

FRONT AXLE

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SPECIFICATIONS**GENERAL SPECIFICATIONS****<Vehicles built up to October, 1993>**

Items	2400	3000	2500D
Front axle hub bearing Type	Taper roller bearing	Taper roller bearing	Taper roller bearing
Drive shaft Joint type			
Outer	Birfield joint	Birfield joint	Birfield joint
Inner	Double-offset joint	Double-offset joint	Double-offset joint
Differential			
Final drive gear type	Hypoid gear	Hypoid gear	Hypoid gear
Reduction ratio			
2-door models	4.875	4.875	4.625 or 4.875*
4-door models	4.875	4.625 or 4.875*	4.875 or 5.285*
Pinion gear type			
2-door models	2 pinion	2 pinion	2 pinion or 4 pinion*
4-door models	4 pinion	2 pinion	A/T: 2 pinion M/T: 4 pinion

NOTE

*: Vehicles with wide fender

<Vehicles built from November, 1993>

Items	2400, 3000 – 12VALVE	3500	2500D	2800D	3000 – 24VALVE
Front axle hub bearing Type	Taper roller bearing	Taper roller bearing	Taper roller bearing	Taper roller bearing	Taper roller bearing
Drive shaft Joint type					
Outer	Birfield joint	Birfield joint	Birfield joint	Birfield joint	Birfield joint
Inner	Double-offset joint	Double-offset joint	Double-offset joint	Double-offset joint	Double-offset joint
Differential					
Final drive gear type	Hypoid gear	Hypoid gear	Hypoid gear	Hypoid gear	Hypoid gear
Reduction ratio					
2-door models	4.875	4.636	4.625 or 4.875*	4.636	4.636 or 4.875*
4-door models	4.875	4.636	4.875 or 5.285*	4.900	4.636 or 4.875*
Pinion gear type					
2-door models	2 pinion	2 pinion	2 pinion or 4 pinion*	2 pinion	2 pinion
4-door models	2 pinion	2 pinion	A/T: 2 pinion M/T: 4 pinion	2 pinion	2 pinion

NOTE

*: Vehicles with wide fender

SERVICE SPECIFICATIONS

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Items	Specifications
Standard value	
Drive shaft axial play	mm (in.) 0.4–0.7 (0.016–0.028)
Solenoid valve resistance [at 20°C (60°F)]	Ω 36–46
Front hub play in the axial direction	mm (in.) 0.05 (0.0020) or less
Front hub turning resistance	Nm (kgcm, in.lbs.) 0.3–1.3 (3–13, 2.6–11.3)
[Spring scale reading]	N (kg, lbs.) 5–18 (0.5–1.8, 1.1–4.0)
Automatic free-wheeling hub	
Brake assembly thickness	mm (in.) 10.5 (0.413)
Setting of D.O.J. boot length	mm (in.) 77–83 (3.03–3.27)
Clutch gear play (bearing axial play)	mm (in.) 0.05–0.40 (0.0020–0.0160)
Final drive gear backlash	mm (in.) 0.11–0.16 (0.0043–0.0063)
Differential gear backlash	mm (in.)
<2 pinion differential>	0–0.076 (0–0.0030)
<4 pinion differential>	0.01–0.25 (0.0004–0.0098)
Drive pinion rotation torque	Nm (kgcm, in.lbs.)
Without oil seal	0.3–0.5 (3.0–5.0, 2.6–4.3)
With anti-rust agent	0.15–0.25 (1.5–2.5, 1.3–2.2)
With oil seal	0.5–0.7 (5.0–7.0, 4.3–6.1)
With gear oil applied	0.35–0.45 (3.5–4.5, 3.1–3.9)
Limit	
Front axle total backlash	
Vehicles with free-wheeling hub	mm (in.) 14 (0.55)
Vehicles without free-wheeling hub	mm (in.) 11 (0.43)
Automatic free-wheeling hub	
Free-wheeling hub turning resistance	Nm (kgcm, in.lbs.) 1.0 (10, 8.7)
[Spring scale reading]	N (kg, lbs.) 14 (1.4, 3.1)
Brake assembly thickness	mm (in.) 9.6 (0.378)
Return spring deterioration	mm (in.) 35 (1.38)
Shift spring deterioration	mm (in.) 30 (1.18)
Drive gear runout	mm (in.) 0.05 (0.0020)
Differential gear backlash <2 pinion differential>	mm (in.) 0.2 (0.0079)

LUBRICANTS

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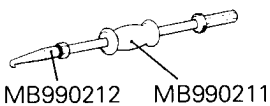
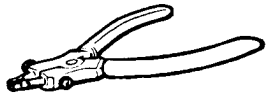

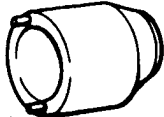
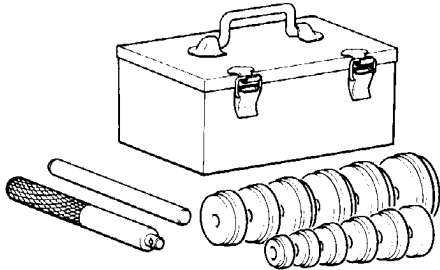
Items	Specified lubricants	Quantity
Front axle gear oil Front differential	Hypoid gear oil API classification GL-5 or higher SAE viscosity No. 90, 80W	1.20 dm ³ (1.27 U.S. qts., 1.05 Imp. qts)
D.O.J. boot grease	Repair kit grease	100 g (3.5 oz.)

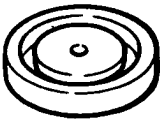

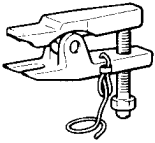


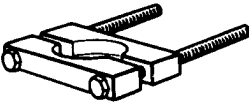
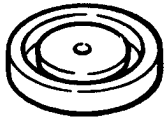

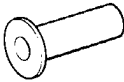
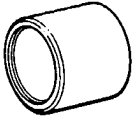
SEALANTS AND ADHESIVES

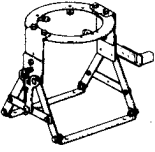
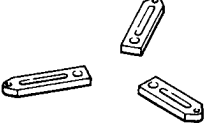
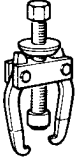
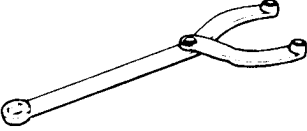
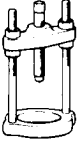

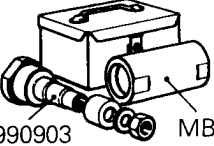
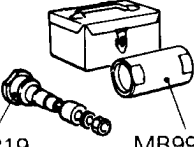


