GROUP 26

FRONT AXLE

CONTENTS

GENERAL DESCRIPTION

M1261000100228

RWD

- The front hub assembly which uses a double taper roller bearing is mounted on the knuckle spindle. For vehicles with ABS, a rotor for detecting the wheel speed is press-fitted into the front hub.

4WD

- The front axle consists of the hub assembly, drive shaft, inner shaft, front differential. The features are:
- The wheel bearing uses a double taper roller bearing. For vehicles with ABS, a rotor for detecting the wheel speed is bolted to the brake disc.
- Drive shafts of almost identical length reduce torque steer. In addition, a DOJ-BJ-type constant velocity ball joint has high power transmission efficiency and reduces vibration and noise.
- Full time 4WD mechanism has been adopted.
- There are two types of differential gear. The difference between them is gear ratio.

NOTE:
DOJ: Double Offset Joint
BJ: Birfield Joint

FRONT AXLE DIAGNOSIS

INTRODUCTION TO FRONT AXLE DIAGNOSIS

M1261005500179

The full time 4WD mechanism has been adopted for the 4WD vehicles.

Noise from the driveshaft, inner shaft or differential can be caused by a component defect.

FRONT AXLE DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1261005600198

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find a front axle 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

M1261005700214

SYMPTOM		INSPECTION PROCEDURE	REFERENCE PAGE
Driveshaft, inner shaft	Noise during wheel rotation	1	P.26-3
	Noise due to excessive wheel play in turning direction	2	P.26-3
Differential	Constant noise	3	P.26-3
	Gear noise while driving	4	P.26-5
	Gear noise while coasting	5	P.26-6
	Bearing noise while driving or coasting	6	P.26-6
	Noise while turning	7	P.26-6
	Heat	8	P.26-7
	Oil leakage	9	P.26-7

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Noise during Wheel Rotation

DIAGNOSIS

STEP 1. Check the housing tube and inner shaft for bending.

Q: Is the housing tube and inner shaft bent?
YES : Replace the part. Then go to Step 4.
NO : Go to step 2.

STEP 2. Check the inner shaft bearing for wear.

Q: Is the inner shaft bearing worn?
YES : Replace the bearings. Then go to Step 4.
NO : Go to Step 3.

STEP 3. Check the driveshaft assembly for wear, damage or bending.

Q: Is the driveshaft assembly worn, damaged or bent?
YES : Replace the driveshaft assembly. Then go to Step 4.
NO : There is no action to be taken.

STEP 4. Retest the system.

Q: Is the abnormal noise eliminated?
YES : The procedure is complete.
NO : Repeat from Step 1.

INSPECTION PROCEDURE 2: Noise Due to Excessive Wheel Play in Turning Direction

DIAGNOSIS

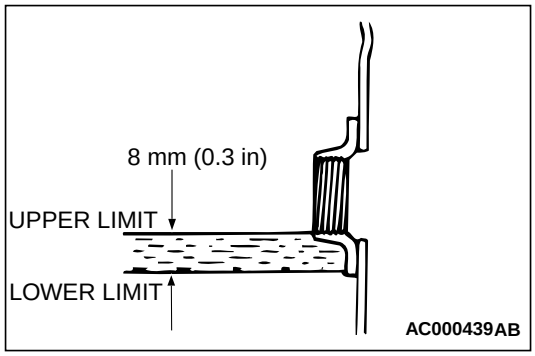
STEP 1. Check for play in the inner shaft and side gear serration, the driveshaft and side gear, or the driveshaft and drive flange.

Q: Is play found?
YES : Adjust or replace the part. Then go to Step 2.
NO : The procedure is complete.

STEP 2. Retest the system.

Q: Is the abnormal noise eliminated?
YES : The procedure is complete.
NO : Repeat from Step 1.

INSPECTION PROCEDURE 3: Constant Noise



DIAGNOSIS

STEP 1. Check the oil level.
Remove the filler plug and check the gear oil level.

Q: Is the gear oil level more than 8 mm (0.3 inch) below the bottom of the filler plug hole?
YES : Check the oil leakage from differential carrier, and repair if necessary. Then, refill Hypoid gear oil API classification GL-5 or higher, SAE viscosity Number 90, 80W. Then go to Step 9.
NO : Go to Step 2.

STEP2. Check the tooth contact (engagement) of the drive gear and drive pinion. Refer to P.26-38.

Q: Is the tooth contact (engagement) of the drive gear and drive pinion correct?

YES : Go to Step 3.
NO : Adjust or replace the part. Then go to Step 9.

STEP3. Check the side bearing for looseness, wear or damage.

Q: Is the side bearing loosened, worn or damaged?

YES : Adjust or replace the part. Then go to Step 9.
NO : Go to Step 4.

STEP 4. Check the drive pinion bearing for wear or damage.

Q: Is the drive pinion bearing worn or damaged?

YES : Adjust or replace the part. Then go to Step 9.
NO : Go to Step 5.

STEP 5. Check the drive gear and drive pinion for wear.

Q: Is the drive gear or drive pinion worn?

YES : Replace the part. Then go to Step 9.
NO : Go to Step 6.

STEP 6. Check the side gear thrust washer or pinion shaft for wear.

Q: Is the side gear thrust washer or pinion shaft worn?

YES : Replace the part. Then go to Step 9.
NO : Go to Step 7.

STEP 7. Check the drive gear and differential case for strain, and the gear for damage.

Q: Is the drive gear or differential case strained or damaged?

YES : Replace the part. Then go to Step 9.
NO : Go to Step 8.

STEP 8. Check for the engagement of foreign material.

Q: Is foreign material found?

YES : Remove the foreign material and then inspect. If necessary, replace the part. Then go to Step 9.
NO : Go to Step 9.

STEP 9. Retest the system.

Q: Is the abnormal noise eliminated?

YES : The procedure is complete.
NO : Repeat from Step 1.

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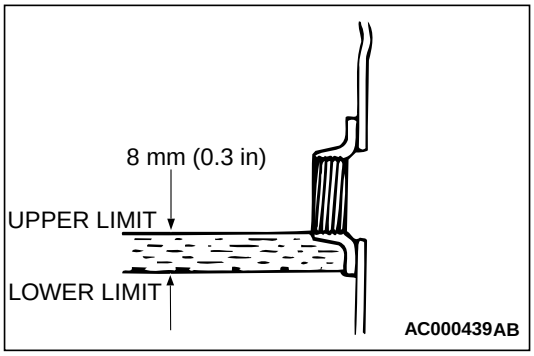
INSPECTION PROCEDURE 4: Gear Noise While Driving



DIAGNOSIS

STEP 1. Check the oil level.
Remove the filler plug and check the gear oil level.

Q: Is the gear oil level more than 8 mm (0.3 inch) below the bottom of the filler plug hole?

YES : Check the oil leakage from differential carrier, and repair if necessary. Then, refill Hypoid gear oil API classification GL-5 or higher, SAE viscosity Number 90, 80W. Then go to Step 7.
NO : Go to Step 2.

STEP 2. Check the gear engagement.

Q: Is the gear engagement in good condition?

YES : Go to Step 3.
NO : Adjust the drive gear and drive pinion. Then go to Step 6.

STEP 3. Check the drive pinion turning torque. Refer to P.26-45.

Q: Is the drive pinion turning torque correct?

YES : Go to Step 4.
NO : Adjust the turning torque. Then go to Step 7.

STEP 4. Check the gear for damage.

Q: Is the gear damaged?

YES : Replace the gear. Then go to Step 7.
NO : Go to Step 5.

STEP 5. Check for the engagement of foreign material.

Q: Is the foreign material found?

YES : Remove the foreign material and then inspect. If necessary, replace the part. Then go to Step 7.
NO : Go to Step 6.

STEP 6. Retest the system.

Q: Is the abnormal noise eliminated?

YES : Replace the drive gear and drive pinion. Then go to Step 7.
NO : The procedure is complete.

STEP 7. Retest the system.

Q: Is the abnormal noise eliminated?

YES : The procedure is complete.
NO : Repeat from Step 1.

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INSPECTION PROCEDURE 5: Gear Noise while Coasting

DIAGNOSIS

STEP 1. Check the drive pinion turning torque. Refer to P.26-45.

Q: Is the drive pinion turning torque correct?
YES : Go to Step 2.
NO : Adjust the turning torque. Then go to Step 3.

STEP 2. Check the gear for damage.

Q: Is the gear damaged?
YES : Replace the gear. Then go to Step 3.
NO : There is no action to be taken.

STEP 3. Retest the system.

Q: Is the abnormal noise eliminated?
YES : The procedure is complete.
NO : Repeat from Step 1.

INSPECTION PROCEDURE 6: Bearing Noise While Driving or Coasting

DIAGNOSIS

STEP 1. Check the drive pinion rear bearing for cracks or damage.

Q: Is the drive pinion rear bearing cracked or damaged?
YES : Replace the part. Then go to Step 2.
NO : There is no action to be taken.

STEP 2. Retest the system.

Q: Is the abnormal noise eliminated?
YES : The procedure is complete.
NO : Repeat to Step 1.

INSPECTION PROCEDURE 7: Noise while Turning

DIAGNOSIS

STEP 1. Check the side bearing for wear or damage.

Q: Is the side bearing worn or damaged?
YES : Replace the part. Then go to Step 3.
NO : Go to step 2.

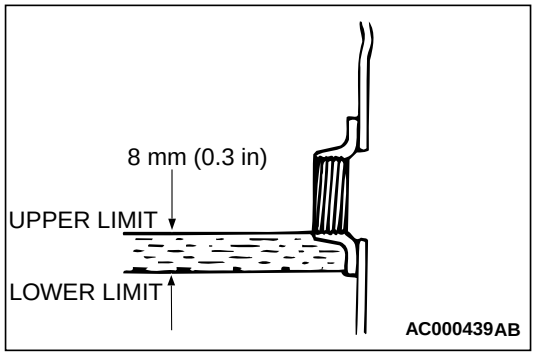
STEP 2. Check the side gear, pinion gear or pinion shaft for damage.

Q: Is the side gear, pinion gear or pinion shaft damaged?
YES : Replace the part. Then go to Step 3.
NO : There is no action to be taken.

STEP 3. Retest the system.

Q: Is the abnormal noise eliminated?
YES : The procedure is complete.
NO : Repeat from Step 1.

INSPECTION PROCEDURE 8: Heat



DIAGNOSIS

STEP 1. Check the oil level.
Remove the filler plug and check the gear oil level.

Q: Is the gear oil level more than 8 mm (0.3 inch) below the bottom of the filler plug hole?

YES : Check the oil leakage from differential carrier, and repair if necessary. Then, refill Hypoid gear oil API classification GL-5 or higher, SAE viscosity Number 90, 80W. Then go to Step 3.
NO : Go to Step 2.

STEP 2. Check the gear backlash (excessive) Refer to P.26-45.

Q: Is the gear backlash correct?

YES : Go to Step 3.
NO : Adjust the backlash. Then go to step 3.

STEP 3. Retest the system.

Q: Is the heat eliminated?

YES : The procedure is complete.
NO : Repeat from Step 1.

INSPECTION PROCEDURE 9: Oil leakage

DIAGNOSIS

STEP 1. Check the vent plug for clogging.

Q: Is the vent plug clogged?

YES : Clean or replace the part. Then go to Step 5.
NO : Go to step 2.

STEP 2. Check the cover installation.

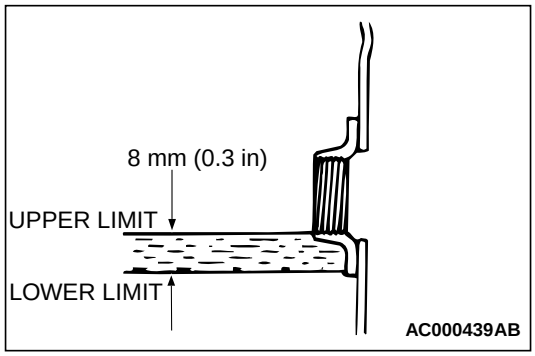
Q: Is the cover installed properly?

YES : Go to Step 3.
NO : Repair. Then go to Step 5.

STEP 3. Check the oil seal for wear or damaged.

Q: Is the oil seal worn or damaged?

YES : Replace the seal. Then go to Step 5.
NO : Go to Step 4.



STEP 4. Check the oil level.

Remove the filler plug and check the gear oil level.

Q: Is the gear oil level more than 8 mm (0.3 inch) below the bottom of the filler plug hole?

YES : Refill Hypoid gear oil API classification GL-5 or higher, SAE viscosity Number 90, 80W. Then go to Step 5.

NO : There is no action to be taken.

STEP 5. Retest the system.

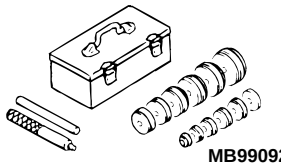
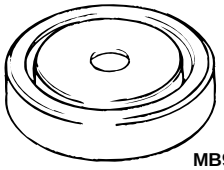
Q: Is there oil leakage?

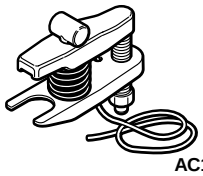
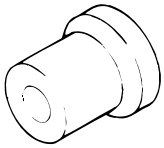
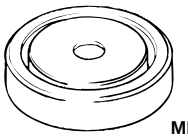
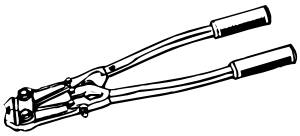
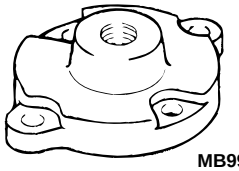
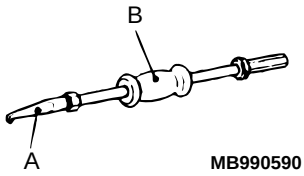
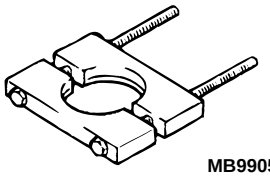
YES : The procedure is complete.

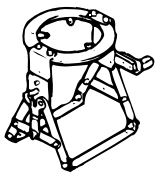
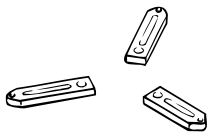
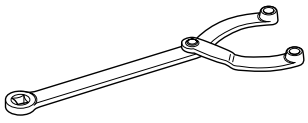
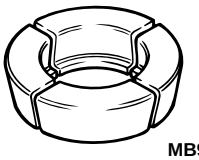
NO : Repeat to Step 1.

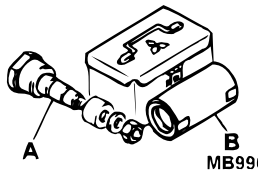
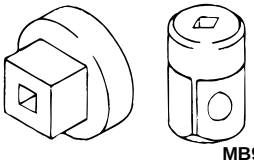
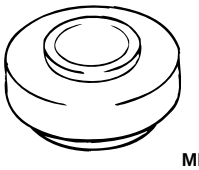
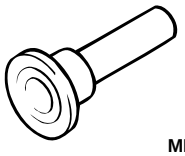
SPECIAL TOOLS

M1261000600245

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 B990954	MB990954 Lock nut wrench	MB990954-01	Removal and adjustment of jam nut
 MB990925	MB990925 Bearing and oil seal installer set	MB990925-01 or General service tool	• Press-fitting of wheel bearing outer race MB990935 MB990938 • Press-fitting of oil seal (differential carrier) • Press-fitting of drive pinion rear bearing outer race MB990934 MB990938 • Press-fitting of drive pinion front bearing outer race MB990936 MB990938
 MB990955	MB990955 Oil seal installer	MB990955-01	• Press-fitting of front hub oil seal (Used together with MB990938) • Press-fitting of housing tube dust seal (Used together with MB990938)

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 AC106827	MB991897 Ball joint remover	MB991113-01, MB990635-01 or General service tool	Ball joint removal *NOTE: Steering linkage puller (MB990635 or MB991113) is also used to disconnect knuckle and tie rod end ball joint.*
 MB990956	MB990956 Needle bearing installer	MB990956-01	Press-fitting of knuckle needle bearing (used together with MB990938)
 MB990985	MB990985 Oil seal installer	MB990985-01	Press-fitting of knuckle oil seal (used together with MB990938)
 MB991561	MB991561 Boot band crimping tool	MB991561	Resin boot band installation
 MB990906	MB990906 Driveshaft attachment	MB990241-01	Removal and installation of inner shaft
 MB990590	MB990590 Rear axle shaft oil seal remover A: MB990212 Adapter B: MB990211 Sliding hammer	–	
 MB990560	MB990560 Bearing remover	MD998348-01	Removal and press-fitting of inner shaft bearing

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB990909	MB990909 Working base	–	Supporting of front differential carrier assembly
	MB991116 Adapter	–	
 MB990810	MB990810 Side bearing puller	MB990810-01	Wheel bearing inner race (outside) removal
 MB990811	MB990811 Differential side bearing cap	MB990811-01	
 B990767	MB990767 End yoke holder	MB990767-01	Removal and installation of companion flange
 MB990339	MB990339 Bearing puller	MB990339-01	Removal of drive pinion front bearing inner race
 MB990648	MB990648 Bearing remover	MB990648-01	

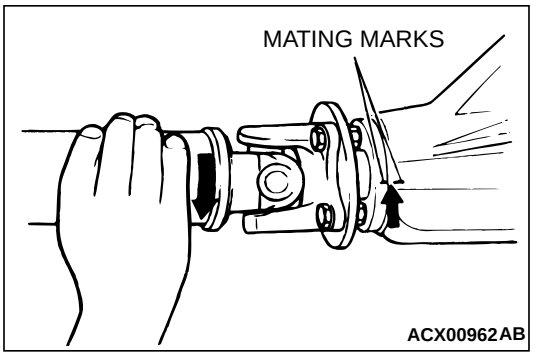
TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB990835	MB991171 Pinion height gauge set A: MB990819 Drive pinion gauge assembly B: MB991170 Cylinder gauge	–	• Inspection of drive pinion rotation starting torque • Measurement of drive pinion height
 MB990326	MB990326 Preload socket	General service tool	Measurement of wheel bearing turning torque
	MB990685 Torque wrench	–	Measurement of drive pinion turning torque
 MB990802	MB990802 Bearing installer	MB990802-01	• Press-fitting of drive pinion front bearing inner race • Press-fitting of side bearing inner race
 MB990031	MB990031 or MB990699 Drive pinion oil seal installer	MB990031-01	Press-fitting of drive pinion oil seal

ON-VEHICLE SERVICE

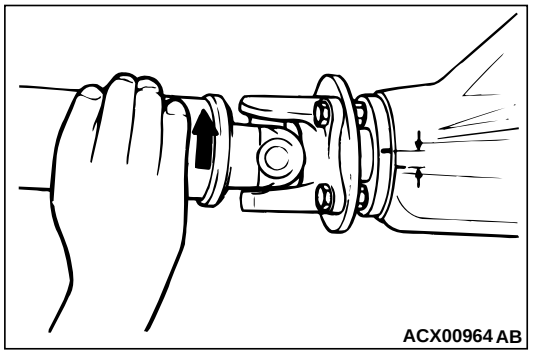
FRONT AXLE TOTAL BACKLASH CHECK

M1261001300076

1. If the vehicle vibrates and produces a booming sound due to an imbalance in the drive system, measure the front axle total backlash by the following procedure to see if the differential carrier assembly requires removal.
   (1) Park the vehicle on a flat, level surface.
   (2) Move the transmission control lever to the neutral position. Apply the parking brake. Raise the vehicle on a jack.



(3) Turn the companion flange clockwise as far as it will go. Make the mating mark on the dust cover of the companion flange and on the differential carrier.



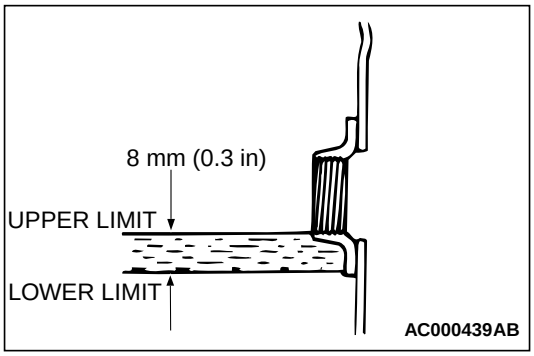
(4) Turn the companion flange counterclockwise as far as it will go, and measure the amount of distance the mating marks moved.

Limit: 11 mm (0.4 inch)

2. If the backlash exceeds the limit, remove the differential carrier assembly and final drive gear. Then check the differential gear meshing condition and the looseness of the driveshaft or inner shaft splines.

FRONT AXLE GEAR OIL LEVEL CHECK

M1262000900078



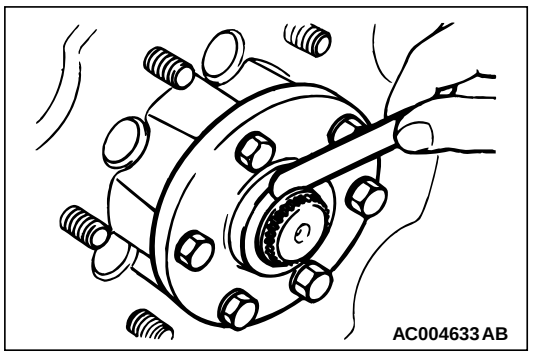
Remove the filler plug and check the gear oil level. Check that the gear oil level is not more than 8 mm (0.3 inch) below the bottom of the filler plug hole.

