

DAIHATSU

Rocky

CO

COOLING SYSTEM

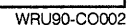
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WRU90-CO001

DESCRIPTION

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.

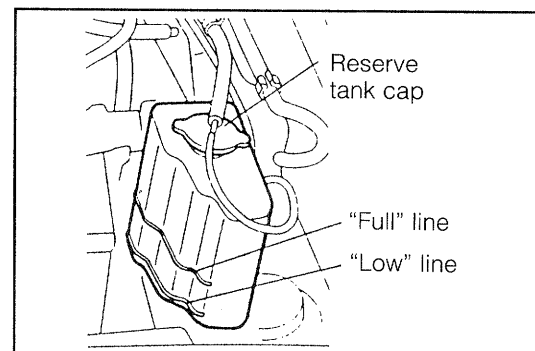
WARNING:

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.

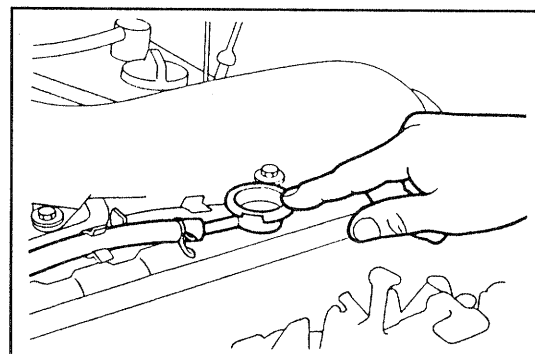


WRU90-CO005

- 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:

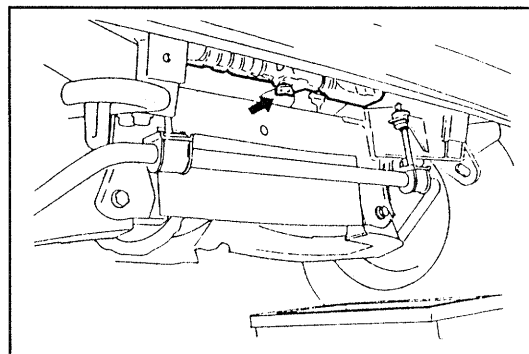
Never open the radiator cap and/or the drain plug when the engine is still hot. Care must be exercised to avoid getting scalded.

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.

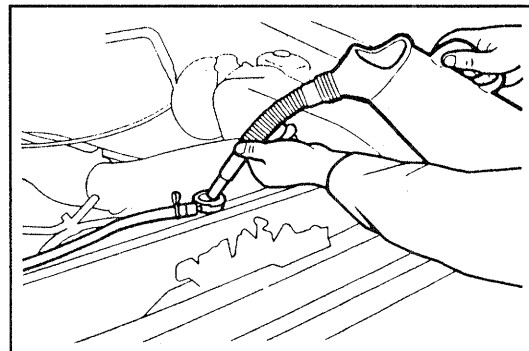


WRU90-CO008

- (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.

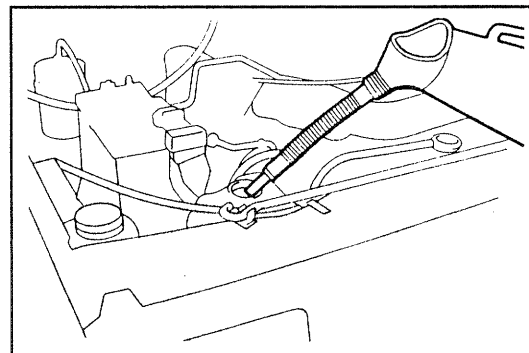


WRU90-CO009

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.