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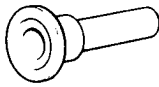

Items	Specified sealants and adhesives	Characteristics
Contact surface of drive flange or free-wheeling hub and front axle hub Contact surface of hub cap and drive flange Contact surface of differential cover and differential carrier Free-wheeling clutch assembly	3M ATD Part No. 8661, 8663 or equivalent	Semi-drying sealant
Drive gear threaded hole	3M Stud Locking 4170 or equivalent	Anaerobic sealant

SPECIAL TOOLS

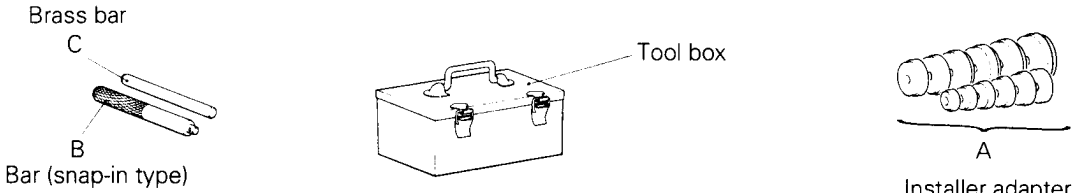
Tool	Number	Name	Use
	MB990590	Sliding hammer	Removal of differential carrier oil seal Removal and installation of inner shaft (Used together with MB990906)
	MB990628	Snap ring pliers	Removal and installation of drive shaft snap ring Removal and installation of manual free-wheeling hub snap ring
 L : 90 mm (3.54 in.) : MD998051 (MD998001) L : 80 mm (3.15 in.) : MD998360	MD998051 (MD998001) MD998360	Cylinder head bolt wrench	Removal and installation of automatic free-wheeling hub
	MB990954	Lock nut wrench	Removal and adjustment of lock nut
	MB990925	Bearing and oil seal installer set	Driving-out of front axle hub bearing outer race (MB990939) Press-fitting of front axle hub bearing outer race (MB990938, MB990935) Driving-out of knuckle needle bearing (MB990939) Driving-out of drive pinion bearing outer race (MB990939) Press-fitting of drive pinion front bearing outer race (MB990938, MB990936) Press-fitting of drive pinion rear bearing outer race (2400, 2500D, 3000-A/T : MB990938, MB990933) (3000-M/T, 3500, 2800D : MB990938, MB990934) Press-fitting of drive shaft oil seal (MB990938, MB990934)

Tool	Number	Name	Use
	MB990985	Oil seal installer	Press-fitting of knuckle oil seal (Used together with MB990938)
	MB990811	Differential side bearing cup	Disassembly and reassembly of automatic free-wheel hub Removal of side bearing inner race (Used together with MB990810)
	MB991113, MB990635 or MB991406	Steering linkage puller	Disconnection of tie rod Disconnection of upper ball joint (MB991113, MB990635 or MB991406) Disconnection of lower ball joint (MB991406)
	MB990956	Needle bearing installer	Press-fitting of knuckle needle bearing (Used together with MB990938)
	MB990906	Drive shaft attachment	Removal and installation of inner shaft (Used together with MB990211)
	MB990560	Bearing remover	Removal and press-fitting of inner shaft bearing
	MB990955	Oil seal installer	Press-fitting of housing tube dust seal Press-fitting of front axle hub oil seal (Used together with MB990938)
	MB990799	Ball joint remover and installer	Installation of free-wheel clutch bearing
	MB991168	Differential oil seal installer	Installation of free-wheel clutch oil seal
	MB990890 or MB990891	Rear suspension bushing base	Installation of free-wheel clutch bearing

Tool	Number	Name	Use
	MB990909	Working base	Support of front differential carrier assembly
	MB991116	Adapter	
	MB990810	Side bearing puller	Removal of side bearing inner race (Used together with MB990811)
	MB990767	End yoke holder	Removal and installation of companion flange
	MB990339	Bearing puller	Removal of drive pinion front bearing inner race
	MB990648	Bearing remover	
 MB990903 MB990552	MB990901	Pinion height gauge set	Measurement of drive pinion height <2400, 2500D, 3000-A/T>
 MB990819 MB990552	MB990818	Pinion height gauge set	Measurement of drive pinion height <3000-M/T, 3500, 2800D>
	MB991151	Torque wrench	Measurement of drive pinion preload
	MB990326	Preload socket	

Tool	Number	Name	Use
	MB990802	Bearing installer	Press-fitting of drive pinion front bearing inner race Press-fitting of side bearing inner race
	MB990031 or MB990699	Drive pinion oil seal installer	Press-fitting of drive pinion oil seal
	MB990813	Tap	Removal of adhesive

MB990925



Brass bar
C
Bar (snap-in type)
B
Tool box
A
Installer adapter

	Contents of new tool (MB990925)	O.D. mm (in.)		Contents of new tool (MB990925)	O.D. mm (in.)
A	MB990926	39 (1.54)	A	MB990933	63.5 (2.50)
	MB990927	45 (1.77)		MB990934	67.5 (2.66)
	MB990928	49.5 (1.95)		MB990935	71.5 (2.81)
	MB990929	51 (2.01)		MB990936	75.5 (2.97)
	MB990930	54 (2.13)		MB990937	79 (3.11)
	MB990931	57 (2.24)	B	MB990938	—
	MB990932	61 (2.40)	C	MB990939	—

SERVICE ADJUSTMENT PROCEDURES**FRONT AXLE TOTAL BACKLASH CHECK** E26FBAA

1. If the vehicle vibrates and produces a booming sound, measure the front axle total backlash by the following procedure to see if the differential carrier assembly requires removal.

- (1) On vehicles with free-wheeling hub, shift into 4-wheel drive position.

NOTE

On vehicles with manual free-wheeling hub, place the control handle in the LOCK position.

On vehicles with automatic free-wheeling hub, place the transfer shift lever in 4H position and drive the vehicle 1 to 2 meters (3.3 to 6.5 ft.) to engage the hub with the drive shaft.

For vehicles with super select 4WD, place the transfer control lever in 4H position and drive the vehicle until the 4WD indicator changes from flashing to illuminated.

- (2) Hold the wheels and place the transfer control lever in 2H position.

- (3) Turn the companion flange clockwise until all play is removed. Mate mark on the dust cover of the companion flange with that on the differential carrier.

- (4) Turn the companion flange counterclockwise until all play is removed and measure the amount of distance through which the mating marks moved.

