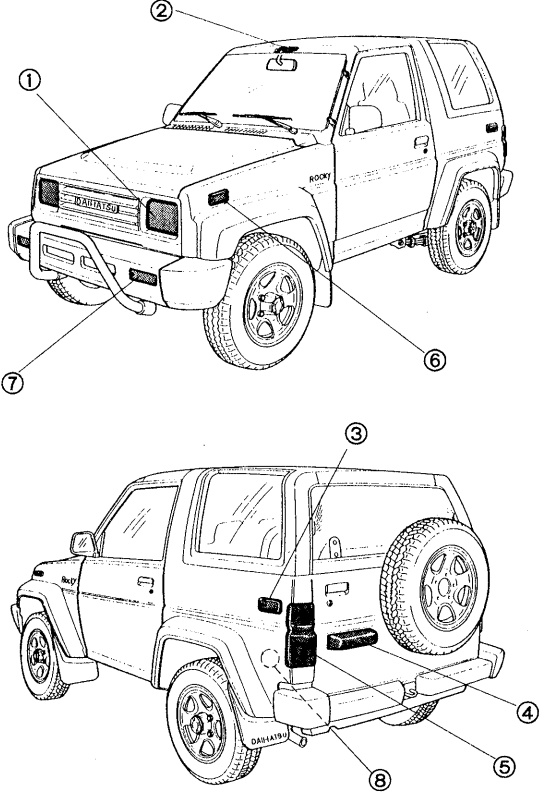
WRU90-BE344

INSTALLATION

1. Install the horn relay.
2. Install the instrument panel finish lower panel.

WRU90-BE071

5. LIGHTING



	Light	Wattage
①	Candescent head lamps	65/55
	Halogen head lamps	63/35
②	Room lamp	10
③	Rear side marker lamps	5
④	Licence plate lamps	5
⑤	Stop, rear turn signal lamps	27
	Back-up lamps	27
	Tail lamps	8
⑥	Front marker lamps	5
⑦	Front turn signal lamps	27
	Clearance lamps	8
⑧	Luggage room lamp	8

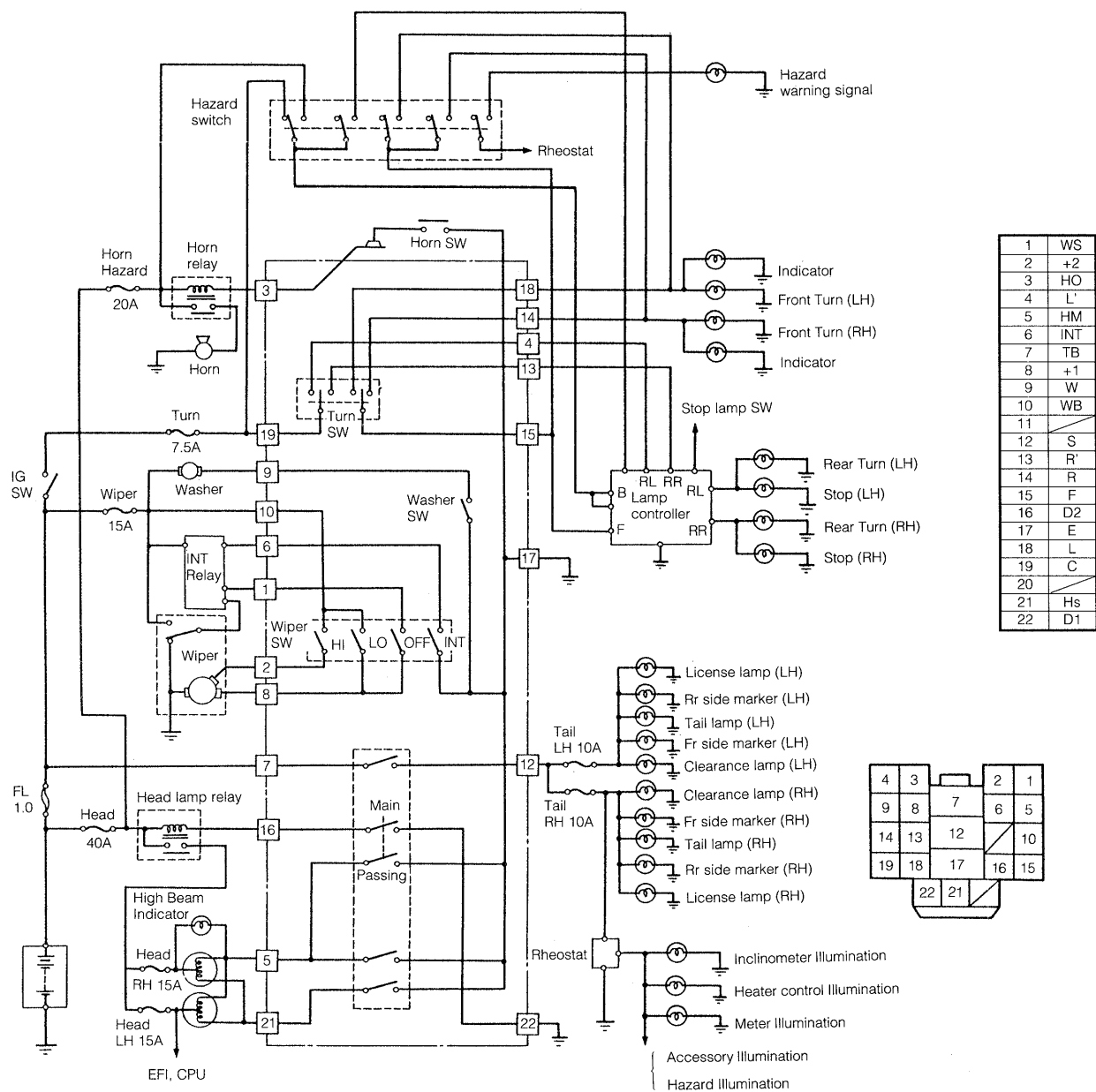
WRU90-BE072

5-1. TROUBLE SHOOTING

Problem	Possible cause	Remedies
One headlamp will not glow.	<ul style="list-style-type: none"> • Burnt bulb • Faulty socket • Faulty wiring or fuse blown out 	<ul style="list-style-type: none"> • Replace bulb. • Repair, as repaired.
Headlamps will not glow.	<ul style="list-style-type: none"> • Fusible link and/or fuse blown out • Faulty lighting switch • Faulty wiring or earth 	<ul style="list-style-type: none"> • Replace fusible link and/or fuse. • Check switch. • Repair, as required.
High beam or low beam will not glow.	<ul style="list-style-type: none"> • Faulty lighting switch or dimmer switch • Faulty wiring 	<ul style="list-style-type: none"> • Check switch. • Repair, as required.
Clearance lamp, tail lamp or license lamp will not glow.	<ul style="list-style-type: none"> • "Tail" fuse blown out • Fusible link blown out • Faulty side lamp switch • Faulty wiring or earth 	<ul style="list-style-type: none"> • Check for short. Replace fuse. • Replace fusible link. • Check switch. • Repair, as required.
Turn signal lamps at one side will not glow.	<ul style="list-style-type: none"> • Faulty turn signal lamp switch • Faulty wiring or earth 	<ul style="list-style-type: none"> • Check switch. • Repair, as required.
Turn signal lamps at both side will not glow.	<ul style="list-style-type: none"> • "Turn" fuse blown out • Faulty turn signal/hazard switch • Faulty turn signal flasher relay • Faulty wiring or earth 	<ul style="list-style-type: none"> • Check for short. Replace fuse. • Check switch. • Check flasher relay • Repair, as required.
Stop lamp will not glow.	<ul style="list-style-type: none"> • "Stop" fuse blown out • Faulty stop lamp switch • Faulty wiring or earth 	<ul style="list-style-type: none"> • Check for short. Replace fuse. • Check switch. • Repair, as required.
Stop lamp remains in glow state.	<ul style="list-style-type: none"> • Faulty stop lamp switch. 	<ul style="list-style-type: none"> • Adjust or replace switch.
Hazard warning lamp will not glow.	<ul style="list-style-type: none"> • "Horn" fuse blown out • Faulty flasher relay • Faulty hazard switch • Faulty wiring or earth 	<ul style="list-style-type: none"> • Check for short. Replace fuse. • Check flasher. • Check switch. • Repair, as required.

WRU90-BE073

5-2. WIRING DIAGRAM



1	WS
2	+2
3	HO
4	L'
5	HM
6	INT
7	TB
8	+1
9	W
10	WB
11	
12	S
13	R'
14	R
15	F
16	D2
17	E
18	L
19	C
20	
21	Hs
22	D1

4	3		2	1
9	8	7	6	5
14	13	12		10
19	18	17	16	15
	22	21		

Light & dimmer Passing Switch

		5	21	17	7	12	22	16
OFF	HF							
	HL							
	LU							
	HF							
I	HL							
	HU							
	HF							
	HL							
II	HL							
	HU							
	HF							
	HL							

Turn signal switch

	15	18	14	19	4	13
L						
N	x	x	x	x	x	x
R						

Wiper switch

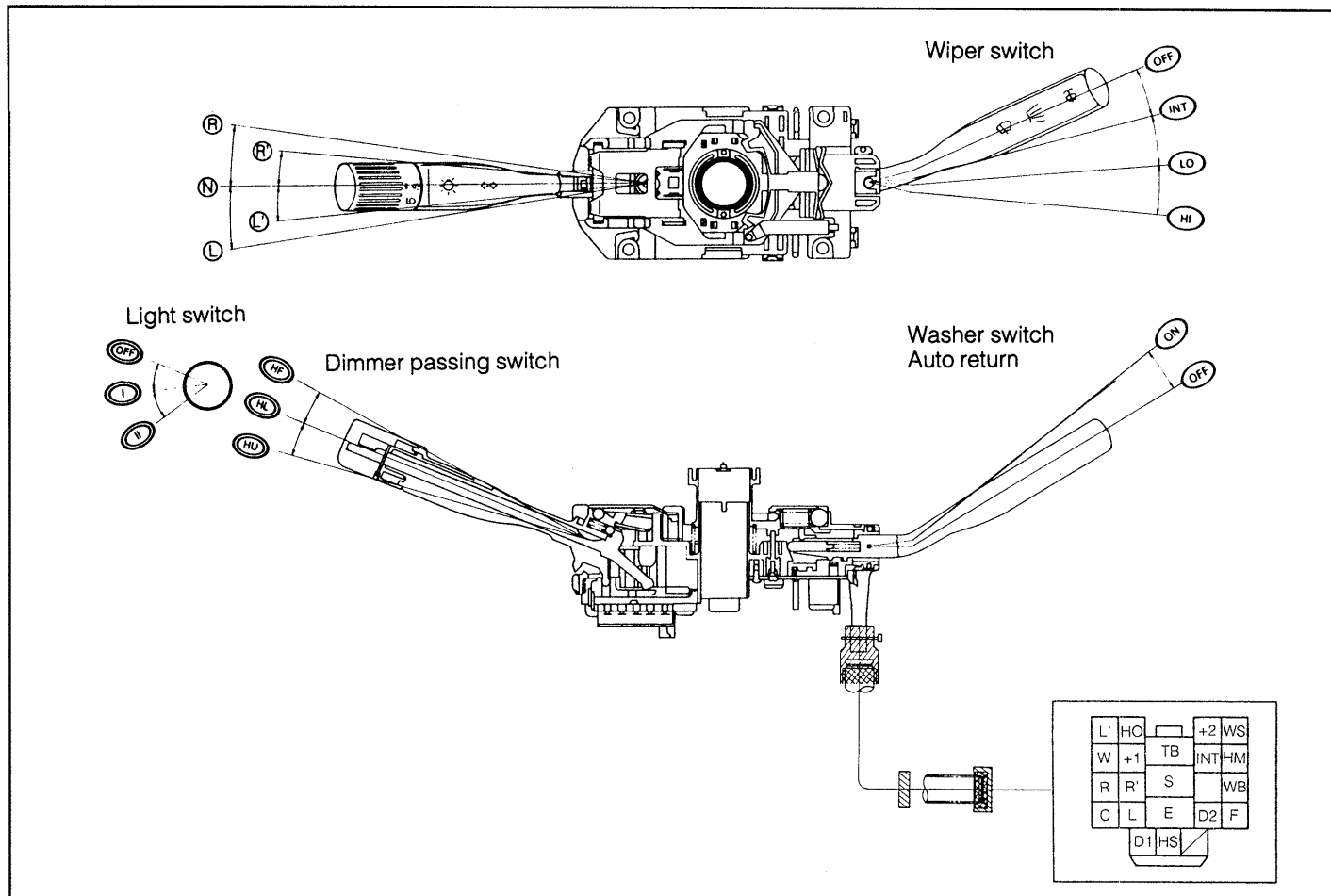
	1	8	2	6	17	10
OFF						
INT						
LO	x					x
HL						

Washer switch

	9	17
OFF		
ON		

5-3. MULTI-USE LEVER SWITCH

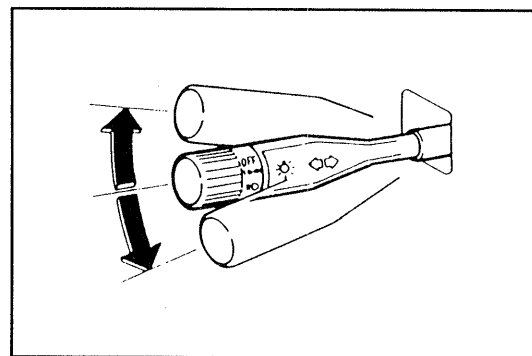
A multi-use lever type in which all switches to be used most frequently during the driving, such as the lighting switches, turn signal switch and wiper switch, are arranged concentrated around the steering column has been employed.



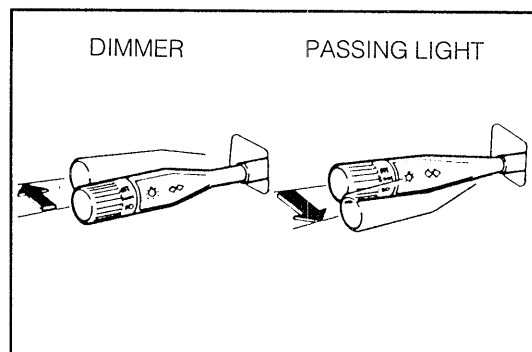
WRU90-BE075

INSPECTION

1. Ensure that each of the turn signal, dimmer, lighting, hazard warning and front wiper switches is functioning smoothly with a positive detent feeling.
2. With the ignition switch turned ON, move the turn signal switch to the right or left. Ensure that the turn signal indicator lamp flashes.
3. Ensure that the upper beam indicator lamp glows regardless of the ignition switch position when the dimmer switch and passing light switch are operated.



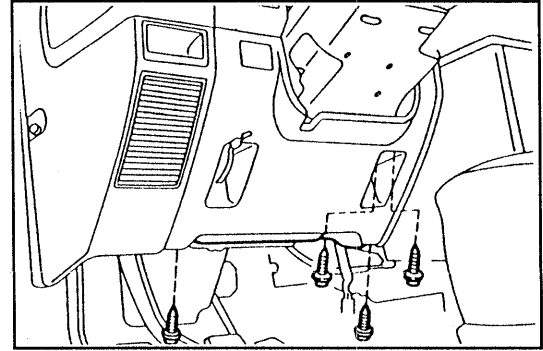
WRU90-BE076



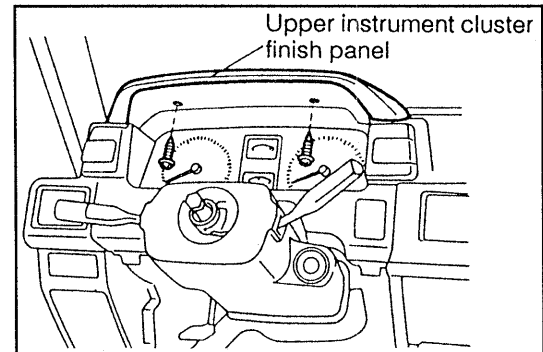
WRU90-BE077

REMOVAL

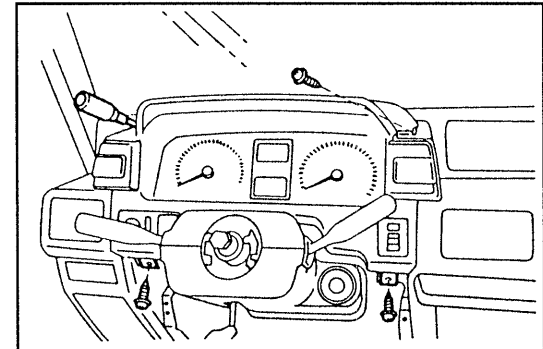
1. Disconnect the battery cable from the negative \ominus terminal.
2. Remove the steering wheel assy.
3. Remove lower instrument panel finish panel.



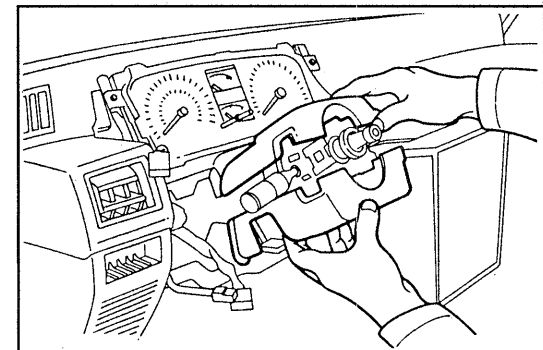
4. Remove the upper instrument cluster finish panel by removing the two screws.



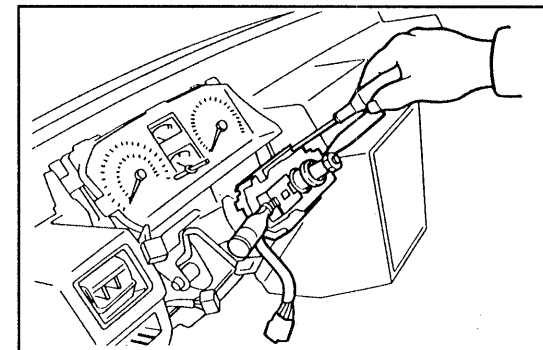
5. Removal of instrument cluster finish panel subassembly
 - (1) Remove the instrument cluster finish panel subassembly by removing the four screws.
 - (2) Disconnect the connectors.



6. Remove the steering column lower/upper cover.

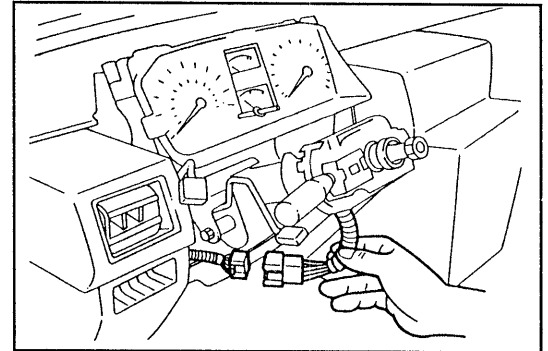


7. Remove the coupler of the multi-use lever.
8. Remove the multi-use lever switch.

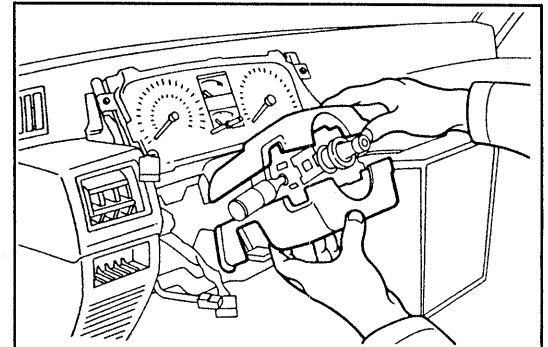


INSTALLATION

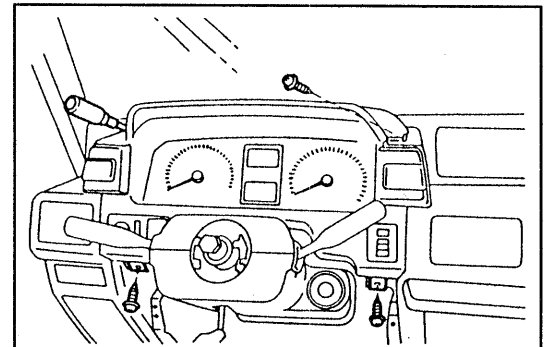
1. Install the multi-use lever switch. Connect the coupler.
2. Install the steering column lower/upper cover.
3. Install the instrument cluster finish panel subassembly.
4. Install the instrument cluster finish upper panel.
5. Install the instrument cluster finish lower panel.
6. Install the steering wheel subassembly.
7. Connect the battery cable to the negative \ominus terminal.



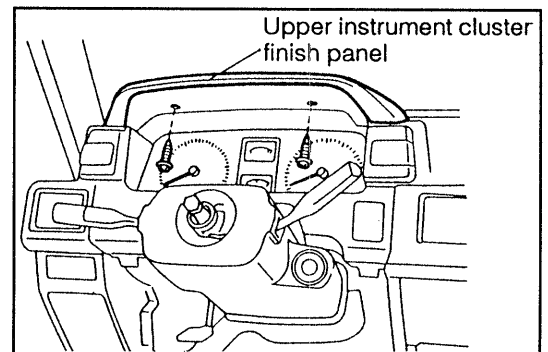
WRU90-BE349



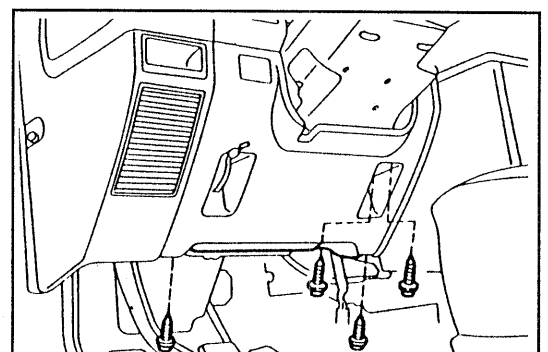
WRU90-BE350



WRU90-BE351



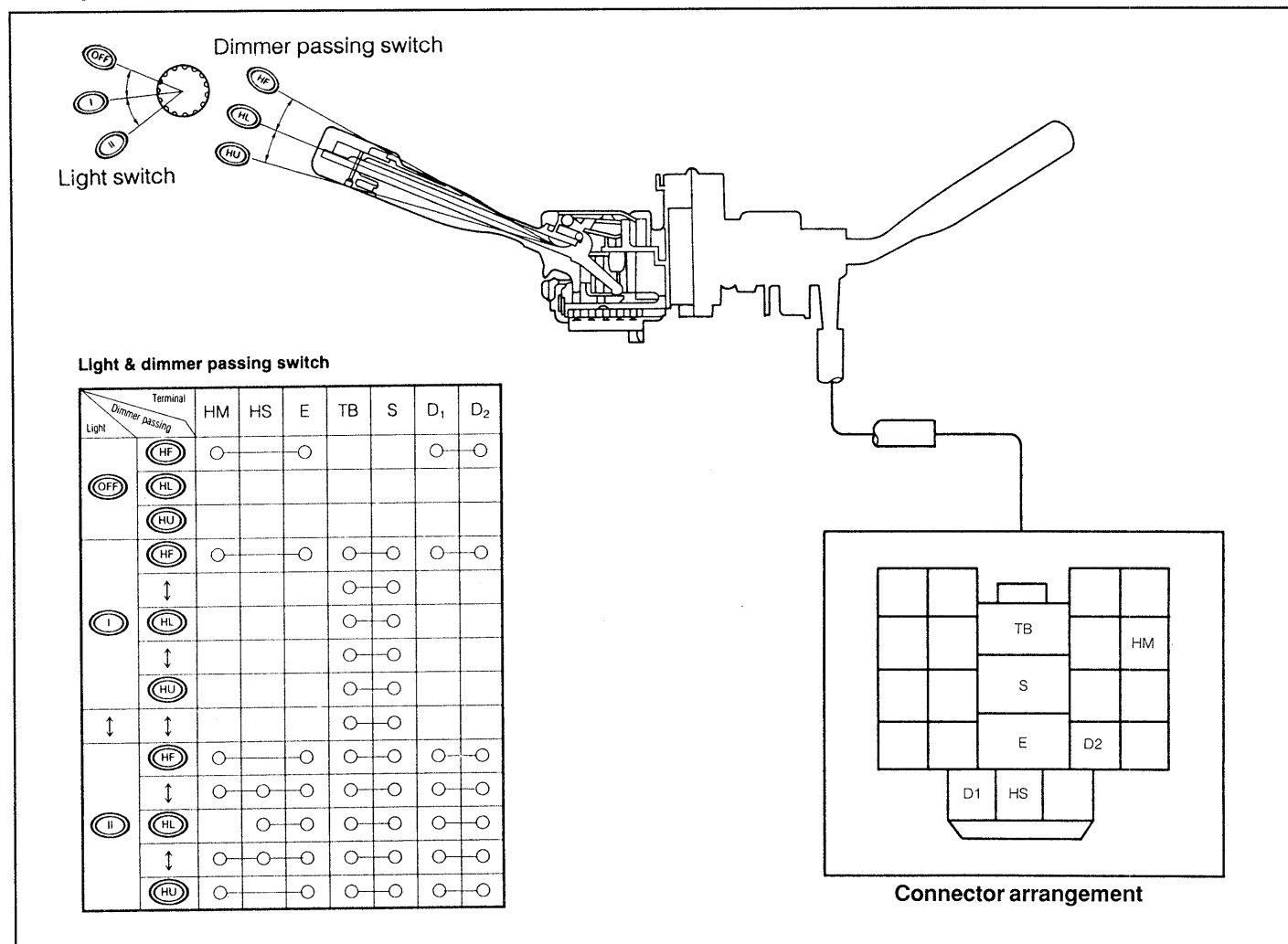
WRU90-BE352



WRU90-BE079

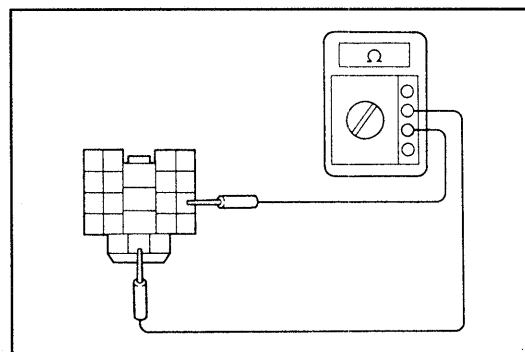
INSPECTION

1. Light & dimmer passing switch



WRU90-BE353

1. Ensure that continuity exists between the terminals of the connector, as indicated in the table above.

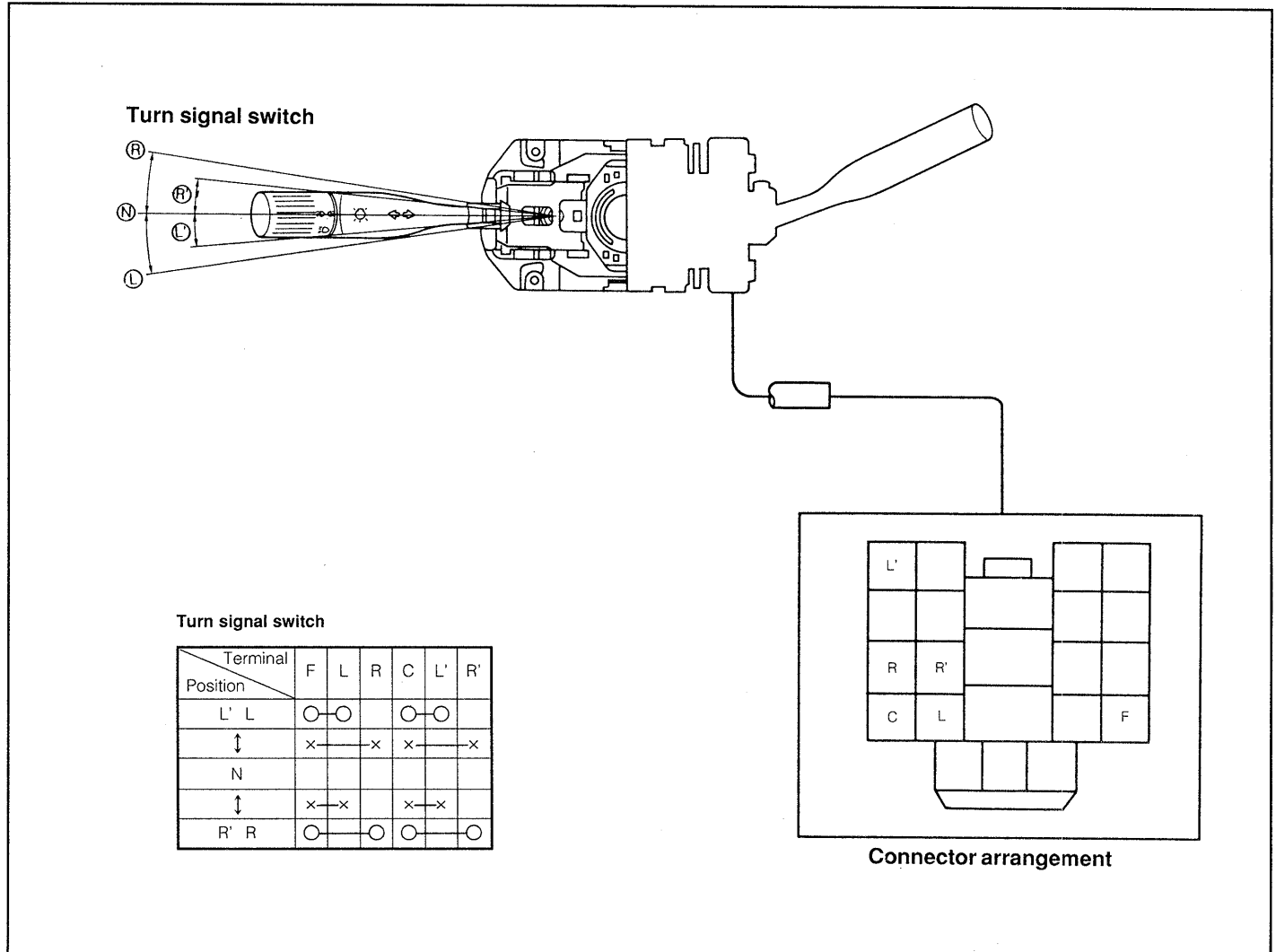


WRU90-BE354

2. Operate the light switch and dimmer passing switch. Ensure that each switch can be operated without any binding and with a detent feeling.

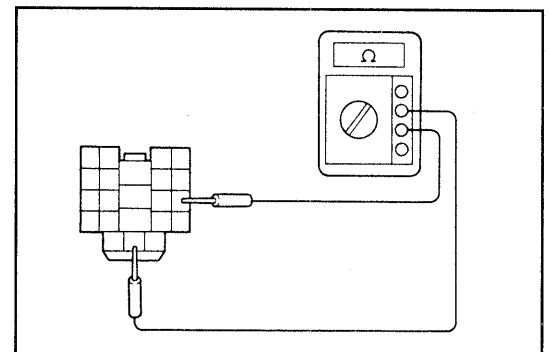
WRU90-BE355

2. Turn signal switch



WRU90-BE356

1. Ensure that continuity exists between the terminals of the connector, as indicated in the table above.



WRU90-BE357

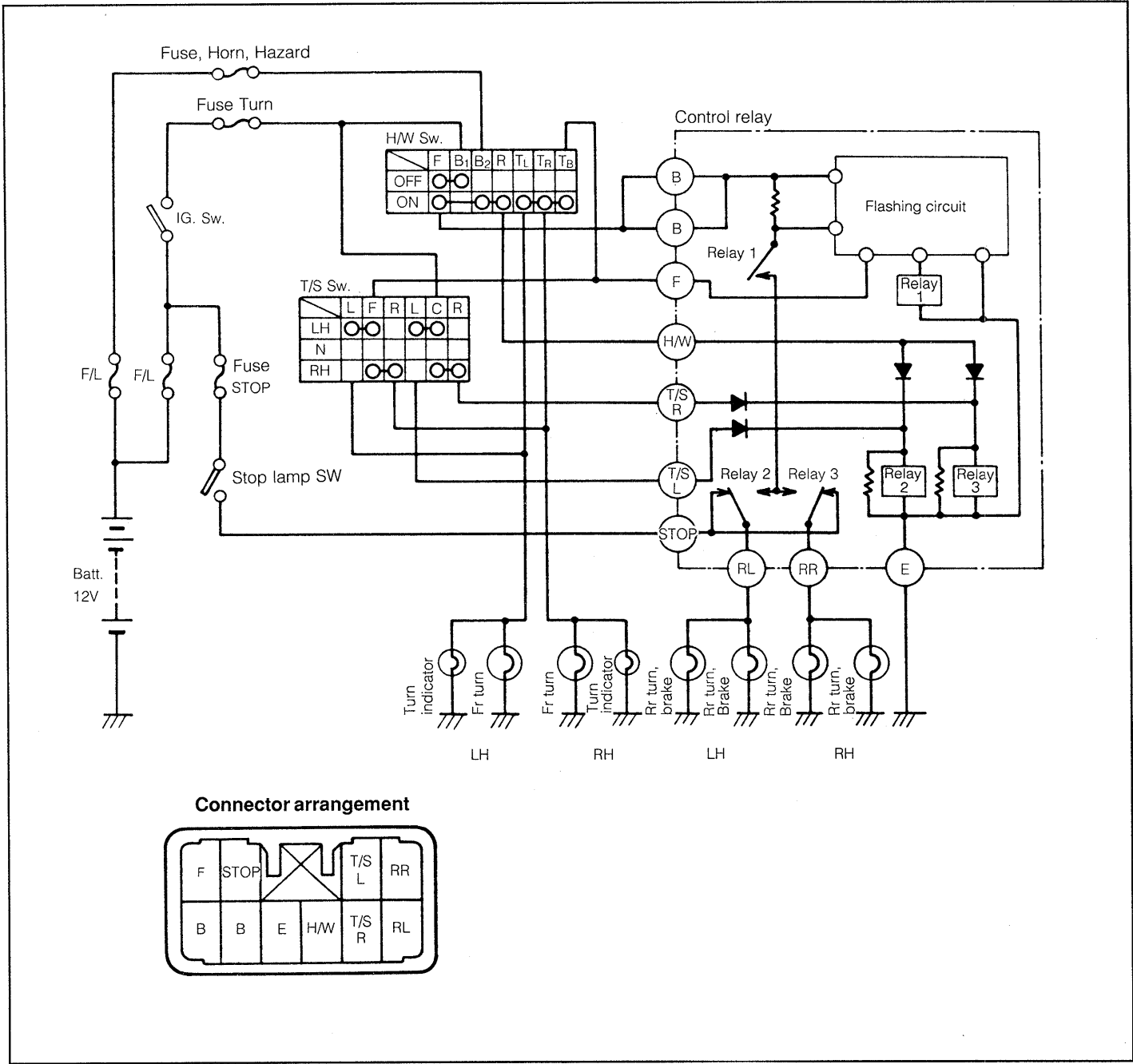
2. Ensure that the turn signal switch can be operated smoothly and with a detent feeling.

WRU90-BE358

5-4. LAMP CONTROL RELAY

The lamp control relay controls all operations of the brake lamp, turn signal and hazard warning.

CIRCUIT DIAGRAM



WRU90-BE080

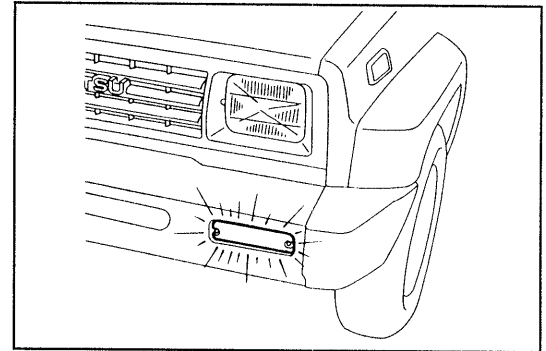
INSPECTION OF THE CONTROL RELAY

- Perform the inspection 1 through 8 described in the table below. Check each lamp for the state of glowing, flashing and not glowing.

Specified Flashing Speed: 85 ± 10 times/min.

NOTE:

- If any of the front or rear turn signal lamps has open wire, the flashing speed will exceed 120 times/min.
- If any abnormality is found in the inspection, check for burnt bulb and check each switch. When no abnormality is found in these checks, replace the lamp control relay.



WRU90-BE081

Contents of inspection	Mode	Switch mode			Lamp mode			
	Switch	Turn SW.		Hazard SW.	LH		RH	
	Stop lamp SW	LH	RH		Rr turn, brake	Fr turn, turn indicator	Rr turn, brake	Fr turn, turn indicator
1	OFF	OFF	OFF	OFF	×	×	×	×
2	OFF	ON	OFF	OFF	☆	☆	×	×
3	OFF	OFF	ON	OFF	×	×	☆	☆
4	OFF	ON or OFF	ON or OFF	ON	☆	☆	☆	☆
5	ON	OFF	OFF	OFF	○	×	○	×
6	ON	ON	OFF	OFF	☆	☆	○	×
7	ON	OFF	ON	OFF	○	×	☆	☆
8	ON	ON or OFF	ON or OFF	ON	☆	☆	☆	☆

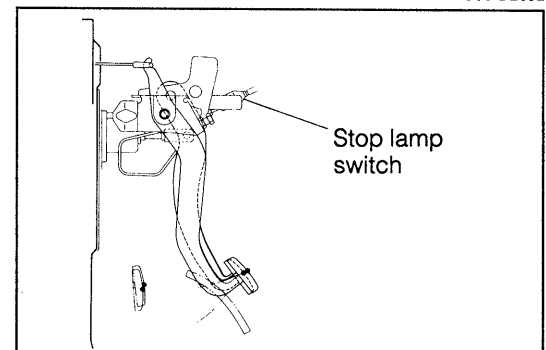
× - Not glowing
 ○ - Glowing
 ☆ - Flashing

WRU90-BE082

5-5. STOP LAMP SWITCH

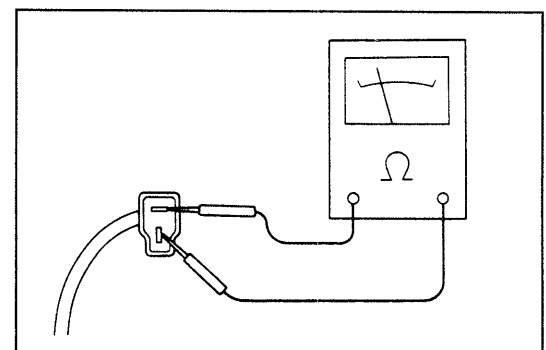
INSPECTION

- Disconnect the connector of the stop lamp switch.
- Ensure that continuity exists between the terminals when the brake pedal is depressed.



WRU90-BE083

- Ensure that no continuity exists between the terminals when the brake pedal is not depressed.

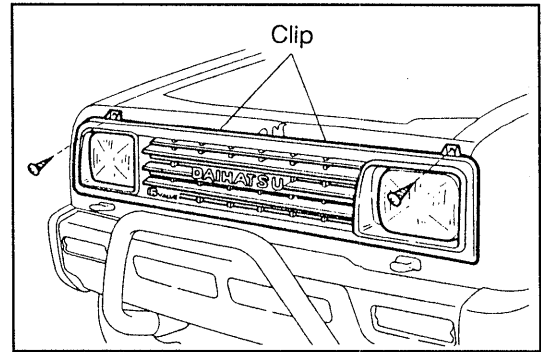


WRU90-BE359

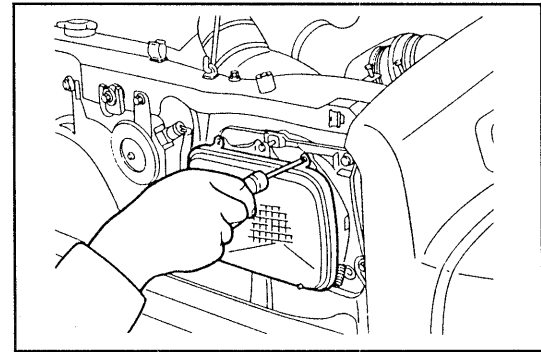
5-6. HEADLAMP

REMOVAL

1. Removal of radiator grille
 - (1) Remove the two screws.
 - (2) Detach the two clips, using a screwdriver.
 - (3) Remove the radiator grille from the vehicle body by raising it diagonally toward you.
2. Remove the headlamp retainer by removing the four screws.
3. Disconnect the coupler.



WRU90-BE084



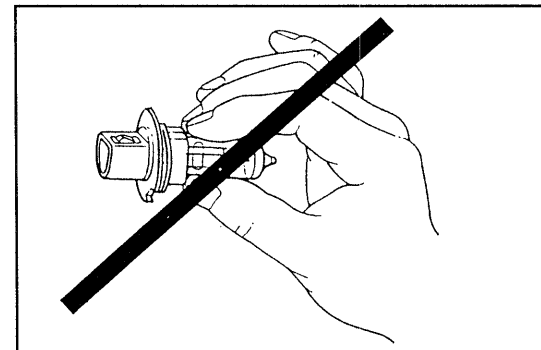
WRU90-BE085

Replacement of halogen headlamp bulb.

The bulb can be replaced from the engine compartment without a need of removing the headlamp proper.

WARNING:

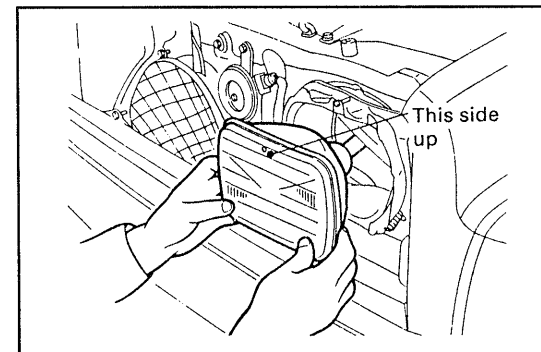
The halogen bulb reaches a very high temperature while it is put into use. If any lubricant gets on the bulb surface, it will result in significantly reduced lamp life. Hence, be very careful not to allow your fingers, etc. to touch with the glass portion during the replacement. Be sure to hold the flange section to replace the bulb.



WRU90-BE086

INSTALLATION

1. Connect the coupler to the headlamp. Install the coupler to the headlamp with the four screws.
2. Install the radiator grille.

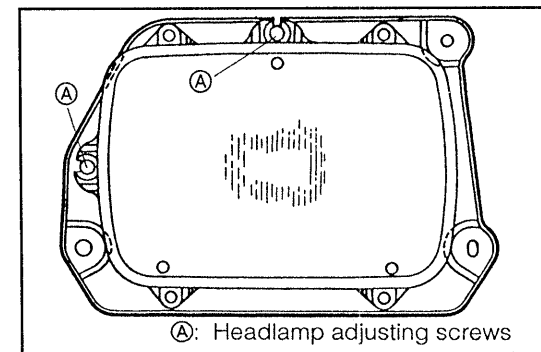


WRU90-BE360

Headlamp aiming adjustment

Perform the headlamp aiming adjustment, using a mechanical aimer, an aiming wall screen or a headlamp tester. When the headlamp aiming adjustment is performed using one of those aimers, ensure that the aimer has been well maintained. Also, carry out the adjustment in accordance with its instruction manual.

For details of the headlamp aiming adjustment, conform to your country requirements.

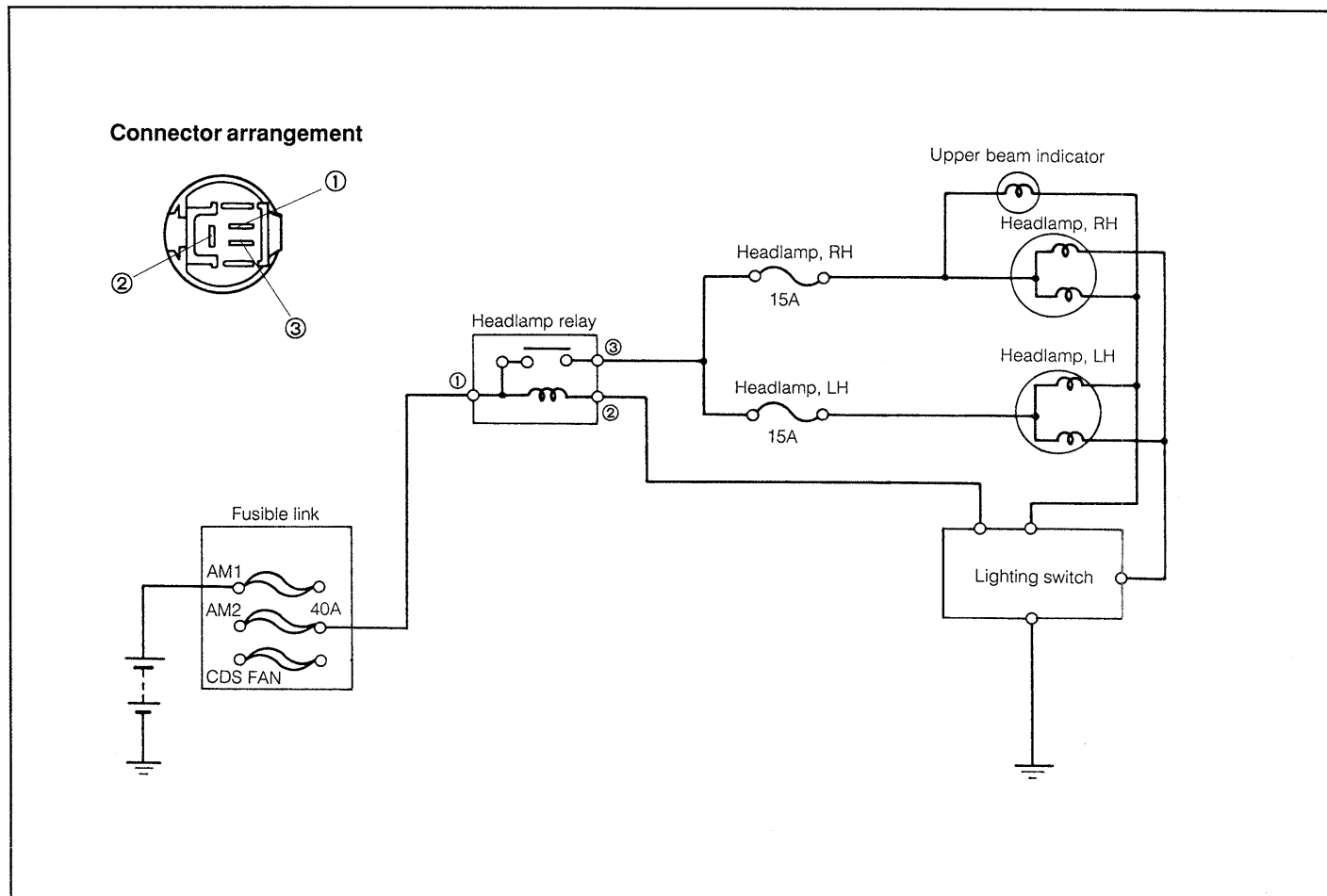


WRU90-BE361

5-7. HEADLAMP RELAY

The headlamp relay controls the operation of the right and left headlamps and lighting switch.

CIRCUIT DIAGRAM



WRU90-BE087

INSPECTION

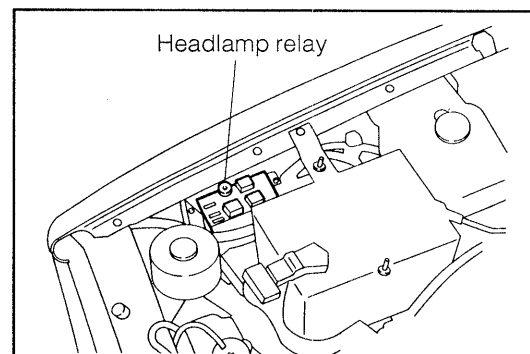
Perform unit inspection for the following parts. If the trouble persists with the headlamp, replace the headlamp relay.

- (1) Headlamp fuse, 15A (R/L)
- (2) Fusible link, 40 A (AM2)
- (3) Light & dimmer passing switch

WRU90-BE362

REPLACEMENT

Replace the headlamp relay inside the relay block fuse.

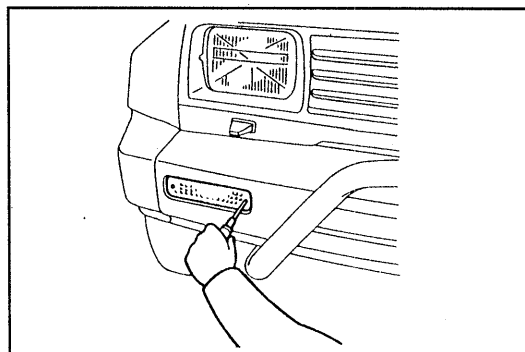


WRU90-BE363

5-8. FRONT TURN AND CLEARANCE LAMPS

REMOVAL

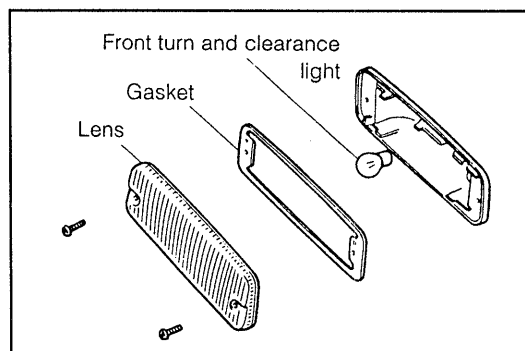
1. Remove the front turn signal lamp by removing the two screws.
2. Detach the lens and gasket.
3. Remove the turn signal bulb and clearance bulb.



WRU90-BE088

INSTALLATION

1. Connect the coupler to the bulb socket.
2. Install the front turn and clearance lamp with the two screws.

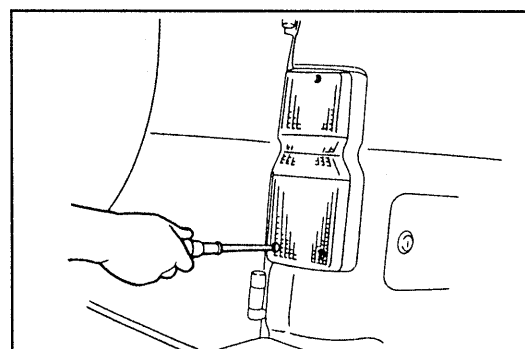


WRU90-BE364

5-9. REAR COMBINATION LAMPS

REMOVAL

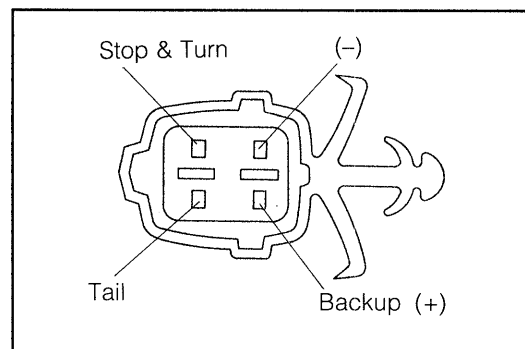
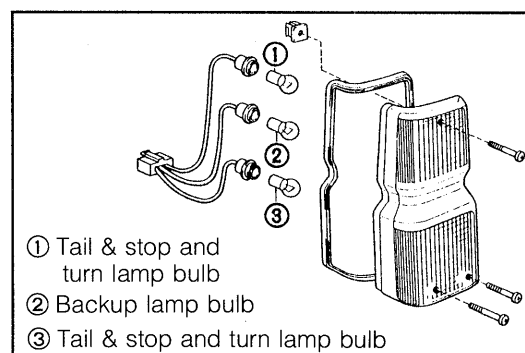
1. Remove the rear combination lamp assembly by removing the three screws.
2. Detach the socket and bulb.



WRU90-BE089

INSTALLATION

1. When the bulb is burnt out, install a new bulb with the designated wattage.
2. Install the bulb and socket in the rear combination lamp assembly.
3. Install the rear combination lamp assembly with the three screws.



WRU90-BE090

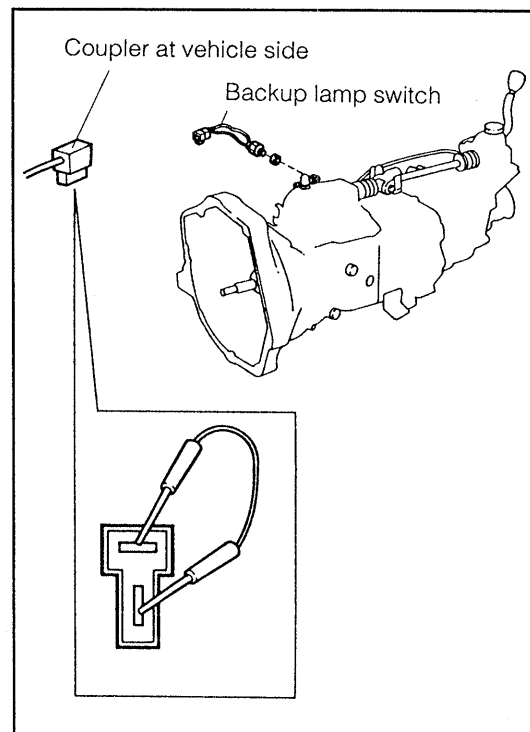
BACKUP LAMP SWITCH

The backup lamp switch is mounted on the transmission case cover.

Inspection

1. Draw out the coupler which is connected to the backup lamp switch. This disconnection should be made at the vehicle side. Then, short the coupler.
2. Ensure that the backup lamp goes on.
3. Connect the backup lamp switch coupler again. Place the transmission in the reverse gear.
4. If the backup lamp fails to go on, replace the backup lamp switch.

Tightening Torque: 0.3 - 0.5 kg-m
(2.2 - 3.6 ft-lb, 2.9 - 4.9 N·m)

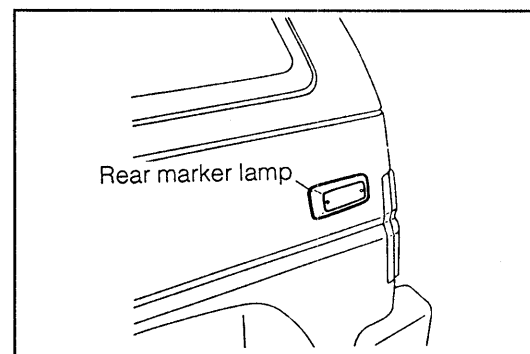
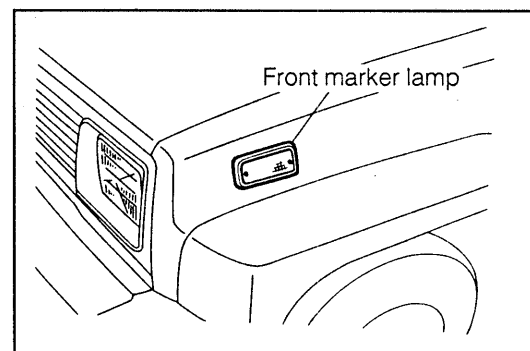


WRU90-BE365

5-10. FRONT AND REAR SIDE MARKER LAMPS

REMOVAL

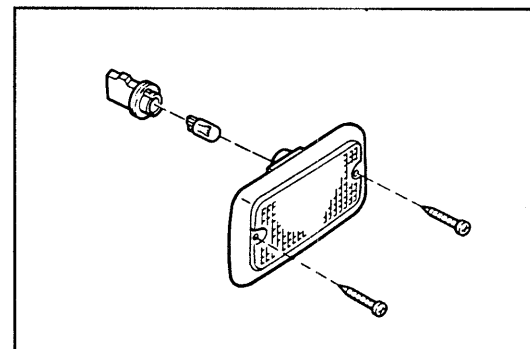
1. Remove the marker lamp by removing the two screws.
2. Remove the bulb.



