

GROUP 27B

REAR AXLE <AWD>

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GENERAL INFORMATION

M1271000100995

The rear axle has the following features:

- The wheel bearing is a unit ball bearing (double-row angular contact ball bearing) which incorporates the oil seals and is highly resistant to thrust loads.
- The driveshaft incorporates lightweight and compact EBJ-ETJ type constant velocity joints.
- The rear driveshaft spline diameter on the wheel-side has been increased, improving torsional strength.
- The protector cover of magnetic encoder is equipped to driveshaft.
- Lead-free grease for the constant velocity joint is adopted.
- Hexavalent chromium is eliminated from the dust cover material.

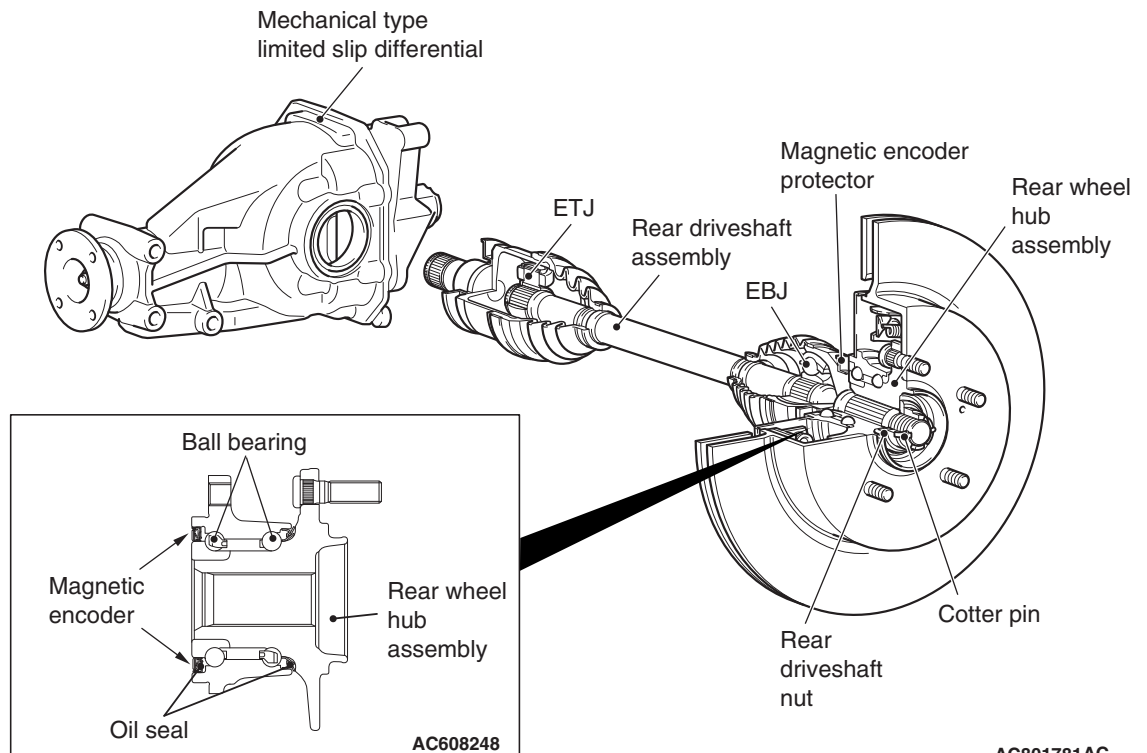
- The number of parts is reduced by integrating the magnetic encoder for ABS wheel speed detection into the wheel bearing.
- The mechanical type limited slip differential has been equipped.

NOTE:

EBJ (High Efficiency Compact Birfield Joint): the lighter and smaller constant velocity joint compared with the conventional BJ has been achieved by adopting the eight small balls.

ETJ (High Efficiency Compact Tripod Joint): the lighter and smaller constant velocity joint compared with the conventional TJ has been installed.

CONSTRUCTION DIAGRAM



GENERAL SPECIFICATIONS

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| Item | | Specification | |
|---|--|---|-----------------------|
| Rear axle | | | |
| Wheel bearing | Bearing type | Unit ball bearing (double-row angular contact ball bearing) | |
| Driveshaft Joint | Type | Outer | EBJ |
| | | Inner | ETJ |
| | Length (joint to joint) × diameter mm (in) | Left | 495 × 25 (19.5 × 1.0) |
| Right | | 581.5 × 25 (22.89 × 1.0) | |
| Differential | | | |
| Differential type | | Mechanical type LSD | |
| Reduction gear type | | Hypoid gear | |
| Reduction ratio | | 3.307 | |
| Number of teeth | Drive gear | 43 | |
| | Drive pinion | 13 | |
| Bearings (Outside diameter × Inside diameter) mm (in) | Side | 72 × 35 (2.8 × 1.4) | |
| | Front | 62 × 25 (2.4 × 1.0) | |
| | Rear | 72 × 35 (2.8 × 1.4) | |

SERVICE SPECIFICATIONS

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| Item | Standard value | | Limit | |
|---|--|---|---------------------------|---|
| Rear axle total backlash mm (in) | – | | 6 (0.2) | |
| Wheel bearing end play mm (in) | – | | 0.05 (0.002) | |
| Hub rotation starting torque N· m (in-lb) | – | | 1.4 (12.4) | |
| ETJ boot assembly dimension mm (in) | 80 ± 3 (3.1 ± 0.1) | | – | |
| Drive gear backlash mm (in) | 0.11 -0.16 (0.004 – 0.006) | | – | |
| Drive gear runout mm (in) | – | | 0.05 (0.002) | |
| Drive pinion turning torque N· m (in-lb) | Without oil seal | Bearing (oil seal contacting area) with anti-rust agent | 0.88 -1.17 (7.79 – 10.36) | – |
| | | Bearing (oil seal contacting area) with gear oil applied | 0.39 -0.49 (3.45 – 4.34) | – |
| | With oil seal | Companion flange (oil seal contacting area) with anti-rust agent | 0.98 -1.27 (8.67 – 11.24) | – |
| | | Companion flange (oil seal contacting area) with gear oil applied | 0.49 -0.58 (4.34 – 5.13) | – |
| Right-to-left difference in combined thickness of friction plate and friction disc mm (in) | 0 -0.05 (0 – 0.002) | | – | |
| Clearance between spring plate and differential case mm (in) | 0.06 -0.25 (0.002 – 0.010) | | – | |
| Limited slip differential starting torque N· m (in-lb) | When a new clutch plate is used | 2.1 -2.9 (18.6 – 25.7) | – | |
| | When re-installed current clutch plate | 2.1 -2.9 (18.6 – 25.7) | – | |
| Friction plate and friction disc warping (flatness) mm (in) | – | | 0.08 (0.003) | |
| Friction plate, friction disc and spring plate wear (difference in the thickness of the friction surface and the projections) mm (in) | – | | 0.1 (0.004) | |

LUBRICANTS

M1271000400725

| Item | Specified lubricant | Quantity |
|---------------------|---|--|
| Mechanical type LSD | MITSUBISHI Genuine DIA QUEEN LSD gear oil | Approx. 0.55 dm ³ (0.58 qt) |
| EBJ joint | Repair kit grease | 110 ± 10 g (3.9 ± 0.3 oz) |
| ETJ joint | Repair kit grease | 125 ± 10 g (4.4 ± 0.3 oz) |

SEALANT AND ADHESIVE

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| Item | Specified sealant and adhesive |
|--|--|
| Vent plug | 3M™ AAD Part No.8672, 8679, 8678, 8661, 8663 or equivalent |
| Differential cover assembly | |
| Tightening area between drive gear and differential case | 3M™ AAD Part No. 8730, 8731 or equivalent |

COMPONENT IDENTIFICATION

M1271003800153

DRIVE PINION SPACER

| Height of drive pinion spacer mm (in) |
|---------------------------------------|
| 57.08 (2.247) |
| 57.72 (2.272) |

REAR AXLE DIAGNOSIS

INTRODUCTION

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Noise from the driveshaft or differential may be caused by defects in the components.

TROUBLESHOOTING STRATEGY

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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 rear 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

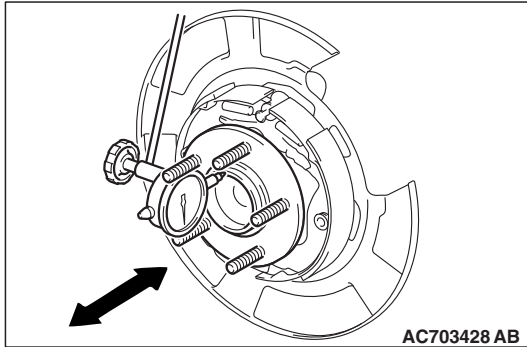
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| Symptom | | Inspection procedure | Reference page |
|--------------|---|----------------------|--------------------------|
| Driveshaft | Noise during wheel rotation | 1 | P.27B-6 |
| Differential | Constant noise | 2 | P.27B-7 |
| | Gear noise while driving | 3 | P.27B-8 |
| | Gear noise while coasting | 4 | P.27B-9 |
| | Bearing noise while driving or coasting | 5 | P.27B-9 |
| | Noise while turning | 6 | P.27B-10 |
| | Heat | 7 | P.27B-10 |
| | Oil leakage | 8 | P.27B-11 |

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Noise during Wheel Rotation <DRIVESHAFT>

DIAGNOSIS

**STEP 1. Check the wheel bearing end play.**

- (1) Remove the caliper assembly, and suspend the caliper assembly with a wire and remove the brake disk (Refer to [P.27B-19](#)).
- (2) Fit the dial gauge as shown in the diagram and move the hub in the axial direction to measure the play.

Limit: 0.05 mm (0.002 inch)

Q: Is the wheel bearing end play within the limit?

YES : Go to step 2.

NO : Replace the part, then go to Step 4.

STEP 2. Check if the driveshaft is bent.**Q: Is the driveshaft bent?**

YES : Replace the part. Then go to Step 3.

NO : Go to Step 4.

STEP3. Check the driveshaft assembly for wear or damage.**Q: Is the driveshaft assembly worn or damaged?**

YES : Replace the driveshaft assembly. Then go to Step 4.

NO : There is no action to be taken.

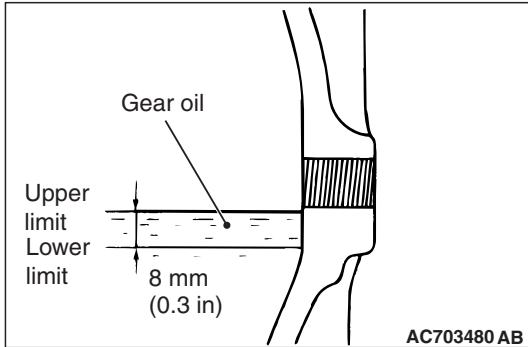
STEP 4. Retest the system.**Q: Is the abnormal noise eliminated?**

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 2: Constant Noise <DIFFERENTIAL>

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 MITSUBISHI Genuine DIA QUEEN LSD gear oil. Then go to Step 9.

NO : Go to Step 2.

STEP 2. Check the tooth contact (engagement) of the drive gear and drive pinion (Refer to P.27B-30).

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.

STEP 3. Check the side bearing for looseness, wear or damage.

Q: Is the side bearing loose, 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 spacer or pinion shaft for wear.

Q: Is the side gear spacer 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 wear or 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 foreign material.

Q: Is any foreign material found?

YES : Remove the foreign material and then inspect for damage. 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 : Start over at Step 1.

INSPECTION PROCEDURE 3: Gear Noise while Driving <DIFFERENTIAL>

DIAGNOSIS

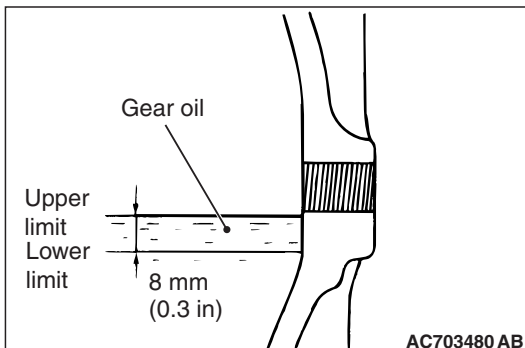
STEP 1. Check the oil level.

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 MITSUBISHI Genuine DIA QUEEN LSD gear oil. Then go to Step 6.

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 or replace the part. Then go to Step 6.

STEP 3. Check the drive pinion turning torque.

Q: Is the drive pinion turning torque correct?

YES : Go to Step 4.

NO : Adjust the turning torque. Then go to Step 6.

STEP 4. Check the gear for damage.

Q: Is the gear damaged?

YES : Replace the gear. Then go to Step 6.

NO : Go to Step 5.

STEP 5. Check for foreign material.

Q: Is foreign material found?

YES : Remove the foreign material and then inspect for damage. If necessary, replace the part. Then go to Step 6.

NO : Go to Step 6.

STEP 6. Retest the system.

Q: Is the abnormal noise eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 4: Gear Noise while Coasting <DIFFERENTIAL>

DIAGNOSIS

STEP 1. Check the drive pinion turning torque.

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 : Go to Step 3.

STEP 3. Retest the system.

Q: Is the abnormal noise eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 5: Bearing Noise while Driving or Coasting <DIFFERENTIAL>

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 : Go to Step 2.

STEP 2. Retest the system.

Q: Is the abnormal noise eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 6: Noise while Turning <DIFFERENTIAL>

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 : Go to Step 3.

STEP 3. Retest the system.

Q: Is the abnormal noise eliminated?

YES : The procedure is complete.

NO : Start over at Step 1.

INSPECTION PROCEDURE 7: Heat <DIFFERENTIAL>

DIAGNOSIS

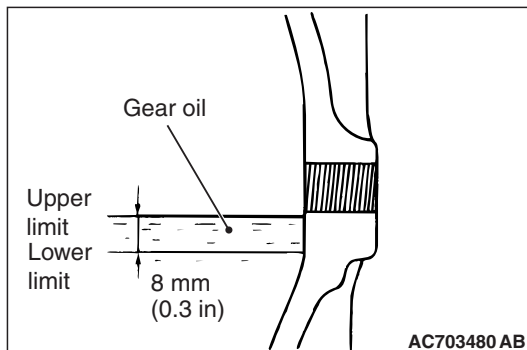
STEP 1. Check the oil level.

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 MITSUBISHI Genuine DIA QUEEN LSD gear oil. Then go to Step 3.

NO : Go to Step 2.



STEP 2. Check for excessive gear backlash (Refer to P.27B-37).

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 : Start over at Step 1.

INSPECTION PROCEDURE 8: Oil Leakage <DIFFERENTIAL>

DIAGNOSIS

STEP 1. Check the cover installation.

Q: Is the cover installed correctly?

YES : Go to Step 2.

NO : Repair. Then go to Step 4.

STEP 2. Check the oil seal for wear or damage.

Q: Is the oil seal worn or damaged?

YES : Replace the seal. Then go to Step 4.

NO : Go to Step 3.

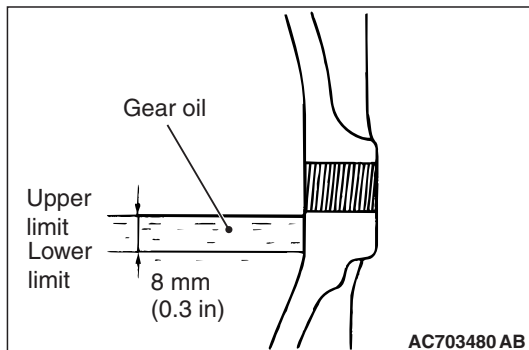
STEP 3. Check the oil level.

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 MITSUBISHI Genuine DIA QUEEN LSD gear oil. Then go to Step 4 .

NO : Go to Step 4.



STEP 4. Retest the system.

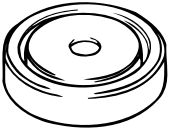
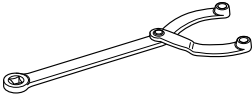
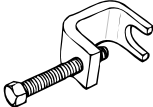
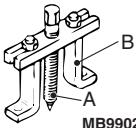

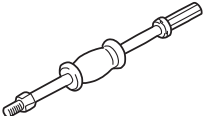
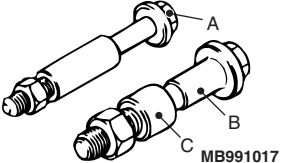
Q: Is there oil leakage?

