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# PROPELLER SHAFT

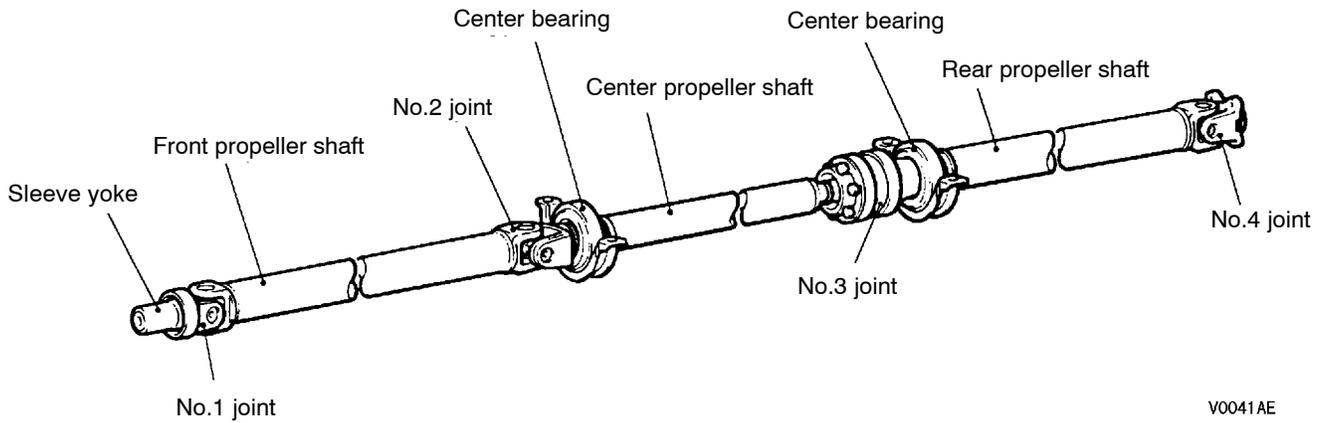
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## GENERAL INFORMATION

The propeller shaft is a 3-shaft and 4-joint type with center bearing. Furthermore, a L.J. is used for the No.3 joint.



## SERVICE SPECIFICATIONS

Items	Standard value	Limit
Propeller shaft (front, center, rear) runout mm	-	0.6
Clearance of snap ring groove mm	0.01 - 0.03	-

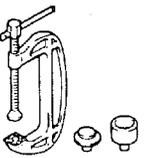
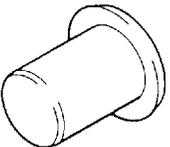
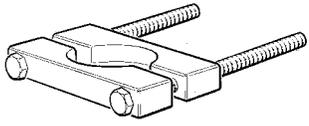
## LUBRICANT

Items	Specified lubricant	Quantity
Front propeller shaft sleeve yoke	Hypoid gear oil	As required
L.J. assembly	Repair kit grease	45 - 55 g

