GROUP 25

PROPELLER SHAFT

CONTENTS

GENERAL DESCRIPTION

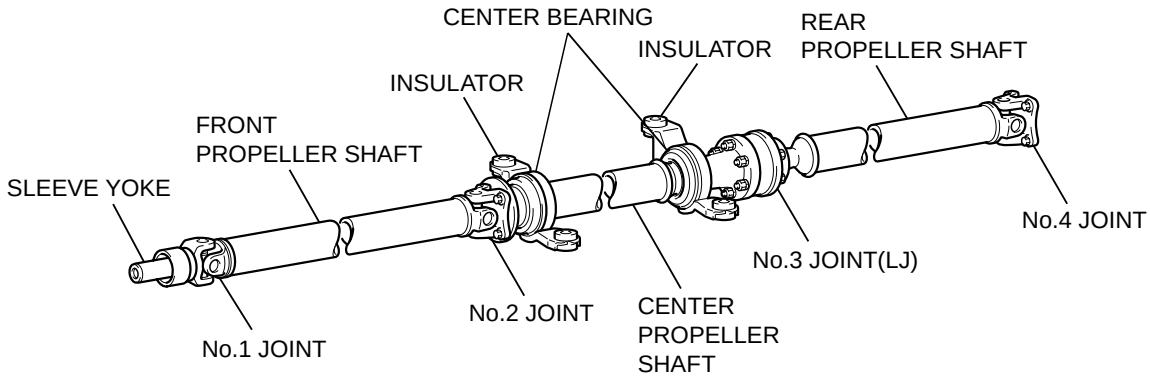
M1251000100142

3 way split 4-joint type propeller shaft with center bearing, with the following features is utilized:

- The No.3 joint incorporates LJ, which is light and compact.
- An insulator is located at the center bearing to vehicle body joint, reducing vibration.
- For environmental protection, a lead-free grease is used on LJ and center bearing.

LJ: Lobro Joint

CONSTRUCTION DIAGRAM



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PROPELLER SHAFT DIAGNOSIS

INTRODUCTION TO PROPELLER SHAFT DIAGNOSIS

M1251001800111

If an abnormal noise is heard from the propeller shaft while driving, some parts of the propeller shaft may be worn or damaged, or some mounting bolts may be loose.

PROPELLER SHAFT DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1251001900129

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted all of the possible ways to find a propeller shaft fault.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Chart.
4. Verify malfunction is eliminated.

SYMPTOM CHART

M1251002000107

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Noise at start	1	P.25-3
Noise and vibration at high speed	2	P.25-3

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Noise at Start

DIAGNOSIS

STEP 1. Check if the propeller shaft and differential companion flange connecting nuts and the center bearing mounting nuts are loose.

Connecting nuts tightening torque: 32 ± 2 N·m (24 ± 1 ft-lb)

Mounting nuts tightening torque: 30 ± 4 N·m (22 ± 3 ft-lb)

Q: Are the connecting nuts and mounting nuts tightened to the specified torque?

YES : Go to Step 2.

NO : Tighten the connecting nuts and mounting nuts to the specified torque. Then go to Step 3.

STEP 2. Check the sleeve yoke's spline of front propeller shaft for wear.

Q: Is wear apparent?

YES : Replace the propeller shaft. Then go to Step 3.

NO : Go to Step 3.

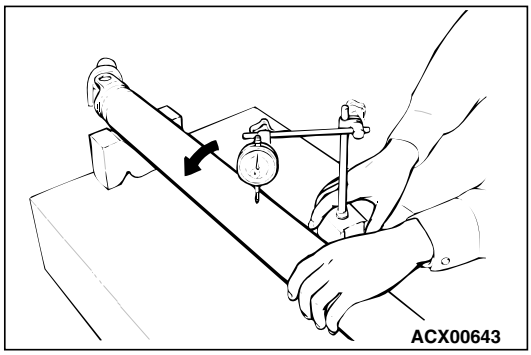
STEP 3. Retest the system.

Q: Is the abnormal noise eliminated?

YES : The procedure is complete.

NO : Recheck from Step 1.

INSPECTION PROCEDURE 2: Noise and Vibration at High Speed



DIAGNOSIS

STEP 1. Check the propeller shaft run-out.

(1) Remove the propeller shaft. (Refer to P.25-4.)

(2) Measure the propeller shaft runout.

Limit: 0.5 mm (0.02 inch)

Q: Is the measured value within the limit?

YES : Go to Step 2.

NO : Replace the propeller shaft. Then go to Step 2.

STEP 2. Retest the system.

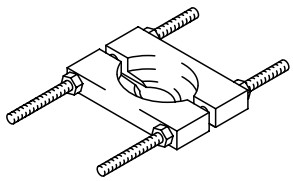
Q: Is the abnormal noise eliminated?

