DAIHATSU

ROCKY

PROPELLER SHAFTS

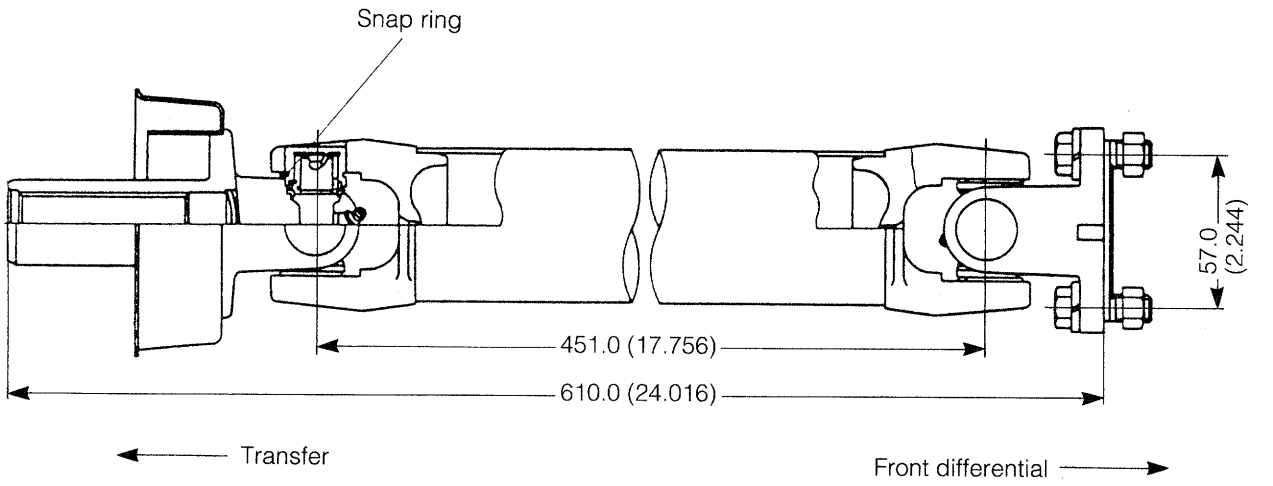
WRU90-PR001

PR

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



mm (inch)

WRU90-PR084

Propeller shaft specification

mm (inch)

Item / Kind	Dimensions of propeller shaft (Length x outer dia.)
Front propeller shaft	610.0 x 57.0 (24.016 x 2.244)

WRU90-PR085

TROUBLE SHOOTING

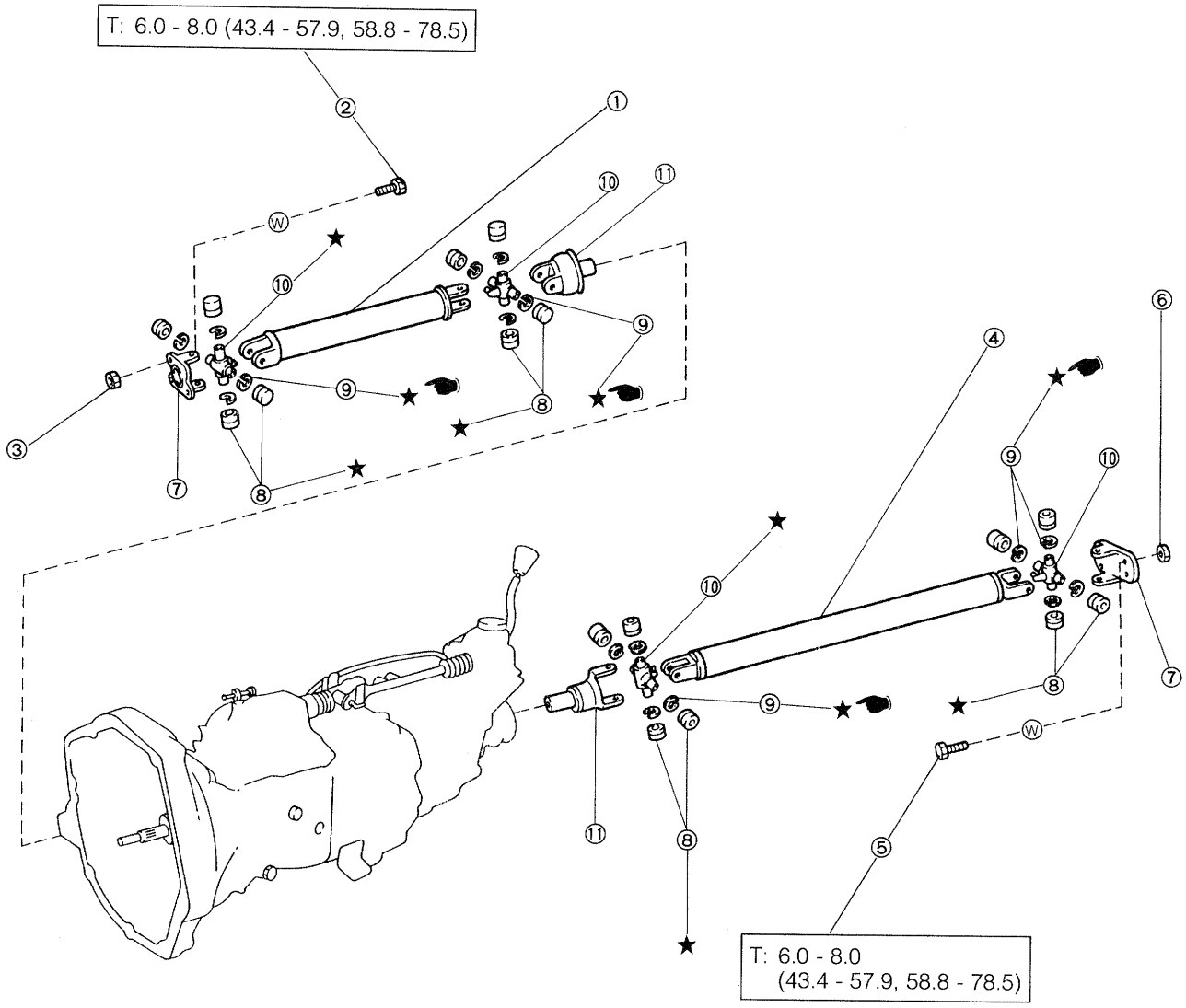
Symptom	Possible causes	Checking points
Abnormal noise Vibration	• Universal joint improperly lubricated	• Lubrication to grease nipple
	• Universal joint spider section damaged	• Check universal joint.
	• Runout or damage of propeller shaft	• Check propeller shaft for runout.

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



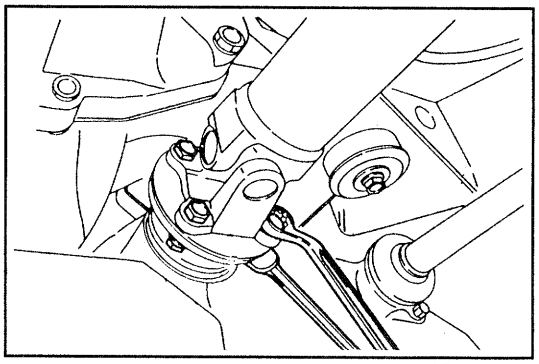
① Front propeller shaft assembly
② Bolt (4 pieces)
③ Nut (4 pieces)
④ Rear propeller shaft assembly
⑤ Bolt (4 pieces)
⑥ Nut (4 pieces)
⑦ Universal joint w/flange yoke
⑧ Universal joint spider bearing cup (4 pieces)
⑨ Snap ring (4 pieces)
⑩ Universal joint spider
⑪ Universal joint sleeve yoke S/A

WRU90-PR002

REPLACEMENT OF PROPELLER SHAFT WITH NEW ONE (FRONT)

REMOVAL

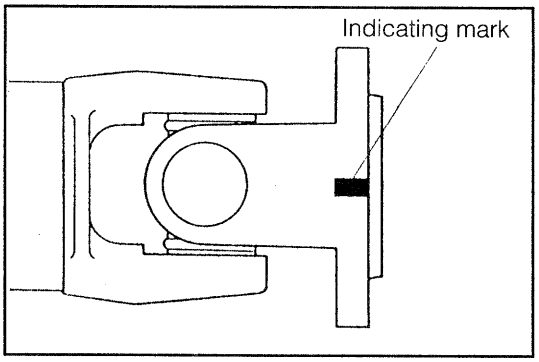
1. Remove the front propeller shaft assembly by removing the four bolts.



WRU90-PR003

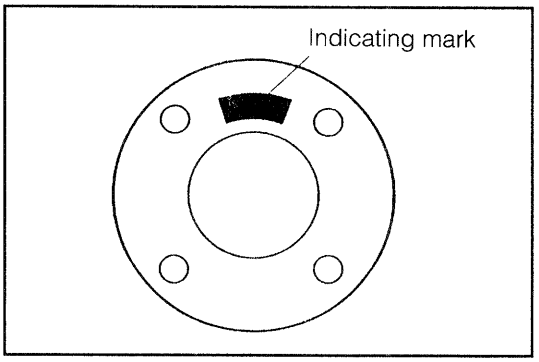
INSTALLATION

1. Confirm the installation indicating mark on the front differential attaching surface of the front propeller shaft.



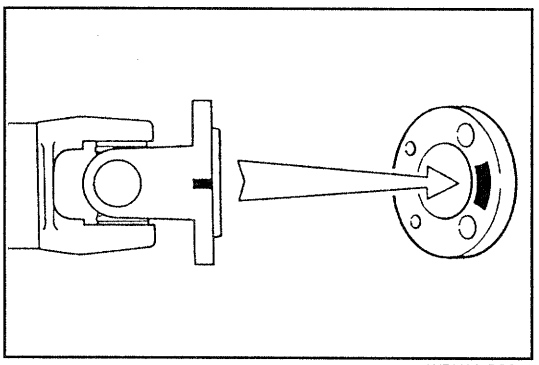
WRU90-PR004

2. Confirm the installation indicating mark on (painted with pink) the front propeller shaft attaching surface of the front differential companion flange.