## ADHESIVE

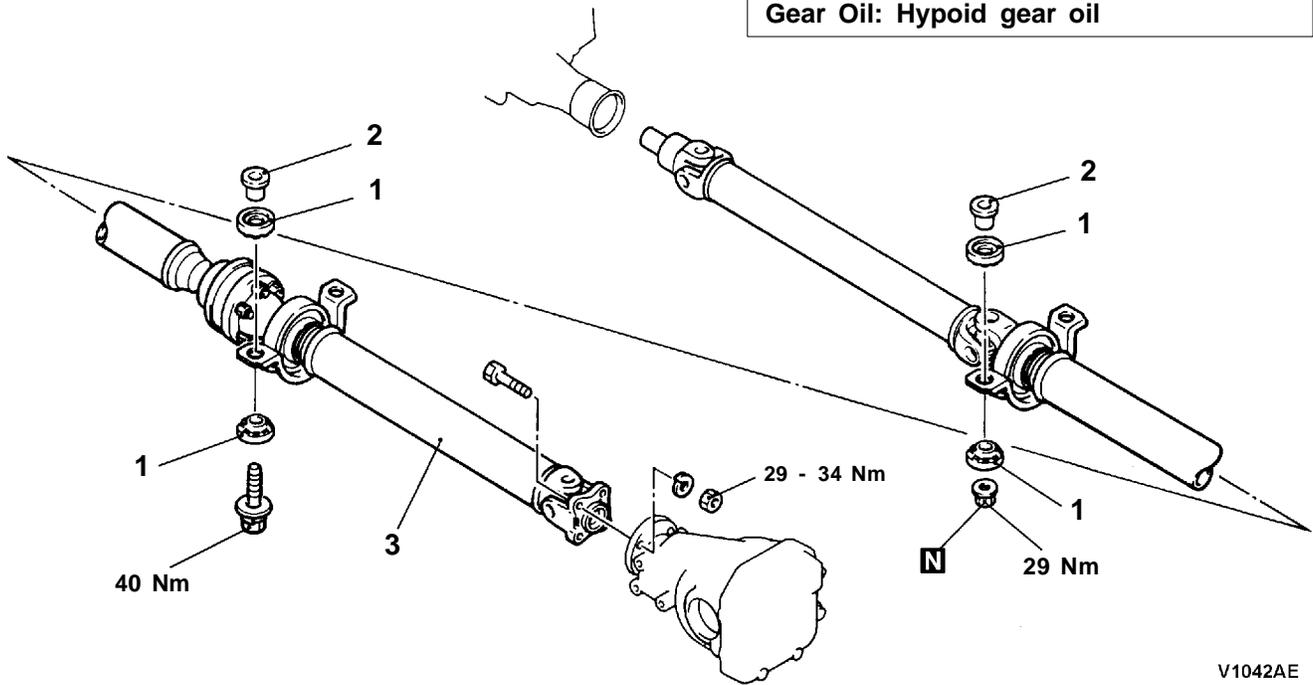
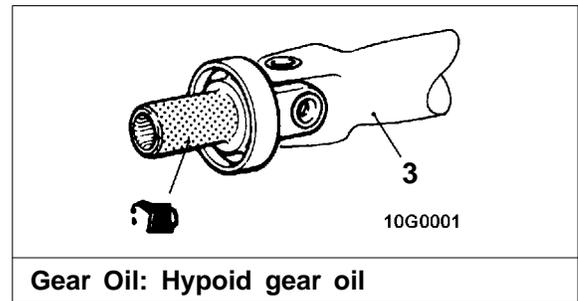
Item	Specified adhesive
L.J. assembly rubber packing	3M ATD Part No.8155 or equivalent

**SPECIAL TOOLS**

Tool	Number	Name	Use
 <p>B990840</p>	MB990840	Universal joint remover and installer	Disassembly and reassembly of the universal joint
 <p>B991193</p>	MB991193	Plug	Preventing of entry of foreign objects into the transmission and transfer
	MD998801	Bearing remover	Removal of the center bearing assembly

# PROPELLER SHAFT

## REMOVAL AND INSTALLATION

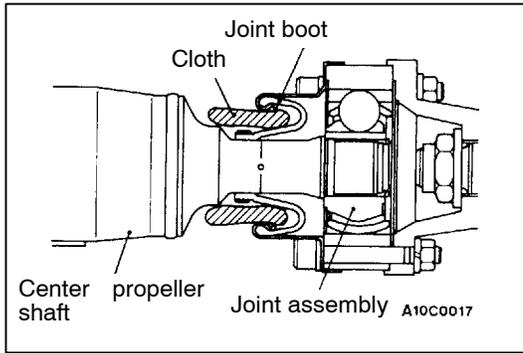


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### Removal steps

1. Insulator
2. Spacer

◀A▶ ▶A◀ 3. Propeller shaft assembly



**REMOVAL SERVICE POINT**

**◀▶ PROPELLER SHAFT ASSEMBLY REMOVAL**

1. Make mating marks on the differential companion flange and on the flange yoke, and then remove the propeller shaft assembly.

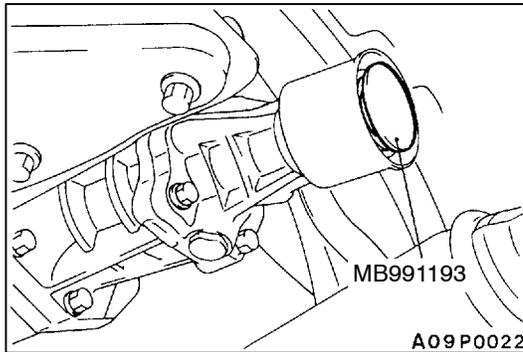
**Caution**

**Straighten front, center and rear shafts when removing the propeller shaft. If not, the joint boot will be pinched by the joint and damaged.**