YES : The procedure is complete.

NO : Recheck from Step1.

SPECIAL TOOL

M1251000600158

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
	MD998801 Bearing remover	–	Removal of the center bearing assembly

PROPELLER SHAFT

REMOVAL AND INSTALLATION

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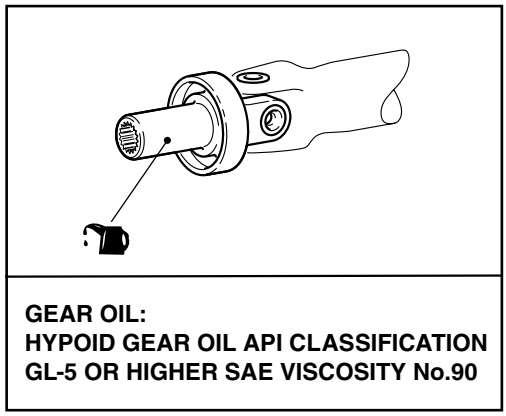
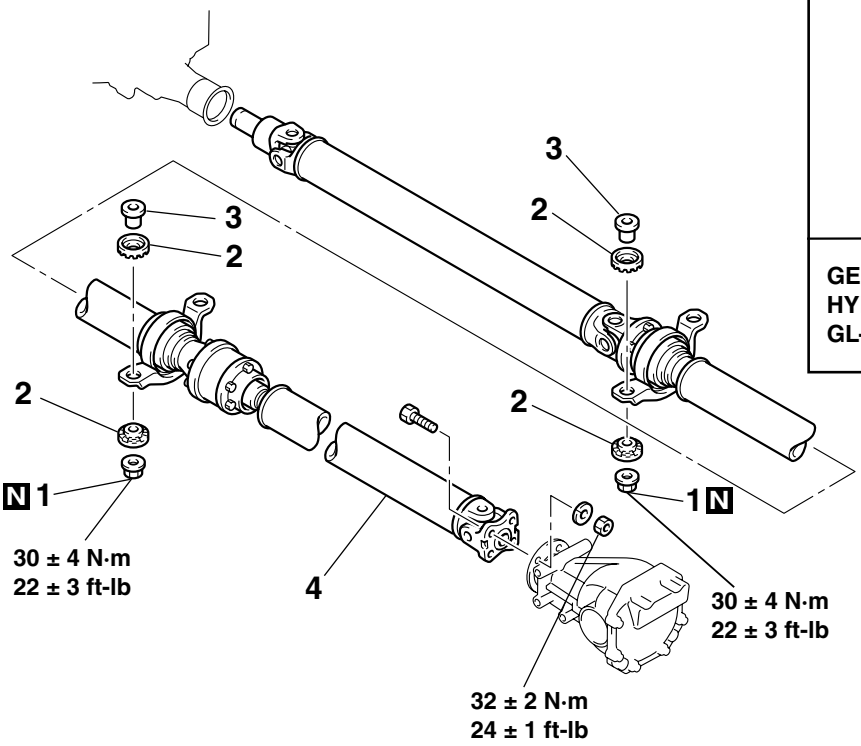


GEAR OIL:
HYPOID GEAR OIL API CLASSIFICATION GL-5 OR HIGHER SAE VISCOSITY No.90



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REMOVAL STEPS
1. SELF LOCKING NUT
2. INSULATOR

<<A>> >>A<<

REMOVAL STEPS (Continued)
3. SPACER
4. PROPELLER SHAFT ASSEMBLY

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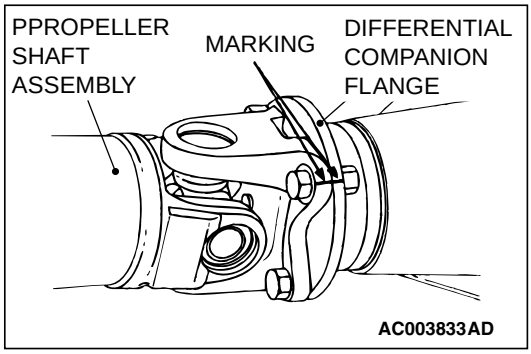
REMOVAL SERVICE POINT