Specified gear oil: Hypoid gear oil API classification GL-5 or higher, SAE viscosity Number 90, 80W [1.15 dm^3 (1.22 quart)]

DRIVE SHAFT END PLAY CHECK

M1261001400062

1. Jack up the vehicle and remove the front wheels.
2. Remove the hub cap.
3. Manually push the driveshaft in the direction in which it will closely contact the knuckle.
4. Use a feeler gauge to measure the clearance between the drive flange and the snap ring as shown in the illustration.



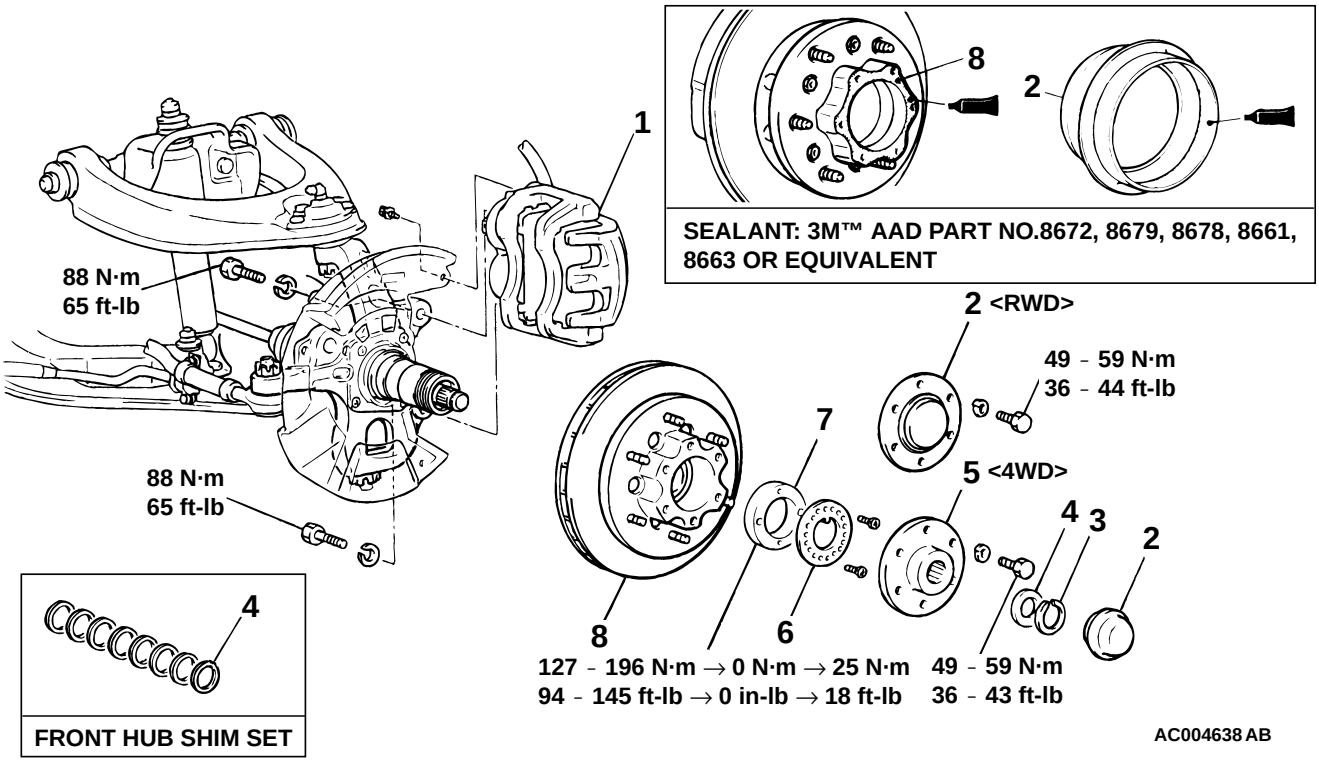
Standard value: 0.4 – 0.7 mm (0.02 – 0.03 inch)

5. If the play is not within the standard value, adjust by adding or removing shims.

FRONT AXLE HUB ASSEMBLY

REMOVAL AND INSTALLATION

M1261001700212



REMOVAL STEPS

<<A>> 1. CALIPER ASSEMBLY
2. HUB CAP
>>D<< • DRIVE SHAFT END PLAY ADJUSTMENT <4WD>
3. SNAP RING
4. SHIM
5. DRIVE FLANGE
>>C<< • HUB ROTARY SLIDING RESISTANCE AND WHEEL ADJUSTMENT <4WD>
>>B<< 6. SPRING WASHER

REMOVAL STEPS (Continued)

<<B>> >>A<< 7. JAM NUT
<<C>> 8. FRONT HUB ASSEMBLY

Required Special Tool:

- MB990954: Lock Nut Wrench

REMOVAL SERVICE POINTS

<<A>> CALIPER ASSEMBLY REMOVAL

Secure the removed caliper assembly with wire to prevent it from falling off.

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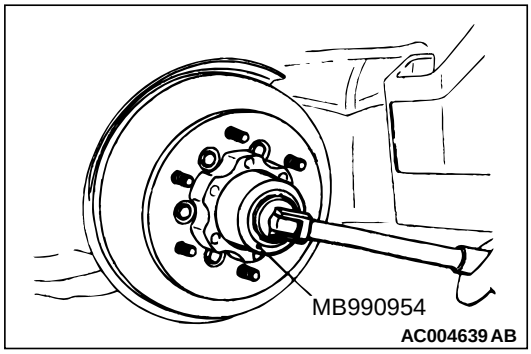
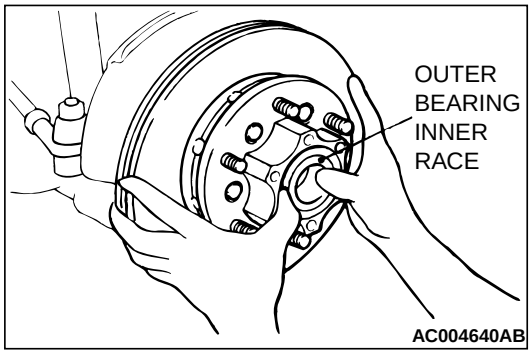


<<B>> JAM NUT REMOVAL

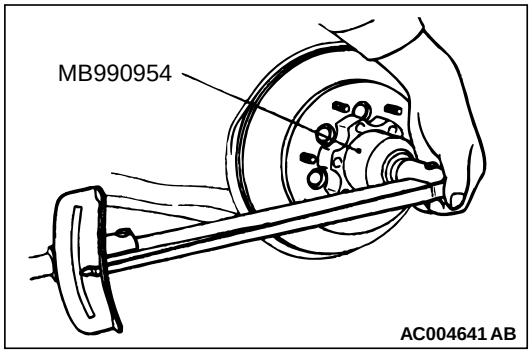
Use special tool MB990954 to remove jam nut.



<<C>> FRONT HUB ASSEMBLY REMOVAL

Do not drop the outer bearing inner race.

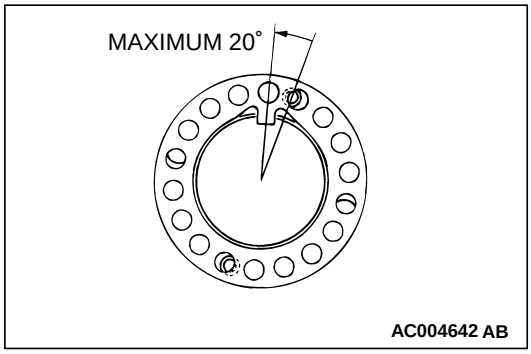
INSTALLATION SERVICE POINT



>>A<< JAM NUT INSTALLATION

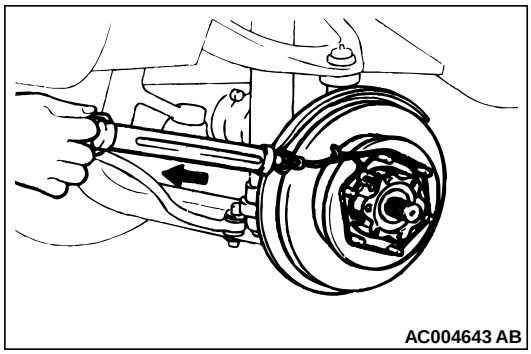
Using special tool MB990954 tighten the jam nut by the following procedures.

1. Tighten the jam nut to 127 – 196 N·m (94 – 145 ft-lb), and then turn the front hub assembly to run in the bearings.
2. Loosen the nuts to 0 N·m (0 in-lb).
3. After re-tightening to 25 N·m (18 ft-lb), loosen the jam nuts by approximately 30 degree angle.



>>B<< SPRING WASHER INSTALLATION

Install the lock washer. If the hole position is not aligned with the jam nut, move it within a range of not more than 20 degree angle until the holes are aligned.


AC004643 AB

>>C<< HUB ROTARY SLIDING RESISTANCE AND WHEEL BEARING AXIAL MOVEMENT ADJUSTMENT <4WD>

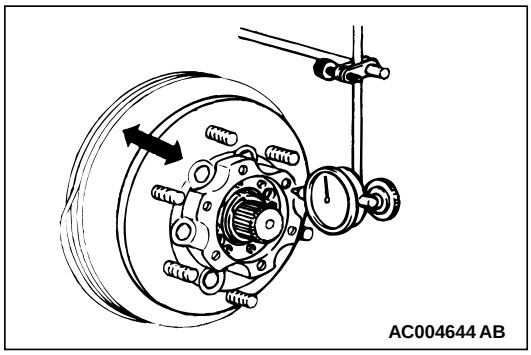
1. Use a spring scale to measure the hub rotary sliding resistance (hub rotation breakaway torque) as shown in the illustration.

   Standard value: 4 – 19 N (0.9 – 4.3 lb) [0.3 – 1.3 N·m (2.7 – 11.5 in-lb)]

2. If the rotary sliding resistance is not within the standard value, remove the lock washer and adjust by the following procedure.
   (1) If the rotary sliding resistance is lower than the standard value, use special tool MB990954 to tighten the jam nut.
   (2) If the rotary sliding resistance is higher than the standard value, use special tool MB990954 to loosen the jam nut.
3. Install a dial gauge as shown in the illustration, and then move the hub in the axial direction and measure how far the front wheel bearing moves.

   Standard value: 0.05 mm (0.002 inch) or less

4. If the distance exceeds the standard value, remove the spring washer and use special tool MB990954 to tighten the jam nut.
5. If adjustment is not possible, disassemble the hub and inspect each part.

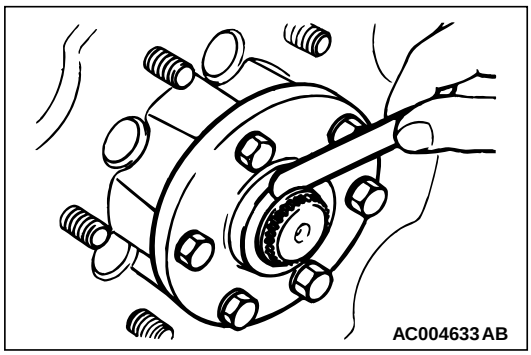

AC004644 AB

>>D<< DRIVESHAFT END PLAY ADJUSTMENT <4WD>

1. Push the driveshaft in by hand towards the knuckle until they touch.
2. Measure the clearance between the drive flange and the spacer with a feeler gauge as shown in the illustration.

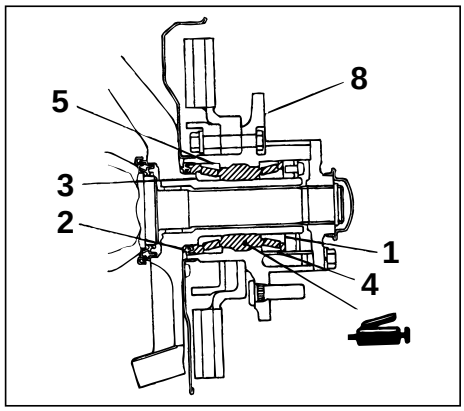
   Standard value: 0.4 – 0.7 mm (0.02 – 0.03 inch)

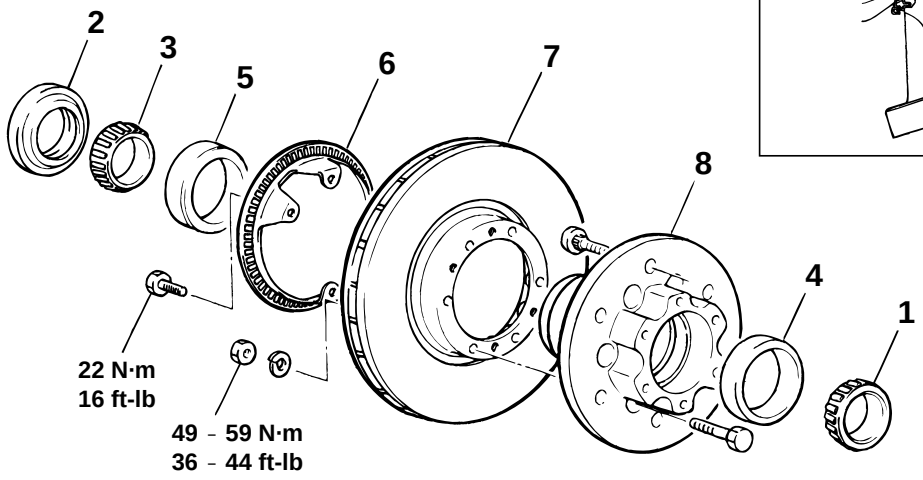
3. If the amount of play is not within the standard value, adjust by selecting a shim that will bring the play to the standard value.


AC004633 AB

DISASSEMBLY AND ASSEMBLY

M1261001900119





AC004655 AB

		DISASSEMBLY STEPS
	1.	OUTER BEARING INNER RACE
>>B<<	2.	OIL SEAL
	3.	INNER BEARING INNER RACE
<<A>> >>A<<	4.	OUTER BEARING OUTER RACE
<<A>> >>A<<	5.	INNER BEARING OUTER RACE
	6.	ABS ROTOR <VEHICLES WITH ABS>
<<B>>	7.	BRAKE DISC
	8.	FRONT HUB ASSEMBLY

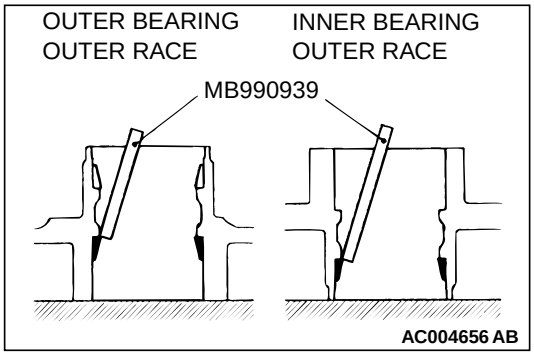
Required Special Tools:

- MB990935: Installer Adapter
- MB990938: Bar
- MB990939: Brass Bar
- MB990955: Oil Seal Installer

DISASSEMBLLY SERVICE POINTS

<<A>> OUTER BEARING OUTER RACE/INNER BEARING OUTER RACE REMOVAL

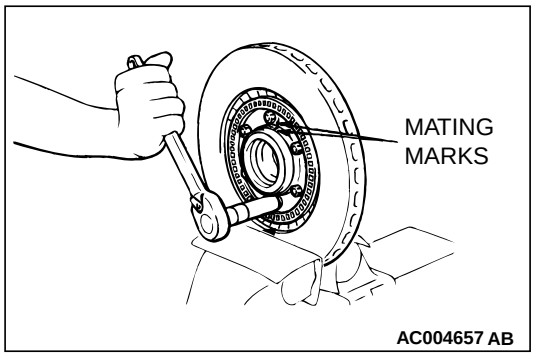
Use special tool MB990939 to remove outer bearing outer race and inner bearing outer race.



AC004656 AB

TSB Revision

<<B>> BRAKE DISC REMOVAL



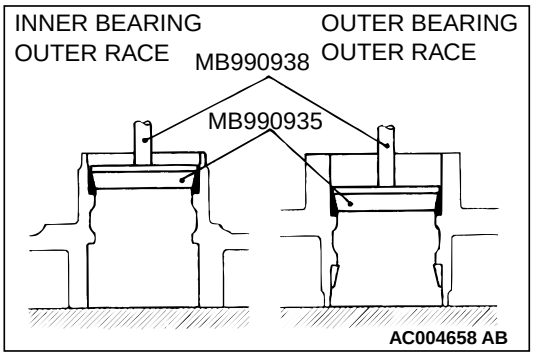
⚠ CAUTION

Lock disc in vise and grip with copper or aluminum board.

Make the mating marks on the brake disc and front hub, and then separate the front hub and brake disc, if necessary.

ASSEMBLY SERVICE POINTS

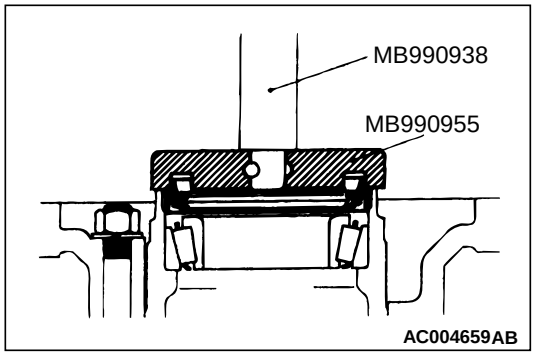
>>A<< INNER BEARING OUTER RACE/OUTER BEARING OUTER RACE INSTALLATION



Use special tools MB990938, MB990935 to install inner bearing outer race and outer bearing outer race.

NOTE: Replace the inner race and outer race assembly as a set.

>>B<< OIL SEAL INSTALLATION



Use special tools MB990938, MB990955 to install oil seal.

KNUCKLE

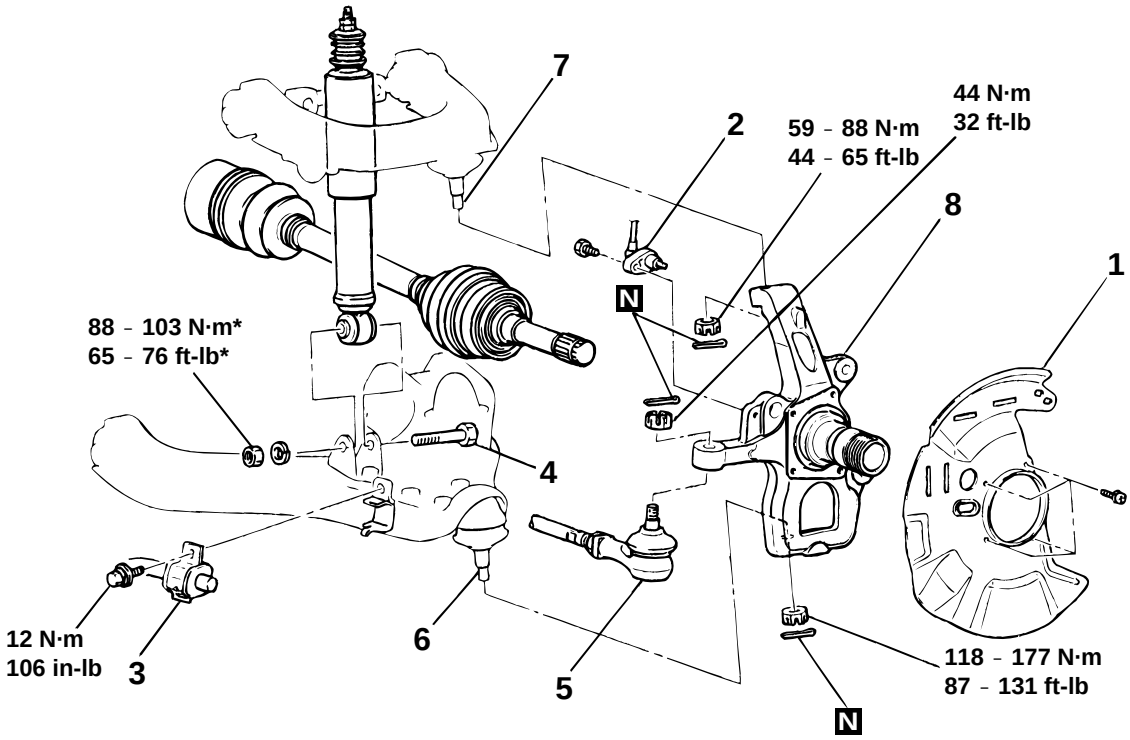
REMOVAL AND INSTALLATION

M1261002400173

⚠ CAUTION

***: Indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.**

Pre-removal Operation	Post-installation Operation
• Front Hub Assembly Removal (Refer to P.26-13.)	• Press the dust cover with a finger to check whether the dust cover is cracked or damaged. • Front Hub Assembly Installation (Refer to P.26-13.) • Wheel Alignment Check and Adjustment (Refer to GROUP 33A, On-vehicle Service P.33A-3.)