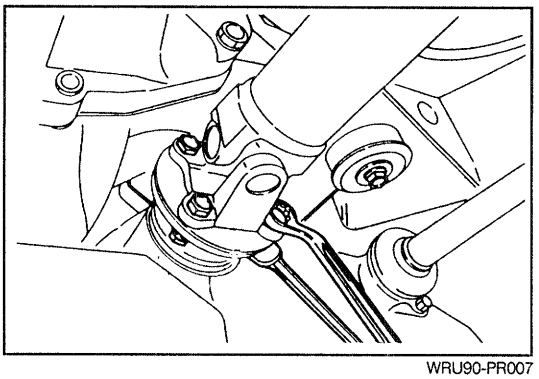
WRU90-PR005

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)

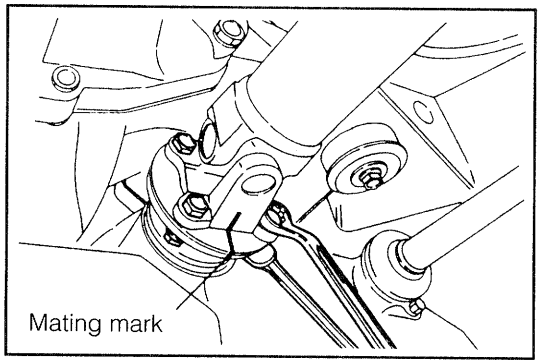


WRU90-PR007

Case where propeller shaft is reused

REMOVAL

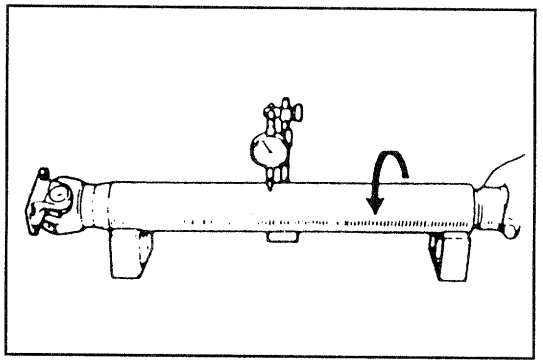
1. Remove the front propeller shaft by removing the four bolts.
   CAUTION:
   - Prior to the removal, mating marks should be put on each of the flange yoke and companion flange of the front differential.
   - If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.



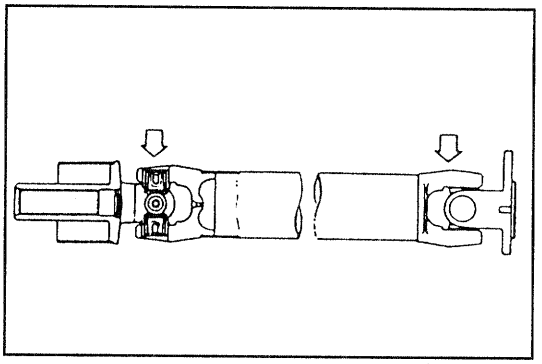
WRU90-PR008

INSPECTION

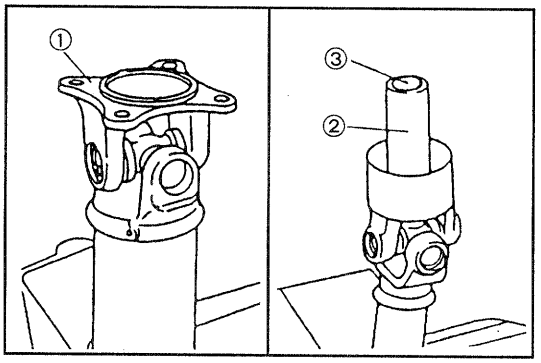
1. With a dial gauge placed at the center of the propeller shaft, measure the runout.
   Allowable Runout Limit: 0.5 mm (0.020 inch)
   Replace to the new front propeller shaft, if the runout is exceed than 0.5 mm (0.020 inch)


WRU90-PR009

2. Check to see if any damage is present at the seal of the spider section of the universal joint.


WRU90-PR100

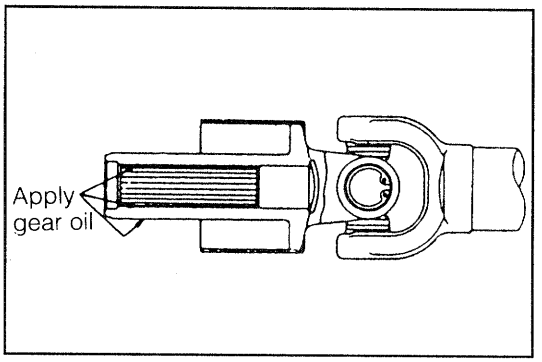
3. Check the flange yoke and sleeve yoke.
   (1) Inspect to see if any damage is present at the differential drive pinion companion flange-contact section ①.
   (2) Check the oil seal sliding section ② for damage or wear.
   (3) Check the spline ③ for damage or wear.
   (4) Fit the sleeve yoke onto the 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

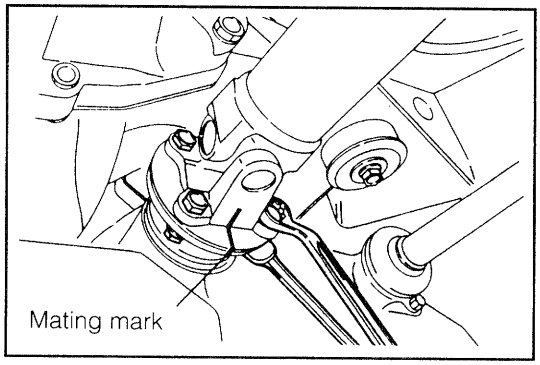
1. Apply gear oil to both the inner and outer sides of the propeller shaft sleeve.



WRU90-PR102

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)

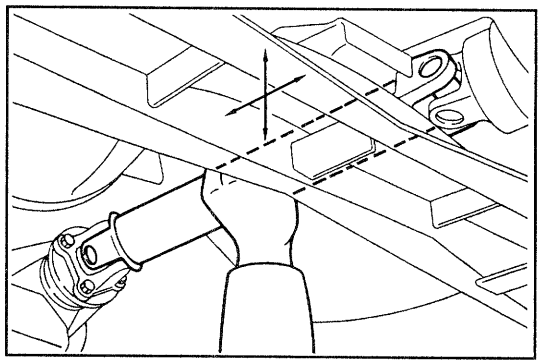
   CAUTION:
   - Make sure to line up those mating marks that were put during the removal of the front propeller shaft. If this caution should fail to be observed, the propeller shaft may emit abnormal noise or vibration.



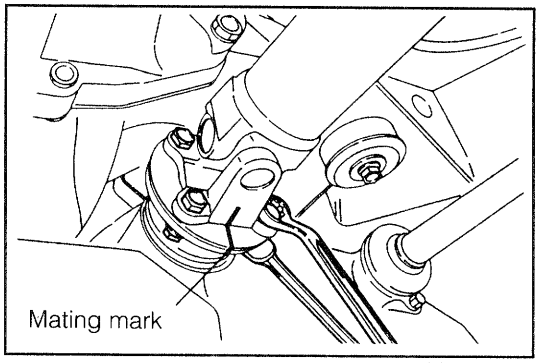
WRU90-PR010

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.

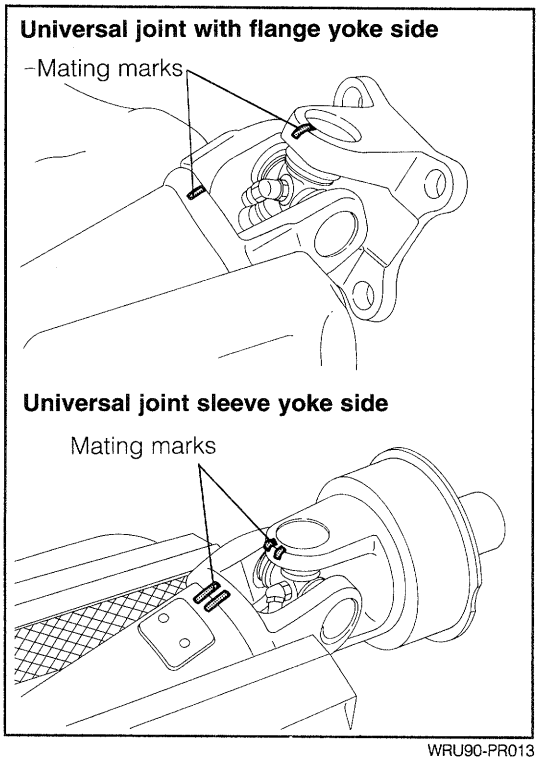

WRU90-PR011

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.