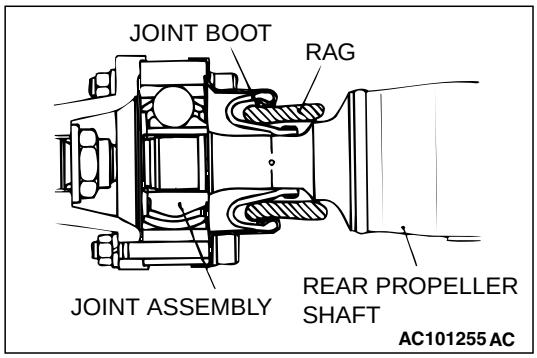
<<A>> PROPELLER SHAFT ASSEMBLY REMOVAL



1. Make mating marks on the differential companion flange and the propeller shaft assembly.

⚠ CAUTION

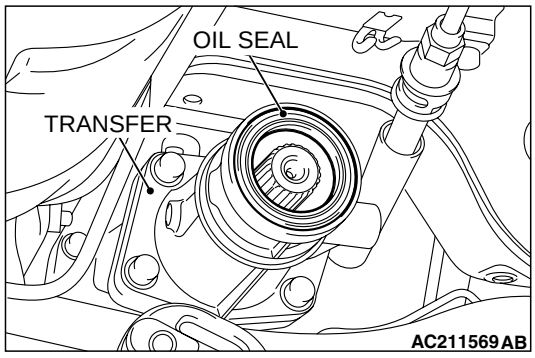
Be careful not to bend the joint portion when removing the propeller shaft because this will damage to the joint boot.



2. Insert a rag so as to avoid boot damage, and remove the propeller shaft assembly in a straight and level manner.

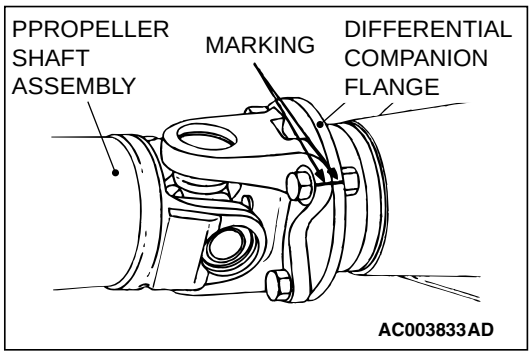
INSTALLATION SERVICE POINT

>>A<< PROPELLER SHAFT ASSEMBLY INSTALLATION



⚠ CAUTION

- **Do not damage the oil seal lips on the transfer case.**
- **Remove oil and grease from the threads of the mounting bolts and nuts before tightening, or they will loosen.**
- **Be careful not to bend the joint portion when removing the propeller shaft, because this will damage the joint boot.**



If reusing the propeller shaft, align the mating marks of differential companion flange and propeller shaft assembly to install.

INSPECTION

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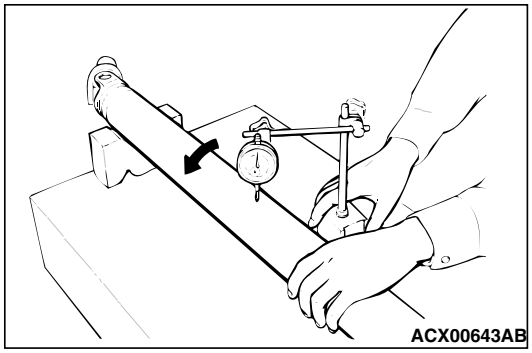
- Check the sleeve yoke and flange yoke for wear, damage or cracks.
- Check the propeller shaft for bends, twisting or damage.
- Check the universal joint for smooth operation in all directions.
- Check the center bearing for smooth movement.

PROPELLER SHAFT RUNOUT

Limit: 0.5 mm (0.02 inch)