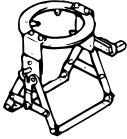
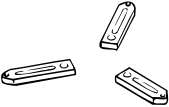
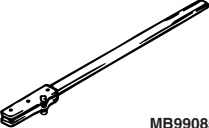


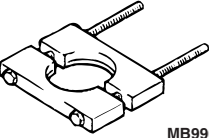
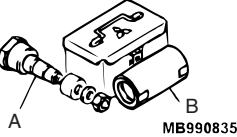
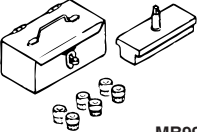
YES : Start over at Step 1.

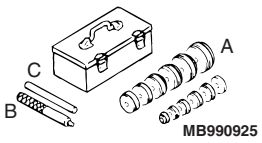
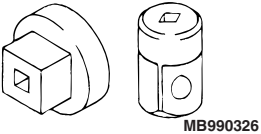


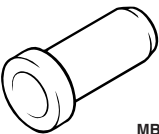
NO : The procedure is complete.

SPECIAL TOOLS

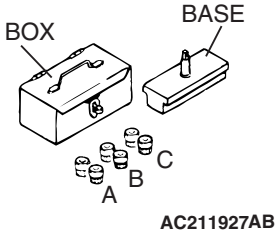
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| Tool | Tool number and name | Supersession | Application |
|--|---|--|--|
|  | MB991115 Oil seal installer | MB991115-01 | Oil seal press-fitting (used in combination with MB990938) |
|  B990767 | MB990767 Front hub and flange yoke holder | MB990767-01 | Hub fixing |
|  MB991618 | MB991618 Hub bolt remover | General service tool | Removal of hub bolt |
|  MB990241AD | MB990241 Axle shaft puller A: MB990242 Puller shaft B: MB990244 Puller bar | MB990241-01 or General service tool | <ul style="list-style-type: none"> • Driveshaft removal • Rear wheel hub assembly removal |
|  MB991354 | MB991354 Puller body | General service tool | |
|  MB990211 | MB990211 Slide hammer | General service tool | Rear wheel hub assembly removal |
|  MB991017 | A: MB991017 B: MB990998 C: MB991000 A, B: Front hub remover and installer C: Spacer | MB990998-01 | <ul style="list-style-type: none"> • Wheel bearing temporarily fixing • Hub rotation starting torque measurement • Wheel bearing axial looseness measurement Use MB991000 (a part of MB990998) for spacer |

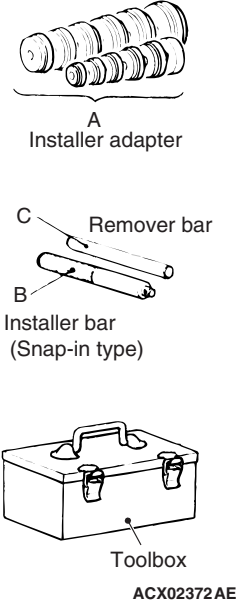
| Tool | Tool number and name | Supersession | Application |
|---|---|-----------------------------|---|
|  <p>MB990909</p> | <p>MB990909 Working base</p> | <p>General service tool</p> | <p>Differential carrier assembly disassembly/assembly</p> |
|  | <p>MB991116 Working base adapter</p> | <p>General service tool</p> | |
|  <p>MB990850</p> | <p>MB990850 End yoke holder</p> | <p>–</p> | <p>Companion flange fixing</p> |
|  <p>MB990810</p> | <p>MB990810 Side bearing puller</p> | <p>MB990810-01</p> | <ul style="list-style-type: none"> • Removal of the side bearing inner race • Removal of the companion flange |
|  <p>MB990811</p> | <p>MB990811 Side bearing cup</p> | <p>MB990811-01</p> | <p>Removal of the side bearing inner race</p> |
|  <p>MB990560</p> | <p>MB990560 Rear axle shaft bearing remover</p> | <p>MD998348-01</p> | <p>Drive pinion rear bearing inner race removal</p> |
|  <p>MB990835</p> | <p>MB990835 Drive pinion setting gauge set A: MB990836 Drive pinion gauge assembly B: MB990392 Cylinder gauge</p> | <p>–</p> | <p>Adjustment of the drive pinion height</p> |
|  <p>MB990988</p> | <p>MB990988 Side gear holding tool set</p> | <p>–</p> | <p>Measurement of clutch plate preload</p> |

| Tool | Tool number and name | Supersession | Application |
|---|--|--|---|
|  | MB990925 Bearing and oil seal installer set A: MB990926 to MB990937 Installer adapter B: MB990938 Installer bar C: MB990939 Remover bar | MB990925-01 or General service tool | <ul style="list-style-type: none"> Differential carrier oil seal driving in Final drive gear teeth contact inspection Drive pinion bearing removal/press-fitting |
|  | MB990326 Preload socket | General service tool | Hub rotation torque measurement |
|  | MB990685 Torque wrench | General service tool | |
|  | MB990728 Bearing installer | – | <ul style="list-style-type: none"> Press-fitting of the drive pinion rear bearing inner race Press-fitting of the differential side bearing inner race |
|  | MB990727 Oil seal installer | – | Press-fitting of drive pinion oil seal |

SIDE GEAR HOLDING TOOL SET

| Tool | Tool number | Name | O D mm (in) |
|---|-------------|--------|-------------|
|  | MB990551 | Box | – |
| | MB990989 | Base | – |
| | MB990990 | Tool A | 25 (1.0) |
| | MB990991 | Tool B | 28 (1.1) |
| | MB990992 | Tool C | 31 (1.2) |

MB990925 BEARING AND OIL SEAL INSTALLER SET

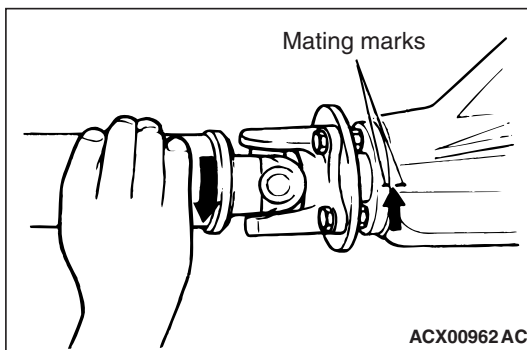
| Tool | Type | Tool number | O D mm (in) | |
|--|------|-------------|-------------|---|
|  <p>A Installer adapter</p> <p>C Remover bar</p> <p>B Installer bar (Snap-in type)</p> <p>Toolbox ACX02372 AE</p> | A | MB990926 | 39.0 (1.54) | |
| | | MB990927 | 45.0 (1.77) | |
| | | MB990928 | 49.5 (1.95) | |
| | | MB990929 | 51.0 (2.00) | |
| | | MB990930 | 54.0 (2.13) | |
| | | MB990931 | 57.0 (2.24) | |
| | | MB990932 | 61.0 (2.40) | |
| | | MB990933 | 63.5 (2.50) | |
| | | MB990934 | 67.5 (2.66) | |
| | | MB990935 | 71.5 (2.81) | |
| | | MB990936 | 75.5 (2.97) | |
| | | MB990937 | 79.0 (3.11) | |
| | | B | MB990938 | – |
| | | C | MB990939 | – |

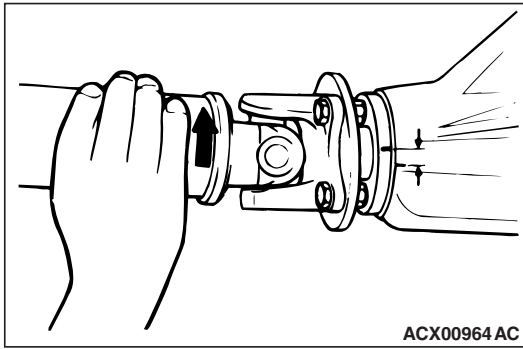
ON-VEHICLE SERVICE

REAR AXLE TOTAL BACKLASH CHECK

M1271001200531

1. Park the vehicle on a flat, level surface.
2. Move the transmission gearshift lever to the neutral position. Apply the parking brake and jack up the vehicle.
3. Turn the propeller shaft clockwise as far as it will go. Make the mating marks on the dust cover of the companion flange and on the differential carrier.





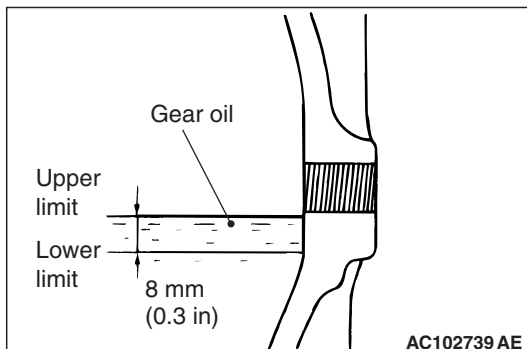
- Turn the propeller shaft counterclockwise as far as it will go, and measure the amount of distance between the mating marks.

Limit: 6 mm (0.2 inch)

- If the backlash exceeds the limit value, remove the differential carrier assembly and check the following.
 - Drive gear backlash (Refer to [P.27B-37.](#))
 - Drive gear runout (Refer to [P.27B-37.](#))

GEAR OIL LEVEL CHECK

M1271004900238



- Remove the filler plug.
- Check that gear oil level is not 8 mm (0.3 inch) below the bottom of filler plug hole.
- If the gear oil level is not between the upper limit and lower limit, add the specified gear oil below the bottom of filler plug.

Specified gear oil: MITSUBISHI Genuine DIA QUEEN LSD gear oil

- Tighten the filler plug to the specified torque (Refer to [P.27B-29.](#))

GEAR OIL REPLACEMENT

M1272004600508

- Remove the filler plug.
- Remove the drain plug and drain oil.
- Tighten the drain plug to the specified torque (Refer to [P.27B-29.](#))
- Add the oil until the level comes to the lower portion of the filler plug hole.

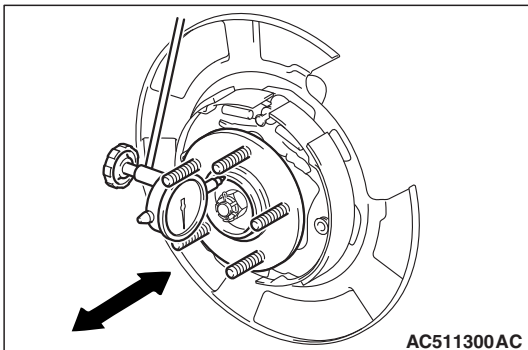
Specified gear oil: MITSUBISHI Genuine DIA QUEEN LSD gear oil

Amount to use: Approx. 0.55 dm³(0.58 quart)

- Tighten the filler plug to the specified torque (Refer to [P.27B-29.](#))

WHEEL BEARING END PLAY CHECK

M1271000900883



1. Remove the caliper assembly and the brake disc. Retain the caliper assembly with a wire and the like to prevent from falling (Refer to P.27B-19).
2. Set a dial gauge as shown in the figure. Move the hub in the axial direction and measure the looseness.

Limit : 0.05 mm (0.002 inch)

3. When the looseness exceeds the limit, replace the rear wheel hub assembly (Refer to P.27B-19).
4. After checking, install the brake disc and the caliper assembly, and tighten the caliper mounting bolt to the specified torque (Refer to P.27B-19).

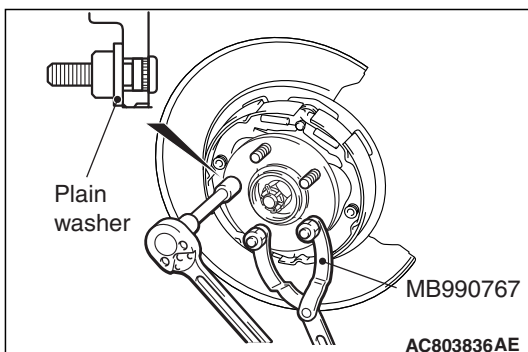
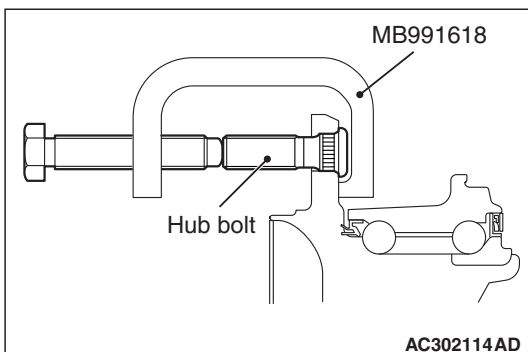
HUB BOLT REPLACEMENT

M1271001000645

Required Special Tools:

- MB990767: Front Hub and Flange Yoke Holder
- MB991618: Hub Bolt Remover

1. Remove the caliper assembly and the brake disc. Retain the caliper assembly with a wire and the like to prevent from falling. (Refer to P.27B-19.)
2. Use special tool MB991618 to remove the hub bolt.



3. After fixing the hub using special tool MB990767, install the plain washer to the new hub bolt, and tighten the bolt with a nut.
4. Install the brake disc, caliper assembly and tighten the caliper assembly mounting bolts to the specified torque (Refer to P.27B-19).

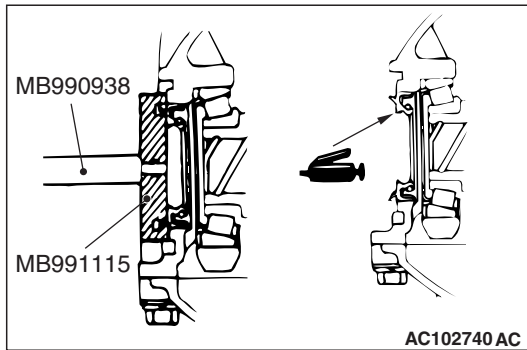
**DIFFERENTIAL CARRIER OIL SEAL
REPLACEMENT**

M1272001300229

Required Special Tools:

- MB990938: Installer bar
- MB991551: Bearing outer race installer

1. Remove the driveshaft. (Refer to [P.27B-23.](#))
2. Remove the mechanical type limited slip differential carrier oil seal.
3. Use special tools MB990938 and MB991551 to press-fit a new oil seal.
4. Apply multi-purpose grease to the oil seal lip and driveshaft oil seal seating area.
5. Replace the driveshaft circlip with a new one, and install the driveshaft to the differential carrier. (Refer to [P.27B-23.](#))



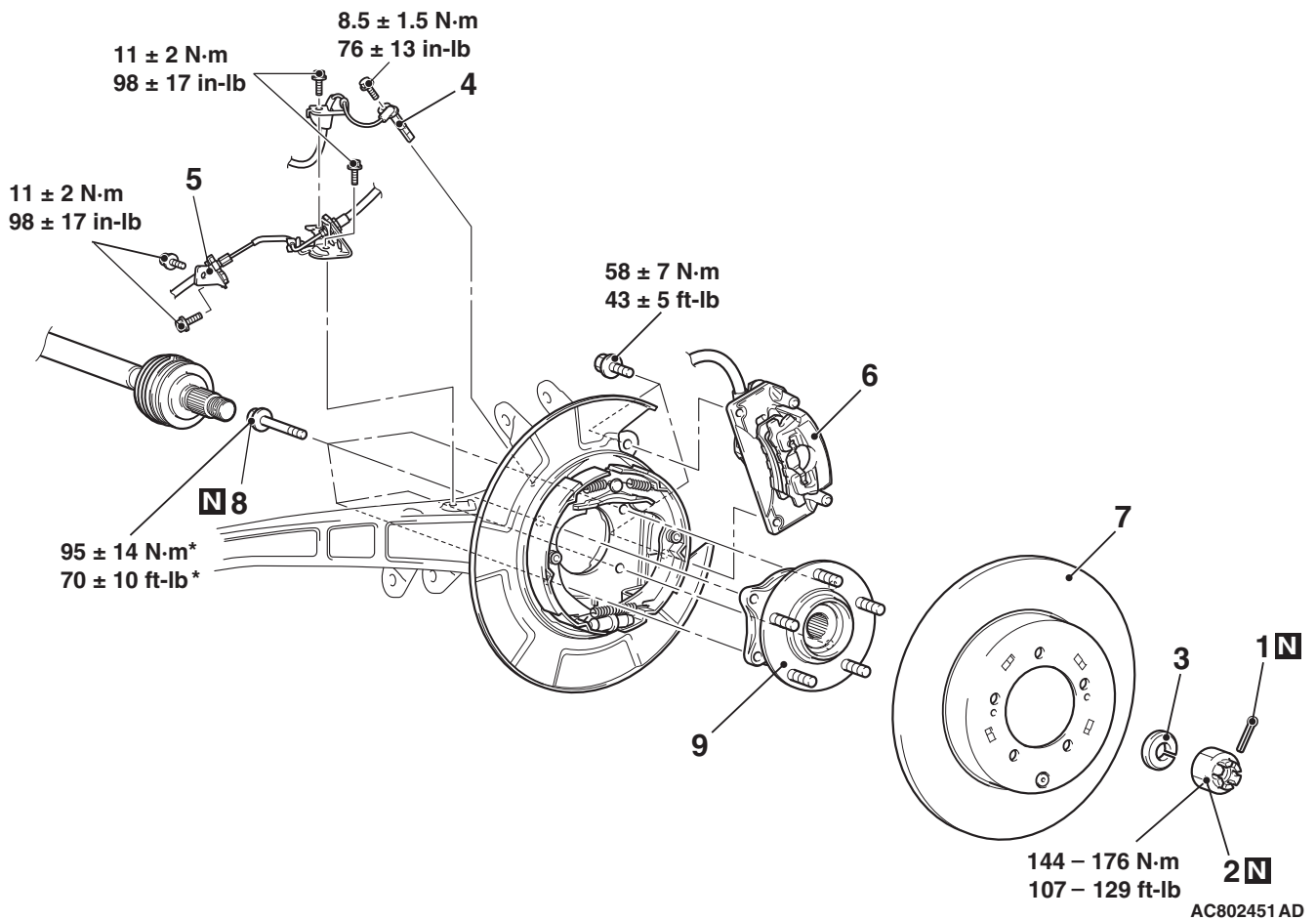
REAR AXLE HUB ASSEMBLY

REMOVAL AND INSTALLATION

M1271002001102

CAUTION

- Do not disassemble the rear wheel hub assembly.
- The magnetic encoder collects metallic particles easily, because it is magnetized. Make sure that the magnetic encoder should not collect metallic particles. Check that there is not any trouble prior to reassembling it.
- When the rear wheel hub assembly is removed/installed, make sure that the magnetic encoder (integrated with inner oil seal) does not contact with surrounding parts to avoid damage.
- When removing and installing the rear wheel speed sensor, make sure that its sensor head does not contact with surrounding parts to avoid damage.
- The part indicated with * is the bolt with friction coefficient stabilizer. In removal, replace it with a new one.