Limit:

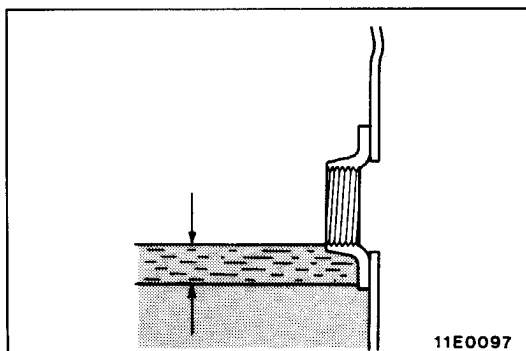
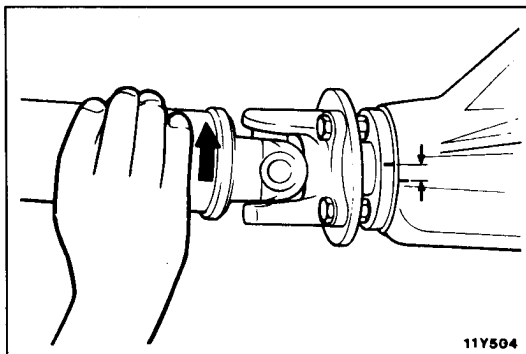
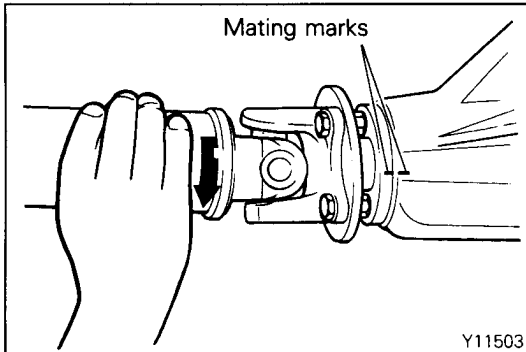
Vehicles with free-wheeling hub

14 mm (0.55 in.)

Vehicles without free-wheeling hub

11 mm (0.43 in.)

2. If the backlash exceeds the limit, remove the differential carrier assembly and final drive gear, and check for differential gear meshing condition and drive shaft or inner shaft spline looseness.

**FRONT AXLE GEAR OIL LEVEL CHECK** E26FCAA

Remove the filler plug, and check the gear oil level. Check that gear oil level is not 8 mm (0.31 in.) below the bottom of filler plug hole.

Specified gear oil: Hypoid gear oil API classification GL-5 or higher, SAE viscosity No. 90, 80W [1.20 dm³ (1.27 U.S.qts., 1.05 Imp.qts.)]

DRIVE SHAFT AXIAL PLAY CHECK

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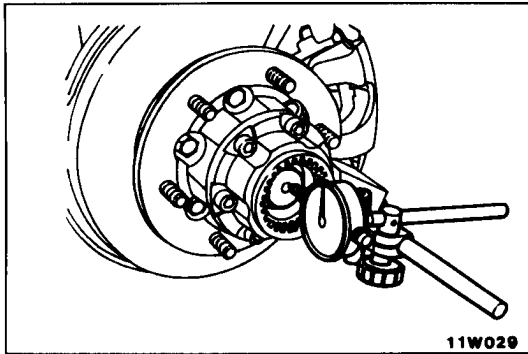
VEHICLES WITH AUTOMATIC FREE-WHEELING HUB

1. Place the free-wheeling hub in the free condition.

NOTE

The free condition can be obtained by shifting the transfer shift lever to the 2H position and then moving in reverse for 1 to 2 meters (3.3 to 6.5 ft.)

2. Jack the vehicle up and remove the front wheels.
3. Remove the free-wheeling hub cover.



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4. Rotate the drive shaft forward, and backward and then set the drive shaft to the position (the position where axial play is maximum) mid-way between where the rotation feels "heavy" for each (where there is a stopping feeling).
5. Set the dial gauge as shown in the figure; then move the drive shaft in the axial direction and measure the play.

Standard value: 0.4–0.7 mm (0.016–0.028 in.)

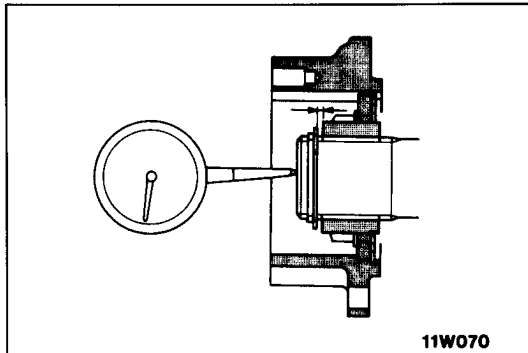
6. If the play is out of standard value, adjust by adding or removing shims.

VEHICLES WITH MANUAL FREE-WHEELING HUB

1. Jack the vehicle up and remove the front wheels.
2. Move the control handle for the free-wheeling hub to the FREE position.
3. Remove the free-wheeling hub cover.
4. Set the dial gauge as shown in the figure; then move the drive shaft in the axial direction and measure the play.

Standard value: 0.4–0.7 mm (0.016–0.028 in.)

5. If the play is out of standard value, adjust by adding or removing shims.



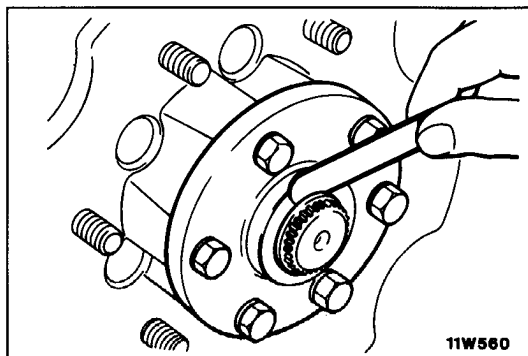
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VEHICLES WITHOUT FREE-WHEELING HUB

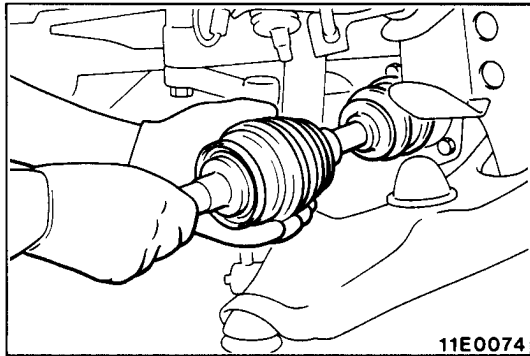
1. Jack the vehicle up and remove the front wheels.
2. Remove the hub cap.
3. Manually push the drive shaft in the direction in which it will closely contact the knuckle.
4. As shown in the figure, use a thickness gauge to measure the clearance between the drive flange and snap ring.