DISASSEMBLY AND ASSEMBLY

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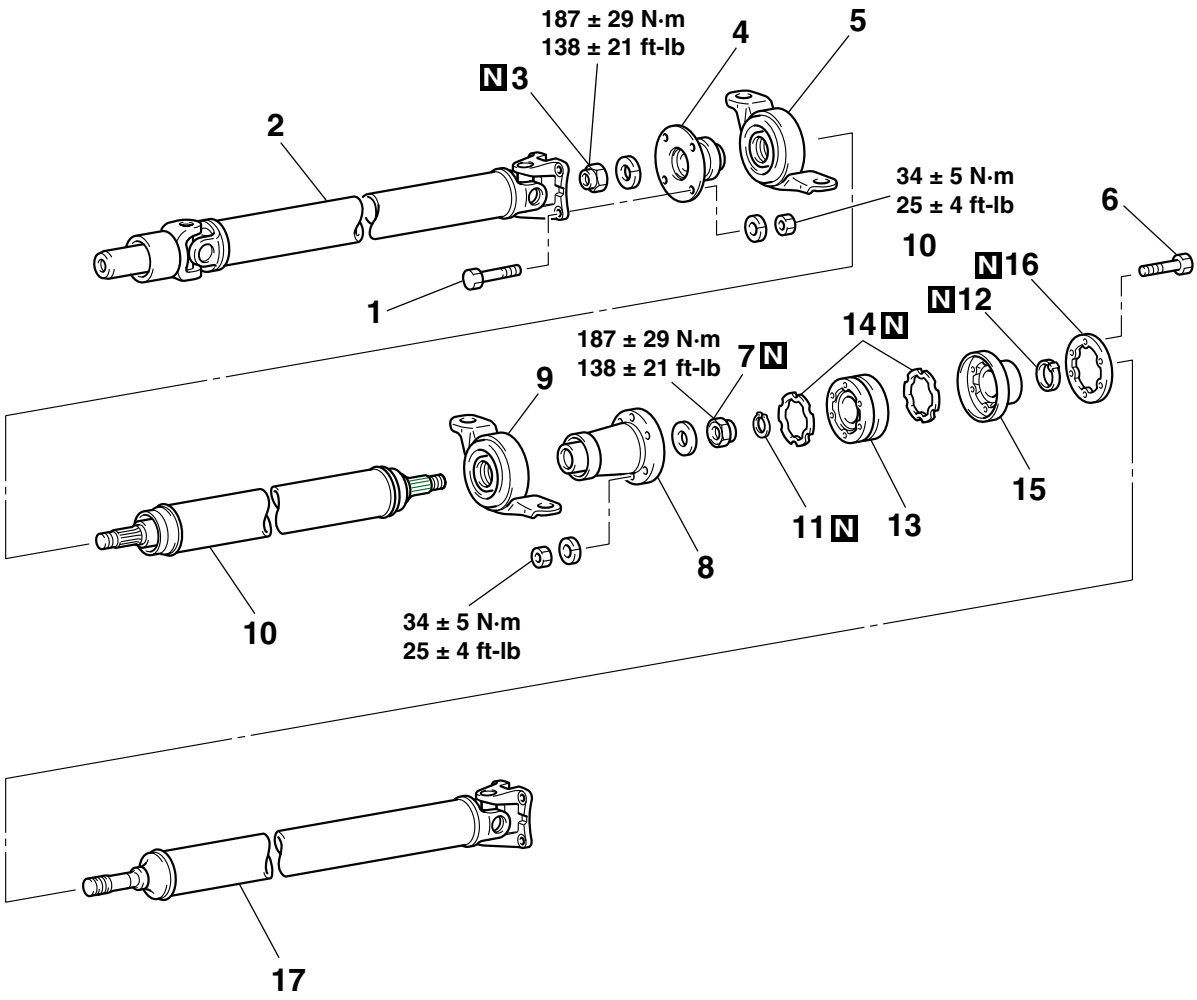

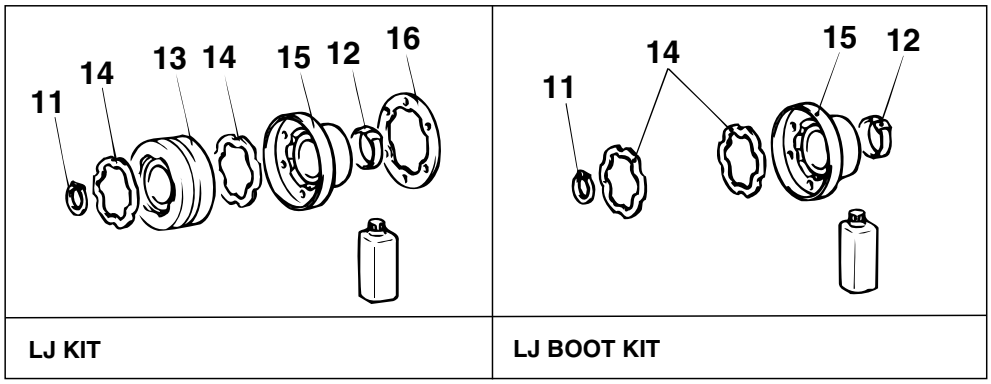

LJ KIT	LJ BOOT KIT

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		DISASSEMBLY STEPS
		1. BOLT
		2. FRONT PROPELLER SHAFT ASSEMBLY
	>>E<<	3. SELF LOCKING NUT
<<A>>	>>E<<	4. COMPANION FLANGE
<<B>>	>>E<<	5. CENTER BEARING ASSEMBLY
<<C>>		6. BOLT
	>>D<<	7. SELF LOCKING NUT

		DISASSEMBLY STEPS
<<A>>	>>D<<	8. COMPANION FLANGE
	>>D<<	9. CENTER BEARING ASSEMBLY
		10. CENTER PROPELLER SHAFT
		11. SNAP RING
	>>C<<	12. BOOT BAND
<<D>>	>>B<<	13. LJ ASSEMBLY
		14. RUBBER PACKING
<<E>>	>>A<<	15. LJ BOOT