Removal steps

- <<A>> >>A<<
1. Cotter pin
 2. Rear driveshaft nut
 3. Washer
 4. Rear wheel speed sensor
 5. Rear brake hose bracket

<>

<<C>>

Removal steps (Continued)

6. Rear caliper assembly
7. Rear brake disk
8. Rear wheel hub assembly mounting bolt
9. Rear wheel hub assembly

Required Special Tools:

- MB990211: Slide Hammer
- MB990241: Rear Axle Shaft Puller
- MB990242: Puller Shaft
- MB990244: Puller Bar
- MB990767: Front Hub and Flange Yoke Holder
- MB991354: Puller Body

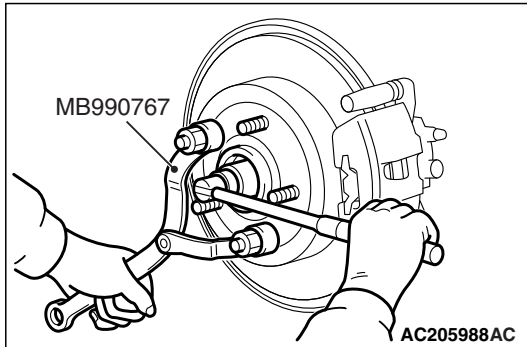
REMOVAL SERVICE POINTS

<<A>> REAR DRIVESHAFT NUT REMOVAL

⚠ CAUTION

Do not apply the vehicle weight on the rear wheel hub assembly with the driveshaft nut loosened. Otherwise, the wheel bearing will be broken.

Use special tool MB990767 to counter the hub as shown in the figure to remove the driveshaft nut.

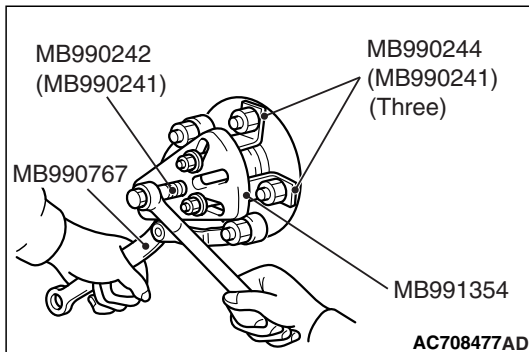


<> REAR CALIPER ASSEMBLY REMOVAL

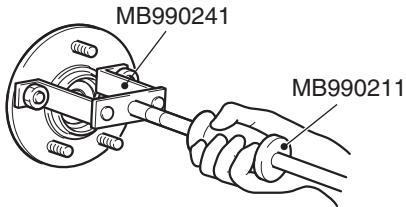
1. Remove the caliper assembly with brake hose.
2. Secure the removed caliper assembly with a wire or other similar material at a position where it will not interfere with the removal and installation of the rear wheel hub assembly.

<<C>> REAR WHEEL HUB ASSEMBLY REMOVAL

1. If the rear wheel hub assembly is seized with the rear driveshaft assembly, use special tools MB990242 and MB990244, MB991354 and MB990767 to push the rear driveshaft assembly out from the hub and then remove the rear wheel hub assembly.

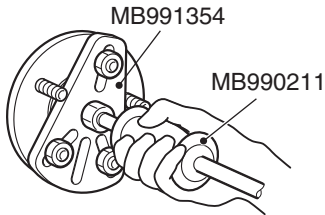


Combination (A)



AC701415 AC

Combination (B)



AC706385 AB

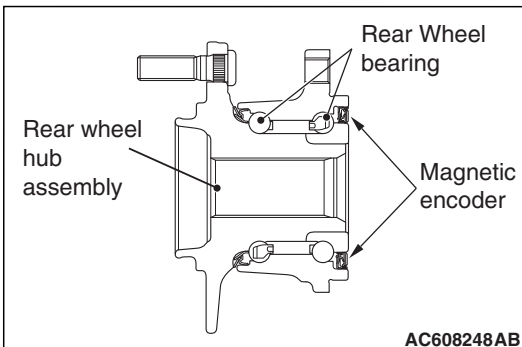
2. If the rear wheel hub assembly is seized with the knuckle, use special tools MB990211 and MB990241 {combination (A)}, or MB990211 and MB991354 {combination (B)} to remove the rear wheel hub assembly.

INSTALLATION SERVICE POINT

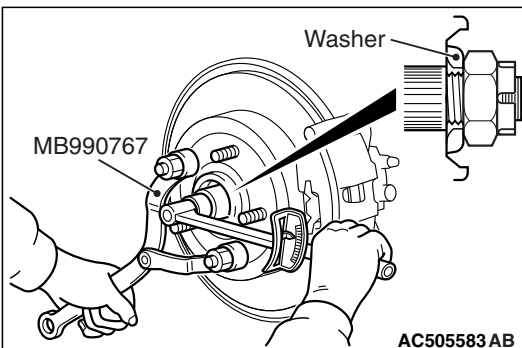
>>A<< WASHER/REAR DRIVESHAFT NUT INSTALLATION

⚠ CAUTION

- The magnetic encoder collects metallic particles easily, because it is magnetized. Make sure that the magnetic encoder should not collect metallic particles. Check that there is not any trouble prior to reassembling it.
- When installing the drive shaft, make sure that it does not contact with the magnetic encoder (integrated with the inner oil seal) to avoid damage.
- Do not apply the vehicle weight on the rear wheel hub assembly before fully tightening the driveshaft nuts. Otherwise, the wheel bearing will be broken.



AC608248 AB



AC505583 AB

1. Incorporate the driveshaft washer as shown in the figure.
2. Using special tool MB990767, tighten the rear driveshaft nut. At this time, tighten the nut to the specified lower limit torque so that the pin hole may align with cotter pin.

Tightening torque: 144 -176 N· m (107 -129 ft-lb)

3. If the pin hole does not align with the pin, tighten the driveshaft nut [less than 176 N· m (129 ft-lb)] and find the nearest hole, then fit the cotter pin.

INSPECTION

INSPECTION OF HUB ROTATION STARTING
TORQUE AND WHEEL BEARING LOOSENESS

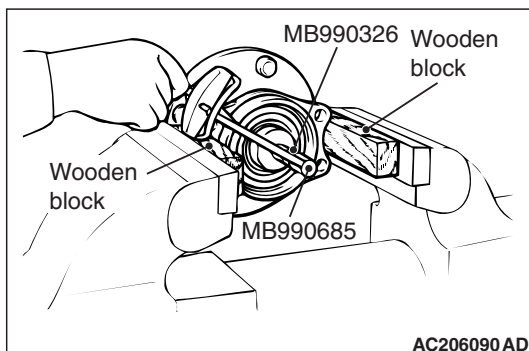
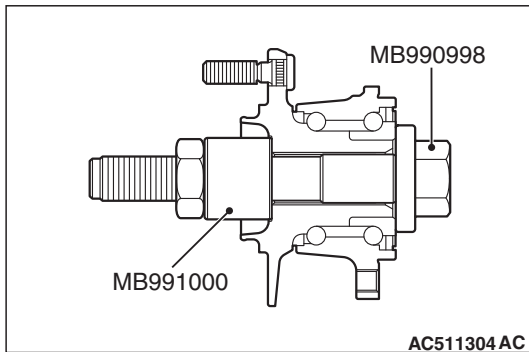
Required Special Tools:

- MB990998: Front Hub Remover and Installer
- MB991000: Spacer
- MB990326: Preload Socket
- MB990685: Torque Wrench

1. Install special tools MB990998 and MB991000 to the hub and tighten to the specified torque.

Tightening torque: 144 -176 N· m (107 -129 ft-lb)

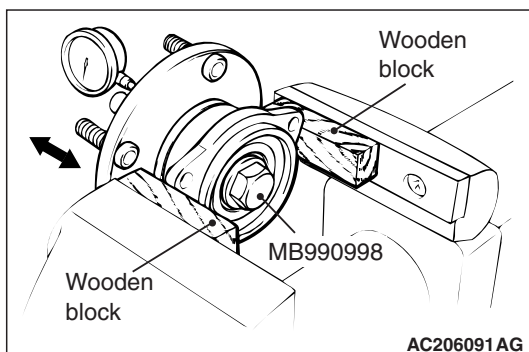
2. Fix the hub in a vice using a piece of wood or the like.
3. Rotate the hub to make the bearing well-greased.



4. Use special tools MB990326 and MB990685 to measure the hub rotation starting torque.

Limit: 1.4 N· m (12.4 in-lb)

5. If the rotation starting torque is not within the limit range, replace the rear wheel hub assembly. If there is any signs of binding or tight spots when the wheel bearing turns, also replace it.



6. Set a dial gauge, and move the hub in the axial direction to measure the looseness in the wheel bearing.

Limit: 0.05 mm (0.002 inch)

7. If the wheel bearing looseness at the specified tightening torque 144 -176 N· m (107 -129 ft-lb) exceeds the limit, replace the rear wheel hub assembly.

DRIVESHAFT ASSEMBLY

REMOVAL AND INSTALLATION

M1271003300578

CAUTION

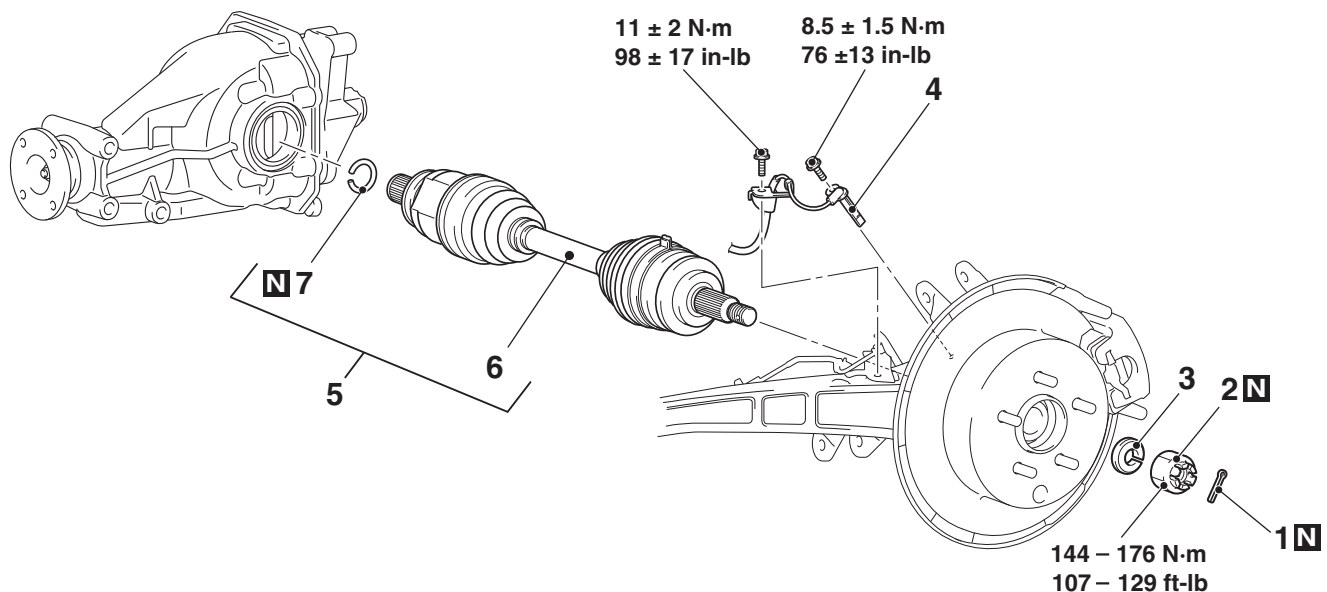
When removing and installing the rear wheel speed sensor, make sure that its sensor head does not contact with surrounding parts to avoid damage.

Pre-removal Operation

- Differential Gear Oil Draining
- Disconnect joints between Lower Arm, Trailing Arm, Shock Absorber, and Stabilizer Link. (Refer to GROUP 34 –Control Link, Upper Arm, Lower Arm Removal and Installation P.34-10.)
- Disconnect joint between Control Link and Trailing Arm. (Refer to GROUP 34–Control Link, Upper Arm, Lower Arm Removal and Installation P.34-10.)

Post-installation Operation

- Connect Control Link and Trailing arm. (Refer to GROUP 34 –Control Link, Upper Arm, Lower Arm Removal and Installation P.34-10.)
- Connect Lower Arm, Trailing Arm, Shock Absorber, and Stabilizer Link. (Refer to GROUP 34 –Control Link, Upper Arm, Lower Arm Removal and Installation P.34-10.)
- Differential Gear Oil Filling (Refer to P.27B-16.)



AC712261AE

Removal steps

- <<A>> >>B<<
>>B<<
1. Cotter pin
 2. Rear driveshaft nut
 3. Washer
 4. Rear wheel speed sensor

Removal steps (Continued)

- <> >>A<<
5. Rear driveshaft assembly
 6. Rear driveshaft
 7. Circlip

Required Special Tools:

- MB990242: Puller Shaft
- MB990244: Puller Bar
- MB990767: Front Hub and Flange Yoke Holder
- MB990998: Front Hub Remover and Installer
- MB991000: Spacer
- MB991354: Puller Body

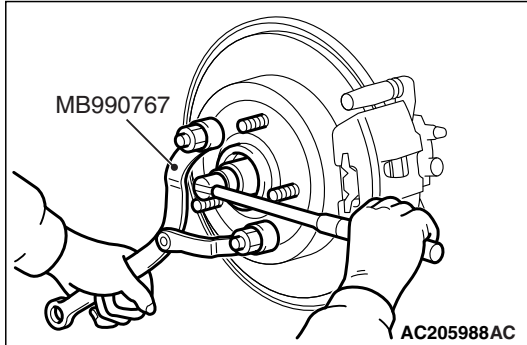
REMOVAL SERVICE POINTS

<<A>> REAR DRIVESHAFT NUT REMOVAL

⚠ CAUTION

Do not apply the vehicle weight on the rear wheel hub assembly before fully tightening the driveshaft nuts. Otherwise, the wheel bearing will be broken.