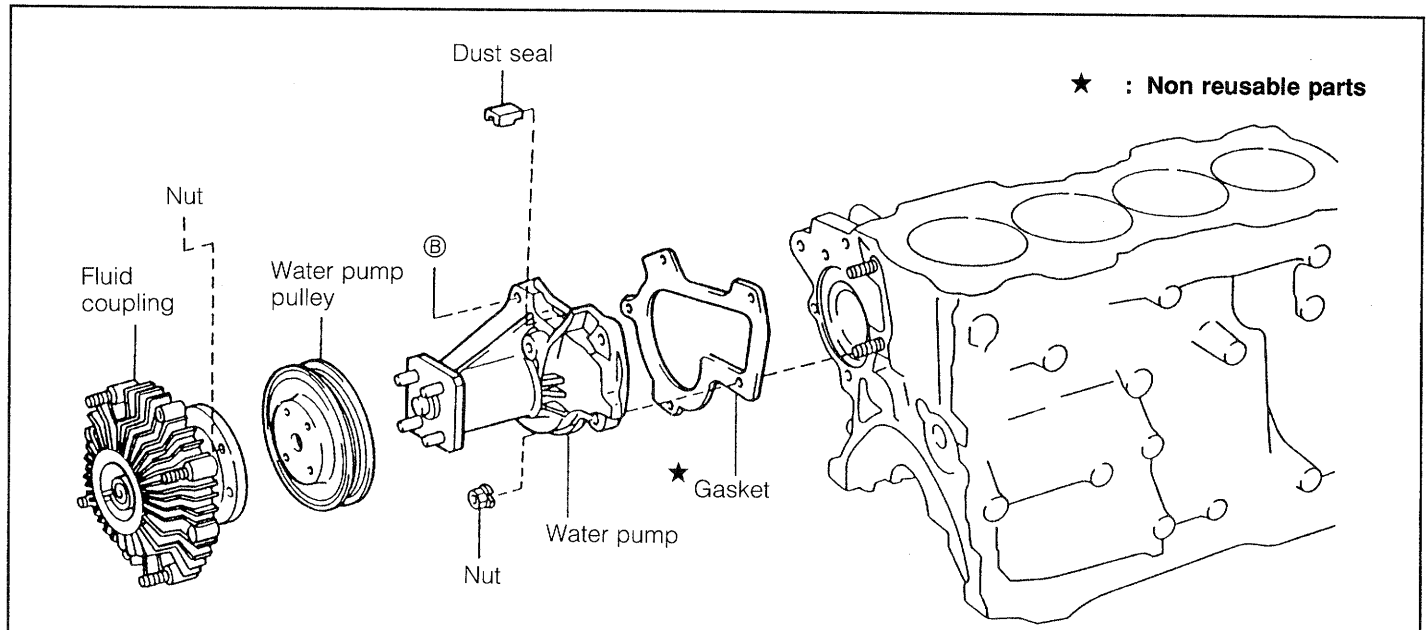
If no coolant remains at all in the reserve tank, recheck the coolant level in the radiator. Replenish the radiator with water, as required. Replenish the reserve tank with coolant up to the full level.

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



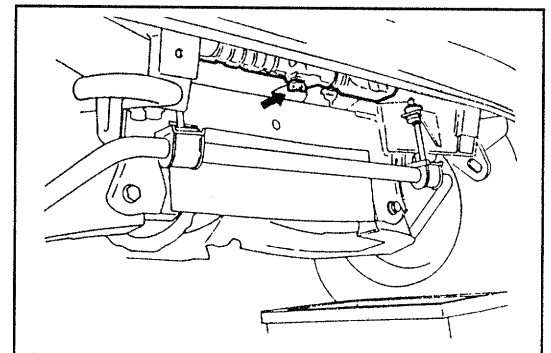
WRU90-CO011

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.

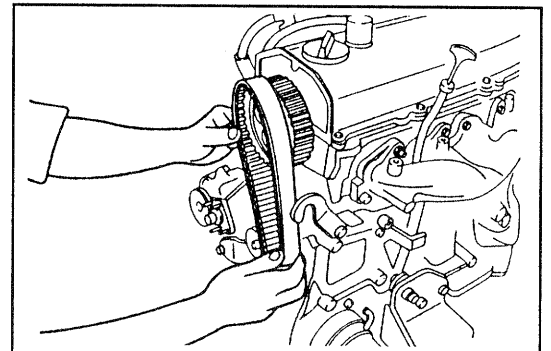
WARNING:

Never open the radiator cap and/or drain plug. When the engine is hot.