AC004662AB

REMOVAL STEPS

1. DUST COVER
2. FRONT SPEED SENSOR <VEHICLES WITH ABS> (REFER TO GROUP 35B, WHEEL SPEED SENSOR.)
3. STABILIZER BAR CONNECTION
4. SHOCK ABSORBER LOWER MOUNTING BOLT

<<A>> 5. TIE ROD END CONNECTION

REMOVAL STEPS (Continued)

<<A>> 6. LOWER ARM BALL JOINT CONNECTION

<<A>> 7. UPPER ARM BALL JOINT CONNECTION

8. KNUCKLE

Required Special Tool:

- MB991897: Ball Joint Remover

TSB Revision

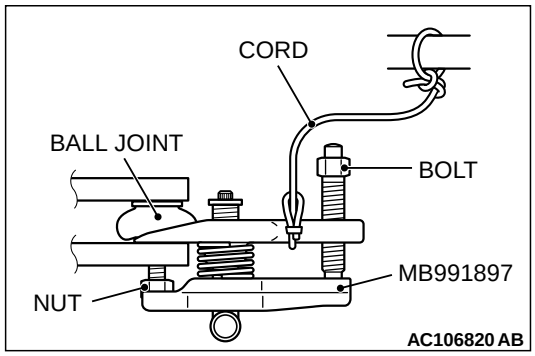
REMOVAL SERVICE POINT

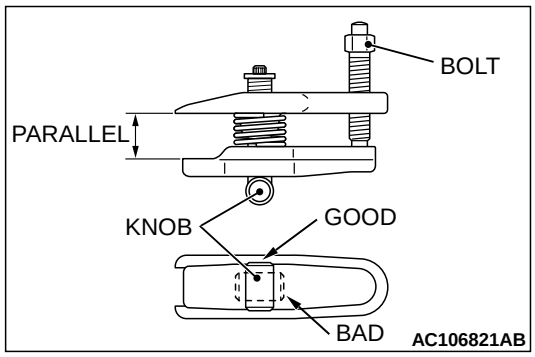
<<A>> TIE ROD END/UPPER ARM BALL JOINT DISCONNECTION

⚠ CAUTION

- **Do not remove the nut from ball joint. Loosen it and use special tool MB991897 to avoid possible damage to ball joint threads.**
- **Hang special tool MB991897 with cord to prevent it from falling.**

1. Install special tool MB991897 as shown in the figure.





2. Turn the bolt and knob as necessary to make the jaws of special tool MB991897 parallel, tighten the bolt by hand and confirm that the jaws are still parallel.

   NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.

3. Tighten the bolt with a wrench to disconnect the tie rod end.

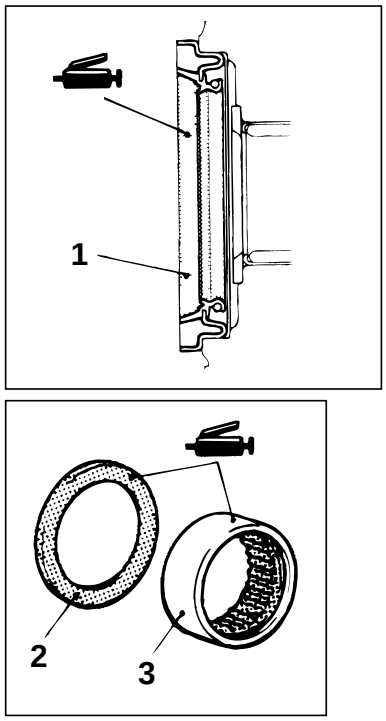
INSPECTION

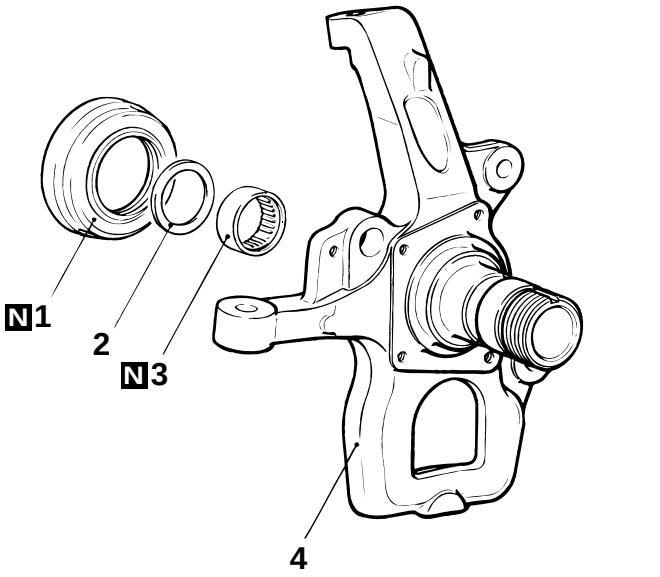
M1261002500169

Check the knuckle for wear or cracks.

DISASSEMBLY AND ASSEMBLY <4WD>

M1261003200064





AC004676 AB

DISASSEMBLY STEPS

	>>C<<	1. OIL SEAL
	>>B<<	2. SPACER
<<A>>	>>A<<	3. NEEDLE BEARING
		4. KNUCKLE

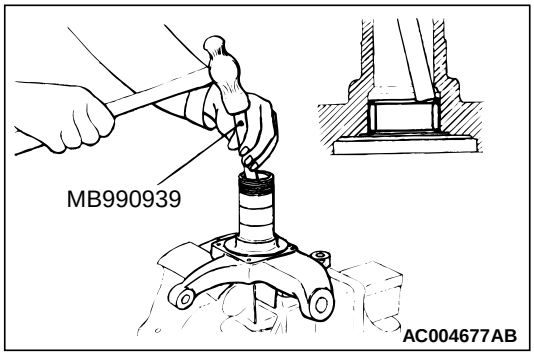
Required Special Tools:

- MB990938: Bar
- MB990939: Brass Bar
- MB990956: Needle Bearing Installer
- MB990985: Oil Seal Installer

DISASSEMBLY SERVICE POINT

<<A>> NEEDLE BEARING REMOVAL

1. Remove the oil seal and take out the spacer.
2. Drive out the needle bearing by tapping the needles uniformly.



AC004677AB

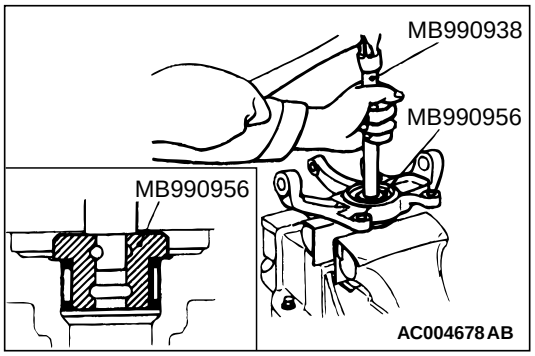
ASSEMBLY SERVICE POINTS

>>A<< NEEDLE BEARING INSTALLATION

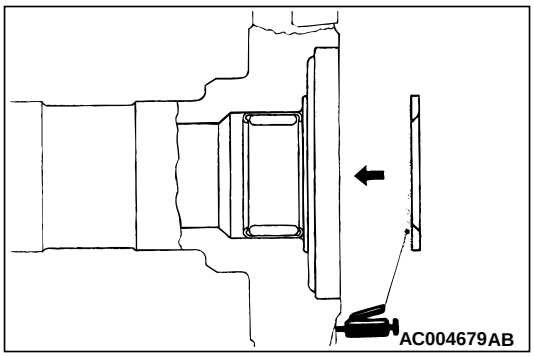
⚠ CAUTION

Use care to prevent driving the needle bearing too far in.

1. Apply multipurpose grease to the roller surface of the new needle bearing.

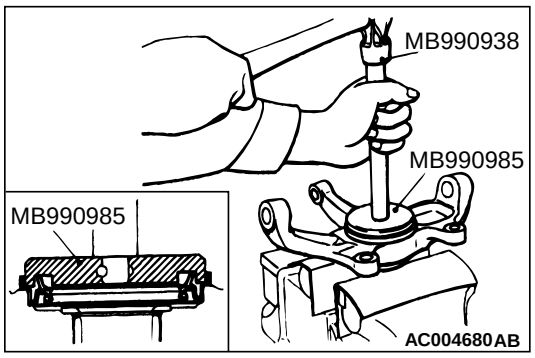


2. Use the special tools MB990938, MB990956 to press-fit the needle bearing until it is flush with the knuckle end face.



>>B<< SPACER INSTALLATION

1. Apply multipurpose grease to the knuckle attachment surface of the spacer.
2. Install the spacer to the knuckle with the chamfered side toward the center of vehicle.



>>C<< OIL SEAL INSTALLATION

1. Use the special tools MB990938, MB990985 to press-fit the new oil seal until it is flush with the knuckle end face.
2. Apply multipurpose grease to the inside and lip of the oil seal.

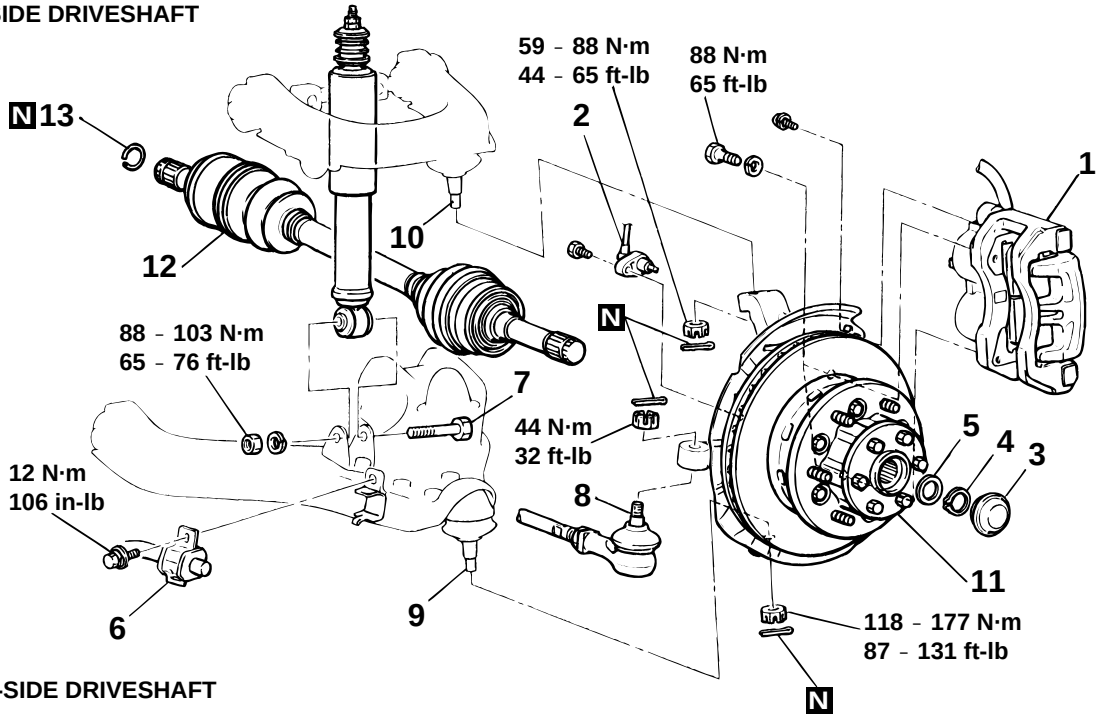
DRIVE SHAFT ASSEMBLY

REMOVAL AND INSTALLATION

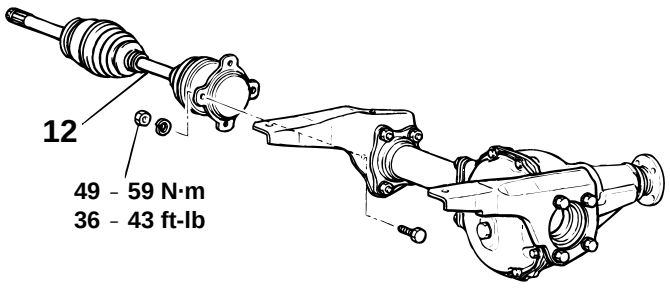
M1261003500225

Pre-removal Operation	Post-installation Operation
• Under Cover Removal (Refer to GROUP 42, Under cover P.42-164.) • Gear Oil Draining (Refer to P.26-12.)	• Press the dust cover with a finger to check whether the dust cover is cracked or damaged. • Gear Oil Supplying (Refer to P.26-12.) • Under Cover Installation (Refer to GROUP 42, Under cover P.42-164.) • Wheel Alignment Check and Adjustment (Refer to GROUP 33A, On-vehicle Service P.33A-3.)

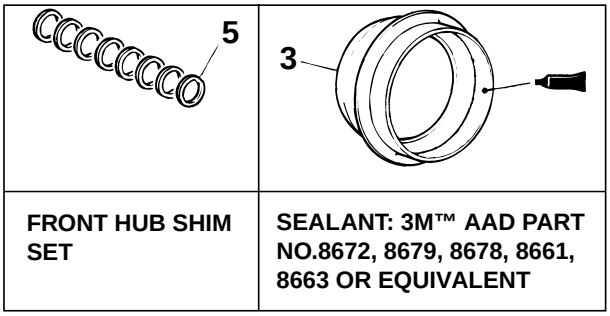
LEFT-SIDE DRIVESHAFT



RIGHT-SIDE DRIVESHAFT



AC004699 AB



FRONT HUB SHIM SET	SEALANT: 3M™ AAD PART NO.8672, 8679, 8678, 8661, 8663 OR EQUIVALENT

REMOVAL STEPS

<<A>> 1. CALIPER ASSEMBLY
2. FRONT SPEED SENSOR <VEHICLES WITH ABS> (REFER TO GROUP 35B, WHEEL SPEED SENSORP.35B-65.)
3. HUB CAP
>>C<< • DRIVESHAFT END PLAY ADJUSTMENT
4. SNAP RING
5. SHIM
6. STABILIZER BAR CONNECTION

REMOVAL STEPS (Continued)

7. SHOCK ABSORBER LOWER MOUNTING BOLT
<<B>> 8. TIE ROD END CONNECTION
<<B>> 9. LOWER ARM BALL JOINT CONNECTION
<<B>> 10. UPPER ARM BALL JOINT CONNECTION
<<C>> >>B<< 11. KNUCKLE AND FRONT HUB ASSEMBLY
<<D>> >>A<< 12. DRIVESHAFT ASSEMBLY
13. CIRCLIP

TSB Revision

Required Special Tool:
- MB991897: Ball Joint Remover

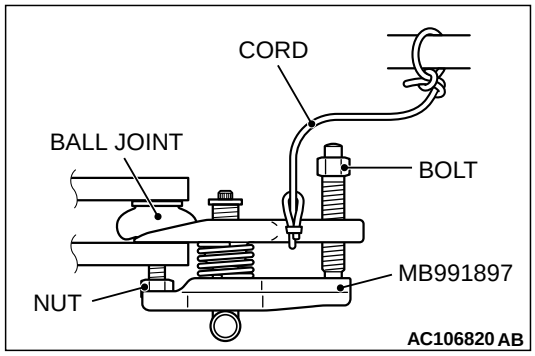
REMOVAL SERVICE POINTS

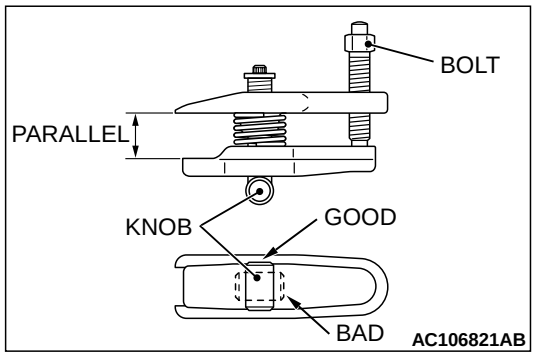
<<A>> CALIPER ASSEMBLY REMOVAL
Secure the removed caliper assembly with wire to prevent it from falling off.

<<B>> TIE ROD END /LOWER ARM BALL JOINT /UPPER ARM BALL JOINT DISCONNECTION

⚠ CAUTION
- **Do not remove the nut from ball joint. Loosen it and use special tool MB991897 to avoid possible damage to ball joint threads.**
- **Hang special tool MB991897 with cord to prevent it from falling.**

1. Install the special tool MB991897 as shown in the figure.



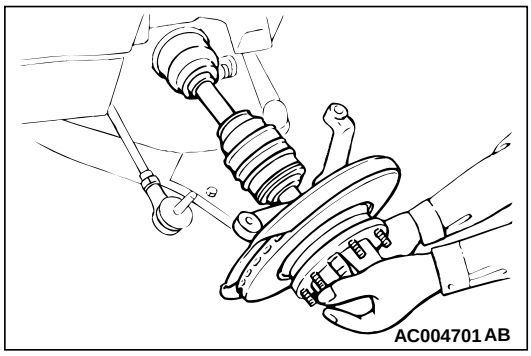


2. Turn the bolt and knob as necessary to make the jaws of special tool MB991897 parallel, tighten the bolt by hand and confirm that the jaws are still parallel.

   NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.
3. Tighten the bolt with a wrench to disconnect the tie rod end.

<<C>> KNUCKLE AND FRONT HUB ASSEMBLY REMOVAL
1. Press down the lower arm and remove the upper knuckle towards you.

   NOTE: Pull the DOJ side of the driveshaft assembly out slightly from the front differential carrier.

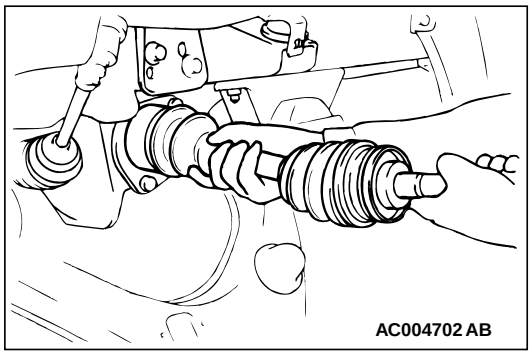

AC004701 AB

2. Slightly back off driveshaft from the knuckle. Remove the lower knuckle holding nut from the lower arm ball joint.
3. Disconnect the knuckle and lower ball joint.

⚠ CAUTION
Do not damage the knuckle oil seals with the driveshaft spline.

4. Remove the knuckle and front hub assembly from the driveshaft assembly.

<<D>> DRIVESHAFT (LEFT SIDE) REMOVAL


AC004702 AB

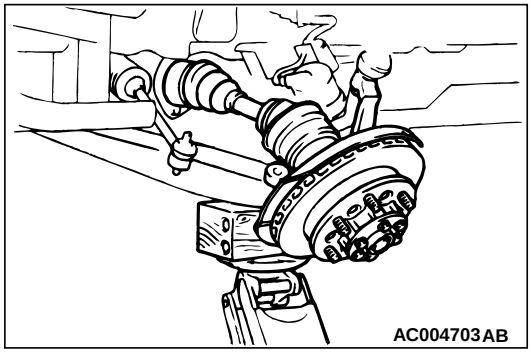
⚠ CAUTION
When pulling the driveshaft out from the differential carrier, be careful that the spline part of the driveshaft does not damage the oil seal.

INSTALLATION SERVICE POINTS

>>A<< DRIVE SHAFT (LEFT SIDE) INSTALLATION

⚠ CAUTION
Do not damage the oil seal of the differential carrier by the drive shaft splines.

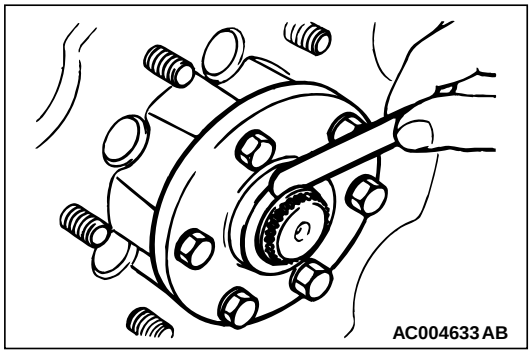
>>B<< KNUCKLE AND FRONT HUB ASSEMBLY INSTALLATION


AC004703 AB

⚠ CAUTION
Do not damage the knuckle oil seal with the drive shaft splines.

1. Insert the knuckle and front hub assembly to the driveshaft.
2. Assemble knuckle and lower ball joint and temporarily tighten slotted nut.
3. Press up the lower arm and lock upper ball joint onto the upper arm.
4. Tighten the lower ball joint mounting nuts to the specified torque.

Tightening torque: 118 – 177 N·m (87 – 131 ft-lb)


AC004633AB

>>C<< DRIVESHAFT END PLAY ADJUSTMENT

1. Push the driveshaft in by hand toward the knuckle until they touch.
2. Measure the clearance between the drive flange and the spacer with a feeler gauge as shown in the illustration.

   Standard value: 0.4 – 0.7 mm (0.02 – 0.03 inch)
3. If the amount of play is not within the standard value, adjust by selecting a shim that will bring the play to the standard value.

   NOTE: The shims available range from 0.3 mm (0.01 inch) thick to 0.6 mm (0.02 inch) thick in steps of 0.1 mm (0.004 inch), and from 0.9 mm (0.04 inch) thick to 1.8 mm (0.07 inch) thick in steps of 0.3 mm (0.01 inch).