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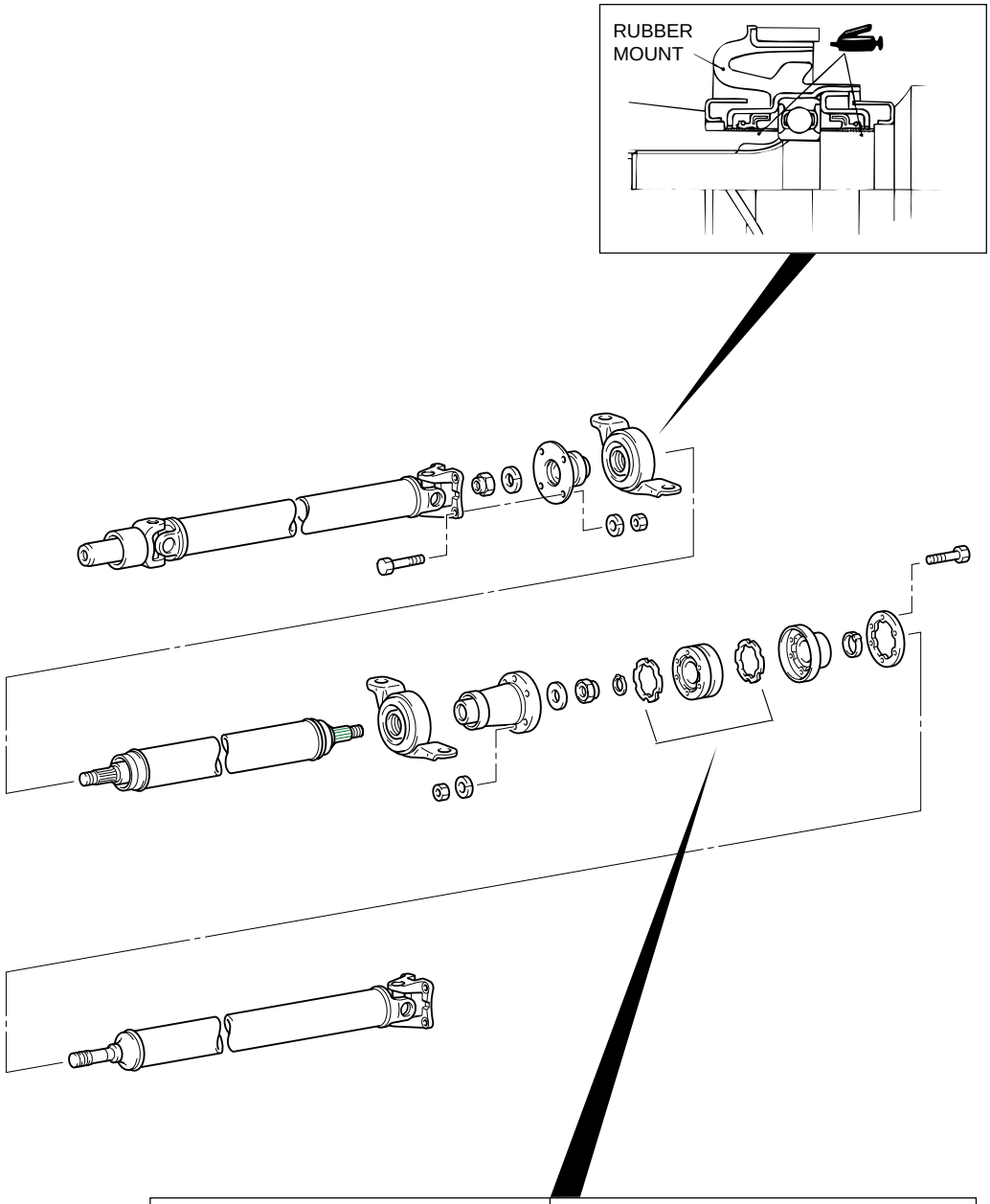
DISASSEMBLY STEPS

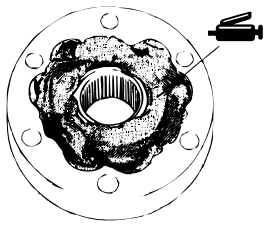
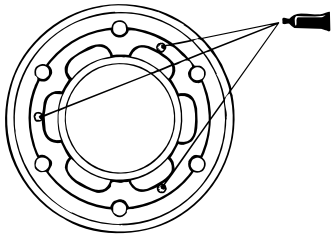
16. WASHER
17. REAR PROPELLER SHAFT

Required Special Tool:

- MD998801: Bearing Remover

LUBRICATION AND ADHESIVE POINTS



	
GREASE: REPAIR KIT GREASE AMOUNT USED: 75 ± 5 g (2.6 ± 0.1 oz)	ADHESIVE: 3M™ AAD PART NO. 8730, 8731 OR EQUIVALENT

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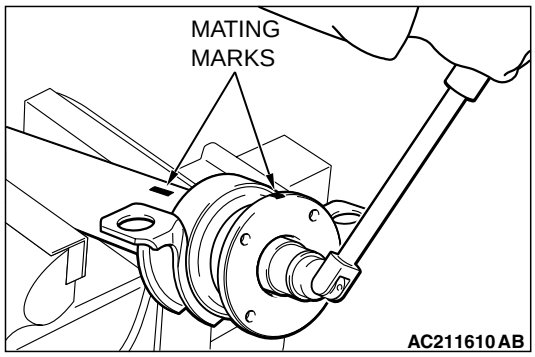
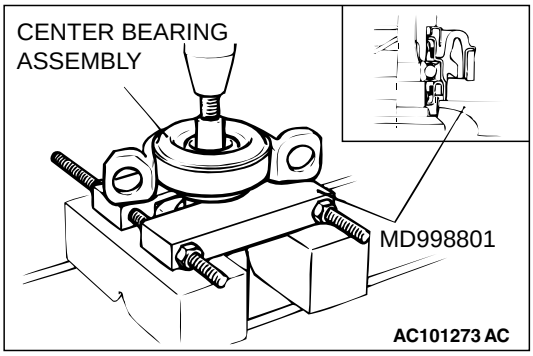
DISASSEMBLY SERVICE POINTS

<<A>> COMPANION FLANGE REMOVAL



Make mating marks on the companion flange and center propeller shaft. Then, remove the companion flange.

<<B>> CENTER BEARING ASSEMBLY REMOVAL



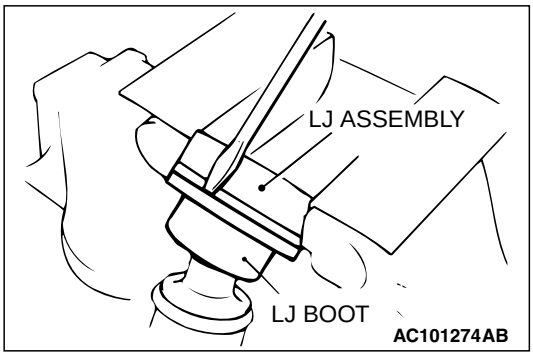
Use special tool MD998801 to remove the center bearing assembly.

<<C>> BOLT REMOVAL

Make mating marks on the rear propeller shaft, LJ assembly and companion flange. Then, remove the bolt.

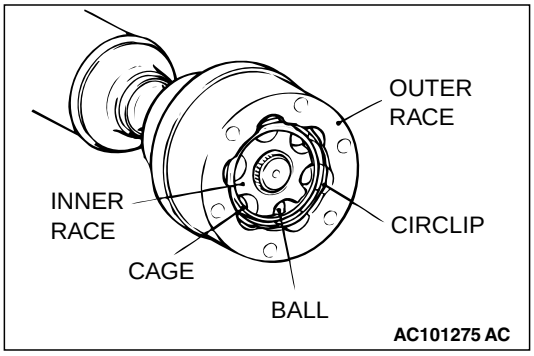
<<D>> LJ ASSEMBLY REMOVAL

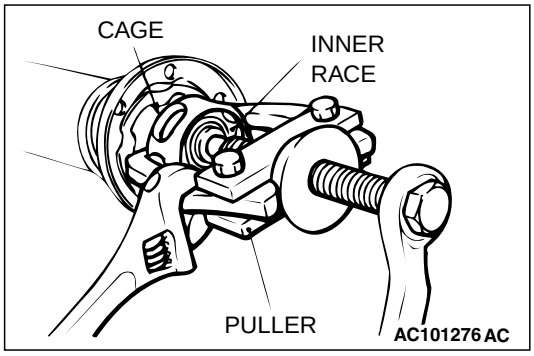
1. Remove the LJ boot from the LJ assembly.



2. Mark the mating marks in outer race, cage and inner race, then remove the circlip, outer race and ball.

   NOTE: Ensure the proper installation of ball as show.





3. Using puller (general service tool), remove the inner race and cage from the center propeller shaft assembly.
4. Wipe grease from the outer race, inner race, cage and ball.