WRU90-BE091

INSTALLATION

1. Install the bulb.
2. Install the side marker lamp with the two screws.



WRU90-BE092

5-11. LICENSE PLATE LAMP

NOTE:

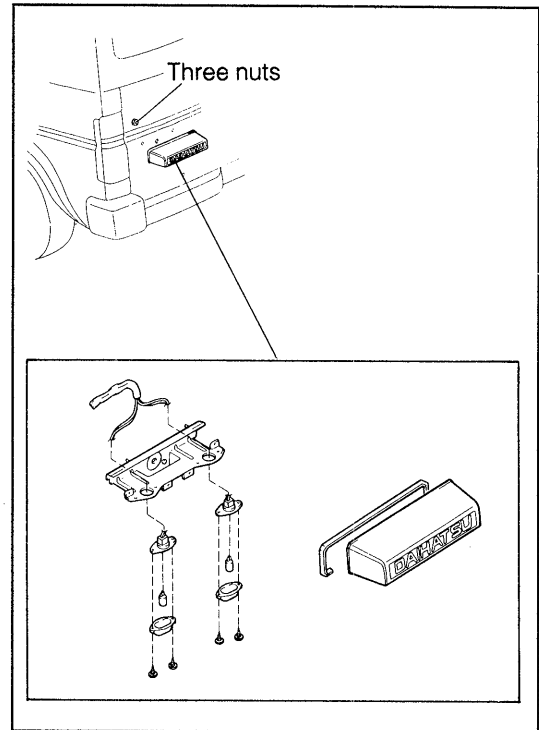
- It should be noted that the bulb replacement can be performed only after the lens has been detached by removing the two screws.
- Install a new bulb with the designated wattage.

REMOVAL

1. Remove the back door trim and back door service hole cover.
2. Disconnect the connector.
3. Remove the license plate lamp assembly by removing the three nuts.

INSTALLATION

1. Install the license plate lamp assembly with the three screws.
2. Connect the connector.
3. Install the back door service hole cover and back door trim.



WRU90-BE093

5-12. ROOM LAMP

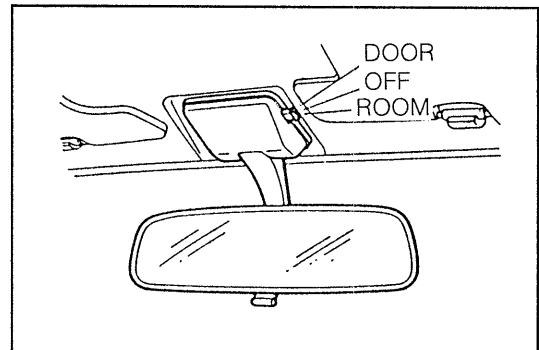
INSPECTION

1. When the room lamp switch is set to the ROOM position with the door in its closed state, the room lamp goes on.

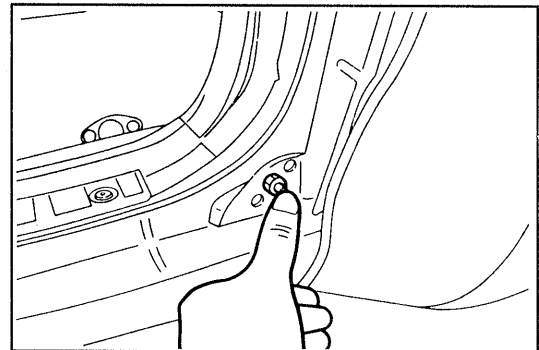
If the room lamp fails to go on, replace the room lamp bulb or the room lamp assembly.

2. When the courtesy lamp is pushed in repeatedly, the room lamp should go on and off.

If the room lamp fails to go on, replace the courtesy lamp or check for proper installation conditions.



WRU90-BE094



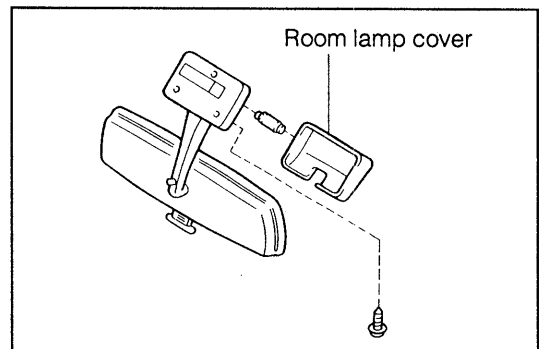
WRU90-BE366

NOTE:

- It should be noted that the bulb replacement can be performed only after the room lamp cover has been detached.

REMOVAL

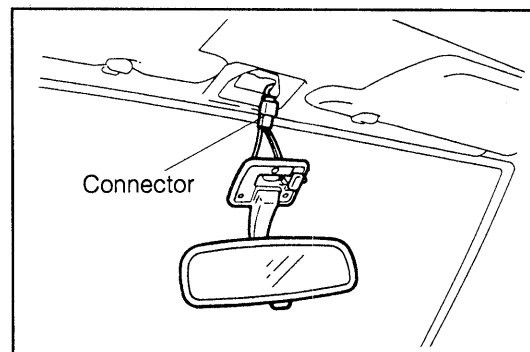
1. Detach the room lamp cover.
2. Remove the room lamp assembly by removing the three screws and disconnect the connector.



WRU90-BE095

INSTALLATION

1. Connect the connector.
2. Install the room lamp assembly with the three screws.
3. Attach the room lamp cover.



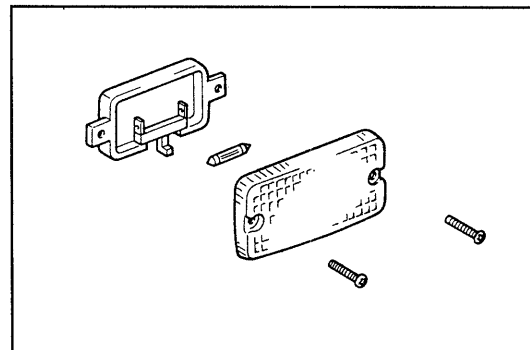
WRU90-BE367

5-13. LUGGAGE ROOM LAMP**REMOVAL**

1. Remove the two screws to detach the lamp assembly.
2. Pull the bulb straight out.

INSTALLATION

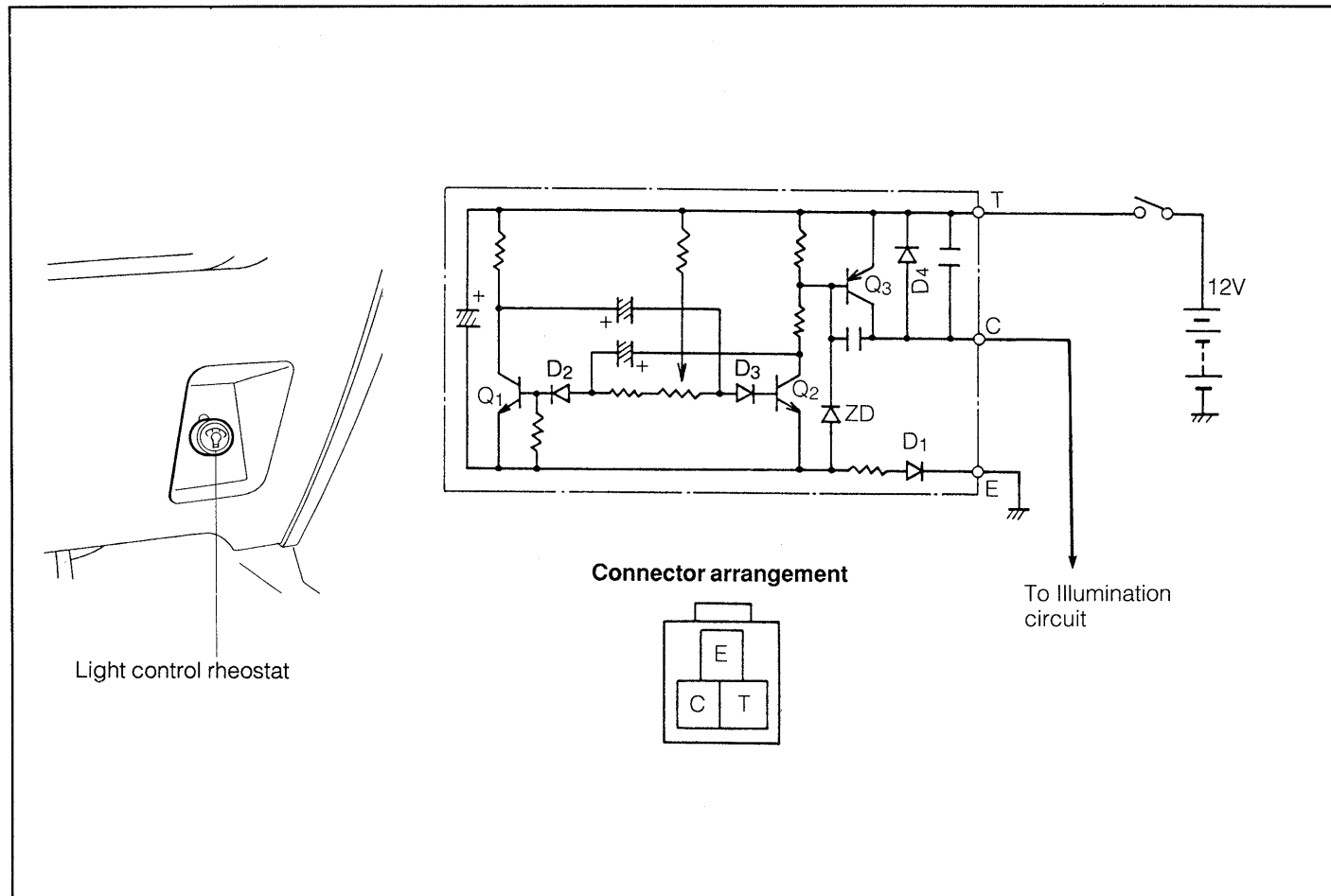
Reverse the removal procedure to install the lamp assembly.



WRU90-BE096

5-14. RHEOSTAT

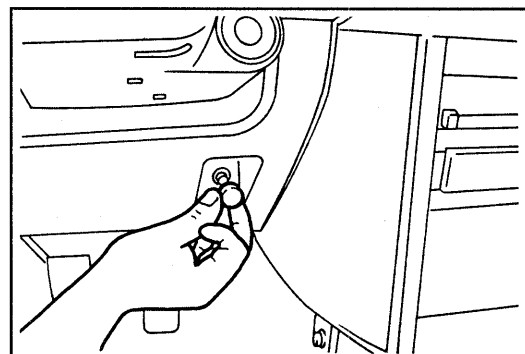
The light control rheostat is located below the steering wheel at the right side. This electronic type light control rheostat incorporates an oscillation circuit and an amplifier circuit. The rate of current flowing through the lamp is regulated by regulating the ratio of ON to OFF of the oscillating circuit.



WRU90-BE097

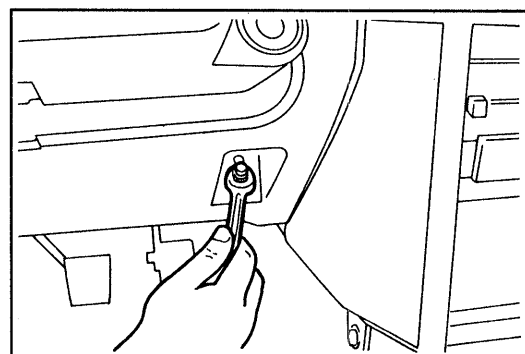
REMOVAL

1. Remove the rheostat light knob.



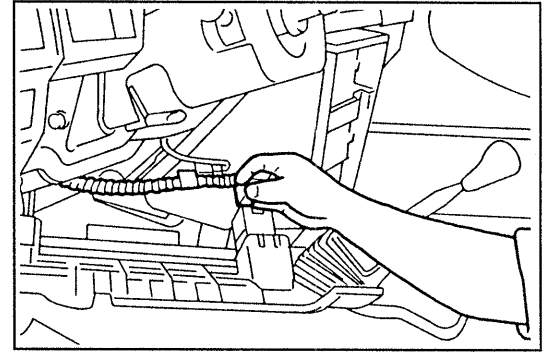
WRU90-BE368

2. Remove the attaching nut.



WRU90-BE369

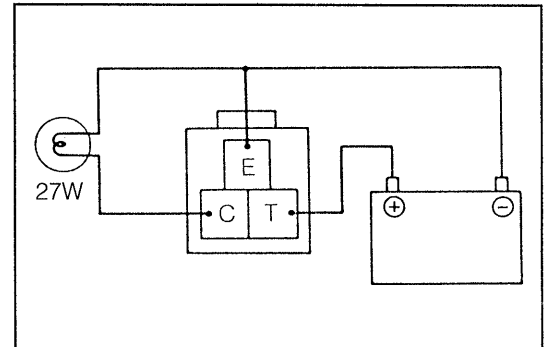
3. Remove the instrument panel finish lower panel.
4. Remove the light control rheostat.



WRU90-BE370

INSPECTION

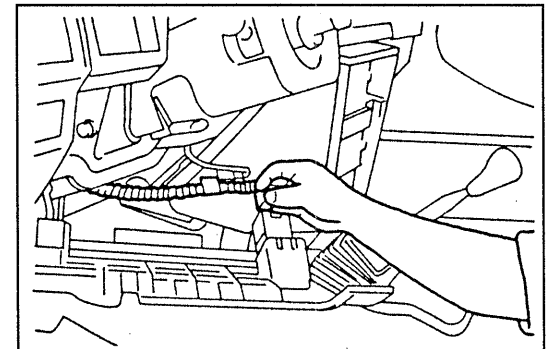
1. Check of change in luminous intensity
 Fabricate a test circuit as indicated in the right figure. Ensure that luminous intensity of the test lamp changes when the rheostat knob is turned clockwise or counterclockwise.
NOTE:
 - As the bulb of the test lamp, the bulb of the backup lamp or the like can be used.
2. Measurement of voltage between **C** and **E**
 - (1) 0V (when knob is fully turned counterclockwise)
 - (2) Approx. 7V (middle position)
 - (3) Battery voltage (when knob is fully turned clockwise)



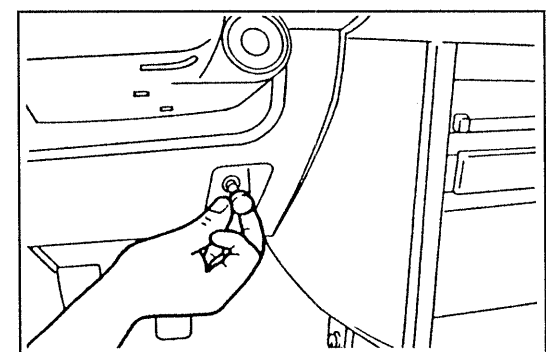
WRU90-BE098

INSTALLATION

1. Install the light control rheostat on the instrument panel finish lower panel. Connect the coupler.
2. Install the attaching nut.
3. Install the rheostat light knob.



WRU90-BE371

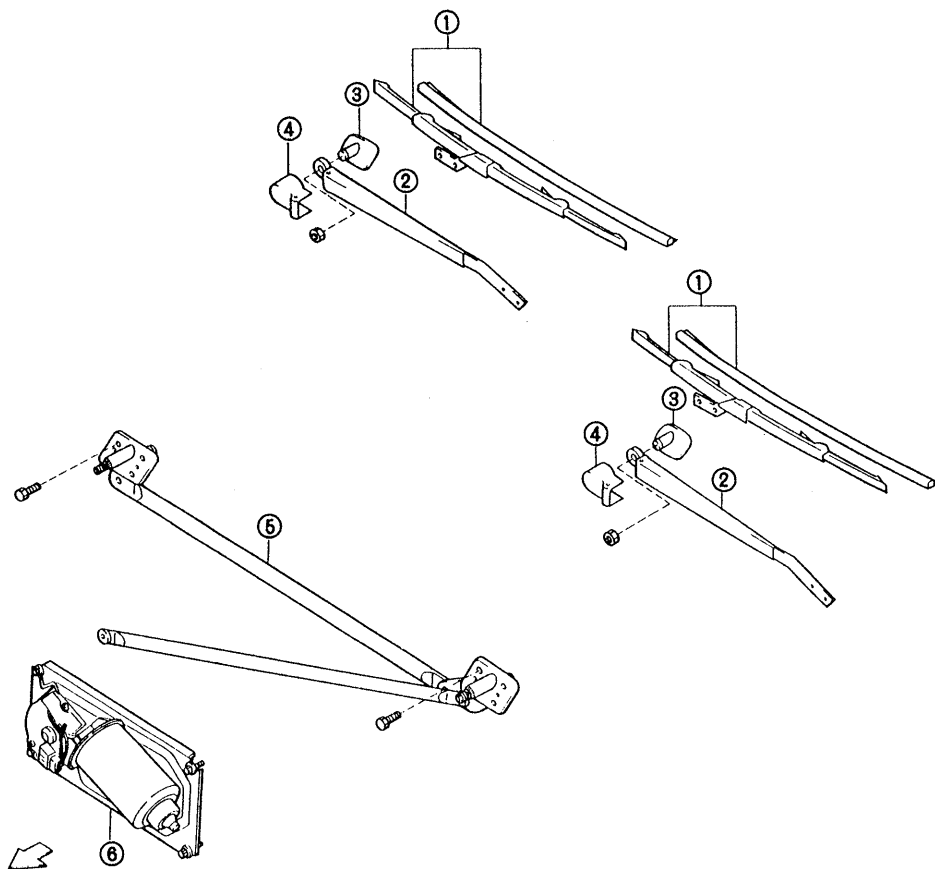
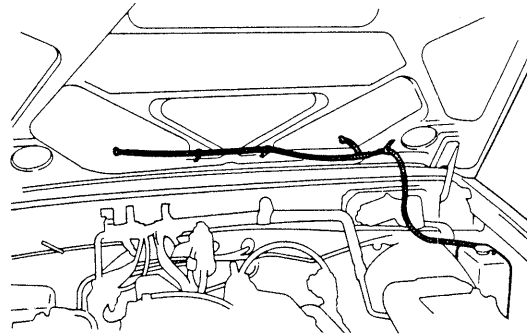
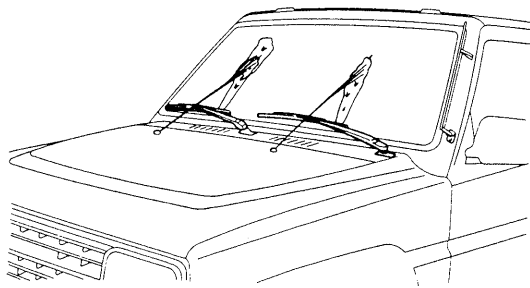


WRU90-BE372

6. FRONT WIPER & WASHER

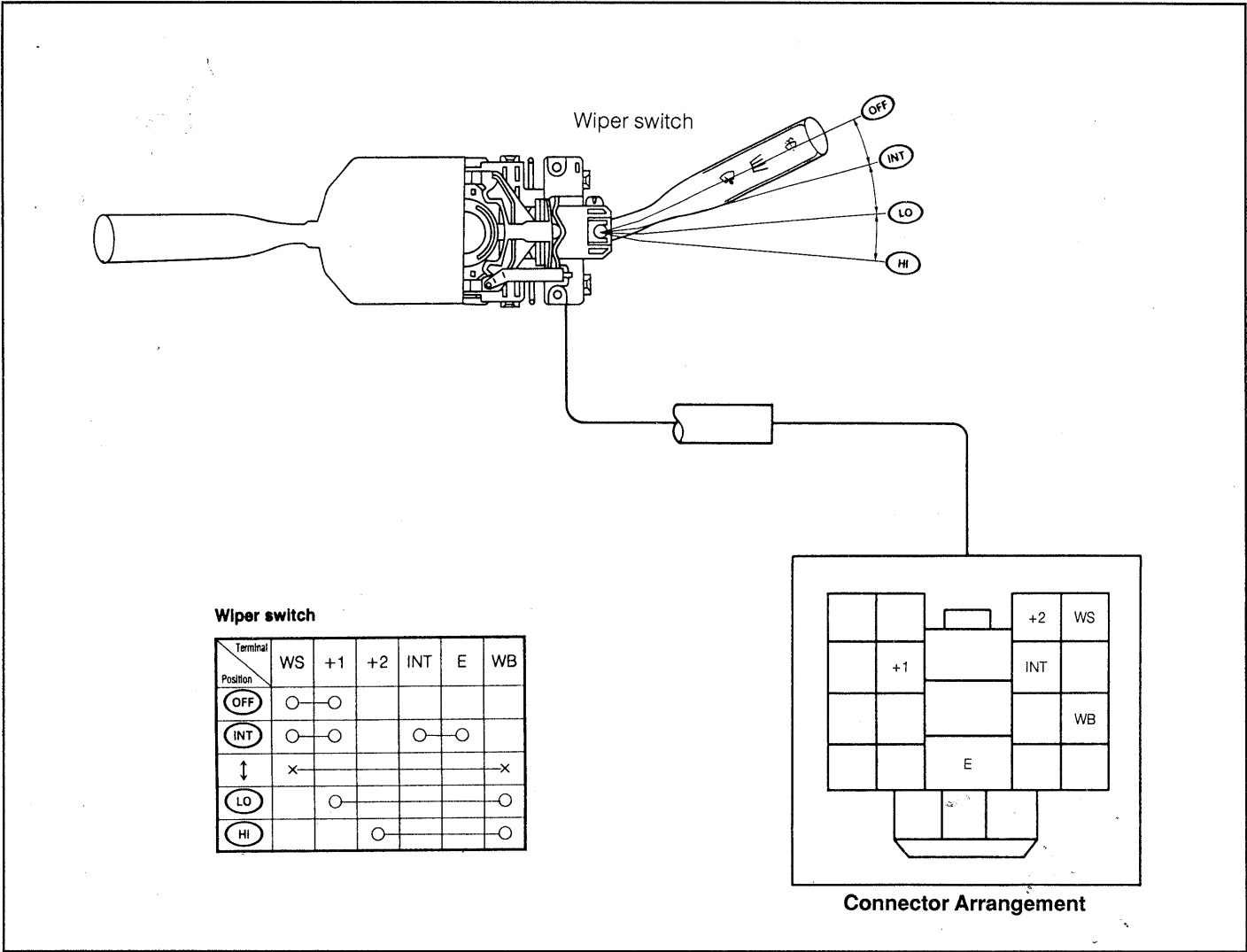
The wiper motor is located inside the engine compartment.

The wiper link comes in two kinds: One is the standard specifications and the other is cold region specifications having upgraded strength.



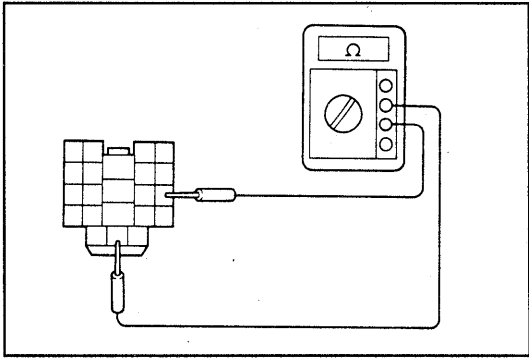
- ① Wiper blade Ay
- ② Windshield wiper arm Ay
- ③ Wiper link bush
- ④ Windshield wiper arm cover
- ⑤ Windshield wiper link Ay
- ⑥ Windshield wiper motor & bracket Ay

6-1. WIPER SWITCH



WRU90-BE100

1. Ensure that continuity exists between the terminals of the connector, as indicated in the table above.

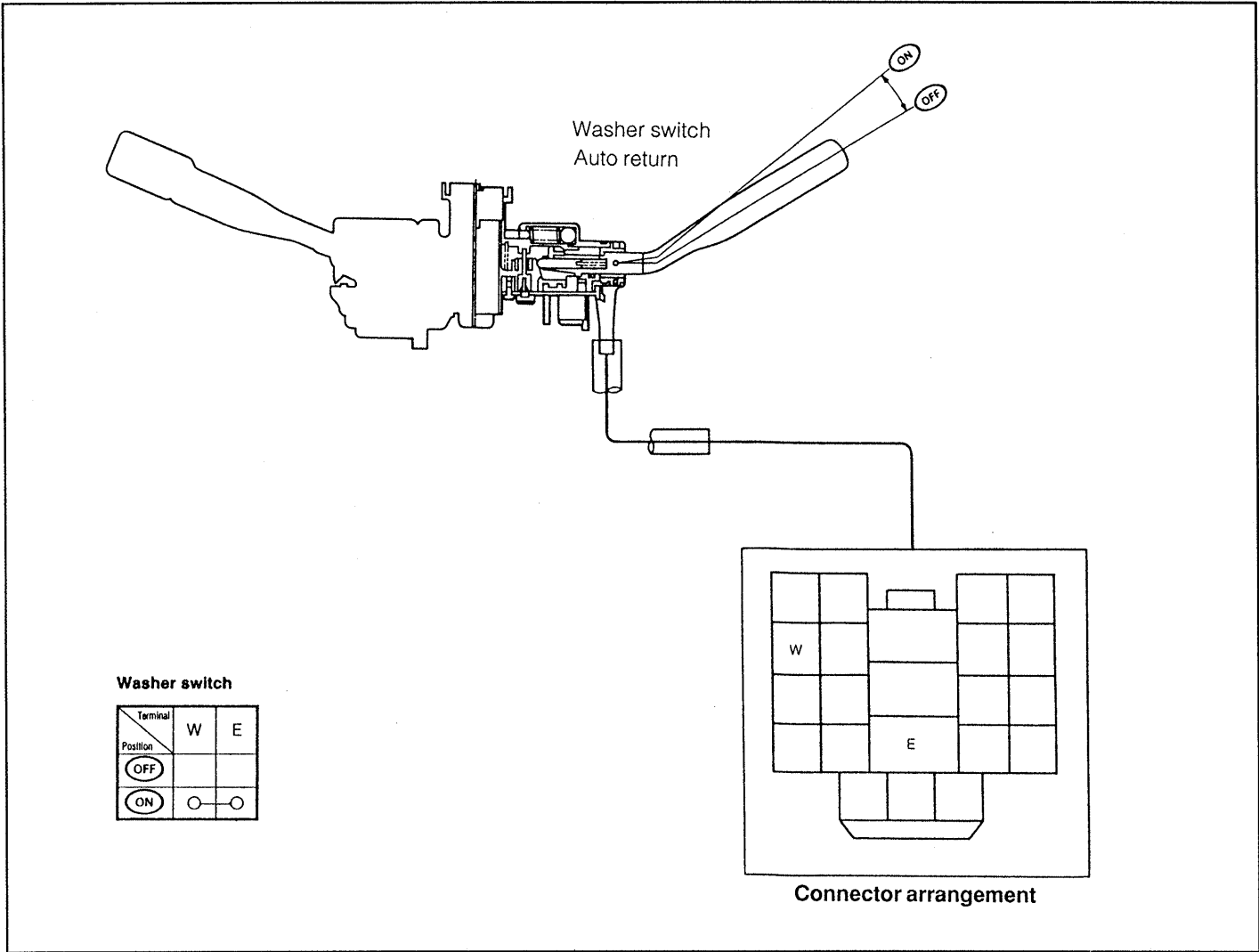


WRU90-BE373

2. Operate the wiper switch. Ensure that the switch can be operated without any binding and with a sharp feeling.

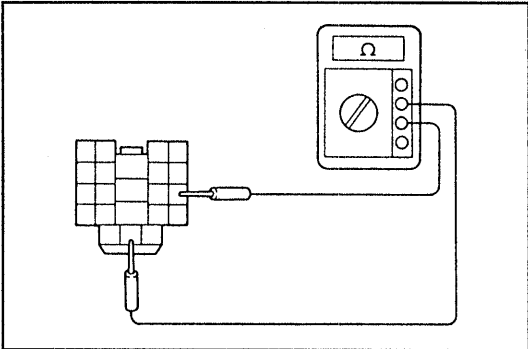
WRU90-BE203

6-2. WASHER SWITCH



WRU90-BE374

1. Ensure that continuity exists between the terminals of the connector, as indicated in the table above.

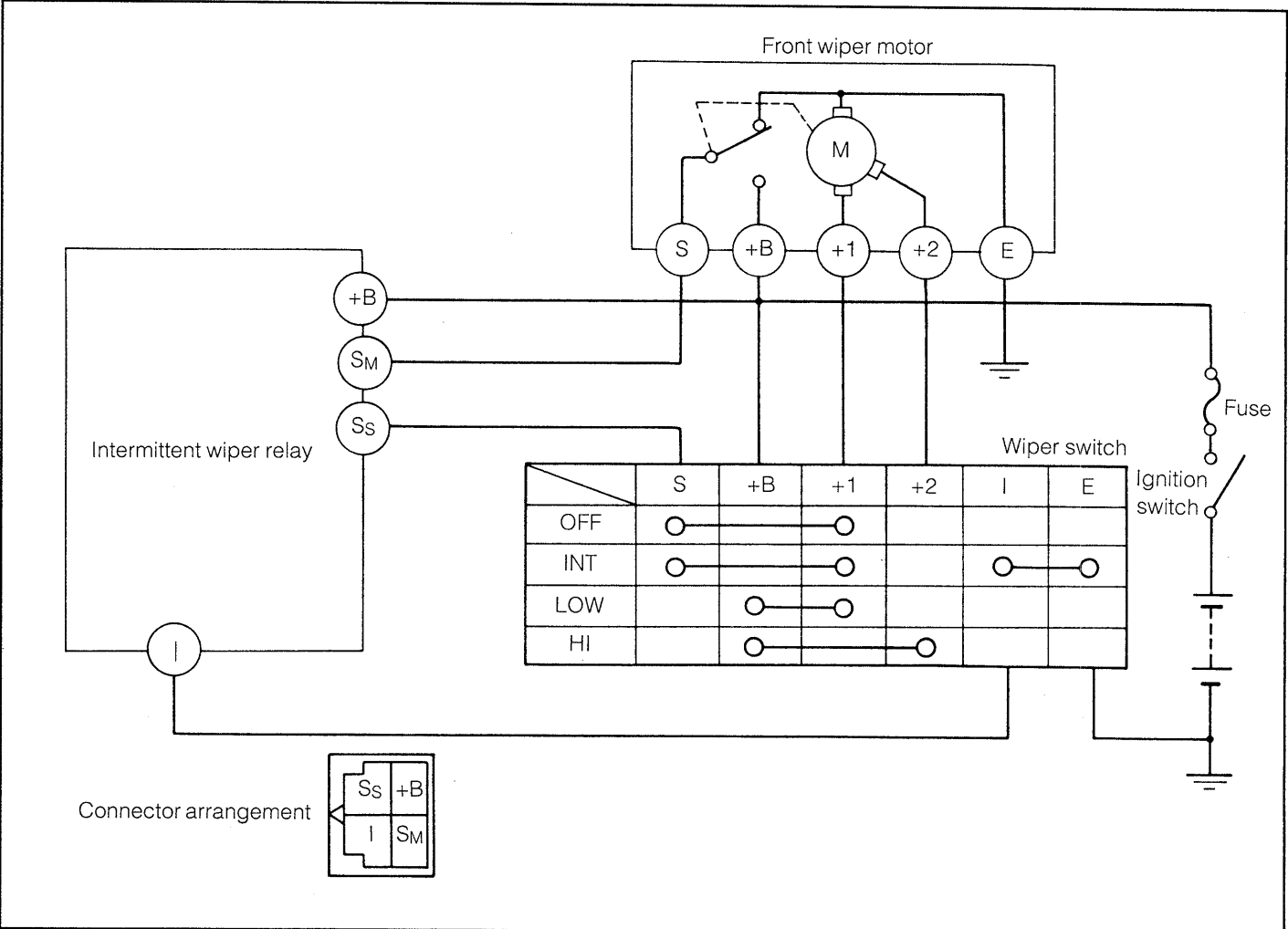


WRU90-BE375

2. Operate the washer switch. Ensure that the switch automatically returns to the OFF state.

WRU90-BE376

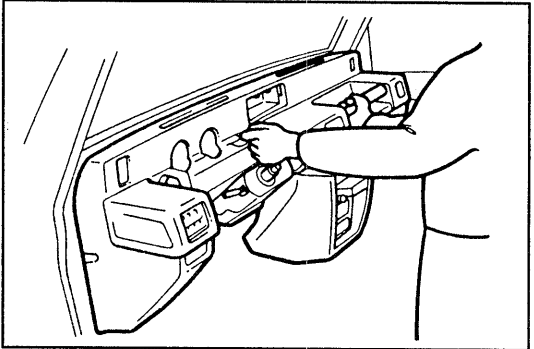
6-3. INTERMITTENT WIPER RELAY
CIRCUIT DIAGRAM



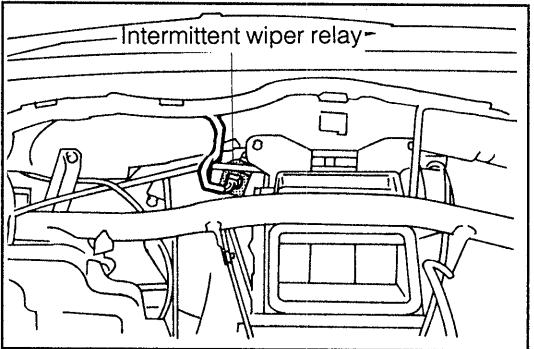
WRU90-BE101

REMOVAL

1. Remove the instrument panel assembly.
(For the removal procedure, refer to FRONT HEATER section.)
2. Remove the intermittent wiper relay.



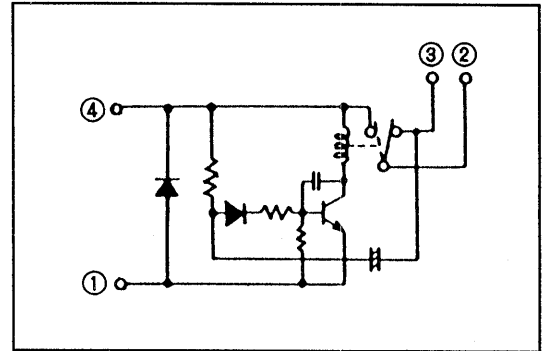
WRU90-BE102



WRU90-BE377

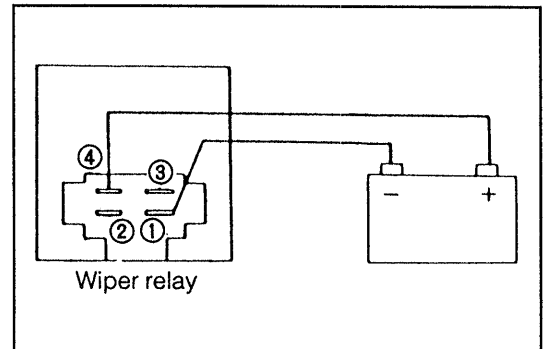
INSPECTION

1. Perform continuity checks between terminals given below.
 - (1) Between terminals ② and ③ ... Continuity exists.
 - (2) Between terminals ② and ④ ... No continuity exists.



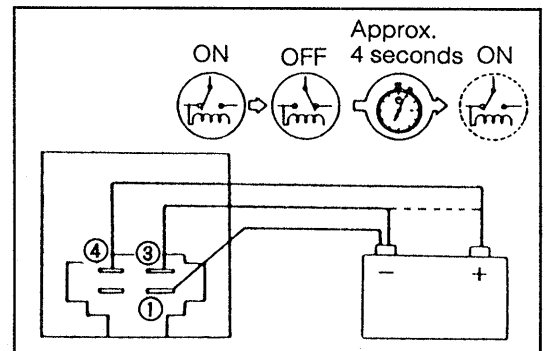
WRU90-BE103

2. Intermittent operation check
 - (1) Connect the terminal ④ to the positive \oplus terminal of the battery; terminal ① to the negative \ominus terminal of the battery.
(At this time, the relay emits an operating sound.): The relay is turned ON.



WRU90-BE104

- (2) Connect the terminal ③ to the positive \oplus terminal of the battery for about one second. Then, ground the terminal ③.
(The relay emits an operating sound.): The relay is turned OFF.
 - (3) Ensure that, about four seconds later, the relay emits an operating sound (intermittent operation.)



WRU90-BE378

INSTALLATION

1. Install the intermittent wiper relay on the vehicle body.
2. Install the instrument panel assembly.

WRU90-BE105

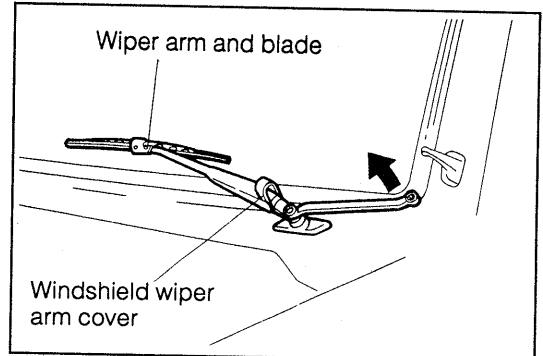
6-4. WIPER MOTOR & BLADE

REMOVAL

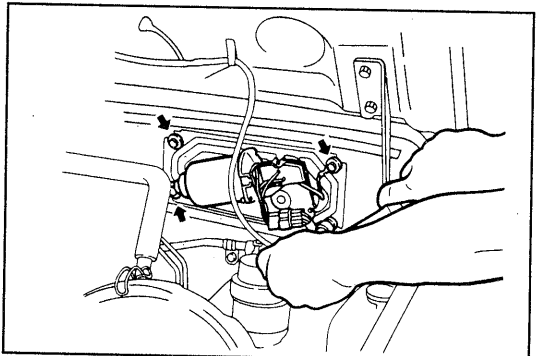
1. Remove the windshield wiper arm cover. Remove the nut.

NOTE:

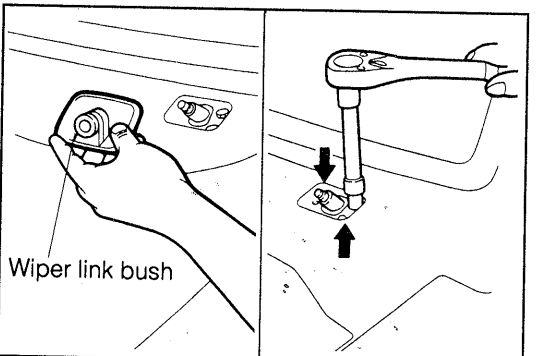
- Care must be exercised to ensure that no scratch is made to the body.



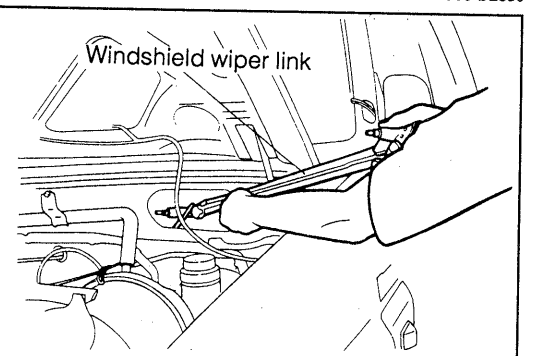
WRU90-BE106



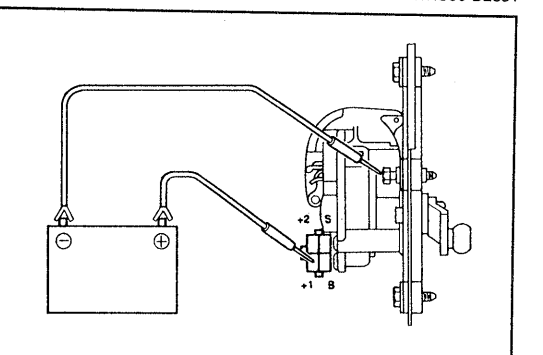
WRU90-BE379



WRU90-BE380



WRU90-BE381



WRU90-BE107

2. Remove the windshield wiper link assembly.
 - (1) Remove the wiper link bush.
 - (2) Remove the set bolt.

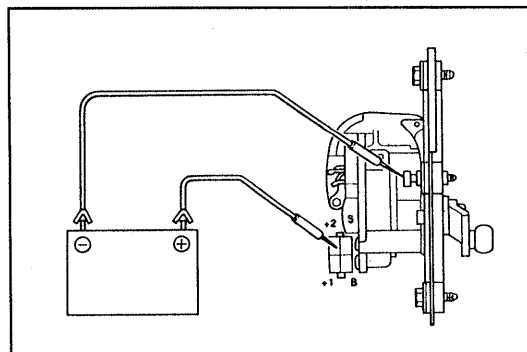
- (3) Take out the windshield wiper link assembly from the cowl louver hole.

INSPECTION OF WIPER MOTOR UNIT

1. Low speed operation check
 - (1) Connect the terminal +1 to the positive \oplus terminal of the battery; the body to the negative \ominus terminal of the battery. Ensure that the wiper operates at the low speed.

2. High speed operation check

- (1) Connect the terminal +2 to the positive \oplus terminal of the battery; the body to the negative \ominus terminal of the battery. Ensure that the wiper operates at the high speed.

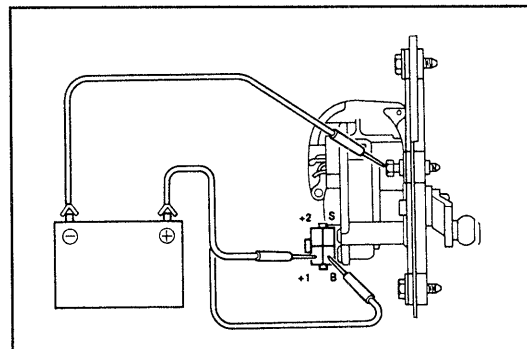


WRU90-BE108

3. OFF operation check

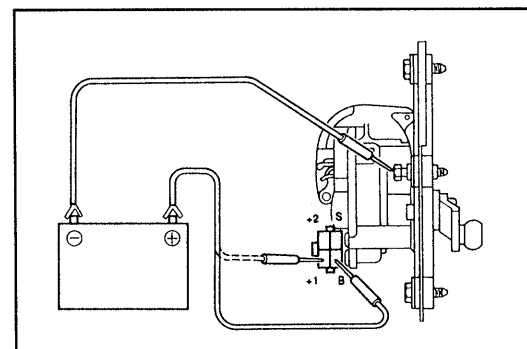
With the wiper motor body connected to the negative \ominus terminal of the battery, perform the following checks.

- (1) Connect the terminal B to the positive \oplus terminal of the battery.
- (2) Operate the wiper at the low speed by connecting the terminal +1 to the positive \oplus terminal of the battery.



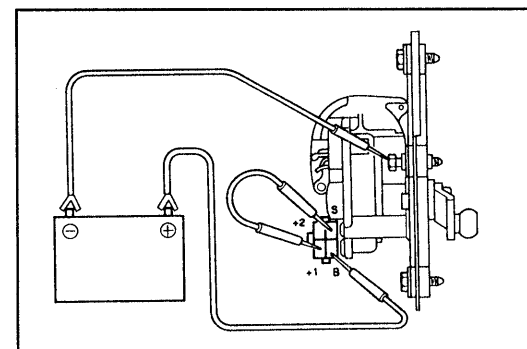
WRU90-BE109

- (3) Under the operating conditions in the step (2), disconnect the terminal +1 so as to interrupt the wiper motor operation.

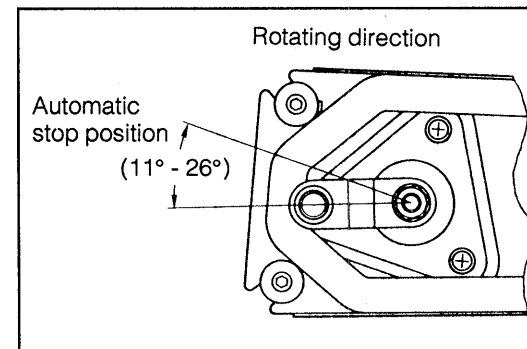


WRU90-BE382

- (4) Connect the terminal +1 to the terminal S. Ensure that the wiper operates and stops at the automatic stopping position.



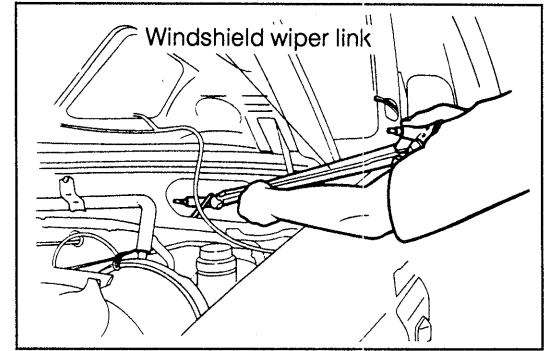
WRU90-BE383



WRU90-BE384

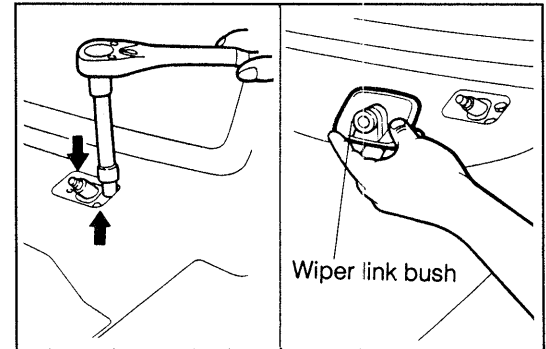
INSTALLATION

1. Install the windshield wiper link assembly.
 - (1) Into the windshield wiper link assembly to the cowl louver hole.



WRU90-BE385

- (2) Install the windshield wiper link assembly to the body using a bolts.
 - (3) Install the wiper link bush.

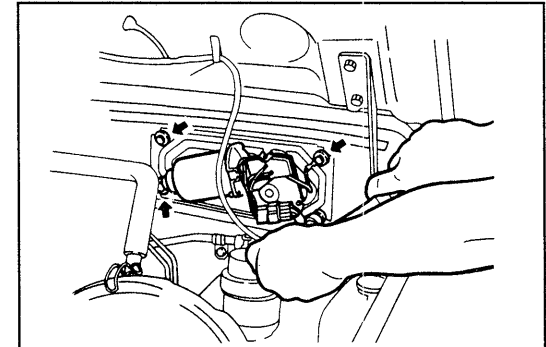


WRU90-BE386

2. Install the motor assembly.

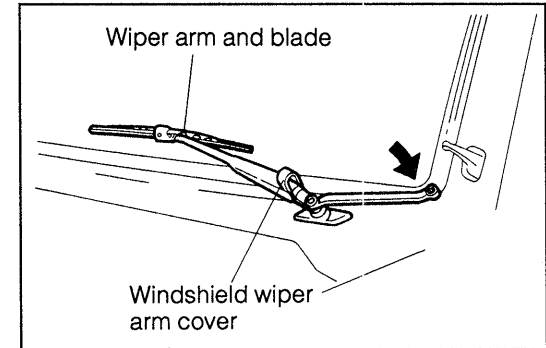
NOTE:

 - Connect the motor assembly with the link securely.

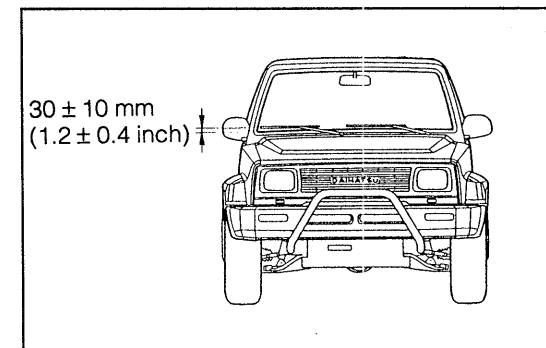


WRU90-BE387

3. Installation of windshield wiper arm assembly
 - (1) Operate the wiper motor, until it assumes the automatic stopping position.
 - (2) Set the wiper arms at the positions indicated in the right figure.
 - (3) Tighten the nut and attach the front wiper arm cover.



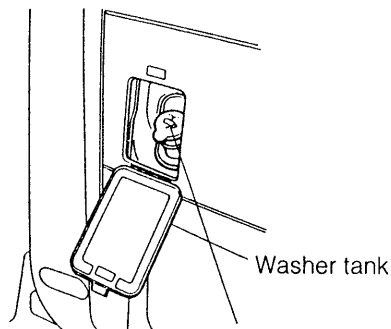
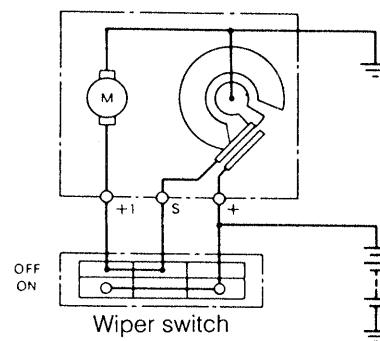
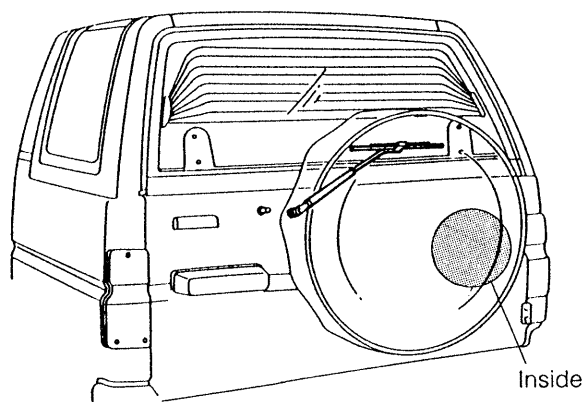
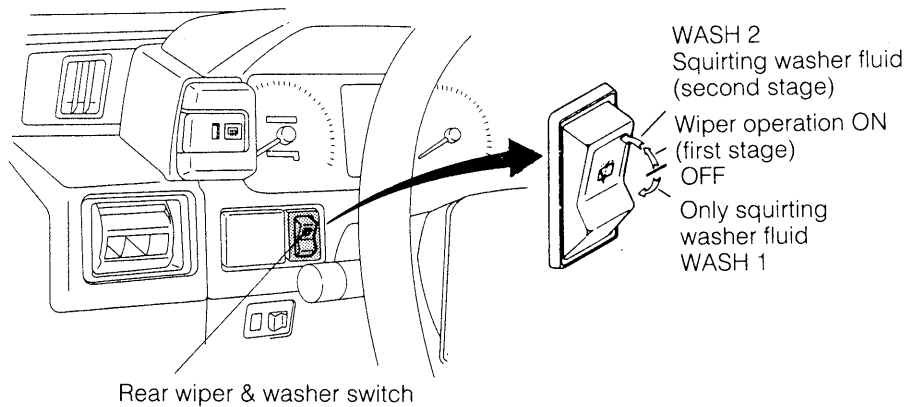
WRU90-BE388



WRU90-BE389

7. REAR WIPER & WASHER

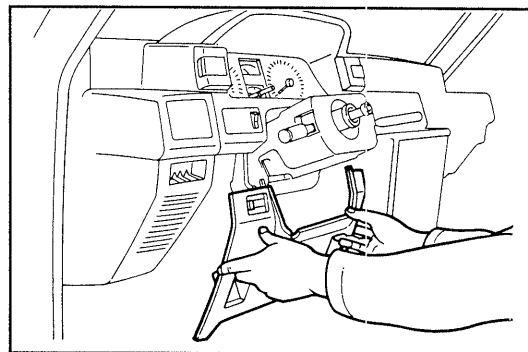
A seesaw type switch which serves as both wiper switch and washer switch has been employed. The washer fluid squirts when the switch knob is further pushed with the wiper switch set to the [ON] or [OFF] position.



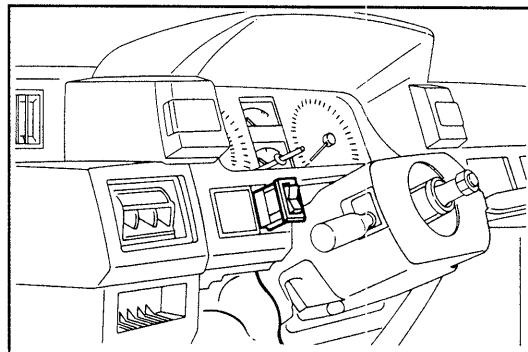
7-1. REAR WIPER & WASHER SWITCH

REMOVAL

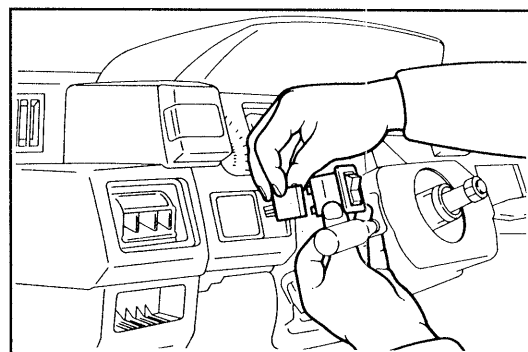
1. Remove the instrument panel finish lower panel.
2. Remove the rear wiper switch from the instrument cluster finish panel subassembly.
3. Disconnect the coupler of the rear wiper switch.



WRU90-BE111



WRU90-BE390



WRU90-BE391

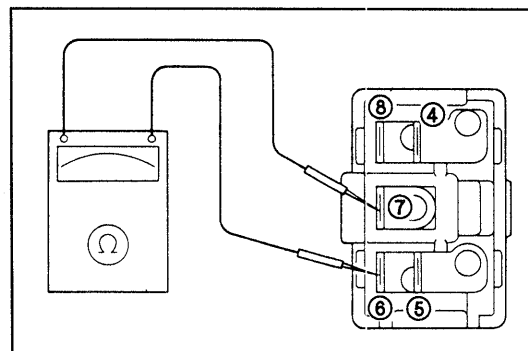
INSPECTION

Ensure that continuity exists between the respective terminals as indicated in the continuity table below.

Continuity table

○—○ Continuity exists.

Switch \ Terminal	8	7	6	5	4
WASH 2		○—○		○—○	
ON		○—○			
OFF	○—○				
WASH 1	○—○			○—○	



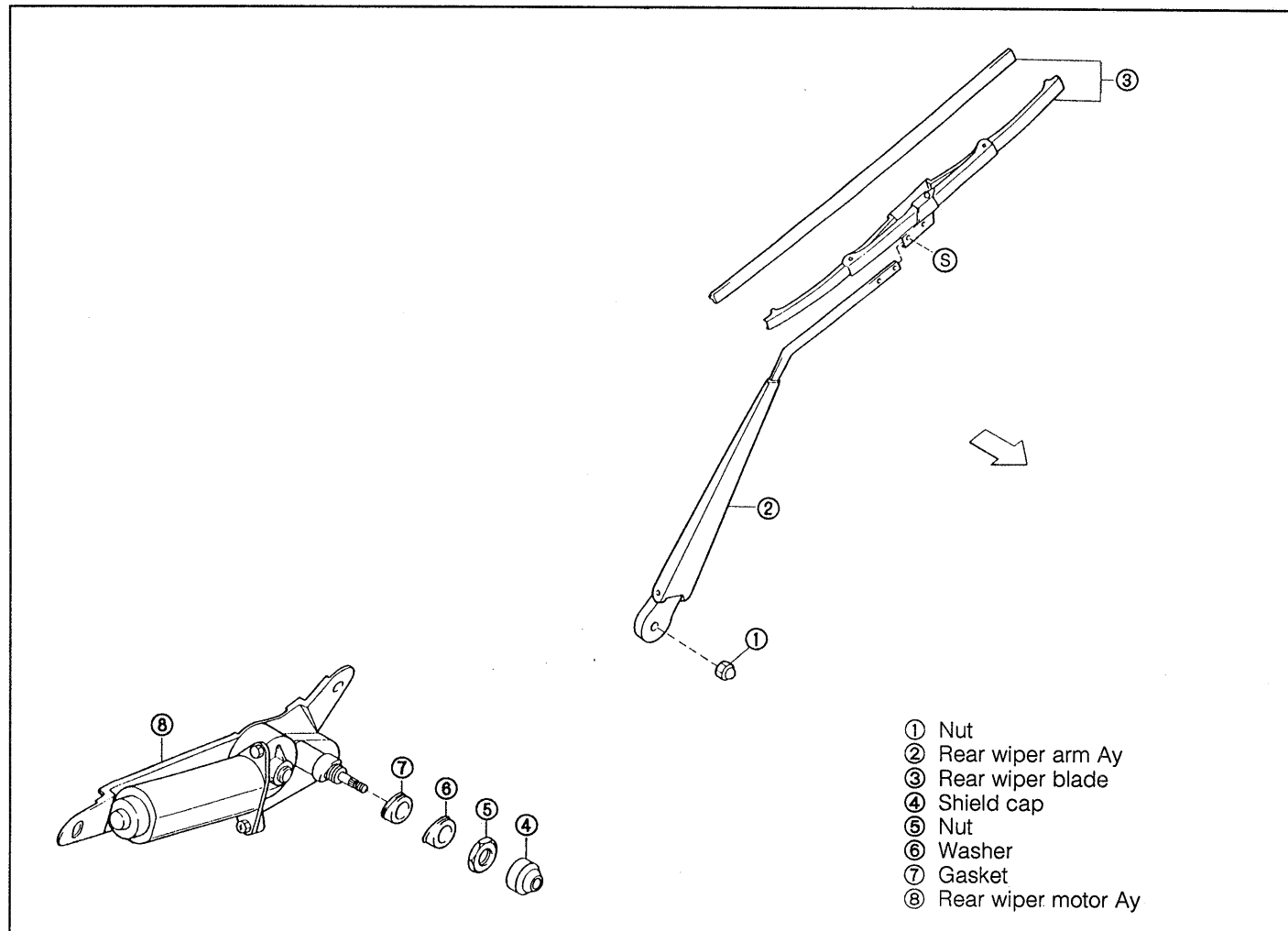
WRU90-BE392

INSTALLATION

1. Connect the coupler of the rear wiper switch.
Install the rear wiper switch to the instrument cluster finish panel subassembly.
2. Install the instrument panel finish lower panel.