INSPECTION

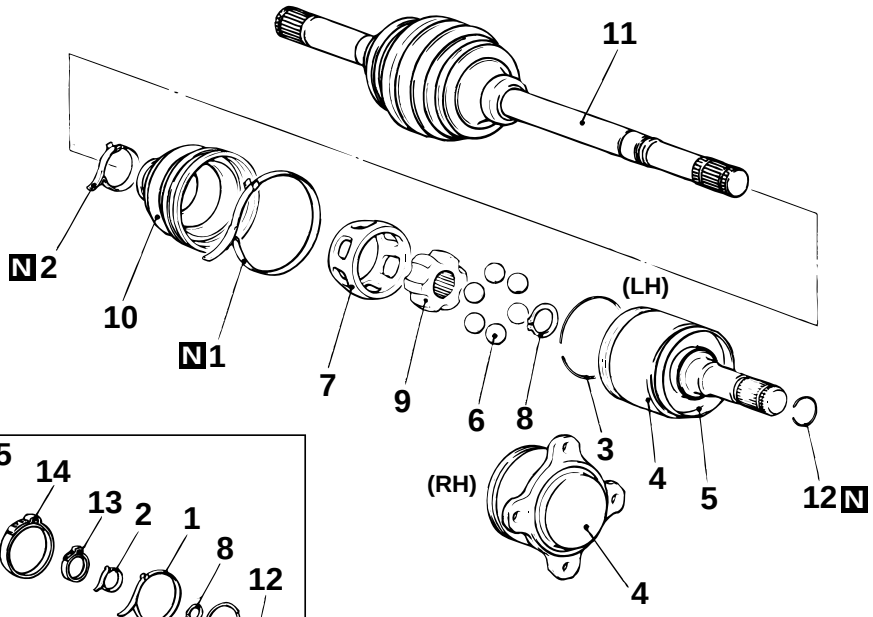
M1261003600181

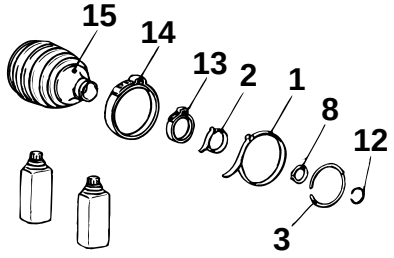
- Check the boot for damage or deterioration.
- Check the ball joint for operating condition and excessive looseness.
- Check the splines for wear or damage.
- Check the differential carrier oil seal (LH) for damage.

DISASSEMBLY AND ASSEMBLY

M1261003700229

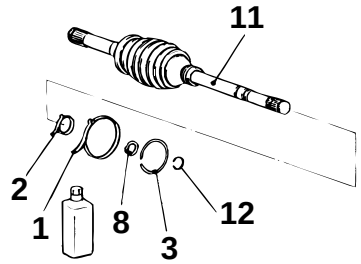
⚠ CAUTION
Never disassemble the BJ assembly except when replacing the BJ boot.



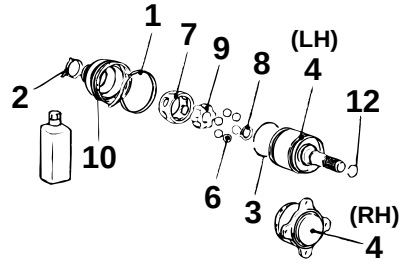


BOOT REPAIR KIT (BJ)

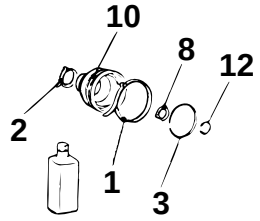
AC004715 AB



BJ REPAIR KIT



DOJ REPAIR KIT



BOOT REPAIR KIT (DOJ)

DISASSEMBLY STEPS

1. DOJ BOOT BAND (LARGE)
2. DOJ BOOT BAND (SMALL)
3. CIRCLIP
4. DOJ OUTER RACE
5. DUST COVER
<<A>> 6. BALLS
<<B>> 7. DOJ CAGE
8. SNAP RING
9. DOJ INNER RACE
<<C>> 10. DOJ BOOT
11. BJ ASSEMBLY
12. CIRCLIP
13. BJ BOOT BAND (SMALL)
14. BJ BOOT BAND (LARGE)
15. BJ BOOT

ASSEMBLY STEPS

12. CIRCLIP
11. BJ ASSEMBLY
>>A<< 9. DOJ ASSEMBLY
>>A<< 8. SNAP RING
>>A<< 7. DOJ CAGE
>>A<< 6. BALLS
>>B<< 4. DOJ OUTER RACE
5. DUST COVER
3. CIRCLIP
>>C<< 10. DOJ BOOT
>>C<< 2. DOJ BOOT BAND (SMALL)
>>C<< 1. DOJ BOOT BAND (LARGE)

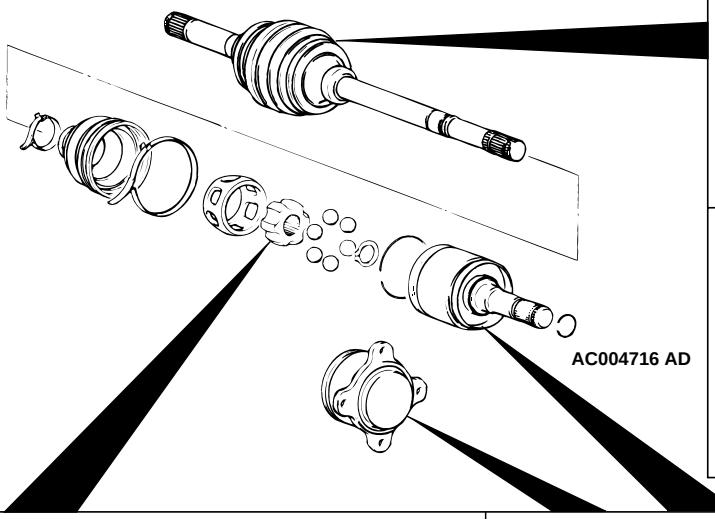
NOTE: DOJ: Double Offset Joint
BJ: Birfield Joint

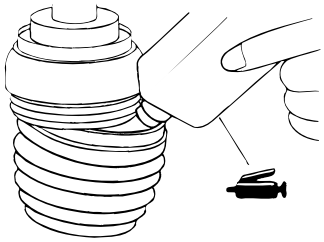
Required Special Tool:

- MB991561: Boot Band Crimping Tool

TSB Revision

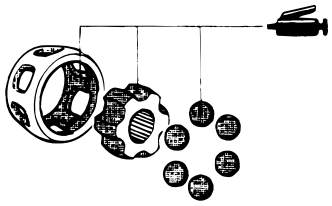
Lubrication Points



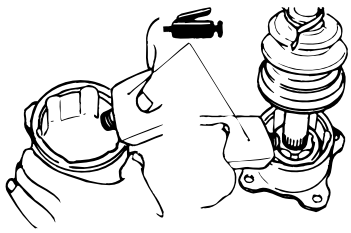


GREASE:
REPAIR KIT GREASE: 120g (4.2 oz)

NOTE
THE GREASE IN THE REPAIR KIT SHOULD BE DIVIDED IN HALF FOR USE, RESPECTIVELY, AT THE JOINT AND INSIDE THE BOOT.



GREASE: REPAIR KIT GREASE

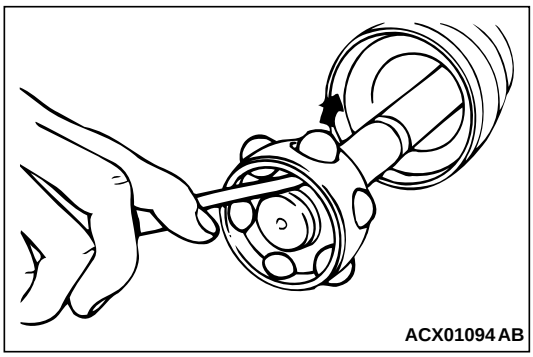


GREASE:
REPAIR KIT GREASE: 140 g (4.9 oz)

NOTE
THE GREASE IN THE REPAIR KIT SHOULD BE DIVIDED IN HALF FOR USE, RESPECTIVELY, AT THE JOINT AND INSIDE THE BOOT.

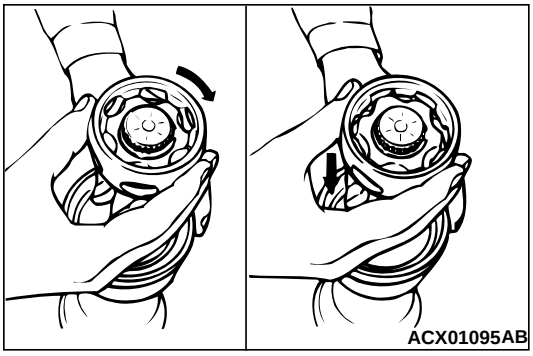
⚠CAUTION
DO NOT MIX OLD AND NEW OR DIFFERENT TYPES OF GREASE, AS A SPECIAL GREASE IS USED IN THE JOINT.

DISASSEMBLY SERVICE POINTS



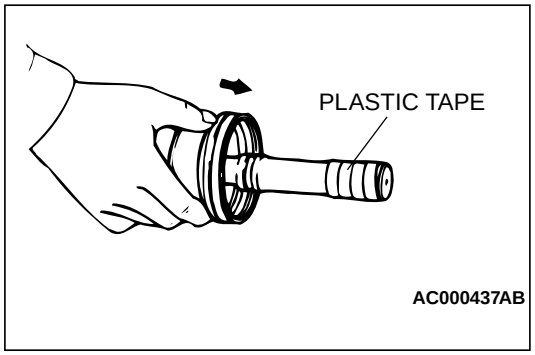
<<A>> BALL REMOVAL
Remove the balls from the DOJ cage.

TSB Revision


ACX01095AB

<<B>> DOJ CAGE REMOVAL

Remove the DOJ cage from the DOJ inner race in the direction shown in the illustration.



AC000437AB

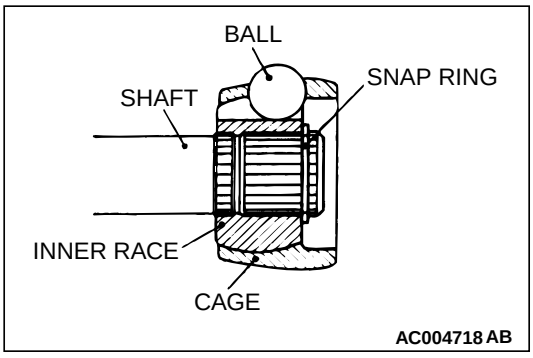
<<C>> DOJ BOOT REMOVAL

Wrap plastic tape around the spline part on the DOJ side of the driveshaft so that DOJ boot is not damaged when removed.

ASSEMBLY SERVICE POINTS

>>A<< DOJ INNER RACE/SNAP RING/DOJ CAGE/BALLS INSTALLATION

Install the cage, balls and inner race to the driveshaft, and fit the snap ring securely to the groove in the driveshaft.



AC004718 AB

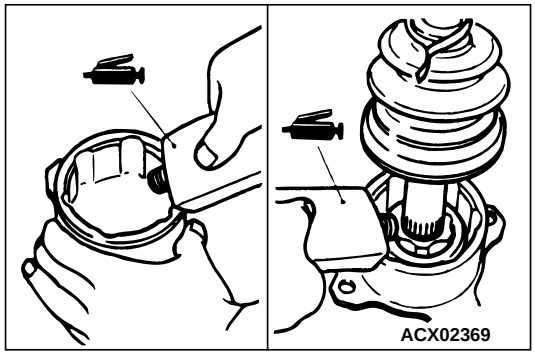
>>B<< DOJ OUTER RACE INSTALLATION

⚠ CAUTION

The driveshaft joint use special grease. Do not mix old and new or different types of grease.

1. Fill the inside of the DOJ outer race and DOJ boot with the specified grease.

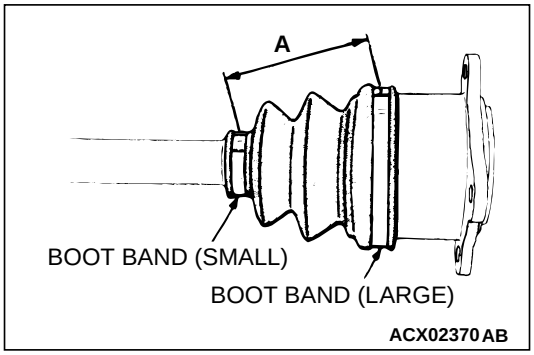
   Specified grease: Repair kit grease 140 g (4.9 oz)


ACX02369

⚠ CAUTION

Do not secure the boot band (large).

2. Install the circlip onto the DOJ outer race. Place the DOJ boot over the DOJ outer race, and then use a boot band (small) to secure the boot.

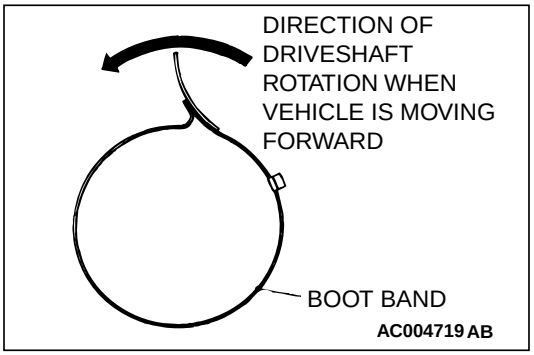


>>C<< DOJ BOOT/DOJ BOOT BAND INSTALLATION

1. Position the DOJ outer race so that the distance between the boot bands is at the standard value.

   Standard value (A): 92 – 98 mm (3.6 – 3.9 inches)

2. Remove part of the DOJ boot from the DOJ outer race to release the air pressure inside the boot.



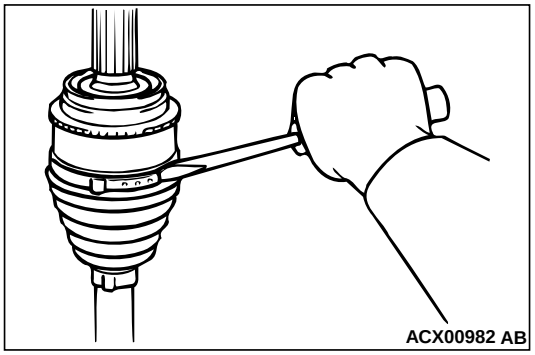
⚠ CAUTION

Be sure that the installation direction of the boot bands is correct.

3. Secure the boot band (large) on DOJ boot.

BJ BOOT (RESIN BOOT) REPLACEMENT

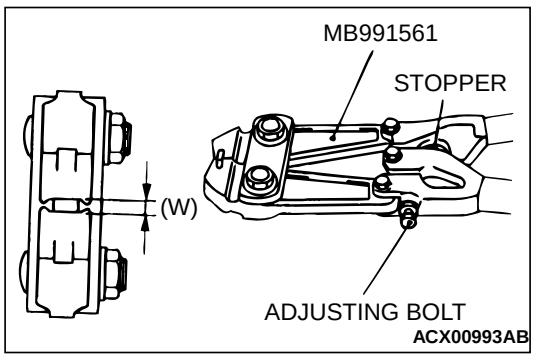
M1261005200231



1. Remove the boot bands (large and small).

   NOTE: The BJ boot bands cannot be re-used.

2. Remove the BJ boot.

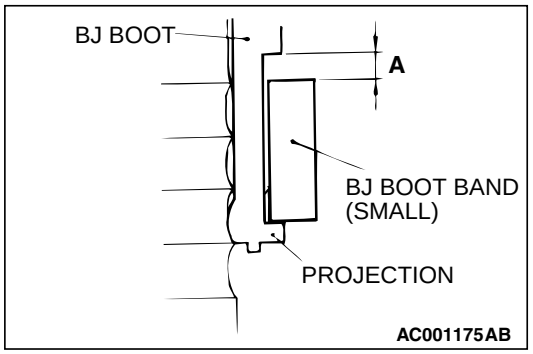


3. Turn the adjusting bolt on special tool MB991561 so that the size of the opening (W) is at the standard value.

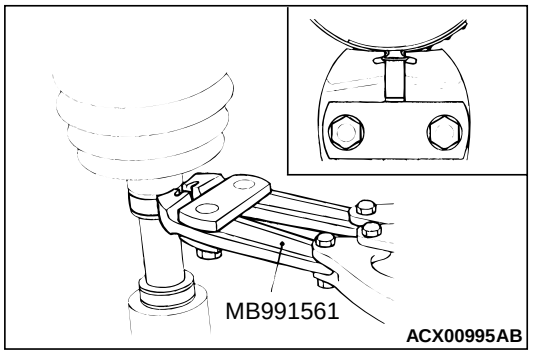
   NOTE: The value of W will change by approximately 0.7 mm (0.03 inch) for each turn of the adjusting bolt.

   NOTE: The adjusting bolt should not be turned more than once.

   Standard value (W): 2.9 mm (0.12 inch)
   <If it is larger than 2.9 mm (0.12 inch)>
   Tighten the adjusting bolt.
   <If it is smaller than 2.9 mm (0.12 inch)>
   Loosen the adjusting bolt.

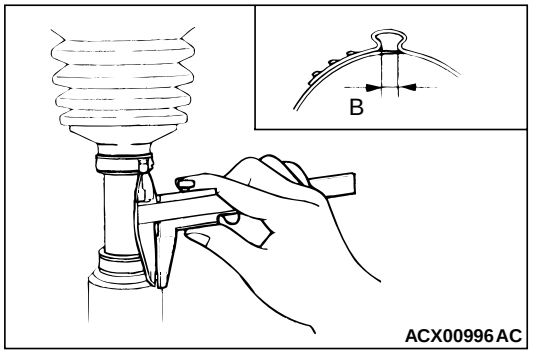


4. Place the BJ boot band (small) against the projection at the edge of the boot, and then secure it so that there is a clearance left as shown by (A) in the illustration.



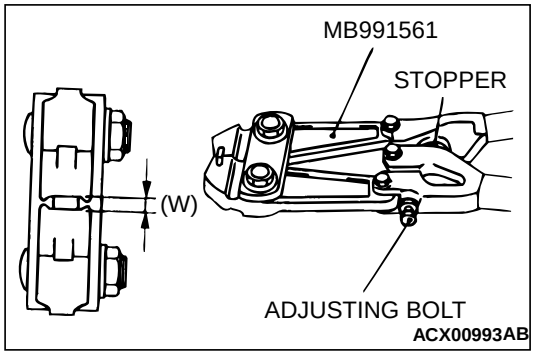
⚠ CAUTION
- **Secure the drive shaft in an upright position and clamp the part of the BJ boot band to be crimped securely in the jaws of the special tool MB991561.**
- **Crimp the BJ boot band until the special tool touches the stopper.**

5. Use the special tool MB991561 to crimp the BJ boot band (small).



6. Check that crimping amount (B) of the BJ boot band is at the standard value.

   Standard value (B): 2.4 – 2.8 mm (0.09 – 0.11 inch)
   <If the crimping amount is larger than 2.8 mm (0.11 inch)>
   Readjust the value of (W) in step 3 according to the following formula, and then repeat the operation in step 5.
   W = 5.5 mm (0.22 inch) – B
   Example:
   If B = 2.9 mm (0.11 inch), then W = 2.6 mm (0.10 inch).
   <If the crimping amount is smaller than 2.4 mm (0.09 inch)>
   Remove the BJ boot band, readjust the value of (W) in step 3 according to the following formula, and then repeat the operations in steps 4 and 5 using a new BJ boot band.
   W = 5.5 mm (0.22 inch) – B
   Example:
   If B = 2.3 mm (0.10 inch) then W = 3.2 mm (0.13 inch).

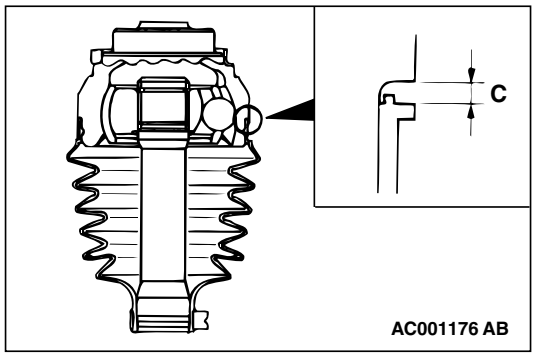


7. Check that the BJ boot band is not protruding past the place where it has been installed. If so, remove it and then repeat the operations in steps 4 to 6 using a new BJ boot band.

⚠ CAUTION
The driveshaft joint uses special grease. Do not mix old and new grease or different types of grease.

8. Fill the inside of the BJ boot with the specified amount of the specified grease.

   Specified grease: Repair kit grease 120 g (4.2 oz)

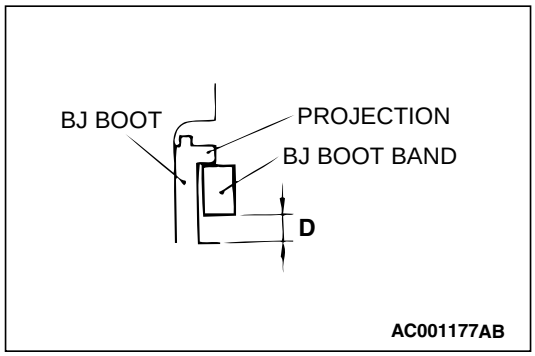


9. Install the BJ boot band (large) so that there is the clearance (C) between it and the BJ housing is at the standard value.

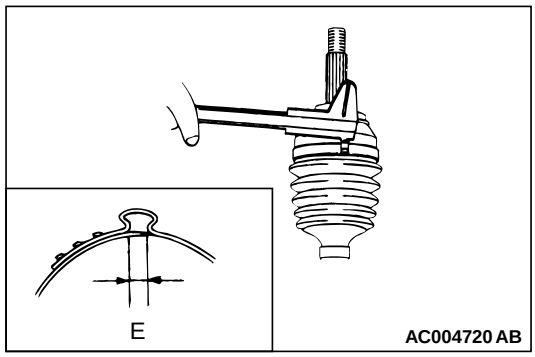
   Standard value (C): 0.1 – 1.55 mm (0.004 – 0.061 inch)

10. Follow the same procedure as in step 3 to adjust the size of the opening (W) shown on P.26-33 on special tool MB991561 so that it is at the standard value.