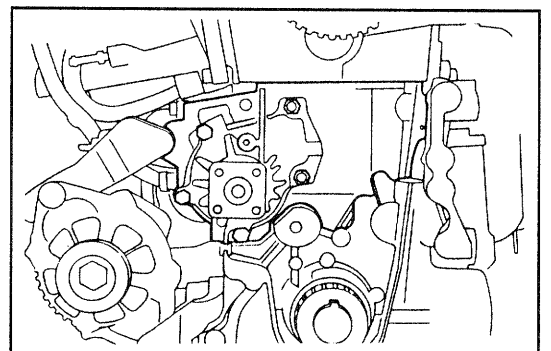
WRU90-CO012

4. Remove the timing belt.
(See pages EM-21.)



WRU90-CO013

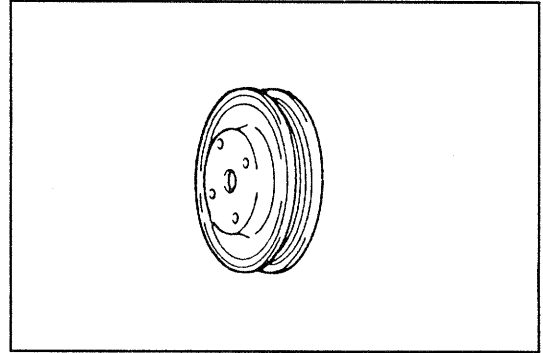
5. Remove the water pump by removing the attaching bolts and nuts of the water pump.



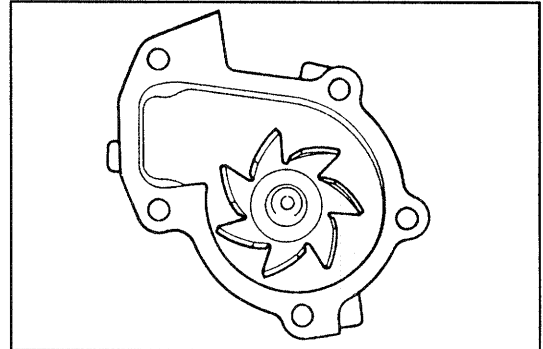
WRU90-CO014

INSPECTION OF WATER PUMP-RELATED PARTS

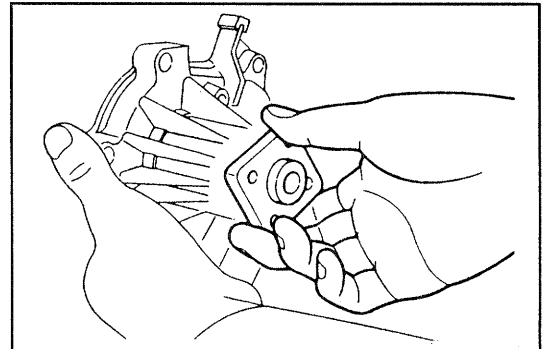
1. Check the water pump pulley for damage or deformation.
Replace the water pump if it exhibits damage or deformation.
2. Visually inspect the water pump rotor for damage or deformation.
Replace the water pump if the water pump rotor exhibits damage or deformation.
3. Ensure that the water pump rotates 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.