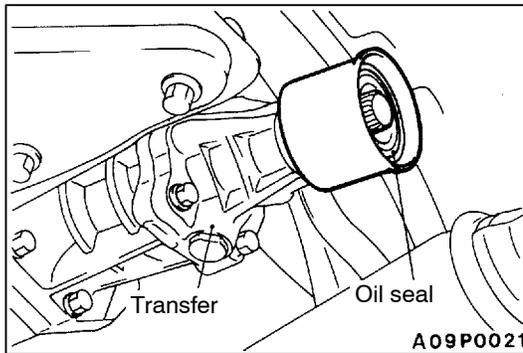
**NOTE**

Putting a piece of cloth in the joint boot will make the work easier.

2. Cover the transfer with the special tool so that no foreign material gets into the transfer case.



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**INSTALLATION SERVICE POINT**

**▶◀ PROPELLER SHAFT INSTALLATION**

Align the mating marks and install the propeller shaft to the companion flange.

**Caution**

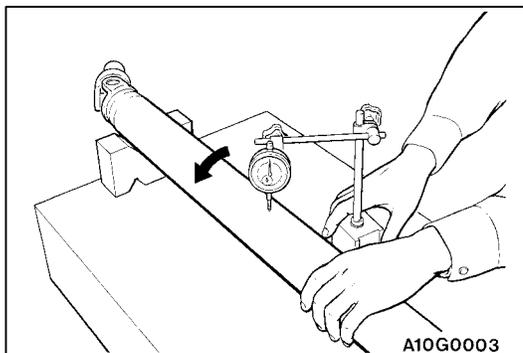
1. Take care not to damage the transfer oil seal lip.
2. Eliminate oil and grease from threads of the mounting bolts and nuts before tightening them. If oil or grease is adhered to bolts and nuts, they will be loosened.

**INSPECTION**

**PROPELLER SHAFT RUNOUT**

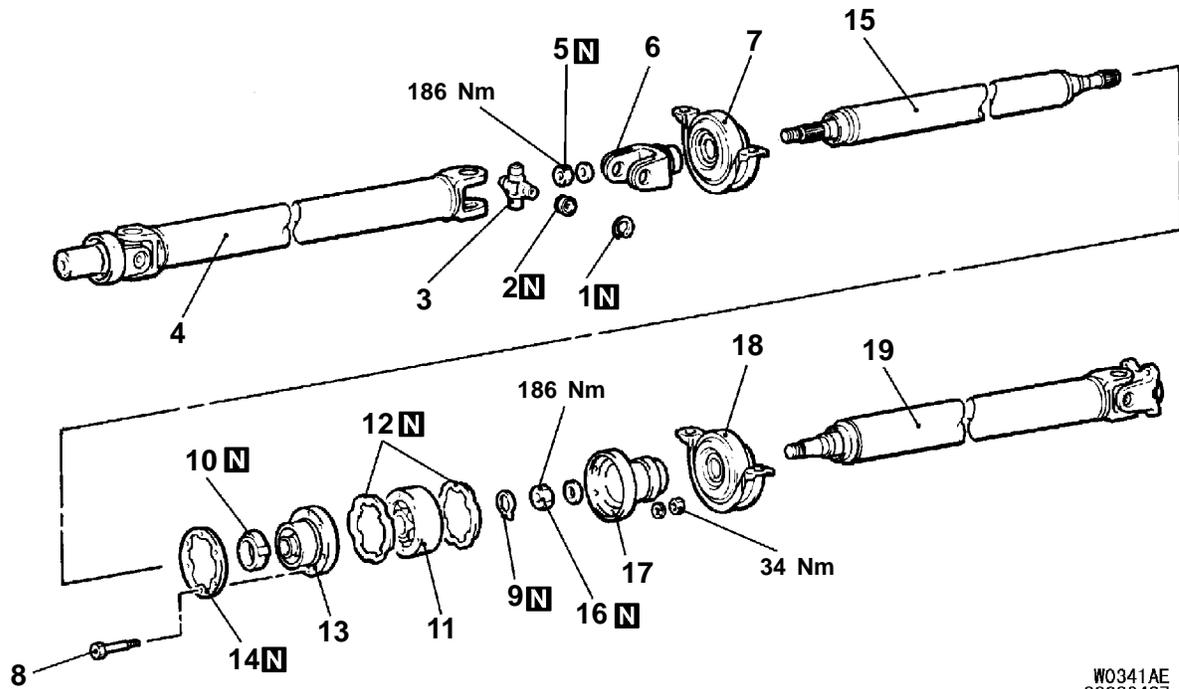
Measure the runout for each of front, center and rear propeller shafts.