Standard value: 0.4–0.7 mm (0.016–0.028 in.)

5. If the play is out of standard value, adjust by adding or removing shims.



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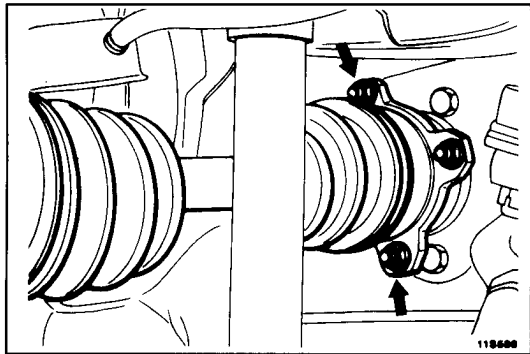
DIFFERENTIAL CARRIER OIL SEAL REPLACEMENT

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1. Remove the under cover.
2. Remove the front hub and knuckle assembly.
3. Remove the left drive shaft.

Caution

When pulling the left drive shaft from the differential carrier assembly, be careful that the drive shaft spline does not damage the oil seal.

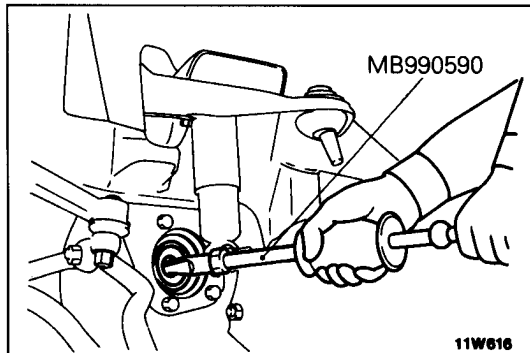


4. Remove the right drive shaft from the inner shaft assembly.
5. After removing the shock absorber (RH) lower mounting bolt, remove the inner shaft.

Caution

When pulling the inner shaft assembly from the differential carrier, be careful that the spline of the inner shaft does not damage the oil seal.

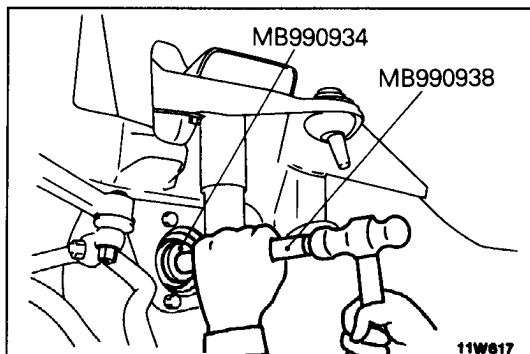
6. For vehicles with super select 4WD, remove the actuator mounting bolt from the housing tube and remove the harness from the clamp.
7. Remove the differential mounting bracket (R.H.) and housing tube.
8. Use the special tool to remove the oil seal.



9. Press-fit the oil seal positively by using the special tools.

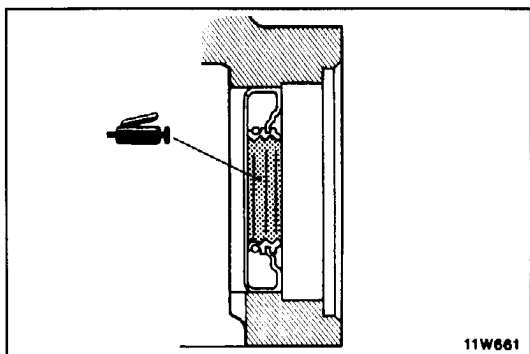
NOTE

For vehicles with 4-pinion type differential, there is a white painted identification mark on the metal ring of the oil seal.



10. Apply multi-purpose grease to the lip of the oil seal and install it to the drive shaft (LH).

For the right side, apply multi-purpose grease to the lip of the oil seal and install to the housing tube and differential mounting bracket (RH).



11. Install the inner shaft and drive shaft (RH).

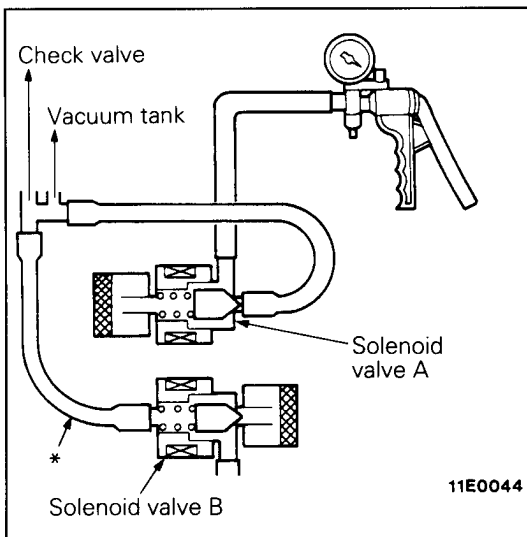
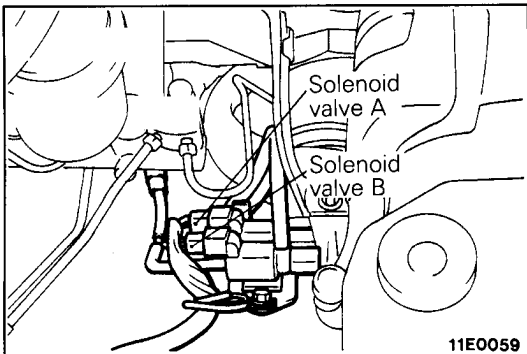
Caution

1. Do not damage the lip of the oil seal.
2. The circlip attached to the BJ side of the drive shaft should be replaced with a new clip.

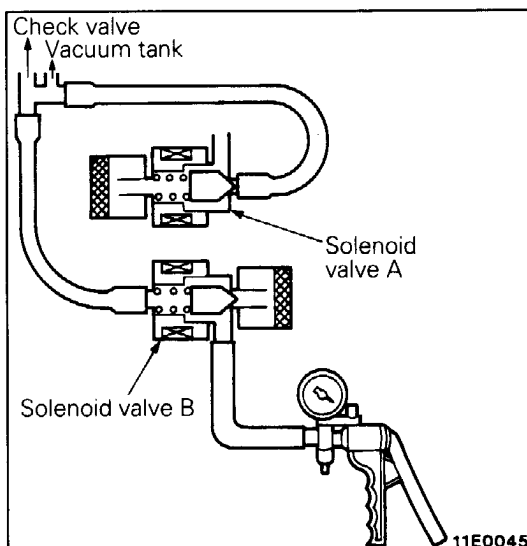
12. Install the actuator and secure the harness with the clamp.
13. Install the shock absorber.
14. Install the hub and knuckle assembly.
15. Install the under cover.