    Standard value (W): 3.2 mm (0.13 inch)

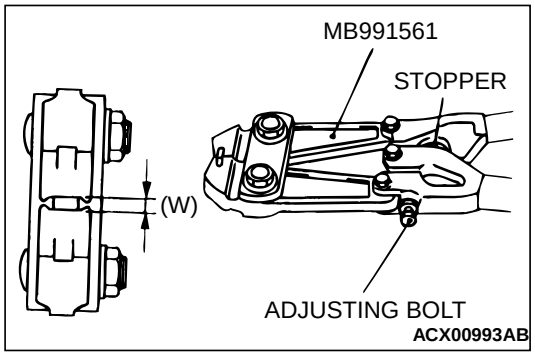


11. Place the BJ boot band (large) against the projection at the edge of the boot, and then secure it so that there is a clearance left as shown by (D) in the illustration.
12. Use special tool MB991561 to crimp the BJ boot band (large) in the same way as in step 5.



13. Check that the crimping amount (E) of the BJ boot band is at the standard value.

    Standard value (E): 2.4 – 2.8 mm (0.09 – 0.11 inch)
    <If the crimping amount is larger than 2.8 mm (0.11 inch)> Readjust the value of (W) in step 10 according to the following formula, and then repeat the operation in step 12. W = 5.8 (0.23 inch) mm – E
    Example: If E = 2.9 mm (0.11 inch), then W = 2.9 mm (0.11 inch). <If the crimping amount is smaller than 2.4 mm (0.09 inch)> Remove the BJ boot band, readjust the value of (W) in step 10 according to the following formula, and then repeat the operating in steps 11 and 12 using a new BJ boot band. W = 5.8 (0.23 inch) mm – E
    Example: If E = 2.3 mm (0.09 inch), then W = 3.5mm (0.14 inch).



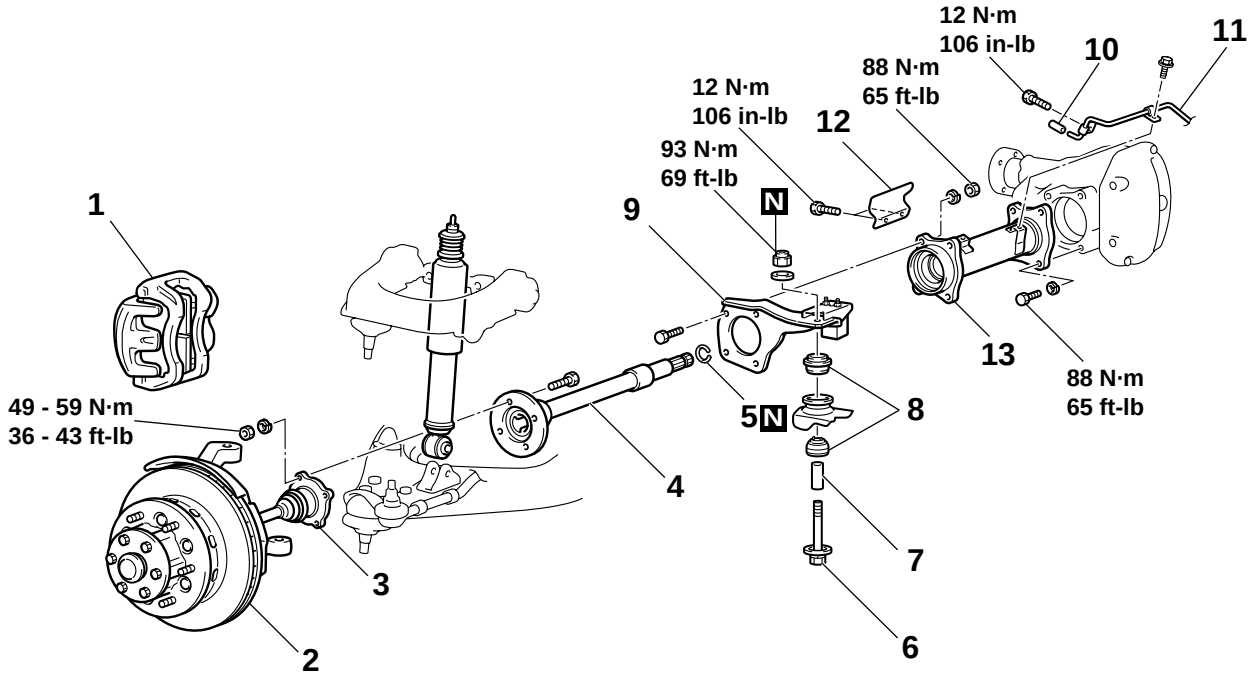
14. Check that the BJ boot band is not protruding past the place where it has been installed. If so, remove it and repeat the operations in steps 11 to 13 using a new BJ boot band.

INNER SHAFT ASSEMBLY

REMOVAL AND INSTALLATION

M1261004000085

Pre-removal and Post-installation Operation
- Under Cover Removal and Installation (Refer to GROUP 42, Under Cover P.42-164.)
- Gear Oil Draining and Supplying (Refer to P.26-12.)



AC103693 AB

REMOVAL STEPS

<<A>>
1. CALIPER ASSEMBLY
2. KNUCKLE AND HUB ASSEMBLY (REFER TO P.26-22.)
3. DRIVESHAFT <RH> (REFER TO P.26-22.)

<<B>> >>A<<
4. INNER SHAFT
5. CIRCLIP
6. PIN
7. SPACER
8. DIFFERENTIAL MOUNTING CUSHION

REMOVAL STEPS (Continued)
9. DIFFERENTIAL MOUNTING BRACKET <RH>
10. BREATHER HOSE
11. BREATHER PIPE
12. HEAT PROTECTOR
13. HOUSING TUBE ASSEMBLY

Required Special Tools:
- MB990211: Sliding Hammer
- MB990906: Driveshaft Attachment

REMOVAL SERVICE POINTS

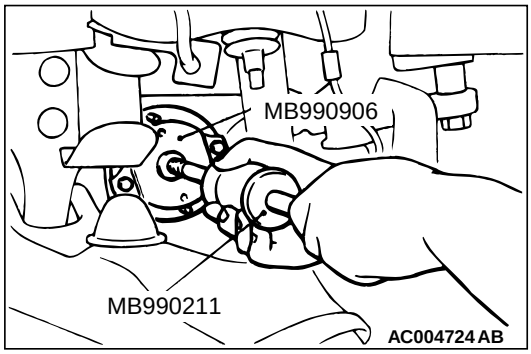
<<A>> CALIPER ASSEMBLY REMOVAL

Secure the removed caliper assembly with wire to prevent it from falling.

TSB Revision

<<B>> INNER SHAFT REMOVAL

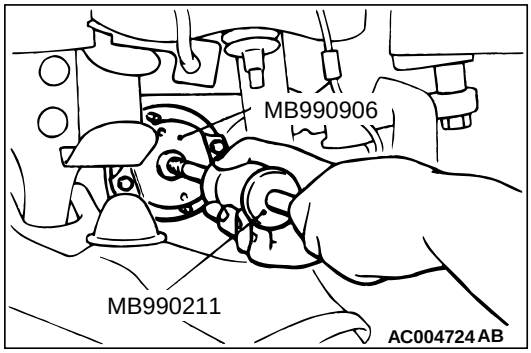
⚠ CAUTION
When pulling the inner shaft out from the front differential carrier, be careful that the spline part of the inner shaft does not damage the oil seal.



INSTALLATION SERVICE POINT

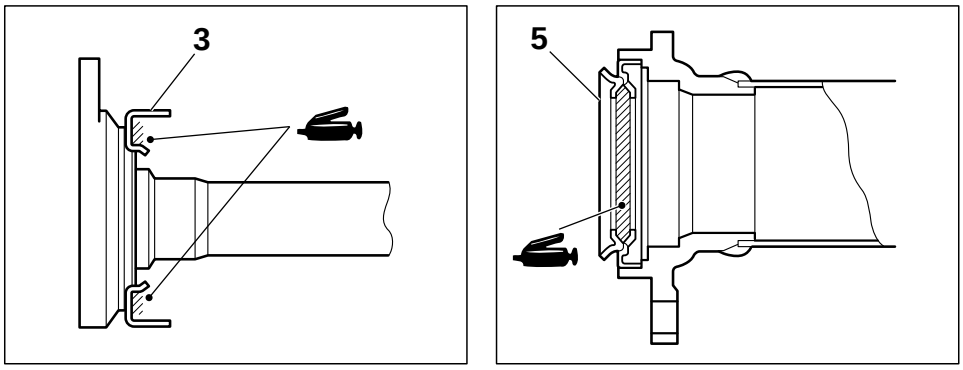
>>A<< INNER SHAFT INSTALLATION

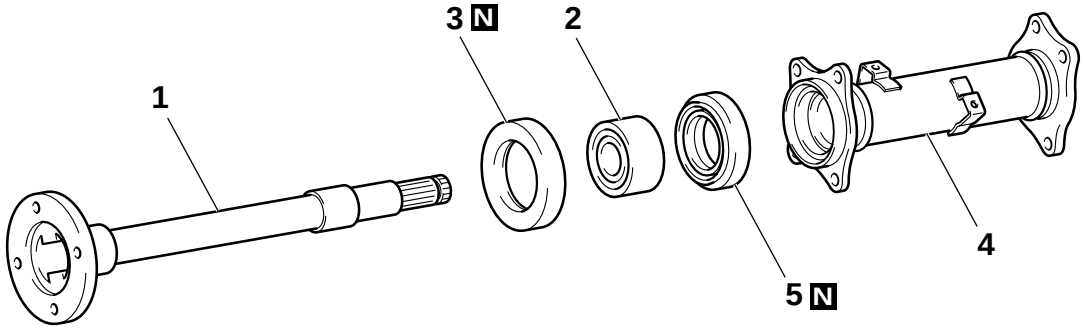
⚠ CAUTION
Be careful not to damage the lip of the dust seal and oil seal.
Drive the inner shaft into the front differential carrier by using special tools MB990906, MB990211.



DISASSEMBLY AND ASSEMBLY

M1261004200089





AC103695 AB

DISASSEMBLY STEPS

	1.	INNER SHAFT
<<A>> >>C<<	2.	BEARING
>>B<<	3.	DUST COVER
	4.	HOUSING TUBE
>>A<<	5.	DUST SEAL

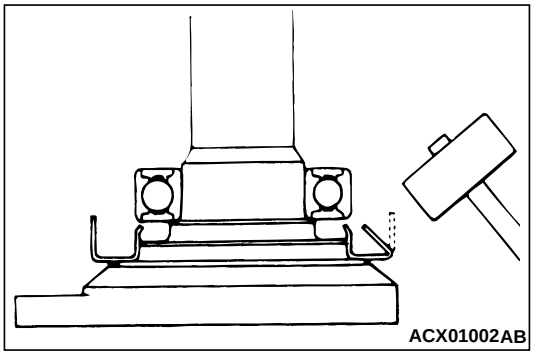
Required Special Tool:

- MB990955: Oil Seal Installer

DISASSEMBLY SERVICE POINT

<<A>> BEARING REMOVAL

1. Bend the outside periphery of dust cover inward with a wooden hammer.



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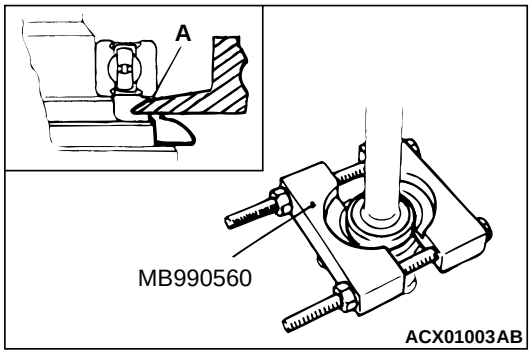
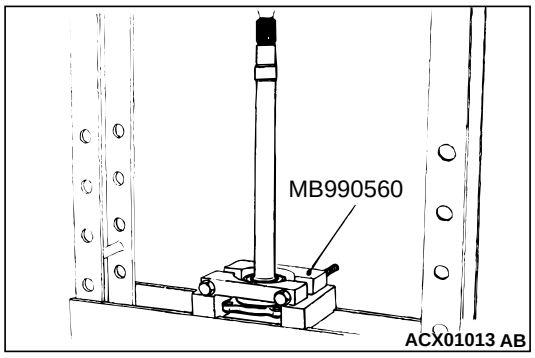
TSB Revision



2. After special tool MB990560 has been installed as shown, tighten the nut of the special tool MB990560 until the portion of the special tool MB990560 touches the bearing outer race.

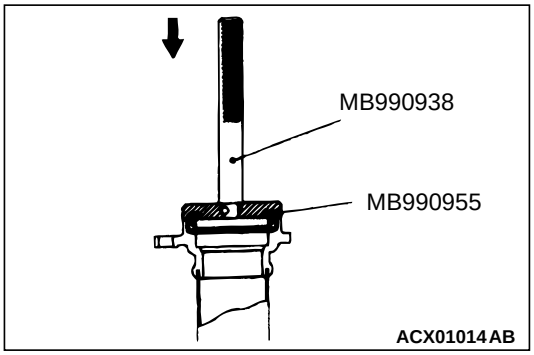


3. Press out the inner shaft from the bearing.

ASSEMBLY SERVICE POINTS

>>A<< DUST SEAL INSTALLATION

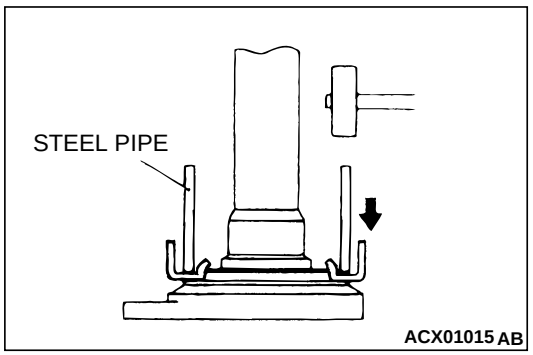
Press-fit the new dust seal into the housing tube by using special tools MB990938 and MB990955, until it is flush with the housing tube end face.

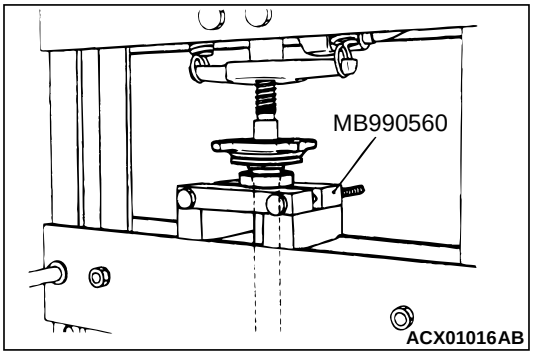


>>B<< DUST COVER INSTALLATION

Using a steel pipe, install a new dust cover onto the inner shaft.

STEEL PIPE	mm (in)
Overall length	50 (2.0)
Outside diameter	75 (3.0)
Wall thickness	4 (0.16)





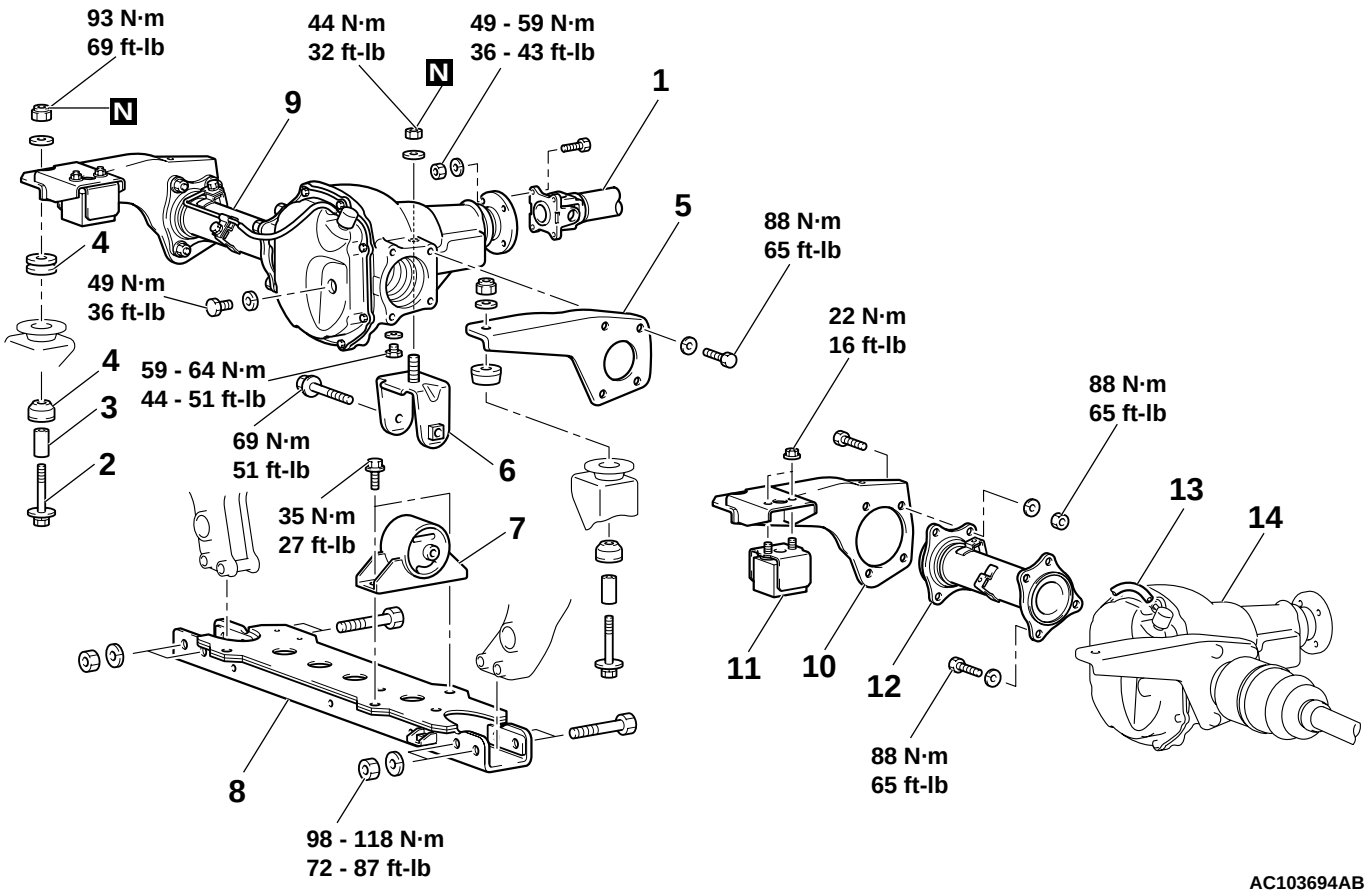
>>C<< BEARING INSTALLATION
Use special tool MB990560 to press-fit the bearing onto the inner shaft.

DIFFERENTIAL CARRIER ASSEMBLY

REMOVAL AND INSTALLATION

M1262002100078

Pre-removal and Post-installation Operation
- Under Cover Removal and Installation (Refer to GROUP 42- Under CoverP.42-164.)
- Front Axle Gear Oil Level Check (Refer to P.26-12.)
- Driveshaft Removal and Installation (Refer to P.26-22.)
- Inner Shaft Removal and Installation (Refer to P.26-32.)



TSB Revision

REMOVAL STEPS

<<A>> >>A<<
1. FRONT PROPELLER SHAFT CONNECTION
   - SUPPORT THE DIFFERENTIAL BY A TRANSMISSION JACK
2. PIN
3. SPACER
4. DIFFERENTIAL MOUNTING CUSHION
5. DIFFERENTIAL MOUNTING BRACKET <LH>
6. DIFFERENTIAL SUPPORT BRACKET
7. DIFFERENTIAL MOUNT INSULATOR ASSEMBLY

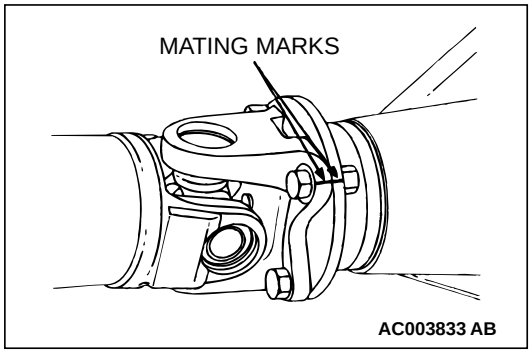
REMOVAL STEPS (Continued)

8. FRONT SUSPENSION CROSSMEMBER
9. FRONT DIFFERENTIAL, HOUSING TUBE AND DIFFERENTIAL MOUNTING BRACKET <RH>
10. DIFFERENTIAL MOUNTING BRACKET <RH>
11. DYNAMIC DAMPER
12. HOUSING TUBE
13. VACUUM HOSE CONNECTION
14. FRONT DIFFERENTIAL CARRIER ASSEMBLY

REMOVAL SERVICE POINT

<<A>> FRONT PROPELLER SHAFT REMOVAL

Make mating marks on the flange yoke and the differential carrier companion flange. Remove the front propeller shaft.