**Limit: 0.6 mm**



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DISASSEMBLY AND REASSEMBLY



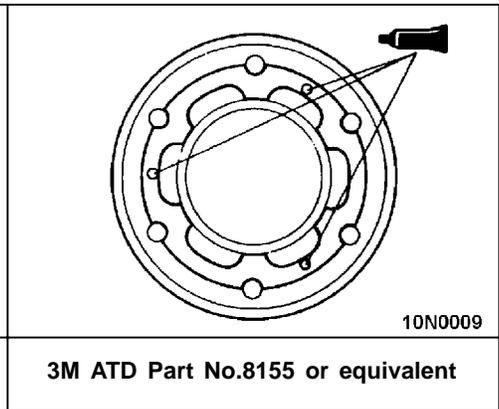
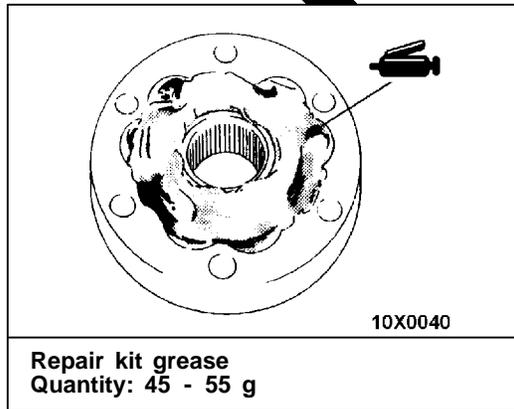
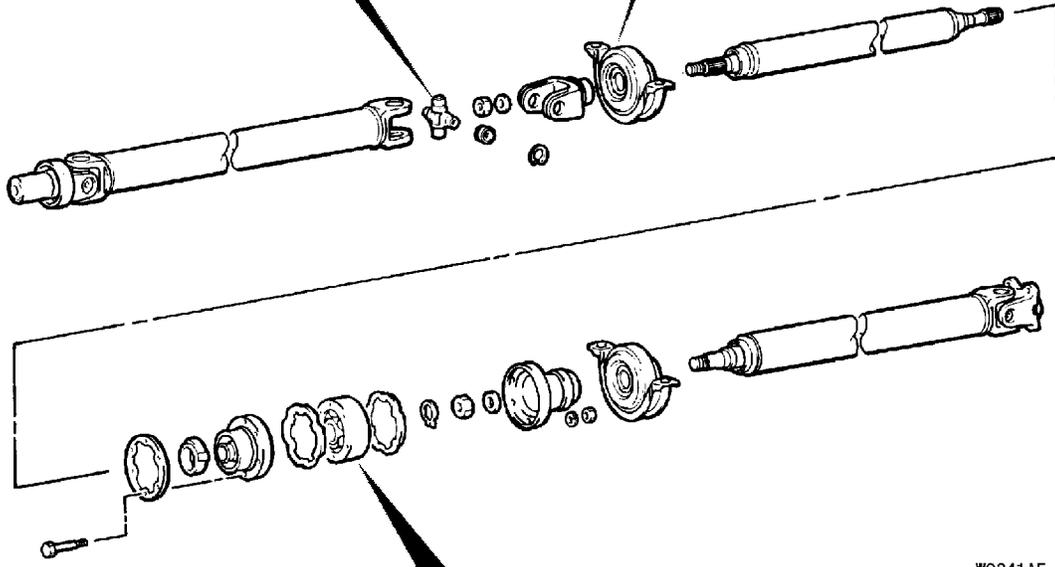
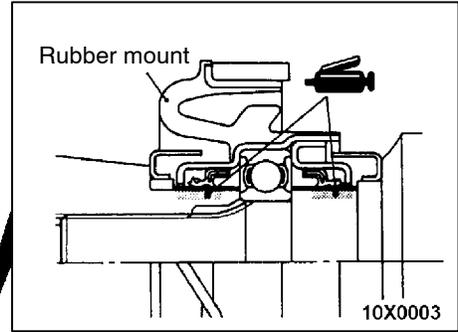
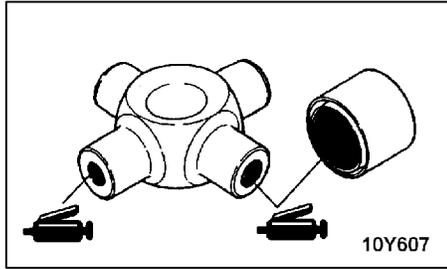
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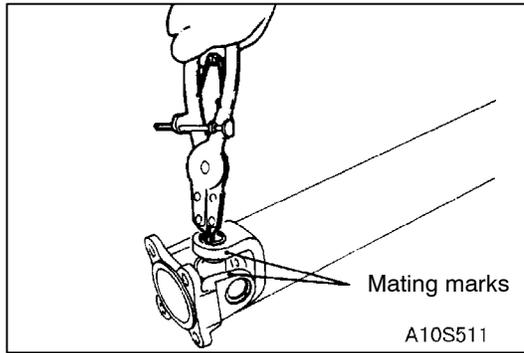
<p>L.J. repair kit</p>	<p>L.J. boot repair kit</p>	<p>Universal joint repair kit</p>