SOLENOID VALVE OPERATION CHECK

- (1) Remove the vacuum hoses (blue stripe, yellow stripe) from the solenoid valves.
- (2) Disconnect the harness connectors.



- (3) Connect a hand vacuum pump to solenoid valve A. Apply negative pressure and carry out the following inspections.
 1. Even if the hand pump is operated with no other operation, no negative pressure develops.
 2. Even when battery voltage is applied to solenoid valve A, the condition is the same as in (1), but when the vacuum hose of solenoid valve B is blocked by bending at the * mark, negative pressure is maintained.
 3. When battery voltage is applied to solenoid valves A and B, negative pressure is maintained.

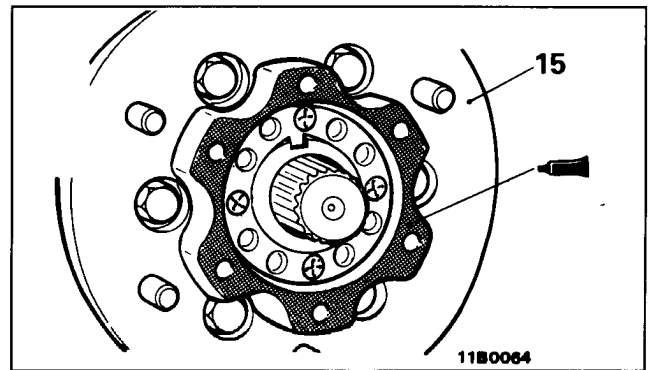
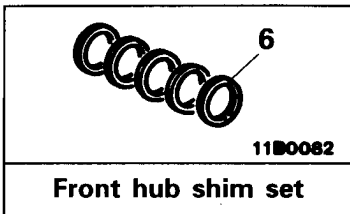
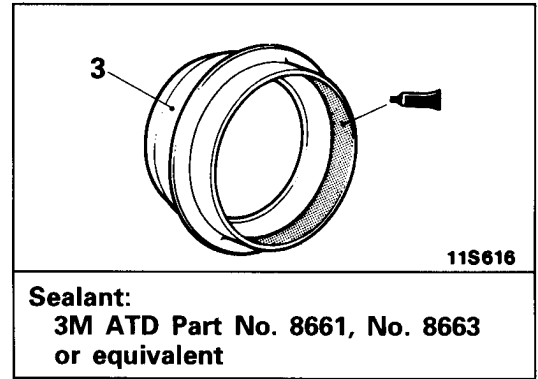
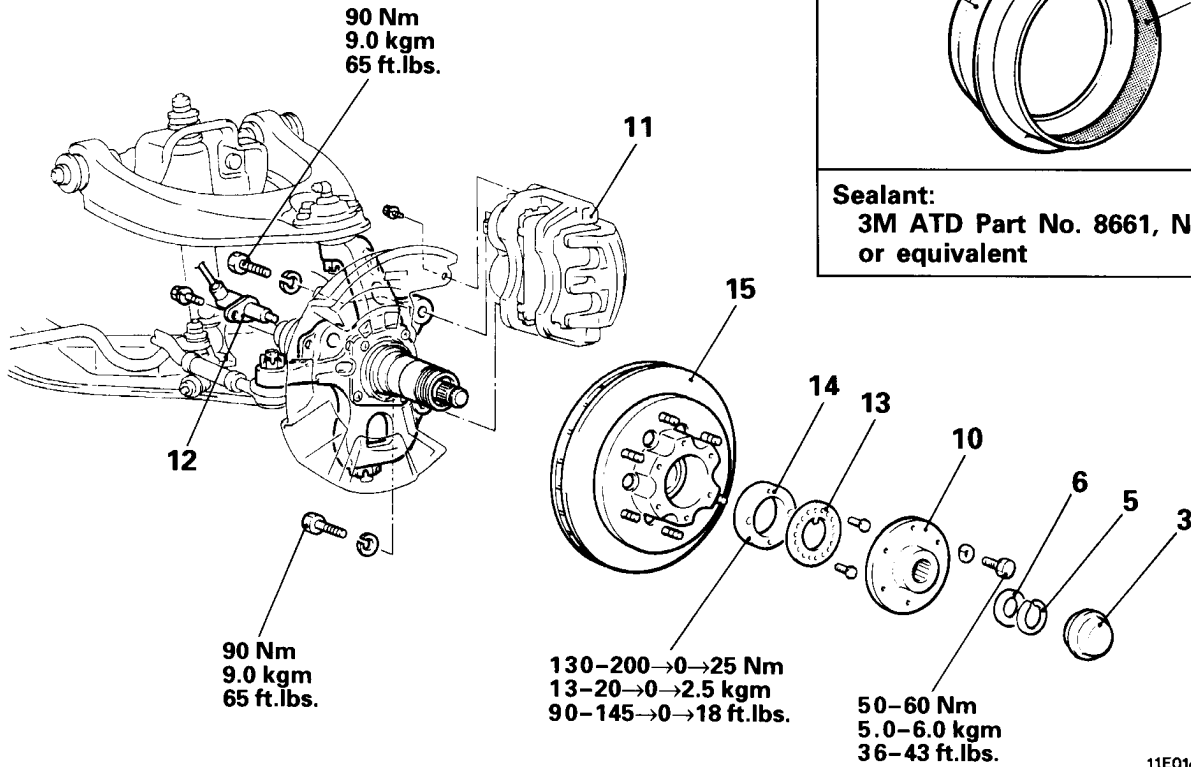


- (4) Connect the hand vacuum pump to solenoid valve B. Apply negative pressure and carry out the following inspections.
 1. With no other operation, negative pressure is maintained.
 2. When battery voltage is applied to solenoid valve B, negative pressure equalizes.
 3. When battery voltage is applied to solenoid valve A, negative pressure equalizes.
- (5) Measure the resistance of the solenoid valves.