<<E>> LJ BOOT REMOVAL

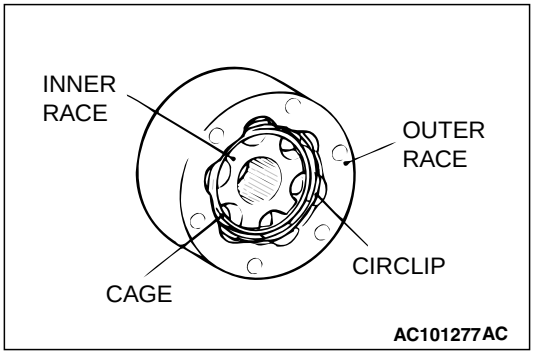
If LJ boot will be reused, tape the spline part of the center propeller shaft in order to remove the boot.

ASSEMBLY SERVICE POINTS

>>A<< LJ BOOT INSTALLATION

1. Install the boot band.
2. After taping the spline part of the center propeller shaft, install the LJ boot.

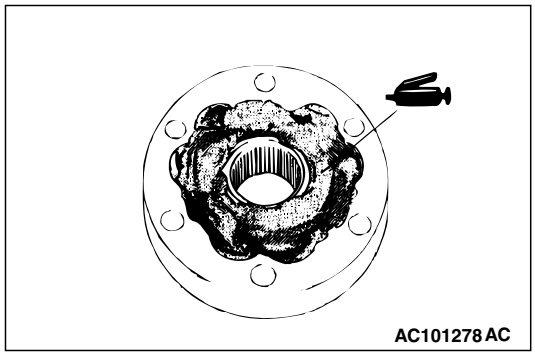
>>B<< LJ ASSEMBLY INSTALLATION



1. Lubricate the specific grease to ball moving part of the outer race and inner race.

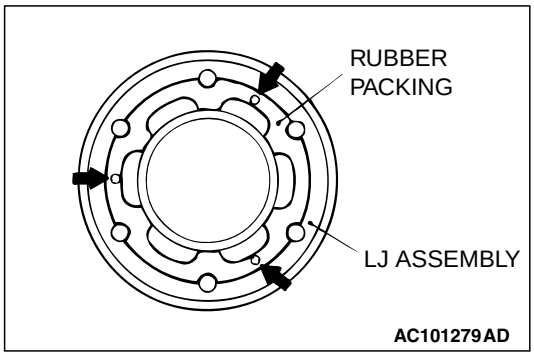
   Specified grease: Repair kit grease

2. Assemble the LJ as follows:.
   (1) Align the mating marks and install the outer race, cage, ball and inner race.
   (2) Install the circlip.



3. Fill the specified grease evenly in LJ assembly.

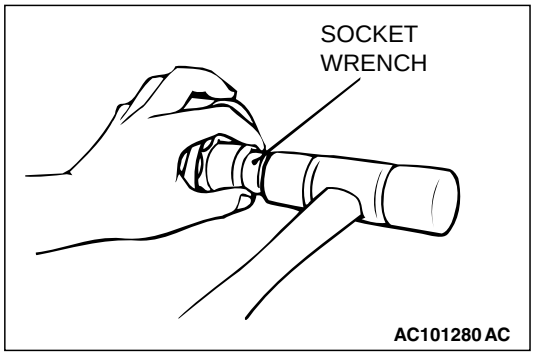
   Specified grease: Repair kit grease
   Amount to use: 75 ± 5 g (2.6 ± 0.1 ounces)



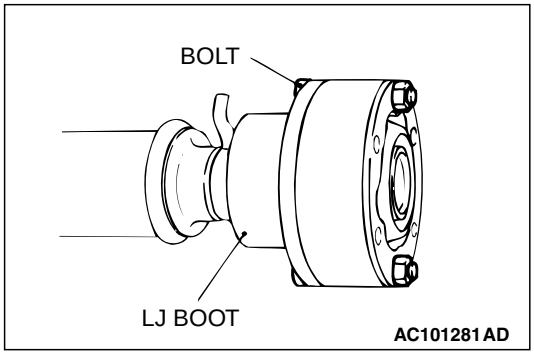
4. Apply a little of the specified sealant to the surface which has groove (for packing) of LJ assembly (shown by arrows in the illustration), fix the rubber packing.

   Specified sealant: 3M™ AAD Part No. 8730, 8731 or equivalent

5. Install the surface which has groove (for packing) of LJ assembly to LJ boot side.



6. Align the mating marks of LJ assembly and center propeller shaft, then install the LJ assembly to center propeller shaft using socket wrench.

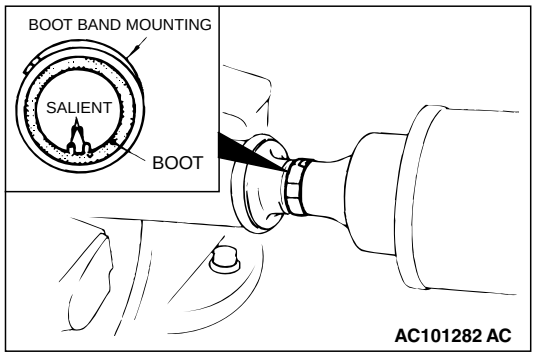


7. Aligned the position of bolt holes of LJ boot and LJ assembly, and install the LJ boot to LJ assembly.
8. Fix the rubber packing of companion flange side, in a similar manner to step 4.