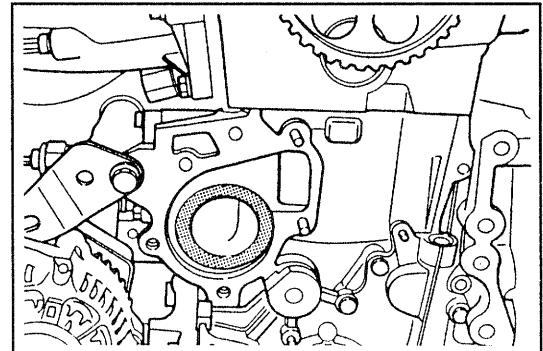
WRU90-CO015



WRU90-CO016



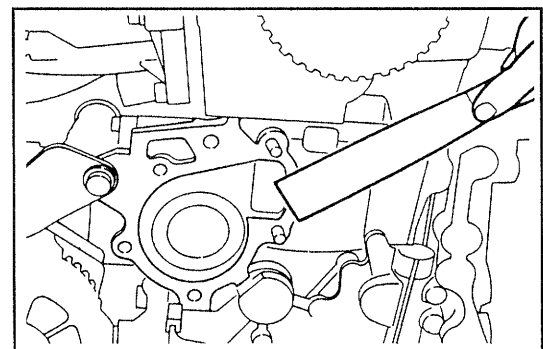
WRU90-CO017



WRU90-CO018

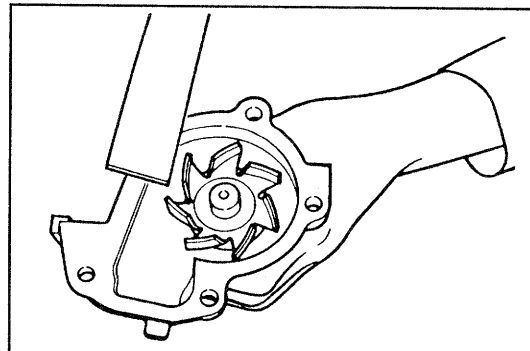
INSTALLATION OF WATER PUMP

1. Remove the gasket material from the water pump installing surface of the cylinder block, using a gasket scraper.



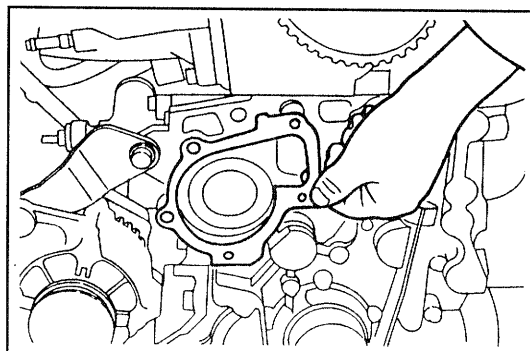
WRU90-CO019

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

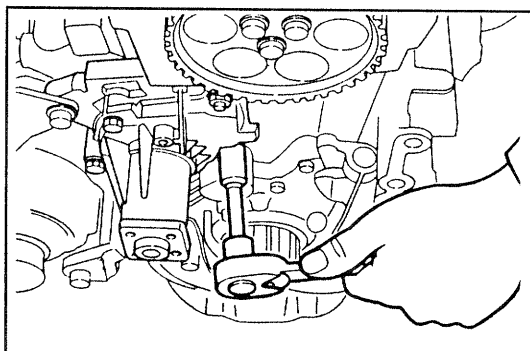
4. Install the water pump to the cylinder block. Tighten the attaching bolts and nuts evenly over two or three stages to the specified torque.

Tightening Torque:

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

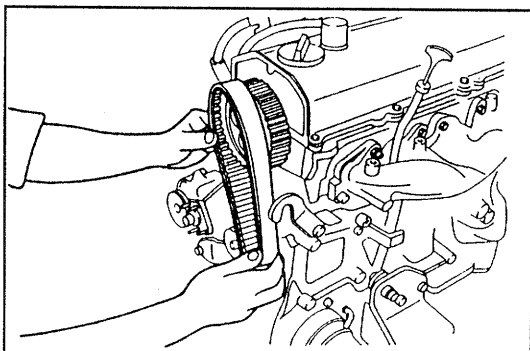
NOTE:

After tightening bolts, ensure that the water pump rotates smoothly by hand.



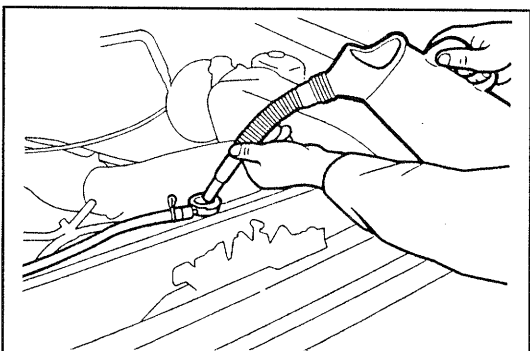
WRU90-CO022

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

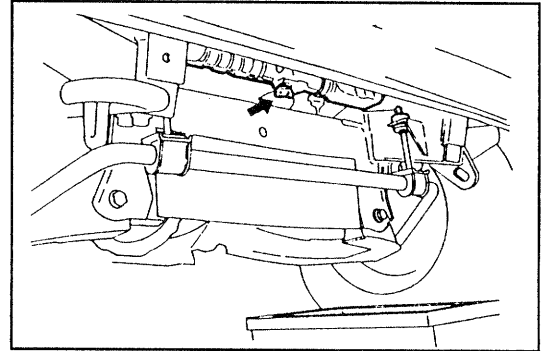
1. Disconnect the ground cable terminal from the negative (-) terminal of battery.
2. Drain the coolant
(See page CO-4.)