Disassembly steps

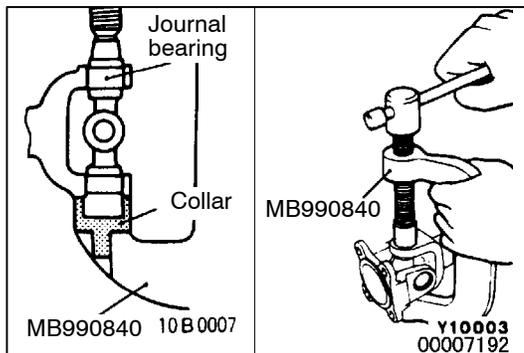
- |     |     |                            |     |     |                                   |
|-----|-----|----------------------------|-----|-----|-----------------------------------|
| ◀A▶ | ▶G▶ | 1. Snap ring               | ◀F▶ | ▶C▶ | 11. L.J. assembly                 |
| ◀B▶ | ▶F▶ | 2. Journal bearing         | ◀G▶ | ▶B▶ | 12. Rubber packing                |
|     | ▶F▶ | 3. Journal                 |     |     | 13. L.J. boot                     |
|     |     | 4. Front propeller shaft   |     |     | 14. Washer                        |
|     | ▶E▶ | 5. Self-locking nut        |     |     | 15. Center propeller shaft        |
| ◀C▶ | ▶E▶ | 6. Center yoke             |     | ▶A▶ | 16. Self-locking nut              |
| ◀D▶ | ▶E▶ | 7. Center bearing assembly |     | ▶A▶ | 17. Companion flange              |
| ◀E▶ |     | 8. Bolt                    | ◀H▶ | ▶A▶ | 18. Center bearing assembly       |
|     |     | 9. Snap ring               |     |     | 19. Rear propeller shaft assembly |
|     | ▶D▶ | 10. Boot band              |     |     |                                   |

LUBRICATION POINTS



**DISASSEMBLY SERVICE POINTS****◀A▶ SNAP RING REMOVAL**

Make mating marks on the yoke and on the propeller shaft, and then remove the snap ring.

**◀B▶ JOURNAL BEARING REMOVAL**

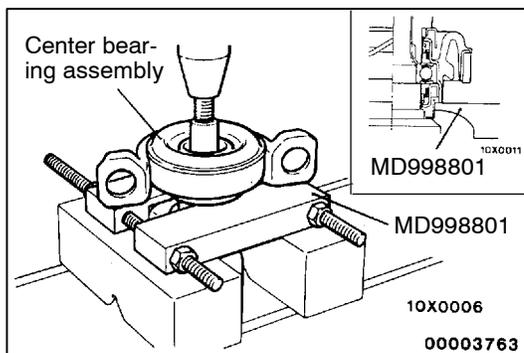
Use the special tool to press-out the journal bearing from the yoke and propeller shaft.

**Caution**

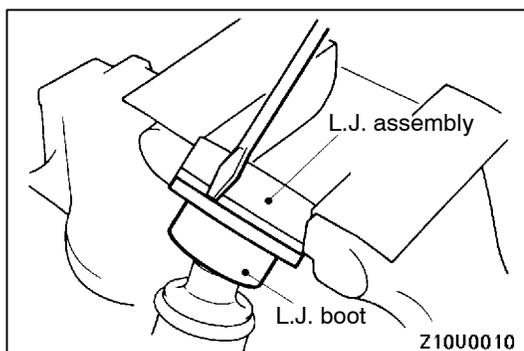
Do not tap the journal bearing to remove it. Tapping the journal bearing will upset the balance of the propeller shaft.