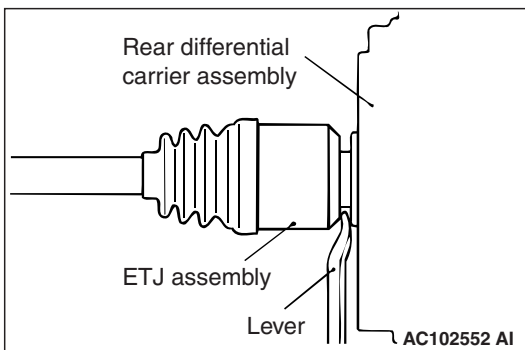
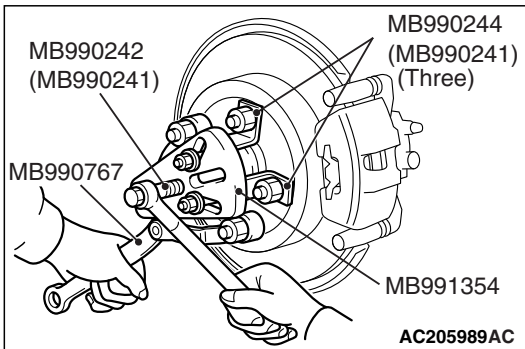
Use special tool MB990767 to counter the hub, and remove the driveshaft nut.

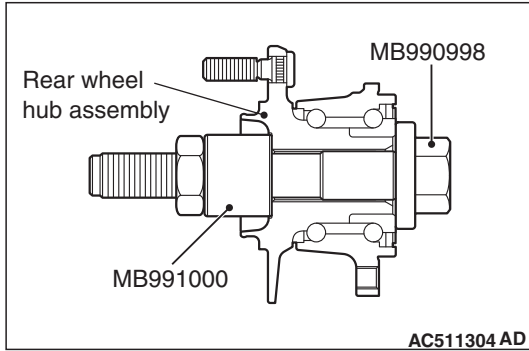
<> REAR DRIVESHAFT ASSEMBLY
REMOVAL

1. If the rear driveshaft assembly is seized with the rear wheel hub assembly, use special tools MB990242 and MB990244, MB990767 and MB991354 to push the rear driveshaft assembly out from the rear wheel hub assembly.

⚠ CAUTION

- Do not pull out the driveshaft from the EBJ assembly side. Otherwise, the ETJ assembly will be damaged. Be sure to remove the driveshaft from the ETJ assembly side, by using a lever.
 - Care must be taken to ensure that the oil seal of the differential carrier is not damaged by the spline part of the driveshaft.
2. Use a lever to remove the rear driveshaft (ETJ assembly side) from the rear differential carrier assembly.





⚠ CAUTION

- Do not apply the vehicle weight to the wheel bearing with the driveshaft removed.
- If, however, the vehicle weight shall be applied to the bearing (in order to move the vehicle), tighten the following special tools MB991000 and MB990998 to the specified torque 144 -176 N·m (107 -129 ft-lb).

INSTALLATION SERVICE POINTS

>>A<< REAR DRIVESHAFT ASSEMBLY INSTALLATION

⚠ CAUTION

Care must be taken to ensure that the oil seal of the differential carrier is not damaged by the spline part of the driveshaft.

>>B<< WASHER/REAR DRIVESHAFT NUT INSTALLATION

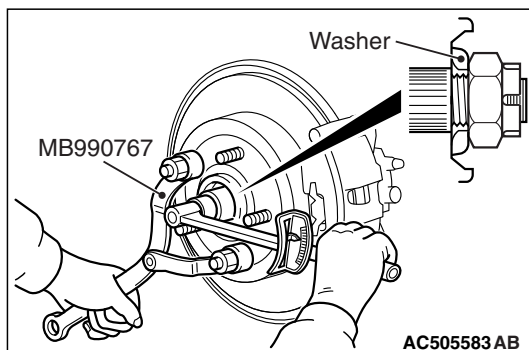
⚠ CAUTION

Do not apply the vehicle weight on the rear wheel hub assembly before fully tightening the driveshaft nuts. Otherwise, the wheel bearing will be broken.

1. Incorporate the driveshaft washer as shown in the figure.
2. Using special tool MB990767, tighten the driveshaft nut. At this time, tighten the nut to the specified lower limit torque so that the pin hole may align with cotter pin.

Tightening torque: 144 -176 N·m (107 -129 ft-lb)

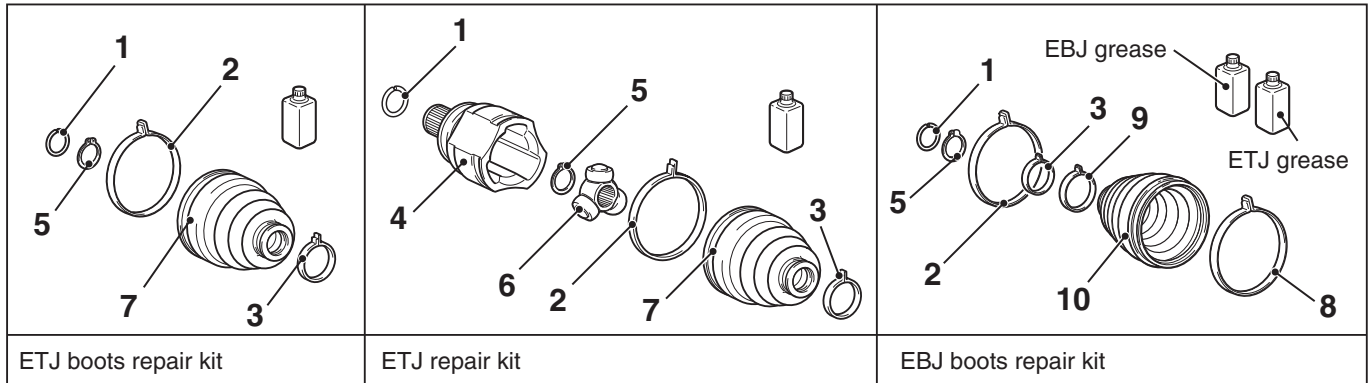
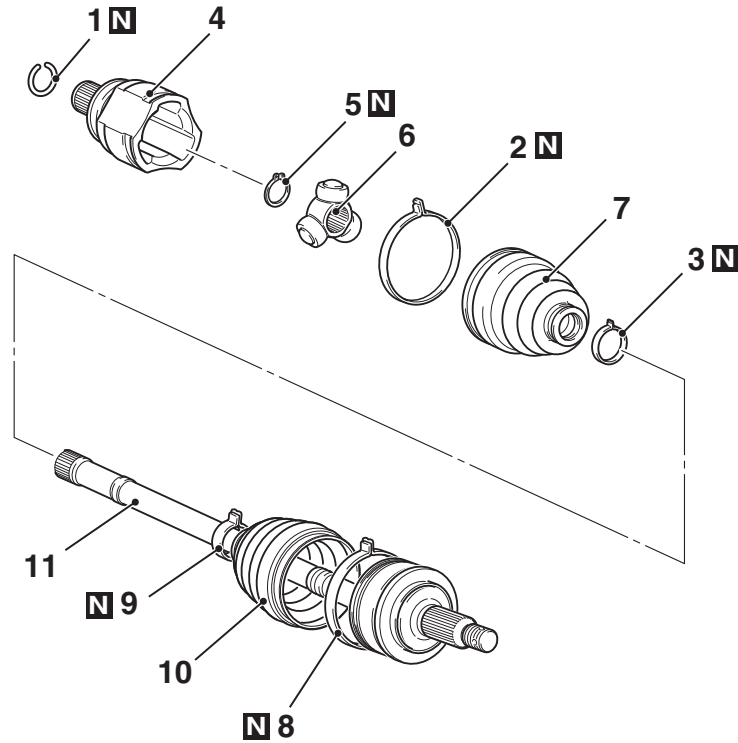
3. If the pin hole does not align with the pin, tighten the driveshaft nut [less than 176 N·m (129 ft-lb)] and find the nearest hole, then fit the cotter pin.



DISASSEMBLY AND REASSEMBLY

CAUTION

As for the EBJ assembly, only the EBJ boot can be replaceable, and other parts cannot be disassembled.



AC800756 AB

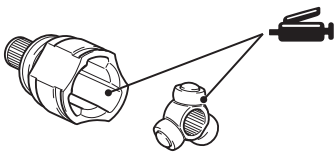
Disassembly steps

- 1. Circlip
- >>C<< 2. ETJ boot band (large)
- >>C<< 3. ETJ boot band (small)
- <<A>> >>B<< 4. ETJ case
- >>B<< 5. Snap ring
- >>B<< 6. Spider assembly

Disassembly steps (Continued)

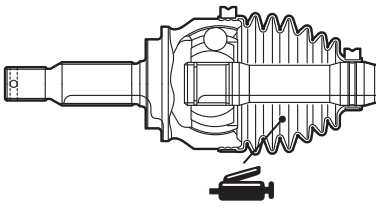
- <> >>A<< 7. ETJ boot
- 8. EBJ boot band (large)
- 9. EBJ boot band (small)
- 10. EBJ boot
- 11. EBJ assembly

LUBRICATION POINTS



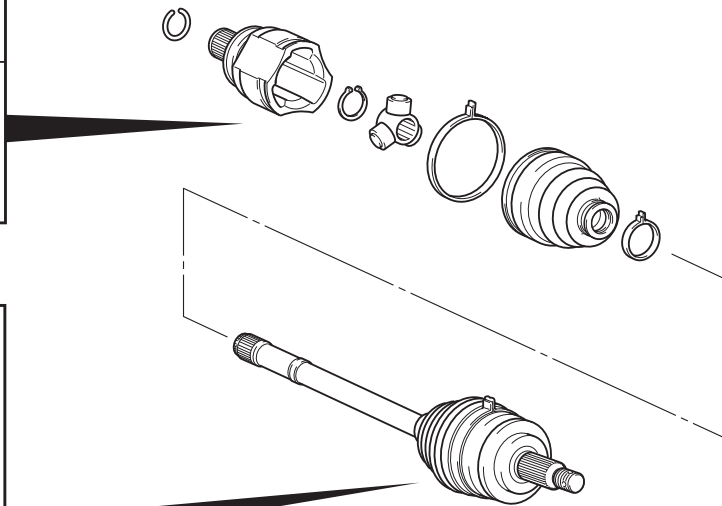
Grease: Repair kit grease
amount: 125 ± 10 g (4.4 ± 0.3 oz)

CAUTION
The drive shaft joint uses special grease, do not mix old and new or different types of grease.



Grease: Repair kit grease
amount: 110 ± 10 g (3.9 ± 0.3 oz)

CAUTION
The drive shaft joint uses special grease, do not mix old and new or different types of grease.



AC706941AB

DISASSEMBLY SERVICE POINTS

<<A>> ETJ CASE REMOVAL

CAUTION

Never disassemble the spider assembly.

<> ETJ BOOT REMOVAL

1. Wipe off the grease on the shaft spline.
2. When reusing the ETJ boot, wrap plastic tape around the shaft spline to avoid damaging the boot.

REASSEMBLY SERVICE POINTS

>>A<< ETJ BOOT INSTALLATION

Apply a tape to the shaft spline area. Then incorporate the ETJ boot.

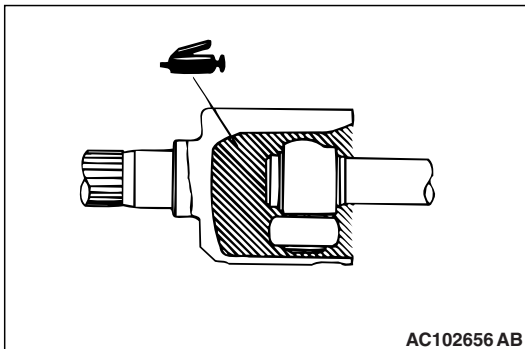
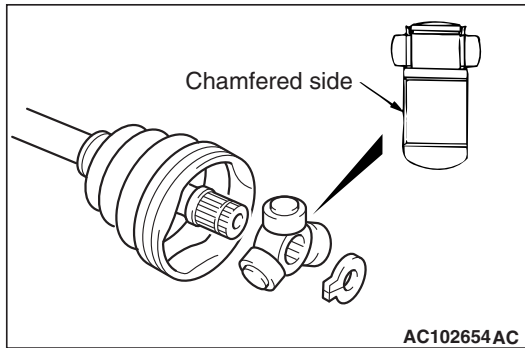
>>B<< SPIDER ASSEMBLY/ETJ CASE
INSTALLATION**⚠ CAUTION**

- The driveshaft joint use special grease. Do not mix old and new or different types of grease.
- If the spider assembly has been cleaned, take special care to apply the specified grease.

1. Apply the specified grease furnished in the repair kit to the spider assembly between the spider axle and the roller.

Specified grease: Repair kit grease

2. Install the spider assembly to the shaft from the direction of the spline chamfered side.



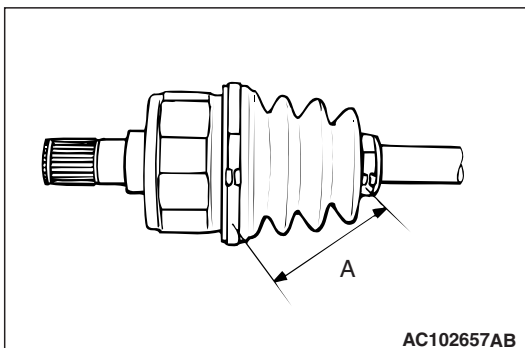
3. After applying the specified grease to the ETJ case, insert the driveshaft and apply grease one more time.

Specified grease: Repair kit grease**Amount to use: 125 ± 10 g (4.4 ± 0.3 ounce)**

NOTE: When using the repair kit grease, fill the half of the grease into the joint and the other half into the boot as a guideline, and consume the grease completely.

>>C<< ETJ BOOT BAND (SMALL)/ETJ BOOT
BAND (LARGE) INSTALLATION

Adjust the distance (A shown in the illustration) between the boot bands to the standard value to adjust the air volume inside the ETJ boot to the specified value, then be sure to tighten the ETJ boot band (large) and ETJ boot band (small).

Standard value (A): 80 ± 3 mm (3.1 ± 0.1 inches)

EBJ BOOT REPLACEMENT

M1271006200064

Other than described below is same as front driveshaft service procedure. (Refer to GROUP26, EBJ boot replacement P.26-35.)

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

Specified grease: Repair kit grease

Amount to use: 110 ± 10 g (3.9 ± 0.3 ounces)

DIFFERENTIAL CARRIER ASSEMBLY

REMOVAL AND INSTALLATION

M1271005300240

CAUTION

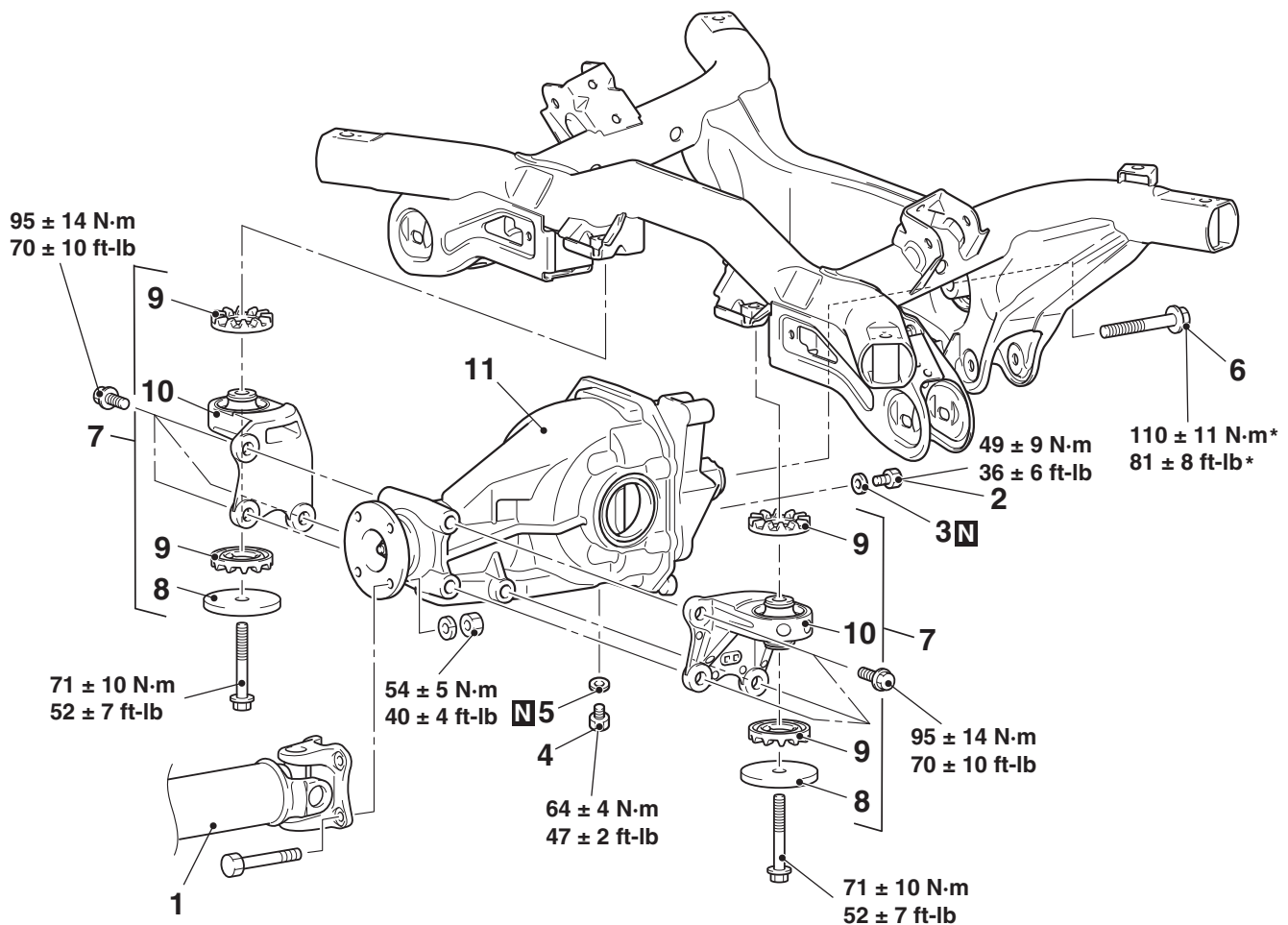
- The parts indicated by * are the bolts with friction coefficient stabilizer. In removal, ensure there is no damage, clean dust and soiling from the bearing and thread surfaces, and tighten them to the specified torque.