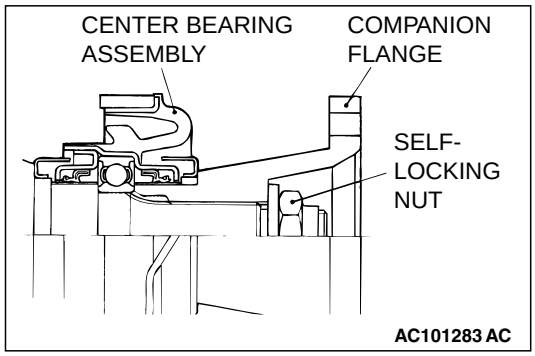
>>C<< BOOT BAND INSTALLATION

⚠ CAUTION

- **Tighten the boot part in opposite direction of convex part for bleeding the boot.**
- **If there is grease in the convex part, wipe out the grease in order to bleed the boot.**

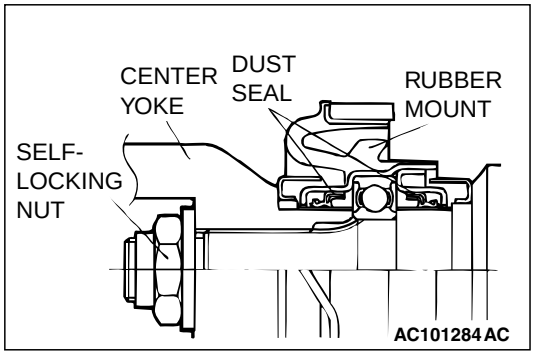


>>D<< CENTER BEARING ASSEMBLY/COMPANION FLANGE/SELF LOCKING NUT INSTALLATION



1. Install the center bearing assembly to the center propeller shaft in the direction shown in the illustration.
2. After aligning the mating marks of the companion flange and center propeller shaft, install them.
3. Tightening the self locking nut, press fit the center bearing assembly using companion flange.

>>E<< CENTER BEARING ASSEMBLY/COMPANION FLANGE/SELF LOCKING NUT INSTALLATION



1. Install the center bearing assembly to the center propeller shaft in the direction shown in the illustration.
2. After aligning the mating marks of the companion flange and center propeller shaft, install them.
3. Tightening the self locking nut, press fit the center bearing assembly using companion flange.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1251001600117

ITEM	SPECIFICATION
Center bearing assembly nut	30 ± 4 N·m (22 ± 3 ft-lb)
Companion flange to front propeller shaft connecting nut	34 ± 5 N·m (25 ± 4 ft-lb)
Companion flange, LJ assembly, LJ boot and washer connecting nut	34 ± 5 N·m (25 ± 4 ft-lb)
Propeller shaft and differential companion flange connecting nut	32 ± 2 N·m (24 ± 1 ft-lb)
Self locking nut (companion flange to front and center propeller shaft connection)	187 ± 29 N·m (138 ± 21 ft-lb)

GENERAL SPECIFICATIONS

M1251000200161

ITEM			SPECIFICATION
Propeller shaft	Type		3 way split 4-joint type propeller shaft
	Length* × Outside diameter mm (in)	Front	608.5 x 65 (24.0 x 2.56)
		Center	551 x 65 (21.7 x 2.56)
		Rear	750.5 x 65 (29.5 x 2.56)
Universal joint	Type	No.1	Cross type (cauking method)
		No.2	Cross type (cauking method)
		No.3	Constant velocity type (LJ)
		No.4	Cross type (cauking method)
	Cross type joint	Bearing	Non-lubrication type needle roller bearing
		Journal diameter mm (in)	18.3 (0.72)

*NOTE: *: The propeller shaft length indicates the length between the center points of each joint.*

SERVICE SPECIFICATION

M1251000300168

ITEM	STANDARD VALUE	LIMIT
Propeller shaft run-out mm (in)	–	0.5 (0.02)

LUBRICANTS

M1251000400187

ITEM	SPECIFIED LUBRICANT	QUANTITY
Front propeller shaft sleeve yoke	Hypoid gear oil API classification GL-5 or higher SAE viscosity 90	As required
LJ assembly	Repair kit grease	75 ± 5 g (2.6 ± 0.1 oz)

SEALANT

M1251000500087

ITEM	SPECIFIED SEALANT	QUANTITY
LJ assembly rubber packing	3M™ AAD Part No. 8730, 8731 or equivalent	As required