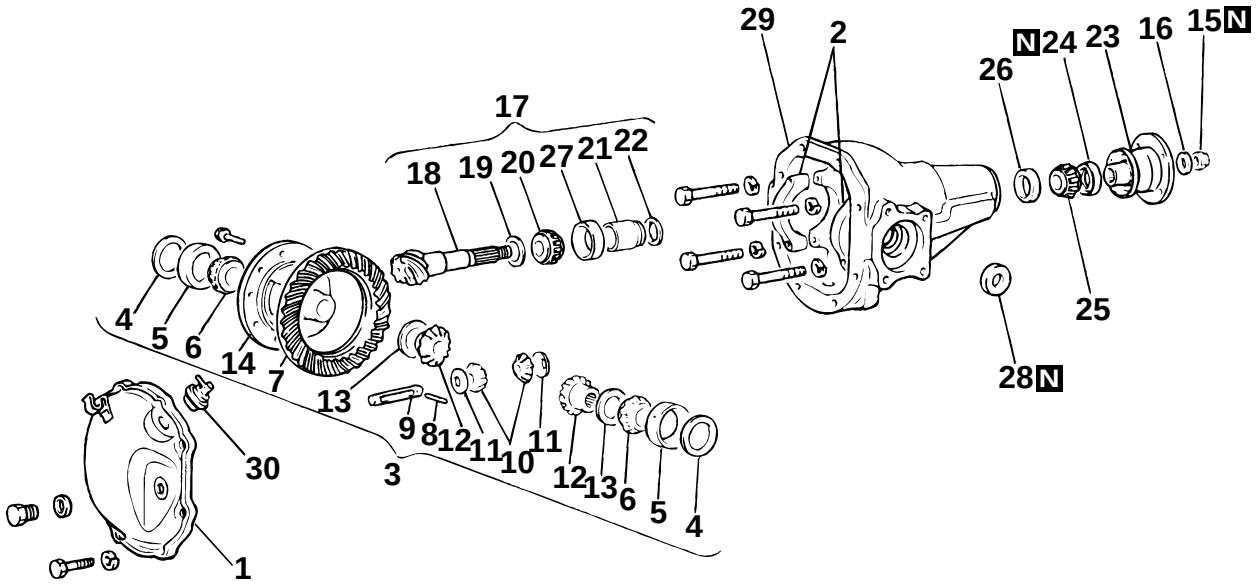
INSTALLATION SERVICE POINTS

>>B<< FRONT PROPELLER SHAFT INSTALLATION

Install the front propeller shaft so that the mating marks of the flange yoke and the differential carrier companion flange are aligned.

DISASSEMBLY

M1262002300102



AC004731AB

DISASSEMBLY STEPS

<<A>> • INSPECTION BEFORE DISASSEMBLY
1. COVER
2. BEARING CAP

<<B>> 3. DIFFERENTIAL CASE ASSEMBLY
4. SIDE BEARING SPACER
5. SIDE BEARING OUTER RACE

<<C>> 6. SIDE BEARING INNER RACE

<<D>> 7. DRIVE GEAR

<<E>> 8. LOCK PIN
9. PINION SHAFT
10. PINION GEAR
11. PINION WASHER
12. SIDE GEAR
13. SIDE GEAR SPACER
14. DIFFERENTIAL CASE

<<F>> 15. SELF-LOCKING NUT
16. WASHER

<<G>> 17. DRIVE PINION ASSEMBLY
18. DRIVE PINION
19. DRIVE PINION FRONT SHIM (FOR PINION HEIGHT ADJUSTMENT)

<<H>> 20. DRIVE PINION FRONT BEARING INNER RACE
21. DRIVE PINION SPACER

DISASSEMBLY STEPS (Continued)

22. DRIVE PINION REAR SHIM (FOR TURNING TORQUE ADJUSTMENT)
23. COMPANION FLANGE
24. OIL SEAL
25. DRIVE PINION REAR BEARING INNER RACE

<<I>> 26. DRIVE PINION REAR BEARING OUTER RACE

<<J>> 27. DRIVE PINION FRONT BEARING OUTER RACE

<<K>> 28. OIL SEAL
29. GEAR CARRIER
30. VENT PLUG

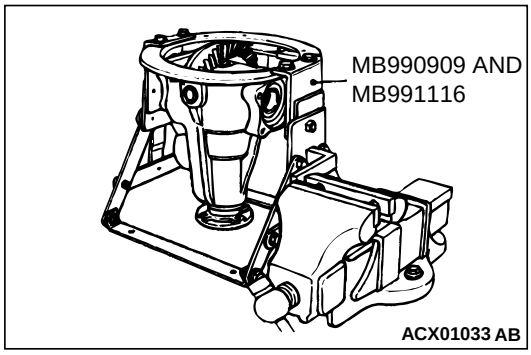
Required Special Tools:

- MB990909: Working Base
- MB990939: Brass Bar
- MB991116: Adapter
- MB990339: Bearing Puller
- MB990590: Rear Axle Shaft Oil Seal Remover
- MB990648: Bearing Remover
- MB990767: End Yoke Holder
- MB990810: Side Bearing Puller
- MB990811: Differential Side Bearing Cap
- MB990939: Bearing and Oil Seal Installer Set

DISASSEMBLY SERVICE POINTS

<<A>> INSPECTION BEFORE DISASSEMBLY

1. Remove the cover and gasket.
2. Hold special tools MB990909 and MB99116 in a vise, and install the differential carrier assembly to it.

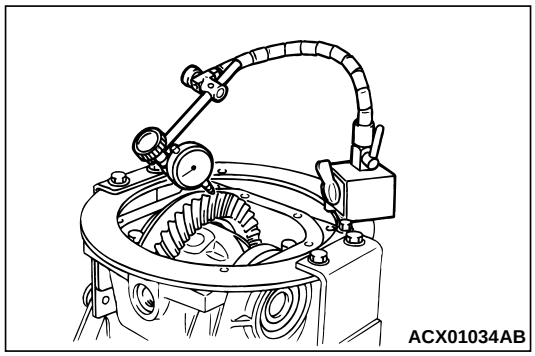


DRIVE GEAR BACKLASH

1. With the drive pinion locked in place, use a dial gauge to measure the drive gear backlash in four or more places on the drive gear.

   Standard value: 0.11 – 0.16 mm (0.004 – 0.006 inch)

2. If the backlash is not within the standard value, insert side bearing adjustment spacers, and then inspect the drive gear tooth contact.

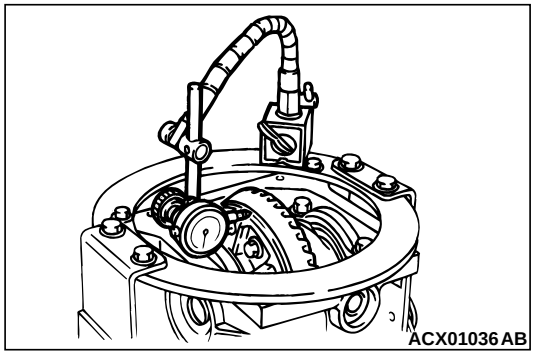


DRIVE GEAR RUNOUT

1. Measure the drive gear runout at the shoulder on the reverse side of the drive gear.

   Limit: 0.05 mm (0.002 inch)

2. When the runout exceeds the limit value, check for foreign material between drive gear rear side and differential case, and for loose drive gear installation bolts.
3. When check (2) gives normal results, reposition drive gear and differential case and remeasure.
4. If adjustment is impossible, replace differential case, or replace drive gear and pinion as a set.

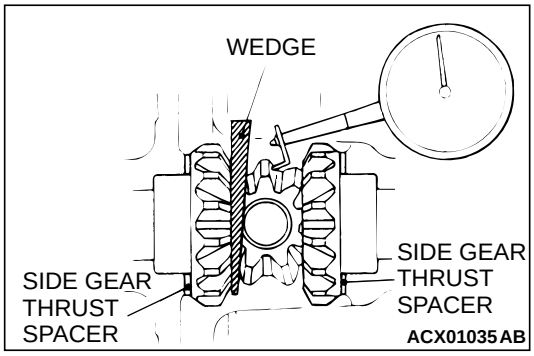


DIFFERENTIAL GEAR BACKLASH

1. While locking the side gear with the wedge, measure the differential gear backlash with a dial indicator on the pinion gear.

   Standard value: 0 – 0.076 mm (0 – 0.0030 inch) Limit: 0.2 mm (0.08 inch)

2. Repeat the same procedure for both pinion gears.
3. If the backlash exceeds the limit, adjust by using the side gear thrust spacers.
4. If adjustment is impossible, replace the side gear and pinion gear as a set.



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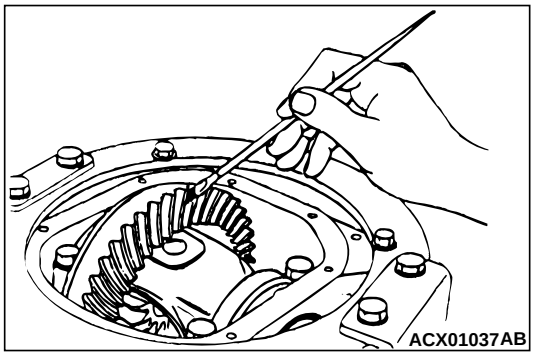


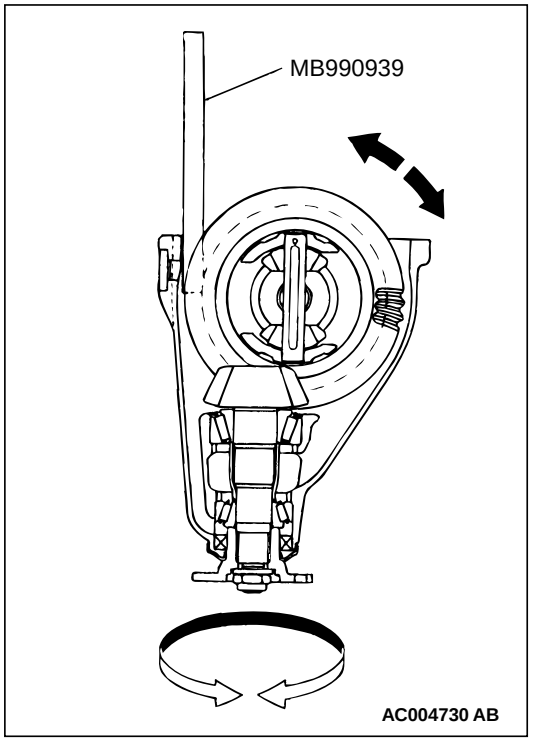
DRIVE GEAR TOOTH CONTACT

Check the tooth contact of drive gear by following the steps below.

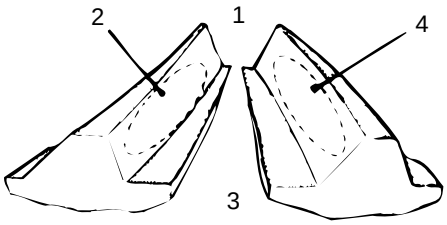
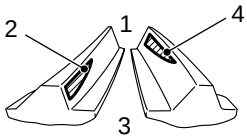
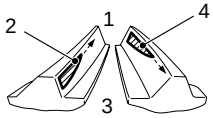
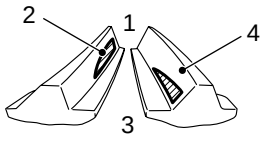
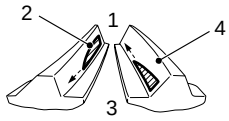
1. Apply a thin, uniform coat of machine blue to both surfaces of the drive gear teeth.

⚠ CAUTION

If the drive gear is rotated too much, the tooth contact pattern will become unclear and difficult to check.



2. Insert special tool MB990939 between the differential carrier and the differential case, and then rotate the companion flange by hand (once in the normal direction, and then once in the reverse direction) while applying a load to the drive gear so that the revolution torque [approximate 2.5 – 3.0 N·m (22.1 – 26.6 in-lb)] is applied to the drive pinion.
3. Check the tooth contact condition of the drive gear and drive pinion.

STANDARD TOOTH CONTACT PATTERN	PROBLEM	SOLUTION
1. Narrow tooth side 2. Drive-side tooth surface (the side applying power during forward movement) 3. Wide tooth side 4. Coast-side tooth surface (the side applying power during reverse movement)  ACX01039 AF	Tooth contact pattern resulting from excessive pinion height  AC107260 AB The drive pinion is positioned too far from the center of the drive gear.	 AC107261AB Increase the thickness of the drive pinion rear shim, and position the drive pinion closer to the center of the drive gear. Also, for backlash adjustment, position the drive gear farther from the drive pinion.
	Tooth contact pattern resulting from insufficient pinion height.  AC107262 AB The drive pinion is positioned too close to the center of the drive gear.	 AC107263 AB Decrease the thickness of the drive pinion rear shim, and position the drive pinion farther from the center of the drive gear. Also, for backlash adjustment, position the drive gear closer to the drive pinion.

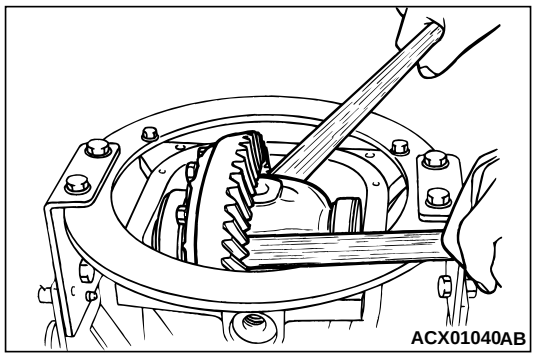
NOTE: Check the tooth contact pattern to confirm that the adjustments of the pinion height and backlash have been done properly. Continue to adjust the pinion height and backlash until the tooth contact pattern resembles the standard pattern. If, even after adjustments have been made, the correct tooth contact pattern cannot be obtained, it means that the drive gear and the drive pinion have become worn beyond the allowable limit. Replace the gear set.

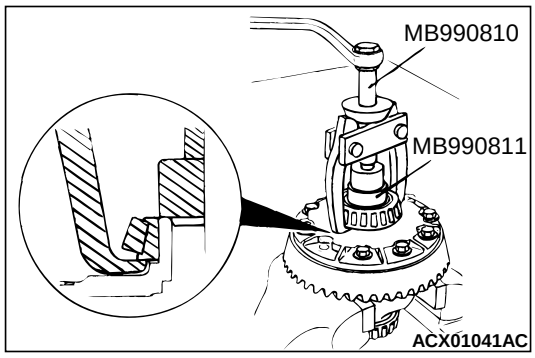
<<B>> DIFFERENTIAL CASE ASSEMBLY REMOVAL

⚠ CAUTION

When taking out the differential case assembly, be careful not to drop and damage the side bearing outer races.

NOTE: Keep the right and left side bearings and side bearing adjusting spacers separate, so that they do not become mixed during assembly.

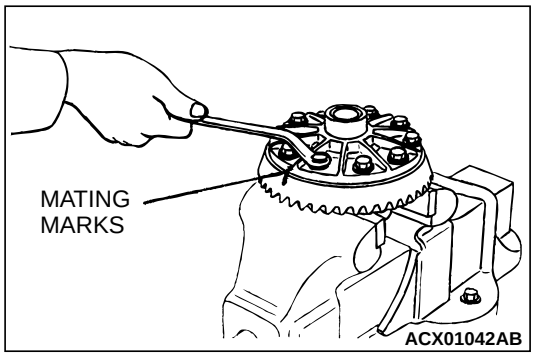

ACX01040AB



<<C>> SIDE BEARING INNER RACE REMOVAL

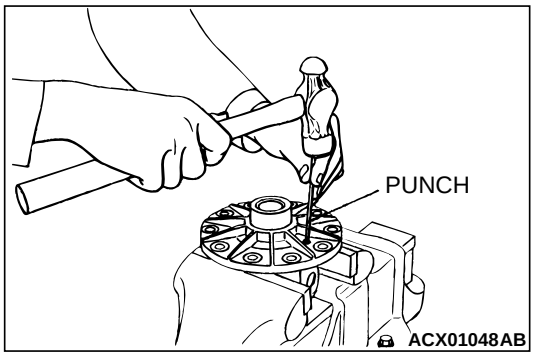
Use special tools MB990810, MB990811 to pull out the side bearing inner races.

NOTE: There are two notches provided (at the differential case side) for the claw part of the special tools; use special tools MB990810, MB990811 at that position.



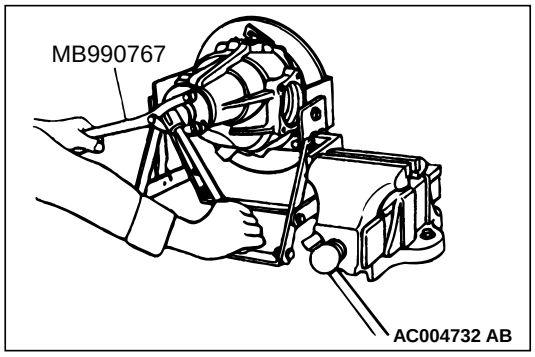
<<D>> DRIVE GEAR REMOVAL

1. Make the mating marks to the differential case and the drive gear.
2. Loosen the drive gear attaching bolts in diagonal sequence to remove the drive gear.



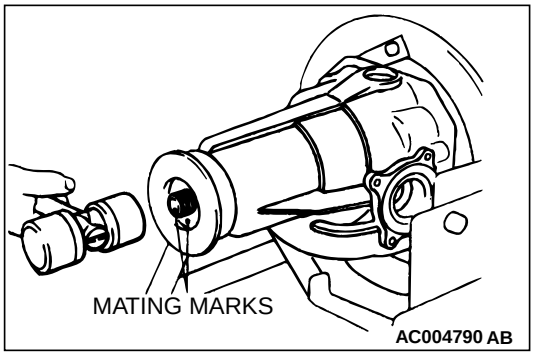
<<E>> LOCK PIN REMOVAL

Drive out the lock pin with a punch.



<<F>> SELF-LOCKING NUT REMOVAL

Use the special tool MB990767 to hold the companion flange, and then remove the companion flange self-locking nut.

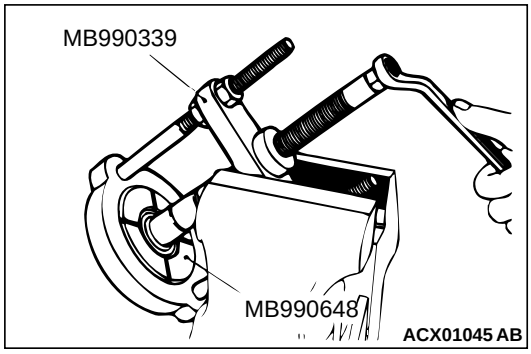


<<G>> DRIVE PINION ASSEMBLY REMOVAL

⚠ CAUTION

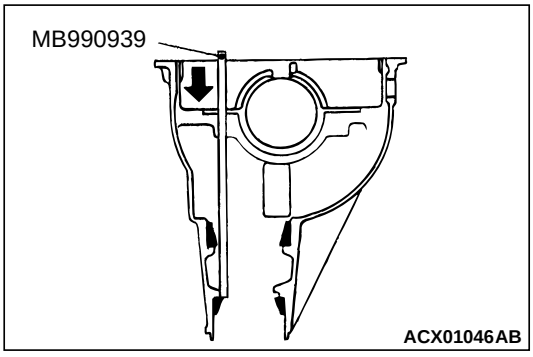
The mating mark made on the companion flange must not be on the coupling surface of the flange yoke and the front propeller shaft.

1. Make mating marks on the drive pinion and companion flange.
2. Drive out the drive pinion together with the drive pinion spacer and drive pinion shims.



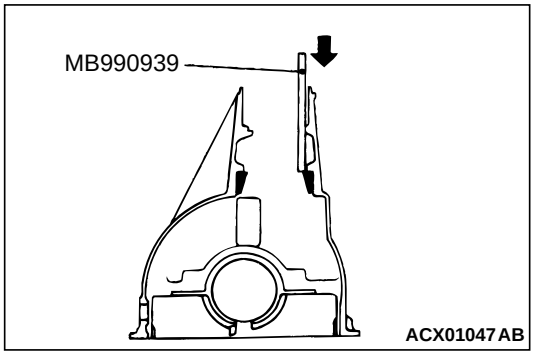
<<H>> DRIVE PINION FRONT BEARING INNER RACE REMOVAL

Use special tools MB990339, MB990648 to pull out the front bearing inner race.



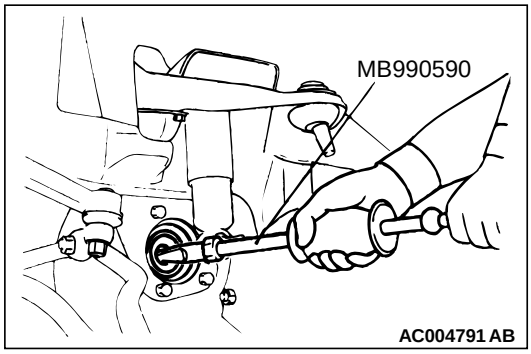
<<I>> DRIVE PINION REAR BEARING OUTER RACE REMOVAL

Use special tool MB990939 to remove the drive pinion rear bearing outer race.



<<J>> DRIVE PINION FRONT BEARING OUTER RACE REMOVAL

Use special tool MB990939 to remove the drive pinion front bearing outer race.