**◀C▶ CENTER YOKE REMOVAL**

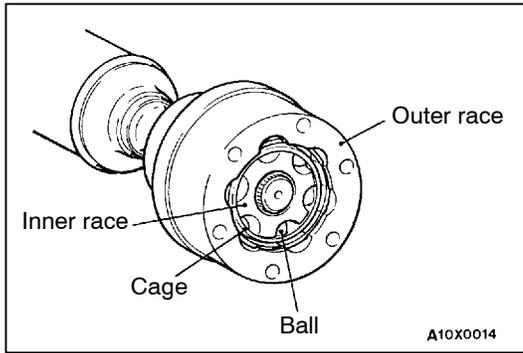
Make mating marks on the center yoke and on the center propeller shaft, and then remove the center yoke.

**◀D▶ CENTER BEARING ASSEMBLY REMOVAL****◀E▶ BOLT REMOVAL**

Make mating marks on the center propeller shaft, L.J. assembly and on the companion flange, and then remove the bolt.

**◀F▶ L.J. ASSEMBLY REMOVAL**

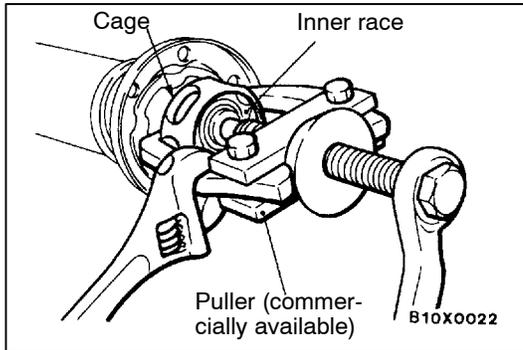
1. Remove the L.J. boot from the L.J. assembly.



2. Make mating marks on the outer race, cage and on the inner race, and then remove the outer race and balls.

**NOTE**

Note the positions of balls so that they can be reinstalled in their original positions.



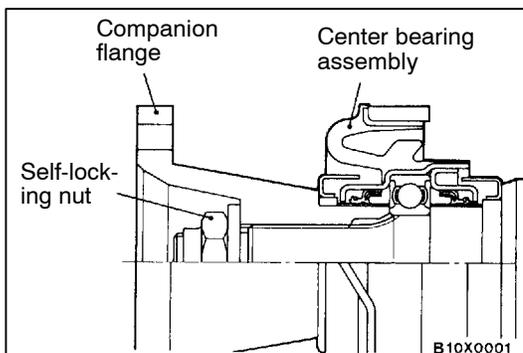
3. Use a puller (commercially available) to remove the inner race with cage from the center propeller shaft assembly.
4. Wipe off the grease and clean the outer race, inner race, cage and balls.

**◀G▶ L.J. BOOT REMOVAL**

When reusing the L.J. boot, wrap the splined end of the center propeller shaft with adhesive tape before removing the L.J. boot.

**◀H▶ COMPANION FLANGE REMOVAL**

Make mating marks on the companion flange and on the rear propeller shaft, and then remove the companion flange.



**REASSEMBLY SERVICE POINTS**

**▶A◀ CENTER BEARING ASSEMBLY/COMPANION FLANGE/SELF-LOCKING NUT INSTALLATION**

1. Face the center bearing assembly as shown in the illustration, and then install it to the rear propeller shaft.
2. Align the mating marks on the companion flange and rear propeller shaft.
3. Tighten the self-locking nut to press-in the center bearing assembly with the companion flange.

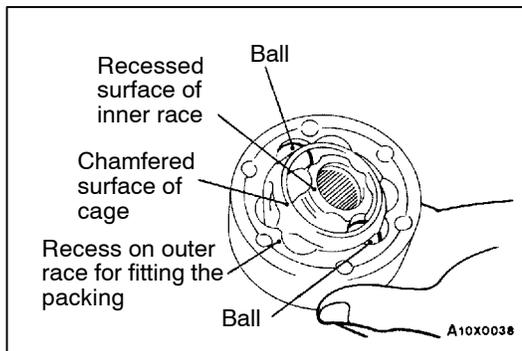
**▶B◀ L.J. BOOT INSTALLATION**

1. Install the boot band.
2. Wrap the splined end of the center propeller shaft with adhesive tape, and then install the L.J. boot.