WRU90-BE112

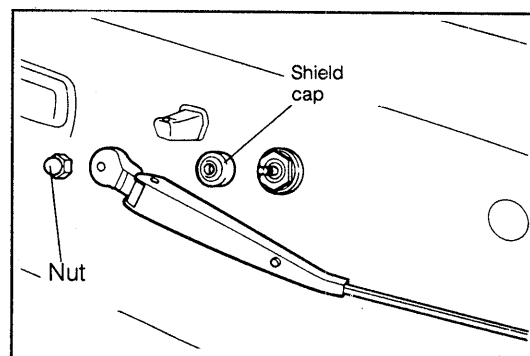
7-2. REAR WIPER MOTOR AND BLADE COMPONENTS



WRU90-BE113

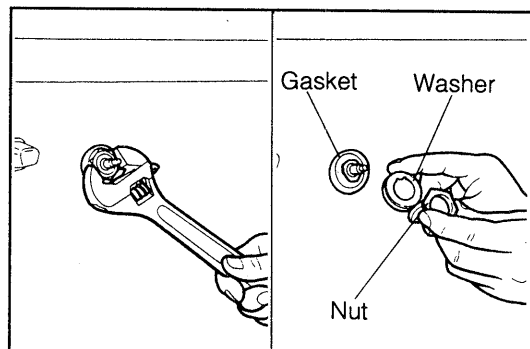
REMOVAL

1. Remove the spare tire.
2. Remove the wiper arm and blade by removing the nut.
3. Remove the shield cap.



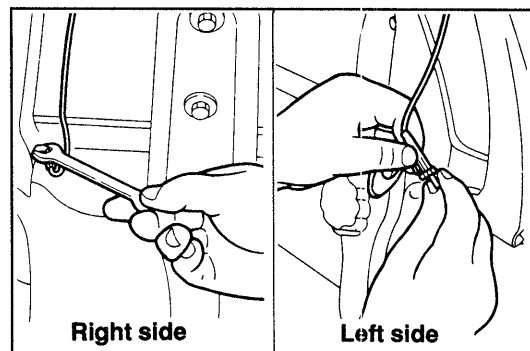
WRU90-BE393

4. Remove the washer and gasket by removing the nut.



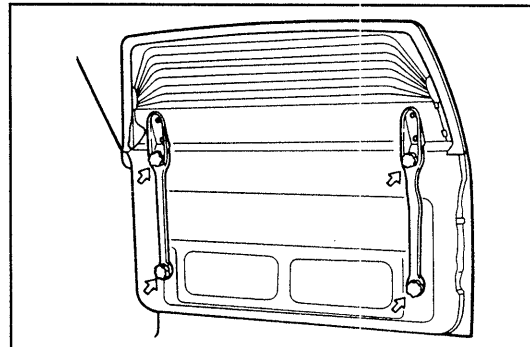
WRU90-BE394

5. Remove the rear window.
 - (1) Remove the rear window defogger ground harness attaching bolt to disconnect the rear window defogger ground harness from the back door.
 - (2) Disconnect the connector for the rear window defogger at left side.



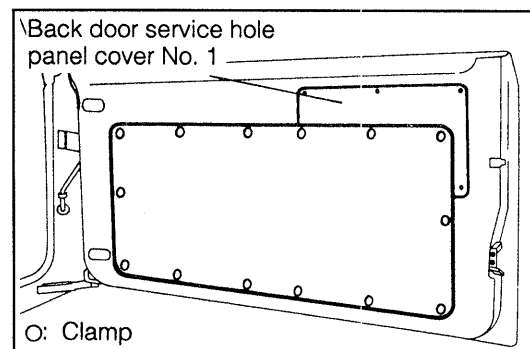
WRU90-BE395

- (3) Remove the rear window by removing the handles (4 points).



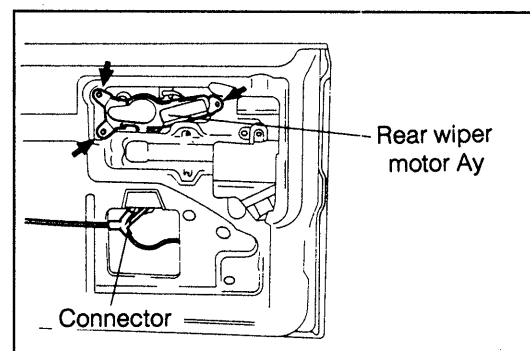
WRU90-BE396

6. Remove the back door trim by removing the clips (14 points.)
7. Remove the back door service hole panel cover No. 1 by removing the screws (4 points).
8. Remove the service hole cover.



WRU90-BE397

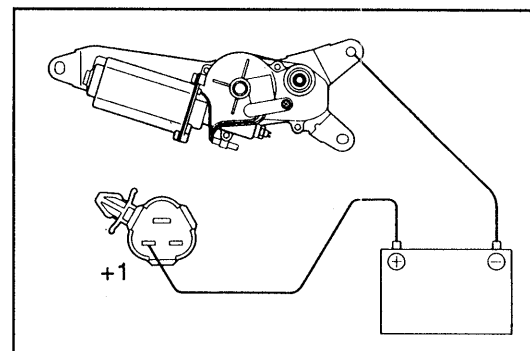
9. Remove the rear wiper motor assembly.
 - (1) Disconnect the connector.
 - (2) Remove the rear wiper motor by removing the three bolts.



WRU90-BE398

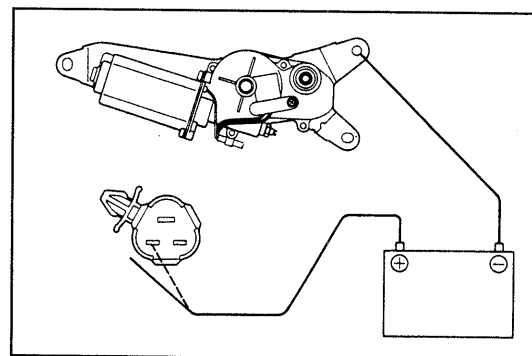
REAR WIPER MOTOR CHECK

1. Connect the terminal +1 to the positive \oplus terminal of the battery; the body to the negative \ominus terminal of the battery. Ensure that the wiper operates.



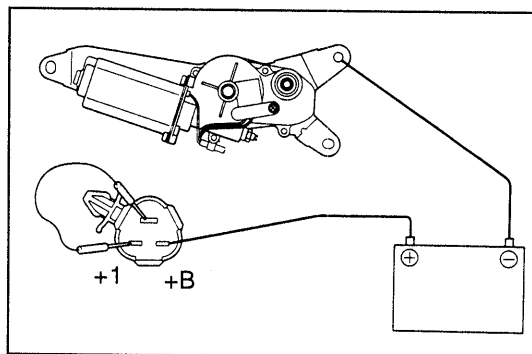
WRU90-BE399

2. Under the operating conditions in the step 1, disconnect the terminal +1 so as to interrupt the wiper motor operation.

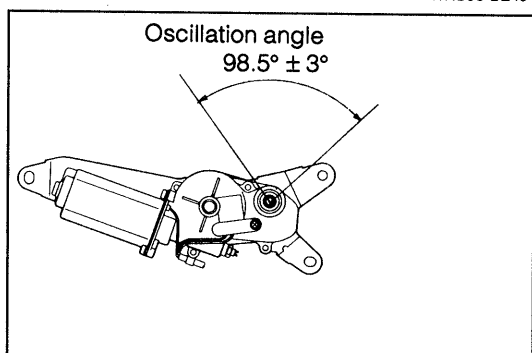


WRU90-BE400

3. Connect the terminal +1 to the terminal S; the terminal +B to the positive \oplus terminal of the battery. Ensure that the wiper operates and stops at the automatic stopping position.



WRU90-BE401



WRU90-BE114

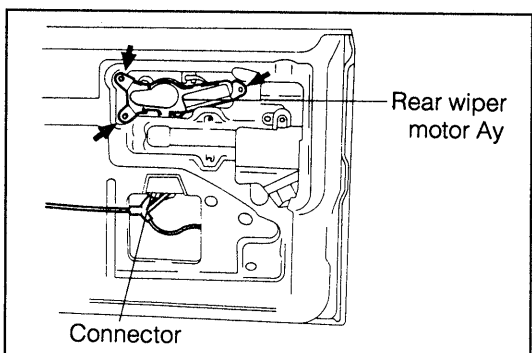
INSTALLATION

1. Install the rear wiper motor assembly, as follows:
 - (1) Install the rear wiper motor assembly by tightening the set bolt.

NOTE:

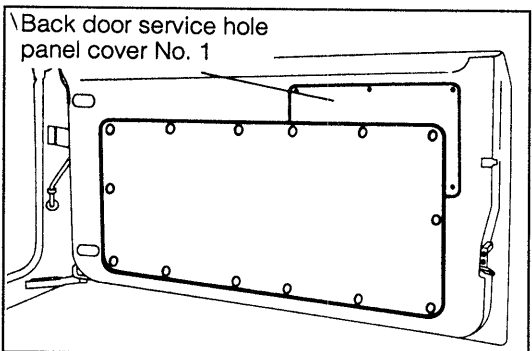
- Make sure that the body earth is provided properly.

- (2) Connect the connector.



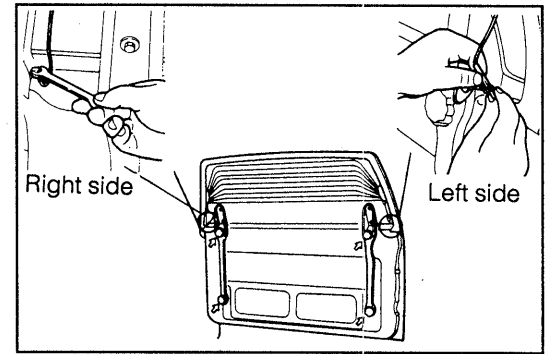
WRU90-BE402

2. Install the back door trim, as follows:
 - (1) Install the service hole cover.
 - (2) Install the back door service hole panel cover No. 1.
 - (3) Install the back door trim.



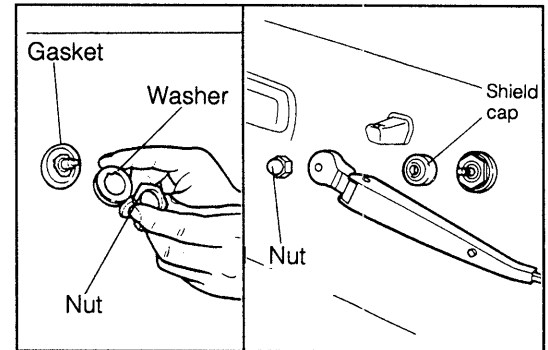
WRU90-BE115

3. Install the rear window.
 - (1) Install the rear window using the handles.
 - (2) Connect the connect to the rear window defogger at left side.
 - (3) Install the rear window defogger ground harness using the bolt.



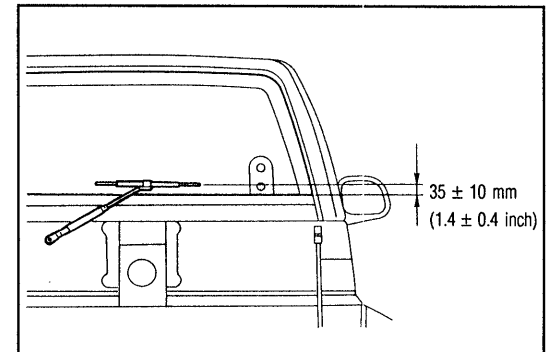
WRU90-BE403

4. Install the gasket, washer and nut.
5. Install the shield cap.



WRU90-BE404

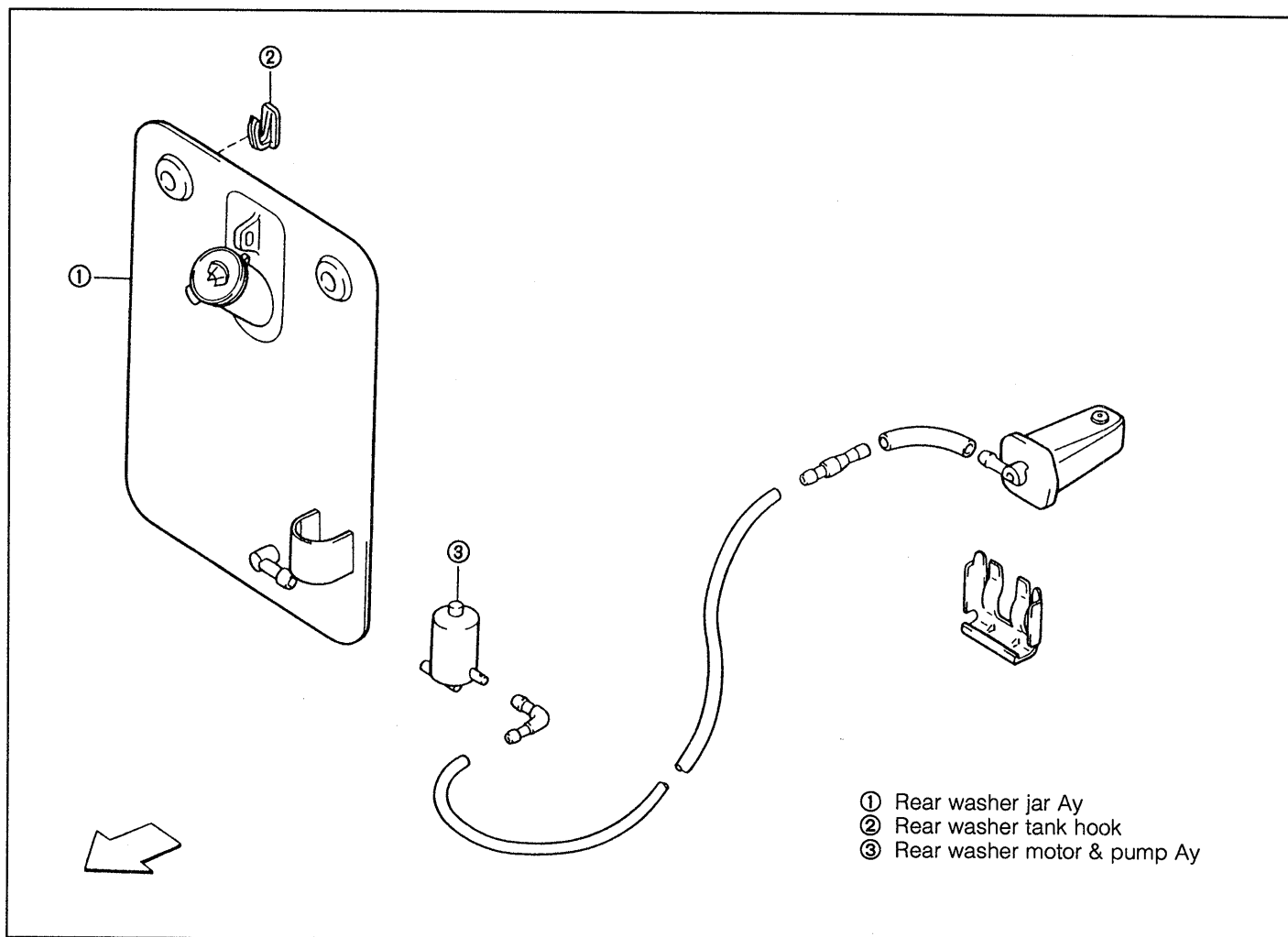
6. Install the wiper arm and blade.
 - (1) Operate the wiper motor and set the wiper arm to the automatic stopping position.
 - (2) Set the wiper arm to the position as indicated in the right figure.
 - (3) Tighten the nut.



WRU90-BE405

7-3. REAR WASHER TANK

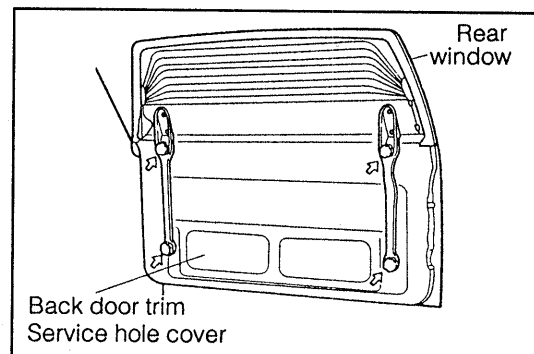
COMPONENTS



WRU90-BE116

REMOVAL

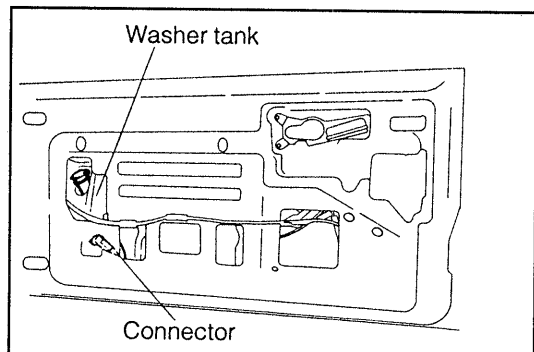
1. Remove the rear window assembly.
2. Remove the back door trim and service hole cover.
3. Disconnect the connector and water hose. Remove the washer tank assembly.



WRU90-BE117

INSTALLATION

1. Install the washer tank assembly to the back door.
2. Connect the connector and water hose.
3. Install the service hole cover and back door trim.
4. Install the rear window assembly.

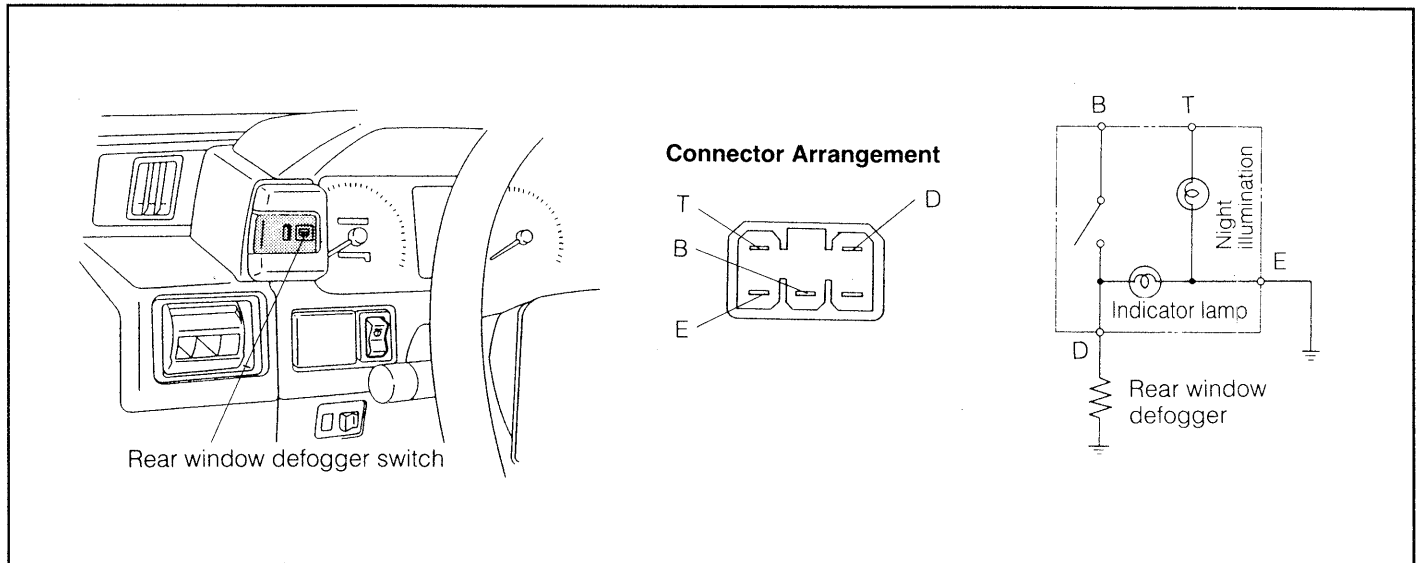


WRU90-BE406

8. REAR WINDOW DEFOGGER

The rear window defogger switch is a seesaw type switch which incorporates a symbol mark with night illumination and an indicator lamp.

Furthermore, the switch is installed in the meter cluster toward the outboard side of the vehicle.

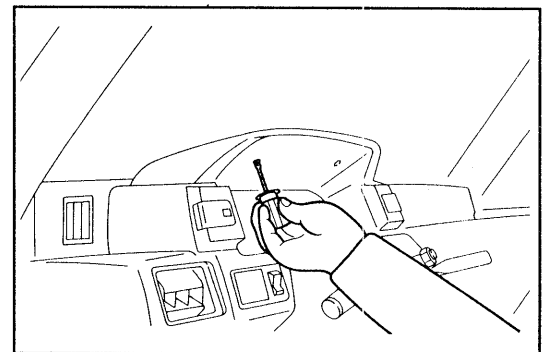


WRU90-BE118

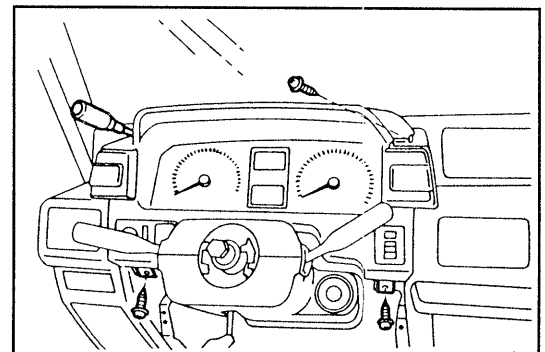
8-1. DEFOGGER SWITCH

REMOVAL

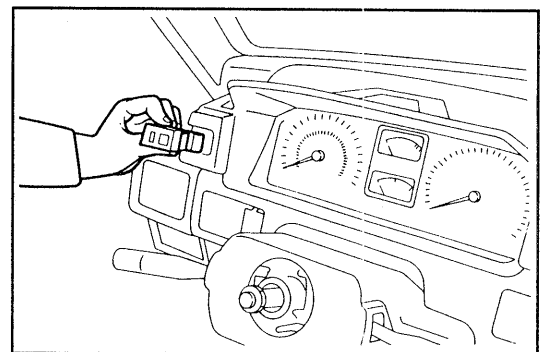
1. Remove the instrument cluster finish upper panel.
2. Remove the instrument cluster finish lower panel.
3. Remove the instrument cluster finish panel subassembly.
4. Remove the rear window defogger switch.



WRU90-BE119



WRU90-BE407



WRU90-BE408

BODY ELECTRICAL SYSTEM

INSPECTION

Ensure that continuity exists between the respective terminals as indicated in the continuity table below.

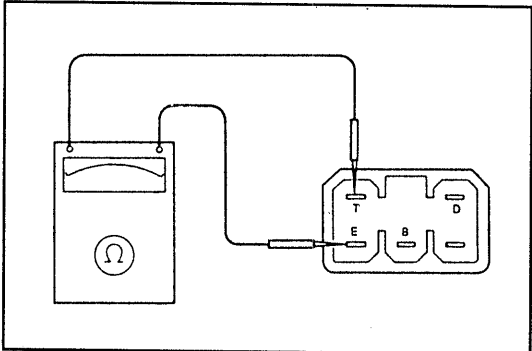
Continuity table

○—○ Continuity exists.
○●○ Bulb in installed state

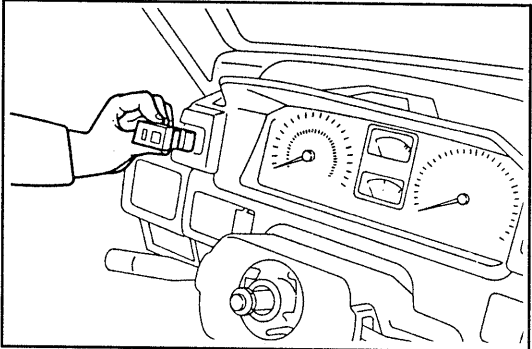
Terminal \ Switch	B	D	E	T
OFF		○●○	○●○	○●○
ON	○—○	○●○	○●○	○●○

INSTALLATION

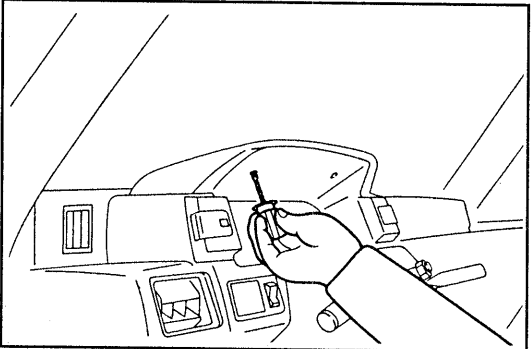
1. Connect the coupler to the rear window defogger switch.
2. Install the rear window defogger switch to the instrument cluster finish panel subassembly.
3. Install the instrument cluster finish panel subassembly.
4. Install the instrument cluster finish upper panel.
5. Install the instrument cluster finish lower panel.



WRU90-BE409



WRU90-BE410

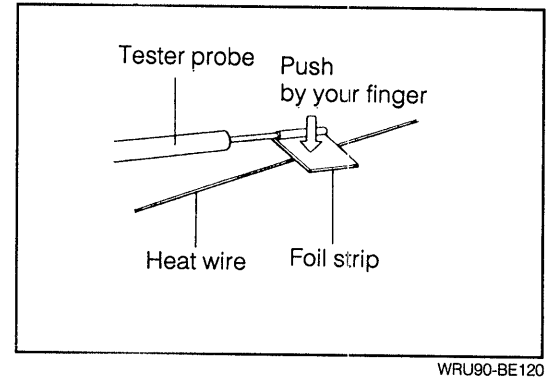


WRU90-BE411

8-2. DEFOGGER WIRE

NOTE:

- (1) When wiping the glass surface, use a soft, dry cloth. Move the cloth along the wire. Be careful not to damage the wire.
- (2) Never use washing agent or glass cleaner which contains abrasive compound.
- (3) Wrap the tip end of the tester probe with foil strip so that the tester probe causes no damage on the heat wire during the voltage measurement. Check the voltage by pushing the foil strip against the heat wire by your finger, as shown in the figure.



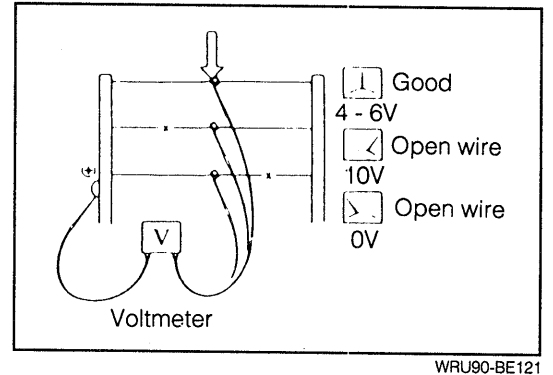
1. OPEN WIRE CHECK

- (1) Turn ON the ignition key switch.
- (2) Turn ON the defogger switch so as to energize the defogger wire.
- (3) Check the voltage at the center section of each heat wire.

Voltage	Judgement criteria
Approx. 5V	Good (No open wire)
Approx. 10V or 0V	Open wire

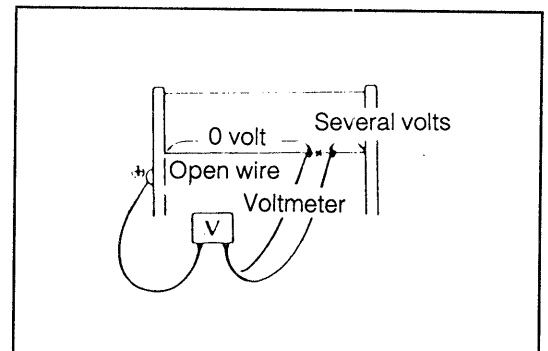
Reference:

If the voltage is 10V, it means that open wire exists between the center of the wire and the end of the positive ⊕ side. If the voltage is 0V, it means that open wire exists between the center of the wire and the end of the earth side.



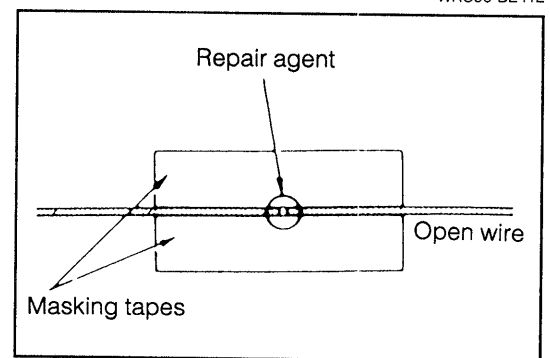
2. LOCATING POINT OF OPEN WIRE

- (1) Connect the positive ⊕ terminal of the voltmeter to the positive ⊕ side of the defogger wire.
- (2) Slide the voltmeter's negative ⊖ terminal wrapped with foil strip on the defogger wire from its positive ⊕ side to its negative ⊖ side.
- (3) The voltmeter reading changes from 0V to several volts at the point where open wire exists.



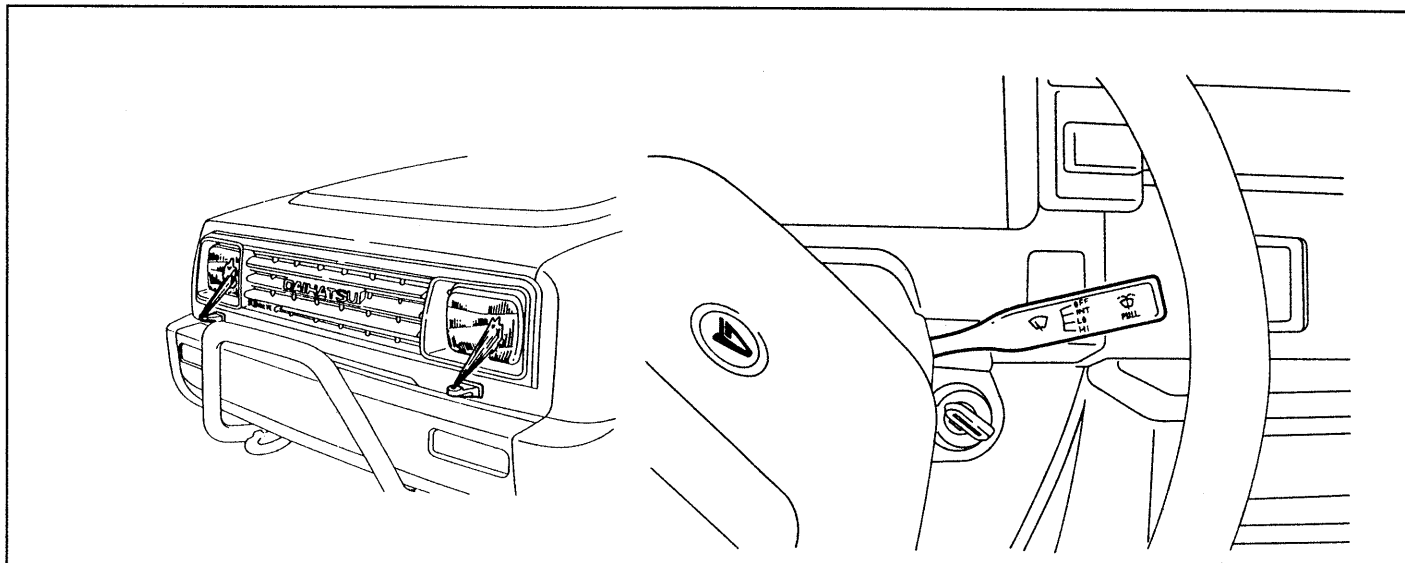
3. REPAIRING POINT OF OPEN WIRE

- (1) Clean the point of open wire with white gasoline.
- (2) Affix masking tapes to both upper and lower portions of the point to be repaired.
- (3) Stir repair agent (Du Pont Paste No. 4817) thoroughly. Apply a small amount of the repair agent to the repairing point, using a fine brush.
- (4) Two to three minutes later, peel off the masking tapes.
- (5) Do not energize the defogger wire within 24 hours after the repair.



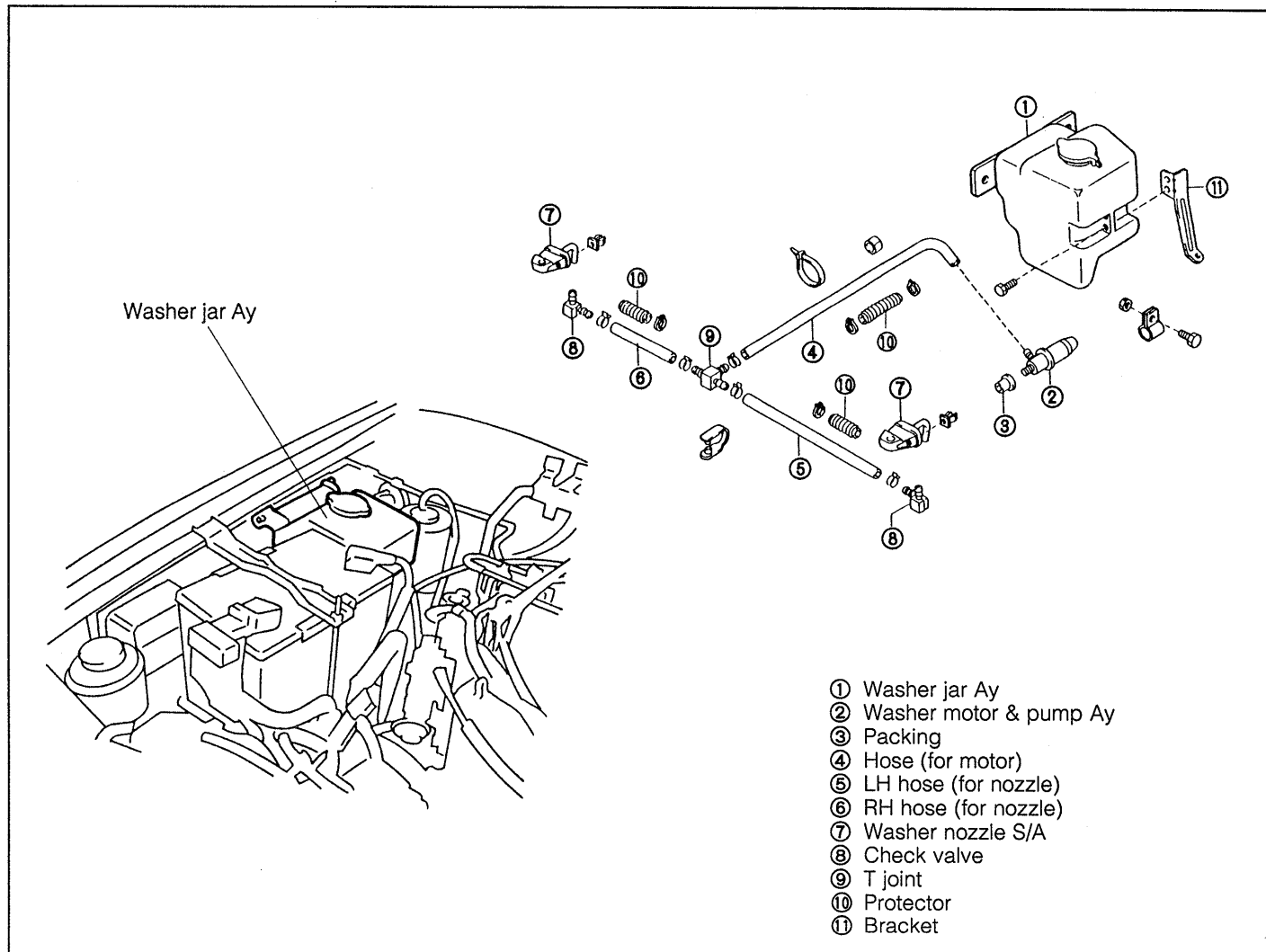
9. HEADLAMP CLEANER

Under conditions where the ignition switch and headlamp switch are turned ON, the washer switch can operate. When the washer switch is actuated again within about 0.8 second, the washer cleaner motor will start operating and squirt the washer liquid for headlamp use for a duration of about 0.5 second.



WRU90-BE122

COMPONENTS

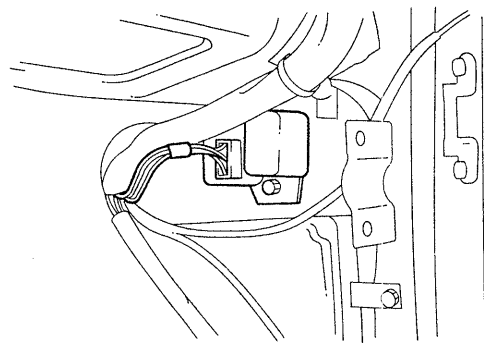
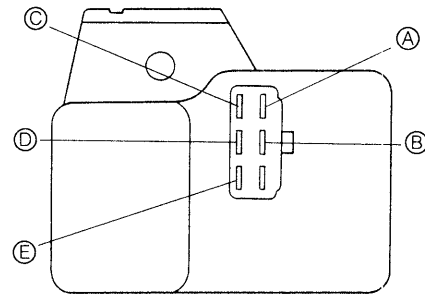
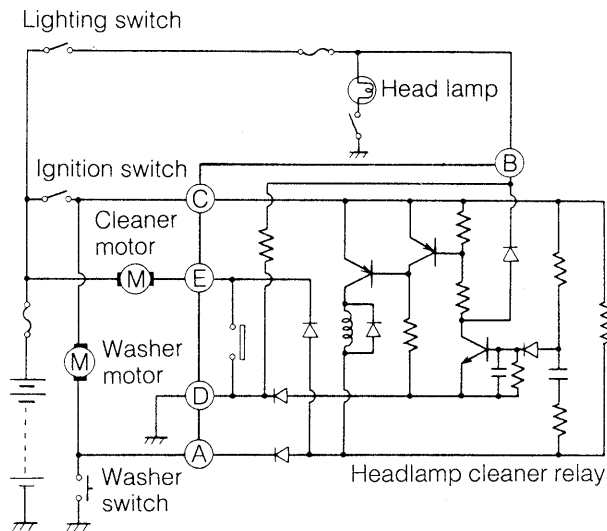


WRU90-BE414

9-1. CONTROL RELAY

The headlamp cleaner relay controls the operation of the headlamp cleaner motor.

CIRCUIT DIAGRAM



WRU90-BE123

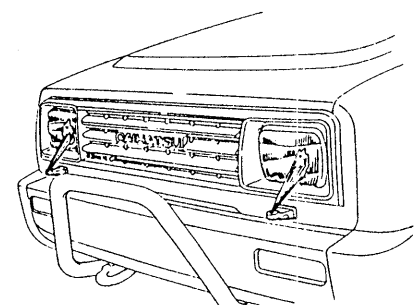
OPERATION CHECK

While the ignition switch is turned ON, carry out the following check: Operate the washer switch one time. Within about 0.8 second, operate the washer switch again. Ensure has the cleaner motor operates for about 0.5 second.

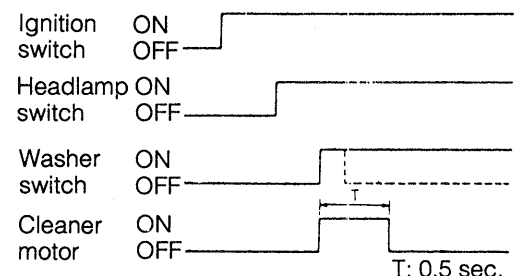
INSPECTION

If the headlamp cleaner is malfunctioning persistently when the following unit inspection reveals no malfunction, replace the headlamp cleaner relay.

- (1) Wiper fuse 15A
- (2) Headlamp cleaner motor
- (3) Washer switch
- (4) Front windshield washer motor



Headlamp cleaner operation chart

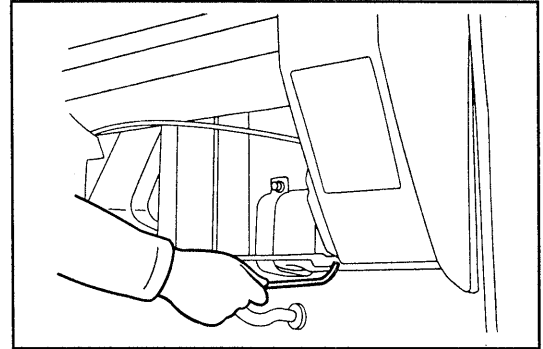


WRU90-BE415

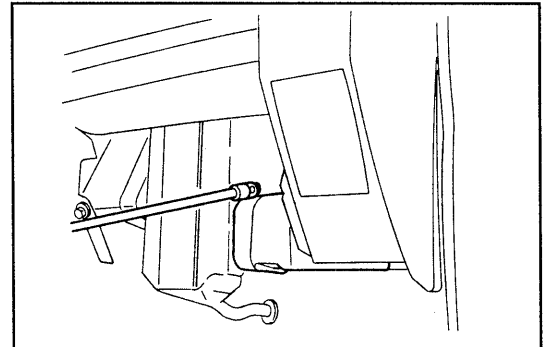
BODY ELECTRICAL SYSTEM

REMOVAL

1. Remove the glove compartment box.
2. Remove the instrument panel reinforcement.
3. Disconnect the coupler of the blower assembly.
4. Remove the clamp.

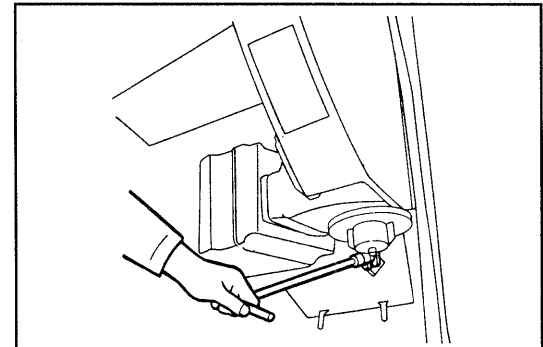


WRU90-BE416



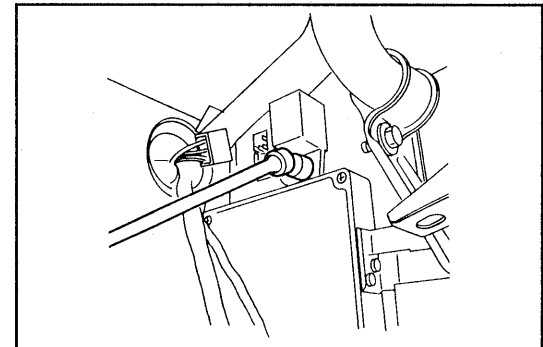
WRU90-BE417

5. Remove the blower assembly.



WRU90-BE418

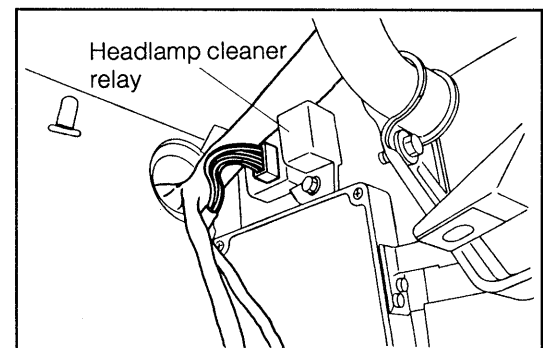
6. Disconnect the coupler of the headlamp cleaner relay.
7. Remove the headlamp cleaner relay.



WRU90-BE419

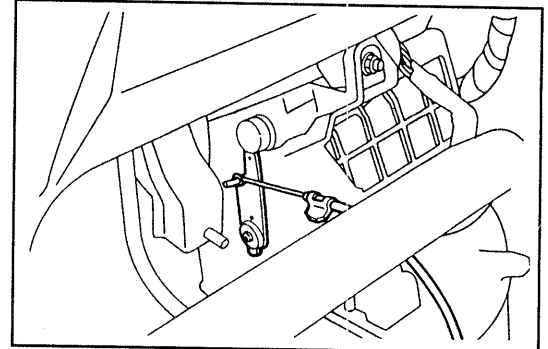
INSTALLATION

1. Install the headlamp cleaner relay.
2. Connect the coupler of the headlamp cleaner relay.



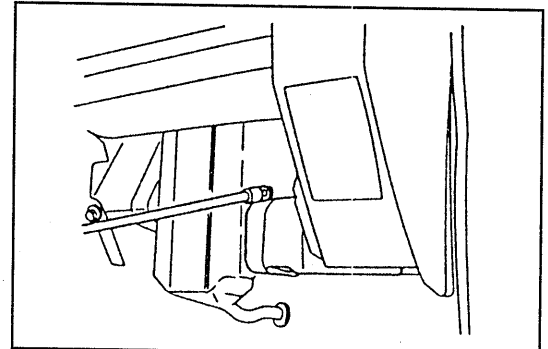
WRU90-BE420

3. Install the headlamp cleaner relay, following the procedure given below.
 - (1) Set the inside/outside air selection lever to the outside air admission side.
 - (2) Install the heater control cable with the lever set in the raised state.



WRU90-BE204

4. Install the blower assembly.
5. Install the clamp.
6. Connect the coupler of the blower assembly.
7. Install the instrument panel reinforcement.
8. Install the glove compartment box.

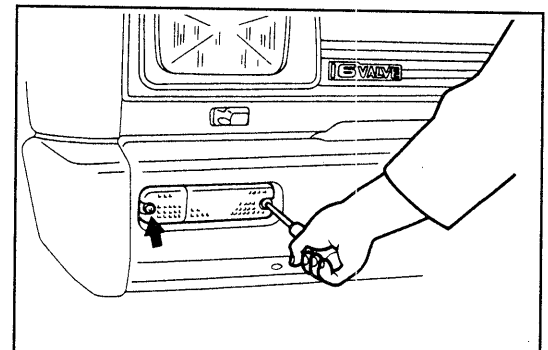


WRU90-BE421

9-2. NOZZLE

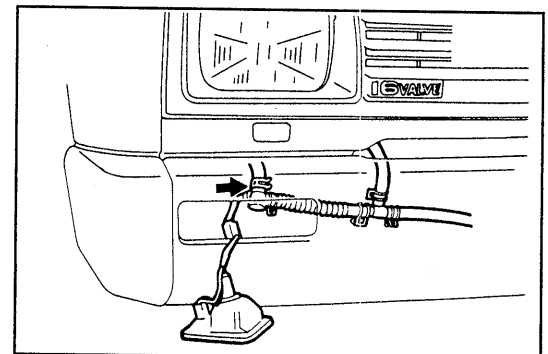
REMOVAL

1. Remove the front turn signal lamp assembly by removing the two screw.



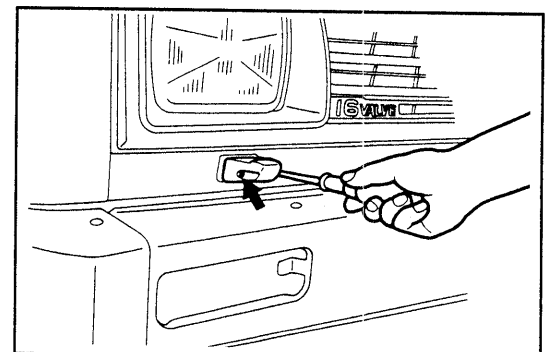
WRU90-BE124

2. Disconnect the washer nozzle and check valve.



WRU90-BE422

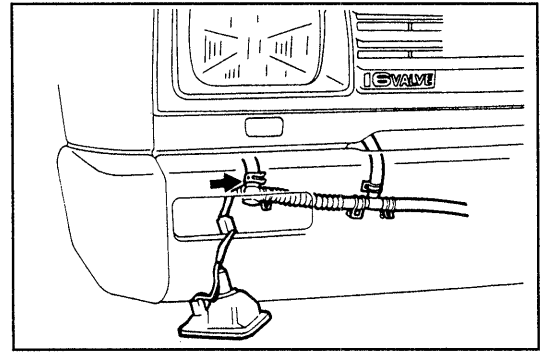
3. Remove the washer nozzle by removing the two screws.



WRU90-BE423

INSTALLATION

1. Install the washer nozzle with the two screws.
2. Connect the washer nozzle and check valve.
3. Install the front turn signal lamp assembly with the two screws.



WRU90-BE424

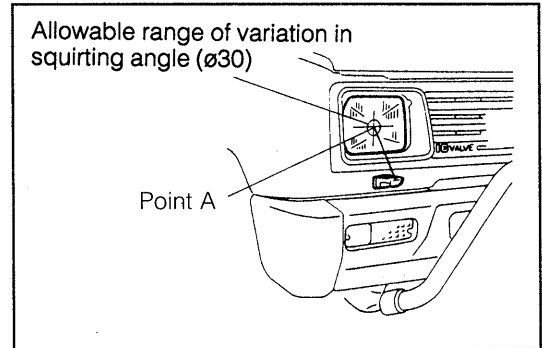
ADJUSTING PROCEDURE FOR NOZZLE INJECTION ANGLE

Operation prior to adjustment

1. Perform the headlamp aiming operation.

Adjustment

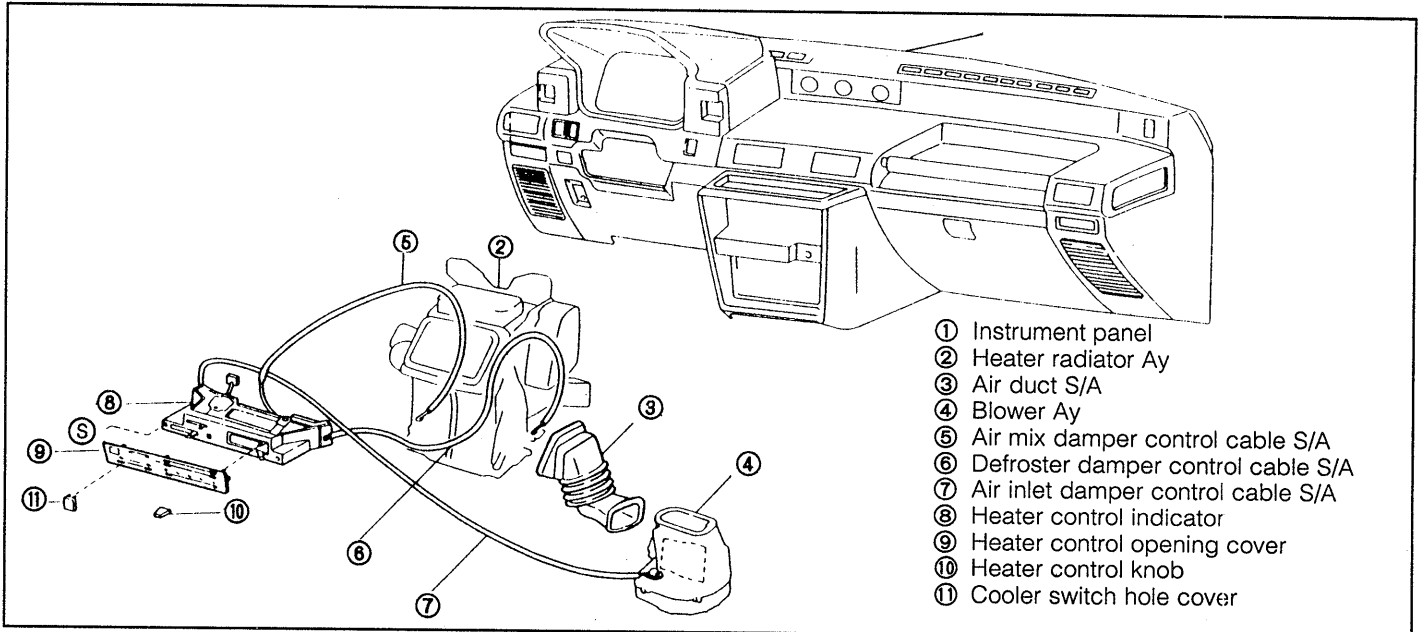
1. Set the nozzle so that the center of squirt come to the bulb installation position of the headlamp. (Bulb center: point A)
2. Ensure that the variation in the squirting angle is within the allowable range.



WRU90-BE125

10. FRONT HEATER

10-1. HEATER UNIT



WRU90-BE205

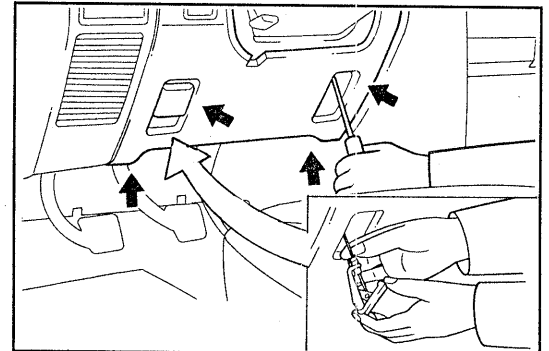
REMOVAL OF INSTRUMENT PANEL

NOTE:

1. This installation and removal procedure has been described for those vehicles equipped with no air conditioner. As for those vehicles equipped with air conditioner, see the AC section.
2. The instrument panel, together with the heater control unit and cable, should be removed from the body.

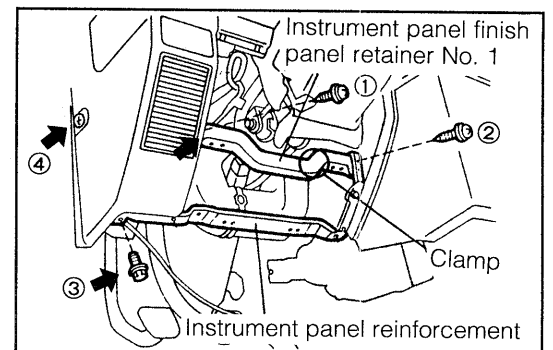
WRU90-BE206

1. Disconnect the battery cable from the negative \ominus terminal.
2. Remove the steering wheel assembly.
3. Removal of lower instrument panel finish panel
 - (1) Remove the hood lock control lever and wire.
 - (2) Remove the screws retaining the rheostat.
 - (3) Remove the two lower screws retaining the lower instrument panel finish panel.
 - (4) Disconnect the rear heater switch connector and the rheostat connector.



WRU90-BE207

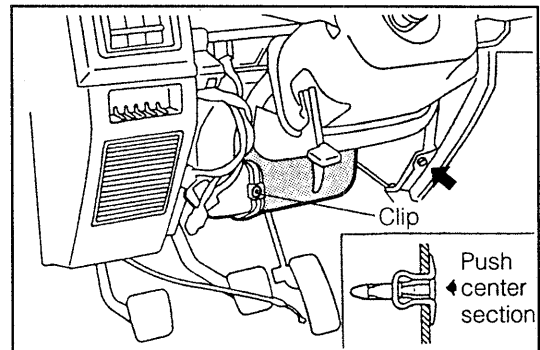
4. Remove the screws ① and ② which retain the instrument panel finish panel retainer No. 1 at the right and left sides. (It is not necessary to remove the multi-use lever switch connector. Also, do not disconnect the connector.)
5. Remove the screws ③ and ④ located at the left side of the instrument panel. (It is not necessary to remove the instrument panel reinforcement.)