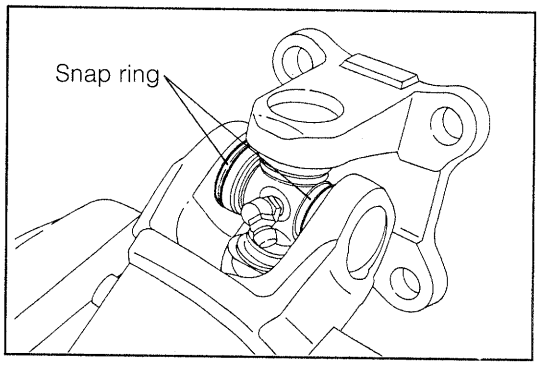
WRU90-PR012

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-PR013

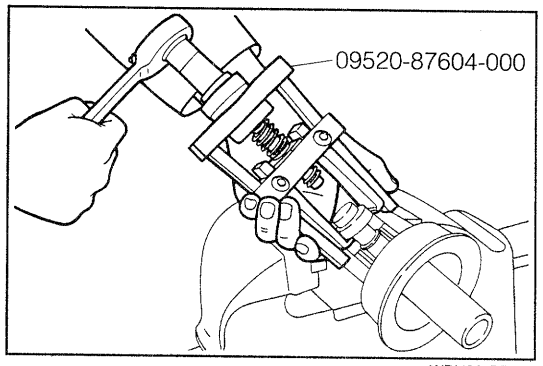
4. Set the propeller shaft on a vise. Remove the snap ring, using a hammer and a standard screwdriver. (Arrow-headed section in the right figure)
   CAUTION:
   - Never clamp the balancer weight section of the propeller shaft in a vise.
   - Never reuse the snap ring.



WRU90-PR014

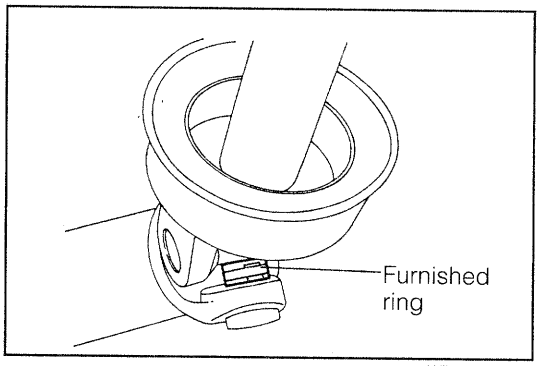
5. Push down the right and left universal joint spider bearing cups, using the following SST.
   SST: 09520-87604-000

   NOTE:
   - At this stage, the universal joint spider bearing cups can not be removed completely.



WRU90-PR015

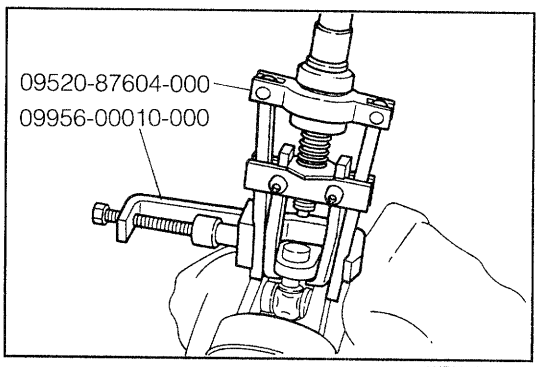
6. Lift the sleeve yoke. Install a furnished ring to the shaft section of the universal joint spider.



WRU90-PR016

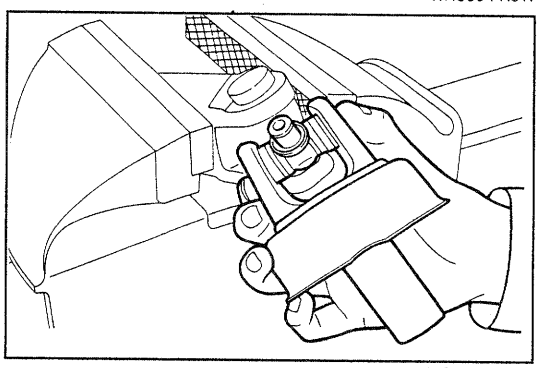
7. Remove the universal joint spider bearing cup at one side, using the suitable socket wrench and the following SSTs.
   SST: 09520-87604-000
   09956-00010-000

   CAUTION:
   - Never reuse the removed universal joint spider bearing cup.

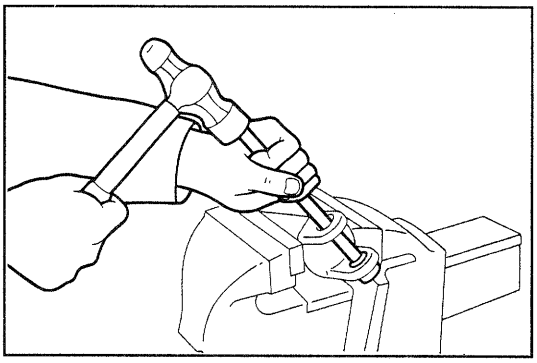


WRU90-PR017

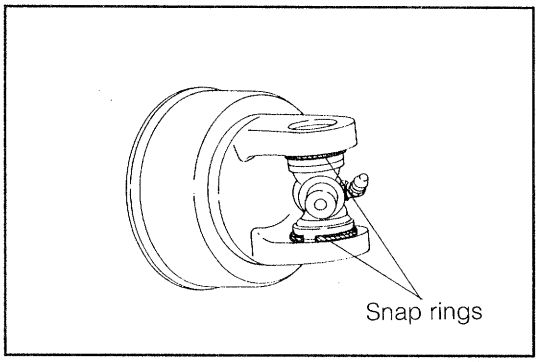
8. Remove the universal joint sleeve yoke from the propeller shaft.


WRU90-PR018

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

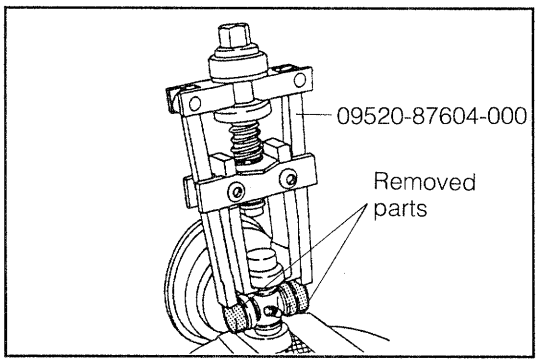
10. Remove the snap ring of the universal joint sleeve yoke.
    CAUTION:
    - Never reuse the removed snap ring.



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

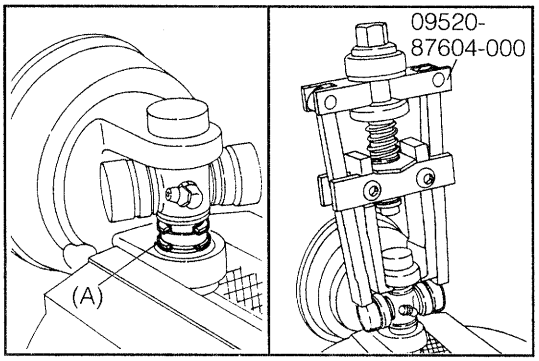
    NOTE:
    - At this stage, the universal joint spider bearing cups can not be removed completely.



WRU90-PR021

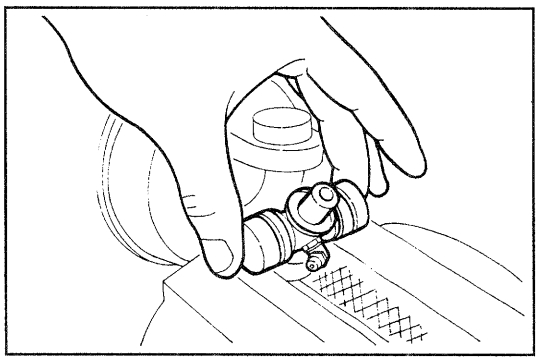
12. Install a furnished ring (A) to the shaft section of the universal joint spider. Then, remove the universal joint spider bearing cup at one side, using the following SST.
    SST: 09520-87604-000

    CAUTION:
    - Never reuse the removed universal joint spider bearing cup.

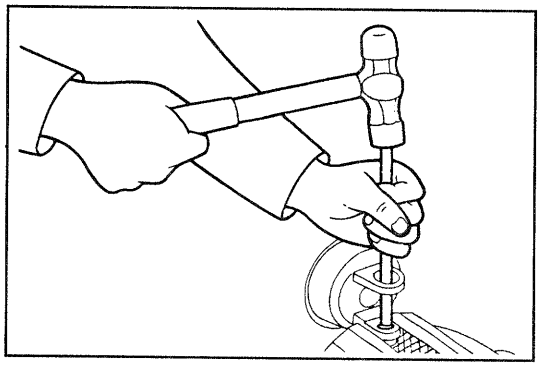


WRU90-PR022

13. Remove the universal joint spider.
    CAUTION:
    - Never reuse the removed universal joint spider.


WRU90-PR023

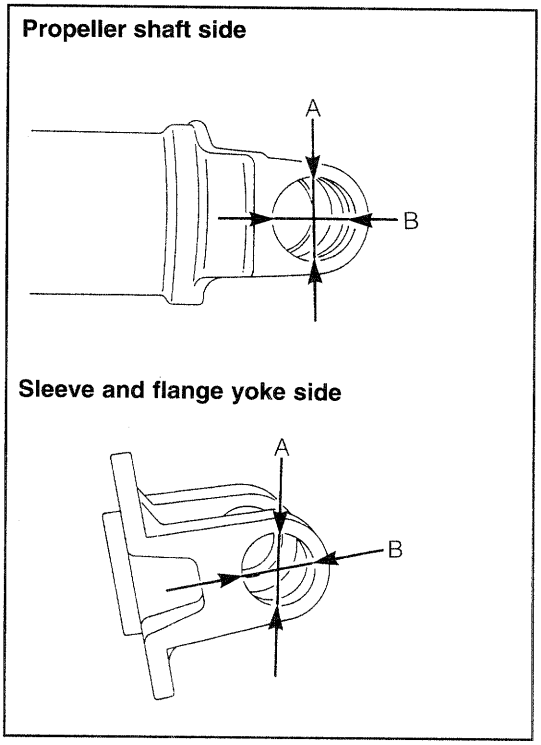
14. Remove the universal joint spider bearing cup by lightly tapping it, using a hammer in combination with a suitable metal rod.
    CAUTION:
    - Never reuse the removed universal joint spider bearing cup.