Pre-removal operation

- Drain Differential Gear Oil.
- Rear Driveshaft Assembly Removal (Refer to P.27B-23.)

Post-installation operation

- Rear Driveshaft Assembly Installation (Refer to P.27B-23.)
- Fill the Differential Gear Oil.



AC712268AC

Removal steps

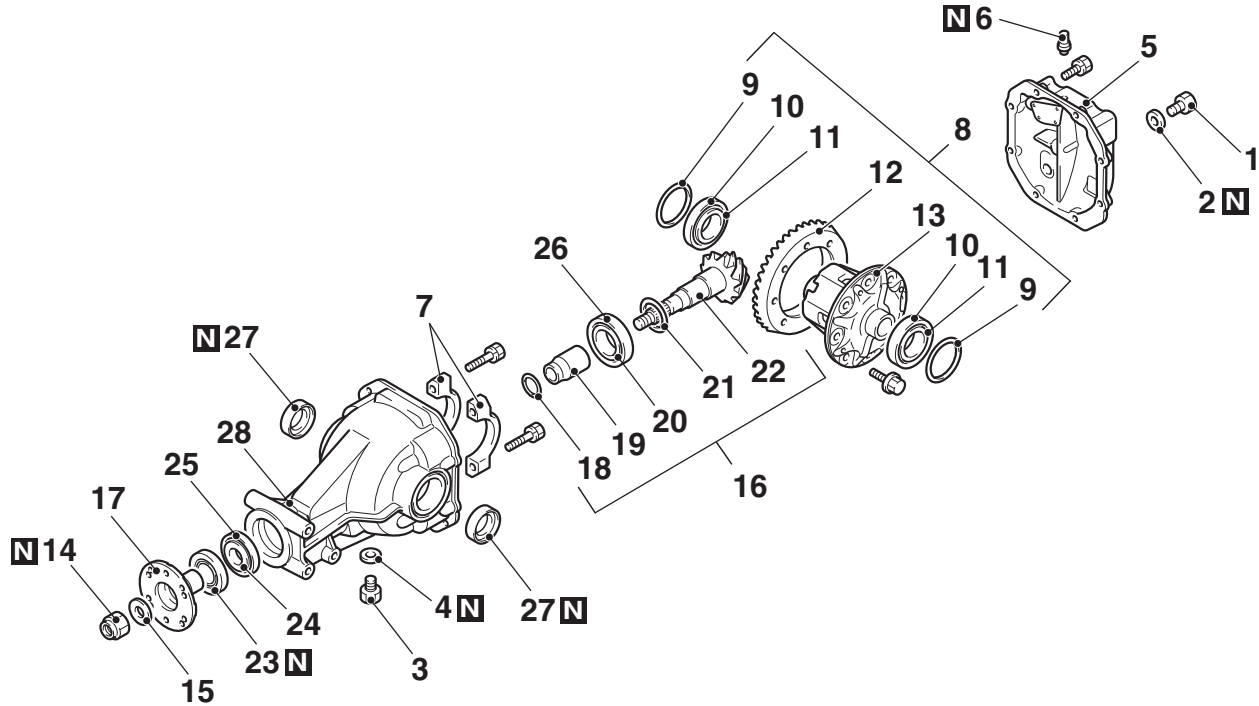
1. Propeller shaft assembly (Refer to GROUP 25, Propeller Shaft P.25-7.)
2. Filler plug
3. Gasket
4. Drain plug
5. Packing

Removal steps (Continued)

6. Differential to rear suspension crossmember connection bolt
7. Differential mount bracket assembly (LH/RH)
8. Weight
9. Upper stopper
10. Differential mount bracket (LH/RH)
11. Differential carrier assembly

DISASSEMBLY

M1272002200515



AC212068AB

Disassembly steps

- <<A>>
- Inspection before disassembly (Refer to P.27B-31.)
1. Filler plug
 2. Gasket
 3. Drain plug
 4. Packing
 5. Differential cover assembly
 6. Vent plug
 7. Bearing cap
 8. Differential case assembly
 9. Differential side bearing spacer
 10. Differential side bearing outer race
 11. Differential side bearing inner race
 12. Drive gear
 13. Limited slip differential case assembly
 14. Self-locking nut

<>
<>
<>
<<C>>
<<D>>
<<E>>

Disassembly steps (Continued)

15. Washer
 16. Drive pinion assembly
 17. Companion flange
 18. Drive pinion front shim (for drive pinion turning torque adjustment)
 19. Drive pinion spacer
 20. Drive pinion rear bearing inner race
 21. Drive pinion rear shim (for drive pinion height adjustment)
 22. Drive pinion
 23. Oil seal
 24. Drive pinion front bearing inner race
 25. Drive pinion front bearing outer race
 26. Drive pinion rear bearing outer race
 27. Oil seal
 28. Differential carrier
- <<F>>
<<F>>
<<G>>
<<H>>
<<I>>

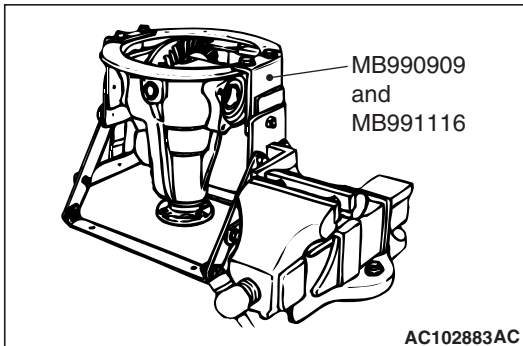
Required Special Tools:

- MB990810: Side Bearing Puller
- MB990811: Side Bearing Cup
- MB990850: End Yoke Holder
- MB990909: Working Base
- MB990939: Remover Bar
- MB991116: Working Base Adapter
- MD998801: Rear Axleshaft Bearing Remover

DISASSEMBLY SERVICE POINTS

<<A>>INSPECTION BEFORE DISASSEMBLY

1. Remove the differential cover assembly.
2. Hold special tools MB990909 and MB991116 in a vise, and install the differential carrier assembly to the special tool.

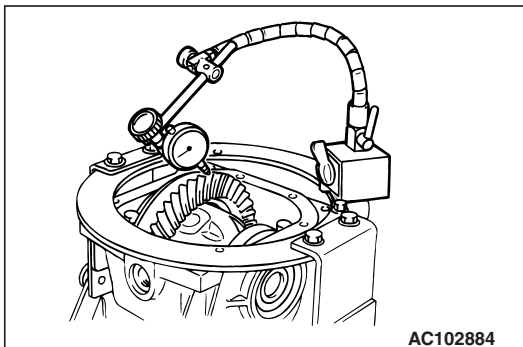


DRIVE GEAR BACKLASH

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, adjust the final drive gear backlash (Refer to [P.27B-37](#)).
3. After the adjustment, inspect the final drive gear tooth contact.

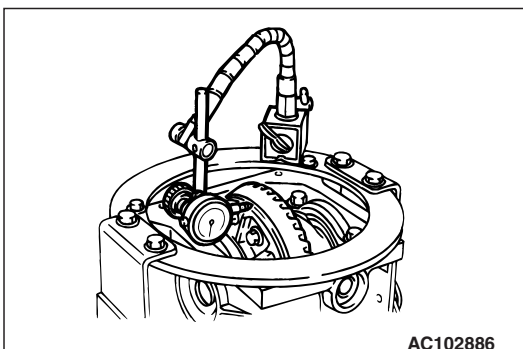


DRIVE GEAR RUNOUT

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

Limit: 0.05 mm (0.002 inch)

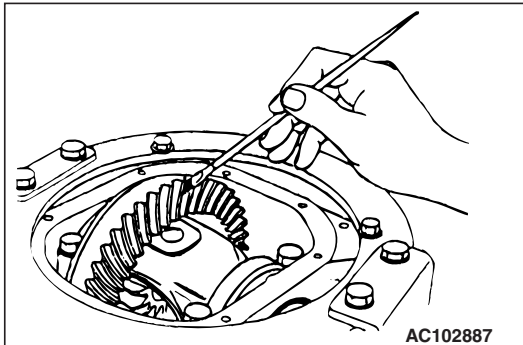
2. When runout exceeds the limit value, check for foreign material between drive gear rear side and differential case, or for loose drive gear installation bolts.
3. When step (2) gives normal results, reposition the drive gear and differential case and remeasure.
4. If adjustment is impossible, replace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



FINAL DRIVE GEAR TOOTH CONTACT

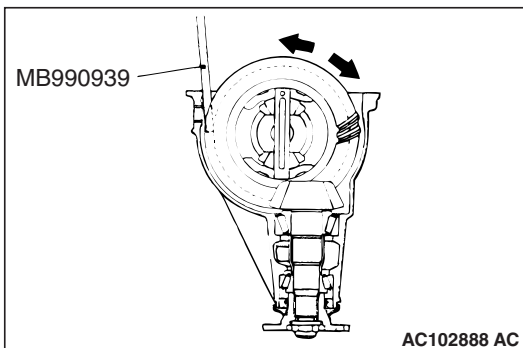
Check the tooth contact of drive gear by following the steps below.

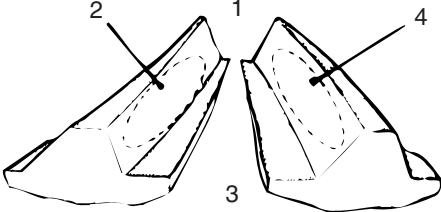
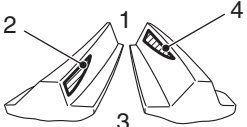
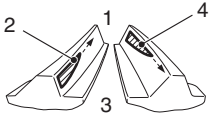
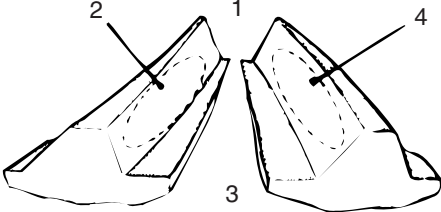
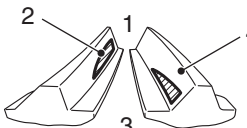
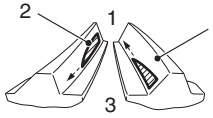
1. Apply a thin, uniform coat of machine blue to both surfaces of the drive gear teeth.

**⚠ 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 [approximately 2.5 –2.9 N·m (22.1 –25.7 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 |
|---|--|---|
| <p>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)</p>  <p>ACX01039 AF</p> | <p>Tooth contact pattern resulting from excessive pinion height</p>  <p>AC107260 AB</p> <p>The drive pinion is positioned too far from the center of the drive gear.</p> |  <p>AC107261 AB</p> <p>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.</p> |
|  <p>ACX01039 AF</p> | <p>Tooth contact pattern resulting from insufficient pinion height.</p>  <p>AC107262 AB</p> <p>The drive pinion is positioned too close to the center of the drive gear.</p> |  <p>AC107263 AB</p> <p>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.</p> |

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.

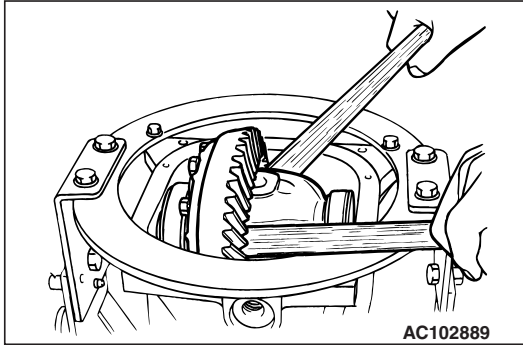
<> DIFFERENTIAL CASE ASSEMBLY/DIFFERENTIAL SIDE BEARING SPACER/DIFFERENTIAL SIDE BEARING OUTER RACE REMOVAL

⚠ CAUTION

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

Use the wooden handle of a hammer to remove the differential case assembly, differential side bearing spacers and differential side bearing outer races.

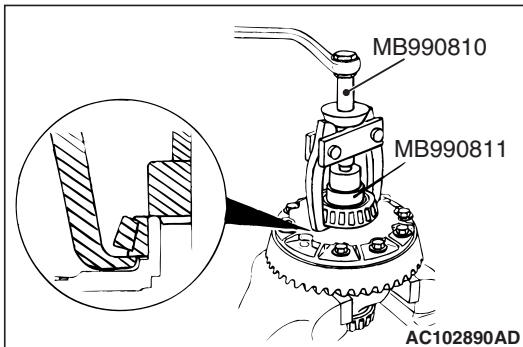
NOTE: Keep the right and left side bearings and side bearing spacers separate, so that they do not become mixed during reassembly.



<<C>> DIFFERENTIAL SIDE BEARING INNER RACE REMOVAL

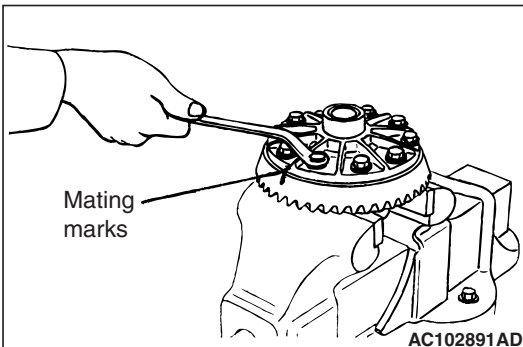
Use special tools MB990810 and MB990811 to pull out the side bearing inner races.

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



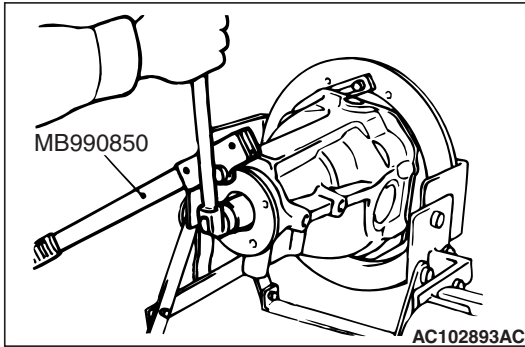
<<D>> DRIVE GEAR REMOVAL

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



<<E>> SELF-LOCKING NUT REMOVAL

Use special tool MB990850 to hold the companion flange, and then remove the companion flange self-locking nut.