WRU90-BE208

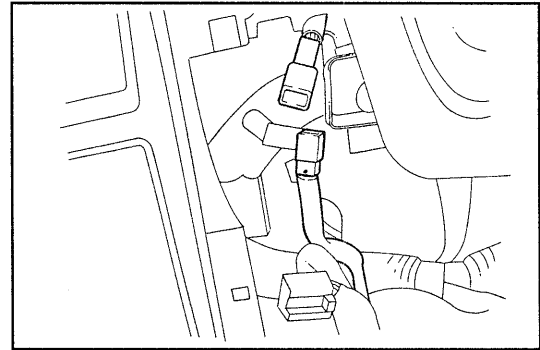
BODY ELECTRICAL SYSTEM

6. Detach the clip retaining the air No. 1 duct subassembly.
Remove the duct.
7. Remove the bolt connecting the instrument panel to the brace.



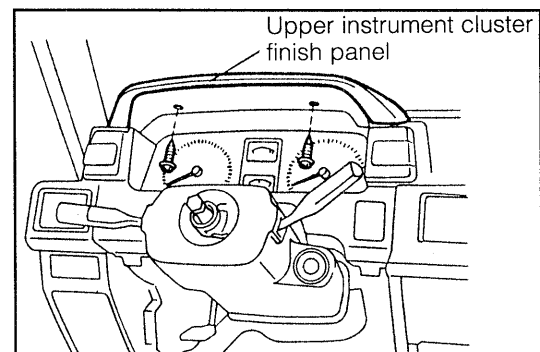
WRU90-BE209

8. Disconnect the connector of the instrument panel wire.



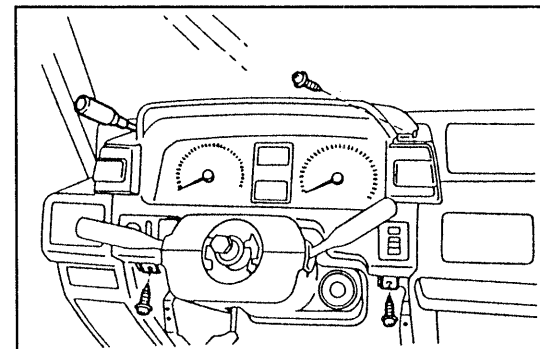
WRU90-BE210

9. Remove the upper instrument cluster finish panel.



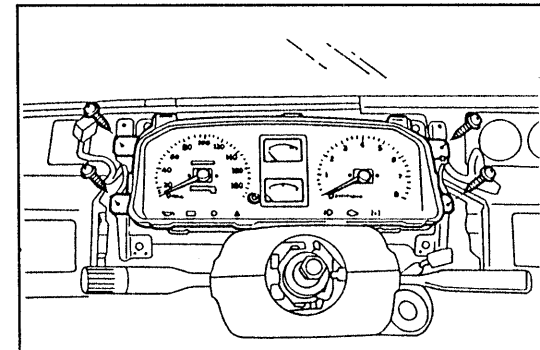
WRU90-BE211

10. Removal of instrument cluster finish panel subassembly
 - (1) Remove the instrument cluster finish panel subassembly.
 - (2) Disconnect the connectors of the rear window defogger switch, hazard warning signal switch and rear wiper switch.



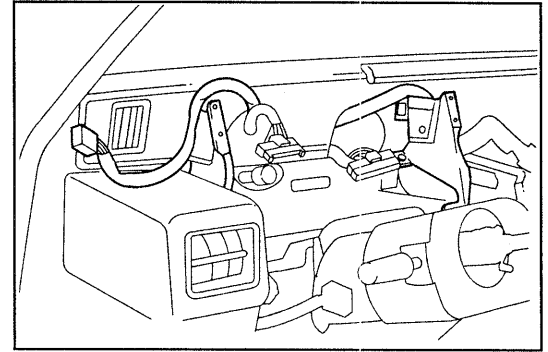
WRU90-BE212

11. Removal of combination meter assembly
 - (1) Remove the attaching screw of the combination meter assembly.
 - (2) Pull out the combination meter assembly toward your side.
 - (3) Disconnect the speedometer cable and the two couplers of the wire harness.



WRU90-BE213

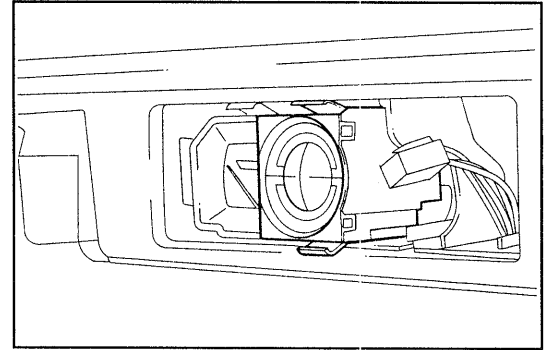
12. Disconnect the clamp of the wire harness.



WRU90-BE214

13. Removal of triple meter

- (1) Remove the upper instrument panel finish by means of a bamboo spatula wrapped with a cloth.
- (2) Pull out the voltmeter, clinometer and clock toward your side, while pushing the upper and lower claws by means of a spatula or the like.
- (3) Disconnect the connectors.

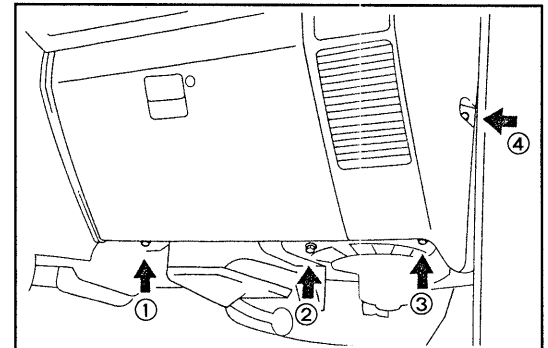


WRU90-BE215

14. Remove the glove compartment door subassembly (screws ① and ②).

15. Remove the screws ③ and ④.

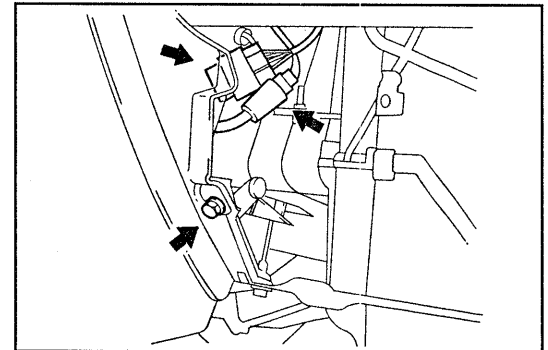
(It is not necessary to remove the instrument panel reinforcement.)



WRU90-BE216

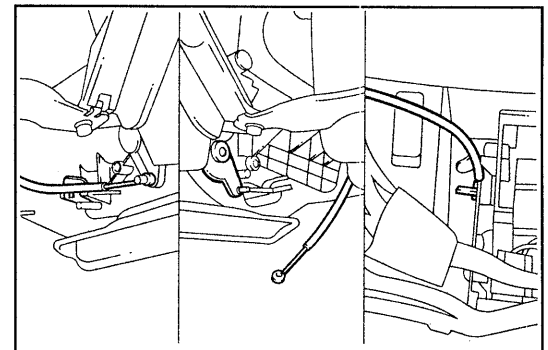
16. Disconnect the connectors of the wire harnesses of the heater control switch (and the air conditioner switch).

17. Remove the attaching screw of the instrument panel and brace.



WRU90-BE217

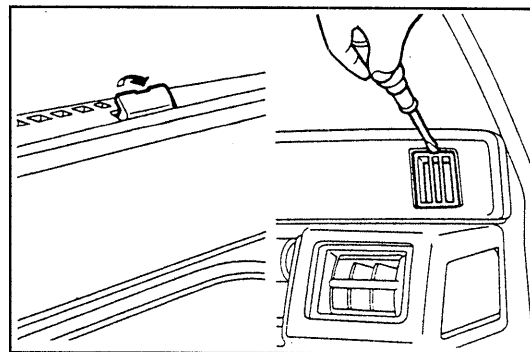
18. Disconnect the heater control cables.



WRU90-BE218

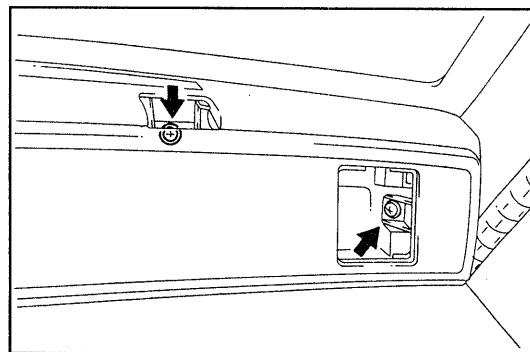
BODY ELECTRICAL SYSTEM

19. Remove the defroster nozzles by means of a spatula wrapped with a cloth or the like (at the right and left sides).
20. Remove the instrument panel hole covers (at the right and left sides).



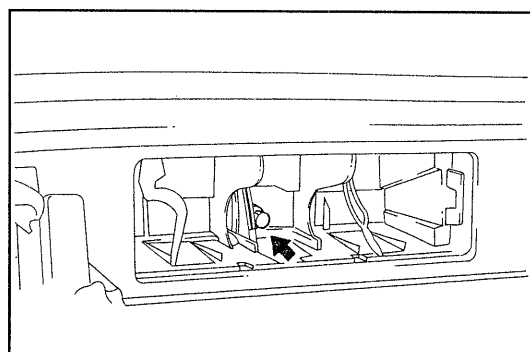
WRU90-BE219

21. Remove the attaching screws of the instrument panel (at the right and left sides).



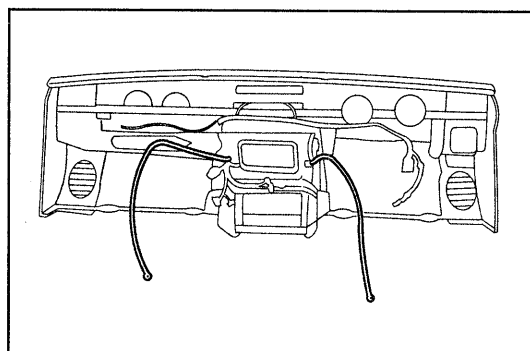
WRU90-BE220

22. Remove the attaching screws of the instrument panel (center).



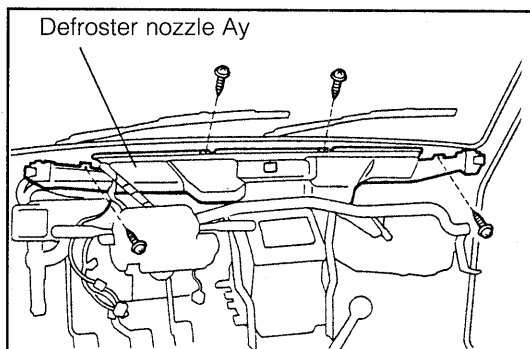
WRU90-BE221

23. Remove the instrument panel from the body.



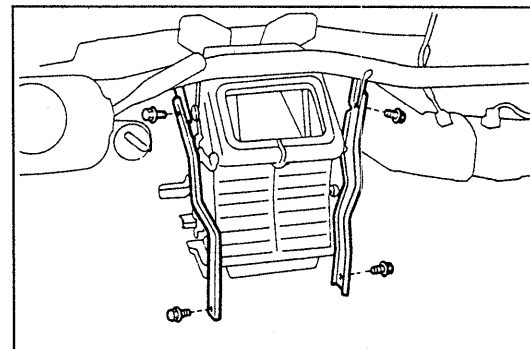
WRU90-BE222

24. Remove the defroster nozzle assembly.



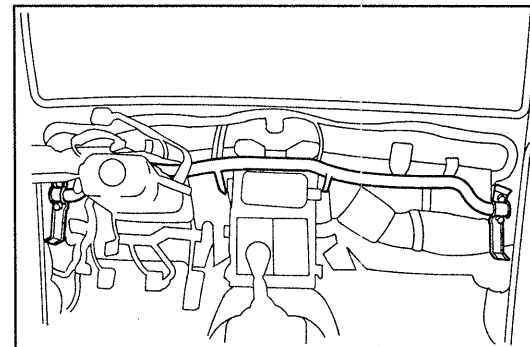
WRU90-BE223

25. Remove the instrument panel panel brace subassembly.
26. Remove the following parts.
 - (1) Bracket of key reminder buzzer, heater relay and horn relay
 - (2) Sub-fuse box



WRU90-BE224

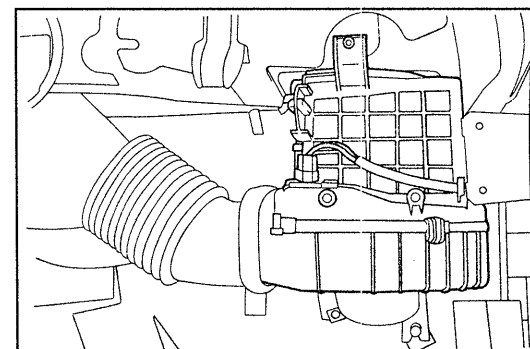
27. Remove the steering column from the pillar-to-pillar member subassembly.
28. Remove the pillar-to-pillar member subassembly from the pillar.



WRU90-BE225

REMOVAL OF BLOWER

Remove the blower assembly and disconnect the connector of the wire harness.



WRU90-BE226

INSPECTION OF BLOWER

NOTE:

- The unit of the heater blower can be removed without removing the instrument panel. As for the headlamp cleaner, refer to page BE-72.
- The unit of the blower switch can be removed from the back side after the instrument panel has been removed.

WRU90-BE227

1. Blower resistor

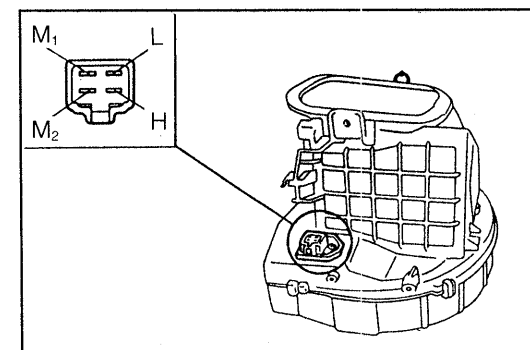
Ensure that the resistance between the respective terminals conforms to the specifications below.

Specified Values:

Between Terminals L and M ₁ :	About 1.17 Ω
L and M ₂ :	About 1.88 Ω
H and M ₂ :	About 0.32 Ω

NOTE:

- The resistor is cooled by the air flow from the blower. Therefore, it should be noted that the resistor may be burnt out if the cooling air should be suspended owing to some reasons.



WRU90-BE228

2. Blower motor & case

- (1) Turn the blades of the blower by hand. Ensure that the blades rotate lightly.
- (2) Ensure that the screws retaining the blades to the motor axle are not loose.
- (3) Ensure that the blades are not turning eccentrically.
- (4) Check the flow route switching plate and packing for damage. Also, ensure that they can be switched smoothly.

NOTE:

- In the step (3) above, there is the possibility that water enters the case and freezes there, thereby preventing the sirocco fan from rotating.

3. Blower switch

When the blower switch is set to each stage, ensure that continuity exists between the respective terminals, as indicated in the continuity table below.

Switch \ Terminal	E	Lo	M ₁	M ₂	Hi
OFF					
I	○	○			
II	○	○	○		
III	○	○		○	
IV	○	○			○

REMOVAL OF HEATER

1. Remove the heater cover.
2. Remove the attaching screws ① through ④ for the heater case.
3. Slightly pull out the heater case toward your side. Then, draw it out toward the left side.

NOTE:

- Never disconnect the water hoses from the engine, unless such disconnection is required. Failure to observe this caution may cause dents or scratches of the copper pipe, resulting in water leakage.

INSPECTION OF HEATER UNIT SUBASSEMBLY

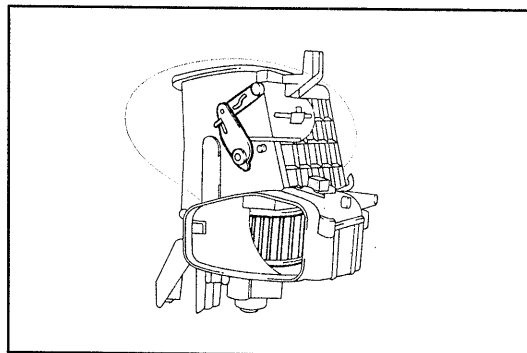
Check the heater unit for cracks.

Check the packing for damage.

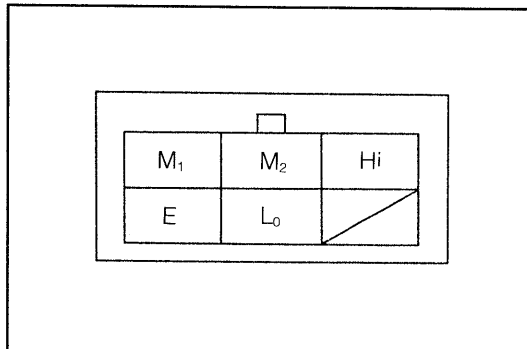
Ensure that the flow route switching plate moves smoothly.

INSPECTION OF HEATER RELAY

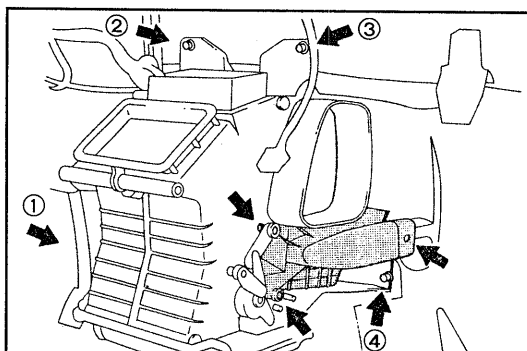
1. If the blower will not functioning properly, replace the heater relay.
2. Check the operation.



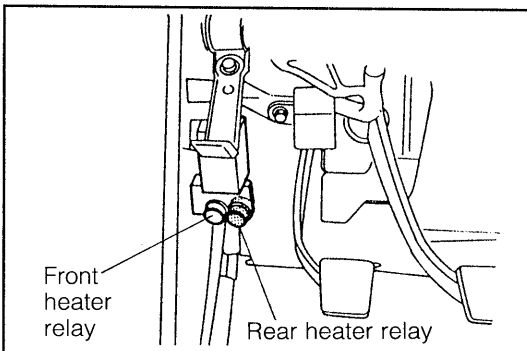
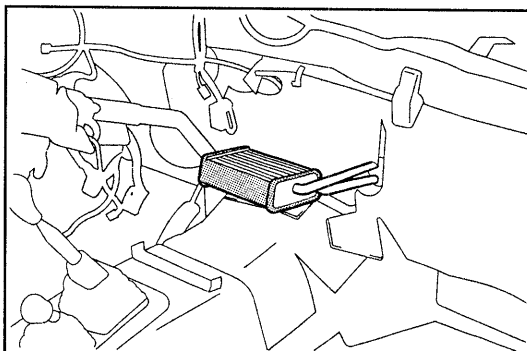
WRU90-BE229



WRU90-BE230



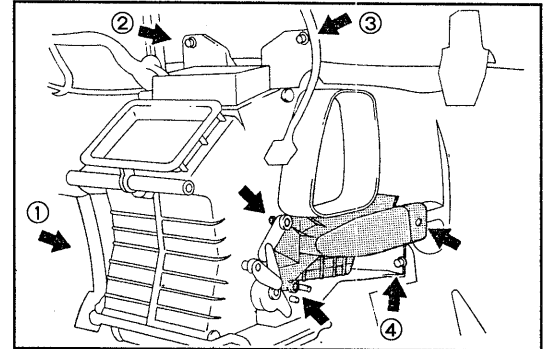
WRU90-BE231



WRU90-BE232

INSTALLATION OF HEATER-RELATED PARTS

1. Install the heater radiator assembly with the two nuts and two bolts.
2. Install the heater cover with the two nuts and screws.



WRU90-BE233

3. Install the blower assembly with the two bolts, nuts and the connector.
4. Install the pillar-to-pillar member subassembly and steering column.

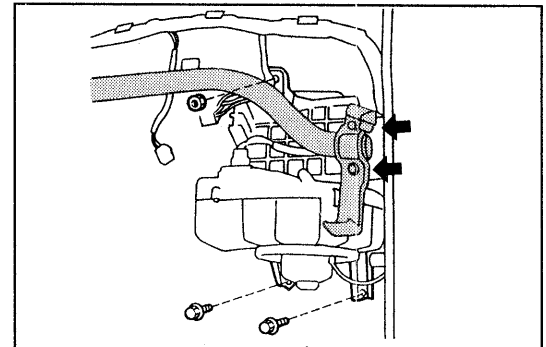
Tightening Torque:

- 14.7 - 21.6 N·m (Steering column)
- 29.4 - 44.1 N·m (M10, pillar)
- 14.7 - 21.6 N·m (M8, body center)

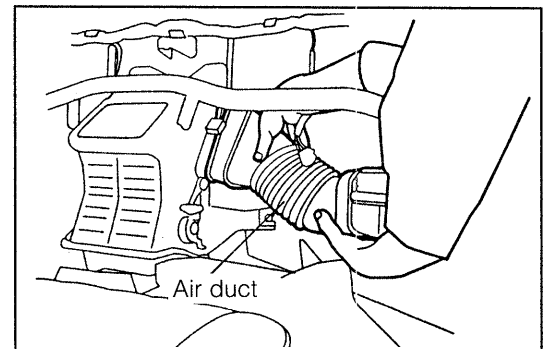
NOTE:

- Install the arrow-headed bolts after the left bolts (pillar and body center) have been installed. This procedure will facilitate the operation.

5. Install the air duct.



WRU90-BE234

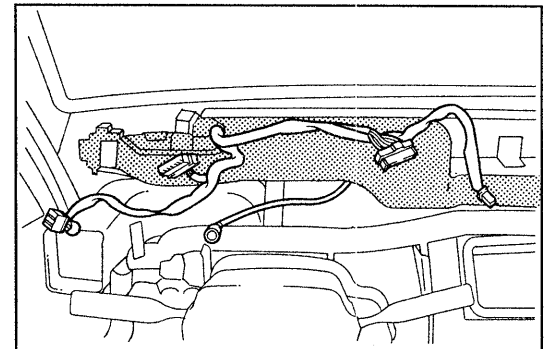


WRU90-BE235

6. Install the defroster nozzle.

NOTE:

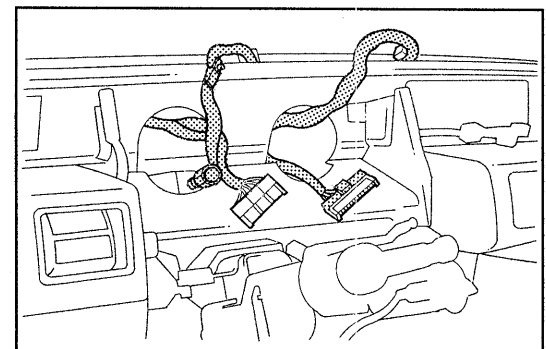
- The wire harness of the combination meter should be drawn from the position as indicated by the arrow in the right figure.



WRU90-BE236

INSTALLATION OF INSTRUMENT PANEL

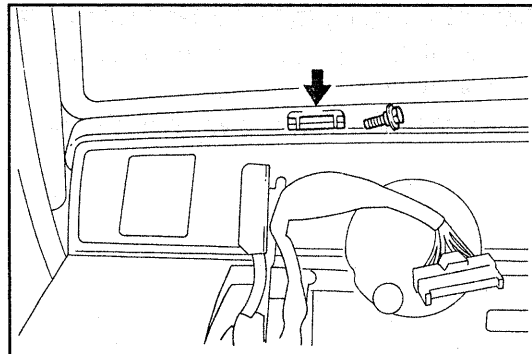
1. Put the instrument panel in place.
2. Draw out the wire harnesses and speedometer cable from the hole for the combination meter.



WRU90-BE238

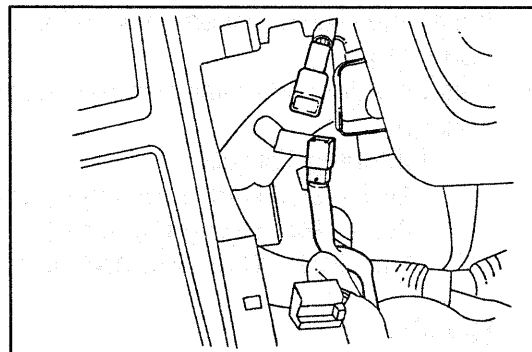
BODY ELECTRICAL SYSTEM

3. Temporarily install the instrument panel with two bolts at upper right and left points.




WRU90-BE239

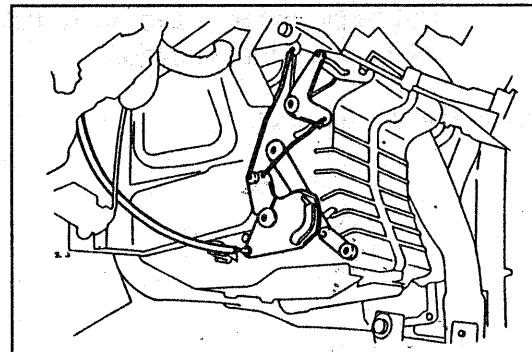
4. Connect the coupler of the wire harness.
(1) Wire, instrument panel
(2) Wire, heater control switch
(3) Wire, air conditioner switch
5. Clamp of wire harness
(1) Wire cowl in left figure (for instrument panel wire)
(2) Wire harnesses for hazard of combination meter section and rear wiper switch




WRU90-BE240

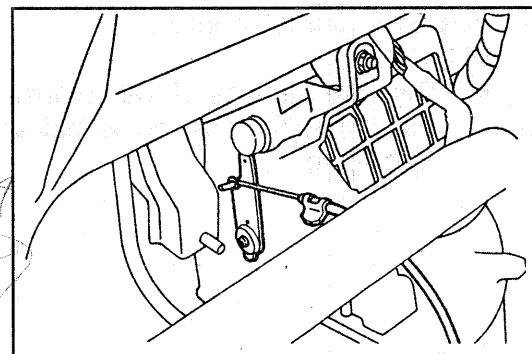
6. Connect the wire of the heater control unit to the lever of the heater/blower unit.

- (1) Install the mode switching cable, as follows:
1) Set the mode switching lever of the heater control to the  (DEF) side; the mode switching lever of the heater unit to the DEF side.
2) Connect the mode switching cable. Insert it into the clamp securely.




WRU90-BE241

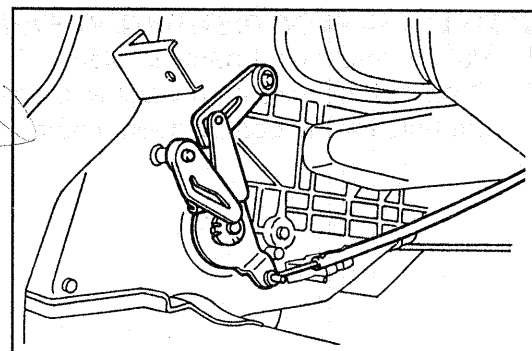
- (2) Install the temperature regulating cable, as follows:
1) Set the temperature regulating lever of the heater control to the  (COOL) side; the temperature regulating lever of the heater unit to the COOL side.
2) Connect the temperature regulating cable. Insert it into the clamp securely.



WRU90-BE242

- (3) Install the inside air/outside air switching cable, as follows:

- 1) Set the inside air/outside air switching lever of the heater control to the  (RECIRC) side; the inside air/outside air switching lever of the blower assembly to the RECIRC side.
2) Connect the inside air/outside air switching cable. Insert it to the clamp securely.

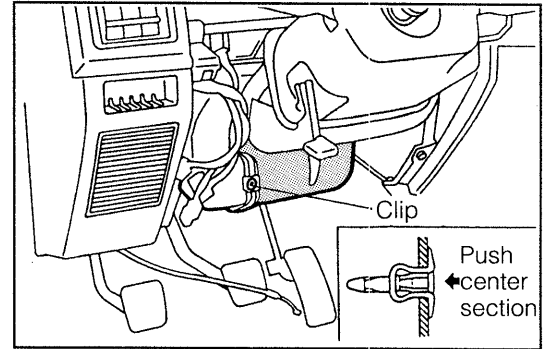


WRU90-BE243

7. Install the air No. 1 duct subassembly. Install the clip.

NOTE:

- Before the instrument panel is tightened securely, make sure that the wire harnesses, clamps and connectors are installed without applying undue force.



WRU90-BE244

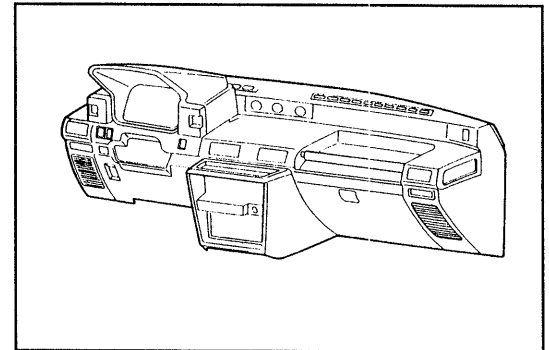
8. Tighten all screws which have been removed during the removal operation.

NOTE:

- Refer to the sequence numbers 4, 5, 17, 21 and 22.

9. Install the defroster nozzle assembly.

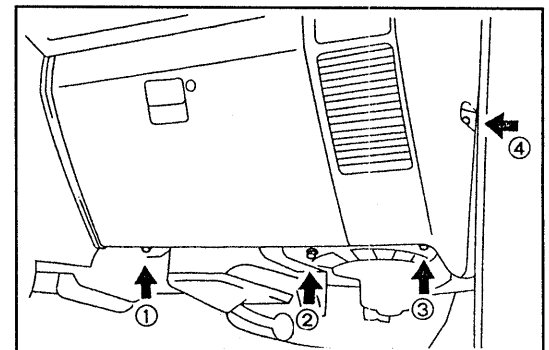
10. Install the instrument panel hole cover.



WRU90-BE245

11. Install the glove compartment door subassembly. (Tighten the screws ① and ②.)

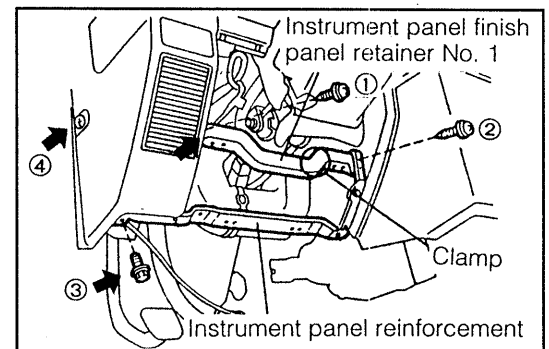
12. Tighten the screws ③ and ④.



WRU90-BE246

13. Install the instrument panel finish panel retainer No. 1. (Tighten the screws ① and ②.)

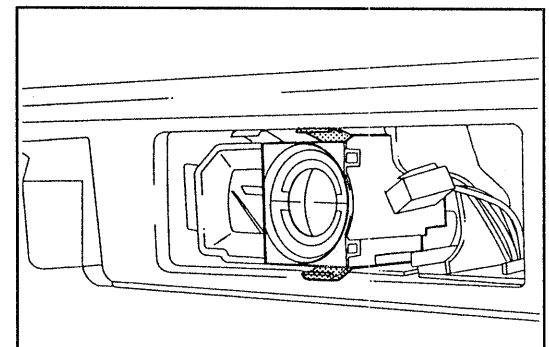
14. Tighten the screws ③ and ④.



WRU90-BE247

15. Install the triple meter.

- (1) Connect each connector to the respective meters. Press the meter into the groove by hands.
- (2) Press the upper instrument panel finish into position by hands.

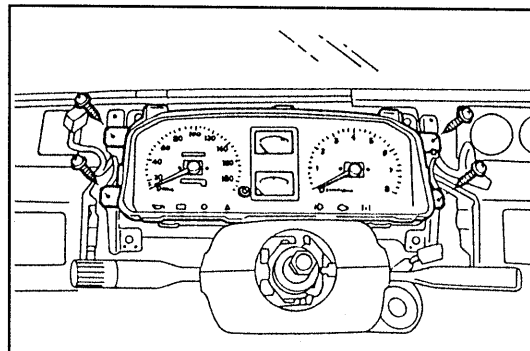


WRU90-BE248

BODY ELECTRICAL SYSTEM

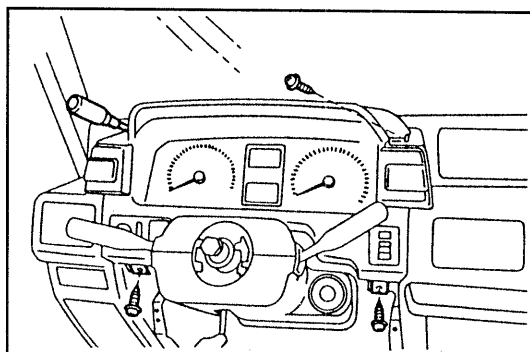
16. Installation of combination meter

- (1) Connect the connector of the speedometer cable and the couplers of the wire harnesses.
- (2) Tighten the attaching screws.



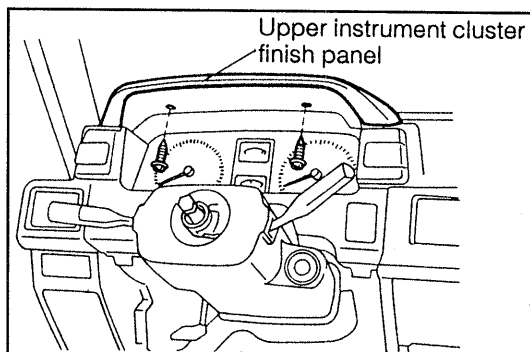
WRU90-BE249

17. Install the instrument cluster finish panel subassembly with the attaching screws.



WRU90-BE250

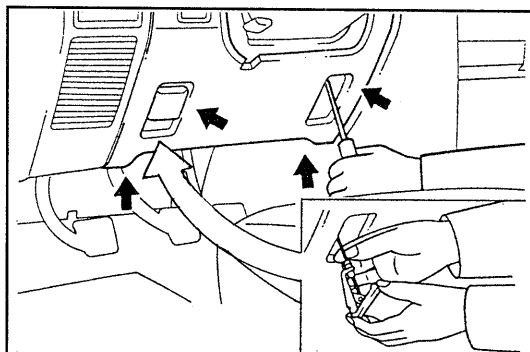
18. Install the upper instrument cluster finish panel with the attaching screws.



WRU90-BE251

19. Installation of lower instrument panel finish panel.

- (1) Connect the connector for the rear heater switch and rheostat.
- (2) Tighten the attaching screws of the lower instrument panel finish panel.
- (3) Tighten the attaching screws of the rheostat.
- (4) Connect the wire for the hood lock control lever and tighten the attaching screws.



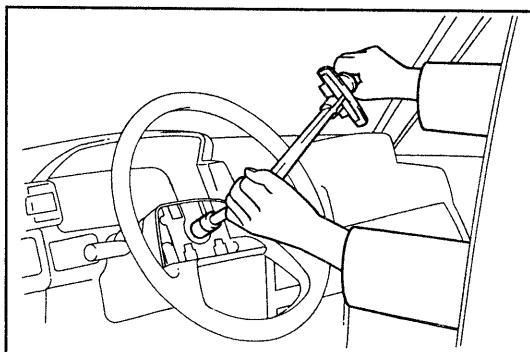
WRU90-BE252

20. Install the steering wheel.

Tightening Torque: 29.4 - 49.0 N·m

21. Connect the horn wire and install the horn pad.

22. Tighten the screw of the horn pad.



WRU90-BE253

OPERATION AFTER INSTALLATION

1. Connect the battery.
2. Ensure that each switch of the instrument panel functions properly.
3. Start the engine.

NOTE:

- (1) Replenish cooling water in advance if the cooling water has been drained out.
 - (2) When starting the engine, place the shift lever of the transmission in the neutral position and apply the parking brake.
4. Ensure that all of the electrical system functions properly.

WRU90-BE254

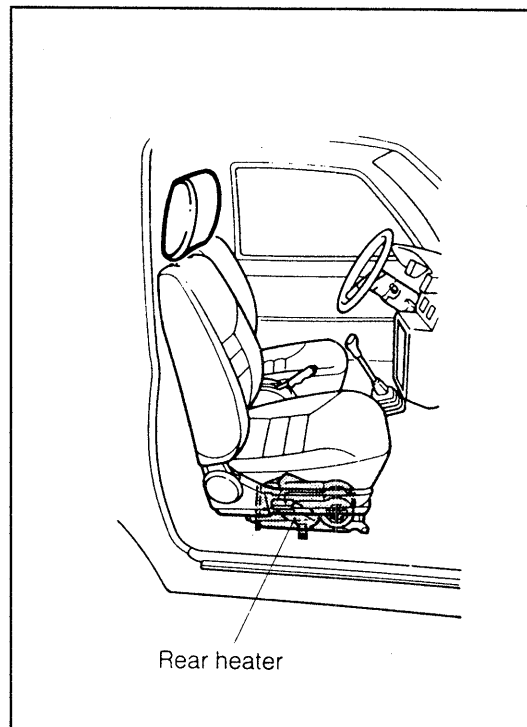
11. REAR HEATER

The rear heater is available as optional equipment on all models.

The rear heater is located below the front passenger seat.

Heater Specifications

Heat radiating rate	kCal/h	1,600
Air flow rate	m ³ h (ft ³ /h)	120 (4238)
Power consumption	W	30
Fan diameter	mm (inch)	80 (3.1)

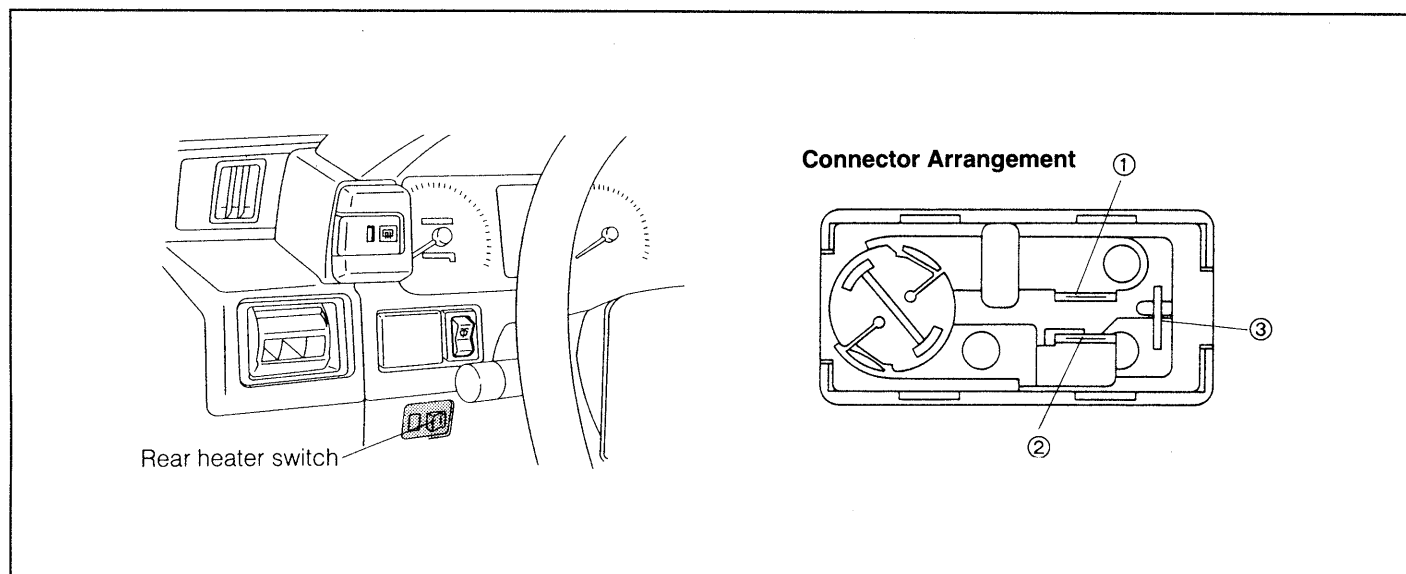


WRU90-BE132

11-1. REAR HEATER SWITCH

The rear heater switch is a seesaw type switch which incorporates an indicator lamp.

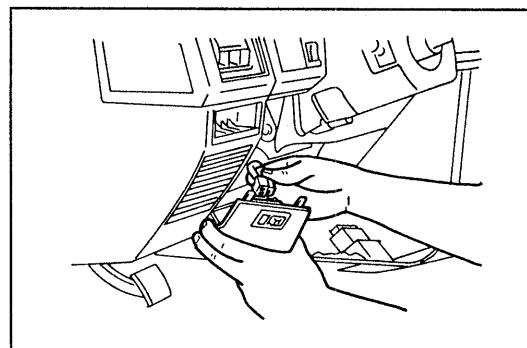
Furthermore, the switch is installed on the finish lower panel of the instrument panel toward the left side of the vehicle.



WRU90-BE133

REMOVAL

1. Remove the instrument panel finish lower panel.
2. Remove the coupler of the rear heater switch.
3. Remove the rear heater switch from the instrument panel finish lower panel.






WRU90-BE425

INSPECTION

Ensure that continuity exists between the respective terminals as indicated in the continuity table below.

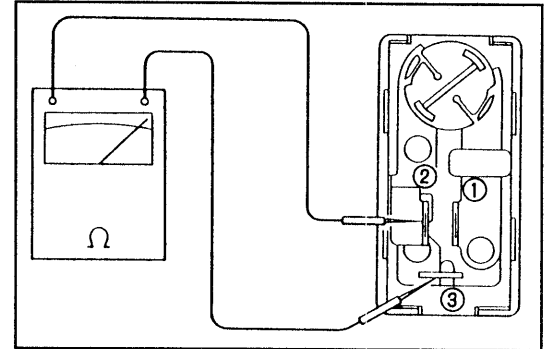
Continuity table

○—○ Continuity exists.
○——○ Bulb in installed state

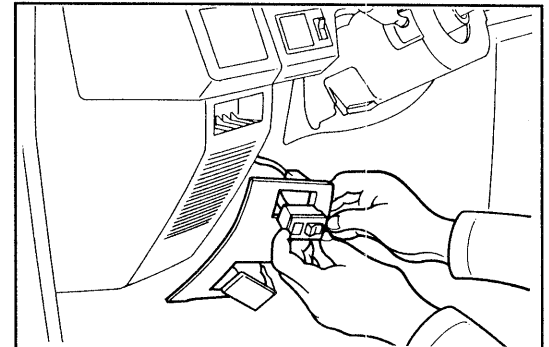
Switch \ Terminal	3	1	2
OFF		○—  —○	
ON	○—	○—  —○	

INSTALLATION

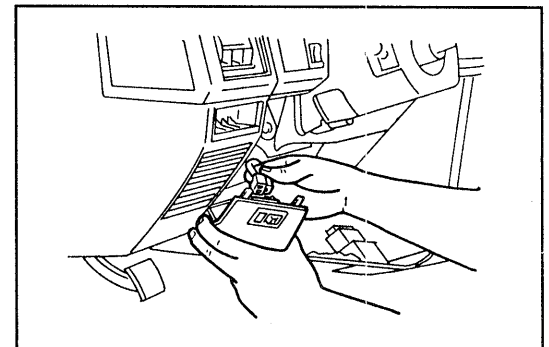
1. Install the rear heater switch to the instrument panel finish lower panel.
2. Connect the coupler of the rear heater switch.
3. Install the instrument panel finish lower panel.



WRU90-BE426



WRU90-BE427



WRU90-BE428

11-2. REAR HEATER RELAY

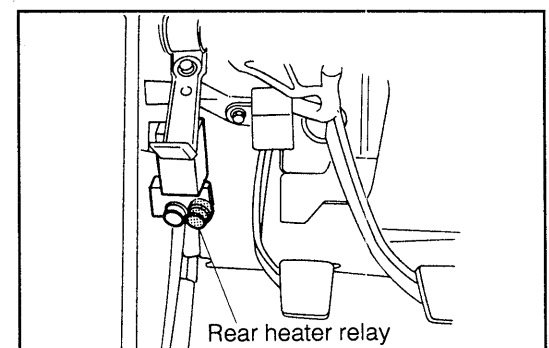
INSPECTION

If the air flow rate of the rear heater exhibits abnormality when the rear heater switch is functioning properly, replace the rear heater relay. Check the operation.

WRU90-BE134

INSTALLATION POSITION OF REAR HEATER RELAY

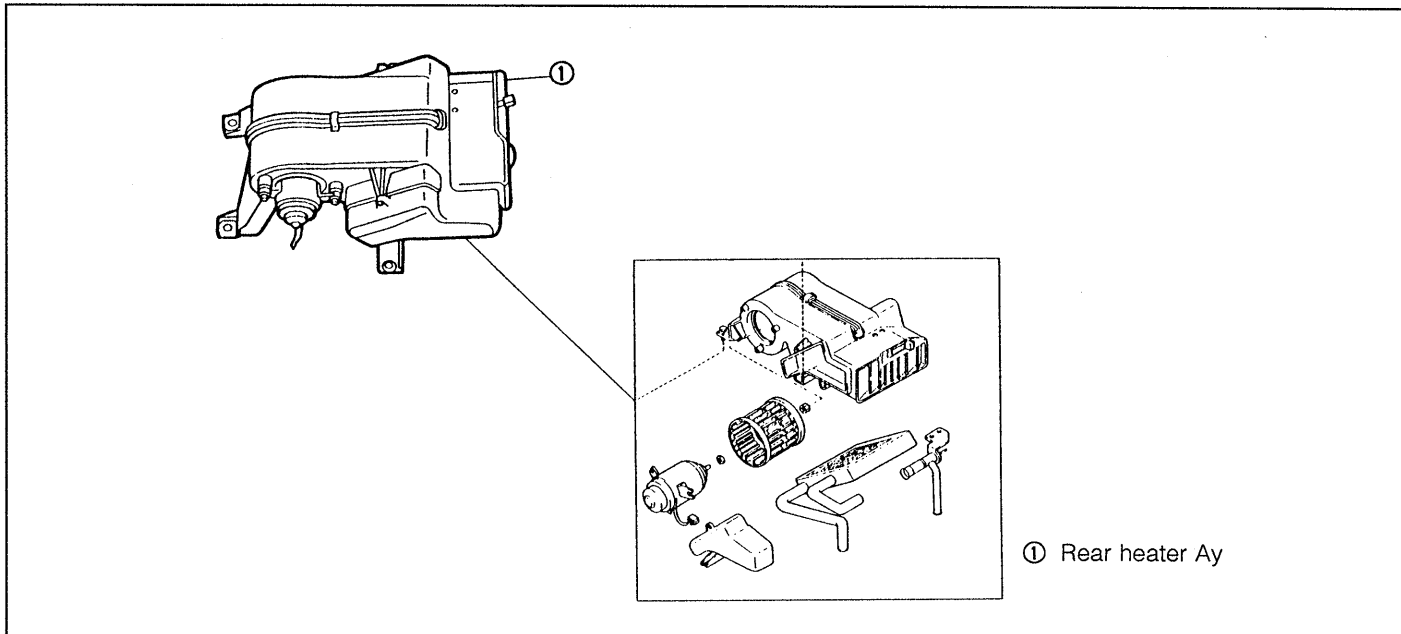
The rear heater relay is located below the main fuse box at the lower left of the instrument panel subassembly.



WRU90-BE429

11-3. HEATER UNIT

RELATED PARTS



WRU90-BE135

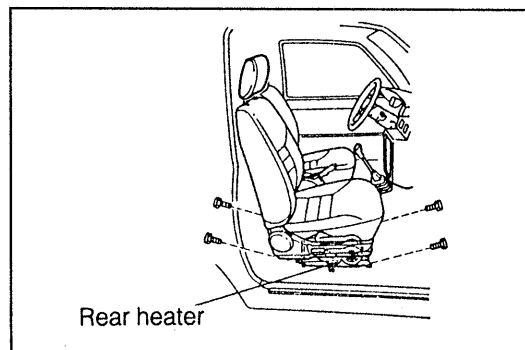
OPERATION PRIOR TO REMOVAL

Disconnect the negative \ominus terminal of the battery.

WRU90-BE430

REMOVAL

1. Remove the right side of the front seat by removing the four bolts.

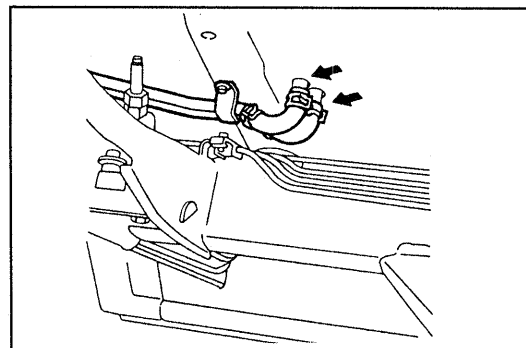


WRU90-BE431

2. Disconnect the two water hoses from the rear heater assembly.

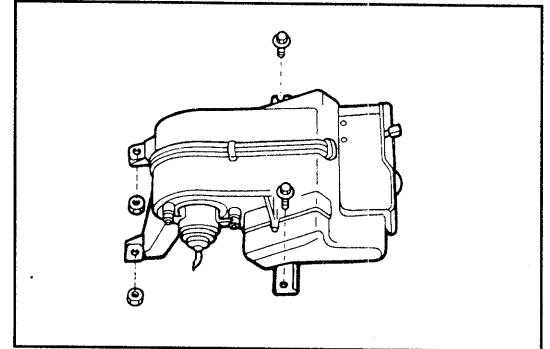
NOTE:

- After removing the water hoses, immediately plug the hoses so that no engine cooling water may be leaked out.



WRU90-BE432

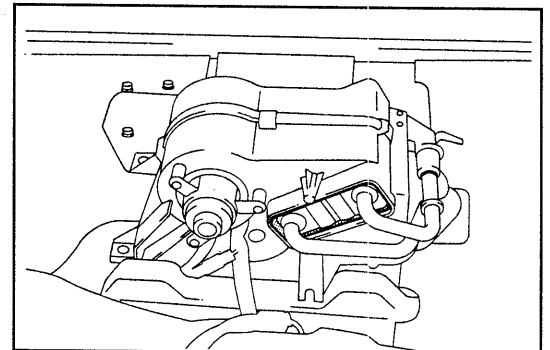
3. Remove the rear heater assembly by removing two nuts and two bolts.



WRU90-BE433

INSPECTION

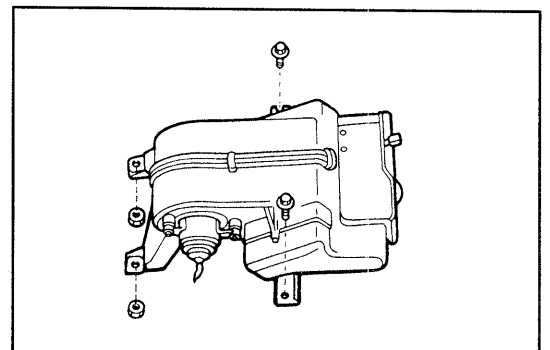
1. Blower unit
 - Ensure that the radiator exhibits no cracks.
 - Ensure that the packing is not damaged.
 - Ensure that the blower fan rotates smoothly when it is turned by hand.



WRU90-BE255

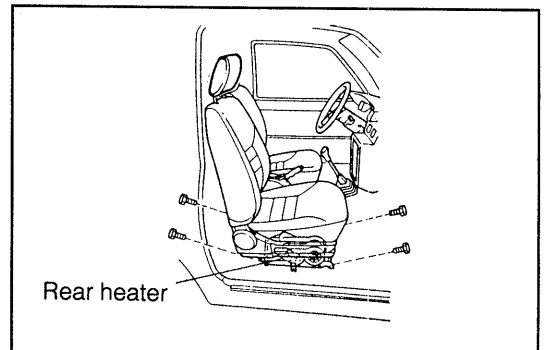
INSTALLATION

1. Install the rear heater assembly with two bolts and two nuts.
2. Install the two water hoses to the rear heater assembly.



WRU90-BE434

3. Install the front seat with four bolts.
 Tightening Torque: 3.0 - 4.5 kg-m
 (22 - 33 ft-lb, 29.4 - 44.1 N-m)



WRU90-BE256

4. Connect the negative terminal \ominus to the battery.
5. Fill the cooling water if the coolant level drops at the radiator.
6. Start the engine and warm up thoroughly. Then, stop the engine and cool down thoroughly. Fill the cooling water if the coolant level drops at the radiator.

WARNING:

- Never remove the radiator cap if the engine is still hot.

WRU90-BE435

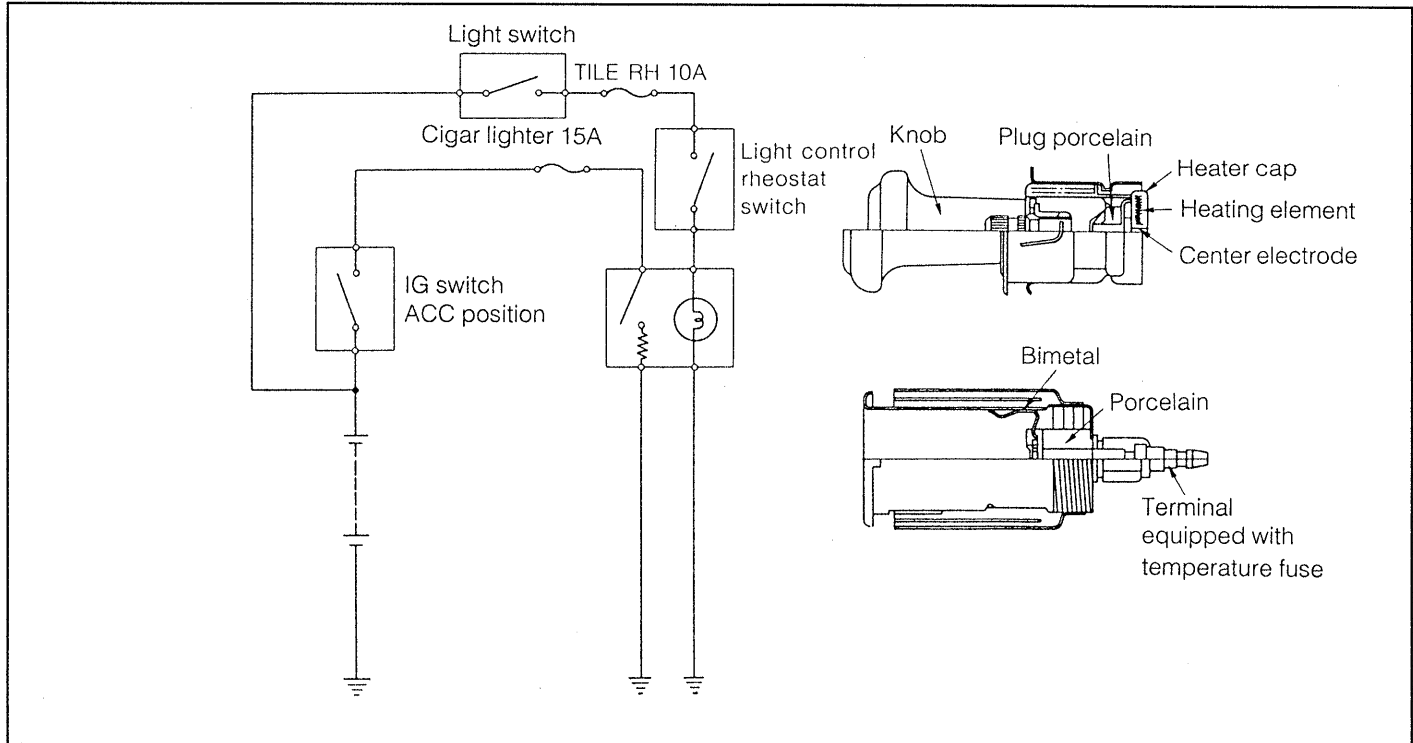
12. CIGARETTE LIGHTER

The cigarette lighter system consists of a plug and a socket. When the plug knob is pushed in, current flows from the bimetal to the heating element, thereby causing the heating element to generate heat.