Standard value: 36–46 Ω [at 20°C (60°F)]

AXLE HUB

REMOVAL AND INSTALLATION (Vehicles without Free-wheeling Hubs)



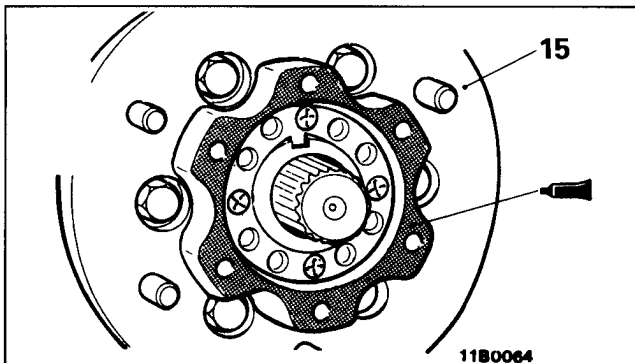
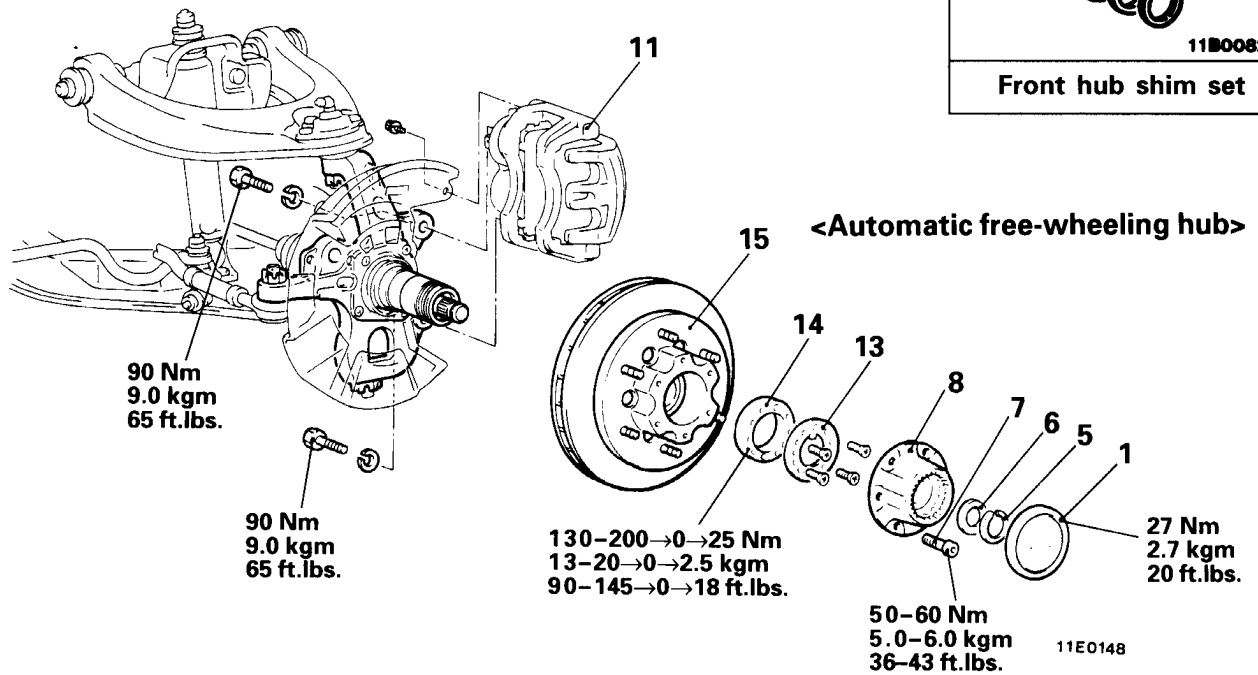
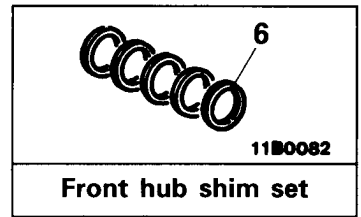
Sealant: 3M ATD Part No. 8661, No. 8663 or equivalent

Caution
Make sure that there is no excess specified sealant on the hub outside surface.

Removal steps

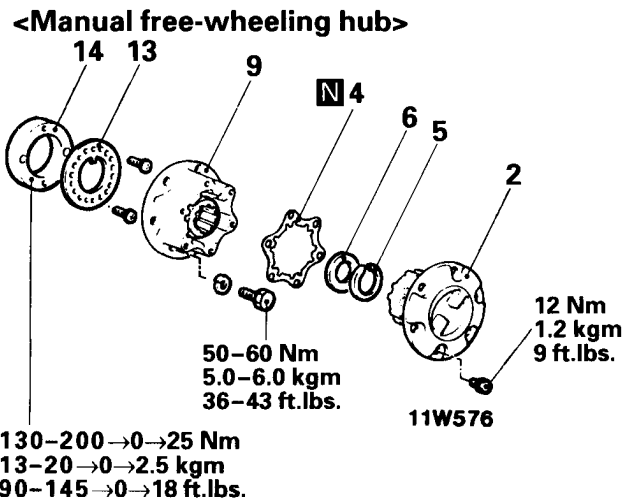
- 3. Hub cap
- ◆◆ Adjustment of drive shaft axial play
- ◆◆ 5. Snap ring
- ◆◆ 6. Shim
- ◆◆ 10. Drive flange
- ◆◆ 11. Front brake assembly
- ◆◆ 12. Speed sensor <Vehicles with ABS>
(refer to GROUP 35 – Wheel Speed Sensor.)
- ◆◆ 13. Lock washer
- ◆◆ Adjustment of wheel bearing preload
- ◆◆ 14. Lock nut
- ◆◆ 15. Front hub assembly

REMOVAL AND INSTALLATION (Vehicles with Free-wheeling Hubs)



Sealant: 3M ATD Part No. 8661, No. 8663 or equivalent

Caution
Make sure that there is no excess specified sealant on the hub outside surface.