WARNING:

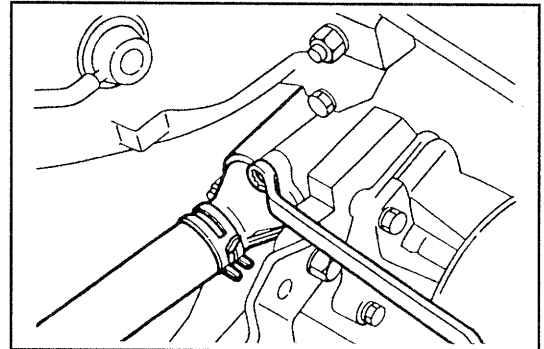
Never open the radiator cap and/or drain plug when the coolant is hot.

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.

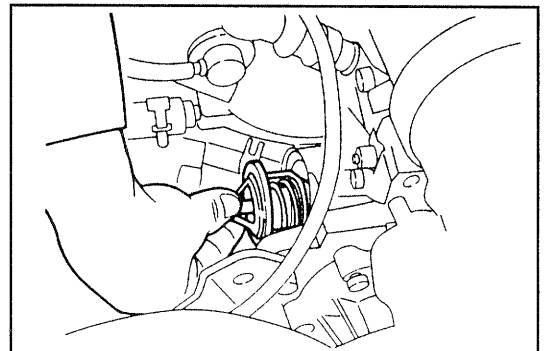
5. Remove the thermostat by removing the water inlet.



WRU90-CO025



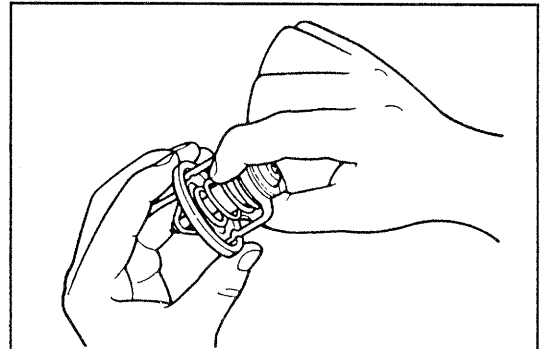
WRU90-CO026



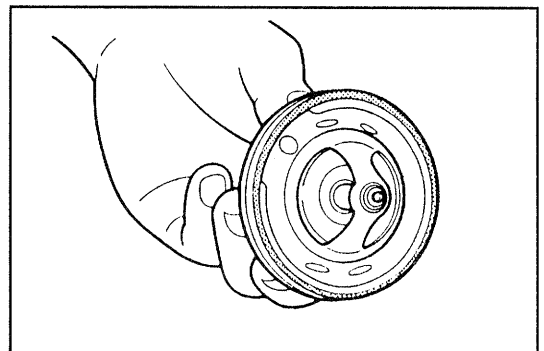
WRU90-CO027

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

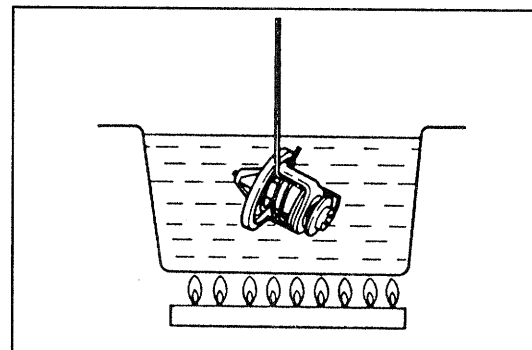


WRU90-CO029

- 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.