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.

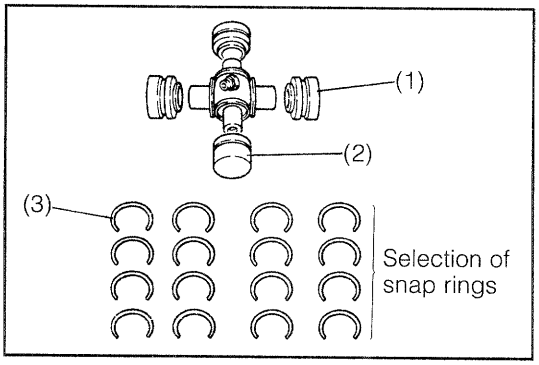


WRU90-PR025

INSTALLATION

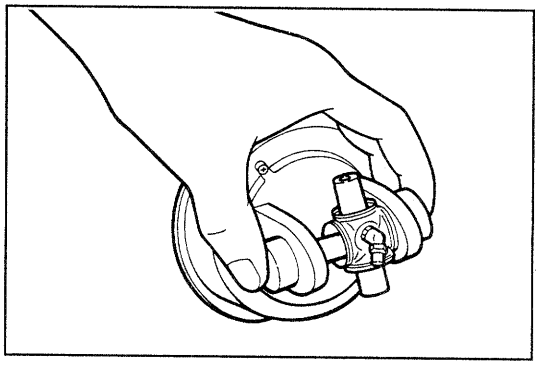
1. The following parts are supplied in one set in the replacement parts for the universal joint spider subassembly.
    (1) Universal joint spider ..... 1 piece
    (2) Universal joint spider bearing cup ..... 4 pcs.
    (3) Four kinds of snap ring
    T = 1.20 mm (0.0472 inch)
    T = 1.25 mm (0.0492 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.



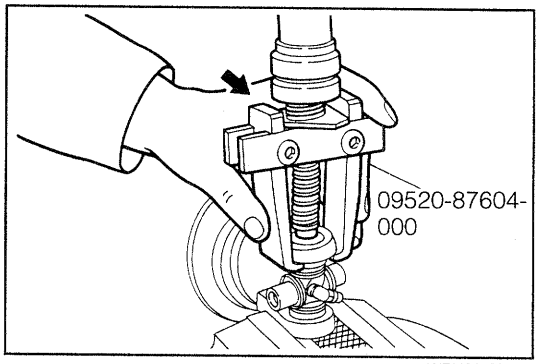
WRU90-PR026

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

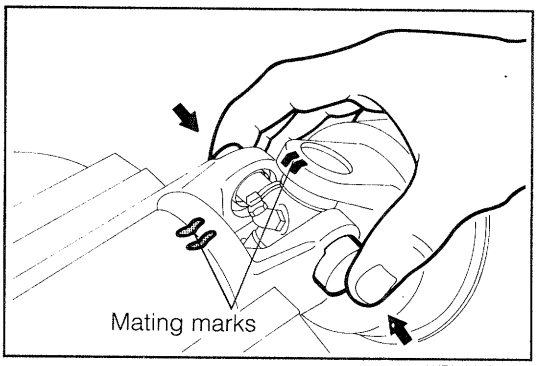
4. Install the right and left universal joint spider bearing cups, using the following SST.
   SST: 09520-87604-000

   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.

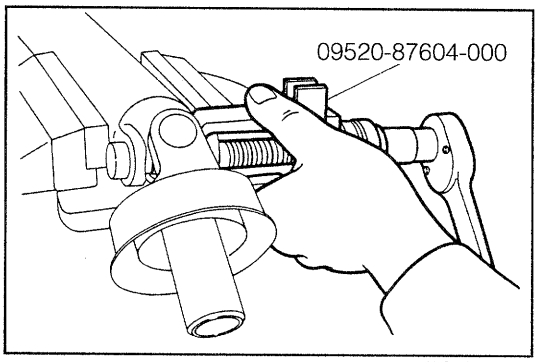


WRU90-PR029

6. Temporarily install new universal joint spider bearing cups (right and left) to the propeller shaft by pushing them with finger.

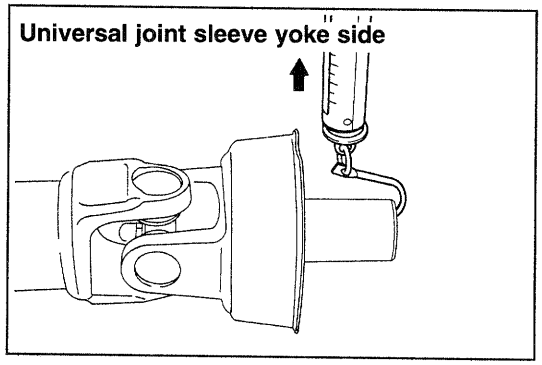
7. Install the right and left universal joint spider bearing cups, using the following SST.
   SST: 09520-87604-000

   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.



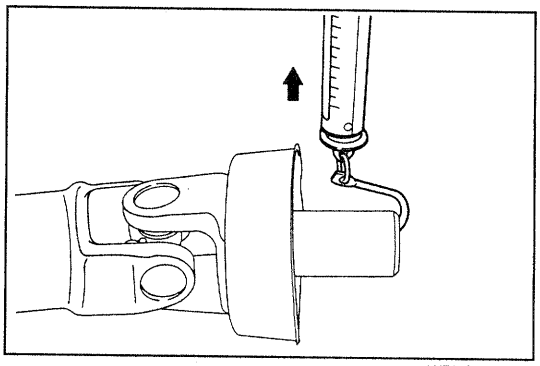
WRU90-PR030

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)

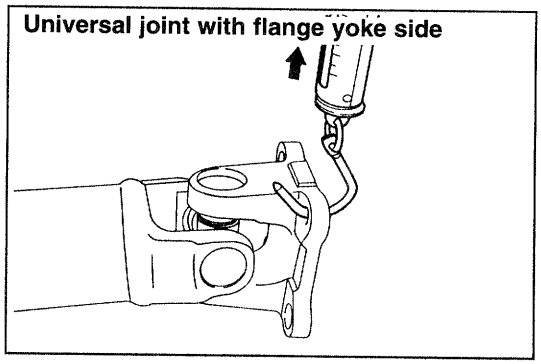


WRU92-PR103

   (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.

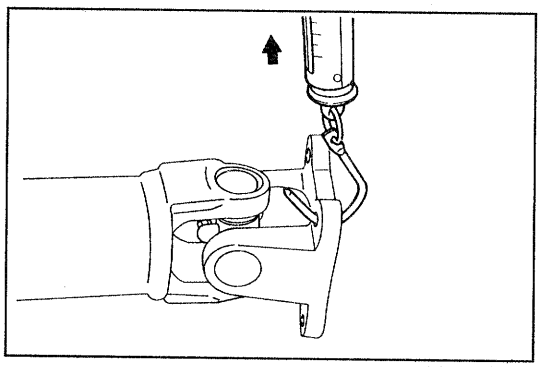

WRU90-PR032

   (3) Measure the starting torque, following the same procedure described above.

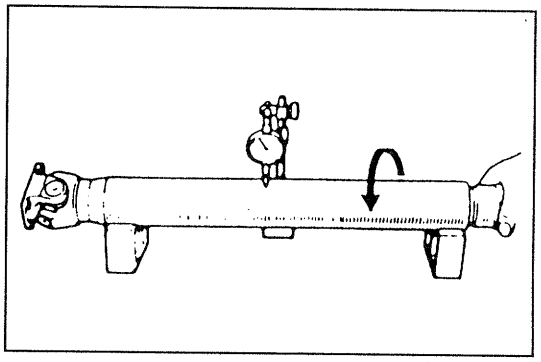


WRU90-PR033

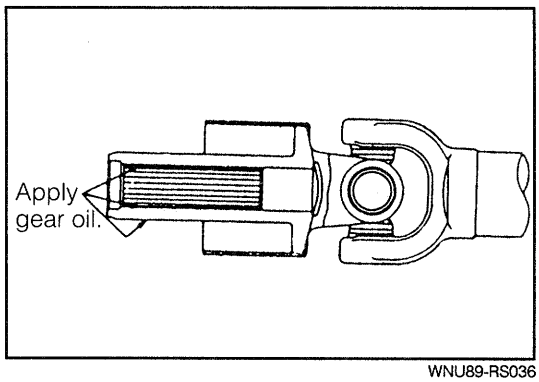
   (4) Turn the propeller shaft 90 degrees. Measure the starting torque.


WRU90-PR034

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)


WRU90-PR035

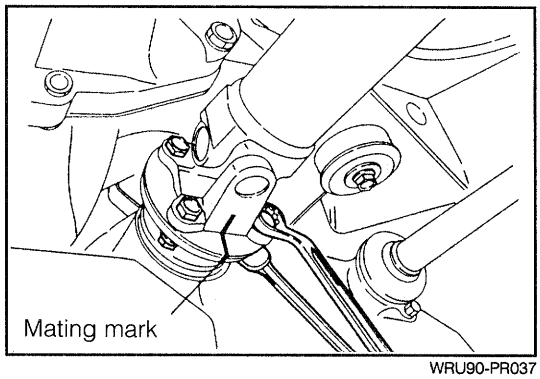
10. Apply gear oil to both the inner and outer sides of the propeller shaft.