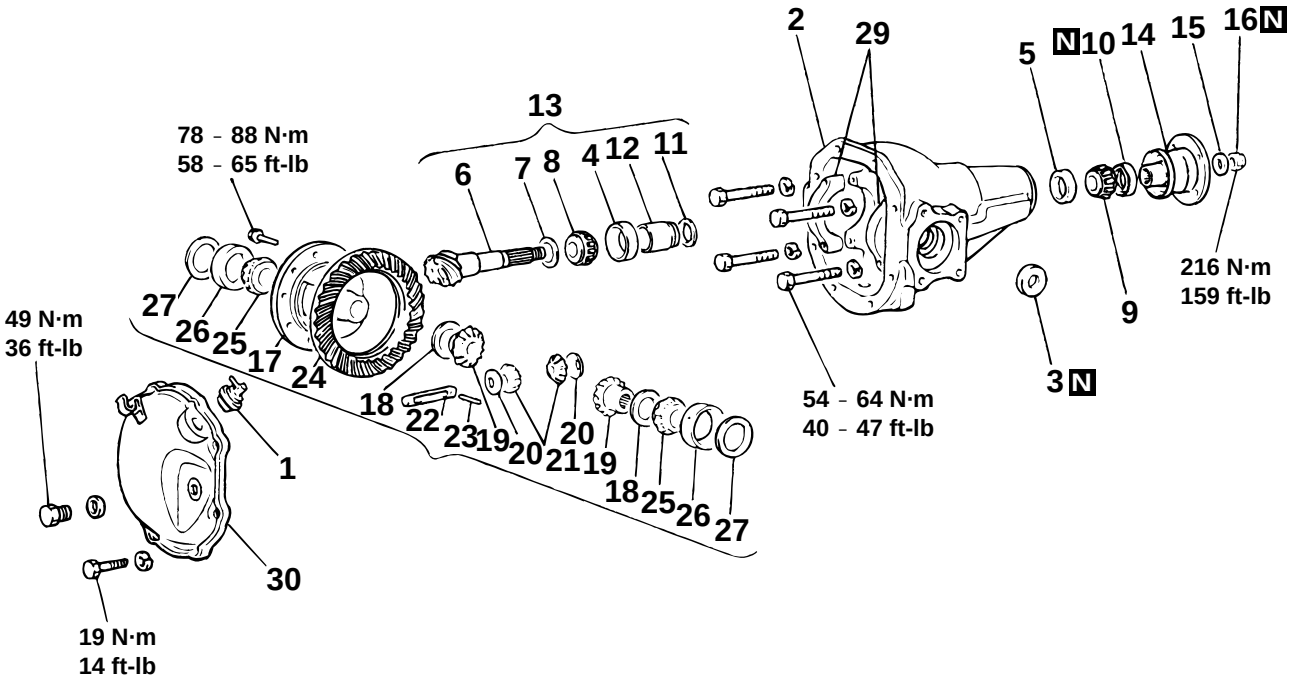


<<K>> OIL SEAL REMOVAL

Use special tool MB990590 to remove the oil seal.

ASSEMBLY

M1262002500128



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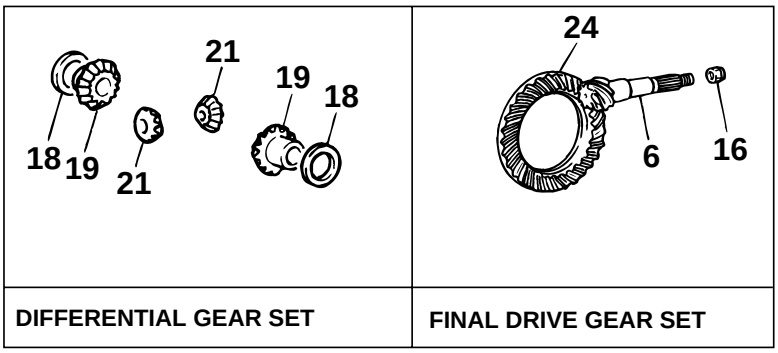

DIFFERENTIAL GEAR SET	FINAL DRIVE GEAR SET

ASSEMBLY STEPS

1. VENT PLUG
2. GEAR CARRIER
- **>>A<<** 3. OIL SEAL
- **>>B<<** 4. DRIVE PINION FRONT BEARING OUTER RACE
- **>>C<<** 5. DRIVE PINION REAR BEARING OUTER RACE
- **>>D<<** • PINION HEIGHT ADJUSTMENT
6. DRIVE PINION
7. DRIVE PINION FRONT SHIM (FOR PINION HEIGHT ADJUSTMENT)
8. DRIVE PINION FRONT BEARING INNER RACE
- **>>E<<** • DRIVE PINION TURNING TORQUE ADJUSTMENT
9. DRIVE PINION REAR BEARING INNER RACE
10. OIL SEAL

ASSEMBLY STEPS (Continued)

11. DRIVE PINION REAR SHIM (FOR TURNING TORQUE ADJUSTMENT)
12. DRIVE PINION SPACER
13. DRIVE PINION ASSEMBLY
14. COMPANION FLANGE
15. WASHER
16. SELF-LOCKING NUT
17. DIFFERENTIAL CASE
18. SIDE GEAR SPACER
19. SIDE GEAR
20. PINION WASHER
21. PINION GEAR
- **>>F<<** • DRIVE GEAR BACKLASH ADJUSTMENT
22. PINION SHAFT
- **>>G<<** 23. LOCK PIN
- **>>H<<** 24. DRIVE GEAR
- **>>I<<** 25. SIDE BEARING INNER RACE

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ASSEMBLY STEPS (Continued)

26. SIDE BEARING OUTER RACE
27. SIDE BEARING ADJUSTING SPACER

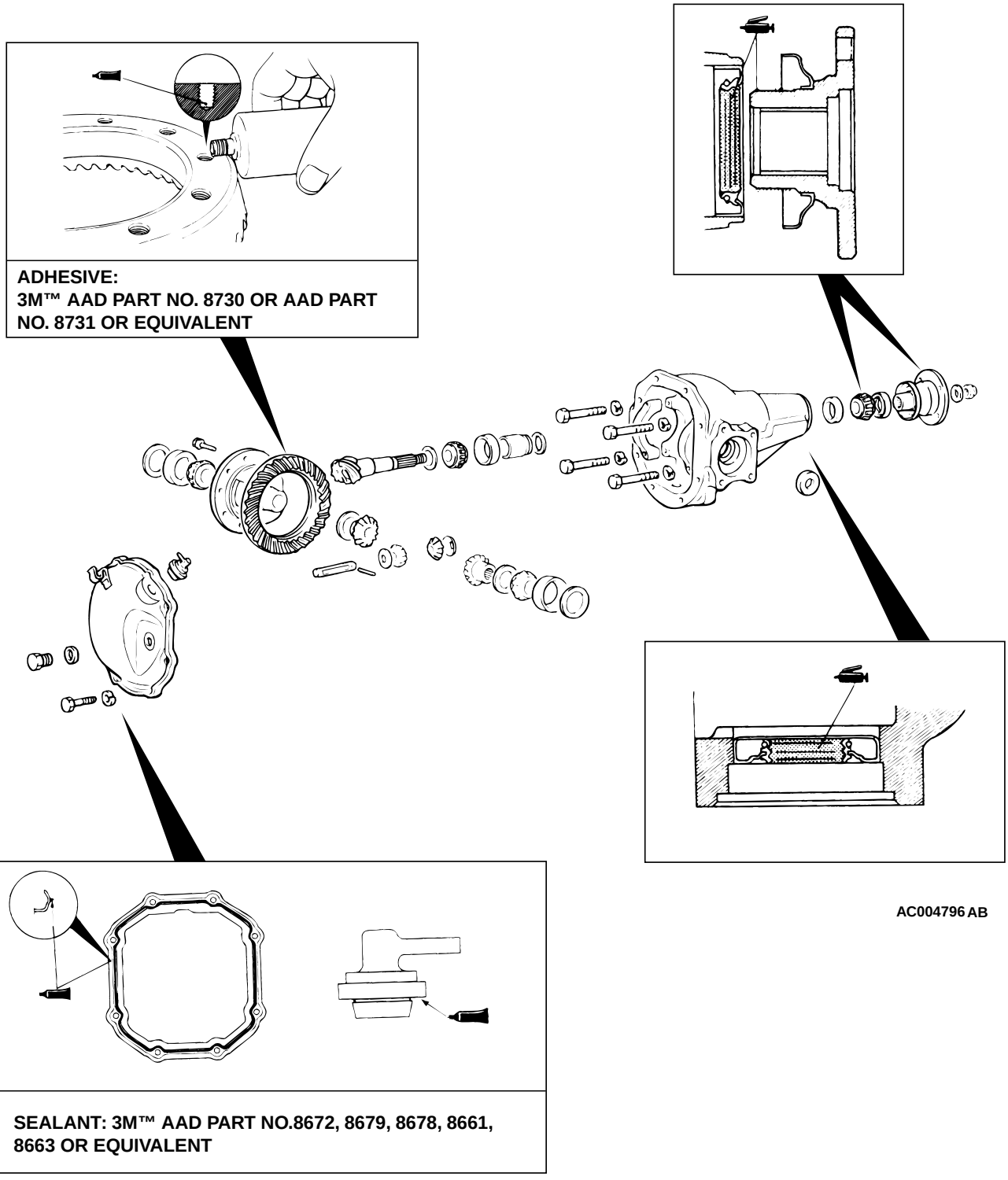
>>J<<
- DRIVE GEAR BACKLASH ADJUSTMENT

28. DIFFERENTIAL CASE ASSEMBLY
29. BEARING CAP
30. COVER

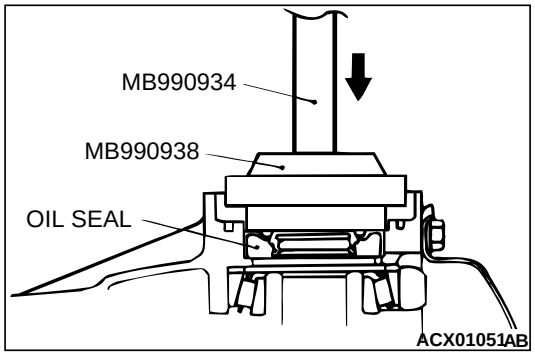
Required Special Tools:

- MB990031 or MB990699: Drive Pinion Oil Seal Installer
- MB990326: Preload Socket
- MB990727: End Yoke Holder
- MB990802: Bearing Installer
- MB990819: Drive Pinion Gauge Assembly
- MB990934: Installation Adapter
- MB990936: Installation Adapter
- MB990938: Bar
- MB990939: Brass Bar
- MB991170: Cylinder Gauge
- MB990685: Torque Wrench

LUBRICATION, SEALING AND ADHESIVE POINTS

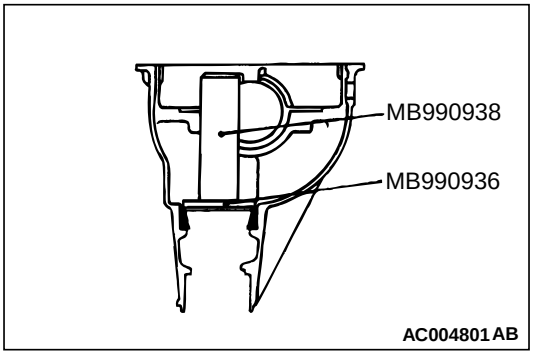


ASSEMBLY SERVICE POINTS



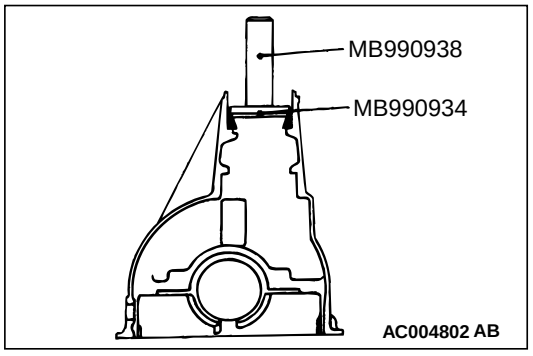
>>A<< OIL SEAL INSTALLATION

Use special tools MB990938, MB990934 to insert the oil seal, and then apply a thin coat of multipurpose grease to the lip of the oil seal.



>>B<< DRIVE PINION FRONT BEARING OUTER RACE INSTALLATION

Use special tools MB990938, MB990936 to press-fit the drive pinion front bearing outer races into the gear carrier.

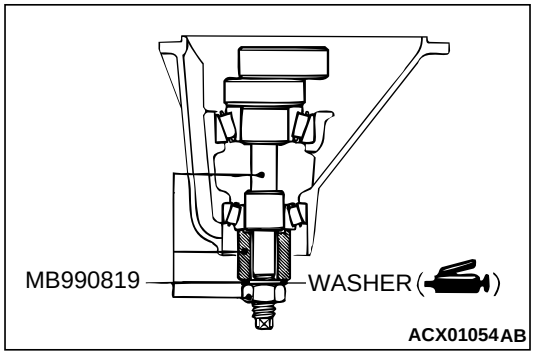


>>C<< DRIVE PINION REAR BEARING OUTER RACE INSTALLATION

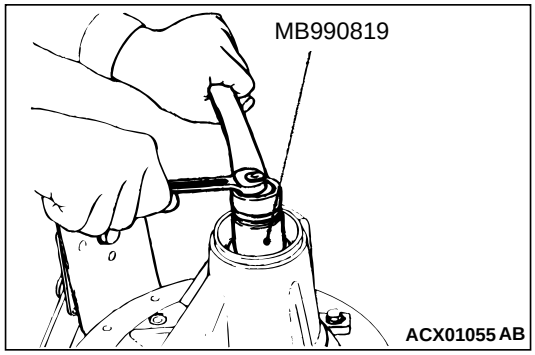
Use special tools MB990938, MB990934 to press-fit the drive pinion rear bearing outer races into the gear carrier.

>>D<< PINION HEIGHT ADJUSTMENT

Adjust the drive pinion height as follows:



1. Apply multipurpose grease to the washer of special tool MB990819.
2. Install special tool MB990819, drive pinion front and rear bearing inner races to the gear carrier.

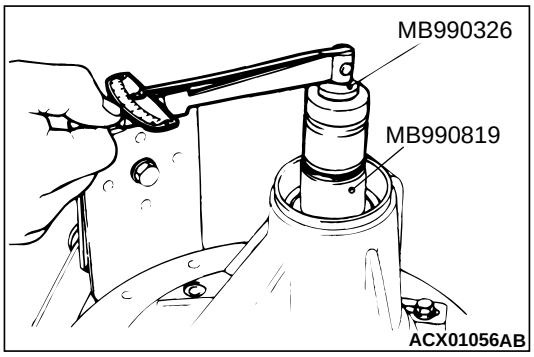


3. Tighten the nut of special tool MB990819 while measuring the turning torque of the drive pinion. Gradually keep tightening the nut of special tool MB990819 until the turning torque of the drive pinion (without oil seal) is at the standard value.

   Standard value:

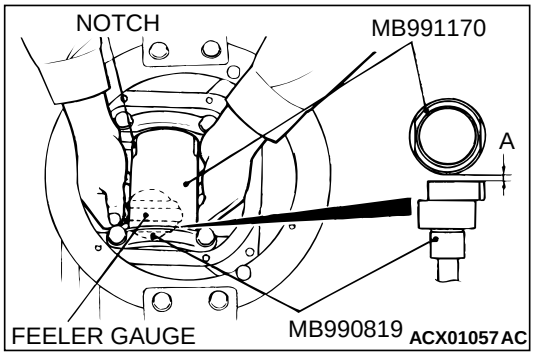
BEARING DIVISION	BEARING LUBRICATION	TURNING TORQUE
New	None (with anti-rust agent)	0.83 – 1.19 N·m 7.35 – 10.53 in-lb

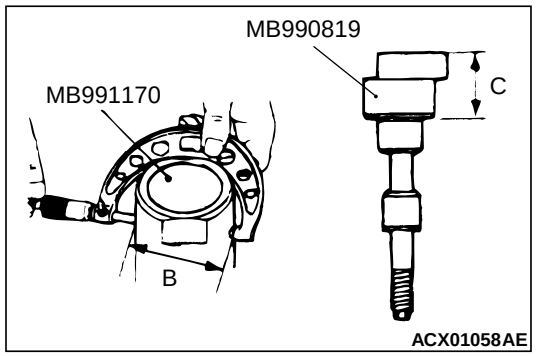
NOTE: The special tool MB990819 cannot be turned a full revolution, so turn it several times within the range of movement to run in the bearing, and then measure the turning torque.



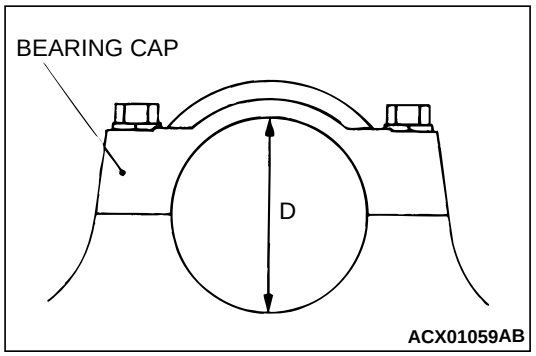
4. Clean the side bearing hub.
5. Install special tool MB991170 to the side bearing hub of the gear carrier, and then install the bearing cap.

   NOTE: Always check that the notch is in the shown position and that special tools MB991170 are touching firmly against the side bearing hub.
6. Use a feeler gauge to measure the clearance (A) between special tools MB991170, MB990819.
7. Remove special tools MB991170, MB990819.

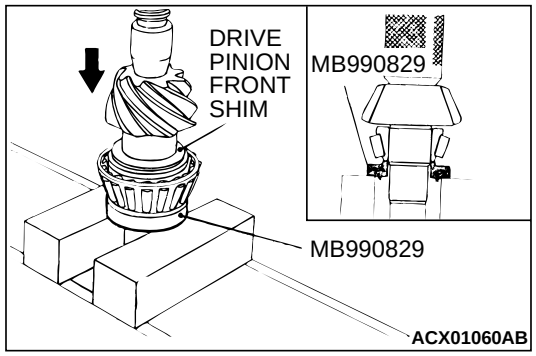




8. Use a micrometer to measure special tools MB991170, MB990819 in the places (B, C) shown in the illustration.



9. Install the bearing cap, and then use a cylinder gauge and micrometer to measure the inside diameter (D) of the bearing cap as shown in the illustration.
10. Calculate the thickness (E) of the required drive pinion front shim by the following formula, and then select a shim which most closely matches this thickness.
    E = A + B + C-1/2D-100.0 mm (3.94 inches)



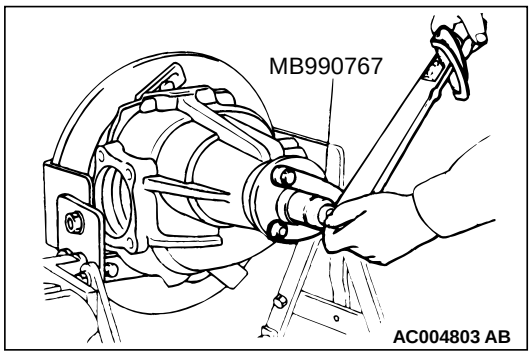
11. Fit the selected drive pinion front shim(s) to the drive pinion, and press-fit the drive pinion front bearing inner race by using special tool MB990802.

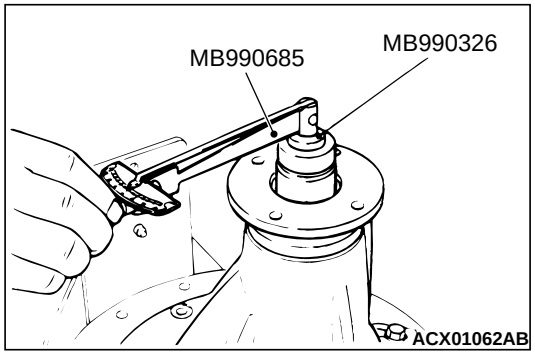
>>E<< DRIVE PINION TURNING TORQUE ADJUSTMENT

Adjust the drive pinion turning torque by using the following procedure:

1. Insert the drive pinion into the gear carrier, and then install the drive pinion spacer, the drive pinion rear shim, the drive pinion rear bearing inner race, and the companion flange in that order.

   NOTE: Do not install the oil seal.
2. Tighten the companion flange to the specified torque by using special tool MB990767.