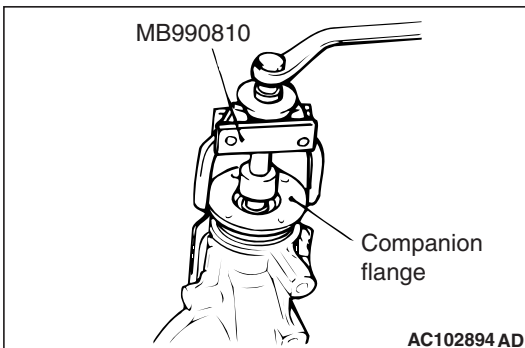


<<F>> DRIVE PINION ASSEMBLY/COMPANION FLANGE REMOVAL

CAUTION

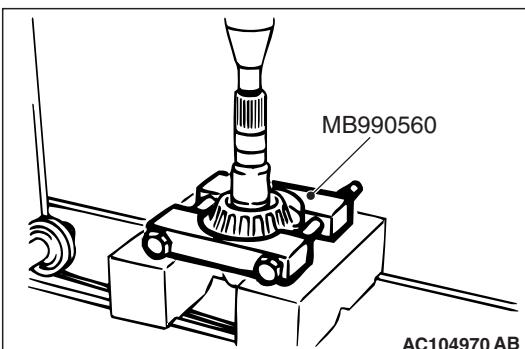
The mating mark made on the companion flange must not be on the coupling surface of the companion flange and the front propeller shaft.

1. Make mating marks on the drive pinion and companion flange.
2. Use special tool MB990810 to pull out the companion flange.



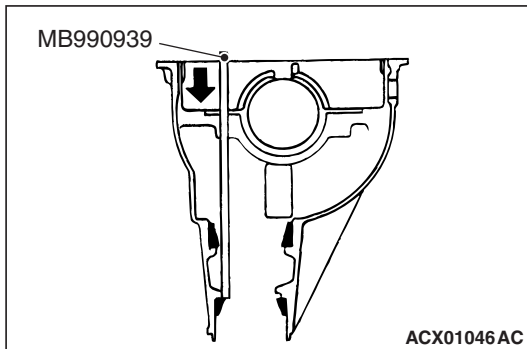
<<G>> DRIVE PINION REAR BEARING INNER RACE REMOVAL

Use special tool MB990560 to pull out the drive pinion rear bearing inner race.

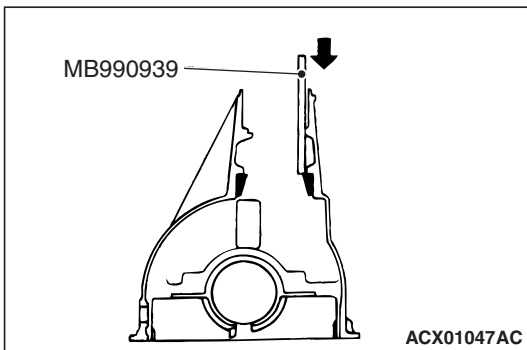


**<<H>> DRIVE PINION FRONT BEARING OUTER
RACE REMOVAL**

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

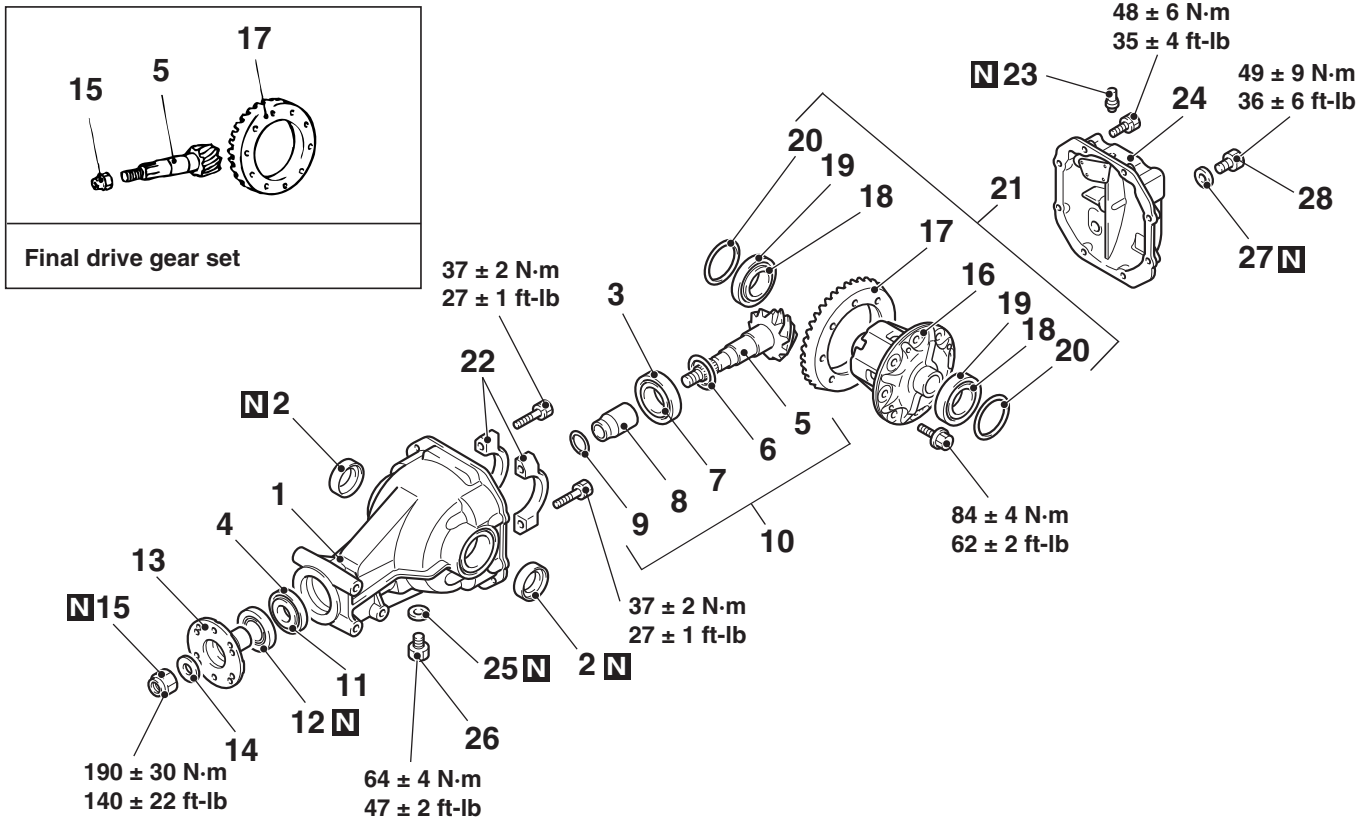
**<<I>> DRIVE PINION REAR BEARING OUTER
RACE REMOVAL**

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



ASSEMBLY

M1272002300619



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Assembly steps

1. Differential carrier
- >>A<< 2. Oil seal
- >>B<< 3. Drive pinion rear bearing outer race
- >>C<< 4. Drive pinion front bearing outer race
- >>D<< • Drive pinion height adjustment
5. Drive pinion
6. Drive pinion rear shim (for drive pinion height adjustment)
7. Drive pinion rear bearing inner race
8. Drive pinion spacer
- >>E<< • Drive pinion turning torque adjustment
9. Drive pinion front shim (for drive pinion turning torque adjustment)
10. Drive pinion assembly
11. Drive pinion front bearing inner race
- >>E<< 12. Oil seal

Assembly steps (Continued)

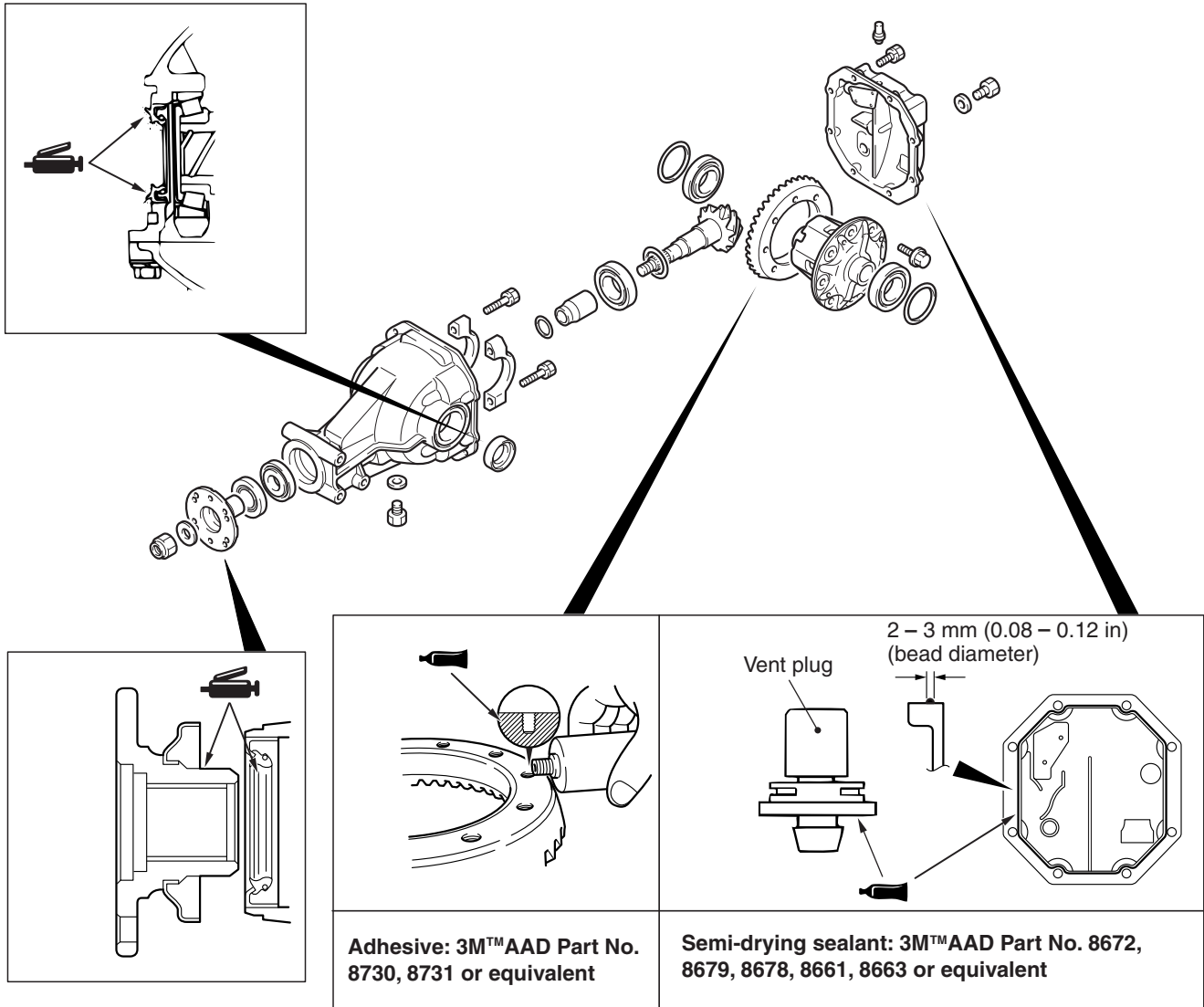
13. Companion flange
14. Washer
15. Self-locking nut
16. Limited slip differential case assembly
- >>F<< 17. Drive gear
- >>G<< 18. Differential side bearing inner race
19. Differential side bearing outer race
20. Differential side bearing spacer
21. Differential case assembly
22. Bearing cap
23. Vent plug
24. Differential cover assembly
25. Packing
26. Drain plug
27. Gasket
28. Filler plug
- >>H<< • Final drive gear backlash adjustment

Required Special Tools:

- MB990326: Preload Socket
- MB990392: Cylinder Gauge
- MB990685: Torque Wrench
- MB990727: Oil Seal Installer
- MB990728: Bearing Installer

- MB990836: Drive Pinion Gauge Assembly
- MB990850: End Yoke Holder
- MB990932: Installer Adapter
- MB990936: Installer Adapter
- MB990938: Installer Bar
- MB991115: Oil Seal Installer

LUBRICATION AND ADHESIVE POINTS

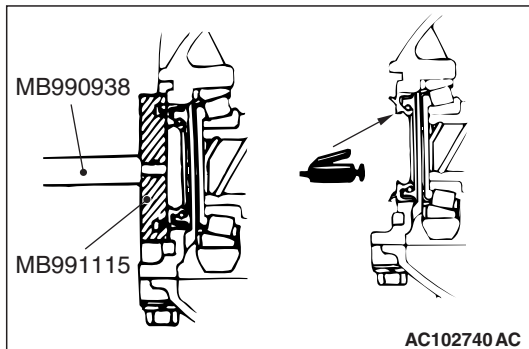


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ASSEMBLY SERVICE POINTS

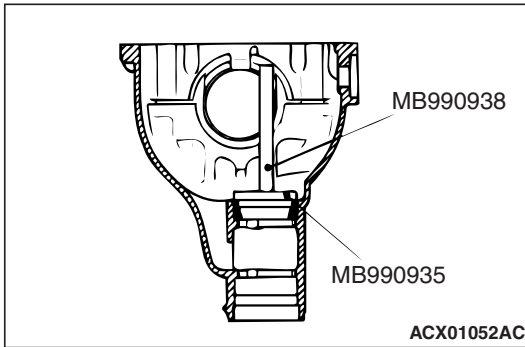
>>A<< OIL SEAL PRESS-FITTING

Use special tools MB990938 and MB991115 to press-fit a new oil seal.



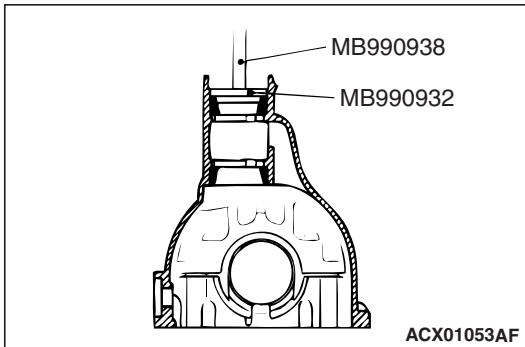
>>B<< DRIVE PINION REAR BEARING OUTER RACE PRESS-FITTING

Use special tools MB990938 and MB990935 to press-fit the drive pinion rear bearing outer race.



>>C<< DRIVE PINION FRONT BEARING OUTER RACE PRESS-FITTING

Use special tools MB990938 and MB990932 to press-fit the drive pinion front bearing outer race.



>>D<< DRIVE PINION HEIGHT ADJUSTMENT

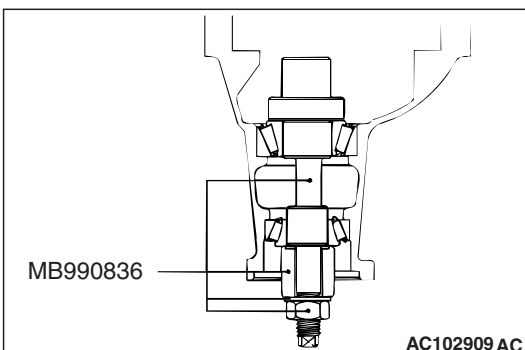
Adjust the drive pinion height by the following procedures:

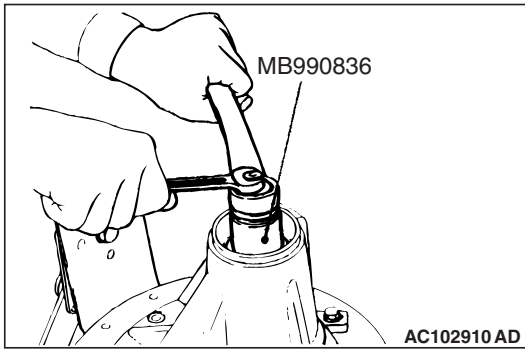
1. Apply multipurpose grease to the washer of special tool MB990836.

⚠ CAUTION

There should be no gear oil adhered to the bearing.

2. Install special tool MB990836, drive pinion front and rear bearing inner races to the differential carrier as shown in the illustration.

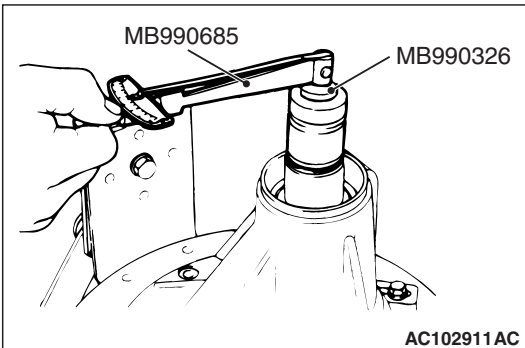




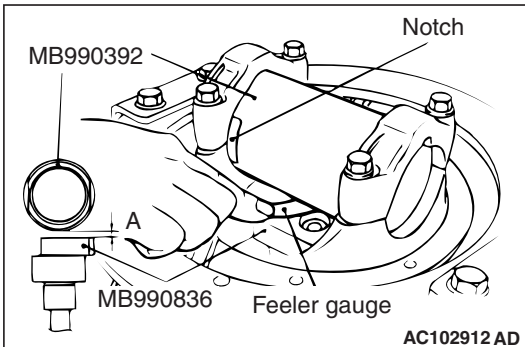
- Tighten the nut of special tool MB990836 a little at a time, while measuring the turning torque of the drive pinion by using special tools MB990326 and MB990685. Then confirm that the turning torque (without the drive pinion oil seal) is at the standard value.