WNU89-RS036

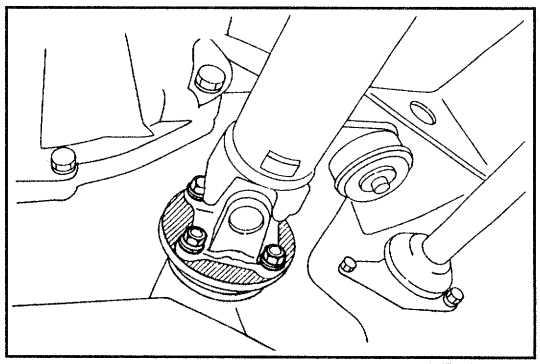
11. Install the propeller shaft with the mating marks that were put during the removal of the propeller shaft aligned with each other.
    Tightening Torque:
    6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

    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.

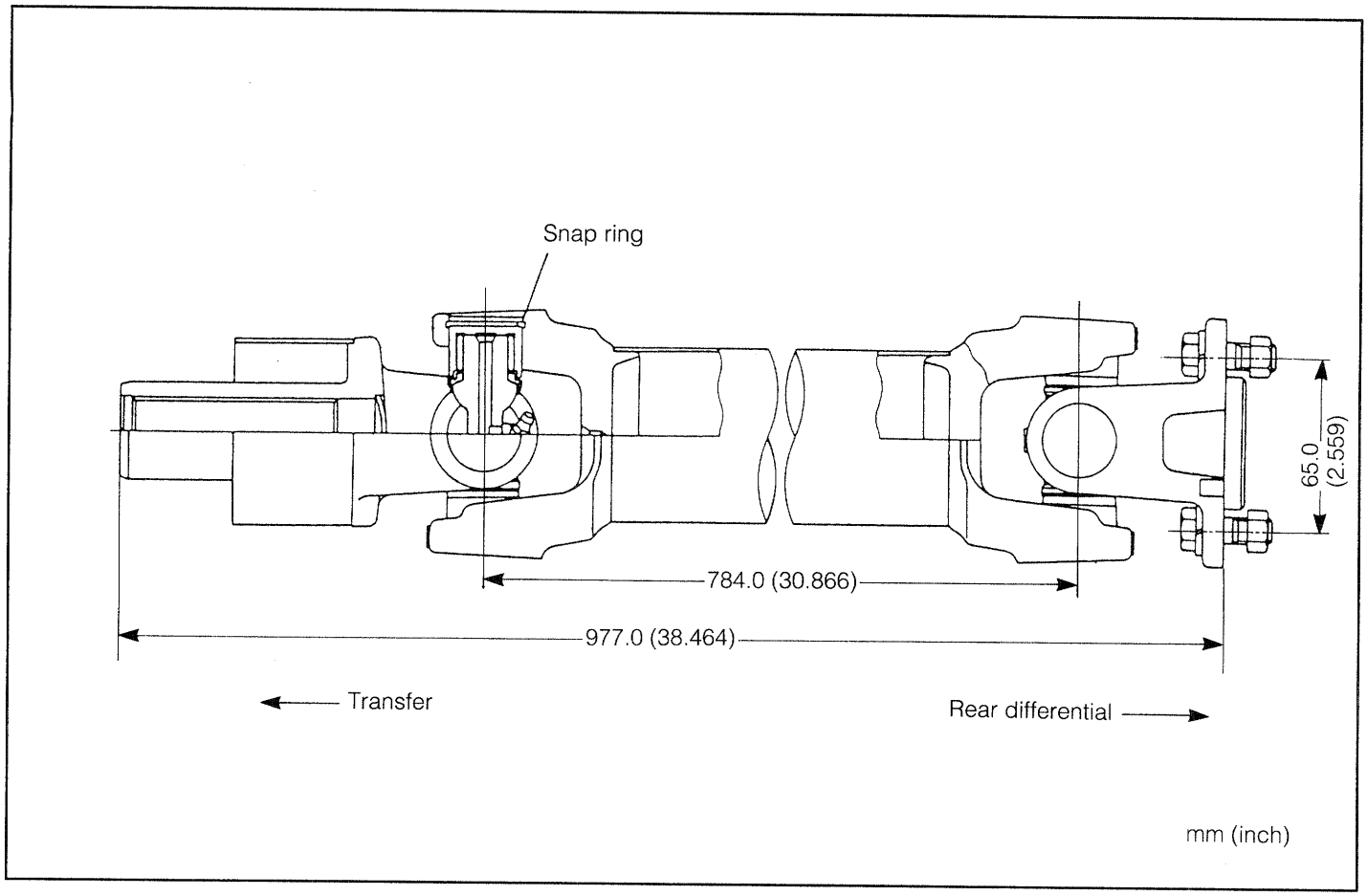

WRU90-PR038

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)

Item / Kind	Dimensions of propeller shaft (Length × outer dia.)
Rear propeller shaft	977.0 × 65.0 (38.464 × 2.559)

WRU90-PR041

TROUBLE SHOOTING

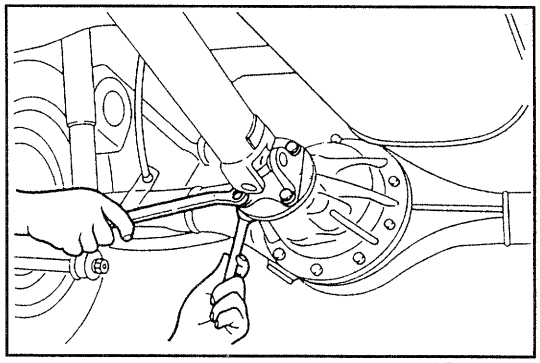
Symptom	Possible causes	Checking points
Abnormal noise Vibration	• Universal joint improperly lubricated	• Lubrication to grease nipples
	• Damage of universal joint spider section	• Check universal joints.
	• Runout or damage of propeller shaft	• Check propeller shaft for runout.
	• Imbalance of propeller shaft	• Check mating marks that were put during installation or removal.

WRU90-PR042

REPLACEMENT OF PROPELLER SHAFT WITH NEW ONE (REAR)

REMOVAL

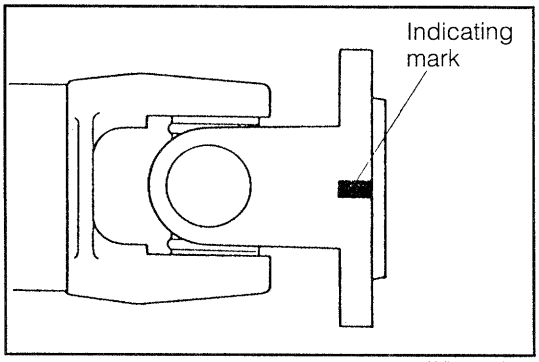
1. Remove the rear propeller shaft assemble by removing the four bolts.



WRU90-PR043

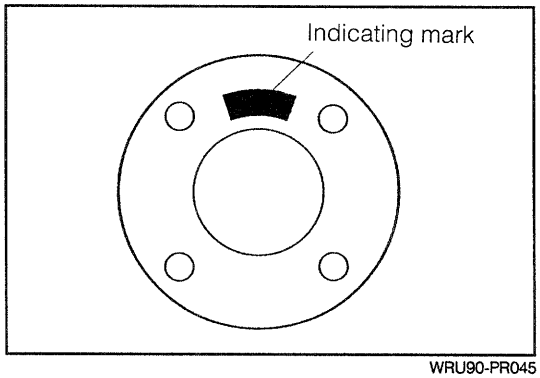
INSTALLATION

1. Confirm the installation indicating mark on the front differential attaching surface of the front propeller shaft.



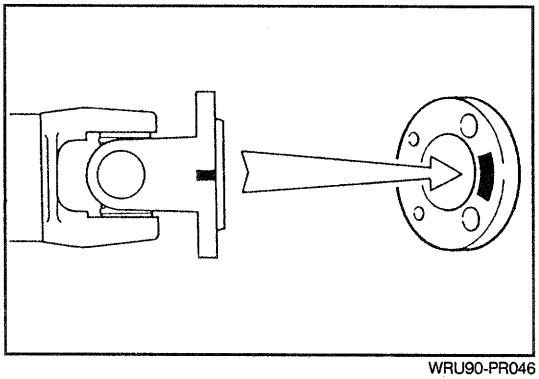
WRU90-PR044

2. Confirm the installation indicating mark on the front propeller shaft attaching surface of the front differential companion flange.



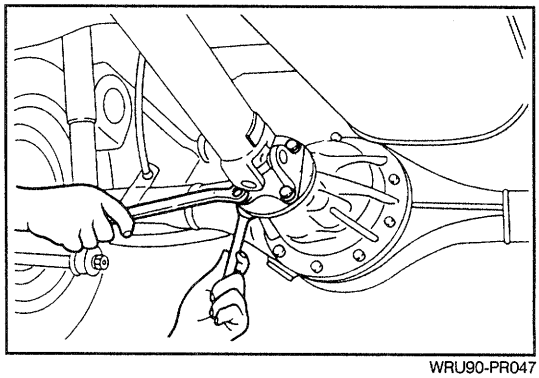
WRU90-PR045

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)

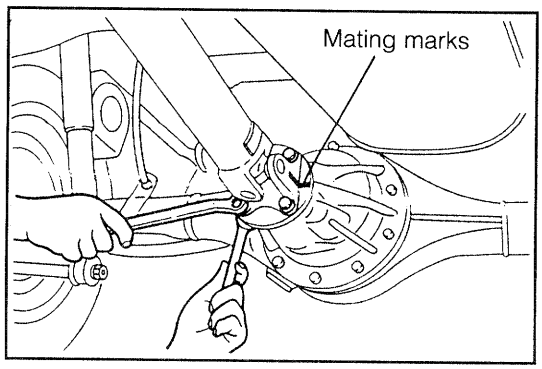


WRU90-PR047

Case where propeller shaft is reused

REMOVAL

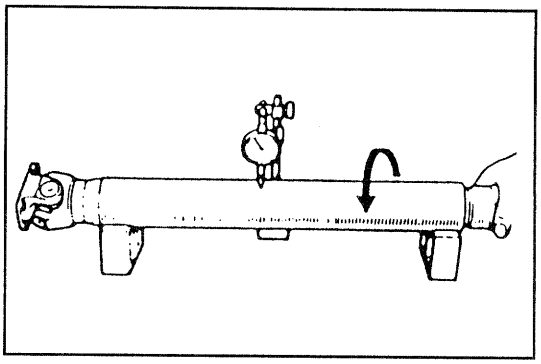
1. Remove the rear propeller shaft assembly by removing the four bolts.
   CAUTION:
   - Prior to the removal, mating marks should be put on each of the flange yoke and companion flange of the rear differential.
   - If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration during the running.