When the specified heating temperature is attained, the bimetal opens. As a result, the retention of the heater cap is released. The plug has been so constructed that it will pop up owing to its own spring tension. To assure the safety in the event of overheating, a temperature fuse is employed in order that fusing may take place, as required.

WRU90-BE436

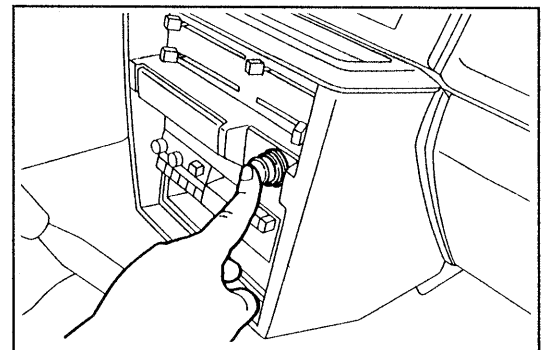
CIRCUIT DIAGRAM



WRU90-BE136

INSPECTION

1. With the ignition switch set to the ON position, push in the cigarette lighter. Ensure that the plug pops out with the heating element in a glow state.
If the normal function fails to take place, check for the fuse-related parts. Replace the cigarette lighter assembly, as required.
2. With the ignition switch set to the ON position, set the light control switch to the ON position. Ensure that the cigarette lighter position lamp goes on.
If the normal function fails to take place, check for the fuse-related parts. Replace the cigarette lighter assembly, as required.



WRU90-BE259

REMOVAL & INSTALLATION PROCEDURE

NOTE:

- The replacement of the socket section of the cigarette lighter can be carried out from the back side after the instrument panel has been removed from the body.
- For the removal procedure for the instrument panel, see the "Front Heater Section."

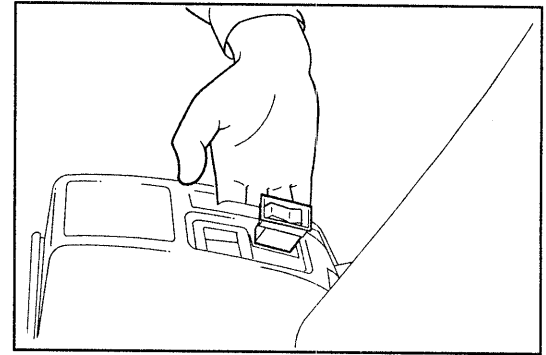
WRU90-BE260

13. REMOTE CONTROL MIRROR

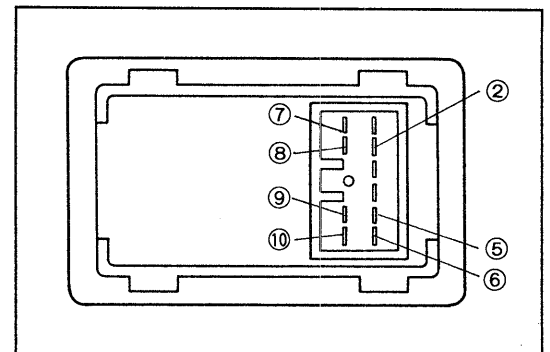
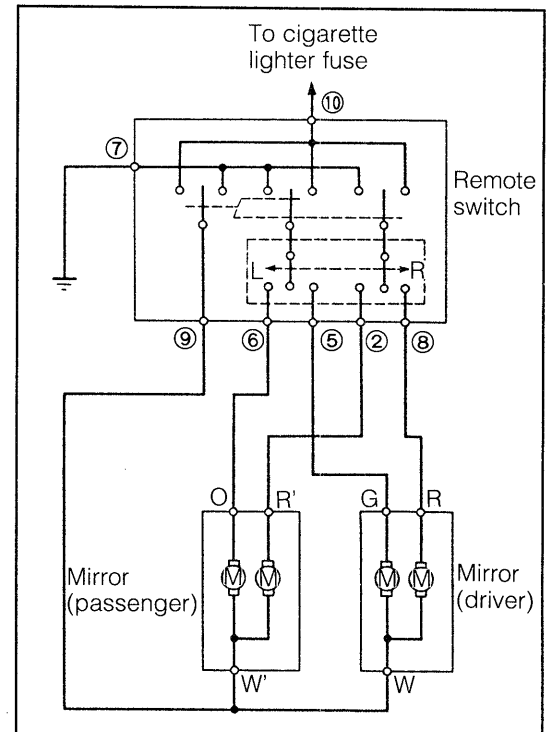
13-1. REMOTE CONTROL SWITCH

Inspection

1. Take out the remote control switch by pushing it from the inside of the floor console box.
2. Disconnect the coupler.
3. Ensure that continuity exists between the respective terminals by operating the switch as indicated in the table below.



	Switch	⑩	⑨	⑧	⑦	⑥	⑤	②
Left	Up	○				○		
	Down		○		○			
	OFF	○	○					
	Left	○					○	
	Right		○		○		○	
OFF	Up		○		○			
	Down	○	○					
	OFF							
	Left		○		○			
	Right	○	○					
Right	Up	○						○
	Down		○		○			○
	OFF	○	○					
	Left	○		○				
	Right		○		○			



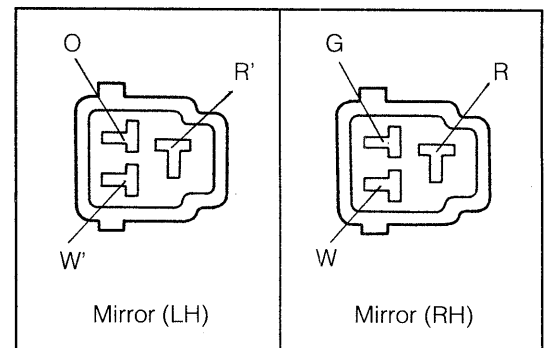
WRU90-BE137

13-2. REMOTE CONTROL MOTOR

Inspection

1. Remove the door trim. Take out the coupler.
2. Ensure that the motor operates properly by applying the battery voltage across the respective terminals as indicated in the table below.

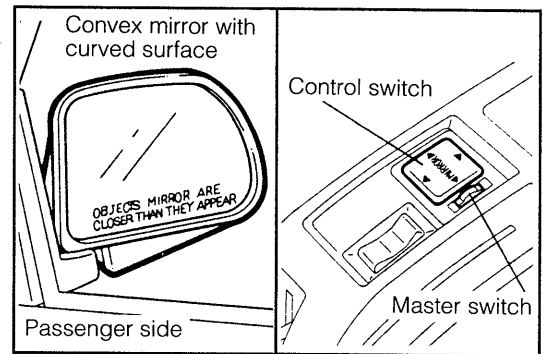
(RH)	W	G	R
Up	—	+	
Down	+	—	
Left	—		+
Right	+		—



WRU90-BE437

BODY ELECTRICAL SYSTEM

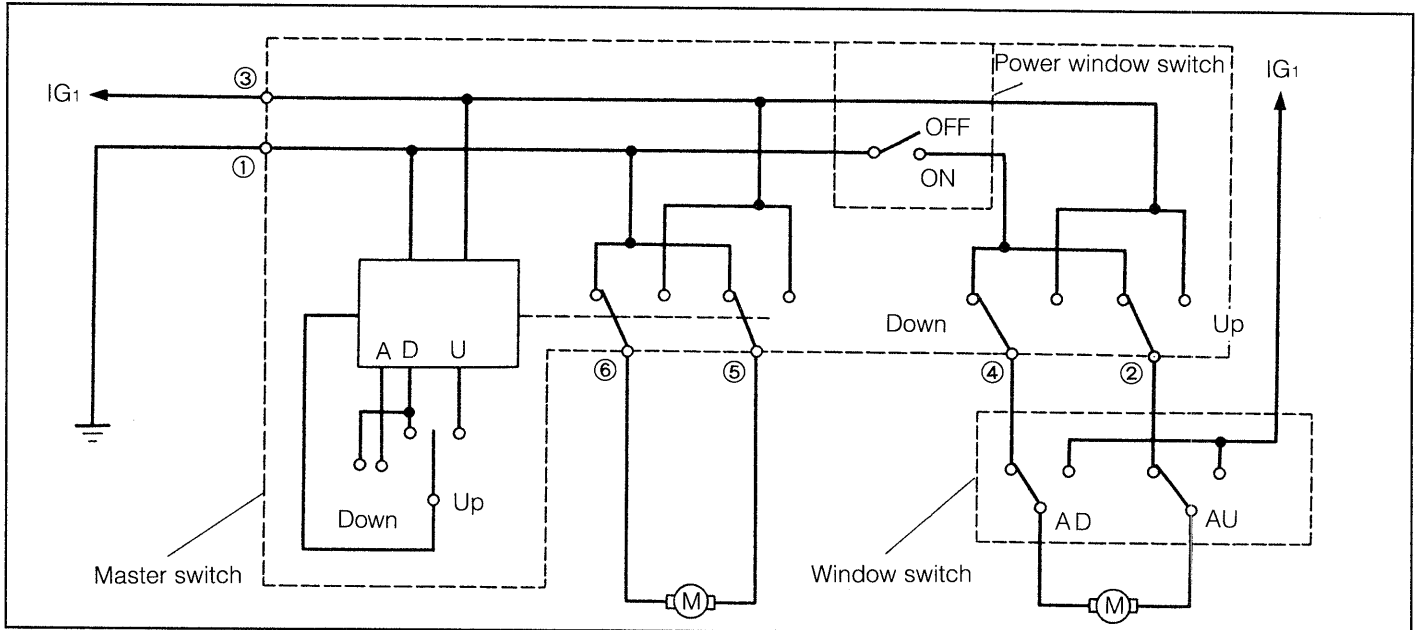
(LH)	W'	O	R'
Up	—	+	
Down	+	—	
Left	—		+
Right	+		—



WRU90-BE138

14. POWER WINDOW

14-1. CIRCUIT DIAGRAM

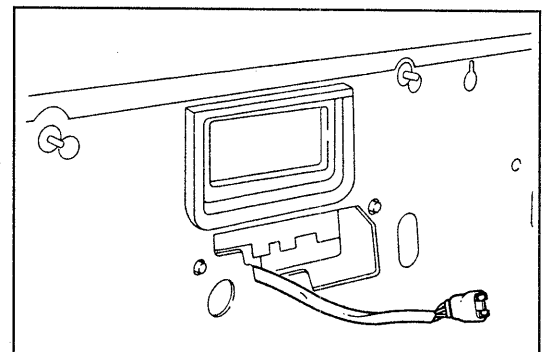


WRU90-BE139

14-2. MASTER SWITCH (Driver's switch)

REMOVAL

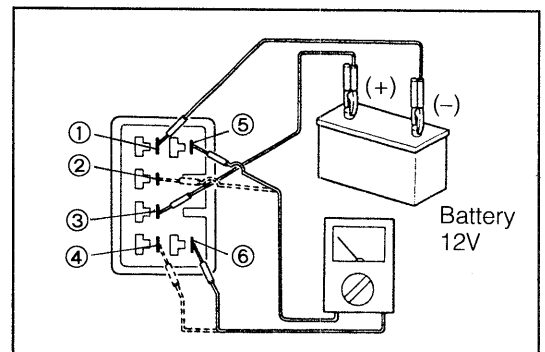
1. Remove the three screws of the arm rest.
2. Remove the screw of the door inside handle. Remove the bezel.
3. Remove the door trim board assembly.
4. Disconnect the wiring coupler.



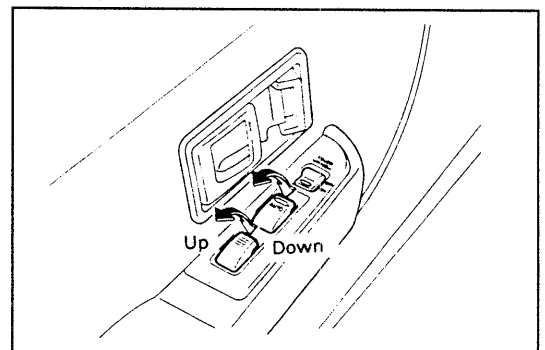
WRU90-BE140

INSPECTION

1. Connect the wiring, as indicated in the right figure, to make a test circuit.
2. Operate the AUTO switch. Measure the voltage between the terminals ⑤ and ⑥.
 - ① OFF: 0V
 - ② UP: Battery voltage
 - ③ DOWN, first stage: Battery voltage (The polarity becomes opposite to the item ②.)
 - ④ DOWN, second stage: Battery voltage should remain for about 20 seconds even if the switch is not held pushed.
3. Operate the window switch, Measure the voltage between the terminals ② and ④, (The power window switch is in the ON state.)
 - ① OFF: 0V
 - ② UP: Battery voltage
 - ③ DOWN: Battery voltage (However, the polarity is opposite to the item ②.)
4. When the power window switch is turned OFF, ensure that no voltage is applied across the terminals ② and ④ even if the window switch is operated.



WRU90-BE141

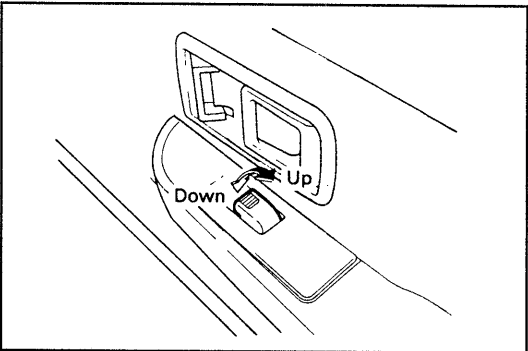


WRU90-BE142

14-3. WINDOW SWITCH (Passenger's switch)

REMOVAL

- 1. Remove the three screws of the arm rest.
- 2. Remove the screw of the door inside handle. Remove the bezel.
- 3. Remove the door trim board assembly.
- 4. Disconnect the wiring coupler.

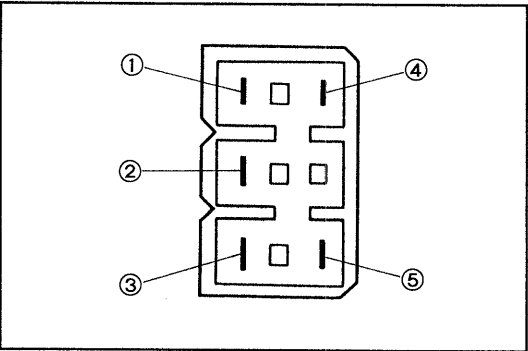


WRU90-BE143

INSPECTION

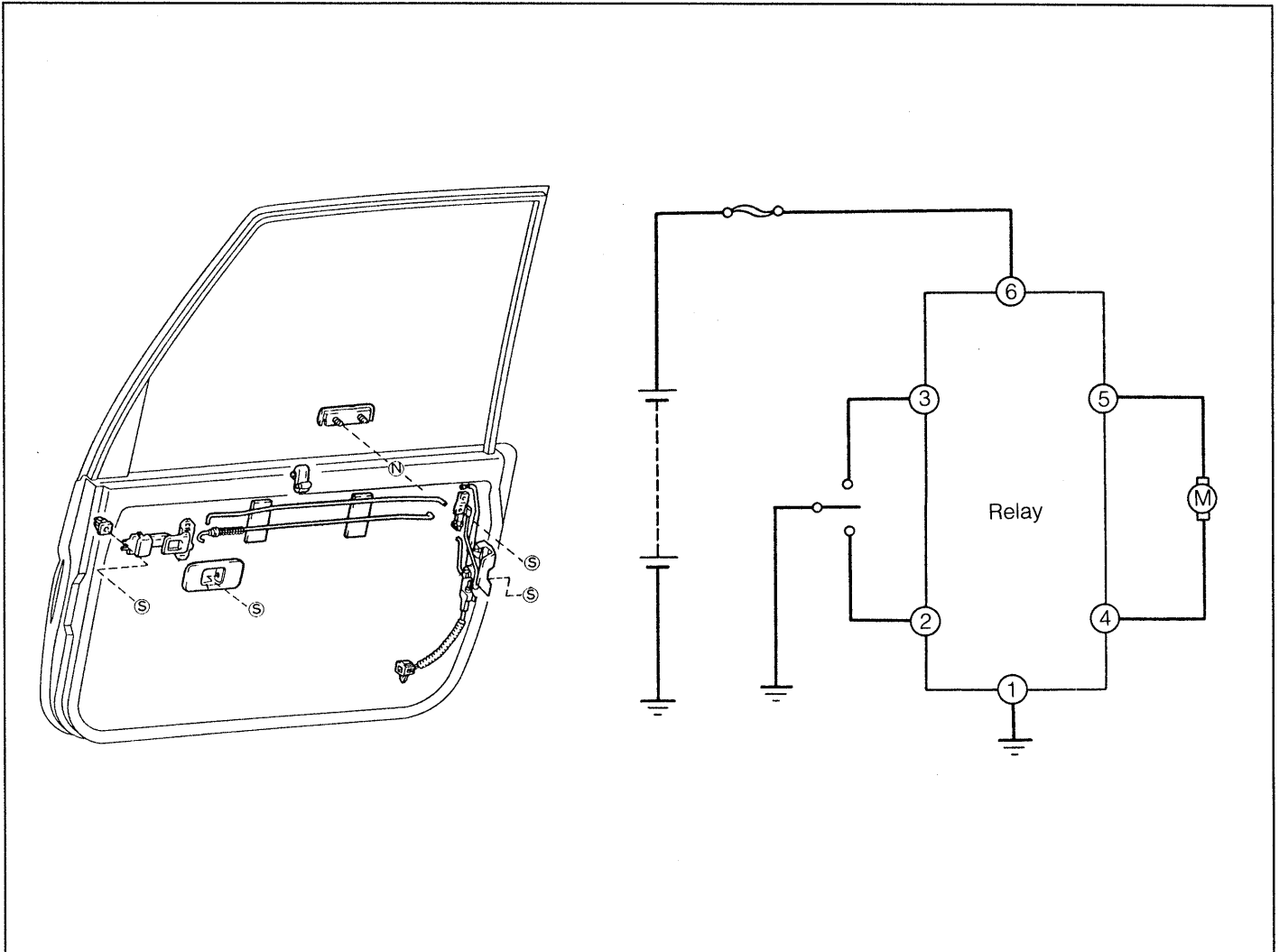
Ensure that continuity exists between the respective terminals as indicated in the table below.

	①	②	③	④	⑤
UP	○	○		○	○
OFF	○	○	○		○
DOWN	○		○		○



WRU90-BE144

15. POWER FRONT DOOR LOCK



WRU90-BE145

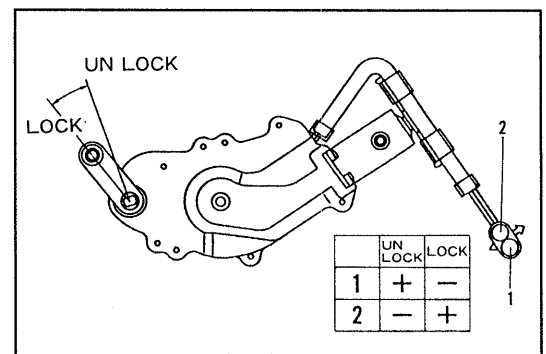
15-1. DOOR LOCK CONTROL MOTOR (Passenger side door)

REMOVAL

1. Remove the three screws of the arm rest.
2. Remove the screw of the door inside handle. Remove the bezel.
3. Remove the door trim board assembly. Disconnect the wiring coupler.
4. Remove the water seal.

INSPECTION

When the positive \oplus and negative \ominus polarities of a 12V battery are connected to the terminals of the coupler, the lever of the motor should move to the LOCK or UNLOCK direction.



WRU90-BE146

15-2. DOOR LOCK CONTROL SWITCH (Driver side door)

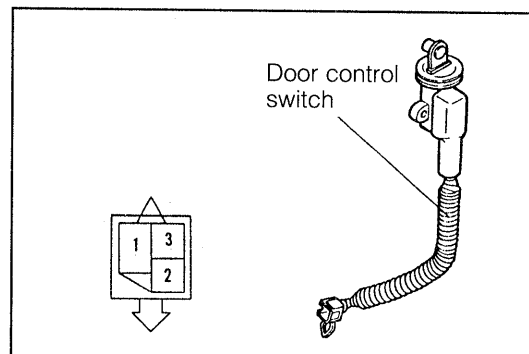
REMOVAL

1. Remove the three screws of the arm rest.
2. Remove the screw of the door inside handle. Remove the bezel.
3. Remove the door trim board assembly. Disconnect the wiring coupler.
4. Remove the water seal.

INSPECTION

Ensure that continuity exists between the respective terminals as indicated in the table below.

	1	2	3
Lock	○	○	
Unlock	○		○

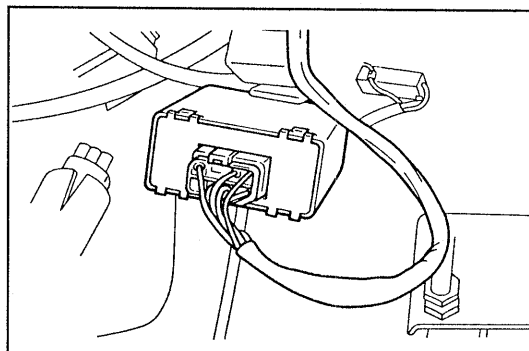
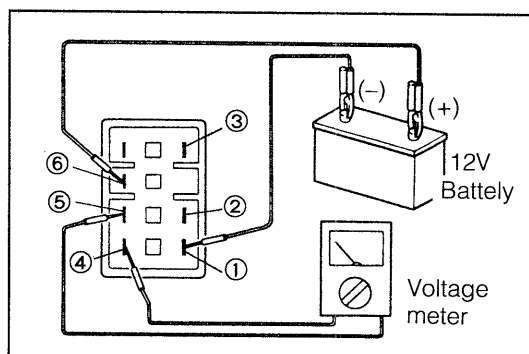


WRU90-BE147

15-3. DOOR LOCK CONTROL RELAY

INSPECTION

1. Fabricate a test circuit as indicated in the right figure.
2. Set the circuit tester to the voltmeter range.
3. When the terminal ② is connected to the negative (–) terminal of the battery, ensure that the battery voltage is momentarily applied across the terminals ④ and ⑤.
4. When the terminal ③ is connected to the negative (–) terminal of the battery, ensure that the battery voltage is momentarily applied across the terminals ④ and ⑤. However, the polarity of the voltage at this time should be opposite to that under the step ③ above. page 80



WRU90-BE149

16. BACK DOOR OPENER

16-1. BACK DOOR OPENER SWITCH

The back door opener switch is located at the rear console box.

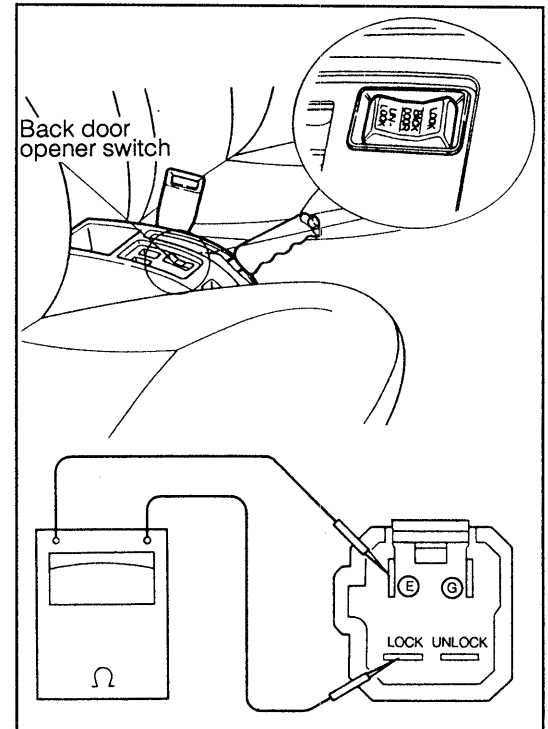
INSPECTION

Remove the back door opener switch. Ensure that continuity exists between the respective terminals as indicated in the continuity table below.

Continuity table

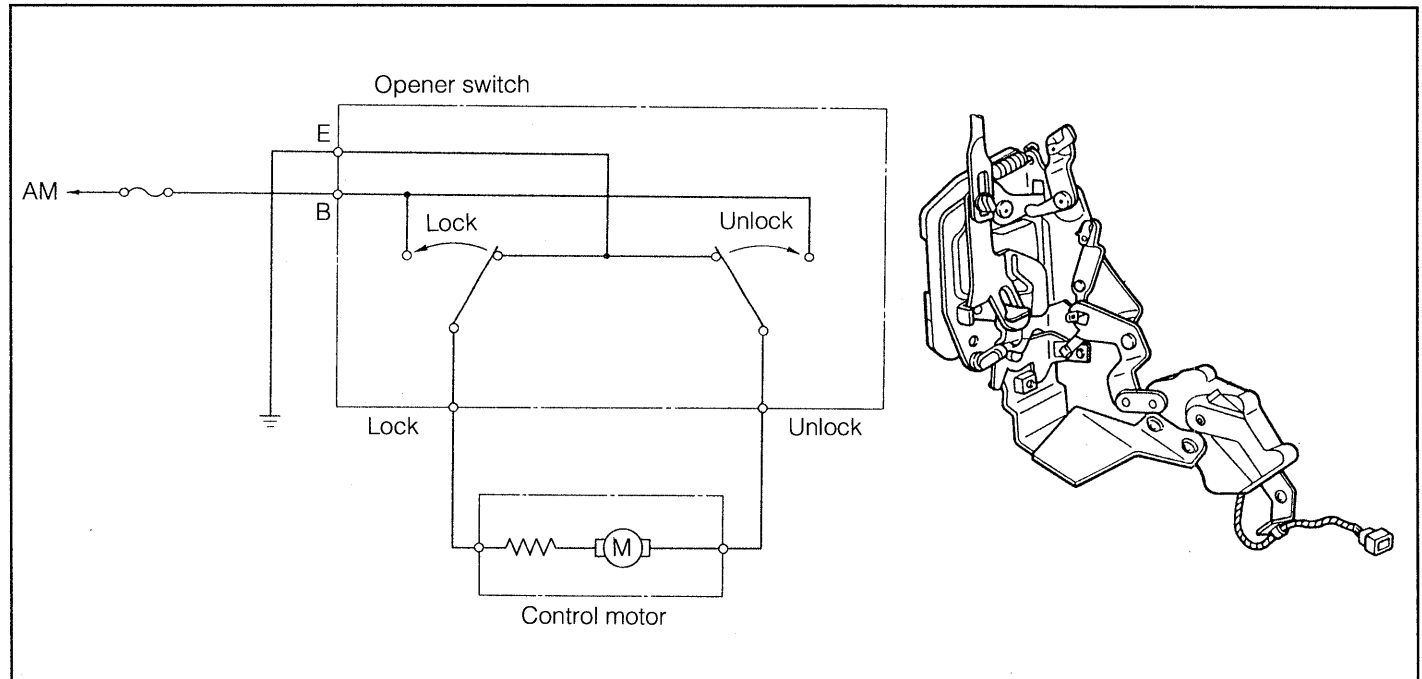
○—○ Continuity exists.

Switch \ Terminal	B	E	LOCK	UNLOCK
LOCK	○	○	○	○
OFF		○	○	○
UNLOCK	○	○	○	○



WRU90-BE150

CONTROL MOTOR CIRCUIT DIAGRAM



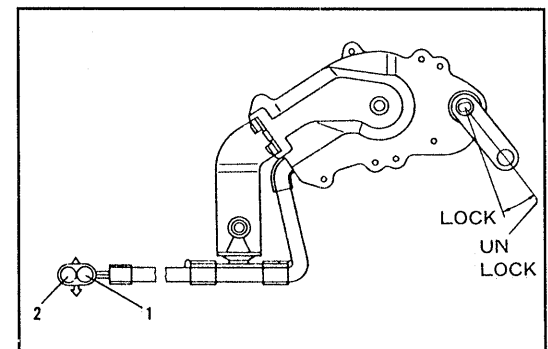
WRU90-BE151

INSPECTION

Solenoid assembly

Apply a voltage of 12V across the following two terminals. Ensure that the motor operates in accordance with the table below.

Operation direction \ Terminal	①	②
UNLOCK	⊕	⊖
LOCK	⊖	⊕

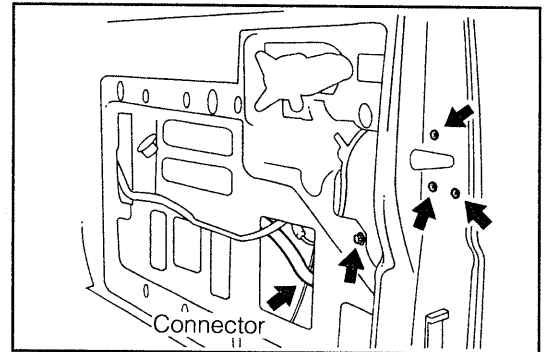


WRU90-BE152

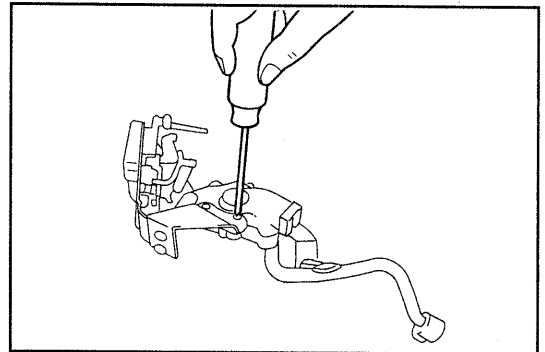
BODY ELECTRICAL SYSTEM

REMOVAL

1. Remove the rear window assembly.
2. Remove the back door trim and service hole cover.
Disconnect the connector.
Remove the assembly by removing the bolt and three screws.
3. Detach the control motor and back door lock by removing the two screws.



WRU90-BE153

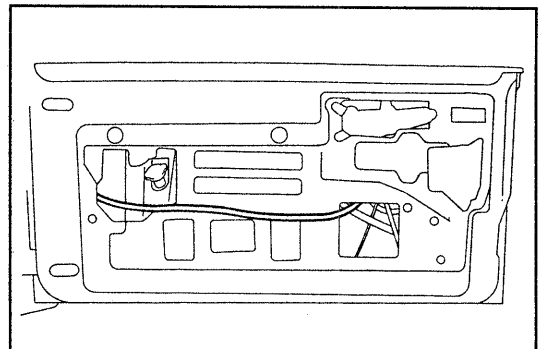


WRU90-BE154

INSTALLATION

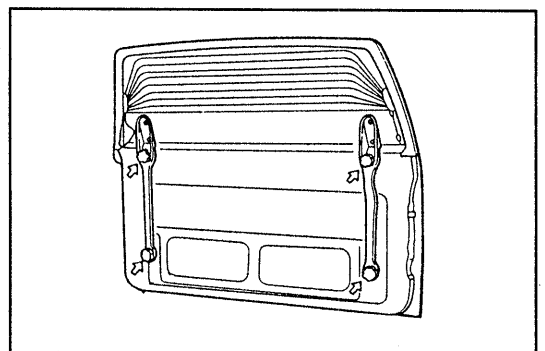
1. Install the control motor assembly.
 - (1) Attach the control motor and back door lock using two screws.
- (2) Install the back door opener assembly to the back door using the bolt and three screws.
- (3) Connect the connector.

WRU90-BE155



WRU90-BE156

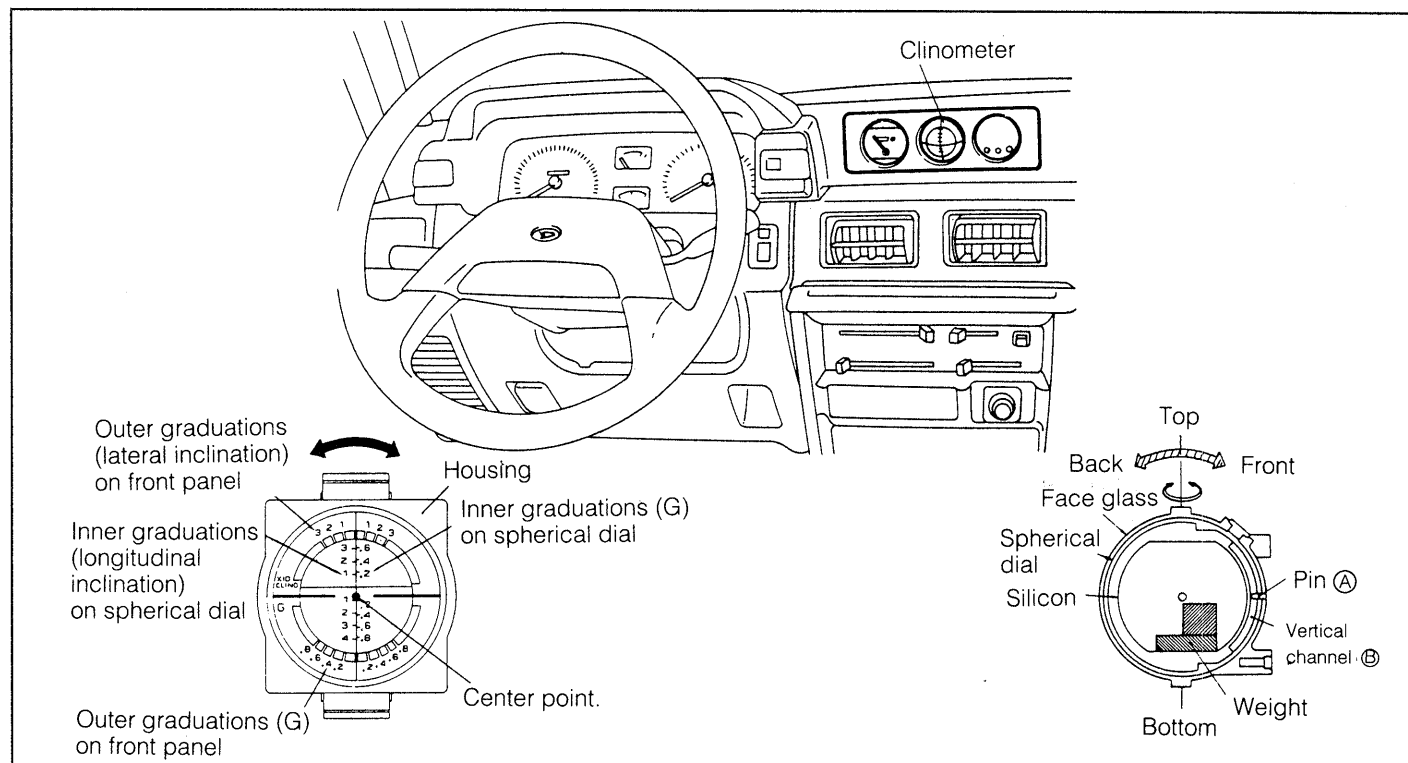
2. Install the service hole cover and back door trim.
3. Install the rear window assembly.



WRU90-BE157

17. INCLINOMETER

The inclinometer indicates any inclination angle of the vehicle in a fore-and aft direction or in a right-and left direction as well as an acceleration being applied to the vehicle.



WRU90-BE158

Specifications

Item		Specification
Operative method		Gravity method by weight
Indications	Front-back	40 degrees max
	Right-left	30 degrees max
Illumination		12V, 1.4W bulb

WRU90-BE438

Construction

The inclinometer consists of an outer casing which inclines in the same way as with the vehicle inclination, a front panel scale plate, a front glass (fixed to the outer casing) and a spherical dial which maintains the horizontal state at all times.

The inclinometer has a pin (A) which protrudes at the rear/inner part of the front glass. Also, a vertical groove (B) is provided at the back side of the spherical dial.

The provision of this pin (A) and vertical groove (B) prevents any rotation of the inclinometer (↺↻) around an axis in an up-and-down direction. However, this construction makes it possible for the inclinometer to turn in a fore-and-aft direction (↔) as well as in a right-and left direction (↻↺).

A weight is fixed at the inside of the spherical dial. This weight indicates always the direction of gravity (lower side).

Furthermore, silicon oil is filled between the spherical dial and the front glass in order that the spherical dial may slide smoothly.

WRU90-BE257

Operation

This weight indicates always the direction of gravity regardless of the vehicle posture. Thus, the inclinometer indicates the vehicle posture in a unit of degree. While the vehicle is running, the meter indicates the acceleration (G).

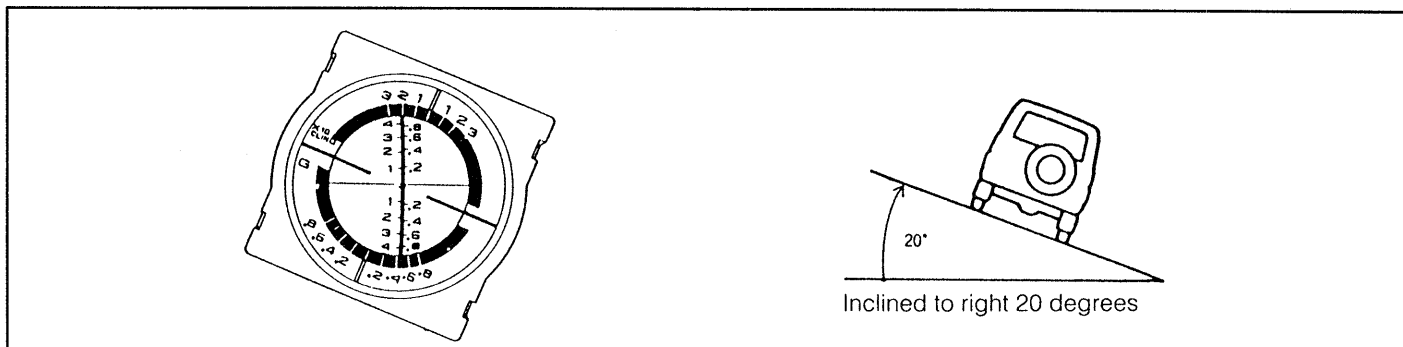
WRU90-BE258

Example of indication

1. Inclination condition when vehicle is running at a constant speed or stopped:

- Case where vehicle is inclined in right-&-left direction
(inclined 20 degrees to left):

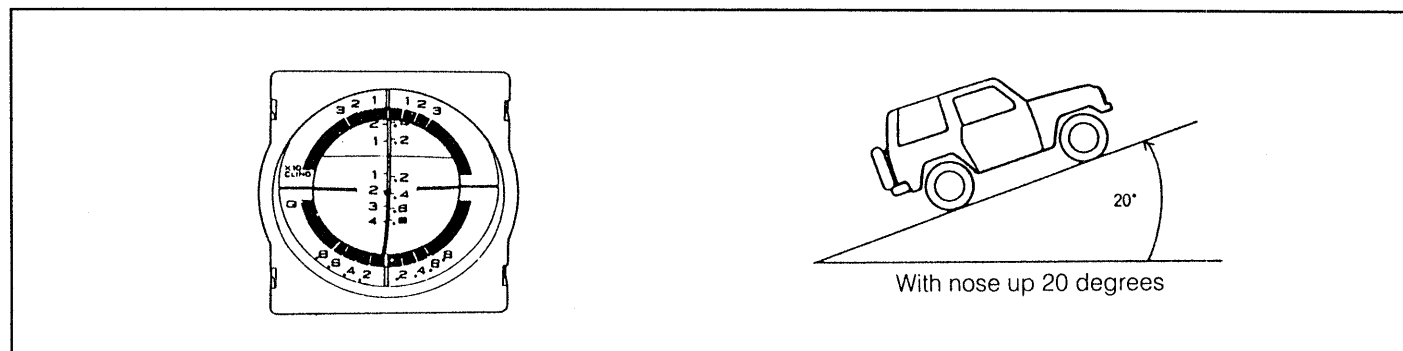
The front panel dial is inclined in the same inclination of the vehicle. However, the spherical dial retains its horizontal state. Hence, the vertical center line of the spherical dial indicates the inclination angle in a right-and-left direction.



WRU90-BE439

- Case where vehicle is inclined in fore-&-aft direction
(with nose upward 20 degrees):

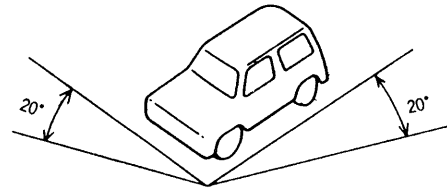
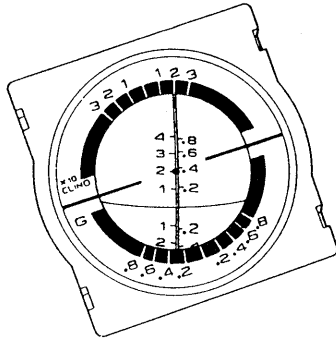
The front glass is inclined in the same inclination of the vehicle. However, the spherical dial retains its horizontal state. Hence, the the intersection of the center point of the front glass with the spherical dial indicates the inclination angle in a fore-and-aft direction.



WRU90-BE440

Case where vehicle is inclined in fore&-aft direction as well as in right-&-left direction
(with nose down 20 degrees and inclined to left 20 degrees):

The inclination angle in a fore-and-aft direction as well as in a right-and-left direction is indicated by means of the spherical dial, front glass and front panel dial.



With nose down 20 degrees and inclined to left 20 degrees

WRU90-BE441

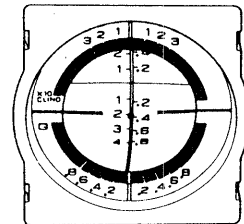
2. When vehicle is under accelerating or decelerating condition:

When an acceleration is applied to the vehicle, the indication of the clinometer changes even while the vehicle is running on a level road.

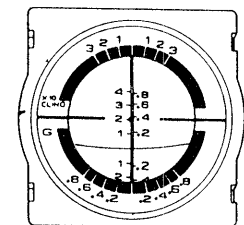
The greater this rate of change, the greater the acceleration.

- Case where vehicle is under acceleration:
A dipping force is applied to front glass in the same dipping direction of the vehicle. However, the spherical dial tends to turn upward. As a result, the intersection of the center point of the front glass with the spherical dial indicates the acceleration.
- Case where vehicle is under deceleration:
A floating force is applied to front glass in the same floating direction of the vehicle. However, the spherical dial tends to turn downward. As a result, the intersection of the center point of the front glass with the spherical dial indicates the deceleration.
- Case where vehicle is cornering:
A centrifugal is applied to the vehicle, thereby changing the indication. The greater this rate of change, the quicker the vehicle is making a turn.

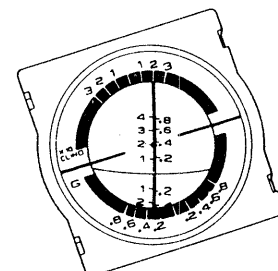
Indication of acceleration



Indication of deceleration



Indication during running while cornering

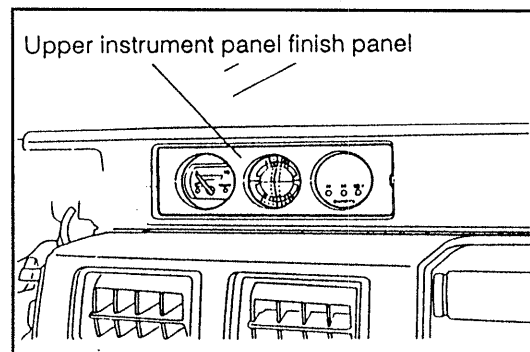


WRU90-BE442

BODY ELECTRICAL SYSTEM

REMOVAL

1. Remove the upper instrument panel finish panel.
2. Remove the clinometer.



WRU90-BE200

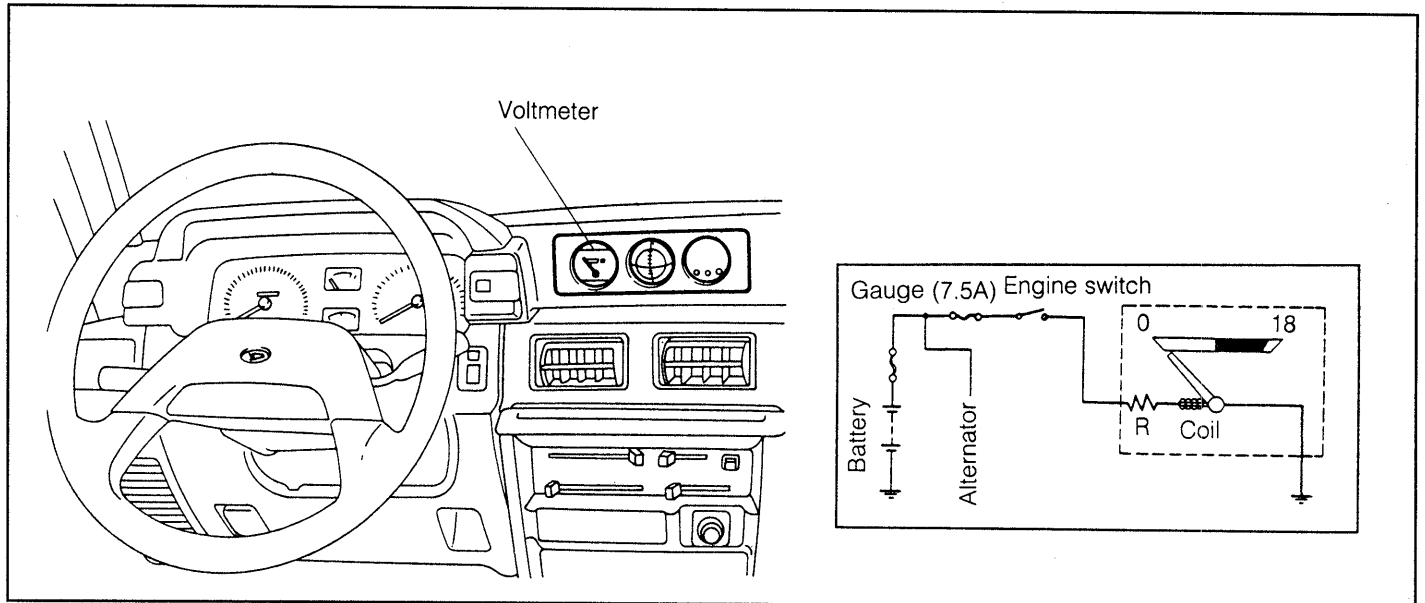
INSTALLATION

1. Install the clinometer to the instrument panel.
2. Install the upper instrument panel finish panel.

WRU90-BE443

18. VOLTMETER

While the engine is running, the voltmeter indicates the charging voltage. When the engine is stopped (with the engine switch turned ON), this voltmeter indicates the battery terminal voltage.



WRU90-BE159

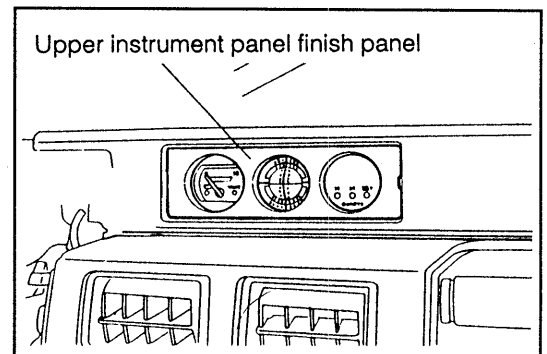
Specification

Type	Bi-metal	
Resistance value (Ω)	R	460
	Coil	70

WRU90-BE444

REMOVAL

1. Remove the upper instrument panel finish panel.
2. Remove the voltmeter.



WRU90-BE445

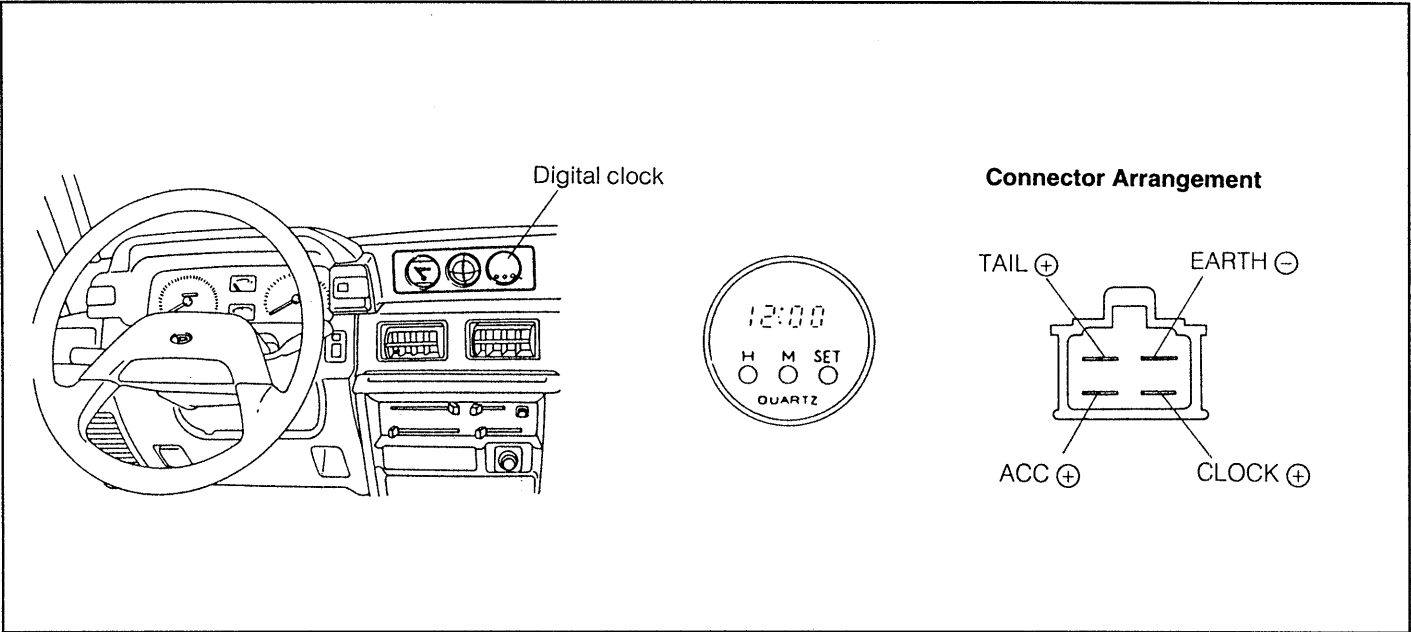
INSTALLATION

1. Install the voltmeter to the instrument panel.
2. Install the instrument panel finish upper panel.

WRU90-BE446

19. CLOCK

The clock is provided at the central part of the instrument panel.



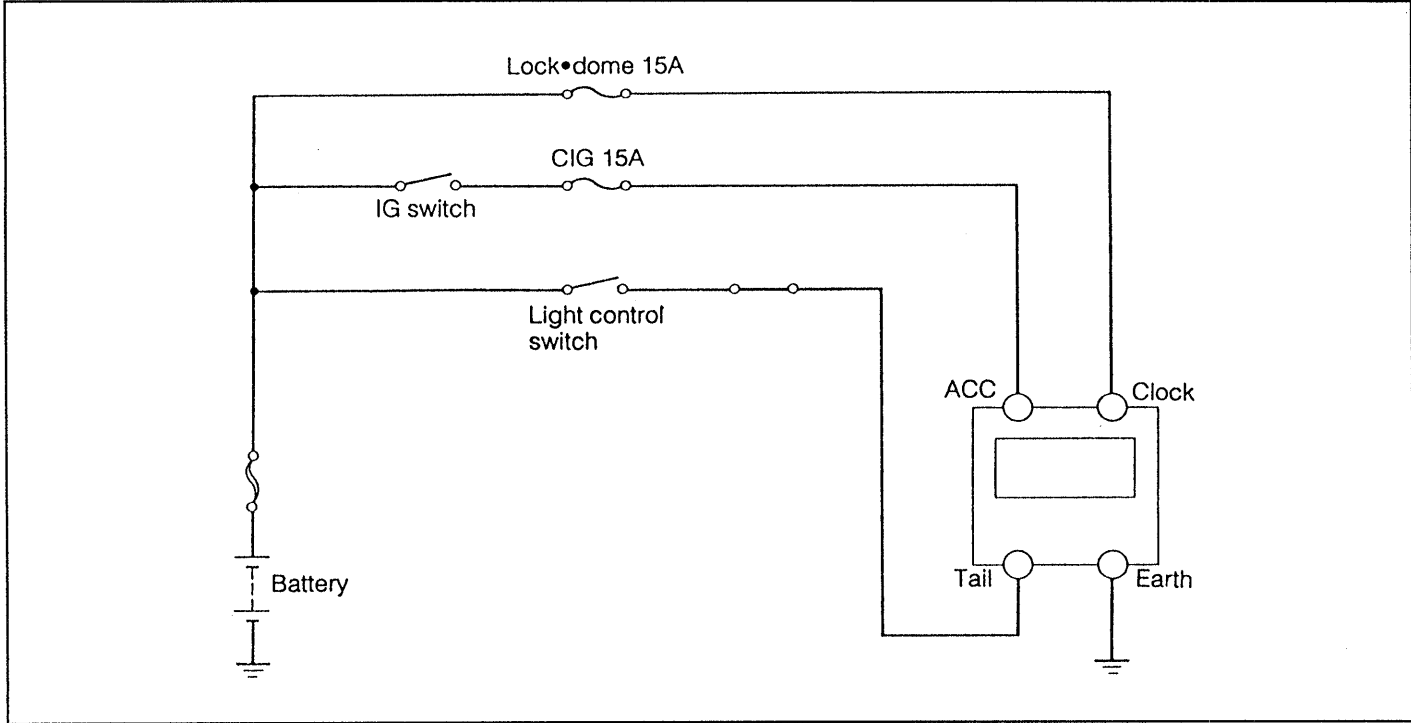
WRU90-BE160

Clock Specification

	Specifications
Rating voltage (V)	12
Accuracy (second/day)	± 1.5
Consuming current (mA)	160 (During indication period with glowing) 5 (During indications period without glowing)
Operating range characteristics (V)	10 – 16

WRU90-BE447

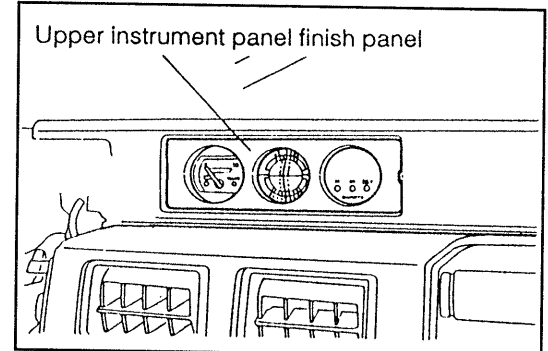
CIRCUIT DIAGRAM



WRU90-BE448

REMOVAL

1. Remove the upper instrument panel finish panel.
2. Remove the clock.



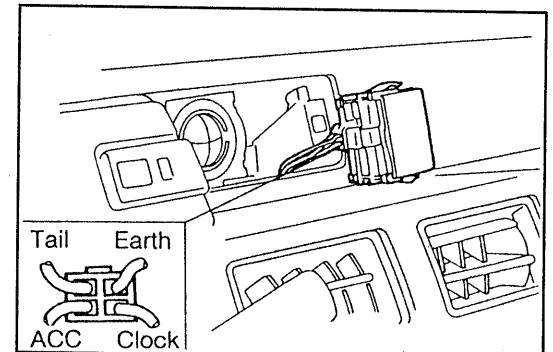
WRU90-BE161

INSPECTION

Connect the wire harness at the vehicle side to the clock. Perform the following checks given below.

- (1) Ensure that continuity exists between the EARTH terminal and the body ground.
- (2) Measure the voltage between each terminal and the body ground.

Terminal	Voltage	Remarks
CLOCK	Approx. 12V	At all times
ACC	Approx. 12V	When IG switch is set to ACC;
TAIL	Approx. 12V	When light control switch is turned ON.