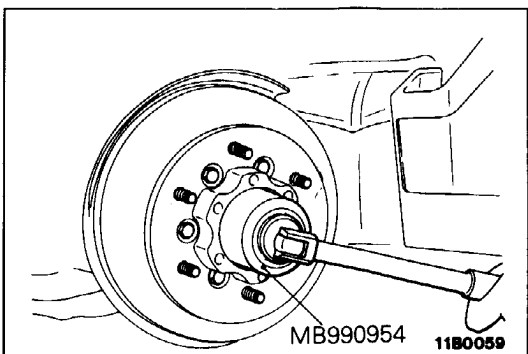
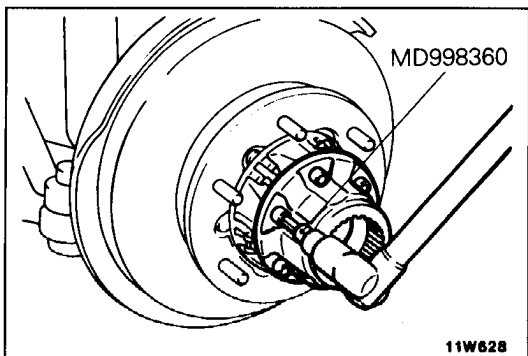
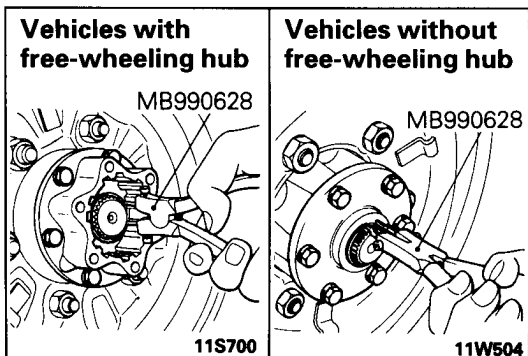
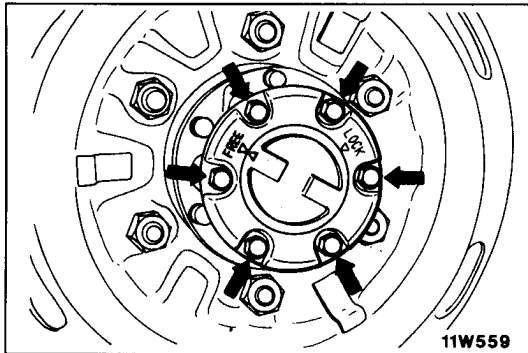
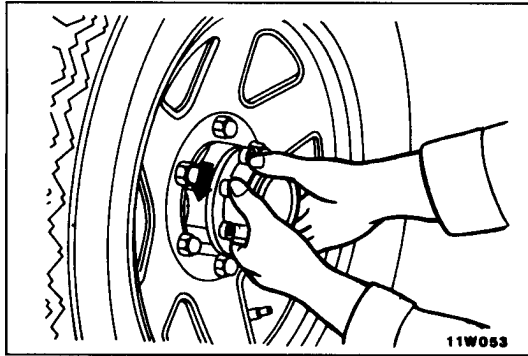


**Removal steps
<Vehicles with automatic
free-wheeling hub>**

- 1. Cover
- Adjustment of drive shaft axial play
- 5. Snap ring
- 6. Shim
- Adjustment of automatic free-wheeling hub turning resistance
- 7. Bolts
- 8. Automatic free-wheeling hub assembly
- 11. Front brake assembly
- 13. Lock washer
- Adjustment of wheel bearing preload
- 14. Lock nut
- 15. Front hub assembly

**Removal steps
<Vehicles with manual
free-wheeling hub>**

- 2. Free-wheeling hub cover
- Adjustment of drive shaft axial play
- 4. Gasket
- 5. Snap ring
- 6. Shim
- 9. Manual free-wheeling hub assembly
- 11. Front brake assembly
- 13. Lock washer
- Adjustment of wheel bearing preload
- 14. Lock nut
- 15. Front hub assembly



SERVICE POINTS OF REMOVAL

E26IBAG

1. REMOVAL OF COVER

- (1) Place the free-wheeling hub in the free condition.

NOTE

The free condition can be obtained by shifting the transfer shift lever to the 2H position and then moving in reverse for 1 to 2 meters (3.3 to 6.5 ft.).

- (2) Remove the automatic free-wheeling hub cover.

NOTE

When the cover cannot be loosened by hand, use an oil filter wrench with a protective cloth in between not to damage the cover.

2. REMOVAL OF FREE-WHEELING HUB COVER

- (1) Set the control handle to the FREE position.
- (2) Remove the free-wheeling hub cover.

5. REMOVAL OF SNAP RING

7. REMOVAL OF BOLTS (Vehicles with automatic free-wheeling hub)

11. REMOVAL OF FRONT BRAKE ASSEMBLY

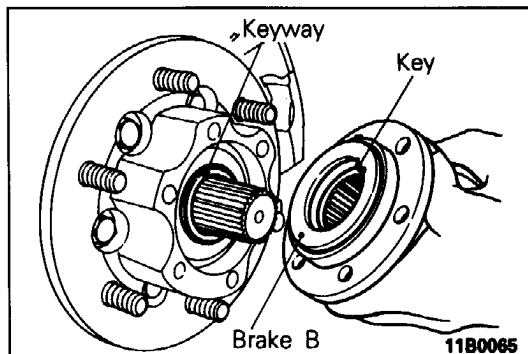
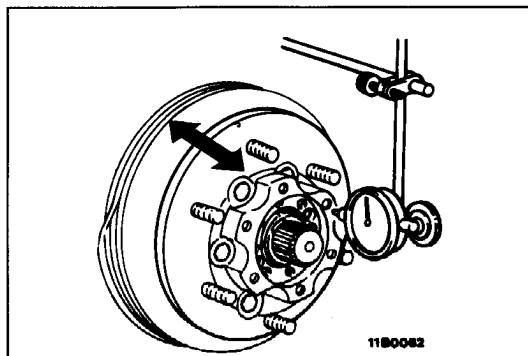
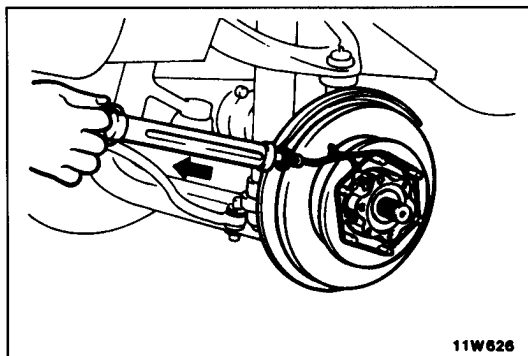
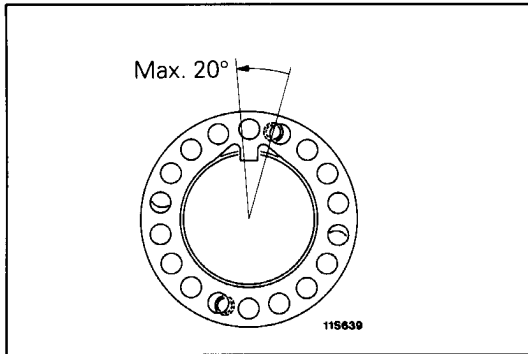
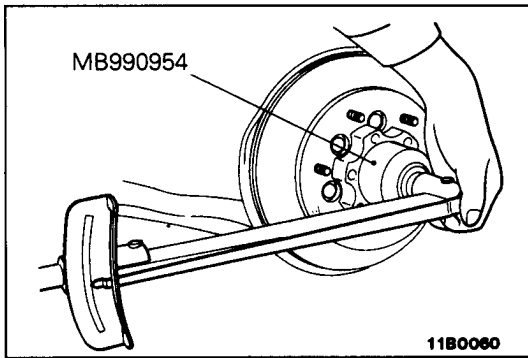
- (1) Remove the front brake assembly with the brake hose connected.
- (2) Use wire to suspend the front brake assembly from the upper arm so that the front brake assembly won't fall.