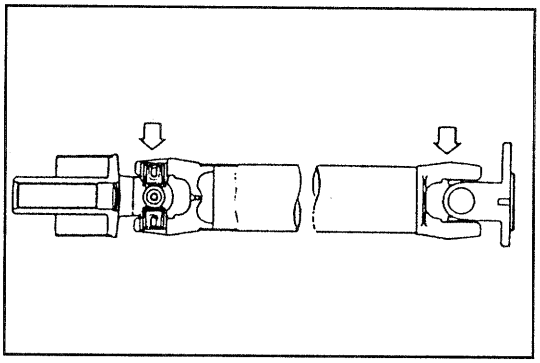
WRU90-PR048

INSPECTION

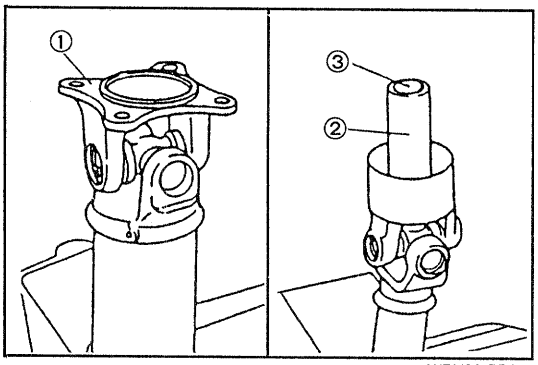
1. Measure the runout with a dial gauge set to the center of the propeller shaft.
   Allowable Runout: 0.5 mm (0.020 inch)
   Replace to the new propeller shaft, if the runout is exceed than 0.5 mm (0.020 inch)


WRU90-PR049

2. Check the oil seal of the universal joint spider section for damage.


WRU90-PR050

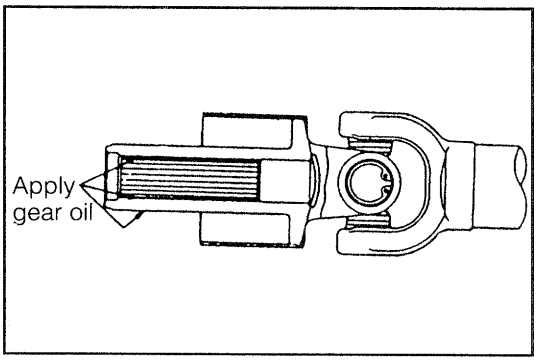
3. Check the flange yoke and sleeve yoke.
   (1) Inspect to see if any damage is present at the differential drive pinion companion flange-contact section ①.
   (2) Check the oil seal sliding section ② for damage or wear.
   (3) Check the spline ③ for damage or wear.
   (4) Fit the sleeve yoke onto the 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

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)

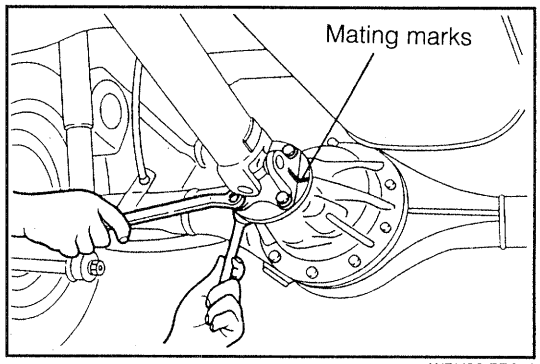
   CAUTION:
   - Make sure to line up those scribing lines that were put during the removal of the rear propeller shaft. If this caution should fail to be observed, the propeller shaft may emit abnormal noise or vibration.

REPLACEMENT OF UNIVERSAL JOINT SPIDER SUBASSEMBLY (REAR)

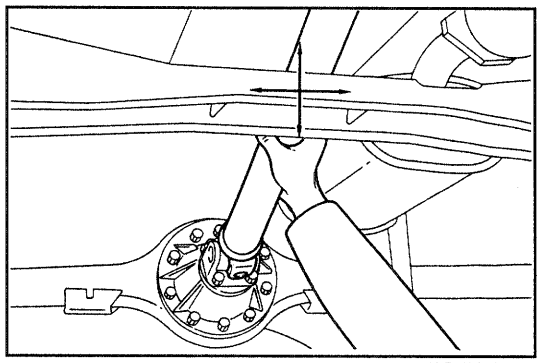
1. Move the center of the propeller shaft in up-&-down and right-&-left directions so as to check the universal joint spider for excessive play by hand feeling.
   NOTE:
   - The removal procedure for the universal joint spider subassembly is the same both at the sleeve yoke side and at the flange yoke side. Therefore, the procedure for the flange yoke (at the differential side) only is described here.

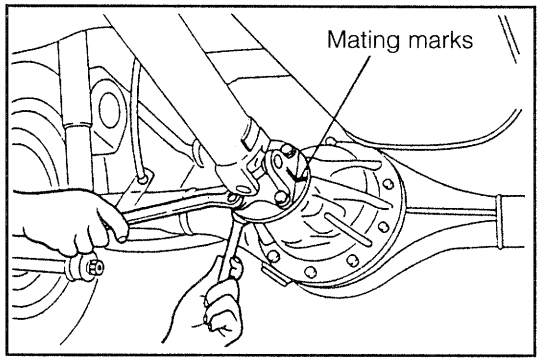
2. Remove the rear propeller shaft assembly by removing the four bolts.
   CAUTION:
   - Prior to the removal, mating marks should be put on each of the flange yoke and companion flange of the rear differential.
   - If this operation should fail to be performed, the propeller shaft may emit abnormal 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.

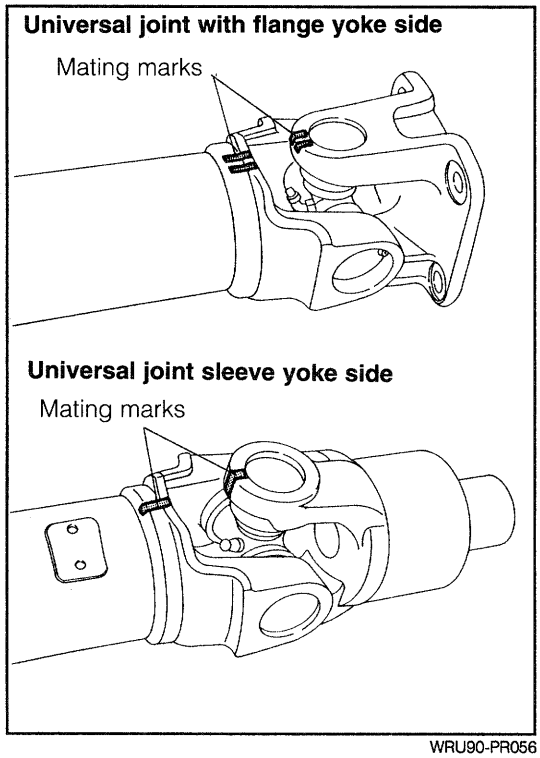


WRU90-PR053


WRU90-PR054

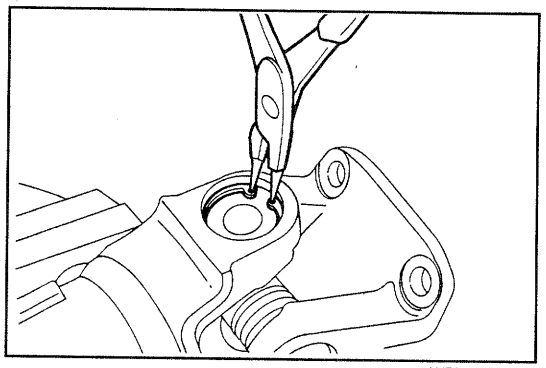


WRU90-PR055



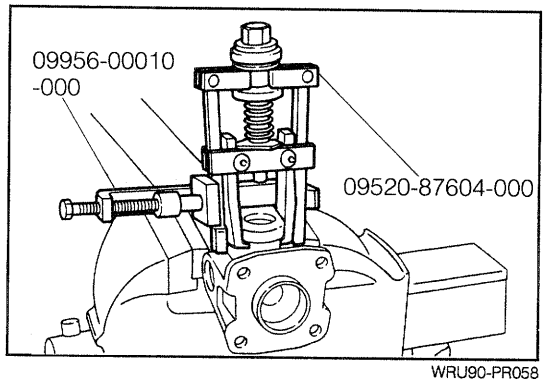
WRU90-PR056

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

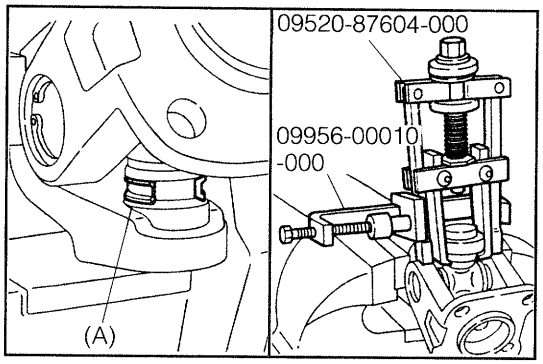
   NOTE:
   - At this stage, the universal joint spider bearing cups can not be removed completely.