WRU90-BE162

INSTALLATION

1. Install the clock to the instrument panel.
2. Install the upper instrument panel finish panel.

DAIHATSU

Rocky

HARNESS & WIRING DIAGRAM

HANDLING INSTRUCTIONS OF LOCK

TYPE CONNECTOR	HW- 2
FUSE	HW- 6
RELAYS & FUSE BLOCK	HW- 8
FUSE CIRCUIT	HW-10
WIRING HARNESSES	HW-12

WRU90-HW001

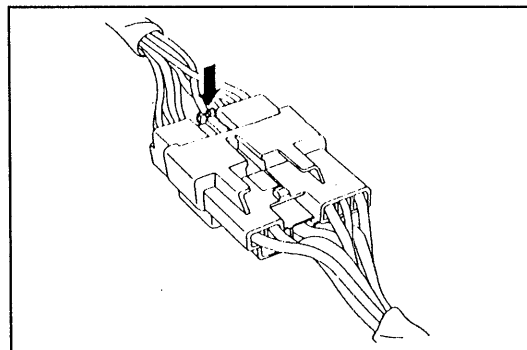
HW

HANDLING INSTRUCTIONS OF LOCK TYPE CONNECTOR

HANDLING AND INSPECTION

Removal

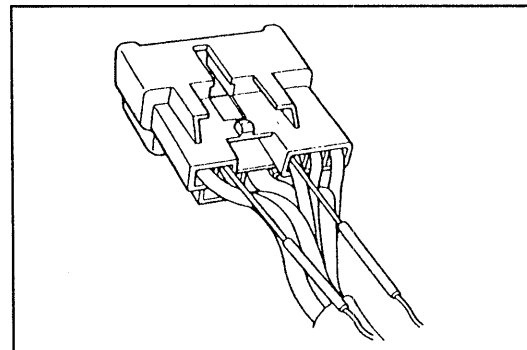
To disconnect the connector, simply pull out the connector while the lock lever is being pressed down, as indicated in the right figure.



WRS89-10002

Inspection

When you conduct continuity checks or voltage checks using a circuit tester, if you insert a test probe from the connector side, it is impossible to get an adequate fitting. Hence, be sure to positively insert the test probe from the harness side, as indicated in the right figure.

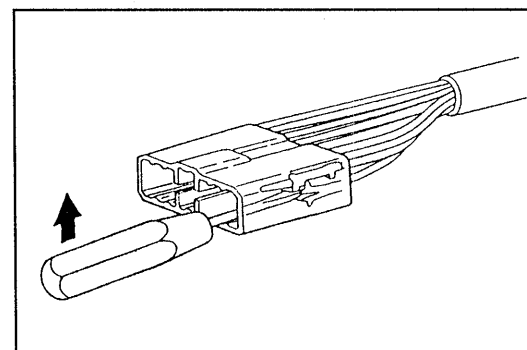


WRS89-10003

REPLACEMENT

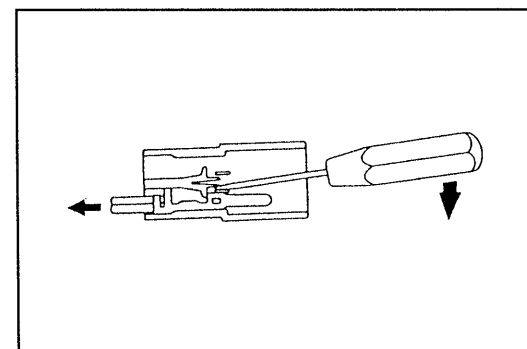
Removal

- (1) From the aperture, insert a miniature type common screwdriver into between the locking lug and the terminal.



WRS89-10004

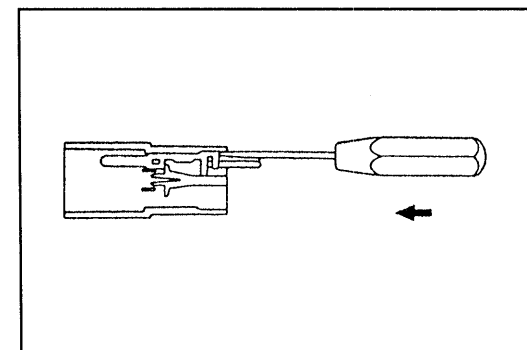
- (2) While the locking lug is being pried upward by means of a screwdriver, pull out the terminal from the backside.



WRS89-10005

Installation

- (1) Insert the terminal, until the locking lug is locked positively.
- (2) Ensure that the locking lug is locked positively by raising the wire.



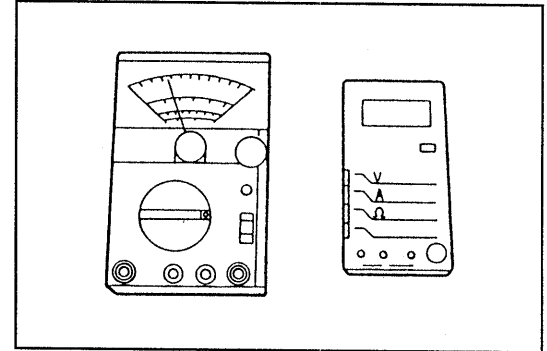
WRS89-10006

INSPECTION

Tester (Volt/ohmmeter)

For the inspection, use a tester having an internal resistance of more than 10 k Ω /V.

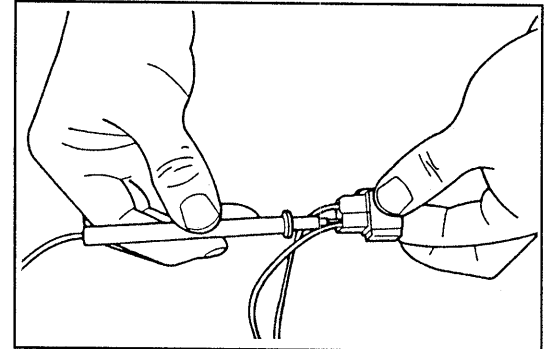
Use of a tester with a low internal resistance may cause wrong measurement or secondary troubles.



WAC89-BE005

Conventional type connector

When resistance measurement and/or voltage measurement is conducted at the connector section, insert the measuring probe from the back of the connector, being very careful not to damage the harness-to-terminal connections.



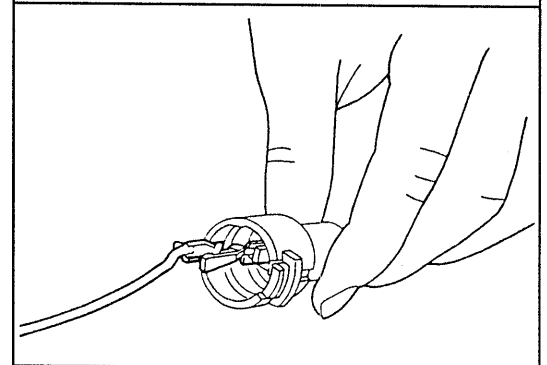
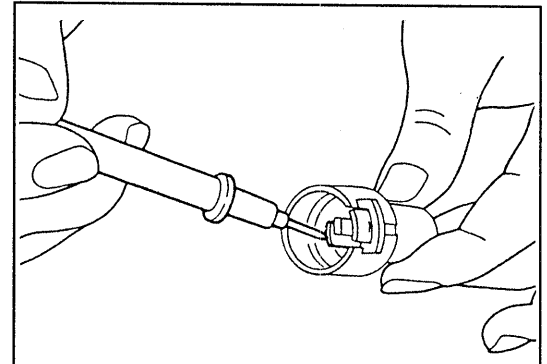
WAC89-BE006

Water-proof type connector

When resistance measurement and/or voltage measurement is conducted at the connector section, bring the measuring probe into contact with the terminal at the connection side of the connector.

Be very careful not to apply excessive force to the terminal at the connector side. Failure to observe this caution may deform the terminal, causing poor continuity.

As an alternative method, insert a male or female terminal into the connector terminal or connect an adequate attachment. Then, connect the measuring probe.



WAC89-BE007

CONNECTION

Perform the connection, until the lock is completely engaged.

NOTE:

To confirm whether the lock type connector has been locked or not, lightly pull the connector. Make sure that the connector will not be disconnected.

Be sure to press the connector again before finishing the confirmation.

WRU90-HW002

OPERATION OF WIRE HARNESS

1. General Instructions

- (1) Never pull the connectors or step on them during the wire harness transport or assembly.
(Prevention of pulling-out of terminals, connector cracks, deformation and so forth)
- (2) Care must be exercised to ensure that no scratch is made to the wire harness by burrs or edges during the wire harness transport or assembly.
(Prevention of scratches to the outer trim, electrical insulators and so forth)
- (3) Clamping method
In the case of resin clamps, ensure that the clamp section is fitted in the body hole.

NOTE:

Ensure that the clamp will not be detached when it is pulled lightly in the arrow-headed direction.

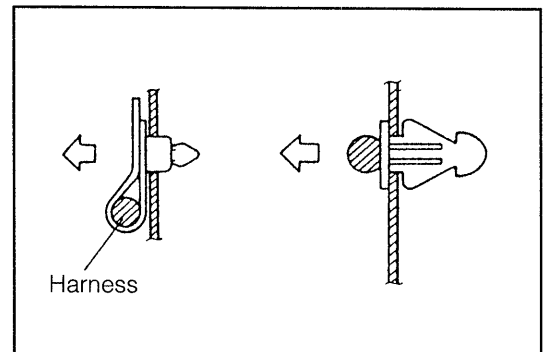
(Prevention of interference due to the detachment of the clamp)

- In the case of metal sheet welded clamps, be sure to assemble the harness in such a way that the harness will not come in contact with the welded surface.
(Prevention of wire harness damage due to welding burrs)

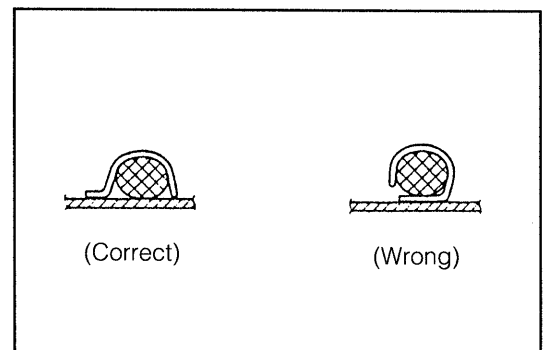
- In case that the locating guide of the clamp position or the clamp mark is clamped, make sure that the clamp is located within the guide. As for the clamp at the clamp mark section, ensure that the clamping is made at a point within ± 10 mm (0.39 inch).

(Prevention of slackness or interference)

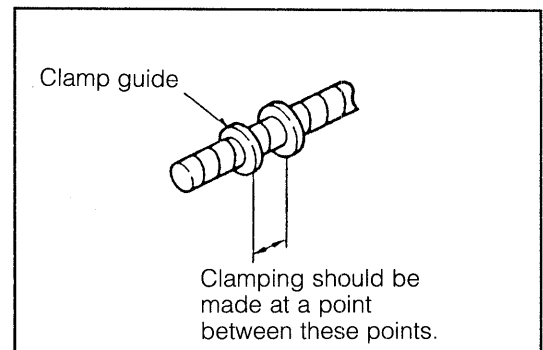
WAC89-BE011



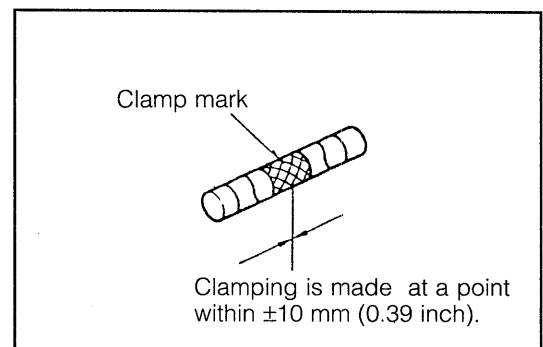
WAC89-BE012



WAC89-BE013



WAC89-BE014

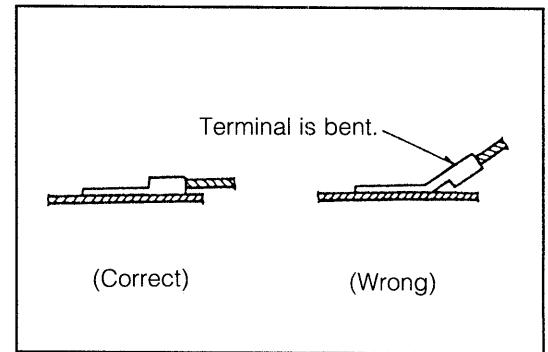


(4) Terminals and connectors

- Perform the connection of connectors positively.
 - Connector with lock Ensure that the locking is made.
 - Connector without lock Connect the connector positively until it stops.

WAC89-BE016

- Retention by screws
 - When the tightening torque is specified, be sure to observe the specification strictly. (The tightening torque is posted in the table separately.)
 - Ensure that the staked section may not come on the assembling surface.
 - After completion of the tightening operation, lightly pull out the terminal. Ensure that there is no slackness.
- When performing other operations, care must be exercised to ensure that no connected connector is detached by pulling out the wire harness forcibly.



WAC89-BE017

WAC89-BE018

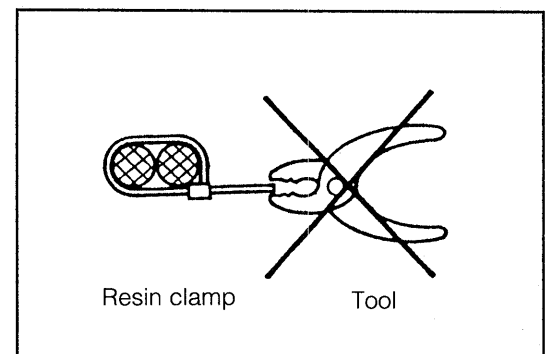
2. Work Procedure for Tightening-up Type Resin Clamps

<Work procedure>

When the tightening-up type resin clamps are employed, do not use any pliers, cutting pliers or the like.

<Reason>

Prevention of clamps being cut or scratched



WAC89-BE019

WIRING HARNESSES

WARNING:

The wire diameter and capacity of each harness have been determined to assure the normal operation of the electrical system.

Hence, do not take power for accessories carelessly through the original wiring harness. Failure to observe this caution may cause system malfunction or fire.

WAC89-BE020

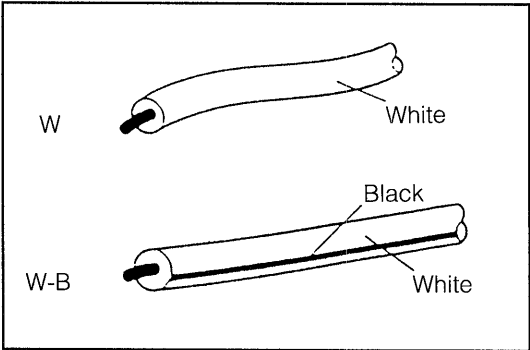
HARNESS & WIRING DIAGRAM

Wiring Color Code

- For identification purpose, each wire has its own color. Each color bears a code as described in the right table. These codes are used in the wiring diagram and will be helpful during trouble shooting.
- The wire color comes in two kinds: single color and composite color. In the case of single color, the whole outer coat of the harness is of a single color. In the case of composite color, a fine line of the second color is drawn on the harness basic color. In this case, the code is composed of the basic color code which comes first and the second color code which comes after a hyphen.

Code	Gr	Br	B
Color	Gray	Brown	Black
Code	W	R	G
Color	White	Red	Green
Code	Y	L	O
Color	Yellow	Blue	Orange
Code	P	Lg	V
Color	Pink	Light green	Violet

WAC89-BE021

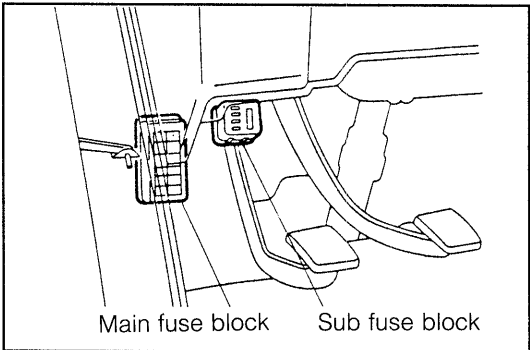


WAC89-BE022

FUSE

Installing position

The fuse block is located at the left side of the steering wheel.



WRU90-HW003

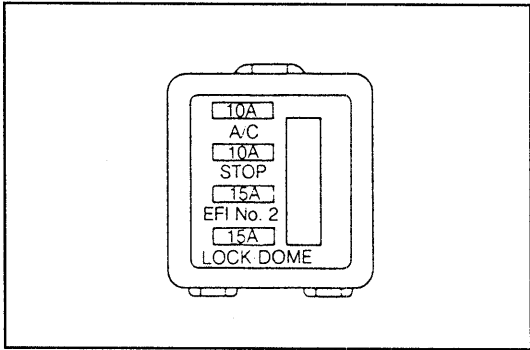
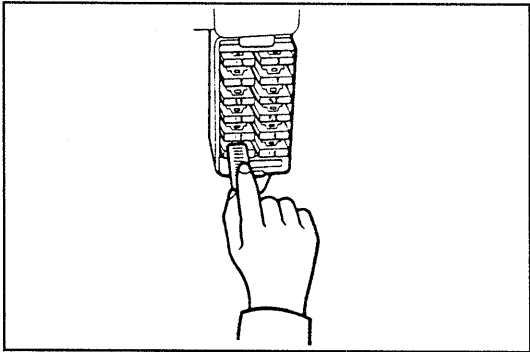
REPLACEMENT OF FUSES & FUSIBLE LINK PRECAUTION

The fuse replacement must be made at all times by using a new fuse with the correct amperage.

NOTE:

- Before any fuse is replaced, be certain to turn OFF all electrical equipment and ignition switch. Never use any fuse in excess of the designated rating.
- Be sure to employ a puller for removing/installing fuses. Also, the removal/installation of fuses must be performed straight. If the fuse is removed or installed in a twisted condition, the terminal will be expanded unduly, resulting in poor contact.

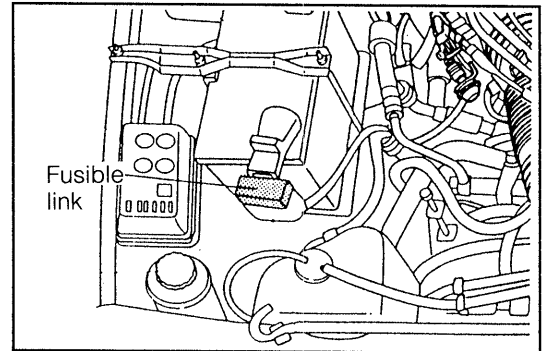
If any fuse is blown out repeatedly, the likelihood is that there exists a short in the relevant system. Hence, perform checks for possible systems, referring to Page and Section under "Wiring Diagram."



WRU90-HW004

FUSIBLE LINK BLOCK

If the fusible link is blown out repeatedly, the likelihood is that there exists a short in the relevant system. Hence, perform checks for possible systems, referring to the wiring diagram.



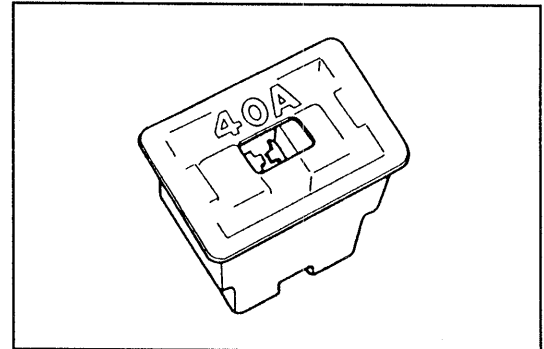
WNU89-BE016

Replacement

1. If visual inspection reveals that the fusible link is blown out, replace it with a new fusible link with the designated rating.

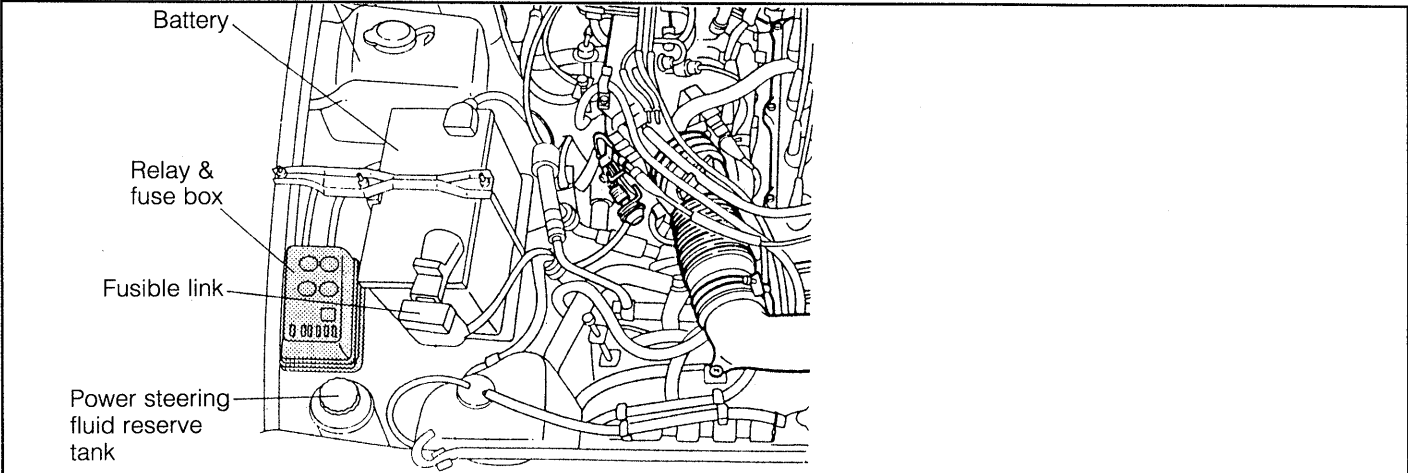
NOTE:

1. Before the fusible link is replaced, be sure to turn OFF the ignition key.
2. Care must be exercised to ensure that the fusible link is not twisted during the removal/installation. If the fusible link is replaced forcibly, it will cause breakage or poor contact.

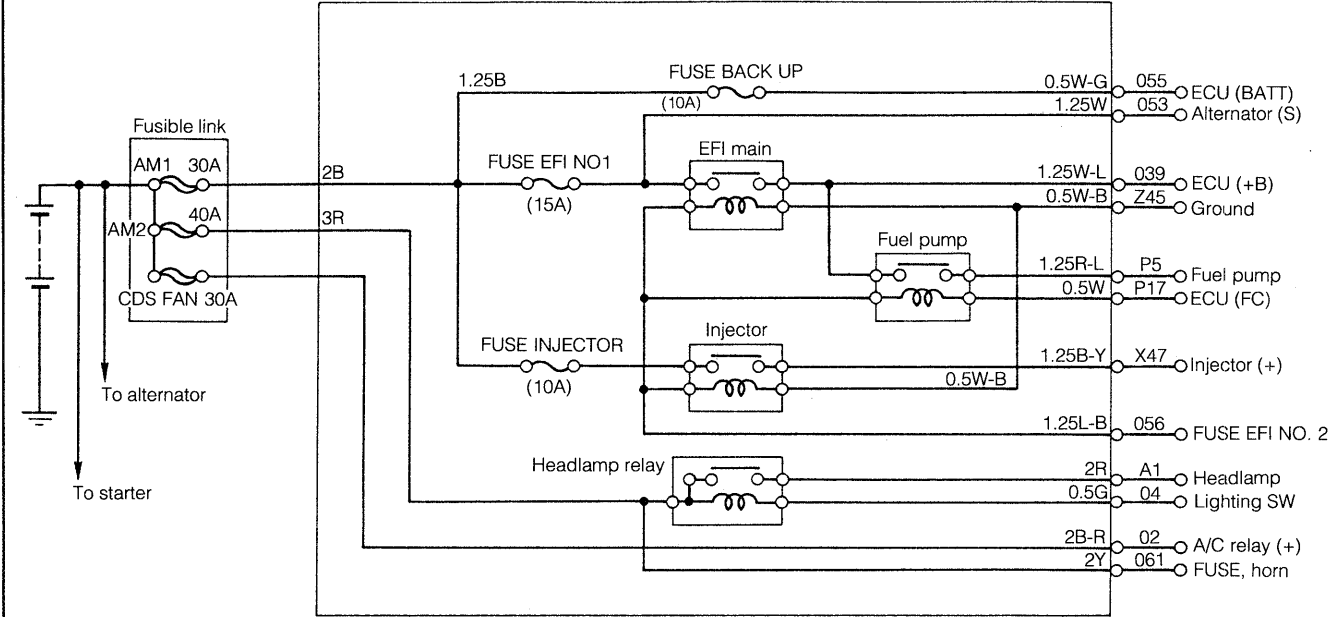


WNU89-BE017

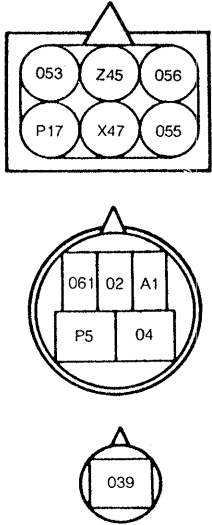
RELAYS & FUSE BLOCK



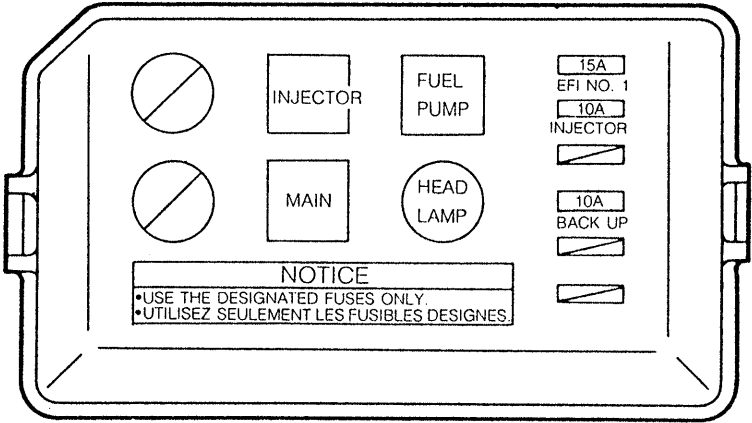
Relays & Fuse block wiring diagram



Connector arrangement



Relay block cover

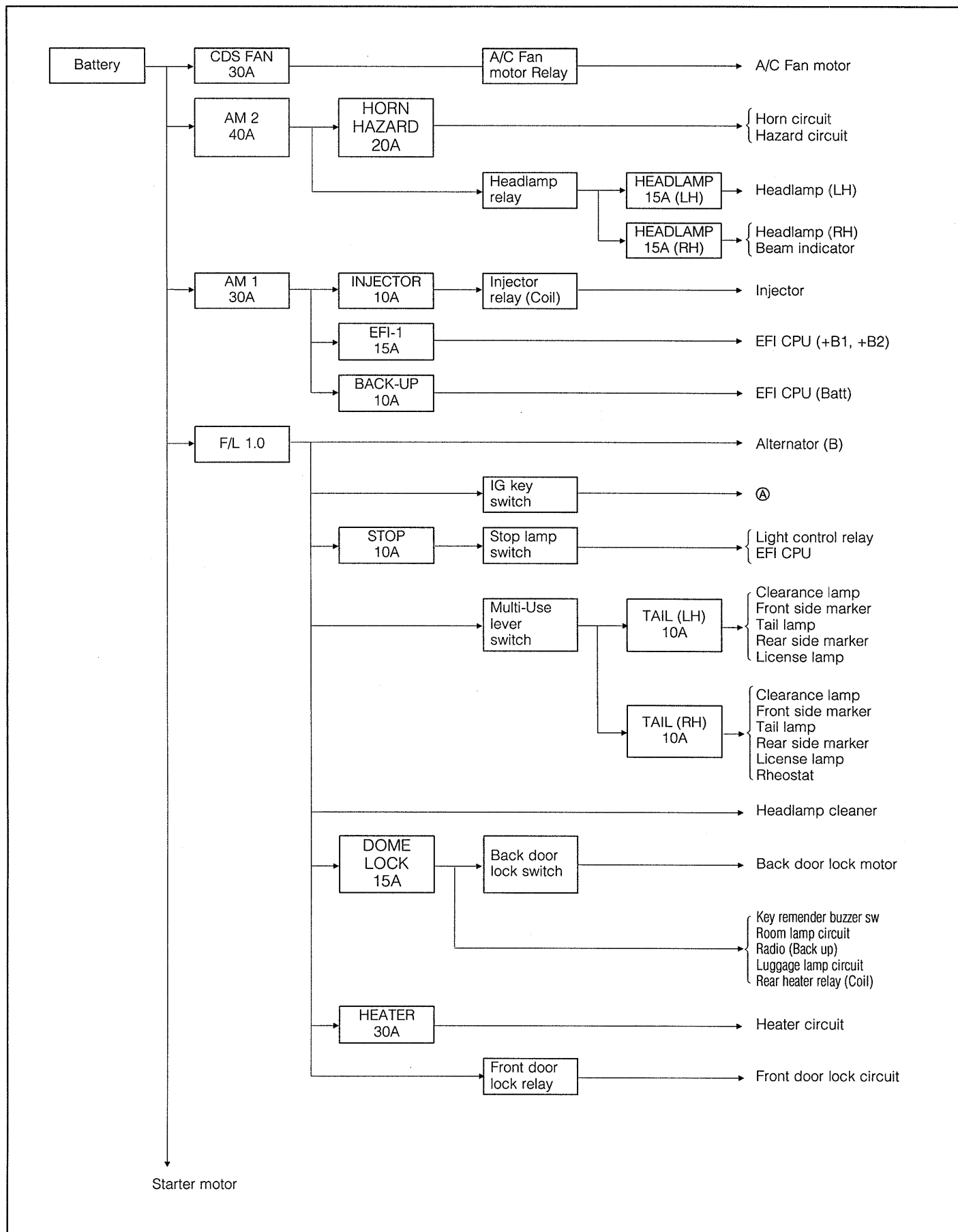


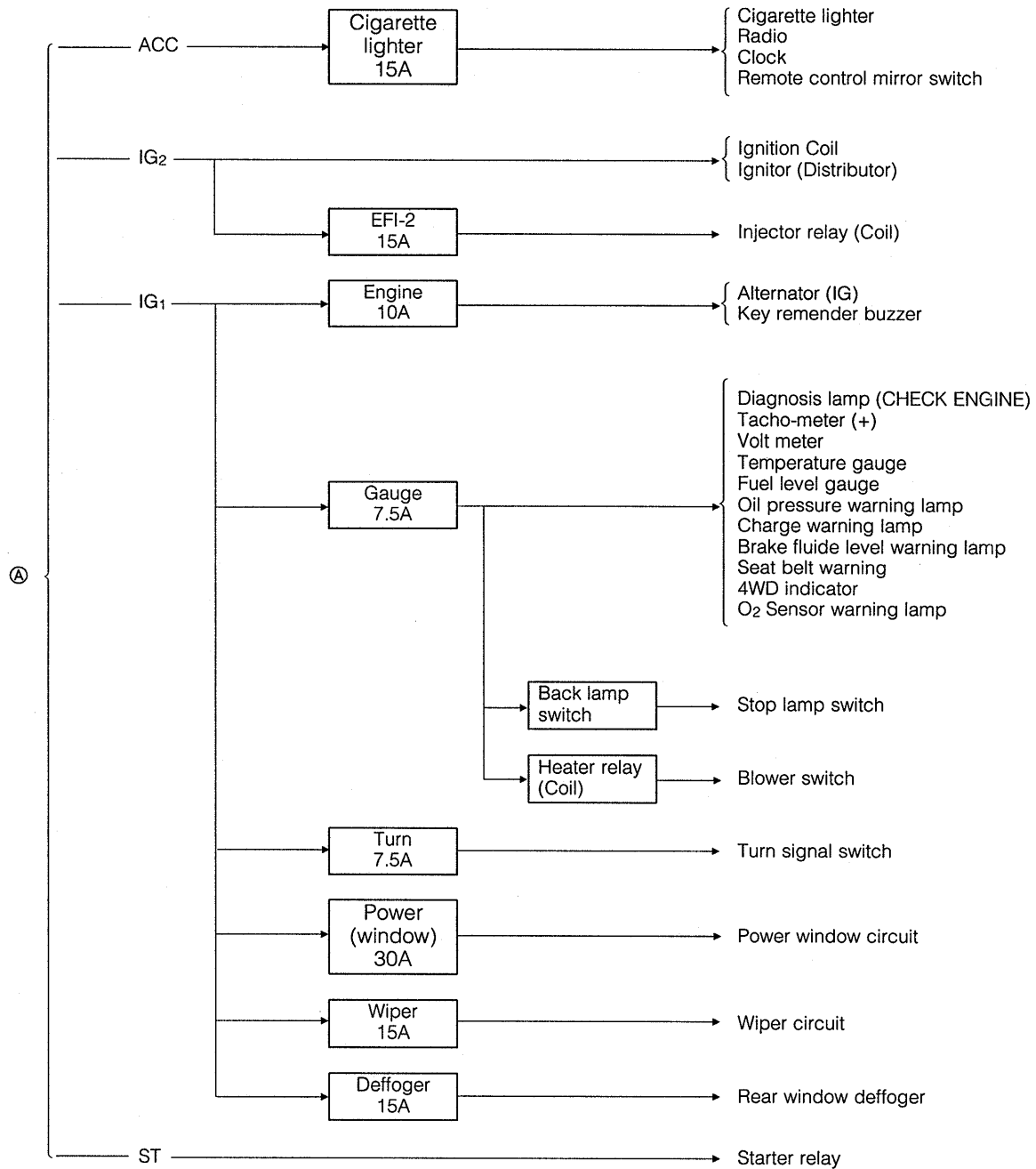
Fuse specifications

Fuse nomenclature	Capacity (A)	Connecting circuit
HEADLAMP (RH)	15	Headlamp (RH), High-beam indicator
HEADLAMP (LH)	15	Headlamp (LH), EFI ECU
HEATER	30	Front heater relay, Rear heater relay
ENGINE	10	Alternator, key reminder buzzer
HORN	20	Horn relay, Hazzard warning switch
CIG	15	Cigar lighter, Radio, clock
WIPER	15	Front washer motor, Front wiper switch Front wiper motor, Rear wiper motor Rear wiper switch, Head lamp cleaner relay
DE FOG	15	Rear window defogger switch
TURN	7.5	Turn signal switch, Hazzard warning switch
GAUGE	7.5	Backup lamp switch, seat warning lamp, 4WD lamp Brake fuled lamp, CHG lamp, Oil pressure lamp, Fuel sender gauge, water temperature sender gauge, Tachometer, Voltmeter, Diagnosis lamp
TAIL RH	10	Light control rheostat switch, License lamp (RH) Rear side marker lamp (RH), tail lamp (RH) Front side marker lamp (RH), Clearance lamp (RH), clock
TAIL LH	10	License lamp (LH), Rear side marker lamp (LH), Tail lamp (LH), Front side marker lamp (LH) Clearance lamp (LH)
A/C	10	A/C switch
STOP	10	Stop lamp switch
EFI NO. 2	15	Main relay, Injector relay, Fuel pump relay
LOCK · DOME	15	Back door lock switch, Radio, Room lamp, clock
EFI NO. 1	15	Main relay, Alternator
INJECTOR	10	Injector relay
BACK UP	10	EFI ECU

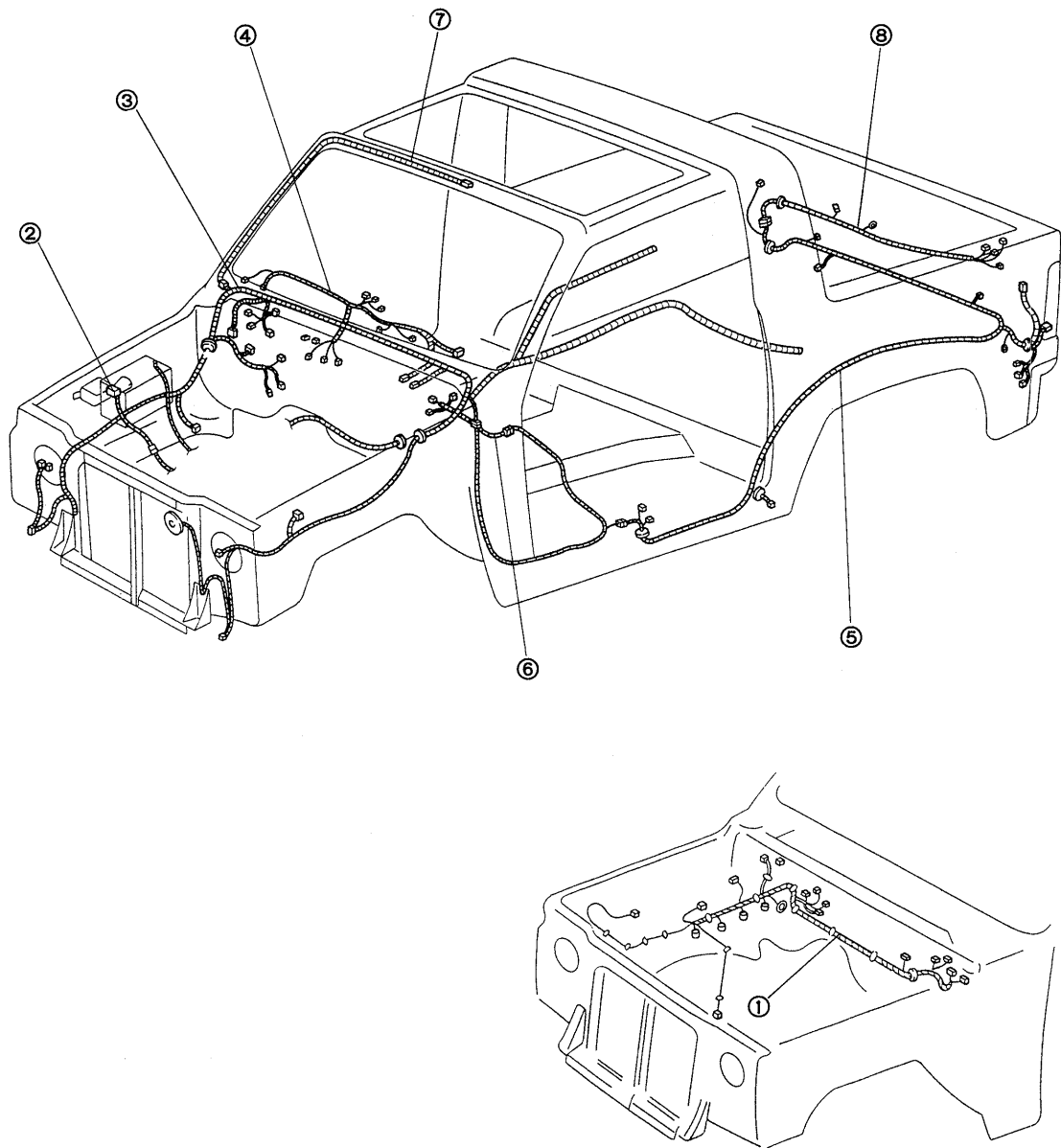
WNU89-BE009

FUSE CIRCUIT



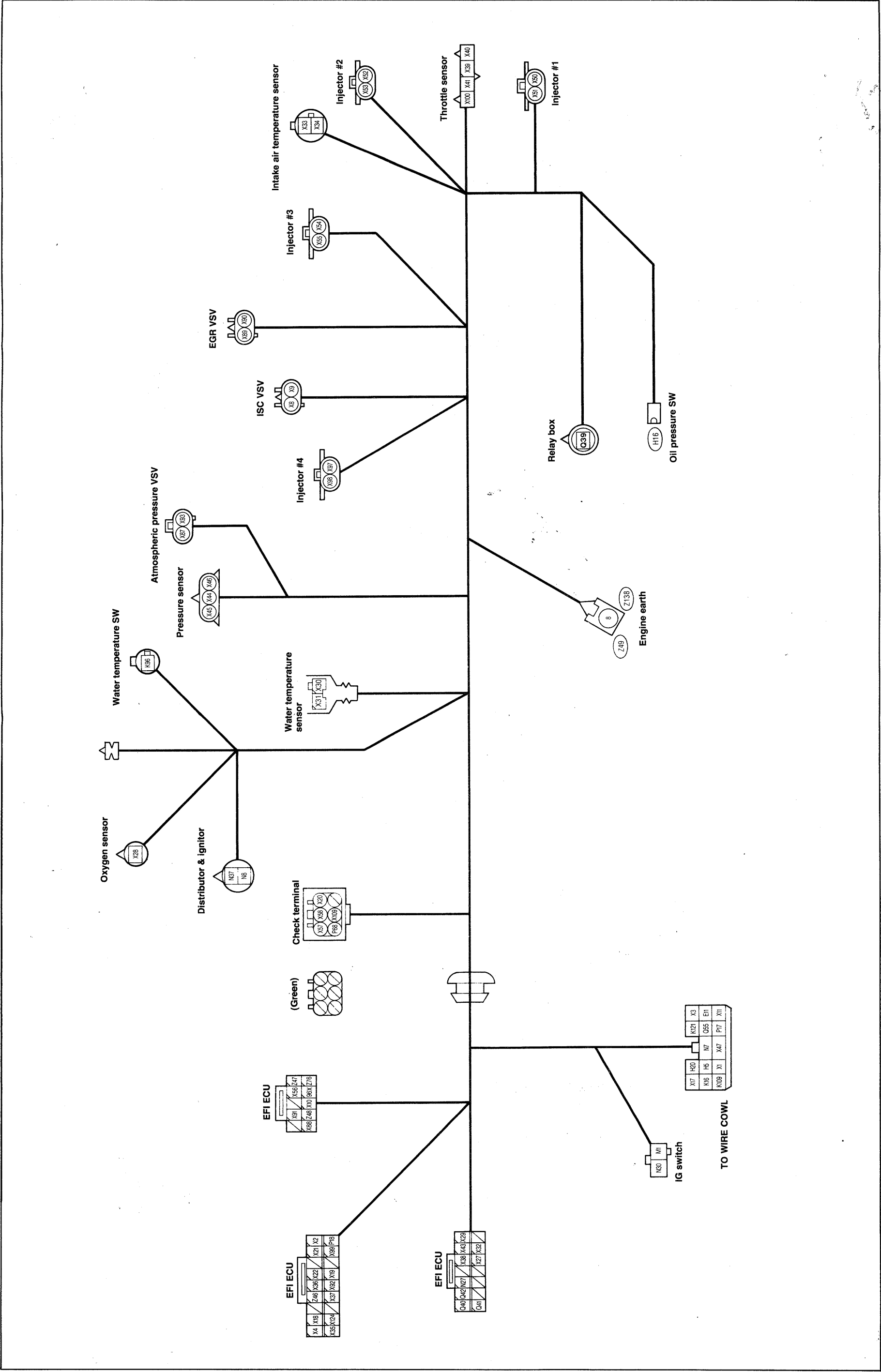


WIRING HARNESSES
SCHEMATIC DIAGRAM

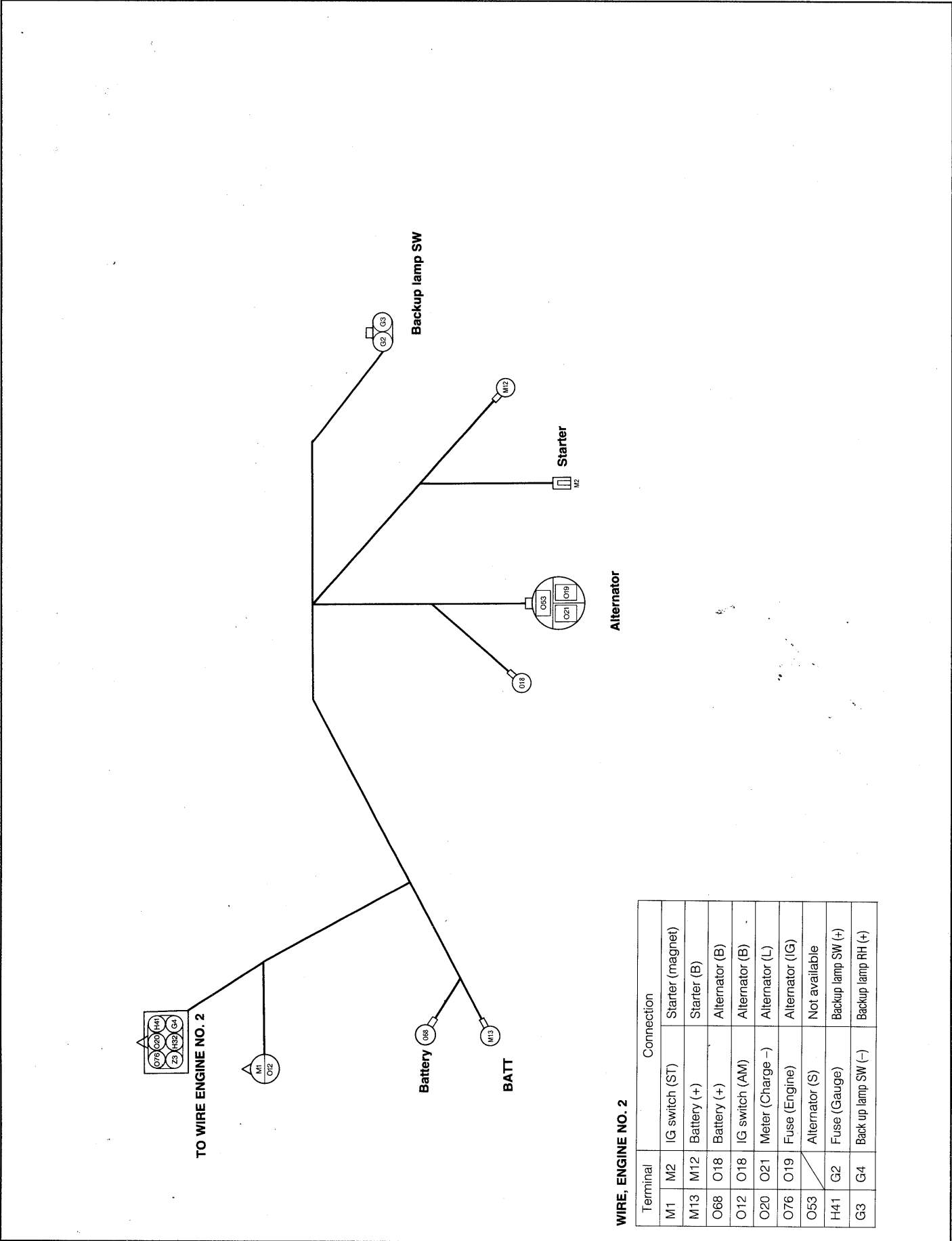


Harness	Page	Harness	Page
① WIRE ENGINE	HW-13	⑤ WIRE FLOOR	HW-17
② WIRE ENGINE NO. 2	HW-14	⑥ WIRE FLOOR NO. 2	HW-18
③ WIRE COWL	HW-15	⑦ WIRE ROOF	—
④ WIRE INSTRUMENT PANEL	HW-16	⑧ WIRE BACK DOOR NO. 1	HW-19

WIRE, ENGINE



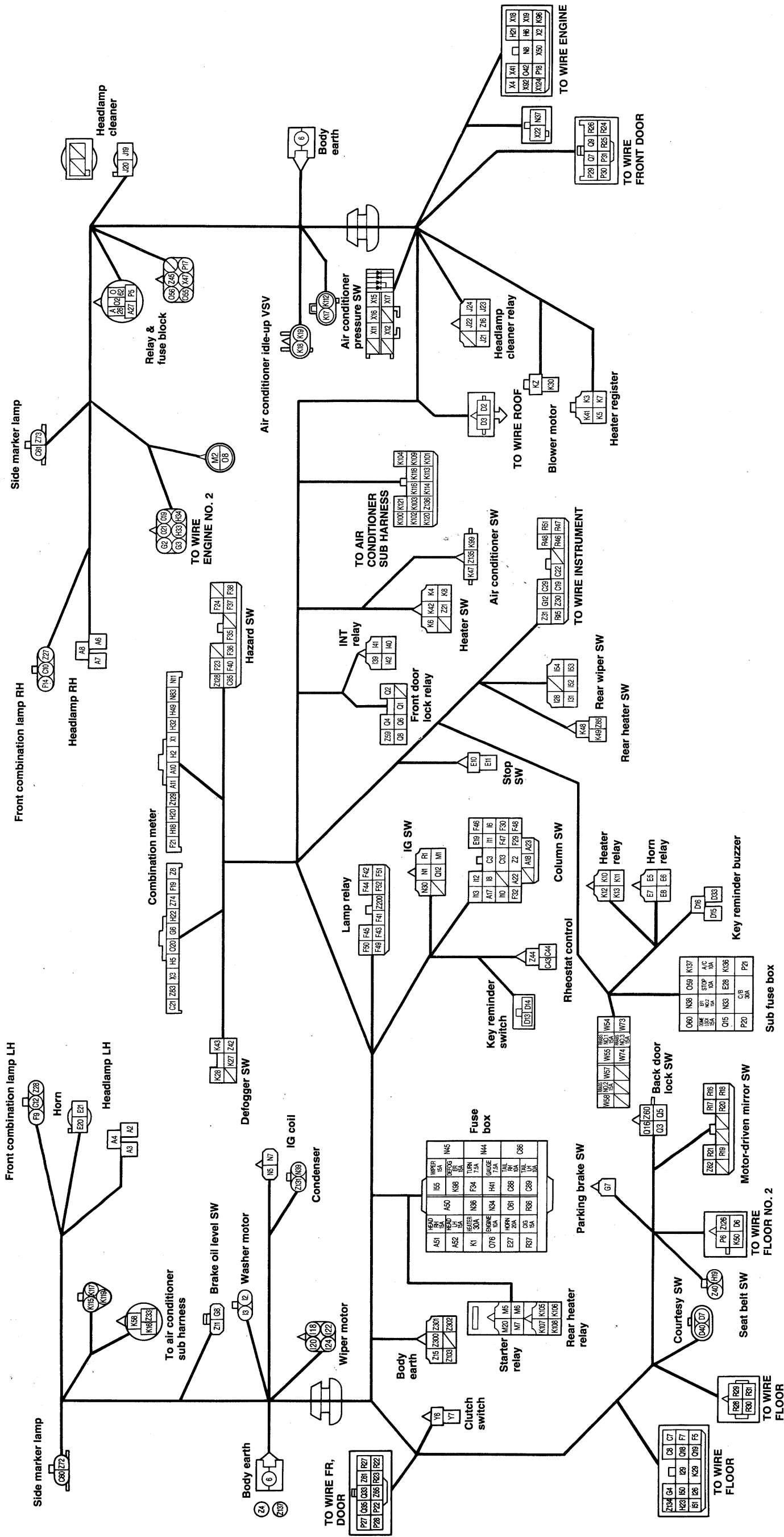
WIRE, ENGINE NO.2

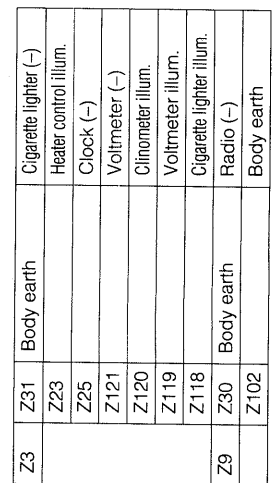


WIRE, ENGINE NO. 2

Terminal		Connection
M1	M2	IG switch (ST)
M13	M12	Battery (+)
O68	O18	Battery (+)
O12	O18	IG switch (AM)
O20	O21	Meter (Charge -)
O76	O19	Fuse (Engine)
O53		Alternator (S)
H41	G2	Fuse (Gauge)
G3	G4	Back up lamp SW (-)
		Back up lamp RH (+)