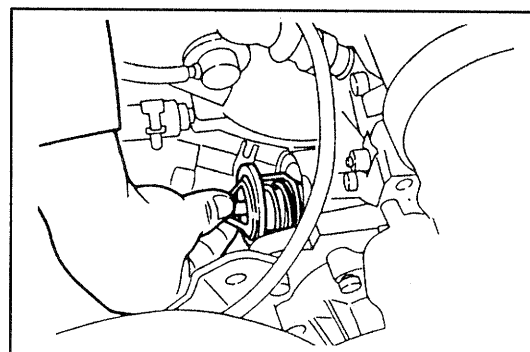
WRU90-CO030

INSTALLATION OF THERMOSTAT

- 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

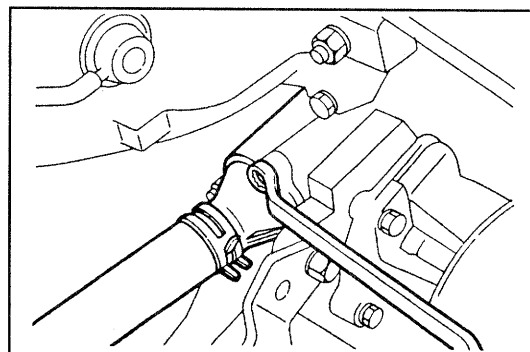
- Install the water inlet.

Tightening Torque:

0.6 - 0.9 kg-m (4.3 - 6.5 ft-lb, 5.9 - 8.8 N·m)

- Install the power steering vane pump assembly into position.

(See page EM-77.)



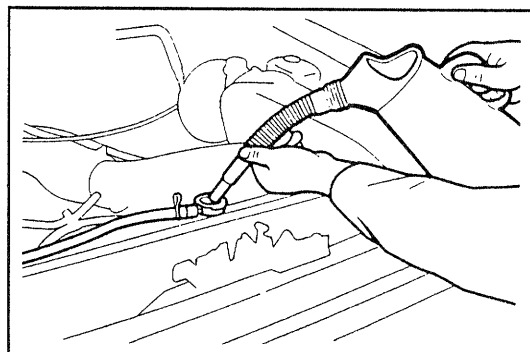
WRU90-CO032

- Fill coolant.

(See page CO-4.)

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

- Start the engine and check it for leakage. Repair the leaky point if the leakage exists.



WRU90-CO033

RADIATOR

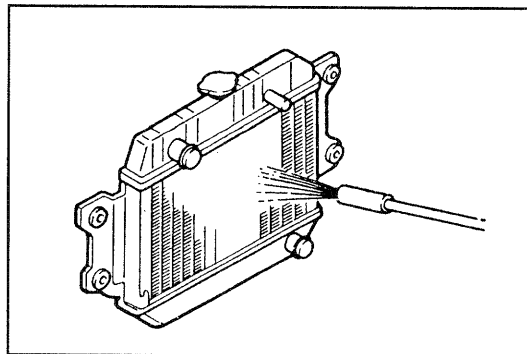
CLEANING OF RADIATOR

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

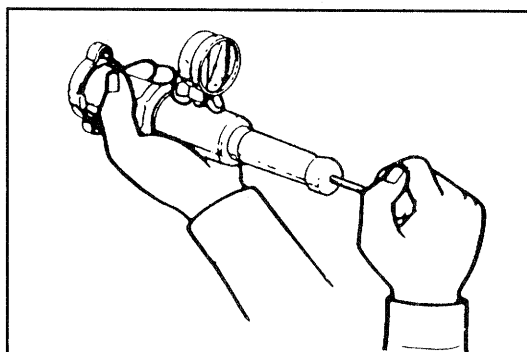
1. Check of radiator cap

- (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.

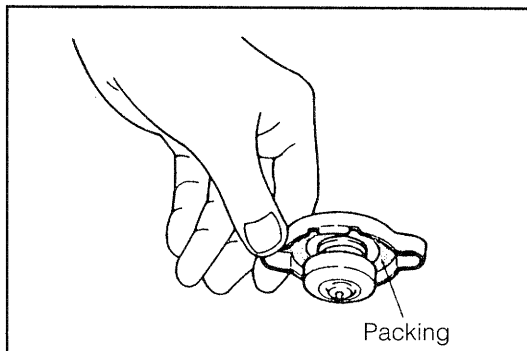
WARNING:

Never open the radiator cap when the engine is hot.