Standard value:

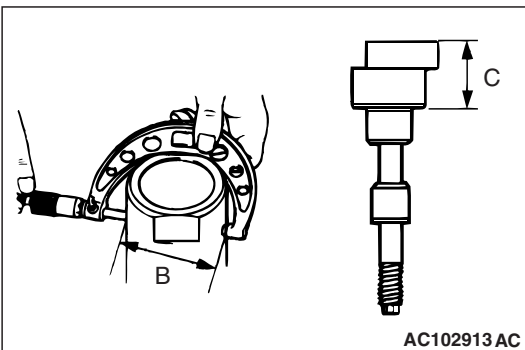
| Bearing type | Bearing lubrication | Turning torque |
|--------------|-----------------------------|--|
| New | None (with anti-rust agent) | 0.88 –1.17 N· m (7.79 –10.36 in-lb) |
| | Gear oil applied | 0.39 –0.49 N· m (3.45 –4.34 in-lb) |



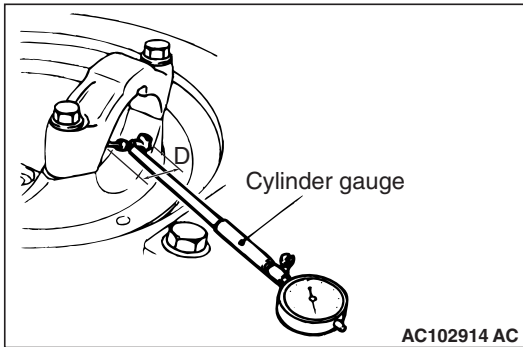
NOTE: Because special tool MB990326 cannot be turned one turn, turn it several times within the range that it can be turned; then, after fitting to the bearing, measure the turning torque.



- Clean the side bearing seat of the differential carrier and bearing caps.
- Place special tools MB990392 and MB990836 in the side bearing seat of the differential carrier, and position the notch as shown in the illustration. Then install the bearing caps.
- Use a feeler gauge to measure the clearance (A) between special tools.
- Remove the bearing caps and special tools.

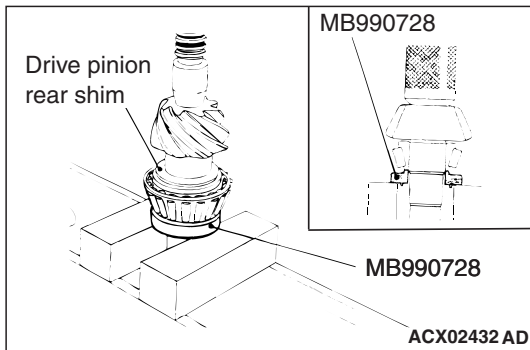


- Use a micrometer to measure the shown dimensions (B, C) of special tools.



9. Install the bearing cap, and then use a cylinder gauge to measure the inside diameter (D) of the bearing cap.
10. Calculate thickness (F) of the required drive pinion rear shim by the following formula. Select a shim which most closely matches this thickness.

$$F = A + B + C - 1/2D - 86.00 \text{ mm (3.386 inches)}$$



11. Fit the selected drive pinion rear shim(s) to the drive pinion, and press-fit the drive pinion rear bearing inner race by using special tool MB990728.

>>E<< DRIVE PINION TURNING TORQUE ADJUSTMENT/OIL SEAL INSTALLATION

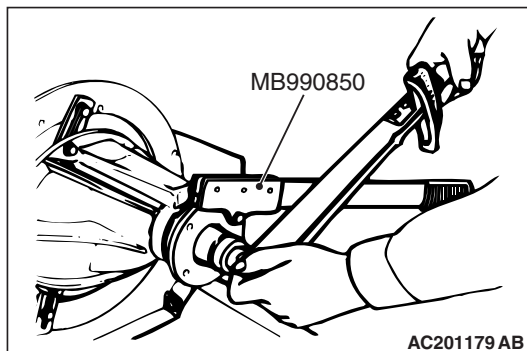
Adjust the drive pinion turning torque by the following procedures:

1. Insert the drive pinion into the differential carrier, and then install the following parts in sequence from the carrier rear side: drive pinion spacer, drive pinion front shim, drive pinion front bearing inner race and companion flange.

NOTE: Do not install the oil seal.

2. Tighten the companion flange self-locking nut to the specified torque while holding the companion flange with special tool MB990850.

Tightening torque: 190 ± 30 N·m (140 ± 22 ft-lb)



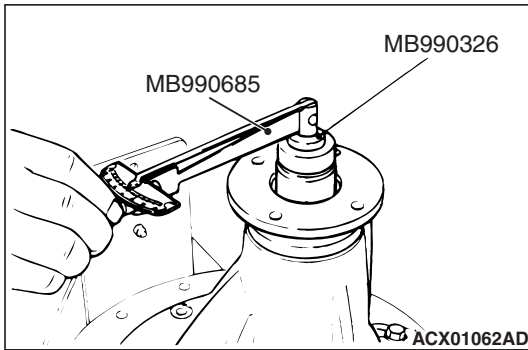
CAUTION

There should be no gear oil adhered to the bearing.

- Use special tools MB990326 and MB990685 to measure the drive pinion turning torque (without the drive pinion oil seal).

Standard value:

| Bearing type | Bearing lubrication | Turning torque |
|--------------|-----------------------------|--|
| New | None (with anti-rust agent) | 0.88 –1.17 N· m (7.79 –10.36 in-lb) |
| | Gear oil applied | 0.39 –0.49 N· m (3.45 –4.34 in-lb) |

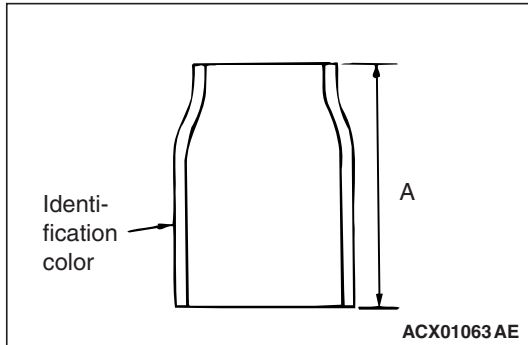


- If the drive pinion turning torque is not within the standard value, adjust the turning torque by replacing the drive pinion front shim(s) or the drive pinion spacer.

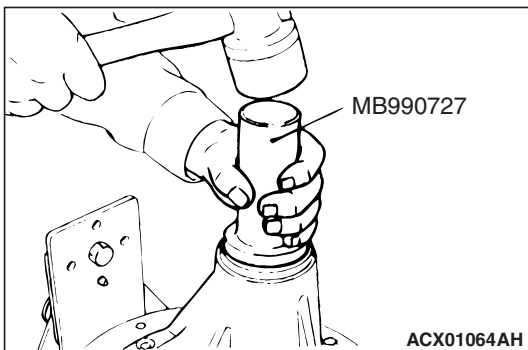
NOTE: When selecting the drive pinion front shims, if the number of shims is large, reduce the number of shims to a minimum by selecting the drive pinion spacers.

Select the drive pinion spacer from the following two types.

| Height of drive pinion spacer (A) mm (in) | Identification color |
|---|----------------------|
| 57.08 (2.25) | Red |
| 57.72 (2.27) | – |

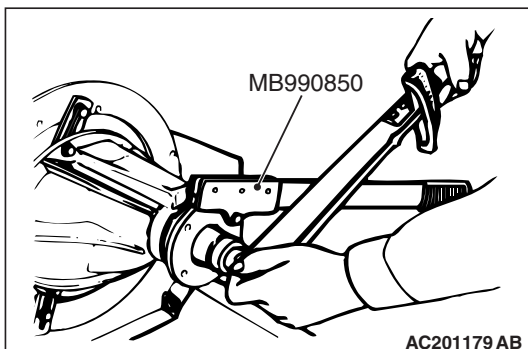


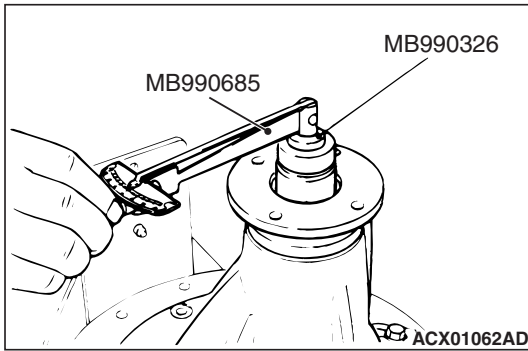
- Remove the companion flange and drive pinion again. Then insert the drive pinion front bearing inner race into the differential carrier. Use special tool MB990727 to press-fit the drive pinion oil seal.



- Install the drive pinion assembly and companion flange with the mating marks properly aligned. Tighten the companion flange self-locking nut to the specified torque while holding the companion flange with special tool MB990850.

Tightening torque: 190 ± 30 N· m (140 ± 22 ft-lb)





- Use special tools to measure the drive pinion turning torque (with drive pinion oil seal) to verify that the drive pinion turning torque complies with the standard value.

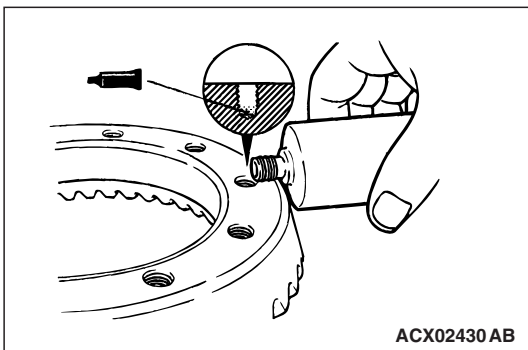
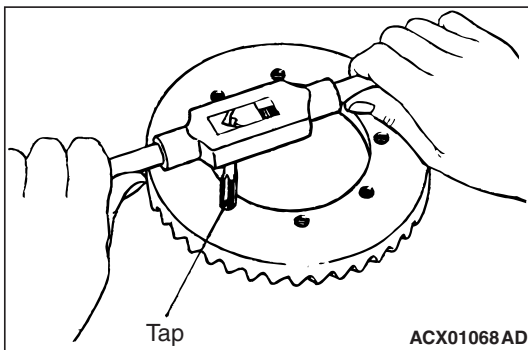
Standard value:

| Bearing type | Bearing lubrication | Turning torque |
|--------------|-----------------------------|--|
| New | None (with anti-rust agent) | 0.98 –1.27 N· m (8.67 –11.24 in-lb) |
| | Gear oil applied | 0.49 –0.58 N· m (4.34 –5.13 in-lb) |

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

>>F<< DRIVE GEAR INSTALLATION

- Clean the drive gear attaching bolts.
- Remove the adhesive adhered to the threaded holes of the drive gear by turning the tap (M10 x 1.25). Clean the threaded holes by applying compressed air.

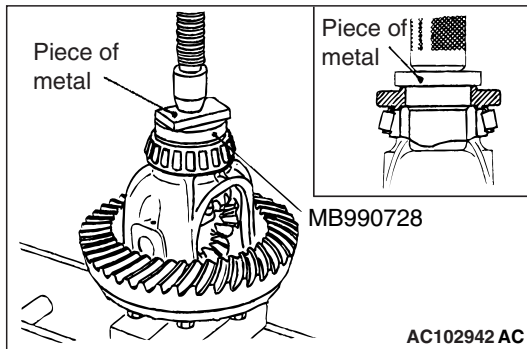


- Apply the specified adhesive to the threaded holes of the drive gear.

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

- Install the drive gear onto the limited slip differential case with the mating marks properly aligned. Tighten the drive gear attaching bolts to the specified torque in a diagonal sequence.

Tightening torque: 84 ± 4 N· m (62 ± 2 ft-lb)



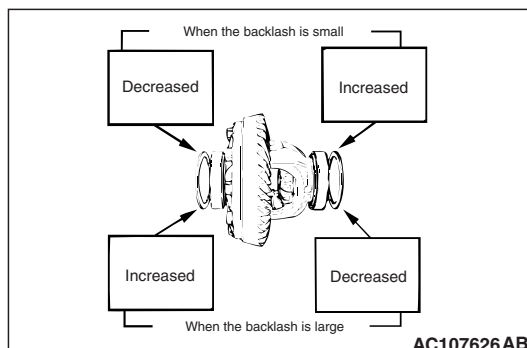
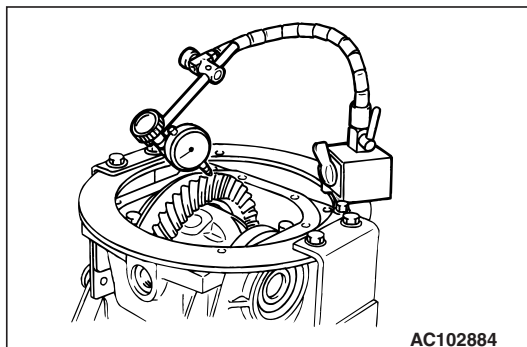
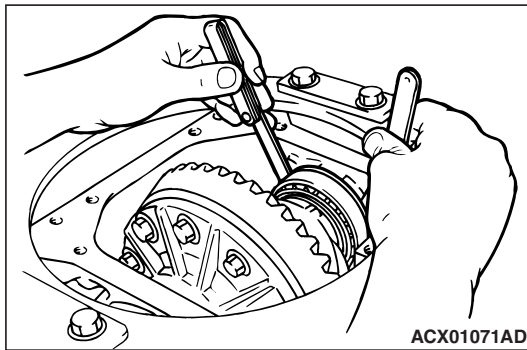
>>G<< DIFFERENTIAL SIDE BEARING INNER RACE INSTALLATION

Use special tool MB990728 to press-fit the differential side bearing inner races into the differential case.

>>H<< FINAL DRIVE GEAR BACKLASH ADJUSTMENT

Adjust the final drive gear backlash by the following procedure:

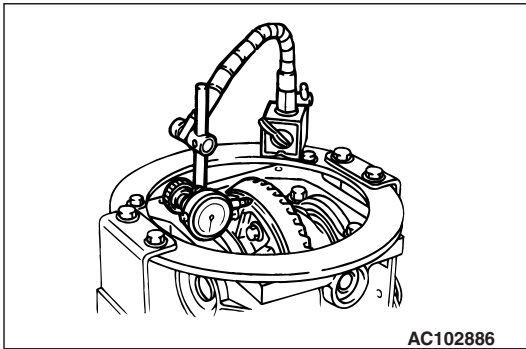
1. Assemble the differential case with the side bearing outer race to the differential carrier.
2. Press the differential case to one side to measure the clearance of the side bearing outer race and the differential carrier.
3. Select two pairs of side bearing spacers. Determine the thickness by adding 1/2 of the clearance to the pre-load 0.05mm (0.002 inch).
4. Assemble the selected side bearing spacers to each side.
5. Measure the final drive gear backlash at four points or more on the circumference of the drive gear.
Standard value: 0.11 –0.16 mm (0.004 –0.006 inch)



6. If the backlash is not within the standard value, move the side bearing spacer as shown in the illustration to adjust the backlash.

NOTE: The increment of side bearing spacer must be the same as the decreased amount.