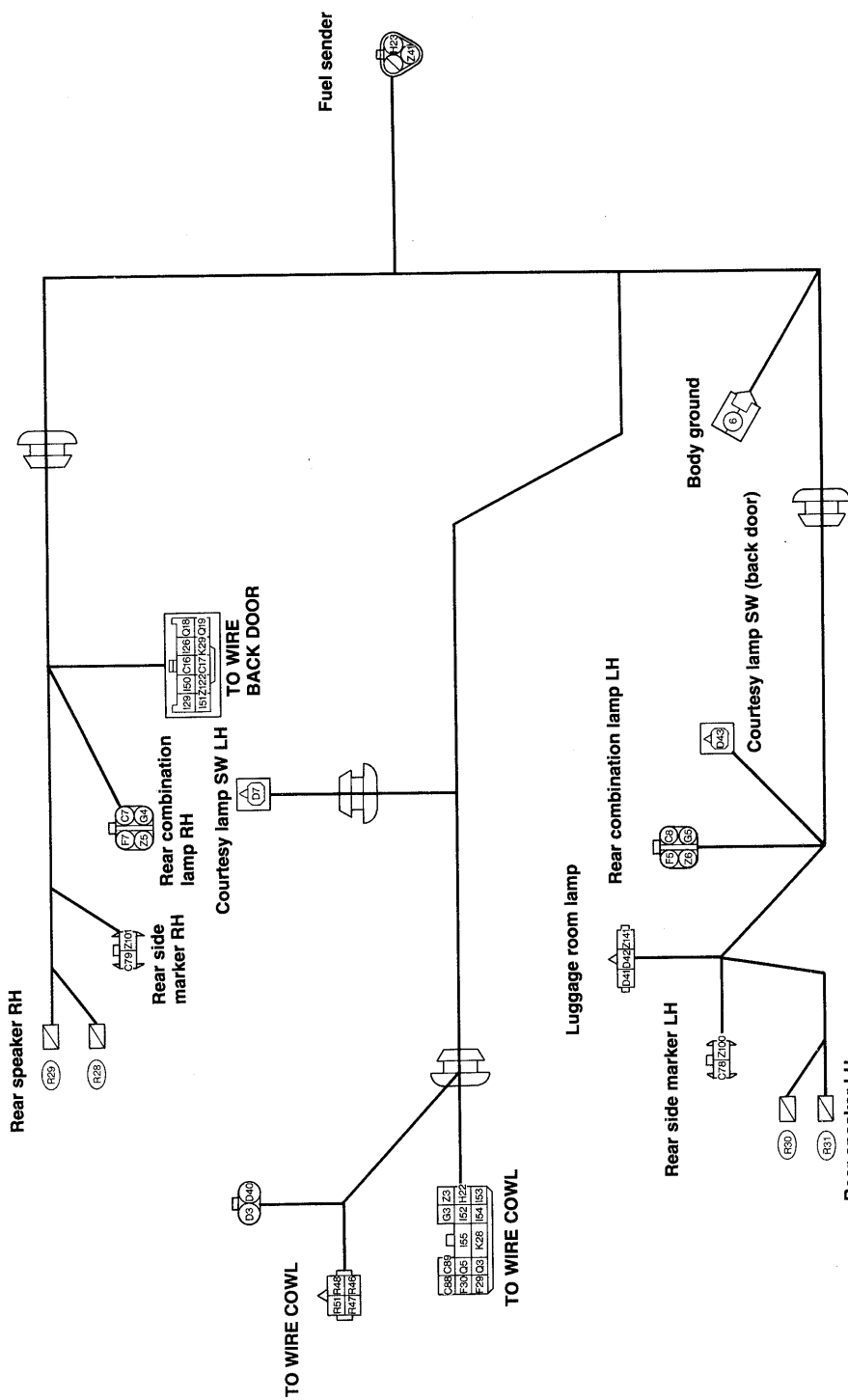
WIRE, COWL



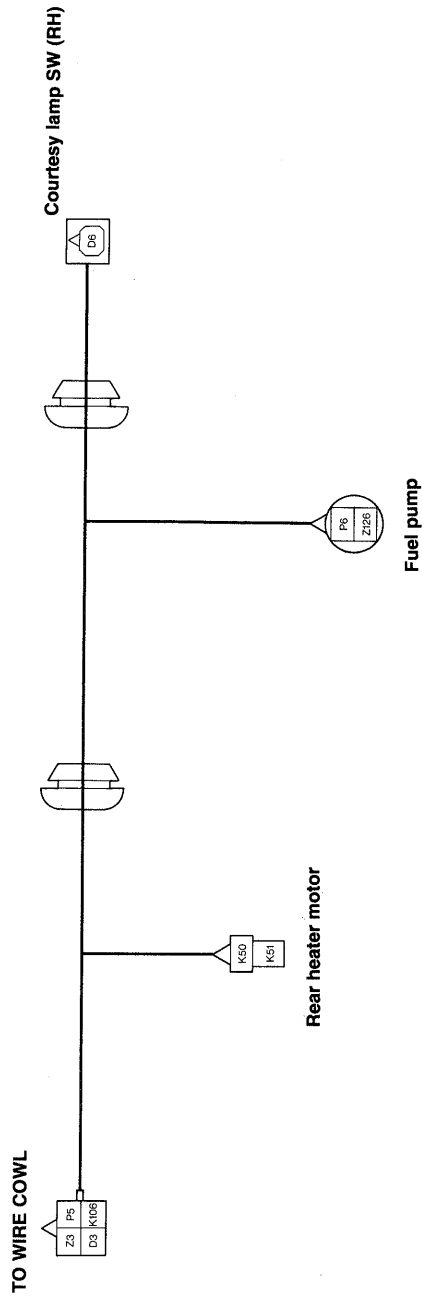


HARNESS & WIRING DIAGRAM

WIRE, FLOOR

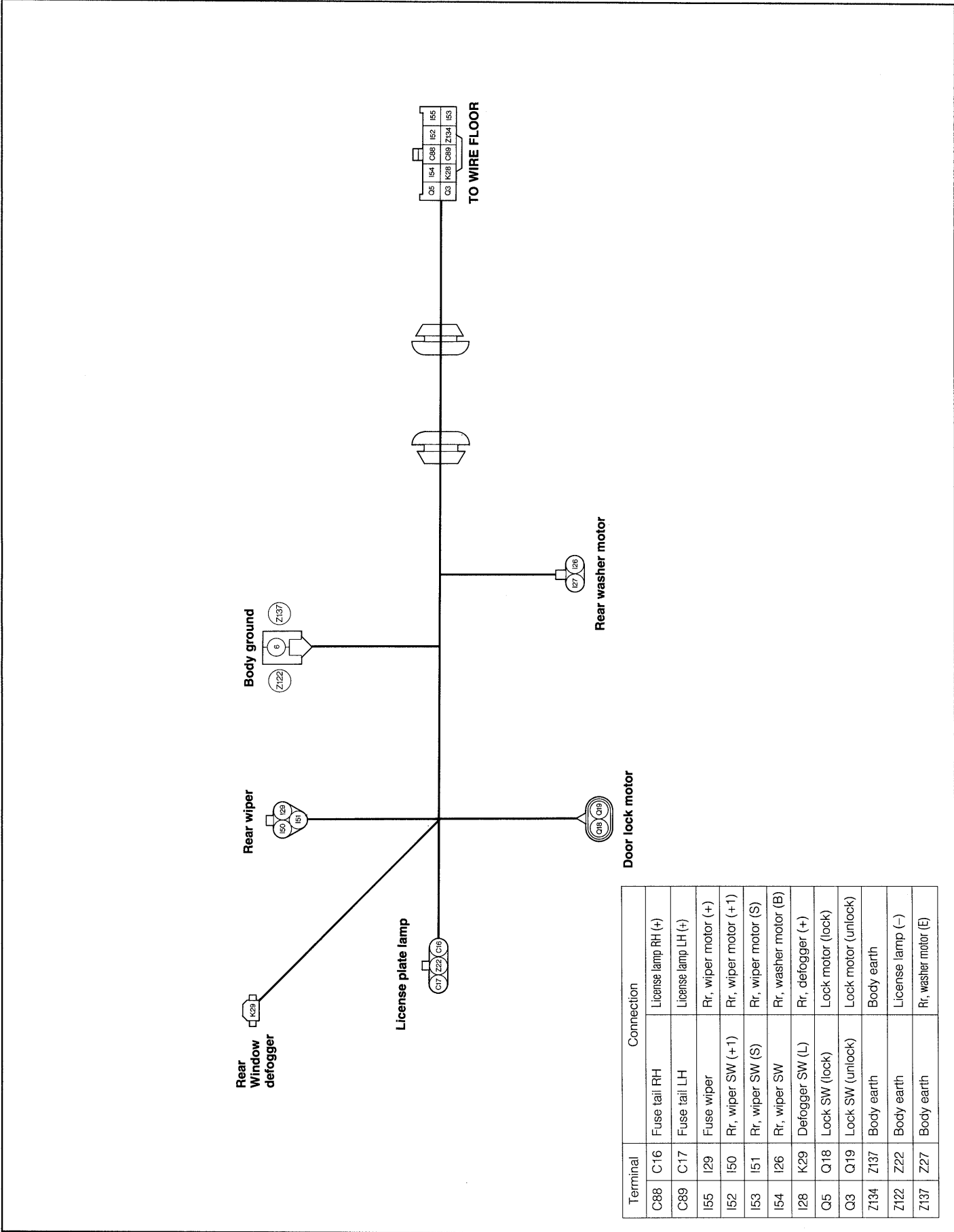


WIRE, FLOOR, NO.2

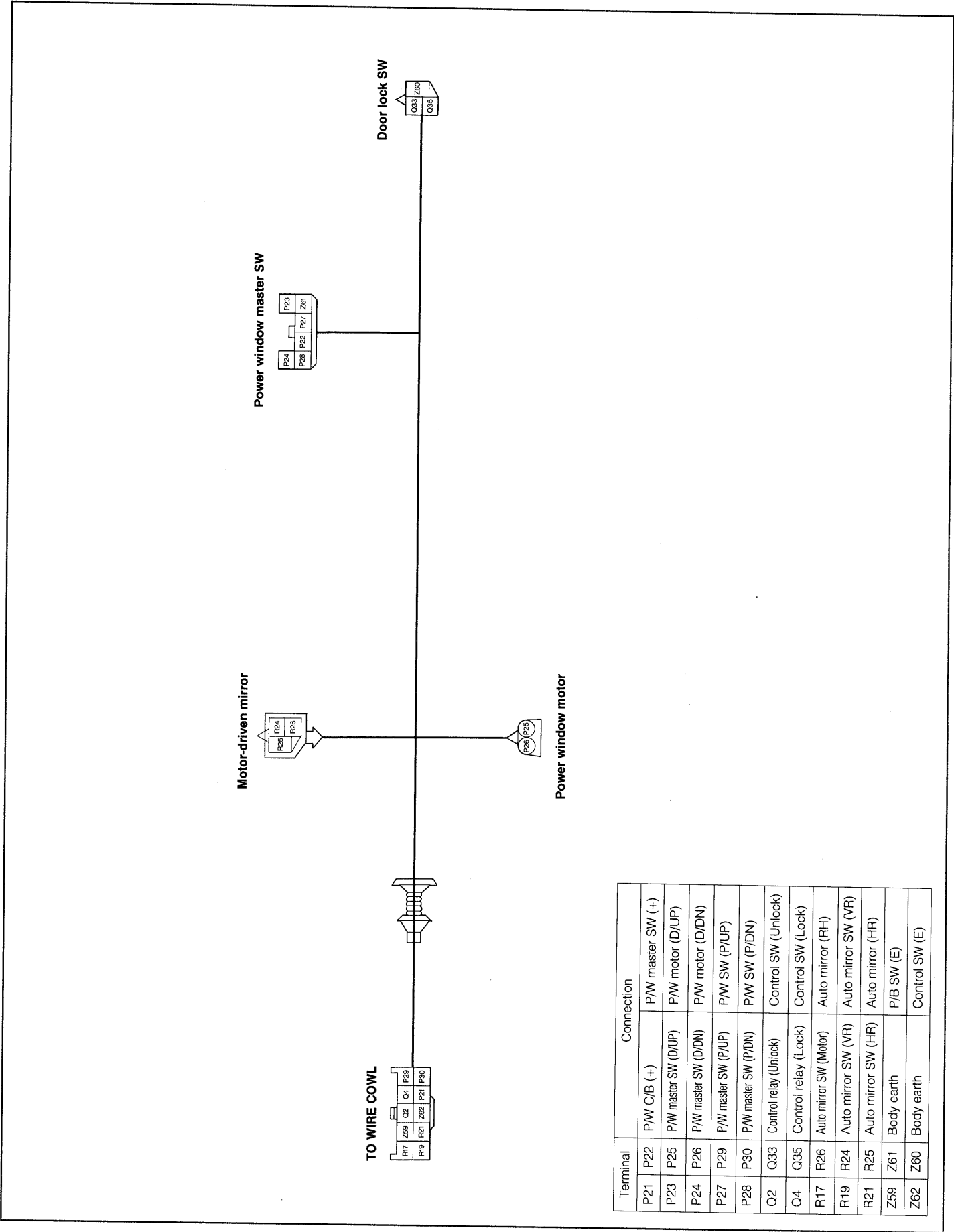


Terminal		Connection
D3	D6	Room lamp (-)
K106	K50	Rear heater relay
P5	P6	Fuel pump relay
W48	W49	(Net wire)
Z3	Z126	Body earth
	K51	Z3 ~ Z126
		Motor (-)

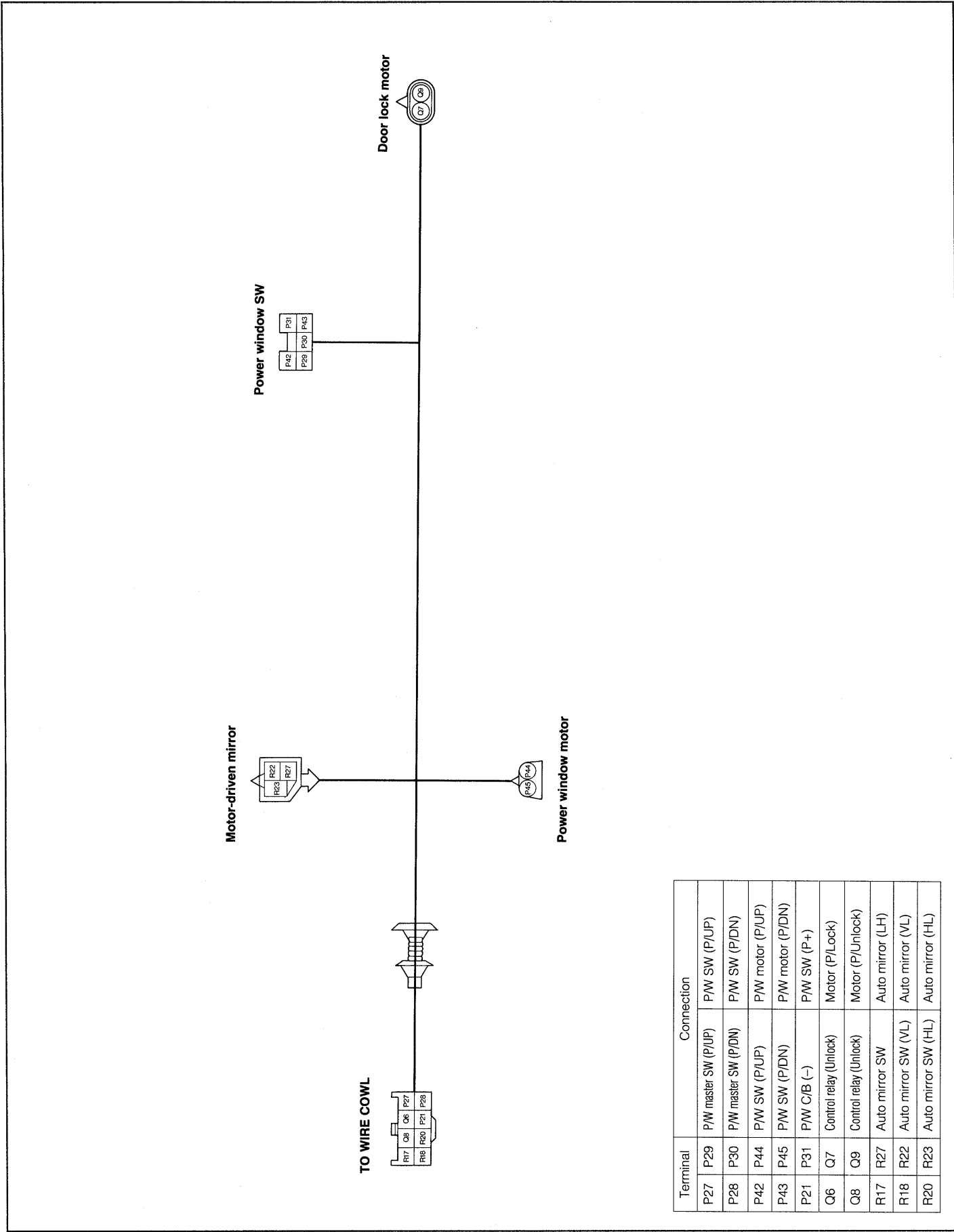
WIRE, BACK DOOR, NO.1



WIRE, FR. DOOR (Driver's side)



WIRE, FR. DOOR (Passenger's side)



WIRE, ENGINE (The table where terminal connecting for engine wire)

Terminal		Connection	
H5	H6	Meter, oil pressure	Oil pressure SW
H20	H21	Meter, temp. gage	Thermo. senda (+)
K16	X19	A/C, magnet clutch	EFI, ECU (A/C)
K96	K109	A/C, water temp. SW	A/C, amp.
N7	N8	IG Coil (-)	Distributor (-)
	N27		EFI, ECU (IG)
N37	N30	Ignitor (+B)	IG SW (IG2)
O55	O42	Fuse, backup	EFI, ECU (Batt)
O39	O40	Relay box, EFI main	EFI, ECU (+B1)
	O41		EFI, ECU (+B2)
P17	P18	Coil, fuel pump relay	EFI, ECU (FC)
	P68		Check terminal (F/P)
X1	X2	Meter, diagnosis	EFI, ECU (W)
	X109		Check terminal (W)
X3	X4	Meter, lead SW	EFI, ECU (SPD)
	X8		ISC, VSV (+)
X9	X10	ISC, VSV (-)	EFI, ECU (Visc)
X124	X11	EFI, ECU (DSW2)	Heater SW
X17	X18	Diode (-)	EFI, ECU (DSW1)
X20	X21	Check terminal (VF)	EFI, ECU (VF)
X27	X28	EFI, ECU (OX)	O ₂ sensor
X29	X30	EFI, ECU (THW)	Water temp. sensor (+)
X32	X33	EFI, ECU (THA)	Intake temp. sensor (E2)
X35	X31	EFI, ECU (E2)	Water temp. sensor (-)
	X34		Intake temp. sensor (-)
X36	X40	EFI, ECU (IDL)	Throttle sensor (IDL)
X37	X41	EFI, ECU (PSW)	Throttle sensor (PSW)
X38	X46	EFI, ECU (Vcc)	Pressure sensor (Vcc)
X43	X45	EFI, ECU (PIM)	Pressure sensor (PIM)
X99	X44	EFI, ECU (E21)	Pressure sensor (E21)
X47	X50	Injector relay (-)	Injector #1 (+)
	X52		Injector #2 (+)
	X54		Injector #3 (+)
	X97		Injector #4 (+)

Terminal		Connection	
X56	X55	EFI, ECU (#10)	Injector #3 (-)
	X51		Injector #1 (-)
	X53		Injector #2 (-)
	X98		Injector #4 (-)
	X96		EFI, ECU (#20)
X87	X88	Atmosphere VSV (-)	EFI, ECU (PVSV)
X90	X91	EGR VSV (-)	EFI, ECU (EVSV)
	X89		EGR VSV (+)
	X93		Atmosphere VSV (+)
K121	X100	A/C amp.	Throttle sensor (A/C cut)
E11	X92	Stop lamp SW (-)	EFI, ECU (B/K)
X22	M1	EFI, ECU (STA)	Starter relay
Z46	X57	EFI, ECU (T1)	Check terminal (T1+)
Z47	Z138	EFI, ECU (E01)	E/G earth
	X85		Sealed wire
	X86		Sealed wire
Z48	Z138	EFI, ECU (E1)	E/G earth
	X58		Check terminal (T1-)
Z49	Z76	E/G earth	EFI, ECU (E02)
	X39		Throttle sensor (E2)

HARNESS & WIRING DIAGRAM

WIRE COWL (1)

Terminal		Connection	
A27	A22	Headlamp relay (Coil)	Lighting SW (D2)
	A23	Z3~Z301	Lighting SW (D1)
A52	A2	Fuse headlamp (LH)	Headlamp LH (B)
A51	A6	Fuse headlamp (RH)	Headlamp RH (B)
	A10		Meter (Hi-beam Ind.)
A3	A17	Headlamp LH (Hi)	Dimmer SW (HM)
	A7		Headlamp RH (Hi)
	A11		Meter (Hi-beam Ind.)
A4	A18	Headlamp LH (Lo)	Dimmer SW (Lo)
	A8		Headlamp RH (Lo)
A26	A50	Headlamp relay	Fuse (Head)
	C3	O8~	Side lamp SW (TB)
C13	C86	Side lamp SW (S)	Fuse (Tail)
C88	C10	Fuse (Tail RH)	Clearance lamp RH (+)
	C7		Tail lamp RH (+)
	C22		Clock illumination (+)
	C61		Fr. side maker RH (+)
	C43		Rheostat (+)
C19	C44	Heater cont. illumi. (+)	Rheostat (-)
	C21		Meter illumination (+)
	C85		Hazard SW illumi. (+)
C89	C12	Fuse (Tail LH)	Clearance LH (+)
	C8		Tail lamp LH (+)
	C60		Fr. side marker LH (+)
	C19		Clock (+)
	D2		Room lamp (+)
D3	D7	Room lamp (-)	Courtesy lamp SW LH
	D6		Courtesy lamp SW RH
	D13	Q15~Q16	Key SW (+)
D14	D15	Key SW (-)	Key reminder buzzer (+)
	D16	D3~D7	Key reminder buzzer (-)
	D33	O19~O76	Key reminder buzzer
	D40	O15~O16	Luggage lamp (+)
E28	E10	Fuse (Stop)	Stop lamp SW (+)
E27	F23	Fuse (Horn)	Hazard SW (B2)
	E5		Horn relay (+)
	E7		Horn relay (Coil +)

Terminal		Connection	
E6	E10	Horn relay (-)	Horn LH (+)
E8	E19	Horn relay (Coil -)	Horn SW (+)
	E21	Z137~Z134	Horn LH (-)
F34	F24	Fuse (Turn)	Hazard SW (B1)
	F48		Turn SW
F52	F38	Turn flasher relay (B)	Hazard SW (F)
	F51		Lamp control relay (B)
F42	F35	Turn flasher relay (F)	Hazard SW (TB)
	F32		Turn SW (+)
F29	F9	Turn SW (L)	Fr. turn lamp LH
	F19		Meter turn indicator LH
	F37		Hazard SW (TL)
F30	F36	Turn SW (R)	Hazard SW (TR)
	F14		Fr. turn lamp RH (+)
	F21		Meter turn indicator RH
F5	F49	Rr. turn lamp LH	Lamp control relay (RL)
F7	F50	Rr. turn lamp RH	Lamp control relay (RR)
F40	F41	Hazard SW (R)	Lamp control relay (H/W)
F43	F47	Lamp control relay (T/S, R)	Turn SW (R)
F45	F46	Lamp control relay (T/S, L)	Turn SW (L)
E11	F44	Stop lamp SW (-)	Lamp control relay (Stop)
	G2	H41~H2	Backup lamp SW (+)
G3	G4	Backup lamp SW (-)	Backup lamp (+)
G6	G7	Meter (Brake warning)	Parking brake SW (+)
	G8		Brake oil level SW
	G12	H41~H2	Volts meter (+)
H41	H2	Fuse (Gauge)	Meter (IG)
H5	H6	Meter (Oil pressure)	Oil pressure SW
H18	H19	Meter (Seat belt warning)	Seat belt SW
H20	H21	Meter (Temp. gauge)	Thermo. senda
H22	H23	Meter (Fuel gauge)	Fuel senda

WIRE COWL (2)

Terminal		Connection	
I55	I10	Fuse (Wiper)	Fr. wiper SW (+)
	I2		Fr. washer motor (+)
	I22		Fr. wiper motor (+)
	I42		INT relay (B)
I3	I6	Fr. washer motor (-)	Fr. washer SW (+)
I8	I41	Fr. wiper SW (INT)	INT relay (INT)
I11	I18	Fr. wiper SW (+1)	Fr. wiper motor (+1)
I12	I20	Fr. wiper SW (+2)	Fr. wiper motor (+2)
I13	I39	Fr. wiper SW (WS)	INT relay (Ss)
I24	I40	Fr. wiper motor (S)	INT relay (Sm)
	I28	I55~I10	Rr. washer SW (+)
	I29	I55~I10	Rr. wiper motor (B)
	I31	I55~I10	Rr. wiper SW (+)
I52	I50	Rr. wiper SW (+1)	Rr. wiper motor (+1)
I53	I51	Rr. wiper SW (S)	Rr. wiper motor (S)
I54	I26	Rr. washer SW (-)	Rr. washer motor (+)
	J19	O8~	H/L cleaner motor (+)
J20	J21	H/L cleaner motor (-)	H/L cleaner relay (M)
	J22	A51~A6	H/L cleaner relay (B)
	J23	I55~I10	H/L cleaner relay (IG)
	J24	I3~I6	H/L cleaner relay (S)
K98	K27	Fuse (Defogger)	Defogger SW (B)
K28	K29	Defogger SW (D)	Rr. Defogger (+)
	K43	C19~C44	Defogger SW illumi. (+)
K1	K10	Fuse (Heater)	Heater relay (+)
K2	K11	Blower motor (+)	Heater relay (-)
K30	K4	Blower motor (-)	Heater SW (H)
	K3		Blower register (H)
K41	K42	Blower register (M2)	Heater SW (M2)
K5	K6	Blower register (M1)	Heater SW (M1)
	K7	Z3~Z301	Blower register (L)
	K12	H41~H2	Heater relay coil (+)
K8	K13	Heater SW (L)	Heater relay coil (-)
K48	K108	Rr. heater SW (+)	Rr. heater relay coil (-)

Terminal		Connection	
K50	K106	Rr. heater motor (+)	Rr. heater relay (-)
	K49	K50~K106	Rr. heater SW (-)
	K105	K1~K10	Rr. heater relay (+)
	K107	H41~H2	Rr. heater relay coil (+)
O2	K58	F/L (A/C)	A/C fan relay (+)
	K137	K2~K11	Fuse (A/C)
K136	K47	Fuse (A/C)	A/C SW (+)
K99	K100	A/C SW (-)	A/C amp. (1)
	K101	N7~N8	A/C amp. (13)
K16	K102	A/C fan relay coil (+)	A/C amp. (4)
K18	K103	A/C idle up VSV (+)	A/C amp. (5)
K19	K104	A/C idle up VSV (-)	A/C amp. (3)
	K17		A/C pressure SW (1)
K112	K113	A/C pressure SW (2)	A/C amp. (12)
K114	K115	A/C amp. (11)	A/C sub harness (S)
K116	K117	A/C amp. (6)	A/C sub harness (I1)
K118	K119	A/C amp. (7)	A/C sub harness (K1)
K109	K96	A/C amp. (8)	A/C motor temp. SW
K120	Z135	A/C amp. (9)	A/C SW (E)
M1	M5	IG SW (ST)	Starter relay (+)
	M20		Starter relay coil (+)
M6	M2	Starter relay (-)	Starter
M7	Y6	Starter relay coil (-)	Clutch SW (+)
	Y7	Z302~Z126	Clutch SW (-)
	N36	O8~	Fuse (Heater)
N1	N34	IG SW (IG1)	Fuse (Engine)
	N44		Fuse (Turn, gauge)
	N45		Fuse (Wiper, defogger)
N7	N8	IG coil (-)	Distributor (+)
	N11		Meter (Tachometer)
N30	N37	IG SW (IG2)	Igniter (B)
	N5		IG coil (+)
	N38		Fuse (EFI-2)
	N39		Condenser (+)

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HARNESS & WIRING DIAGRAM

WIRE COWL (3)

Terminal		Connection	
N33	O56	Fuse (EFI-2)	Relay box (EFI relay)
O8	O12	F/L	IG SW (AM)
	O59		Fuse (Tail, stop)
	O60		Fuse (Doom, lock)
O19	O76	Alternator (IG)	Fuse (Engine)
O20	O21	Meter (Charge lamp)	Alternator (L)
O42	O55	EFI ECU (BATT)	Fuse (Backup)
O62	O61	F/L (40A)	Fuse (Horn)
P5	P6	Fuel pump relay (-)	Fuel pump (+)
P17	P18	Fuel pump relay coil (+)	EFI ECU (FC)
	P20	N1~N34	Power window (C/B +)
P21	P22	Power window (C/B -)	P. window master SW +
	P31		P. window (RH) +
P27	P29	P. window master SW (P/U)	P. window SW (UP)
P28	P30	P. window master SW (P/D)	P. window SW (DN)
Q15	Q16	Fuse (Doom, lock)	Back door lock SW (G)
Q5	Q18	Back door lock SW (Lock)	Back door lock (2)
Q3	Q19	Back door lock SW (Unlock)	Back door lock (1)
	Q1	Q8~	Fr. door lock relay (6)
Q2	Q33	Fr. door lock relay (3)	Fr. door lock SW (Unlock)
Q4	Q35	Fr. door lock relay (2)	Fr. door lock SW (lock)
Q6	Q7	Fr. door lock relay (5)	Door lock (2)
Q8	Q9	Fr. door lock relay (4)	Door lock (1)
R1	R36	IG SW (ACC)	Fuse (Cigarette lighter)
R15	R37	Cigarette lighter	Fuse (Cigarette lighter)
	R16		Door mirror SW (+)
R17	R27	Door mirror SW (Motor)	Door mirror LH (-)
	R26		Door mirror RH (-)
R18	R22	Door mirror SW (VL)	Door mirror VL (+)
R19	R24	Door mirror SW (VR)	Door mirror VR (+)
R20	R23	Door mirror SW (HL)	Door mirror HL (+)
R21	R25	Door mirror SW (HR)	Door mirror HR (+)
R28	R48	Rear speaker RH (+)	Radio (SP RH +)
R30	R46	Rear speaker LH (+)	Radio (SP LH +)
R29	R51	Rear speaker RH (-)	Radio (SP RH -)
R31	R47	Rear speaker LH (-)	Radio (SP LH -)

Terminal		Connection	
Q15	D2	Fuse (Doom, lock)	Room lamp (+)
	C29		Clock (+)
	D13		Key SW (+)
	D40		Luggage lamp (+)
X1	X2	Meter (Check engine)	EFI ECU (W)
X3	X4	Meter (Read SW)	EFI ECU (SPD)
X124	X11	EFI ECU (PSW2)	Diode
	X12	K8~K13	Diode
	X15	K28~K29	Diode
	X16	A52~A2	Diode
X17	X18	Diode	EFI ECU (DSW1)
	X19	K16~K102	EFI ECU (A/C)
	X22	M6~M2	EFI ECU (STA)
X47	X50	Injector relay	Injector #1
X41	K121	Throttle sensor (PSW)	A/C amp. (2)
	X92	E11-F44	ECU (B/K)
Z3	Z301	Body earth	Body earth
Z302	Z126	Body	Fuel pump (E)
	Z2	Z3-Z301	Dimmer SW (E)
	Z8	Z3-Z301	Meter earth
	Z11	Z137-Z134	Oil level SW (E)
	Z16	Z3-Z301	H/L cleaner relay (E)
Z130	Z21	Body earth	Heater SW (E)
	Z27	Z130-Z21	Clearance RH (E)
	Z28	Z137-Z134	Clearance LH (E)
Z103	Z30	Body earth	Radio earth
	Z31	Z4-Z136	Cigarette lighter (E)
	Z33	Z137-Z134	A/C sub (earth)
	Z40	Z302-Z126	Seat belt SW (E)
	Z42	Z3-Z301	Defogger SW (E)
	Z44	Z3-Z301	Rheostat (E)
	Z45	Z130-Z21	Relay box earth
	Z59	Z3-Z301	Fr. door lock control (1)
	Z60	Z302-Z126	Back door lock SW (E)
	Z61	Z302-Z126	Power window SW (E)
	Z62	Z302-Z126	Door mirror SW (E)

Terminal		Connection	
	Z72	Z137-Z134	Fr, side marker LH (-)
	Z73	Z130-Z21	Fr, side marker RH (-)
Z15	Z83	Body earth	Meter gauge earth
	Z85	Body earth	Meter, speed sensor (-)
	Z128	Z3-Z301	Hazard SW illumin. (-)
Z103	Z129	Body earth	Meter, gauge (temp.) (-)
Z137	Z131	Body earth	Condenser (E)
Z137	Z134	Body earth	Body earth
Z4	Z136	Body earth	A/C amp. earth
	Z200	Z4-Z136	Light control (E)
	Z65	Z302-Z126	Door lock SW (E)
W48	N49	Speed sensor (E)	Z130~W71

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HARNESS & WIRING DIAGRAM

WIRE INSTRUMENT PANEL

Terminal		Connection	
C13	C19	Tail SW (S)	Heater control illumin. (+)
	C22		Clock (TAIL+)
	C77		Cigarette lighter illumin. (+)
	C81		Volt meter illumin. (+)
	C82		Clinometer illumin. (+)
Q15	C29	Fuse (Doom, lock)	Clock (+)
H41	G12	Fuse (Gauge)	Volt meter (+)
R37	R15	Fuse (Cigarette lighter)	Cigarette lighter (+)
	R4		Radio (+)
	R5		Clock (Acc)
R6	R7	Radio (Speaker LH+)	Speaker LH (+)
R8	R9	Radio (Speaker LH-)	Speaker LH (-)
R10	R11	Radio (Speaker RH+)	Speaker RH (+)
R12	R13	Radio (Speaker RH-)	Speaker RH (-)

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WIRE FLOOR

Terminal		Connection	
C88	C7	Fuse (Tail RH)	Tail RH (+)
	C16		License lamp RH (+)
	C79		Rear side marker RH (+)
C89	C8	Fuse (Tail LH)	Tail LH (+)
	C17		License lamp LH (+)
	C78		Rear side marker LH (+)
D3	D7	Doom lamp SW (-)	Door courtesy SW LH (+)
D40	D41	Fuse (Doom, lock)	Luggage lamp (+)
D42	D43	Luggage lamp (Door)	Courtesy SW (B/Door+)
F29	F5	Light control relay (RL)	Turn stop lamp LH (+)
F30	F7	Light control relay (RR)	Turn stop lamp RH (+)
G3	G5	Backup lamp SW (-)	Backup lamp LH (+)
	G4		Backup lamp RH (+)
H22	H23	Meter (Fuel gauge)	Fuel senda
I55	I29	Fuse (Wiper)	Rear wiper motor (+)
I52	I50	Rear wiper SW (WIP)	Rear wiper motor (+1)
I53	I51	Rear wiper SW (WIP)	Rear wiper motor (S)
I54	I26	Rear wiper SW (WAS)	Rear washer motor (B)
K28	K29	Defogger SW (-)	Defogger (+)
Q5	Q18	Motor lock SW (Lock)	Motor lock (Lock)
Q3	Q19	Motor lock SW (Unlock)	Motor lock (Unlock)
R28	R48	Rr. speaker RH (+)	Radio (SP RH+)
R29	R51	Rr. speaker RH (-)	Radio (SP RH-)
R30	R46	Rr. speaker LH (+)	Radio (SP LH+)
R31	R47	Rr. speaker LH (-)	Radio (SP LH-)

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DAIHATSU



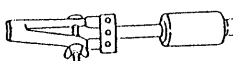
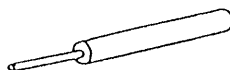
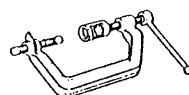
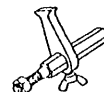
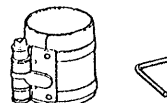
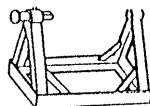
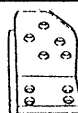


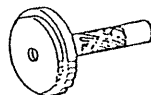
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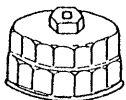
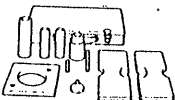
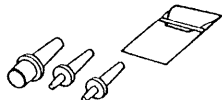

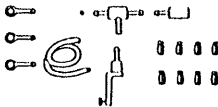
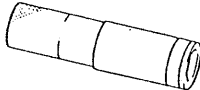
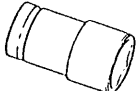

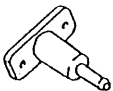
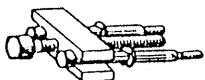

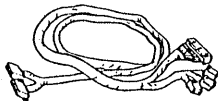
SUPPLEMENT A

SST (Special Service Tools) A-2
WRU90-A001

A

SST (Special Service Tools)



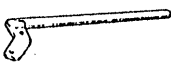



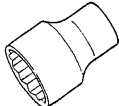


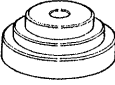

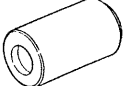
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	09201-87704-000 Valve stem oil seal remover	<input type="radio"/>										
	09201-87705-000 Valve guide bush remover & replacer	<input type="radio"/>										
	09202-87002-000 Valve cotter remover & replacer	<input type="radio"/>										
	09210-87701-000 Flywheel holder	<input type="radio"/>										
	09217-87001-000 Piston replacing guide	<input type="radio"/>										
	09219-87202-000 Engine overhaul stand	<input type="radio"/>		<input type="radio"/>		<input type="radio"/>						
	09219-87701-000 Engine overhaul attachment	<input type="radio"/>										
	09221-87704-000 Piston pin remover & replacer body	<input type="radio"/>										
	09221-87705-000 Piston pin remover & replacer guide	<input type="radio"/>										
	09223-41020-000 Crankshaft rear oil seal replacer	<input type="radio"/>										

Shape	Part No. & Part Name	Section										
		Engine	Clutch	Transmission & Transfer	Propeller shaft	Differential	Front axle & Suspension	Rear axle & Suspension	Brake	Steering	Body	Body electrical
	09223-87201-000 Oil filter wrench	○										
	09236-00100-000 Water pump overhaul tool	○										
	09258-00030-000 Plug set	○										
	09268-87701-000 EFI fuel pressure gauge	○										
	09268-87702-000 Injection measuring tool set	○										
	09268-87703-000 Plug wrench	○										
	09268-87704-000 Oil cooler set bolt box wrench	○										
	09278-87201-000 Timing belt pulley holding tool	○										
	09283-87703-000 Pressure regulator adopter	○										
	09609-20011-000 Steering wheel puller	○										
	09842-30070-000 EFI inspection wire F	○										
	09842-87704-000 EFI computer check sub harness	○										

SUPPLEMENT A

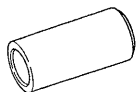
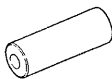
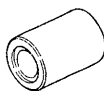
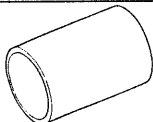
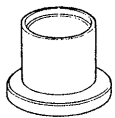
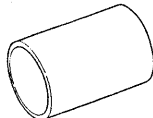
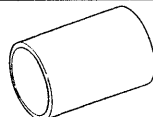
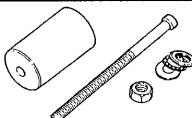
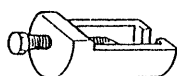

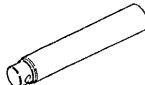

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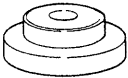
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	09737-87001-000 Brake booster push rod gauge								○			
	09511-87202-000 Brake drum stopper						○					
	09520-00031-000 Rear axle shaft puller						○	○				
	09520-87603-000 Rear wheel bearing puller set							○				
	09607-87602-000 Front axle bearing lock nut wrench						○					
	09607-87603-000 Front axle hub nut wrench						○					
	09608-87603-000 Front axle hub outer bearing outer race replacer						○					
	09608-87604-000 Front axle hub inner bearing outer race replacer						○	○				
	09608-87605-000 Steering knuckle oil seal & dust deflector replacer						○					
	09608-87606-000 Rear axle shaft oil seal replacer							○				
	09608-87607-000 Leaf spring bush No. 1 remover & replacer							○				

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SUPPLEMENT A

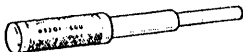

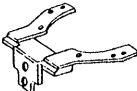
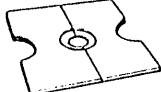

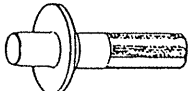
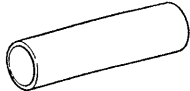

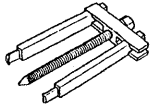
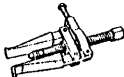
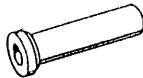
Shape	Part No. & Part Name	Section										
		Engine	Clutch	Transmission & Transfer	Propeller shaft	Differential	Front axle & Suspension	Rear axle & Suspension	Brake	Steering	Body	Body electrical
	09608-87608-000 Leaf spring bush No. 2 remover & replacer							○				
	09608-87609-000 Upper arm bush remover						○					
	09608-87610-000 Upper arm bush replacer						○					
	09608-87611-000 Lower arm dust cover & tie rod end dust cover replacer						○			○		
	09608-87612-000 Upper arm bush remover & replacer holder						○					
	09608-87613-000 Pitman arm tie rod end dust cover & hub cap replacer						○			○		
	09608-87614-000 Idler arm dust cover replacer									○		
	09608-87615-000 Lower arm bush remover & replacer						○					
	09610-20012-000 Pitman arm puller						○			○		
	09610-87301-000 Pitman arm puller									○		
	09611-87506-000 Handle						○	○				
	09611-87701-000 Tie rod end puller									○		

WRU90-A006





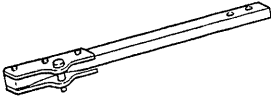

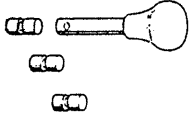

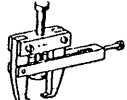
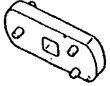
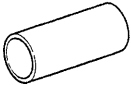

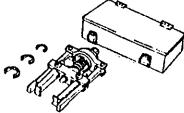
Section		Engine	Clutch	Transmission & Transfer	Propeller shaft	Differential	Front axle & Suspension	Rear axle & Suspension	Brake	Steering	Body	Body electrical
Shape	Part No. & Part Name											
	09616-00010-000 Steering pinion bearing adjusting socket									○		
	09608-87602-000 Front axle hub oil seal replacer						○					

WRU92-A012

SUPPLEMENT A




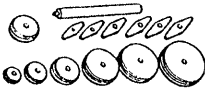
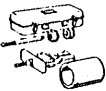


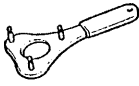
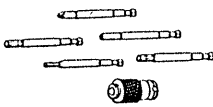
Shape	Part No. & Part Name	Section											
		Engine	Clutch	Transmission & Transfer	Propeller shaft	Front axle & Suspension	Rear axle & Suspension	Front/Rear Differential	Steering	Brake	Body	Air Conditioner	
	09201-60011-000 Valve guide bush remover & replacer		○										
	09201-87201-000 Valve guide bush remover & replacer	○		○									
	09219-87203-000 Engine overhaul attachment (Commercially-available)			○									
	09253-87101-000 Water pump bearing anvil [Crankshaft center bearing anvil]							○					
	09301-87601-000 Clutch guide tool		○										
	09302-87702-000 Clutch diaphragm spring height No. 5 gauge		○										
	09304-87601-000 Replacer input shaft bearing			○									
	09306-87601-000 Replacer counter shaft bearing			○									
	09306-87602-000 Puller counter gear front bearing			○									
	09308-10010-000 Oil seal puller							○					
	09309-87201-000 Transmission bearing replacer			○									

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Shape	Part No. & Part Name	Section										
		Engine	Clutch	Transmission & Transfer	Propeller shaft	Front axle & Suspension	Rear axle & Suspension	Front/Rear Differential	Steering	Brake	Body	Air Conditioner
	09309-87202-000 Transmission bearing replacer							○				
	09309-87301-000 Output shaft bearing replacer			○								
	09310-87102-000 Counter shaft rear bearing replacer			○								
	09326-20020-000 Output shaft bearing lock nut wrench			○								
	09330-00021-000 Companion flange holding tool							○				
	09333-00012-000 Clutch diaphragm spring aligner		○									
	09339-87301-000 Shift fork shaft guide			○								
	09458-87601-000 Attachment differential overhaul							○				
	09502-10012-000 Differential side bearing puller							○				
	09504-87601-000 Differential side bearing adjust nut wrench							○				
	09517-87601-000 Replacer oil seal			○				○				
	09517-87602-000 Attachment oil seal puller							○				
	09520-87604-000 Puller universal joint				○							

WRU90-A009

SUPPLEMENT A

Shape	Part No. & Part Name	Section										
		Engine	Clutch	Transmission & Transfer	Propeller shaft	Front axle & Suspension	Rear axle & Suspension	Front/Rear Differential	Steering	Brake	Body	Air Conditioner
	09530-87602-000 Rear differential drive pinion adjust gauge set							○				
	09530-87603-000 Front differential drive pinion adjust gauge set							○				
	09602-87301-000 Counter gear bearing puller			○								
	09608-87302-000 Axle hub & drive pinion bearing tool set			○				○				
	09612-12010-000 Steering gear housing overhaul			○								
	09636-20010-000 Upper ball joint dust cover replacer							○				
	09801-87701-000 Air conditioner magnet clutch remover											○
	09802-87702-000 Air conditioner magnet clutch stopper											○
	09804-87701-000 Air conditioner bit set											○

[illegible]

DAIHATSU

ROCKY

SUPPLEMENT B SPECIFICATIONS

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B

1. PRE-DELIVERY INSPECTION SPECIFICATIONS

Item		Specifications
Tire inflation pressure Front/Rear	P205/75R15	1.8/2.4
	P225/70R15	1.8/2.4
Spare tire inflation pressure	bar	2.4
Wheel nut tightening torque	N·m	88.2 - 117.6
Idling speed (in neutral)	rpm	850 ± 50
Throttle positioner setting speed	rpm	1,600 ± 100
Engine oil	Capacity ℓ	3.8/(3.3) whole/(oil change)
	Grade	API SG or SF
Manual transmission oil	Capacity ℓ	1.7
	Grade	API GL-3 or GL-4
	Viscosity	SAE 75W-85 or 75W-90
Transfer oil	Capacity ℓ	Part time: 1.4 Full time: 1.7
	Grade	API GL-3 or GL-4
	Viscosity	SAE 75W-85 or 75W-90
Differential oil	Capacity ℓ	Front: 0.9 Rear: 1.95
	Grade	Hypoid gear oil API GL-5
	Viscosity	SAE 90 or 80W-90
Brake fluid	Grade	FMVSS 116 DOT3 or SAE J1703
Power steering fluid	Grade	ATF (DEXRON®-II)
Steering gear box oil	Grade	Gear oil API GL-4
	Viscosity	SAE-90
Accelerator pedal free play	mm	1 - 5
Brake pedal free play	mm	1 - 3 (w/o Vacuum)
Clutch pedal free play	mm	18 - 27
Parking brake lever		Should "Set" within 4-6 notches when pulled-up 55 lb by hand
Exhaust emission concentration at Idle	CO Vol. %	Max. 0.5 (Tail pipe)
	HC Vol. ppm	Max. 100 (Tail pipe)

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2. SUMMARY OF VEHICLE SPECIFICATIONS

Item			Specifications
ENGINE	Type		HD-E
	Displacement	cc	1589
	Bore × Stroke	mm	76.0 × 87.6
	Compression ratio		9.5 ± 0.3
	Firing order		1 - 3 - 4 - 2
	Ignition timing		3°BTDC/1000 rpm (W/O Vacuum advance)
	Valve mechanism		Over head camshaft, Timing belt
	Valve clearancemm	Intake	0.20 - 0.30 (Hot condition)
		Exhaust	0.28 - 0.38 (Hot condition)
	Spark plug type (Gap in mm)	CHAMPION	RC9YC4 (1.0 - 1.1)
		NIPPONDENSO	K20PR-U11 (1.0 - 1.1)
		NGK	BKR6E-11 (1.0 - 1.1)
	Coolant capacity	ℓ	5.5 Excluding for reserve tank (1.0)
	Max. Out put	Power kw/rpm	70/5700
		Torque N·m/rpm	128/3200
CLUTCH	Recommendation fuel		Unleaded, Octane number 91 (RON) or higher
	Fuel tank capacity		60 (15.9 us gal.)
CLUTCH	Type		Dry single plate, diaphragm
	Operation		Mechanical
MANUAL TRANSMISSION	Type		5 Speed, Synchromesh
	Gear ratio	1st	3.752
		2nd	2.182
		3rd	1.482
		4th	1.000
		5th	0.865
		Reverse	3.942
TRANSFER	Type		Drive chain
	Gear ratio	Low	1.754
		High	1.000
DIFFERENTIAL	Type		Hypoid gear
	Gear ratio		5.285
SUSPENSION	Front		Double wish bone
	Rear		Rigid
STEERING	Type		Ball-nut type
	Gear ratio		24 - 28*
BRAKES	Type		Front: Disc (Solid rotor) REAR: Drum (Leading and trailing)
	System		2 Front 2 wheels and rear 2 wheels brake
WHEEL	Size		15 × 6JJ
	Off setmm		Steel: 19 ± 1 Aluminum: 19 ± 0.5

* Overall gear ratio: 24.2 (without power steering), 18.4 (with power steering).

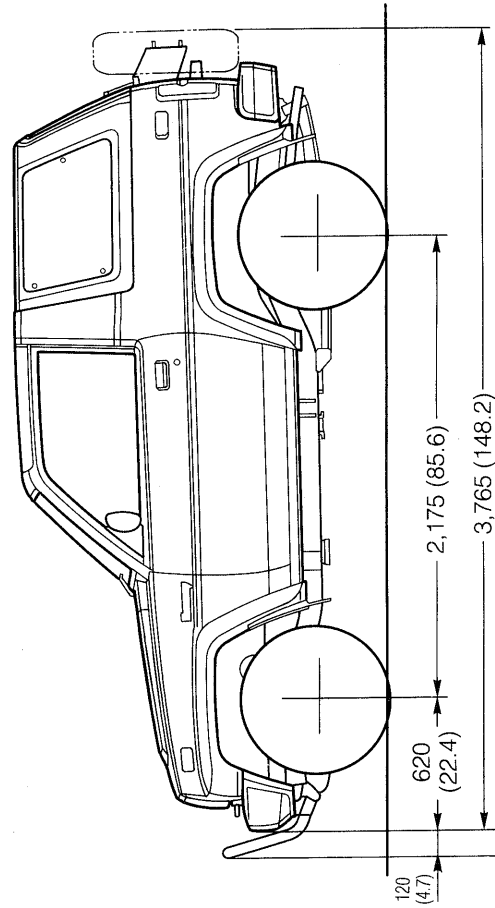
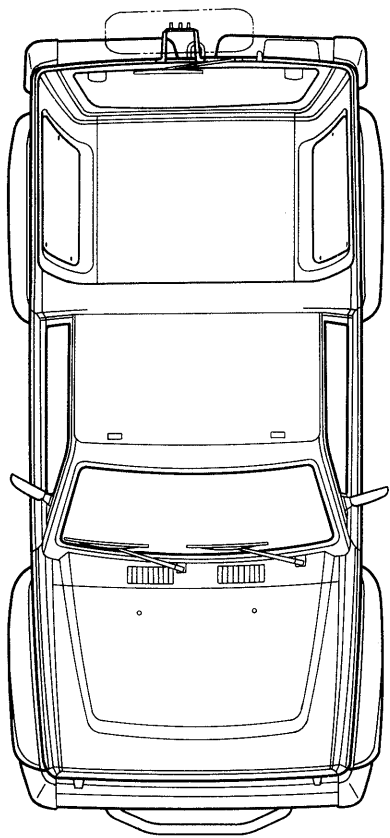
SUPPLEMENT B SPECIFICATIONS

Item				Specifications
BULB	Head lamp	Candescent	W	65/55
		Halogen	W	65/35
	Front combination lamp	Turn signal	W	27
		Clearance	W	8
	Front marker lamp		W	5
	Rear		W	5
	Rear combination lamp	Stop, Turn signal	W	27
		Tail	W	8
		Back up	W	27
	License plate lamp		W	5
	Room lamp		W	10
	Luggage room lamp		W	8

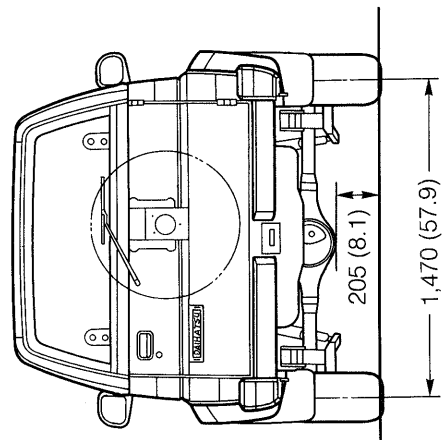
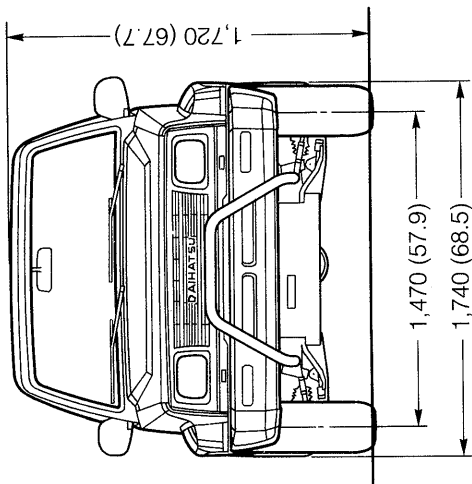
WRU90-B003

3. VEHICLE DIMENSIONS

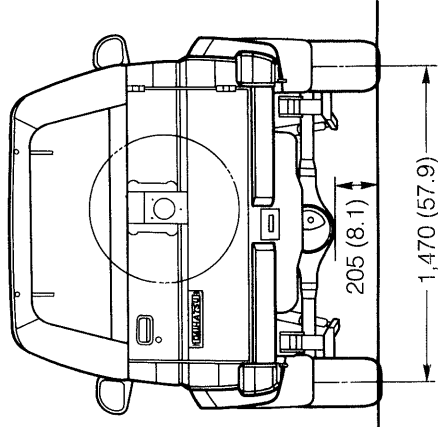
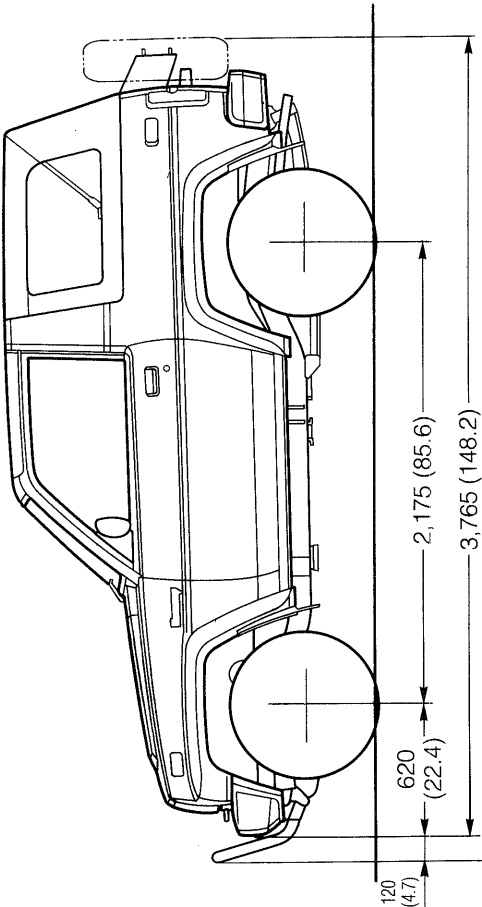
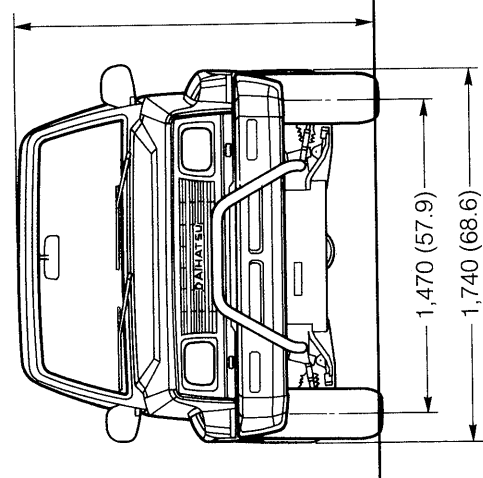
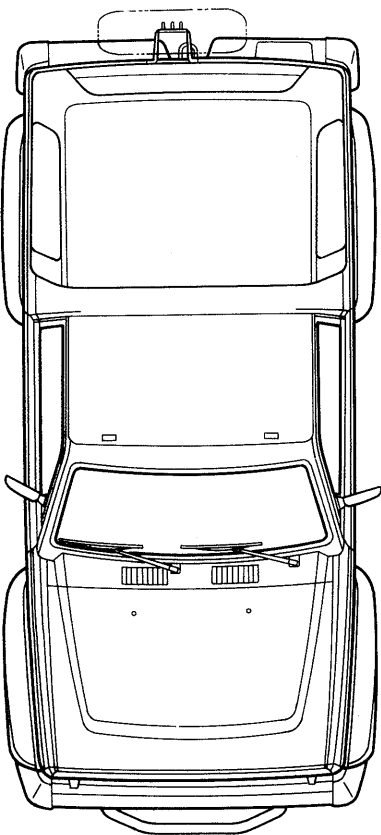
WAGON



mm (inch)



CABRIOLET



mm (inch)

4. ENGINE MECHANICALS

Timing belt pulley	Reference	Camshaft	119.90 mm (4.720 inch)
		Crankshaft	59.37 mm (2.335 inch)
Timing belt tension spring		Free length	46.5 mm (1.83 inch)
		Installation load	3 kg at 50.9 mm (6.6 lb at 2.00 inch)
Camshaft	Oil clearance (cylinder head-to-camshaft)		0.035 - 0.076 mm (0.0014 - 0.0029 inch)
	Maximum limit		0.17 mm (0.0067 inch)
	Thrust clearance		0.1 - 0.25 mm (0.0039 - 0.0098 inch)
	Maximum limit		0.45 mm (0.018 inch)
	Journal diameter		
	Valve cam lobe height		
	Intake	Standard	33.08 - 33.28 mm (1.302 - 1.310 inch)
		Minimum	32.9 mm (1.295 inch)
	Exhaust	Standard	33.00 - 33.20 mm (1.299 - 1.307 inch)
	Minimum	32.85 mm (1.293 inch)	
Maximum circle run out		0.03 mm (0.0012 inch)	
Cylinder head	Warpage	Cylinder block side	0.10 mm (0.0039 inch)
		Intake manifold side	0.10 mm (0.0039 inch)
		Exhaust manifold side	0.10 mm (0.0039 inch)
	Valve seat angle	Intake	30° - 45° - 70°
		Exhaust	20° - 45° - 70°
	Valve contacting angle		45°
	Valve seat contacting width		
		Standard	1.4 mm (0.055 inch)
		Allowance	1.2 - 1.6 mm (0.048 - 0.062 inch)
	Maximum valve seat recession	Intake	2.775 mm (0.1092 inch)
	Exhaust	6.026 mm (0.2372 inch)	
Valves	Valve length	Intake valve	112.8 mm (4.441 inch)
		Exhaust valve	114.5 mm (4.508 inch)
	Valve face angle		45.5°
	Valve stock thickness (Minimum)		
		Intake	0.8 mm (0.032 inch)
		Exhaust	1.0 mm (0.039 inch)
	Valve stem oil clearance		
	Intake	Standard	0.020 - 0.060 mm (0.0008 - 0.0024 inch)
		Maximum	0.080 mm (0.0031 inch)
	Exhaust	Standard	0.025 - 0.065 mm (0.0010 - 0.0026 inch)
	Maximum	0.090 mm (0.0035 inch)	

SUPPLEMENT B SPECIFICATIONS

Valve springs	Free length	Standard Minimum	45.2 - 46.0 mm (1.78 - 1.81 inch) 44.3 mm (1.74 inch)
	Installed tension at 38.0 mm (1.50 inch)		26.4 kg (58.2 lb)
	Maximum out-of-squareness		1.6 mm (0.063 inch)
Valve rocker arm and valve rocker shaft	Oil clearance	Standard Maximum	0.012 - 0.053 mm (0.0005 - 0.0020 inch) 0.08 mm (0.0031 inch)
	Valve rocker arm bore diameter		19.500 - 19.521 (0.7678 - 0.7685 inch)
	Valve rocker shaft outer diameter		19.468 - 19.488 mm (0.7665 - 0.7672 inch)
Valve rocker arm spacer	Free width		22.00 mm (0.866 inch)
Exhaust manifold	Warpage		0.1 mm (0.0039 inch)
Intake manifold	Warpage	Cylinder head side	0.1 mm (0.0039 inch)
Cylinder block	Maximum cylinder head surface warpage		0.1 mm (0.0039 inch)
	Cylinder bore diameter	Standard O/S 0.25	76.000 - 76.030 mm (2.9922 - 2.9933 inch) 76.250 - 76.280 mm (3.0020 - 3.0031 inch)
	Bore honing angle		35° ± 5°
	Coarse degree		1 - 4 Z
Piston, piston pin and piston rings	Piston-to-cylinder bore clearance	Standard Maximum limit	0.025 - 0.045 mm (0.0010 - 0.0018 inch) 0.11 mm (0.0043 inch)
	Piston ring groove-to-piston ring side clearance		
	Standard.	No. 1 No. 2	0.03 - 0.07 mm (0.0012 - 0.0027 inch) 0.02 - 0.06 mm (0.0008 - 0.0023 inch)
	Maximum		0.12 mm (0.0047 inch)
	Piston ring thickness		
	Standard	No. 1 No. 2	1.17 - 1.19 mm (0.0461 - 0.0468 inch) 1.47 - 1.49 mm (0.0579 - 0.0586 inch)
Piston, piston pin and piston rings	Piston ring end gap		
	Standard	No. 1 No. 2	0.27 - 0.42 mm (0.0107 - 0.0165 inch) 0.35 - 0.50 mm (0.0138 - 0.0196 inch)
		oil	0.20 - 0.70 mm (0.0079 - 0.0275 inch)
	Maximum	No. 1 No. 2	0.7 mm (0.028 inch) 0.8 mm (0.031 inch)
		oil	1.0 mm (0.039 inch)
	Piston pin-to-connecting rod interference fit		0.012 - 0.044 mm (0.0005 - 0.0017 inch)
Flywheel	Runout	Maximum	0.1 mm (0.0039 inch)
Connecting rod	Big end thrust clearance		
		Standard Maximum	0.15 - 0.4 mm (0.006 - 0.015 inch) 0.45 mm (0.018 inch)
	Maximum bend		0.05 mm (0.0020 inch)
	Maximum twist		0.05 mm (0.0020 inch)
Crankshaft	Crankpin journal oil clearance		0.020 - 0.044 mm (0.0008 - 0.0017 inch)
	Main journal oil clearance		0.024 - 0.042 mm (0.0010 - 0.0016 inch)
	Crankpin journal diameter		44.975 - 45.000 mm (1.7707 - 1.7716 inch)
	Main journal diameter		49.975 - 50.000 mm (1.9676 - 1.9685 inch)
	Thrust clearance	Standard Maximum limit	0.02 - 0.22 mm (0.0008 - 0.0086 inch) 0.30 mm (0.012 inch)
	Runout	Maximum	0.06 mm (0.0024 inch)

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5. EFI SYSTEM

Fuel pressure regulator	Fuel pressure at no vacuum	2.3 - 2.8 kg/cm ² (33 - 40 psi)													
Injector	Resistance at 20°C (68°F) (approx.)	11 - 17 Ω													
	Injection amount (approx.)	40 - 50 cc/15 seconds at 20°C (68°F) (2.62 - 2.89 cub inch)													
	Difference between each injector	5 cc or less (0.3 cub inch or less)													
	Fuel leakage	Less than one drop of fuel per minute													
EFI main relay Injector relay	Between terminals ① - ② ③ - ④	Continuity Infinity													
Fuel pump relay	Between terminals ① - ② ③ - ④	Continuity Infinity													
Throttle position sensor	Resistance Between terminals ⑫ - ⑲ Throttle valve closed fully	29 Ω or less at 20°C (68°F)													
	Throttle valve opened fully	1000 kΩ or more at 20°C (68°F)													
	Between terminals ⑳ - ㉑ Throttle valve closed fully	1000 kΩ or more at 20°C (68°F)													
	Throttle valve opened fully	29 Ω or less at 20° (68°F)													
Fuel pump	Fuel flow amount	235 cc or more/15 seconds (14.34 cub inch or more)													
Water temperature sensor Intake air temperature sensor	Temperature	Resistance													
	80°C (176°F)	0.322 ± 0.1 kΩ													
	60°C (140°F)	0.584 ± 0.2 kΩ													
	40°C (104°F)	1.14 ± 0.3 kΩ													
	20°C (68°F)	2.45 ± 0.5 kΩ													
	0°C (32°F)	5.88 ± 1.5 kΩ													
	-20°C (-4°F)	16.2 ± 3.2 kΩ													
Pressure sensor Output between SST terminals ⑥ - ③⑨ (ground) (When engine is stopped.)															
<table border="1"> <tr> <th>Measuring point</th><th rowspan="2">Atmospheric pressure mm Hg (inch Hg)</th><th rowspan="2">Voltage V</th></tr> <tr> <th>Altitude (height above sea level) m (ft)</th></tr> <tr> <td>0 (0)</td><td>760 (29.92)</td><td>3.2 - 4.0</td></tr> <tr> <td>500 (1640)</td><td>716 (28.19)</td><td>3.1 - 3.8</td></tr> <tr> <td>1000 (3280)</td><td>674 (26.54)</td><td>3.0 - 3.6</td></tr> </table>			Measuring point	Atmospheric pressure mm Hg (inch Hg)	Voltage V	Altitude (height above sea level) m (ft)	0 (0)	760 (29.92)	3.2 - 4.0	500 (1640)	716 (28.19)	3.1 - 3.8	1000 (3280)	674 (26.54)	3.0 - 3.6
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Altitude (height above sea level) m (ft)															
0 (0)	760 (29.92)	3.2 - 4.0													
500 (1640)	716 (28.19)	3.1 - 3.8													
1000 (3280)	674 (26.54)	3.0 - 3.6													
Idle speed control VSV	Resistance terminal	10 - 50 Ω													
EGR VSV	Resistance between terminal	20 - 60 Ω													
PRESSURE VSV	Resistance between terminal	20 - 60 Ω													

SUPPLEMENT B SPECIFICATIONS

Voltage at ECU connectors

NOTE:

1. Perform the following measurements between terminals with the engine harness connected to the ECU.
2. Verify that the battery voltage is 11 V or above when the ignition key switch is turned ON.
3. Never connect the test probe to terminals not specified.