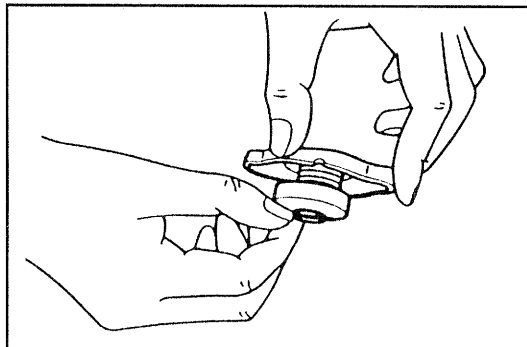
WRU90-CO035

- (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.

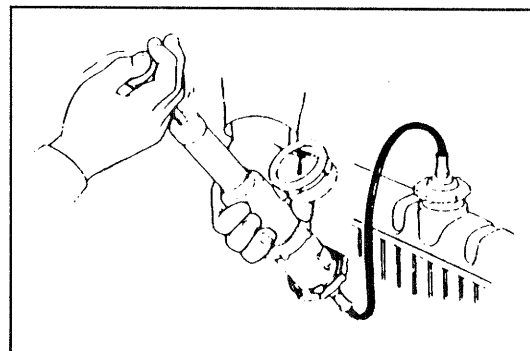


WRU90-CO037

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.



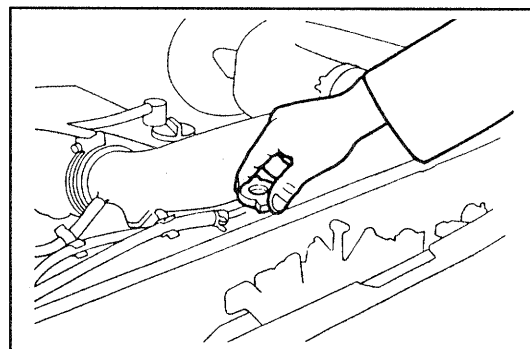
WRU90-CO038

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.

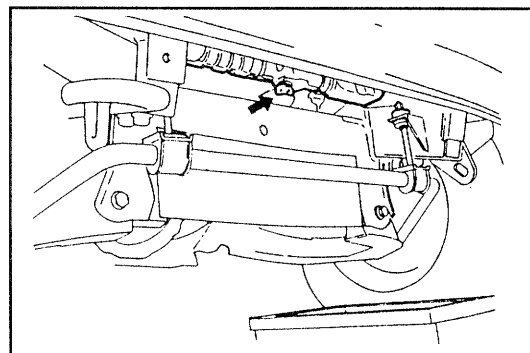
WARNING:

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.

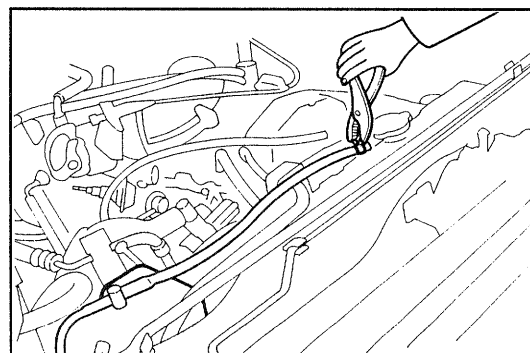


WRU90-CO040

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.

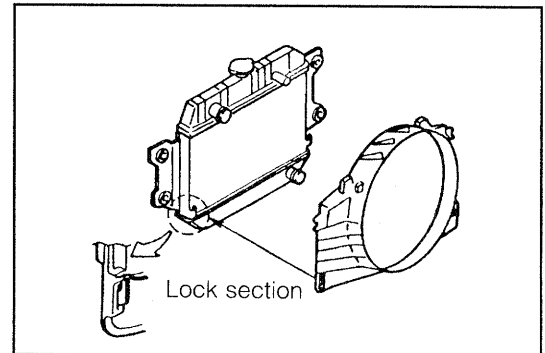
CAUTION:

When the radiator hose is loosened, be sure to protect the alternator because the coolant flows out.