WRU90-PR058

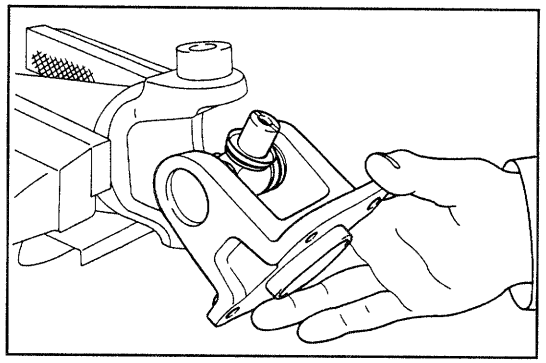
7. Install a furnished ring (A) to the shaft section of the universal joint spider. Remove the universal joint spider bearing cup at one side, using the following SST.
   SST: 09520-87604-000
   09956-00010-000

   CAUTION:
   - Never reuse the removed universal joint spider bearing cups.

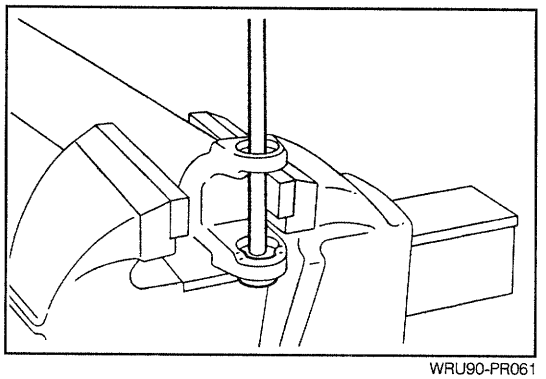


WRU90-PR059

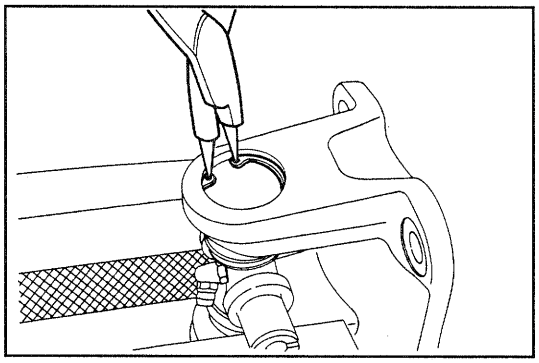
8. Remove the universal joint with flange yoke from the propeller shaft.


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.

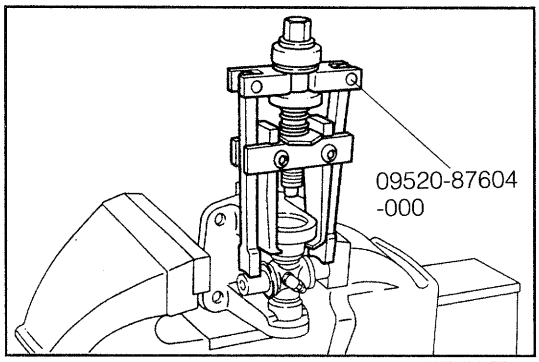

WRU90-PR061

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

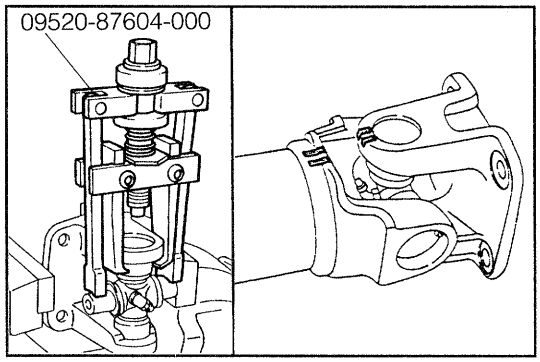
    NOTE:
    - At this stage, the universal joint spider bearing cups can not be removed completely.



WRU90-PR064

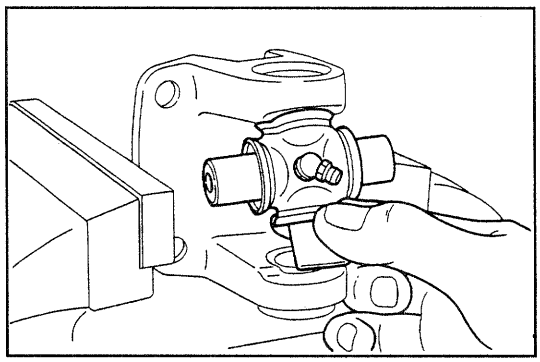
12. Install a furnished ring to the shaft section of the universal joint spider. Then, remove the universal joint spider bearing cup at one side, using the following SST.
    SST: 09520-87604-000

    CAUTION:
    - Never reuse the removed universal joint spider bearing cup.

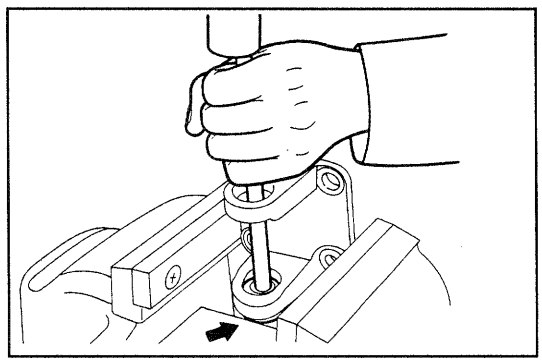


WRU90-PR065

13. Remove the universal joint spider.


WRU90-PR066

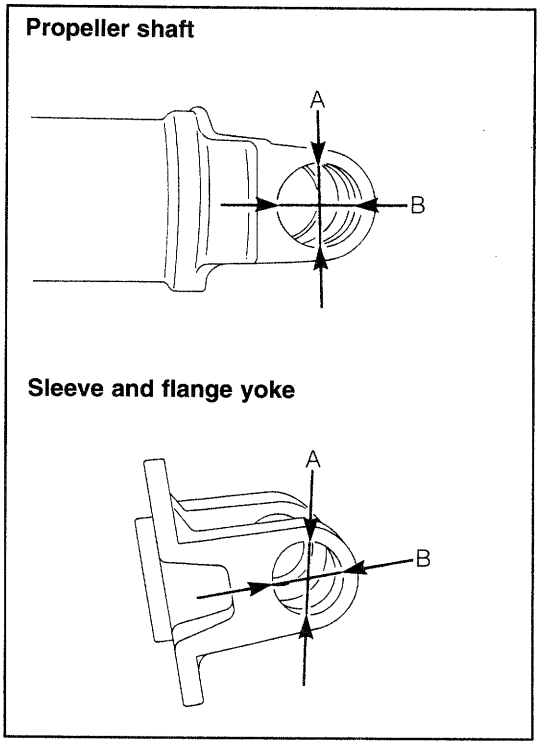
14. Remove the universal joint spider bearing cup by lightly tapping it, using a hammer in combination with a suitable metal rod.
    CAUTION:
    - Never reuse the removed universal joint spider bearing cup.


WRU90-PR067

INSPECTION

1. 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
   $28.0^{+0.015\ mm}_{+0.025\ mm}$ $(1.102^{+0.00059\ inch}_{+0.00098\ inch})$
   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.

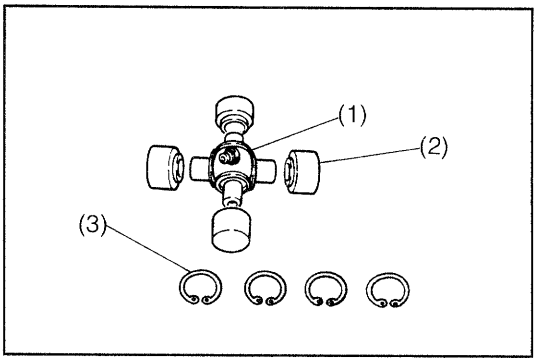


WRU90-PR068

INSTALLATION

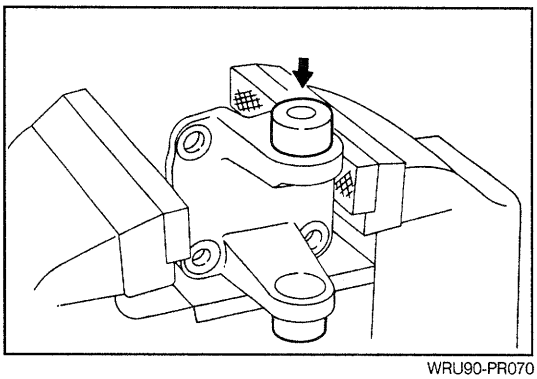
1. The following parts (1), (2), (3) are supplied in one set in the replacement parts for the universal joint spider subassembly.
   (1) Universal joint spider ..... 1 piece
   (2) Universal joint spider bearing cup ..... 4 pcs.
   (3) Snap rings ..... 4 pcs.