### ►C◄ L.J. ASSEMBLY INSTALLATION

1. Apply a thin coat of the specified grease to the ball grooves of the inner and outer races.

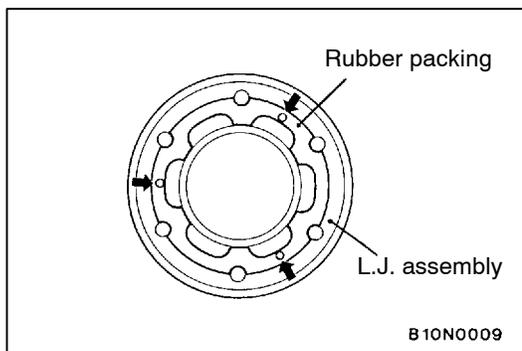
**Specified grease: Repair kit grease**



2. Assemble the L.J. assembly as follows:
  - (1) Put the cage on the inner race with the mating marks aligned, and then install two balls, one in a groove and the other in the groove opposite to that groove. Both balls should be placed in the grooves where they were before disassembly.
  - (2) Assemble the inner race and cage in the outer race with their mating marks aligned.
  - (3) Confirm that the recessed surface of the inner race, the recessed surface (where packing will be fitted) of the outer race, and the chamfered surface of the cage are all on the same side. Also confirm that the relative positions of the inner and outer races are as shown in the illustration.
  - (4) Install the remaining balls in their original positions.
  - (5) Check that the inner and outer races move smoothly.
3. Apply specified grease uniformly to the L.J. assembly.

**Specified grease: Repair kit grease**

**Quantity: 45 - 55 g**

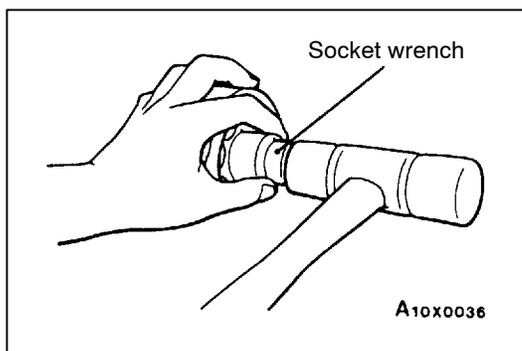


4. Apply a small amount of specified adhesive in places shown by arrow in the illustration on the surface where there is a stepped section for packing, and then fit the rubber packing.

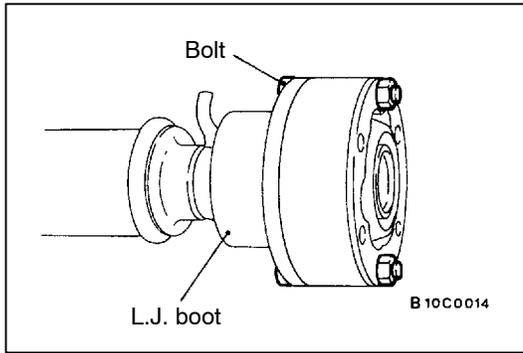
**Specified adhesive:**

**3M ATD Part No.8155 or equivalent**

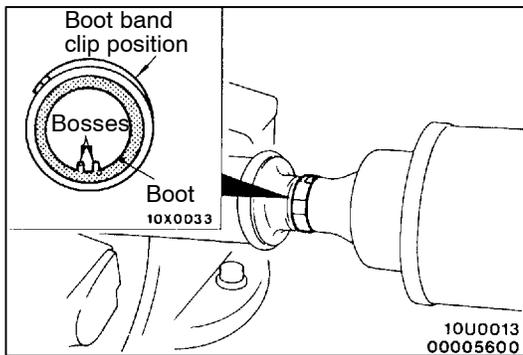
5. Install the L.J. assembly to the center propeller shaft facing the surface where there is a stepped section for packing toward the L.J. boot.



6. Align the mating marks on the L.J. assembly and the center propeller shaft, and then use a socket wrench and hammer to tap the L.J. assembly in the center propeller shaft.