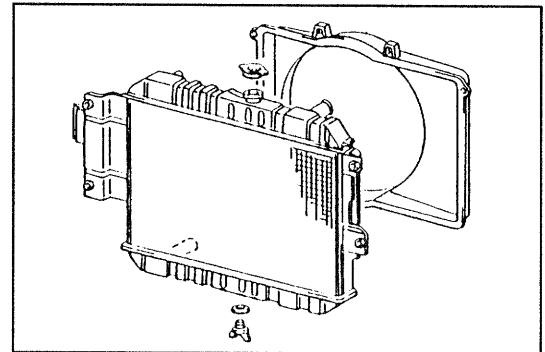


WRU90-CO041

- (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.

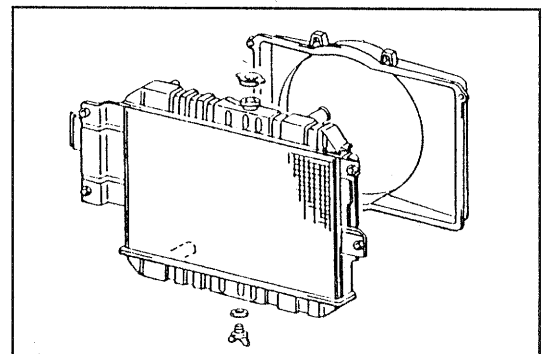


WRU90-CO042



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.

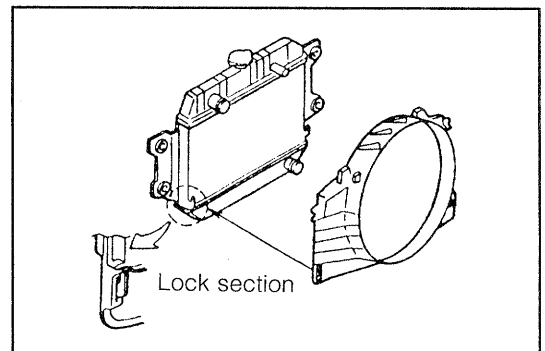


- (3) Install the radiator fan shroud with two attaching bolts.

NOTE:

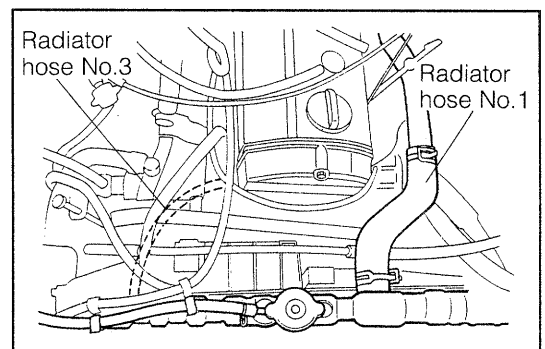
Before attaching the fan shroud to the radiator, insert the lock section of the fan shroud to the lower section of the radiator.

- (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.

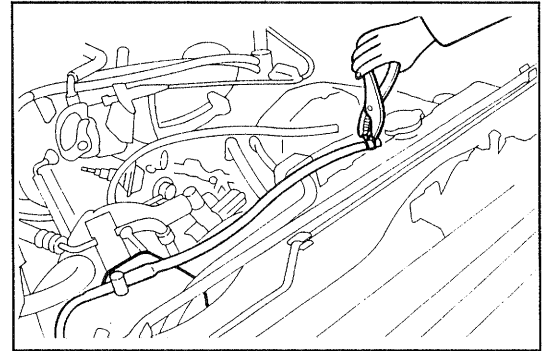
(11) Install the air cleaner and hose assembly into the position.

2. Fill the coolant.

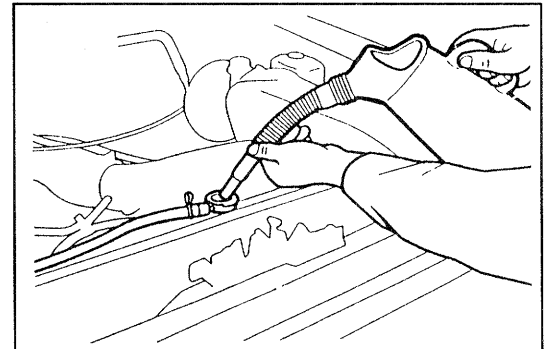
(See page CO-4.)

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