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

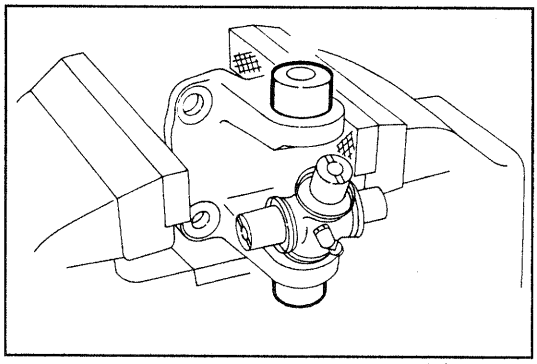


WRU90-PR069

2. Temporarily install new universal joint spider bearing cups (two pcs.) to the universal joint with flange yoke by pushing them with finger.

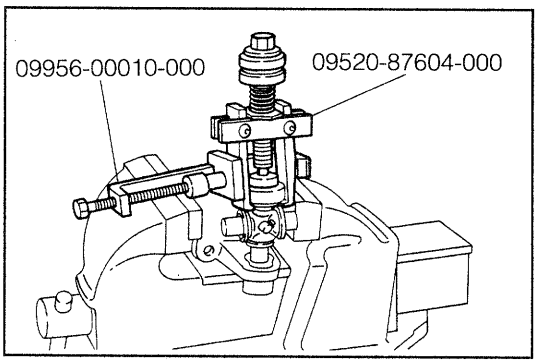

WRU90-PR070

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

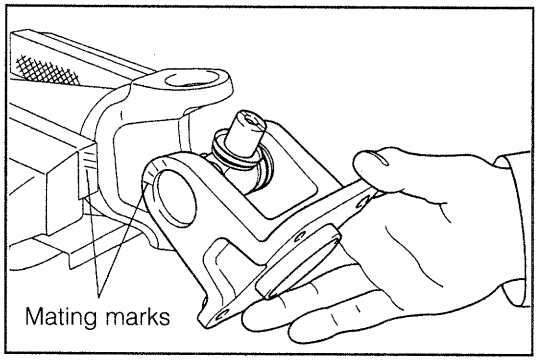
4. Install the right and left universal joint spider bearing cups, using the suitable wrench box with the following SSTs.
   SST: 09520-87604-000
   09956-00010-000

   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.



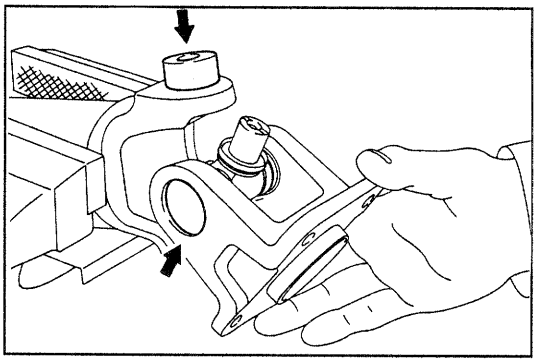
WRU90-PR072

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.

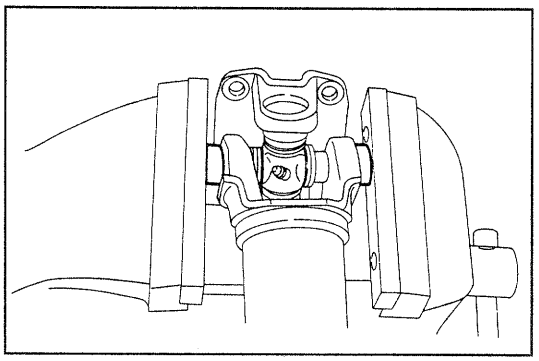


WRU92-PR105

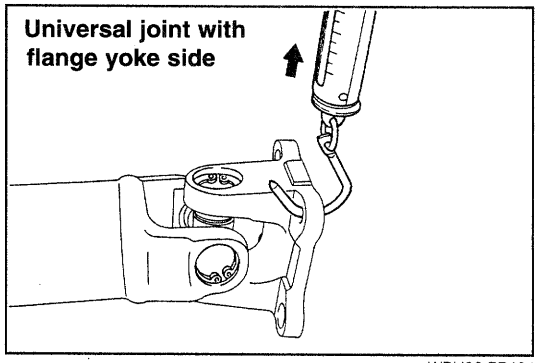
6. Temporarily install new universal joint spider bearing cups (two pcs.) to the propeller shaft by pushing them with finger.


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.

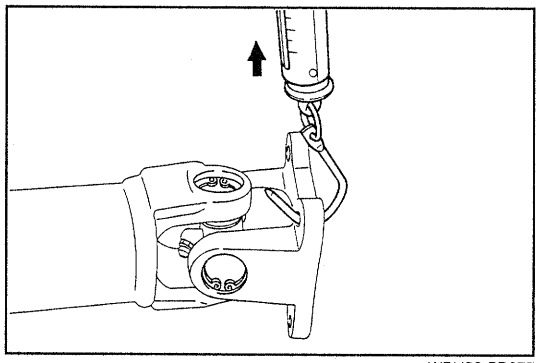

WRU90-PR075

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)



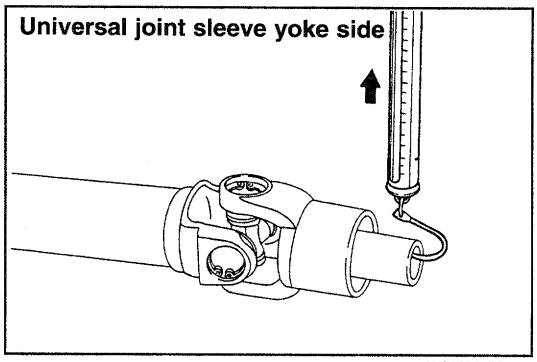
WRU92-PR104

   (2) Turn the propeller shaft 90 degrees. Measure the starting torque.


WRU90-PR077

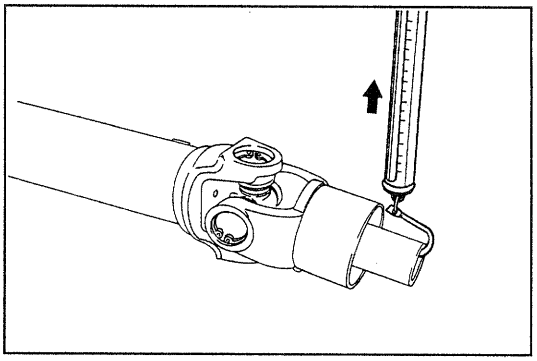
   CAUTION:
   - As regards the snap rings positioned symmetrically relative to the universal joint spider, in principle, it is required to use the snap rings having the same thickness.
   - However, if the starting torque does not reach or exceeds the specified range despite the fact that the snap rings 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.

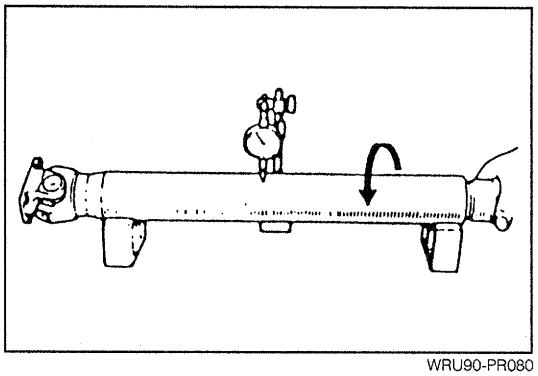


WRU90-PR078

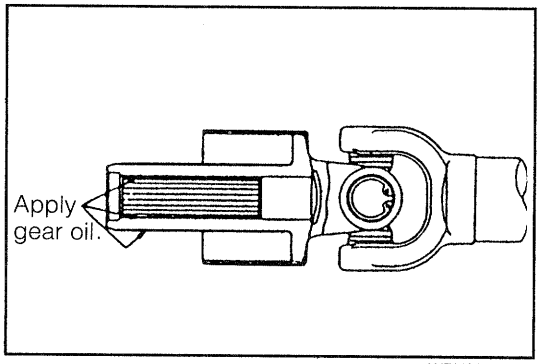
   (4) Turn the propeller shaft 90 degrees. Measure the starting torque.


WRU90-PR079

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)


WRU90-PR080

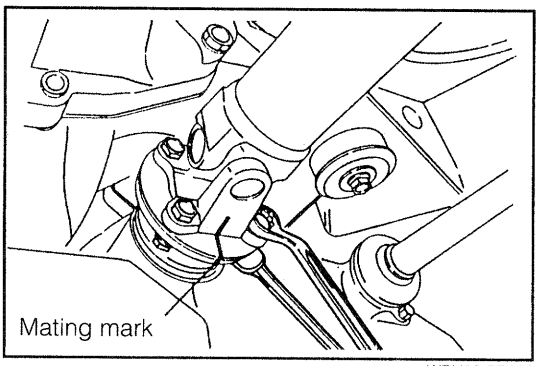
11. Apply gear oil to both the inner and outer sides of the propeller shaft sleeve.



WRU90-PR081

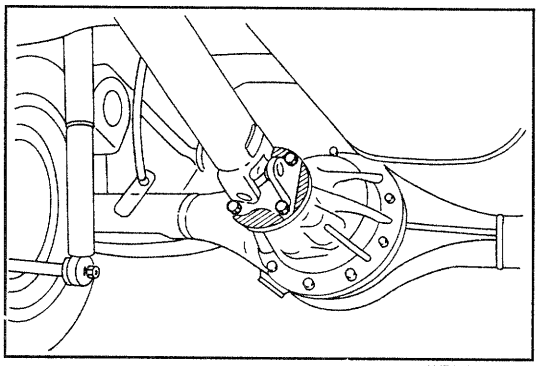
12. Install the propeller shaft with the mating marks that were put during the removal of the propeller shaft aligned with each other.
    Tightening Torque:
    6.0 - 8.0 kg-m (43.4 - 57.9 ft-lb, 58.8 - 78.5 N·m)

    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