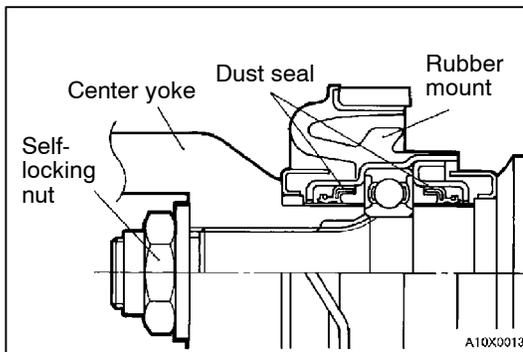
7. Align the bolt holes in the L.J. boot and the L.J. assembly using a mounting bolts, and then tighten the mounting bolts to fix the L.J. boot on the L.J. assembly.
8. Fit the rubber packing for the companion flange to the companion flange using the same procedure as in step 4.



►D◄ BOOT BAND INSTALLATION

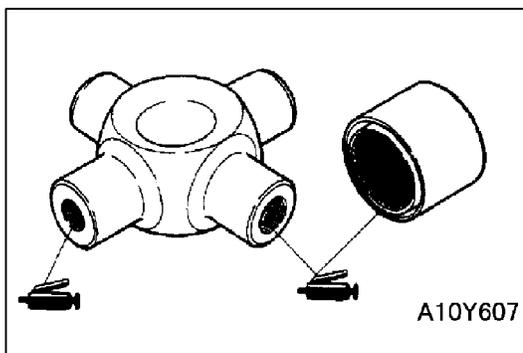
**Caution**

1. Position the boot band clip on the side opposite to the bosses which are provided in the boot for ventilation.
2. Be sure to eliminate grease from around the bosses. Grease obstructs the ventilation air passage.



►E◄ CENTER BEARING ASSEMBLY/CENTER YOKE/SELF-LOCKING NUT INSTALLATION

1. Face the center bearing assembly as shown in the illustration, and then install it to the center propeller shaft.
2. Align the mating marks on the center yoke and center propeller shaft.
3. Tighten the self-locking nut to press-in the center bearing assembly with the center yoke.

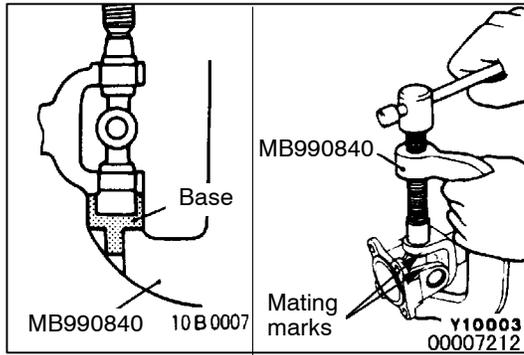


►F◄ JOURNAL/JOURNAL BEARING INSTALLATION

1. Apply multi-purpose grease to the following points of the universal joint.
  - (1) Shaft and journal
  - (2) Dust seal lip
  - (3) Needle roller bearing

**Caution**

Do not apply too much grease. If applying too much grease, improper installation of bearing cap and incorrect selection of snap ring will result.



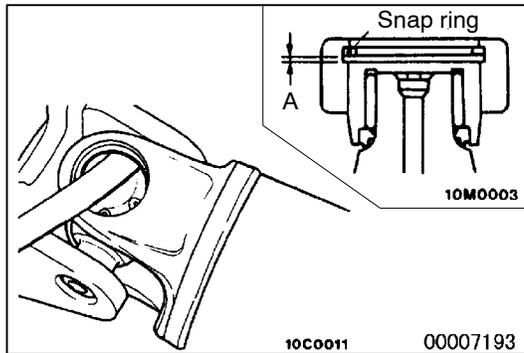
2. Press-in the journal bearing by the following procedure:
  - (1) Align the mating marks on the yoke and propeller shaft.
  - (2) Set the base on the special tool.
  - (3) Use the special tool to press-in the yoke and bearing.

**NOTE**

Bearing will be stopped at the specified position by the base.

**▶G◀ SNAP RING INSTALLATION**

1. Install a snap ring to one side of the snap ring grooves on the flange yoke and propeller shaft yoke, and then use a brass bar to press-in the journal bearing toward the snap ring.



2. Install another snap ring to the opposite snap ring groove, and use a thickness gauge to measure the clearance in the snap ring groove.

**Standard value (A): 0.01 - 0.03 mm**

**Caution**

**Always use snap rings of same thickness on both sides.**