Terminal	STD voltage	Condition	
① - ③⑨	Approx. battery voltage	Ignition switch ON.	
② - ③⑨	Approx. battery voltage	At all time	
③ - ③⑨	Approx. battery voltage	Ignition switch ON.	When engine is stopped:
⑤ - ③⑥	4.5 - 5.5 V	Ignition switch ON.	
⑥ - ③⑨	3.2 - 4.0 V	Ignition switch ON.	When atmospheric pressure of 760 mmHg (29.9 inch Hg) exists.
⑦ - ③⑨	0.4 - 0.65 V	Ignition switch ON.	When cooling water temperature is 80 °C (176 °F):
⑧ - ③⑨	0 - Approx. battery voltage	Ignition switch ON.	Measured voltage changes when vehicle is moved 1.5 m (4.93 ft).
⑨ - ③⑨	Less than 5.0 V	Ignition switch ON.	When defogger and headlamp switches are turned OFF:
	Approx. battery voltage	Ignition switch ON.	When defogger and/or headlamp switches are turned ON:
⑪ - ③⑨	Approx. battery voltage	Ignition switch ON.	When test terminal of check connector is not connected with ground terminal:
	Less than 1.0 V	Ignition switch ON.	When test terminal of check connector is connected with ground terminal:
⑫ - ③⑨	Less than 5 V	Ignition switch ON.	Throttle valve fully closed
	Approx. battery voltage	Ignition switch ON.	Throttle valve fully opened
⑬ - ③⑨	0 V	Ignition switch ON.	
	More than 6 V	When ignition switch is set to ST position:	
⑮ - ③⑨	Measured voltage changes at a point between 0 - 5.0 V.	After warming up engine completely, connect test terminal of check connector with ground terminal. Hold engine revolution speed at 3000 rpm for two minutes.	
⑯ - ③⑨	Less than 3 V	Ignition switch ON	<ul style="list-style-type: none"> • Engine is stopped. • When check engine lamp is illuminated:
	Approx. battery voltage	Ignition switch ON	<ul style="list-style-type: none"> • After engine starts: • When check engine lamp is extinguished:
⑰ - ③⑨	Approx battery voltage	Ignition switch ON	<ul style="list-style-type: none"> • After engine starts: • Cooling water temperature is below 40 °C (104°F).
	Less than 3 V	Ignition switch ON	<ul style="list-style-type: none"> • After engine starts: • Cooling water temperature is above 41 °C (106°F).

WRU90-B008

Terminals	STD voltage	Condition	
②① - ③⑨	Less than 1.0 V	At least 30 seconds have elapsed after turning OFF ignition switch.	
	Approx. battery voltage	Ignition switch ON	• Engine is stopped.
②① - ③⑨	Less than 0.01 V	Ignition switch ON	
②② - ③⑨	Approx. battery voltage	Ignition switch ON	
②⑤ - ③⑨	Change in output voltage	Ignition switch ON	After warming up engine completely, hold engine revolution speed at 3000 rpm for two minutes.
②⑦ - ③⑨	1.5 - 3.0 V	Ignition switch ON	Air temperature inside intake manifold is 20 °C (68 °F):
②⑨ - ③⑨	Less than 0.1 V	Ignition switch ON	
③① - ③⑨	Approx. battery voltage	Ignition switch ON	• Blower fan switch turned OFF
	Less than 2 V	Ignition switch ON	When blower fan switch is turned ON:
③② - ③⑨	Approx. battery voltage	Ignition switch ON	Throttle valve fully closed
	Less than 5 V	Ignition switch ON	Throttle valve fully opened
③③ - ③⑨	Less than 1 V	Ignition switch ON	When brake pedal is not depressed:
	Approx. battery voltage	At all time	When brake pedal is depressed:
③④ - ③⑨	Less than 1 V	Ignition switch ON	When compressor magnet switch of air conditioner is turned OFF:
	Approx. battery voltage	Ignition switch ON	When compressor magnet switch of air conditioner is turned ON:
③⑤ - ③⑨	Less than 0.1 V	Ignition switch ON	
③⑦ - ③⑨	Approx. battery voltage	Ignition switch ON	When fuel pump is stopped:
	Less than 2 V	Ignition switch ON	When fuel pump is operating:
③⑧ - ③⑨	Approx. battery voltage	Ignition switch ON	When pressure VSV is turned OFF:
	Less than 3 V	Ignition switch ON	For 0.5 second immediately after engine starts
③⑨ - Engine ground	Less than 0.1 V	Ignition switch ON	
④① - ③⑨	Less than 3 V	Ignition switch ON	Engine is stopped.
	Approx. battery voltage	Ignition switch ON	When test terminal of check connector is connected with ground terminal:
④① - ③⑨	Less than 1.0 V	At least 30 seconds have elapsed after turning OFF ignition switch.	
	Approx. battery voltage	Ignition switch ON	Engine is stopped.
④② - ③⑨	Less than 0.1 V	Ignition switch ON	

WRU90-B009

6. COOLING SYSTEM

Radiator cap	Relief valve opening pressure	
	Standard	0.75 - 1.05 kg/cm ² (10.7 - 14.9 psi)
	Minimum	0.6 kg/cm ² (8.5 psi)
Thermostat	Valve opening temperature	76 - 80°C (168.8 - 176.0°F)
	Standard specifications	
	Cold area specifications	82 - 86°C (179.6 - 186.8°F)
	Valve lift	
	Standard specifications	8.5 mm or more at 91°C (0.34 inch or more at 195.8°F)
	Cold area specifications	8.5 mm or more at 97°C (0.34 inch or more at 208.4°F)

WRU90-B010

7. IGNITION SYSTEM

Ignition timing	No sub vacuum timing advance takes place. (Engine revolution must be stable at 1000 rpm or less.)	BTDC 3 ± 2°
Spark plug wire	Resistance	Maximum
		15 k Ω per cord
Distributor	Air gap between signal rotor and signal generator	0.2 - 0.4 mm (0.0079 - 0.015 inch)
Ignition coil	Primary coil	1.35 - 1.65 Ω at 20°C (68°F)
	Secondary coil	22 - 30 k Ω at 20° (68°F)

WRU90-B011

8. LUBRICATION SYSTEM

Oil pump	Compression spring free length	57 mm (2.24 inch)
	Body clearance	0.20 - 0.28 mm (0.0079 - 0.011 inch)
	Tip clearance	0.16 - 0.24 mm (0.0063 - 0.0094 inch)
	Side clearance	0.035 - 0.085 mm (0.0014 - 0.0033 inch)
	Oil pressure	idling at 3000 rpm
		0.2 kg/cm ² or more (2.84 psi or more) 2.5 - 5.0 kg/cm ² (35.6 - 71.1 psi)

WRU90-B012

9. STARTING SYSTEM

Reduction type starter motor	Rating voltage and output power (STD)		12V	1.0kW
	No-load characteristic at 11.5V			
		Amperage	Less than 90A	
		rpm	More than 3,000	
	Brush length	Standard	$\left(\begin{array}{l} 12V \ 1.0 \ kW \\ 13.0 \ mm \ (0.51 \ inch) \\ 8.5 \ mm \ (0.33 \ inch) \end{array} \right) \left(\begin{array}{l} 12V \ 1.4 \ kW \\ 15 \ mm \ (0.59 \ inch) \\ 11 \ mm \ (10.43 \ inch) \end{array} \right)$	
		Minimum		
	Commutator			
	Outer diameter	Standard	30 mm (1.18 inch)	
		Minimum	29 mm (1.14 inch)	
	Undercut depth	Standard	0.5 - 0.8 mm (0.020 - 0.031 inch)	
		Minimum	0.2 mm (0.0079 inch)	
	Maximum circle runout	0.05 mm (0.0020 inch)		
Spring installed load		1.93 - 2.36 kgf (4.26 - 5.20 lb)		

WRU90-B013

10. CHARGING SYSTEM

Battery specific gravity		1.25 - 1.27	
Alternator	Rated output	Amperage	50 A
	Rotor coil resistance		$2.9 \pm 0.2 \ \Omega$ at 20°C (68°F)
	Slip ring diameter	Standard	14.4 mm (0.57 inch)
		Minimum	14.0 mm (0.55 inch)
	Brush exploded length	Standard	10.5 mm (0.41 inch)
		Minimum	1.5 mm (0.06 inch)

WRU90-B014

11. CLUTCH

Unit: mm (inch)

Item		Specified value	Allowable limit	Remarks
Clutch disc	Liming wear	—	0.3 (0.0118)	The smallest rivet depth is regarded as the allowable use limit
	Runout	—	1.0 (0.0394)	Longitudinal
			0.7 (0.0276)	Lateral
Clutch cover	Deviation in height	—	0.8 (0.0315)	The deviation can be corrected with the SST
Clutch pedal	Free travel	18 - 27 (0.709 - 1.063)	—	
	Installation height	221^{+6}_{-2} ($8.70^{+0.24}_{-0.08}$)	—	The dimension form the body metal section to the pedal. It is, therefore, necessary to roll up the carpet and floor mat prior to the measurement.

WRU90-B015

12. TRANSMISSION

Unit: mm (inch)

Item		Specified value	Allowable limit	Remarks
Shift fork groove width	Reverse gear	7.05 - 7.12 (0.278 - 0.280)	7.3 (0.287)	
	T/M Hub sleeve	7.05 - 7.12 (0.278 - 0.280)	7.3 (0.287)	
Synchronesh shifting key groove width	1st gear	9.9 - 10.1 (0.3898 - 0.3976)	—	
	Except 1st gear	11.3 - 11.5 (0.4449 - 0.4528)	—	
Synchronizer ring-to-gear clearance	1st gear	0.85 - 1.45 (0.0335 - 0.0571)	0.5 (0.0197)	
	2nd gear			
	3rd gear			
	4th gear			
	5th gear			
Transmission clutch hub (No. 1, No. 2, No. 3) outer diameter	Class ①	69.68 - 69.74 (2.743 - 2.746)	—	
	Class ②	69.78 - 69.84 (2.747 - 2.750)	—	
	Class ③	69.58 - 69.64 (2.739 - 2.742)	—	
Clutch hub sleeve maximum bore diameter		70 (2.7559)	—	
Clearance between clutch hub and clutch hub sleeve		0.03 - 0.19 (0.0012 - 0.0075)	—	
Height of synchronesh shifting key	1st & 2nd gears	5.0 - 5.2 (0.1969 - 0.2047)	4.7 (0.1850)	
	3rd & 4th gears			
	5th gears			
Runout of output shaft		—	0.05 (0.0020)	
Thickness at tip-end-section of shift fork	1st & 2nd shift fork	6.80 - 7.00 (0.2677 - 0.2756)	6.3 (0.2480)	
	3rd & 4th shift fork	6.80 - 7.00 (0.2677 - 0.2756)	6.3 (0.2480)	
Contact width of reverse shift fork		15.00 - 15.043 (0.5906 - 0.5923)	15.1 (0.5945)	
Contact widen of 5th shift arm	Shift inner lever side	16.1 - 16.2 (0.6339 - 0.6378)	16.7 (0.6575)	
	5th shift arm side	12.1 - 12.2 (0.4764 - 0.4803)	12.7 (0.5001)	
Contact width of shift fork and detent sleeve		18.8 - 19.2 (0.7402 - 0.7559)	19.5 (0.7677)	
Backlash of each gear of transmission relative to counter gear	1st gear	0.05 - 0.18 (0.0020 - 0.0071)	—	
	2nd gear	0.05 - 0.16 (0.0020 - 0.0063)	—	
	3rd gear	0.05 - 0.14 (0.0020 - 0.0055)	—	
	5th gear	0.05 - 0.13 (0.0020 - 0.0051)	—	
	Input gear	0.05 - 0.13 (0.0020 - 0.0051)	—	

WRU90-B016

13. TRANSFER

Unit: mm (inch)

Item		Specified value	Allowable limit	Remarks
Transfer high & low shift fork groove width	Transfer high & low clutch sleeve	7.05 - 7.12 (0.2776 - 0.2803)	7.3 (0.2874)	
Thickness at tip-section of transfer high & low shift fork		6.80 - 7.00 (0.2677 - 0.2756)	6.3 (0.2480)	
Thickness at tip-section of transfer front drive shift fork		6.80 - 6.90 (0.2677 - 0.2717)	6.3 (0.2480)	
Contact width of transfer high & low shift head		16.00 - 16.070 (0.6299 - 0.6327)	16.2 (0.6378)	
Contact width of transfer front drive shift head		16.000 - 16.070 (0.6299 - 0.6327)	16.2 (0.6378)	
Diameter of transfer front drive gear at sleeve fitting side	Class ①	87.18 - 87.24 (3.432 - 3.435)	—	
	Class ②	87.28 - 87.34 (3.436 - 3.439)	—	
	Class ③	87.08 - 87.14 (3.428 - 3.431)	—	
Diameter of low speed input gear installation section of output rear shaft		41.975 (1.653)	41.960 (1.652)	
Clearance between transfer front drive gear and transfer front drive gear sleeve		0.03 - 0.19 (0.0012 - 0.0075)	—	
Front drive gear sleeve contact width of front drive shift fork		6.80 - 6.90 (0.268 - 0.272)	6.30 (0.248)	

WRU92-B027

14. DIFFERENTIAL

Item		Specified value	Allowable limit	Remarks
Ring gear runout mm (inch)	Front	—	0.1 (0.004)	
	Rear			
Ring gear backlash mm (inch)	Front	0.07 - 0.17 (0.0028 - 0.0067)	—	
	Rear			
Side gear backlash mm (inch)	Front	0.03 - 0.15 (0.0020 - 0.0059)	—	Measure the over four teeth.
	Rear			
Drive pinion preload kg-cm (inch-lb)	Front	4 - 25 (3.47 - 21.70)	—	New bearing
		4 - 13 (3.47 - 11.28)	—	Bearing reused
	Rear	5 - 30 (4.34 - 26.04)	—	New bearing
		5 - 17 (4.34 - 14.76)	—	Bearing reused
Total preload kg-cm (inch-lb)	Front	6 - 31 (5.21 - 26.91)	—	
	Rear	6 - 19 (5.21 - 16.50)	—	
Clutch inner plate thickness (L.S.D) mm (inch)		1.6 (0.0630)	1.4 (0.0551)	
Clutch outer plate thickness (L.S.D) mm (inch)		1.6 (0.0630)	1.4 (0.0551)	

WRU92-B028

15. FRONT WHEEL ALIGNMENT

Item		Specified value	Allowable limit	Remarks
Toe-in	mm (inch)	$4 \begin{smallmatrix} -1 \\ -3 \end{smallmatrix}$ (0.16 $\begin{smallmatrix} -0.04 \\ -0.12 \end{smallmatrix}$)	—	
Camber	degree	$1^{\circ} \begin{smallmatrix} +0 \\ -1 \end{smallmatrix}$	—	
Caster	degree	$2^{\circ} \pm 30'$	—	
Kingpin angle	degree	$9^{\circ} 30'$	—	
Wheel turning angle	Inner	$27^{\circ}05' \begin{smallmatrix} +0 \\ -3 \end{smallmatrix}$	—	
	Outer	$23^{\circ}55'$	—	

WRU92-B024

16. STEERING

Item		Specified value	Allowable limit	Remarks
Steering wheel freeplay	mm (inch)	0 - 30 (0 - 1.18)	—	
Steering gear box oil level	mm (inch)	13 - 23 (0.51 - 0.91)	—	Except power steering-equipped model
Drive belt tension		at 10 kg (22.0 lb) 9 - 11 mm (0.35 - 0.43 inch)	—	Except for A/C equipped vehicle

WRU92-B029

17. BRAKE

Unit: mm (inch)

Item		Specified value	Allowable limit	Remarks
Brake pedal height		216 ± 5 (8.5 ± 0.2)	—	See page BR-35
Pedal free travel		1 - 3 (0.04 - 0.12)	—	
Disc brake pad thickness		9.0 (0.35)	1.5 (0.06)	
Brake disc thickness		18.0 (0.71)	17.0 (0.67)	
Brake disc runout		—	0.15 (0.0059)	
Brake drum inner diameter		254.0 (10.00)	256.0 (10.08)	
Brake shoe lining thickness		5.0 (0.2)	1.0 (0.04)	
Parking brake working travel		4 - 6 notches	—	At 25 kg (55 lb)

WRU92-B025

18. AIR CONDITIONING SYSTEM

Item		Specified value	Remarks
Refrigerant pressure	Low-pressure side	21 - 28 psi (1.5 - 2.0 kg/cm ²)	
	High-pressure side	185 - 213 psi (13.0 - 15.0 kg/cm ²)	
Compressor drive belt tension	New belt	165 ± 26 lb (75 ± 12 kg)	
	Used belt	132 ± 22 lb (60 ± 10 kg)	
Clearance between compressor pressure plate and rotor		0.020 ± 0.006 inch (0.5 \pm 0.15 mm)	
Thermistor resistance		1,500 Ω	At 77°F (25°C)
Operating pressure range of dual pressure switch		30 - 384 psi (2.1 - 27 kg/cm ²)	
Condenser fan motor operating current (Motor revolution speed)		6.7 ± 0.7 A (2,700 \pm 300 rpm)	At 12V DC
Engine idle-up rpm while air conditioner is operating (Terminal T OFF)		$1,100 \pm 50$ rpm	

WRU92-B030

DAIHATSU

ROCKY

SUPPLEMENT C

TIGHTENING TORQUE

TIGHTENING TORQUE FOR MAIN	
COMPONENTS	C- 2
TIGHTENING TORQUE TABLE FOR	
GENERAL STANDARD BOLTS	C- 3
ENGINE	C- 4
CLUTCH	C- 6
TRANSMISSION CASE COVER	C- 6
TRANSMISSION	C- 6
TRANSFER	C- 7
PROPELLER SHAFT	C- 7
FRONT DIFFERENTIAL	C- 7
REAR DIFFERENTIAL	C- 8
FRONT AXLE & SUSPENSION	C- 9
REAR AXLE & SUSPENSION	C-10
BRAKE	C-10
STEERING	C-11
BODY & OTHERS	C-12

WRU92-C027


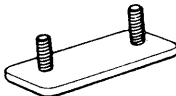






TIGHTENING TORQUE FOR MAIN COMPONENTS

1. When you want to find out a suitable tightening torque for a bolt, first determine the strength division of the said bolt, using the table below. Then, locate suitable tightening torque in the tightening torque table described later.
2. As for the tightening torque for a nut, find out suitable tightening torque in the same way as with the paragraph 1 above, based on the mating bolt.
3. Tightening torque posted in the service manual is a standard value for steel fasteners. It is, therefore, necessary to modify these tightening torque when you tighten fasteners made of materials other than steel. This rule also applies to such instances where bolts are undergoing heat or other stress, such as vibratory loads and so forth.

WRU90-C002

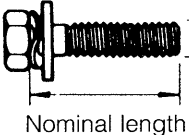
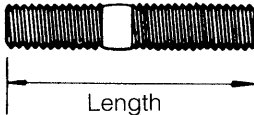
METHOD TO IDENTIFY STRENGTH DIVISION OF BOLTS

1. Identification Method by Checking Bolts Themselves

	Configuration and how to determine strength division		Strength division		Configuration and how to determine strength division		Strength division
Hexagon bolt		Bolt having an embossed or stamped figure at its head section	4 = 4T 5 = 5T 6 = 6T 7 = 7T	Welded bolt			4T
		No mark	4T	Stud bolt		No mark	4T
		Bolt having two embossed lines at its head section	5T 6T		 	Bolt having about 2 mm deep recess at one end or both ends	6T
		Bolt having three embossed lines at its head section	7T				

WRU90-C003

2. Identification Method by Part Numbers

Hexagon Bolt Part number example 9 1 1 1 1 - 4 0 6 2 0 <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div> <p>Nominal length (mm)</p> <p>Nominal diameter (mm)</p> <p>Strength division</p> </div> <div style="text-align: center;">  <p>Nominal diameter</p> <p>Nominal length</p> </div> </div>				Stud Bolt Part number example 9 2 1 3 2 - 4 0 6 2 0 <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div> <p>Nominal length (mm)</p> <p>Nominal diameter (mm)</p> <p>Strength division</p> </div> <div style="text-align: center;">  <p>Nominal diameter</p> <p>Length</p> </div> </div>			
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WRU90-C004

TIGHTENING TORQUE TABLE FOR GENERAL STANDARD BOLTS

Category	Nominal diameter	Pitch	Standard tightening torque kgf-m (ft-lb)	
			Standard torque	Tightening range
4T (Bolt having a mark of "4" at its head section) Example of part number (91000 - 40000)	6	1	0.47 (3.4)	0.4 - 0.7 (2.9 - 5.1)
	8	1.25	1.11 (8.0)	1.0 - 1.6 (7.2 - 11.6)
	10	1.25	2.25 (16.3)	1.9 - 3.1 (14 - 22.5)
	10	1.5	2.14 (15.5)	1.8 - 3.0 (13 - 22)
	12	1.25 (ISO)	4.40 (31.8)	3.5 - 5.5 (25 - 40)
	12	1.5	3.89 (28.1)	3.5 - 5.5 (25 - 40)
	12	1.75	3.74 (27.1)	3.0 - 5.0 (22 - 36)
	13	1.5	5.08 (36.7)	4.5 - 7.0 (33 - 51)
	14	1.5	6.33 (45.8)	5.0 - 8.0 (36 - 58)
	14	2	5.93 (42.9)	4.7 - 7.7 (34 - 56)
	16	1.5	9.57 (69.2)	7.5 - 11.0 (54 - 80)
	16	2	9.10 (65.8)	7.1 - 10.6 (51 - 77.5)
5T (Bolt having a mark of "5" at its head section) Example of part number (91000 - 50000)	6	1	0.71 (5.1)	0.6 - 0.9 (4.3 - 6.5)
	8	1.25	1.66 (12.0)	1.5 - 2.2 (11 - 16)
	10	1.25	3.37 (24.4)	3.0 - 4.5 (22 - 33)
	10	1.5	3.20 (23.1)	2.7 - 4.2 (19.5 - 30.5)
	12	1.25 (ISO)	5.84 (42.2)	5.0 - 7.0 (36 - 51)
	12	1.5	5.84 (42.2)	5.0 - 7.0 (36 - 51)
	12	1.75	5.60 (40.5)	4.8 - 6.8 (34 - 49)
	13	1.5	7.63 (55.2)	6.5 - 9.0 (47 - 65)
	14	1.5	9.50 (68.7)	7.5 - 11.0 (54 - 79.5)
	14	2	8.90 (64.4)	7.0 - 10.5 (51 - 76)
	16	1.5	14.36 (103.9)	12.0 - 17.0 (87 - 123)
	16	2	13.58 (98.2)	11.5 - 16.5 (83 - 119)
6T (Bolt having a mark of "6" at its head section) Example of part number (91000 - 60000)	6	1	0.71 (5.1)	0.6 - 0.9 (4.3 - 6.5)
	8	1.25	1.66 (12.0)	1.5 - 2.2 (11 - 16)
	10	1.25	3.37 (24.4)	3.0 - 4.5 (22 - 33)
	10	1.5	3.20 (23.1)	2.7 - 4.2 (19.5 - 30.5)
	12	1.25 (ISO)	5.84 (42.2)	5.0 - 7.0 (36 - 51)
	12	1.5	5.84 (42.2)	5.0 - 7.0 (36 - 51)
7T (Bolt having a mark of "7" at its head section) Example of part number (91000 - 70000)	12	1.75	5.61 (40.6)	4.8 - 6.8 (35 - 49)
	6	1	0.95 (6.87)	0.8 - 1.2 (5.8 - 8.7)
	8	1.25	2.20 (15.9)	2.0 - 3.0 (14.5 - 22)
	10	1.25	4.50 (32.5)	4.0 - 5.5 (29 - 40)
	10	1.5	4.30 (31.1)	3.7 - 5.2 (27 - 38)
	12	1.25 (ISO)	7.78 (56.3)	7.0 - 9.0 (51 - 65)
	12	1.5	7.78 (56.3)	7.0 - 9.0 (51 - 65)
	12	1.75	7.48 (54.1)	6.0 - 8.5 (43 - 61.5)
	13	1.5	10.17 (73.6)	8.0 - 12.0 (58 - 88)
	14	1.5	12.67 (91.6)	10.0 - 15.0 (72 - 108)
	14	2	11.86 (85.8)	9.5 - 14.0 (69 - 101)
	16	1.5	19.15 (138.5)	15.0 - 23.0 (108 - 169)
	16	2	18.11 (131.0)	14.9 - 22.0 (108 - 159)

WRU90-C005

ENGINE

Tightening component		Tightening torque		
		kgf-m	ft-lb	N-m
Cylinder head × Spark plug		1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Cylinder head × Cylinder head cover		0.3 - 0.5	2.2 - 3.6	3.0 - 4.9
Cylinder head × Rocker shaft	M10 Bolt	2.9 - 3.7	21.0 - 26.8	28.4 - 36.3
	M8 Bolt	1.3 - 1.7	9.4 - 12.3	12.8 - 16.7
Cylinder head × Cylinder block		6.0 - 6.8	43.4 - 49.2	58.8 - 66.7
Cylinder head × Water temperature sensor		2.5 - 3.5	18.1 - 25.3	24.5 - 34.3
Cylinder head × Water temperature sender gauge		1.2 - 2.0	8.7 - 14.5	11.8 - 19.6
Cylinder head × Distributor		1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Cylinder head × Exhaust manifold		3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Cylinder head × Intake manifold		1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Cylinder block × Water inlet		0.6 - 0.9	4.4 - 6.5	5.9 - 8.8
Cylinder block × Crankshaft main bearing cap		4.5 - 5.5	32.5 - 39.8	44.1 - 53.9
Cylinder block × Oil pump		0.6 - 0.9	4.4 - 6.5	5.9 - 8.8
Cylinder block × Rear oil seal retainer		0.6 - 0.9	4.4 - 6.5	5.9 - 8.8
Cylinder block × Water pump		1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Cylinder block × Engine mounting bracket		4.0 - 5.5	28.9 - 39.8	39.2 - 53.9
Cylinder block × Transmission		5.0 - 7.0	36.2 - 50.6	49.0 - 68.6
Cylinder block × Oil cooler pipe		2.5 - 3.5	18.1 - 25.3	24.5 - 34.3
Surge tank × Intake air temperature sensor		3.0 - 4.0	21.7 - 28.9	29.4 - 39.2
Surge tank × Gas filter		1.2 - 2.0	8.7 - 14.4	11.8 - 19.6
Surge tank × Throttle body		1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Crankshaft × Flywheel		8.0 - 10.0	57.9 - 72.3	78.5 - 98.0
Crankshaft × Crankshaft timing belt pulley		9.0 - 10.0	65.1 - 72.0	88.3 - 98.0
Intake manifold × Delivery pipe		1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Exhaust manifold × Exhaust pipe		3.5 - 5.0	25.3 - 36.2	34.3 - 49.0
Exhaust pipe support No. 1 bracket		3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Engine mounting bracket × Engine mounting (bolt)		3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Engine mounting bracket × Engine mounting (nut)		3.5 - 5.5	25.3 - 39.8	34.3 - 53.9
Oil pump body × Oil cooler		2.5 - 3.5	18.1 - 25.3	24.5 - 34.3
Oil pump × Oil pressure switch		1.2 - 2.0	8.7 - 14.5	11.8 - 19.6
Oil pan × Cylinder block		0.7 - 1.2	5.1 - 8.7	6.9 - 11.8
Oil pan × Drain plug		2.0 - 3.0	14.5 - 21.7	19.6 - 29.4
Oil pump body × Oil pump cover		0.8 - 1.3	5.8 - 9.4	7.8 - 12.7
Oil level gauge guide		1.9 - 3.1	13.7 - 22.4	18.6 - 30.4
Surge tank stay No. 1		1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Surge tank stay No. 2		3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Surge tank stay No. 3		1.9 - 3.1	13.8 - 22.4	18.6 - 30.3
Camshaft × Camshaft timing belt pulley		1.5 - 2.2	10.8 - 15.9	14.8 - 21.6
Timing belt cover		0.2 - 0.4	1.4 - 2.9	2.0 - 3.9

SUPPLEMENT C TIGHTENING TORQUE

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Timing belt tensioner	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Crankshaft pulley × Crankshaft timing belt pulley	2.0 - 3.0	14.5 - 21.6	19.6 - 29.4
Fluid coupling × Water pump pulley × Water pump	1.0 - 1.8	7.2 - 13.0	9.8 - 17.7
Cooling fan × Fluid coupling	0.44 - 0.66	3.2 - 4.3	4.3 - 6.5
Fuel filter × Fuel hose No. 1 (To delivery pipe)	3.5 - 4.5	25.3 - 32.5	34.3 - 44.1
Fuel filter × Fuel pipe	3.5 - 4.5	25.3 - 32.5	34.3 - 44.1
Fuel hose No. 1 × Delivery pipe	3.5 - 4.5	25.3 - 32.5	34.3 - 44.1
Connecting rod × Connecting rod cap	3.5 - 4.5	25.3 - 32.5	34.3 - 44.1
Clutch cover × Flywheel	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Transmission × Starter motor	5.0 - 7.0	36.2 - 50.6	49.0 - 68.6
Front pipe × Three-way catalyst	4.5 - 5.5	32.5 - 39.8	44.1 - 53.9
Three way catalyst × Rear pipe	4.5 - 5.5	32.5 - 39.8	44.1 - 53.9
O ₂ sensor × Exhaust manifold	3.0 - 4.0	21.7 - 28.9	29.4 - 39.2
Fuel pump × Fuel pipe	3.5 - 4.4	25.3 - 31.8	34.3 - 43.1

WRU92-C020

SUPPLEMENT C TIGHTENING TORQUE

CLUTCH

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Flywheel × Clutch cover A/y	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Clutch release lever S/A × Clutch release lever yoke	3.0 - 4.0	21.7 - 28.9	29.4 - 39.2

WRU92-C022

TRANSMISSION CASE COVER

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
T/M case cover × Transmission case	1.5 - 2.0 0.7 - 1.0 (only three bolts)	10.8 - 14.5 5.1 - 7.2	14.7 - 19.6 6.9 - 9.8
Reverse restrict pin holder × T/M case cover	3.0 - 5.0	21.7 - 36.2	29.4 - 49.0
Back up lamp switch × T/M case cover	3.0 - 5.0	21.7 - 36.2	29.4 - 49.0
Set bolt × T/M case cover	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Shift lock plate × T/M case cover	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Union × T/M case cover	1.3 - 1.6	9.4 - 11.6	12.7 - 15.7

WRU92-C023

TRANSMISSION

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Cylinder block × T/M case	5.0 - 7.0	36.2 - 50.6	49.0 - 68.6
Exhaust pipe support bracket × T/M case	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Bolt for 5th shift arm × T/M case	4.0 - 6.0	28.9 - 43.4	39.2 - 58.8
Bolt for reverse shift arm × T/M case	3.5 - 5.5	25.3 - 39.8	34.3 - 53.9
Front bearing retainer × T/M case	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Counter shaft 5th gear × Lock nut	14.0 - 20.0	101.3 - 144.7	137.3 - 196.1

WRU92-C021

TRANSFER

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
T/F adapter case × T/M case	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
T/F low speed input gear × Lock nut	18.0 - 22.0	130.0 - 159.0	177.0 - 216.0
T/F front case × T/F adapter case	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Bolt for transfer high & low shift fork shaft × T/F front case	1.9 - 3.1	13.7 - 22.4	18.6 - 30.4
Bolt for T/F front drive shift fork shaft × T/F front case	1.9 - 3.1	13.7 - 22.4	18.6 - 30.4
Transposition detect switch × T/F front case	3.0 - 5.0	21.7 - 36.2	29.4 - 49.0
T/F rear case × T/F front case	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
T/F rear output shaft × Lock nut	14.0 - 20.0	101.0 - 145.0	137.0 - 196.0
Output shaft bearing retainer × T/F rear case	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Speedometer sleeve lock plate × Output shaft bearing retainer	0.7 - 1.0	5.1 - 7.2	6.9 - 9.8
Control shaft lower No. 1 bracket × T/F rear case	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
T/F shift lever retainer × Output shaft bearing retainer	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Control shift lever retainer × Control shaft lower No. 1 bracket	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Control shaft × Shift & select shaft No. 1	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1

WRU92-C024

PROPELLER SHAFT

Tightening Component	Tightening torque		
	kgf-m	ft-lb	N-m
Front differential companion flange × Propeller shaft	6.0 - 8.0	43.2 - 57.6	58.8 - 78.4
Rear differential companion flange × Propeller shaft	6.0 - 8.0	43.2 - 57.6	58.8 - 78.4

WRU90-C012

FRONT DIFFERENTIAL

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Front axle housing cover S/A × Differential carrier	1.8 - 2.4	13.0 - 17.4	17.7 - 23.5
Front axle housing cover S/A × Filler plug	4.0 - 6.0	28.9 - 43.4	39.2 - 58.8
Differential carrier × Drain plug	4.0 - 6.0	28.9 - 43.4	39.2 - 58.8
Differential carrier support bracket × Differential carrier	10.0 - 12.0	72.0 - 87.0	98.0 - 118.0
Chassis frame × Differential carrier support bracket	4.0 - 5.5	28.9 - 39.8	39.2 - 53.9
	4.0 - 5.0 (only right side)	28.9 - 36.2	39.2 - 49.0
Bearing cap × Differential carrier	3.0 - 5.0	21.7 - 36.2	29.4 - 49.0
Differential bearing adjusting nut lock × Bearing cap	0.4 - 1.0	2.9 - 7.2	3.9 - 9.8
Ring gear × Differential case S/A (with wet condition)	8.0 - 9.0	57.9 - 65.1	78.5 - 88.3
Drive pinion × Lock nut	16.0 - 20.0	116.0 - 145.0	157.0 - 196.0

WRU90-C013

REAR DIFFERENTIAL

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Rear axle housing × Differential carrier	5.5 - 8.0	39.8 - 57.9	53.9 - 78.5
Filler plug × Rear axle housing	4.0 - 6.0	28.9 - 43.4	39.2 - 58.8
Drain plug × Rear axle housing	4.0 - 6.0	28.9 - 43.4	39.2 - 58.8
Bearing cap × Differential carrier	7.0 - 9.0	50.6 - 65.1	68.6 - 88.3
Differential bearing adjusting nut lock × Bearing cap	0.4 - 1.0	2.9 - 7.2	3.9 - 9.8
Ring gear × Differential case S/A (with wet condition)	8.0 - 9.0	57.9 - 65.1	78.5 - 88.3
Drive pinion × Lock nut	19.0 - 23.0	137.0 - 166.0	186.0 - 226.0

WRU90-C014

FRONT AXLE & SUSPENSION

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Wheel hub nut	9.0 - 12.0	65.1 - 87.0	89.2 - 118
Tie rod (Adjust nut)	12.0 - 17.0	87.0 - 123	118 - 167
Knuckle stopper bolt lock nut	8.0 - 10.0	57.9 - 72.0	78.5 - 98.0
Torsion spring lock nut	7.0 - 9.0	50.6 - 65.1	68.6 - 88.3
Lock nut (Axle hub nut)	10.0 - 15.0	72 - 109	98.0 - 147
Steering knuckle × Brake mounting support	7.0 - 9.0	50.6 - 65.1	68.6 - 88.3
Axle hub × Hub cover (Free wheel hub body)	6.0 - 7.0	43.4 - 50.6	58.8 - 68.6
Axle hub × Brake disc	5.5 - 7.5	39.8 - 54.2	53.9 - 73.5
Free wheel hub × Hub cover (only for Free wheel hub only)	0.8 - 1.2	5.8 - 8.7	7.8 - 11.8
Free wheel hub nut × Brake drum (only for Automatic locking hub)	0.5 - 0.9	3.6 - 6.5	4.9 - 8.8
Drive shaft × Lock bolt with washer (only for Automatic locking hub)	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Stabilizer link × Frame	1.9 - 3.1	13.7 - 22.4	18.6 - 30.4
Stabilizer link × Stabilizer bracket cover	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Stabilizer × Lower arm	1.9 - 3.1	13.7 - 22.4	18.6 - 30.4
Anchor arm stopper × Frame	0.5 - 0.8	3.6 - 5.8	4.9 - 7.8
Torque arm × Lower arm	4.0 - 5.5	28.9 - 39.8	39.2 - 53.9
Anchor bolt × Lock nut	7.0 - 9.0	50.6 - 65.1	68.6 - 88.3
Shock absorber × Frame	1.9 - 3.1	13.7 - 22.4	18.6 - 30.4
Shock absorber × Lower arm	5.0 - 7.0	36.2 - 50.6	49.0 - 68.6
Suspension upper arm shaft × Frame	10.4 - 13.0	75.2 - 94.0	102 - 128
Suspension upper arm × Upper arm sub assembly	7.0 - 9.0	50.6 - 65.1	68.6 - 88.3
Upper arm × Front spring bumper	1.0 - 1.6	7.2 - 11.6	9.8 - 15.7
Upper ball joint × Upper arm	2.7 - 3.7	19.5 - 26.8	26.5 - 36.3
Lower ball joint × Lower arm	5.7 - 7.8	41.2 - 56.4	55.9 - 76.5
Steering knuckle × Tie rod end	7.0 - 14	50.6 - 101	68.6 - 137
Upper ball joint × Steering knuckle	9.0 - 12.0	65.1 - 87.0	88.3 - 118
Lower arm × Frame	13.0 - 18.0	94.0 - 130.0	128 - 177

WRU90-C015

REAR AXLE & SUSPENSION

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Rear spring shackle	7.0 - 9.0	50.6 - 65.1	68.6 - 88.3
Leaf spring × Frame	12.0 - 14.0	87.0 - 101	118 - 137
U bolt	9.0 - 11.0	65.1 - 80.0	88.3 - 108
Rear shock absorber	1.9 - 3.1	13.7 - 22.4	18.6 - 30.4
Rear axle housing × Backing plate	4.0 - 5.5	28.9 - 39.8	39.2 - 53.9
Frame × Rear spring bumper	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6

WRU90-C016

BRAKE

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Air bleeder plug (Front and rear)	0.9 - 1.3	6.5 - 9.4	8.8 - 12.7
Brake booster push rod × Clevis	1.3 ± 0.26	9.4 ± 1.9	12.7 ± 2.6
Brake mounting support × Steering knuckle	7.0 - 9.0	50.6 - 65.1	68.6 - 88.3
Brake mounting support × Stud bolt	4.0 - 5.0	28.9 - 36.2	39.2 - 49.0
Brake mounting support × Caliper body	3.2 - 4.2	23.1 - 30.3	31.4 - 41.2
Brake house × Caliper body	2.1 - 2.7	15.2 - 19.5	20.6 - 26.5
Wheel cylinder × Backing plate	0.8 - 1.2	5.8 - 8.7	7.8 - 11.8
Wheel cylinder × Brake tube	1.3 - 1.8	9.4 - 13.0	12.7 - 17.7
Brake shoe × Automatic adjust lever pin	0.26 - 0.5	1.88 - 3.62	2.55 - 4.9
Wheel hub nut	9.0 - 12.0	65.1 - 87.0	88.3 - 118
Master cylinder reservoir hose band	0.55 - 0.7	4.0 - 5.1	5.4 - 6.9
Master cylinder piston set bolt	0.7 - 1.1	5.1 - 8.0	6.9 - 10.8
Master cylinder × Brake booster	1.04 - 1.56	7.52 - 11.3	10.2 - 15.3
Master cylinder × Brake tube	1.3 - 1.8	9.4 - 13.0	12.7 - 17.7
Brake booster lock nut × Adjust nut	2.08 - 3.12	15.1 - 22.5	20.4 - 30.6
Brake booster × Dash panel	1.0 - 1.6	7.2 - 11.6	9.8 - 15.7
Parking brake control handle × Floor panel	1.0 - 1.6	7.2 - 11.6	9.8 - 15.7
Parking brake control handle × Lock nut	0.4 - 0.7	2.9 - 5.1	3.9 - 6.9
P & B valve × Brake tube	1.3 - 1.8	9.4 - 13.0	12.7 - 17.7
P & B valve × Floor panel	0.6 - 1.0	4.3 - 7.2	5.9 - 9.8
Brake pedal × Brake pedal bracket	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Stop lamp switch lock nut	1.8 - 3.0	13.0 - 21.7	17.7 - 29.4
Parking brake shoe strut	0.26 - 0.4	1.9 - 2.9	2.6 - 3.9

WRU92-C025

STEERING

Tightening component	Tightening torque		
	kgf-m	ft-lb	N·m
Steering gear housing × Oil filler plug (except power steering equipped model)	0.2 - 0.4	1.4 - 2.9	2.0 - 3.9
Steering wheel × Steering shaft	3.0 - 5.0	21.7 - 36.2	29.4 - 49.0
Steering shaft × Intermediate shaft	2.5 - 3.5	18.1 - 25.3	24.5 - 34.3
Steering column cover × Floor panel	0.4 - 0.7	2.9 - 5.1	3.9 - 6.9
Steering column tube × Brace	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Tilt steering support × Long nut (only for tilt steering equipped model)	1.3	9.4	12.7
Tilt steering lever × Long nut (only for tilt steering equipped model)	3.0 - 4.5	21.7 - 36.2	29.4 - 49.0
Steering gear housing × Intermediate shaft	2.5 - 3.5	18.1 - 25.3	24.5 - 34.3
Steering relay rod × Tie rod	7.0 - 14	50.6 - 101	68.6 - 137
Idler arm support pin × Frame	3.5 - 5.5	25.4 - 39.8	34.3 - 53.9
Idler arm assembly × Idler arm support pin	12 - 17	87 - 123	118 - 167
Idler arm × Relay rod	5.0 - 7.0	36.2 - 50.6	49 - 68.6
Pitman arm × Relay rod	7.0 - 14.0	50.6 - 101	68.6 - 137
Steering gear housing × Pitman arm	15 - 20.0	109 - 145	147 - 196
Tie rod × Steering knuckles	7.0 - 14.0	50.6 - 101	68.6 - 137
Cross shaft adjust screw × Lock nut:	2.0 - 3.5	14.5 - 25.3	19.6 - 34.3
Pressure feed tube × Steering gear housing (only for power steering equipped model)	4.0 - 5.0	28.9 - 36.2	39.2 - 49.0
Vane pump bracket × Idle pulley	3.5 - 5.0	25.3 - 36.2	34.3 - 49.0
Vane pump × Pump front stay	3.5 - 5.0	25.3 - 36.2	34.3 - 49.0
Vane pump × Pulley	3.5 - 5.4	25.3 - 39.1	34.3 - 53.0
Vane pump bracket × Engine: M8 M10	1.0 - 1.6	7.2 - 11.6	9.8 - 15.7
	3.5 - 4.5	25.3 - 32.5	34.3 - 44.1
Tube support bracket × Pump front stay	1.0 - 1.6	7.2 - 11.6	9.8 - 15.7
Tube support bracket × Clamp	0.4 - 0.7	2.9 - 5.1	3.9 - 6.9
Vane pump × Union bolt	4.5 - 5.5	32.5 - 39.8	44.1 - 53.9
Tube support bracket × Tube support bracket	1.0 - 1.6	7.2 - 11.6	9.8 - 15.7
Drive belt tension adjust bolt × Lock nut	1.0 - 1.6	7.2 - 11.6	9.8 - 15.7
Vane pump front stay × Adjusting strut	3.5 - 4.5	25.3 - 32.5	34.3 - 44.1
Adjusting strut × Adjusting bar	7.0 - 9.0	50.6 - 65.1	68.6 - 88.3
Vane pump × Vane pump bracket	5.0 - 7.0	36.2 - 50.6	49.0 - 68.6
Steering gear housing × Frame	7.5 - 10.5	54.2 - 75.9	73.5 - 103

WRU90-C018

BODY & OTHERS

kgf-m (ft-lb, N-m)

Tightening component	Tightening torque
Frame × Body	4.2 - 6.5 (30.4 - 47.0, 41.2 - 63.7)
Front bumper × Body	3.0 - 4.5 (21.7 - 32.5, 29.4 - 44.1)
Front bumper guard bar × Body	3.0 - 4.5 (21.7 - 32.5, 29.4 - 44.1)
Rear bumper × Body	1.9 - 3.1 (13.7 - 22.4, 18.6 - 30.4)
Front seat × Body	3.0 - 4.5 (21.7 - 32.5, 29.4 - 44.1)
Rear seat × Body	2.0 - 3.0 (14.5 - 21.7, 19.6 - 29.4)
Front seat belt × Body	2.9 - 5.4 (21.0 - 39.1, 28.4 - 53.0)
Rear seat belt × Body	2.9 - 5.4 (21.0 - 39.1, 28.4 - 53.0)
Exhaust manifold × Front exhaust pipe	4.5 - 5.5 (32.5 - 39.8, 44.1 - 53.9)
Front exhaust pipe × Tail pipe	3.7 - 5.2 (26.8 - 37.6, 36.3 - 51.0)
Front exhaust pipe × Catalyst converter	3.7 - 5.2 (26.8 - 37.6, 36.3 - 51.0)
Catalyst converter × Tail pipe	3.7 - 5.2 (26.8 - 37.6, 36.3 - 51.0)

WRU92-C026



SUPPLEMENT D CONVERSION TABLE

1. METRIC-ENGLISH CONVERSION
TABLE D-2
2. DECIMAL AND METRIC
EQUIVALENTS D-3

WRU90-D001

1. METRIC-ENGLISH CONVERSION TABLE

Multiply	by	to get equivalent number of:
LENGTH		
Inch	25.4	millimetres (mm)
Foot	0.304 8	metres (m)
Yard	0.914 4	metres
Mile	1.609 3	kilometres (km)
AREA		
Inch ²	645.2	millimetres ² (mm ²)
	6.45	centimetres ² (cm ²)
Foot ²	0.092 9	metres ² (m ²)
Yard ²	0.836 1	metres ²
VOLUME		
Inch ³	16 387.	mm ³
	16.387 2	cm ³
	0.016 4	litres (l)
Quart	0.946 4	litres
Gallon	3.785 4	litres
Yard ³	0.764 6	metres ³ (m ³)
MASS		
Pound	0.453 6	kilograms (kg)
Ton	907.18	kilograms
Ton	0.907	tonne (t)
FORCE		
Kilogram	9.807	newtons (N)
Ounce	0.278 0	newtons
Pound	4.448	newtons
TEMPERATURE		
Degree Fahrenheit	(°F-32) ÷ 1.8	degree Celsius
TORQUE		
Pound-inch	0.112 98	newton-metres (N-m)
Pound-foot	1.355 8	newton-metres
POWER		
Horsepower	0.746	kilowatts (kW)
PRESSURE OR STRESS		
Inches of water	0.249 1	kilopascals (kPa)
Pounds/sq. in.	6.895	kilopascals
ENERGY OR WORK		
BTU	1 055.	joules (J)
Foot-pound	1.355 8	joules
Kilowatt-hour	3 600 000.	joules
	or 3.6 × 10 ⁶	

2. DECIMAL AND METRIC EQUIVALENTS

Fractions	Decimal In.	Metric mm.	Fractions	Decimal In.	Metric mm.
1/64	.015625	.397	33/64	.515625	13.097
1/32	.03125	.794	17/32	.53125	13.494
3/64	.046875	1.191	35/64	.546875	13.891
1/16	.0625	1.588	9/16	.5625	14.288
5/64	.078125	1.984	36/64	.578125	14.684
3/32	.09375	2.381	19/32	.59375	15.081
7/64	.109375	2.778	39/64	.609375	15.478
1/8	.125	3.175	5/8	.625	15.875
9/64	.140625	3.572	41/64	.640625	16.272
5/32	.15625	3.969	21/32	.65625	16.669
11/64	.171875	4.366	43/64	.671875	17.066
3/16	.1875	4.763	11/16	.6875	17.463
13/64	.203125	5.159	45/64	.703125	17.859
7/32	.21875	5.556	23/32	.71875	18.256
15/64	.234375	5.953	47/64	.734375	18.653
1/4	.250	6.35	3/4	.750	19.05
17/64	.265625	6.747	49/64	.765625	19.447
9/32	.28125	7.144	25/32	.78125	19.844
19/64	.296875	7.54	51/64	.796875	20.241
5/16	.3125	7.938	13/16	.8125	20.638
21/64	.328125	8.334	53/64	.828125	21.034
11/32	.34375	8.731	27/32	.84375	21.431
23/64	.359375	9.128	55/64	.859375	21.828
3/8	.375	9.525	7/8	.875	22.225
25/64	.390625	9.922	57/64	.890625	22.622
13/32	.40625	10.319	29/32	.90625	23.019
27/64	.421875	10.716	59/64	.921875	23.416
7/16	.4375	11.113	15/16	.9375	23.813
29/64	.453125	11.509	61/64	.953125	24.209
15/32	.46875	11.906	31/32	.96875	24.606
31/64	.484375	12.303	63/64	.984375	25.003
1/2	.500	12.7	1	1.00	25.4

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