7. Inspect the tooth condition at the final drive gear and replace if required. (Refer to [P.27B-30.](#))

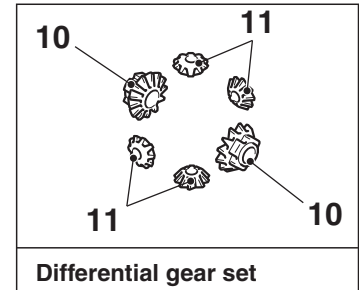
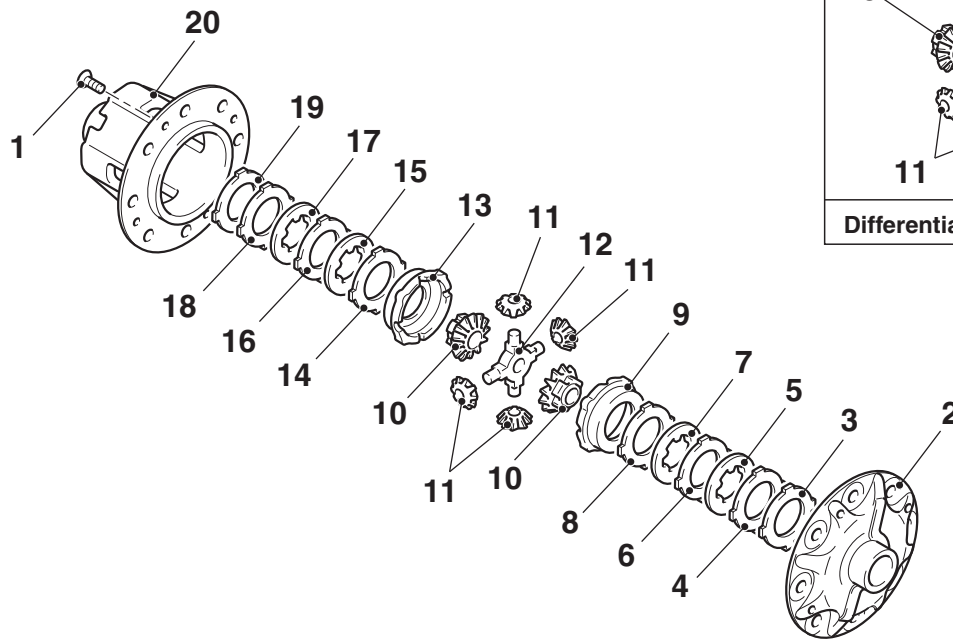


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8. Measure the drive gear runout.
Limit: 0.05 mm (0.002 inch)
9. If drive gear runout exceeds the limit, remove the differential case and then the drive gears, moving them to different positions and reinstall them.
10. If adjustment is not possible, replace the differential case or drive gear and drive pinion as a set.

DISASSEMBLY AND ASSEMBLY

M127300140011



AC212154 AB

Disassembly steps

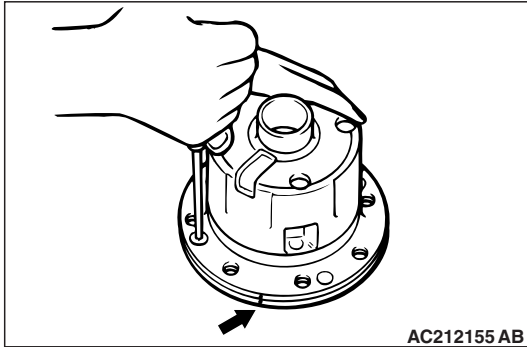
- >>C<< • LSD differential torque check
- <<A>> >>B<<
1. Screw
 2. Differential case (A)
 3. Spring plate
 4. Friction plate
 5. Friction disc
 6. Friction plate
 7. Friction disc
 8. Friction plate
 9. Pressure ring

Disassembly steps (Continued)

10. Side gear
11. Pinion gear
12. Pinion shaft
13. Pressure ring
14. Friction plate
15. Friction disc
16. Friction plate
17. Friction disc
18. Friction plate
19. Spring plate
- >>A<< 20. Differential case (B)

DISASSEMBLY SERVICE POINT

<<A>> SCREW REMOVAL

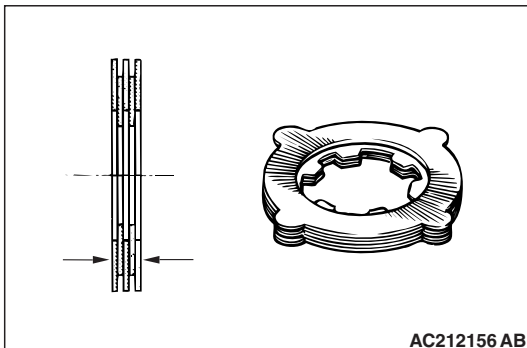


1. Check out the alignment marks.
2. Loosen uniformly, little by little the screws securing differential case A to B.
3. Separate differential case B from differential case A and remove their components.
4. Keep the removed spring plates, friction plates, and friction discs organized in order of removal and separated for right and left use.

ASSEMBLY SERVICE POINTS

>>A<< DIFFERENTIAL CASE B INSTALLATION

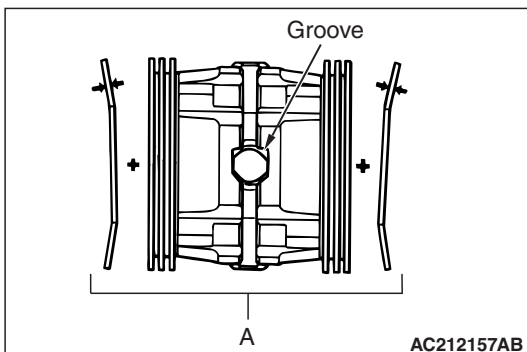
Before starting the assembly procedure, perform the following steps to adjust dimensional differences (clutch plate friction force) in the axial direction of the components inside the differential case and axial clearance of the differential side gear.



1. Place friction discs (two each) and friction plates (three each) one on top of another as illustrated and, using a micrometer, measure the thickness of each of the right and left assemblies. Select different discs and plates so that the difference between the right and left assemblies falls within the specified range.

Standard value: 0 –0.05 mm (0 –0.002 inch)

NOTE: If a new part is used, note that the friction disc comes in two thickness: 1.6 mm (0.063 inch) and 1.7 mm (0.067 inch).

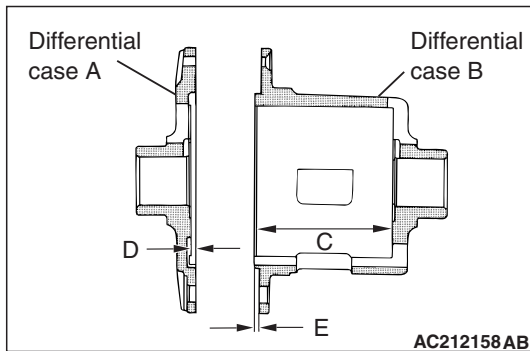


2. Measure the thickness of each of the right and left spring plates.
3. Assemble the pressure ring internal parts (pinion shaft and pressure ring), friction plates, and friction discs and, using a micrometer, measure the overall width.

NOTE: When taking measurements, press the assembly from both sides so that the pinion shaft makes a positive contact with the groove in the pressure ring.

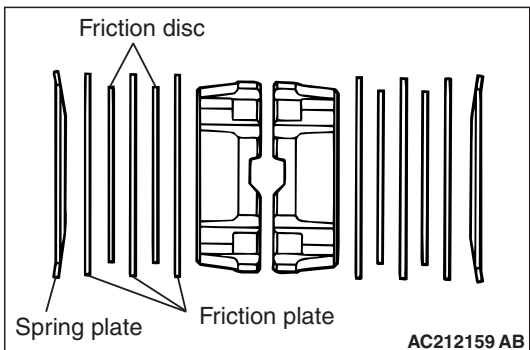
4. Find value (A) which is the thickness measured in step (3) added to the thickness of two spring plates.
5. Find dimension (B) between the spring plate facing surfaces when differential case A and B are assembled together.

$$B = C + D - E$$



6. If the clearance between the spring plate and differential case (B - A) is outside the specified range, change the friction discs and make adjustments.

Standard value: 0.06 –0.25 mm (0.002 –0.010 inch)



7. Coat each part with the specified gear oil and mount it in the specified direction and order into differential case B.

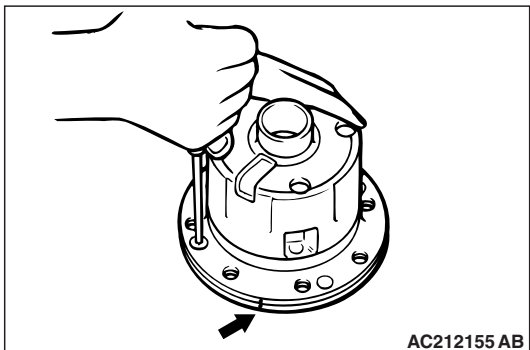
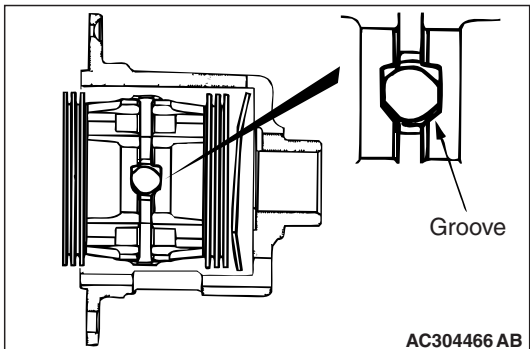
Specified gear oil: MITSUBISHI Genuine DIA QUEEN LSD gear oil

NOTE: Apply a careful coat of gear oil to the contacting and sliding surfaces.

CAUTION

When installing the pressure ring into the differential case B, the groove should be faced in the direction shown in the figure. Otherwise it may cause a malfunction.

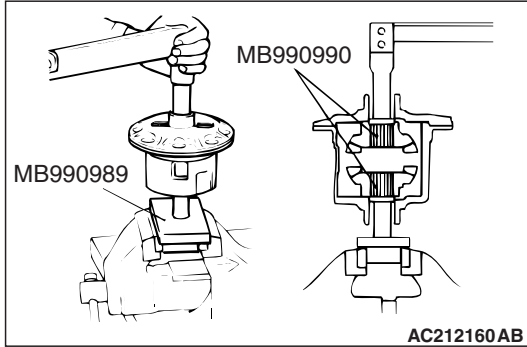
8. Mount each part in the specified direction and order into differential case B.



>>B<< SCREW TIGHTENING

1. Align the alignment mark on differential case A with that on differential case B.
2. Tighten the screws connecting differential case A and B a uniform amount little by little in the diagonal order.

NOTE: If tightening the screws does not bring the two cases properly together, the spring plates are not probably assembled properly. Reassemble from the start.



>>C<< LSD DIFFERENTIAL TORQUE CHECK

1. Use the following special tools to check for differential torque.

- Base (MB990989)
- Tool A (MB990990)

Standard value:

<When a new clutch plate is used>:

2.1 –2.9 N· m (18.6 –25.7 in-lb)

<When the current clutch plate is reused>:

2.1 –2.9 N· m (18.6 –25.7 in-lb)

NOTE: Before measuring the differential torque, first turn the gears so they snug each other, then take measurements during rotation.

2. If the measurement falls outside the specified range, disassemble the differential case assembly and repair or replace defective parts.

INSPECTION

M1273001500077

DIFFERENTIAL CASE INTERNAL PARTS CONTACT/SLIDING SURFACE CHECK

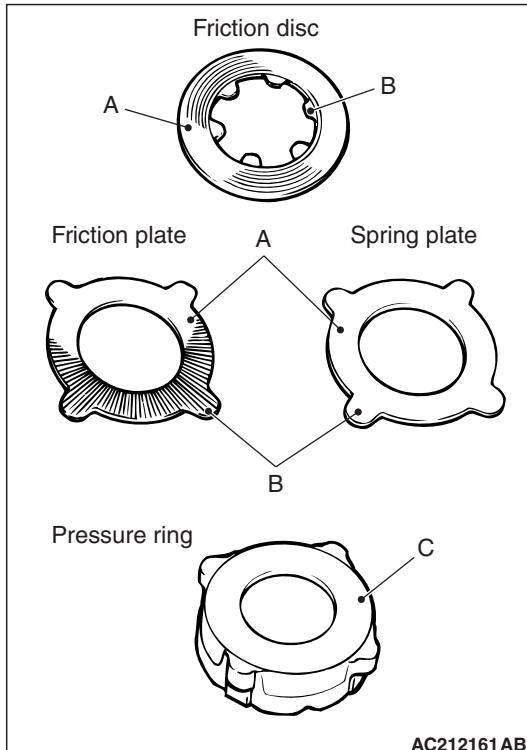
1. Clean the disassembled parts with cleaning oil and dry them with compressed air.

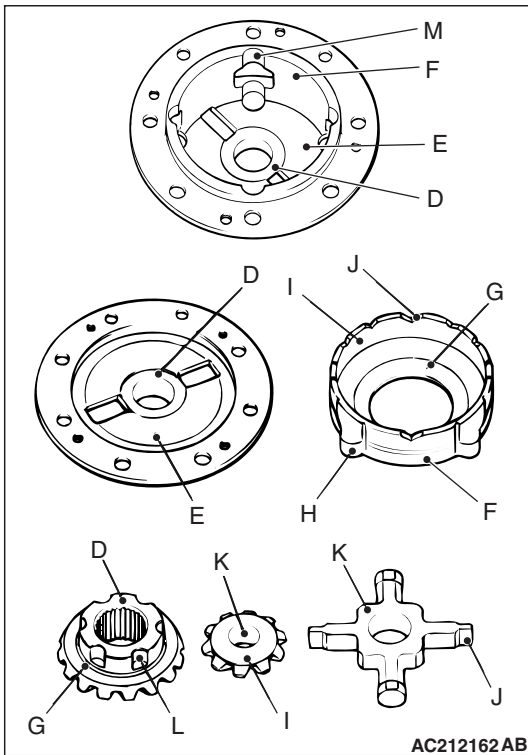
2. Check each plate, disc, and pressure ring for the following:
- A: Friction and sliding surfaces of friction discs, friction plates, and spring plates. Replace a defective part that has heat discoloration and excessive wear, as it degrades locking performance.

NOTE: If the inner periphery of the friction face shows traces of harsh contact, it is because of the spring tension of each plate, disc and other part. Do not confuse this with abnormal wear.

- B: Inner periphery and outer periphery protrusions of friction discs, friction plates, and spring plates. Replace a cracked or damaged part.
- C: Friction and sliding surfaces between pressure rings and friction discs. Grind a dented or scratched part with oil stone and then lap and correct with a compound on a surface plate.

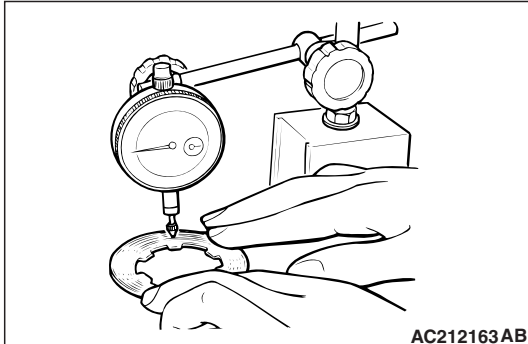
NOTE: If the inner periphery of the friction face shows traces of harsh contact, it is because of the spring tension of each plate, disc and other part. Do not confuse this with abnormal wear.





3. Check the following parts for contact and siding surfaces (D to M) and correct burrs and dents with oil stone.
 - D: Sliding surfaces of side gear and case
 - E: Contacting surfaces of differential case and spring plate
 - F: Contacting surfaces of pressure ring and differential case inner face
 - G: Sliding surfaces of pressure ring hole and side gear
 - H: Protrusions on outer periphery of pressure ring
 - I: Pressure ring inner surface and differential pinion gear spherical surface
 - J: Pressure ring V-groove and pinion shaft V
 - K: Sliding surfaces of pinion shaft and differential pinion gear hole
 - L: Side gear grooves on outer periphery
 - M: Slits in inner periphery of differential

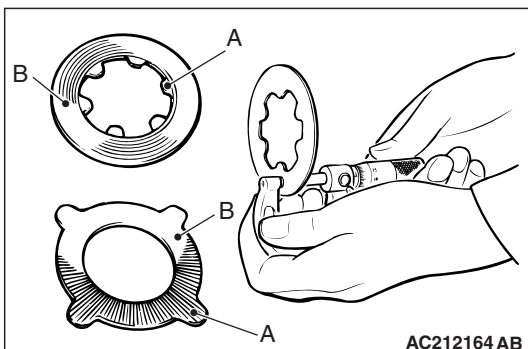
FRICION PLATE AND FRICION DISC DISTORTION CHECK



Apply a dial indicator to the friction plate or disc on a surface plate and, turning the friction plate or disc, measure the distortion (flatness).

Limit: 0.08 mm (0.003 inch)

FRICION PLATE AND FRICION DISC WEAR CHECK



1. For the purpose of determining wear, measure thickness (A, B) of the friction surface and protrusion at several places and find the difference between the two.

Limit: 0.1 mm (0.004 inch)

2. If the wear exceeds the limit, replace the part with a new one.

NOTES