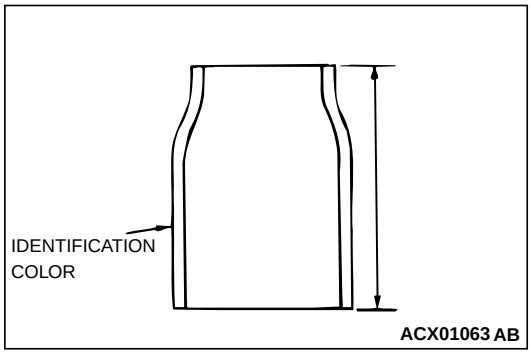




3. Measure the drive pinion turning torque (without the oil seal).

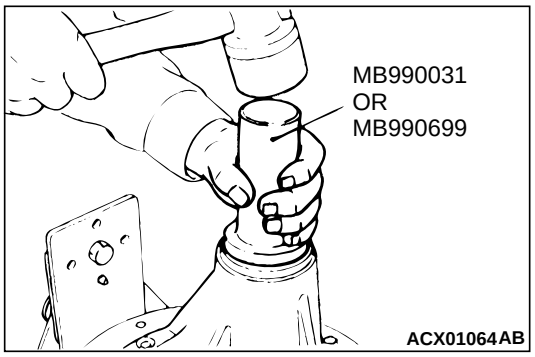
Standard value:

BEARING DIVISION	BEARING LUBRICATION	TURNING TORQUE
New	None (with anti-rust agent)	0.83 – 1.19 N·m 7.35 – 10.53 in-lb

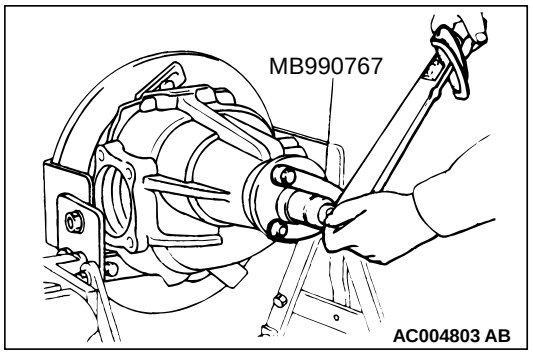


4. If the drive pinion turning torque is not within the range of the standard value, adjust the preload by replacing the drive pinion rear shim(s) or the drive pinion spacer.

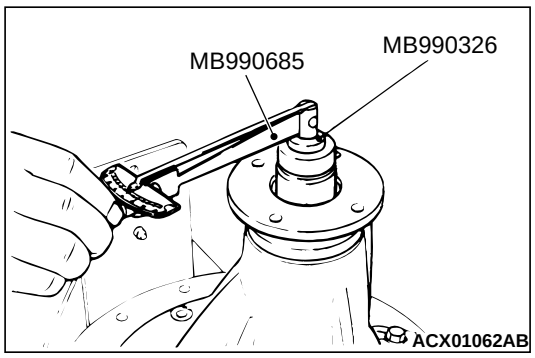
DRIVE PINION SPACER HEIGHT mm (in)	IDENTIFICATION COLOR
56.67 (2.231)	White
57.01 (2.244)	–



5. Remove the companion flange and drive pinion again. Then, after inserting the drive pinion rear bearing inner race into the gear carrier, use special tools MB990031 or MB990699 press-fit the oil seal.



6. Install the drive pinion assembly and companion flange with mating marks properly aligned, and tighten the companion flange self-locking nut to the specified torque by using special tool MB990767.



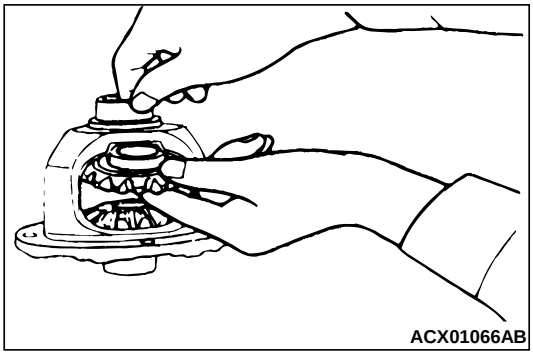
7. Measure the drive pinion turning torque (with the oil seal).

Standard value:

BEARING DIVISION	BEARING LUBRICATION	TURNING TORQUE
New	None (with anti-rust agent)	0.93 – 1.28 N·m 8.23 – 11.33 in-lb
	Gear oil applied	0.97 – 1.32 N·m 8.59 – 11.68 in-lb

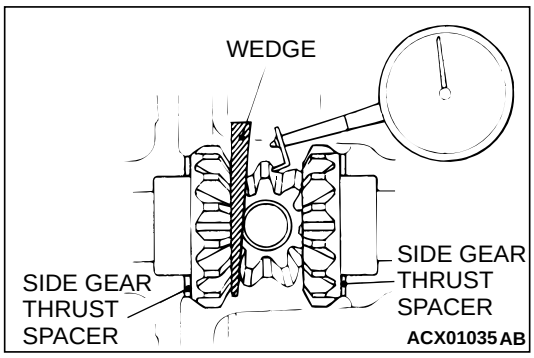
8. If the drive pinion turning torque is not within the standard value, check the tightening torque of the companion flange self-locking nut and the oil seal.

>>F<< DIFFERENTIAL GEAR BACKLASH ADJUSTMENT



1. Assemble the side gears, side gear spacers, pinion gears and pinion washers into the differential case.
2. Temporarily install the pinion shaft.

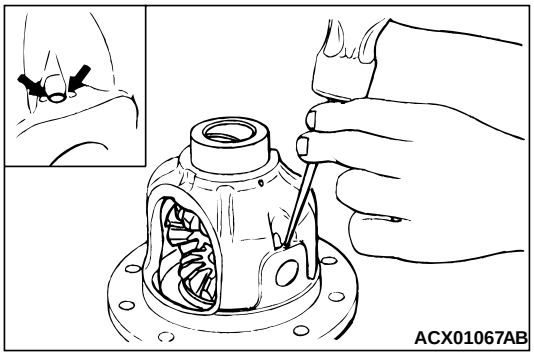
   NOTE: Do not drive in the lock pin yet.



3. Insert a wedge between the side gear and the pinion shaft to lock the side gear.
4. Measure the differential gear backlash with a dial indicator on the pinion gear.

   Standard value: 0 – 0.076 mm (0 – 0.0030 inch)
   Limit: 0.2 mm (0.08 inch)
5. If the differential gear backlash exceeds the limit, adjust the backlash by installing thicker side gear spacers.
6. If adjustment is not possible, replace the side gears and pinion gears as a set.
7. Measure the differential gear backlash once again, and confirm that it is within the limit.

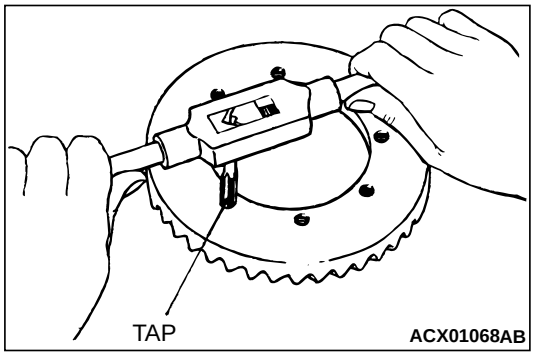
>>G<< LOCK PIN INSTALLATION

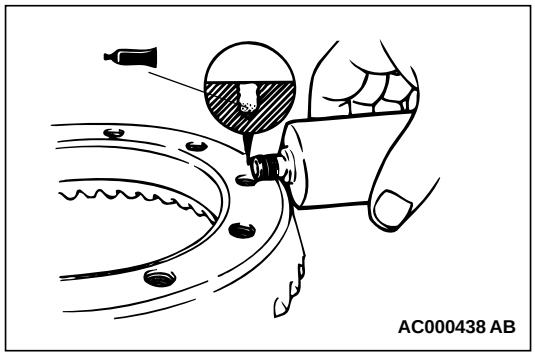


1. Align the pinion shaft lock pin hole with the differential case lock pin hole, and drive in the lock pin.
2. Stake the lock pin with a punch at two points.

>>H<< DRIVE GEAR INSTALLATION

1. Clean the drive gear attaching bolts.
2. Remove the adhesive adhered to the threaded holes of the drive gear by turning the special tool (tap M10 x 1.25), and then clean the threaded holes by applying compressed air.



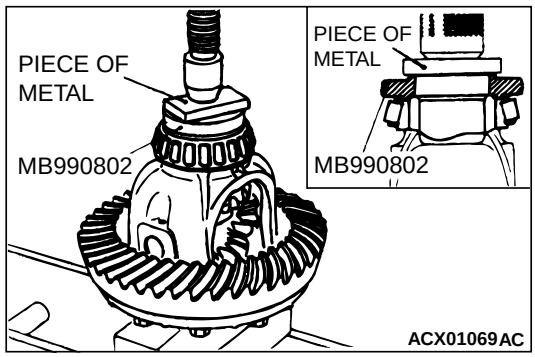


3. Apply the 3M™ AAD Part number 8730 or AAD Part number 8731 or equivalent to the threaded holes of the drive gear.
4. Install the drive gear onto the differential case with the mating marks properly aligned. Tighten the bolts to the specified torque in a diagonal sequence.

   Tightening torque: 78 – 88 N·m (58 – 65 ft-lb)

>>I<< SIDE BEARING INNER RACE INSTALLATION

Use special tool MB990802 to press-fit the side bearing inner races into the differential case.

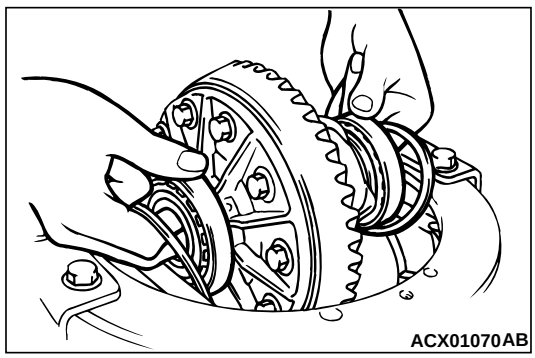


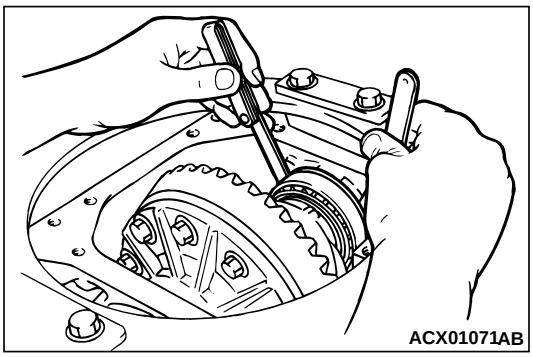
>>J<< DRIVE GEAR BACKLASH ADJUSTMENT

Adjust the drive gear backlash by the following procedures:

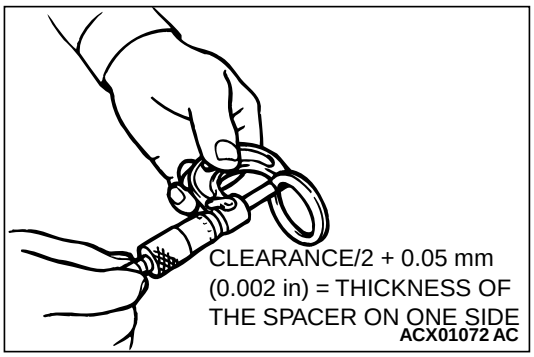
1. Install the side bearing spacers, which are thinner than those removed, to the side bearing outer races, and then mount the differential case assembly into the gear carrier.

   NOTE: Select side bearing spacers with the same thickness for both the drive pinion side and the drive gear side.




ACX01071AB

2. Push the differential case assembly to one side, and measure the clearance between the gear carrier and the side bearing adjusting spacer with a feeler gauge.



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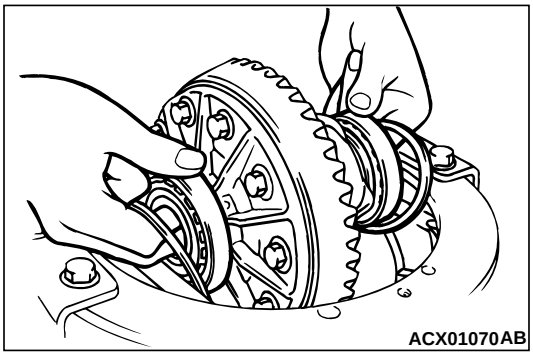
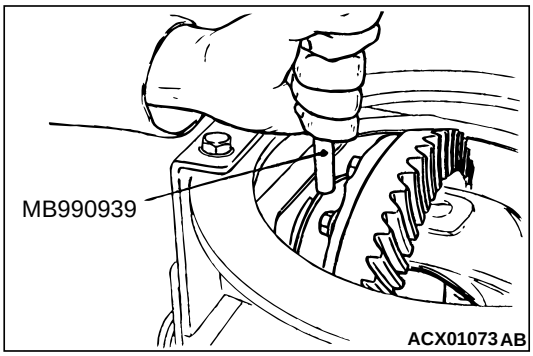
3. Measure the thickness of the side bearing adjusting spacers on one side, select two pairs of spacers which correspond to that thickness plus one half of the clearance plus 0.05 mm (0.002 inch), and then install one pair each to the drive pinion side and the drive gear side.

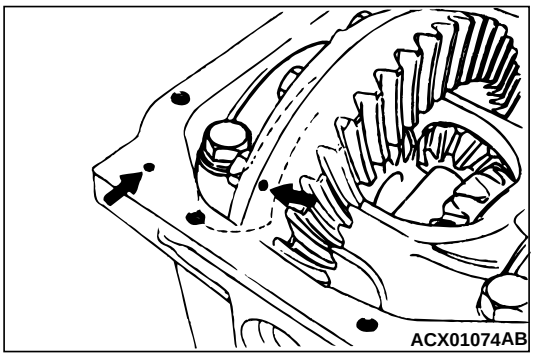

ACX01070AB

4. Install the side bearing adjusting spacers and differential case assembly, as shown in the illustration, to the gear carrier.



ACX01073AB

5. Tap the side bearing adjusting spacers with special tool MB990939 to fit them to the side bearing outer race.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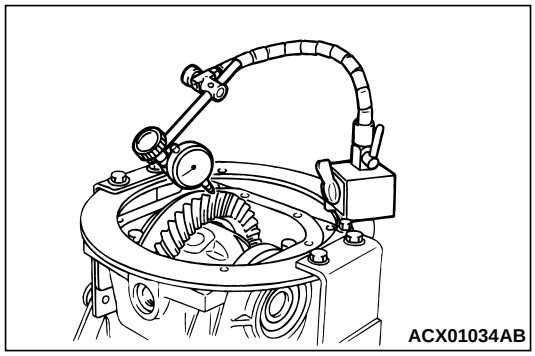
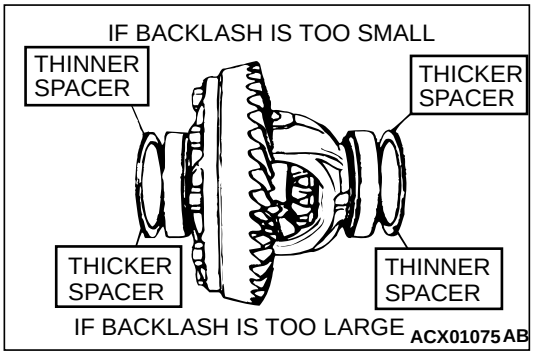
6. Align the mating marks on the gear carrier and the bearing cap, and then tighten the bearing cap.


ACX01034AB

7. With the drive pinion locked in place, measure the drive gear backlash with a dial indicator on the drive gear.

   NOTE: Measure at four points or more on the circumference of the drive gear.

   Standard value: 0.11 – 0.16 mm (0.004 – 0.006 inch)

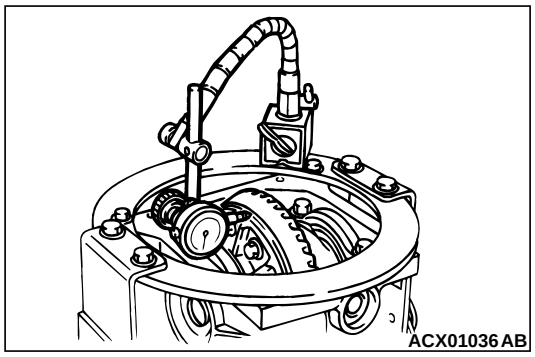


ACX01075AB

8. Change the side bearing adjusting spacers as illustrated, and then adjust the drive gear backlash between the drive gear and the drive pinion.

   NOTE: When increasing the number of side bearing adjusting spacers, use the same number for each, and as few as possible.

9. Check the drive gear and drive pinion for tooth contact. If poor contact is evident, make adjustment. (Refer to P.26-38.)


ACX01036AB

10. Measure the drive gear runout at the shoulder on the reverse side of the drive gear.

    Limit: 0.05 mm (0.002 inch)

11. If the drive gear runout exceeds the limit, reinstall by changing the phase of the drive gear and differential case, and remeasure.

12. If adjustment is not possible, replace the differential case or replace the drive gear and drive pinion as a set.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1261005400224

ITEM	SPECIFICATION
Differential carrier	
Cover bolt	19 N·m (14 ft-lb)
Differential case bolt	78 – 88 N·m (58 – 65 ft-lb)
Drain plug	59 – 64 N·m (43 – 51 ft-lb)
Drive pinion self-locking nut	216 N·m (159 ft-lb)
Filler plug	49 N·m (36 ft-lb)
Front suspension crossmember nut	98 – 118 N·m (72 – 87 ft-lb)
Front propeller shaft connection nut	49 – 59 N·m (36 – 43 ft-lb)
Differential mount insulator assembly	35 N·m (26 ft-lb)
Differential support bracket bolt	69 N·m (51 ft-lb)
Differential support bracket nut	44 N·m (32 ft-lb)
Dynamic damper nut	22 N·m (16 ft-lb)
Bearing cap bolt	54 – 64 N·m (40 – 47 ft-lb)
Drive shaft	
Driveshaft and inner shaft connection nut	49 – 59 N·m (36 – 43 ft-lb)
Front axle hub	
ABS Rotor bolt	22 N·m (16 ft-lb)
Brake disc and front hub assembly connection nut	49 – 59 N·m (36 – 43 ft-lb)
Caliper assembly bolt	88 N·m (65 ft-lb)
Hub cap bolt	49 – 59 N·m (36 – 43 ft-lb)
Jam nut	127 – 196 N·m → 0 N·m → 25 N·m (94 – 145 in-lb → 0 in-lb → 18 ft-lb)
Inner shaft	
Breather pipe bolt	12 N·m (106 ft-lb)
Housing tube bolt	88 N·m (65 ft-lb)
Differential mounting bracket nut	93 N·m (69 ft-lb)
Heat protector bolt	12 N·m (106 in-lb)
Knuckle	
Lower arm ball joint and knuckle connection nut	118 – 177 N·m (87 – 131 ft-lb)
Shock absorber nut (lower)	88 – 103 N·m (65 – 76 ft-lb)
Stabilizer bracket bolt	12 N·m (106 in-lb)
Tie rod end connection nut	44 N·m (32 ft-lb)
Upper arm ball joint and knuckle connection nut	59 – 88 N·m (43 – 65 ft-lb)

GENERAL SPECIFICATIONS

M1261000200214

ITEM			SPECIFICATION
Front axle hub bearing		Type	Taper roller type nut bearing
Driveshaft	Joint type	Outer	Birfield joint
		Inner	Double-offset joint
Differential	Final drive gear type		Hypoid gear
	Reduction ratio	Vehicle without wide fender	4.636
		Vehicle with wide fender	4.900
	Pinion gear type		2 pinion

SERVICE SPECIFICATIONS

M1261000300244

ITEM			STANDARD VALUE	LIMIT
Front axle total backlash mm (in)			–	11 (0.4)
Driveshaft end play mm (in)			0.4 – 0.7 (0.02 – 0.03)	–
Front hub play in the axial direction mm (in)			0.05 (0.002) or less	–
Hub rotary sliding resistance N (lb) [Hub rotation breakaway torque N·m (in-lb)			4 – 19 (0.9 – 4.3) [0.3 – 1.3 (2.7 – 11.5)]	–
Opening dimension of the special tool (MB991561) mm (in)		When the BJ boot band (small) is crimped	2.9 (0.12)	–
		When the BJ boot band (large) is crimped	3.2 (0.13)	–
Crimped width of the BJ boot band mm (in)			2.4 – 2.8 (0.09 – 0.11)	–
Clearance between the bj boot (larger diameter side) and the stepped phase of the bj housing mm (in)			0.1 – 1.55 (0.004 – 0.061)	–
Setting of DOJ boot length mm (in)			92 – 98 (3.6 – 3.9)	–
Clutch gear play (bearing end play) mm (in)			0.05 – 0.30 (0.002 – 0.012)	–
Final drive gear backlash mm (in)			0.11 – 0.16 (0.004 – 0.006)	–
Drive gear runout mm (in)			–	0.05 (0.002)
Differential gear backlash mm (in)			0 – 0.076 (0 – 0.0030)	0.2 (0.08)
Drive pinion turning torque N·m (in-lb)	Without oil seal	With anti-rust agent	0.83 – 1.19 (7.35 – 10.53)	–
	With oil seal	With anti-rust agent	0.93 – 1.28 (8.23 – 11.33)	–
		With gear oil applied	0.97 – 1.32 (8.59 – 11.68)	–

LUBRICANTS

M1261000400230

ITEM	SPECIFIED LUBRICANTS	QUANTITY
Front differential gear oil	Hypoid gear oil API classification GL-5 or higher SAE viscosity No. 90, 80W	1.15 dm^3(1.22 qt)
DOJ boot grease	Repair kit grease	140 g (4.9 oz)
BJ boot grease	Repair kit grease	120 g (4.2 oz)

SEALANTS AND ADHESIVES

M1261000500088

ITEM	SPECIFIED SEALANTS AND ADHESIVES
Contact surface of drive flange and front hub assembly	3M™ AAD Part No. 8672, 8679, 8678, 8663, 8661 or equivalent
Contact surface of hub cap and drive flange	
Contact surface of differential cover and differential carrier	
Vent plug	
Drive gear threaded hole	3M™AAD Part No.8730 or AAD Part No.8731 or equivalent