Caution

Do not twist the brake hose.

14. REMOVAL OF LOCK NUT/15. FRONT HUB ASSEMBLY

- (1) After the lock washer has been removed, remove the lock nut with the special tool.
- (2) Remove the front hub assembly from the knuckle together with the inner and outer bearings.

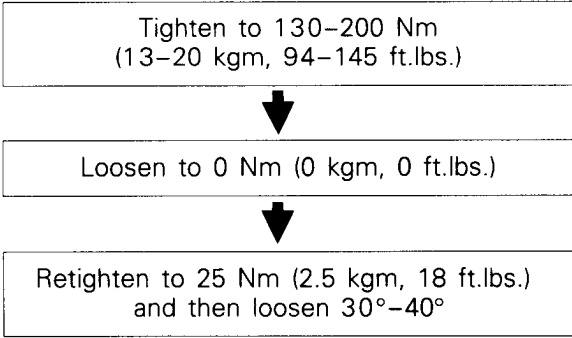


SERVICE POINTS OF INSTALLATION

E261DAH

• **ADJUSTMENT OF WHEEL BEARING PRELOAD**

- (1) Using the special tool, tighten the lock nut by the following procedures.



- (2) Install the lock washer. If the hole position is not aligned with the lock nut, move it within a range of not more than 20° until the holes are aligned.

- (3) Loosen the lock nut approximately 30 to 40 degrees to adjust the front hub's turning resistance and play in the axial direction so that they agree with the standard values.

Standard value: 0.3-1.3 Nm
(3-13 kgcm, 2.6-11.3 in.lbs.)
[Spring scale reading]
5-18 N
(0.5-1.8 kg, 1.1-4.0 lbs.)

Standard value: 0.05 mm (0.0020 in.) or less

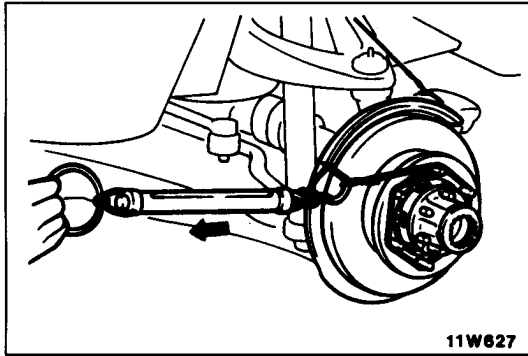
NOTE

If adjustment is not possible, the bearing may be incorrectly installed; check and, if necessary, repair. The lubrication condition should also be checked.

- (4) Mount the lock washer. If the lock washer holes do not align with the lock nut holes, loosen the lock nut to align them.

8. INSTALLATION OF AUTOMATIC FREE-WHEELING HUB ASSEMBLY

- (1) Align the key of the brake (B) and the keyway of knuckle spindle and loosely install the automatic free-wheeling hub assembly.
- (2) Check that the hub proper and automatic free-wheeling hub assembly are brought into intimate contact when the assembly is forced lightly against the hub proper. If not, turn the hub until intimate contact is achieved.



- **ADJUSTMENT OF AUTOMATIC FREE-WHEELING HUB TURNING RESISTANCE**

Check the automatic free-wheeling hub turning resistance by the following procedure.

- (1) Use a spring scale to measure the front hub turning resistance again. Subtract the value measured before the installation of the automatic free-wheeling hub from that measured here to find the turning resistance of the free-wheeling hub.

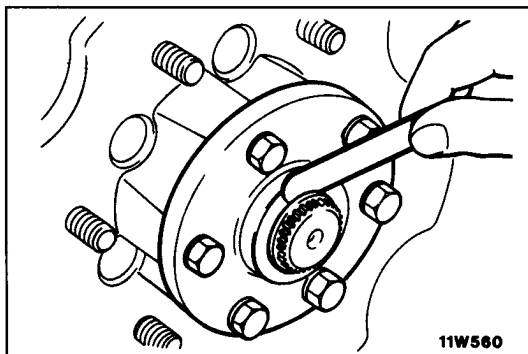
Limit: 1.0 Nm (10 kgcm, 8.7 in. lbs.)

[Spring scale reading] 14 N (1.4 kg, 3.1 lbs.)

- (2) If the free-wheeling hub turning resistance exceeds the limit, disassemble and reassemble the free-wheeling hub again.

- **ADJUSTMENT OF DRIVE SHAFT AXIAL PLAY**

After the installation of shim and snap ring, check the drive shaft axial play by the following procedure.

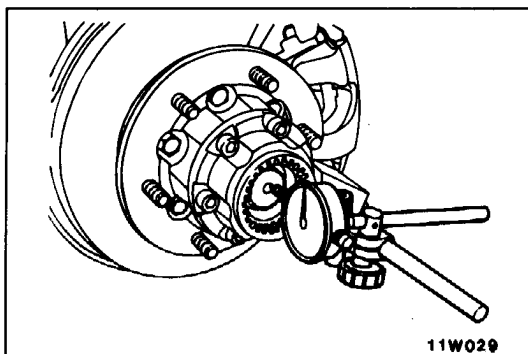


<Vehicles with drive flange>

- (1) Install the shim and snap ring to the drive shaft.
- (2) Push the drive shaft in by hand towards the knuckle until they touch.
- (3) Measure the clearance between the drive flange and the spacer with a thickness gauge as shown in the illustration.

Standard value: 0.4–0.7mm (0.016–0.028in.)

- (4) If the amount of play is outside the standard value, adjust by selecting a shim that will bring the play to the standard value.



<Vehicles with free-wheeling hubs>

- (1) Rotate the drive shaft forward, and backward and then set the drive shaft to the position (the position where axial play is maximum) mid-way between where the rotation feels "heavy" for each (where there is a stopping feeling).
- (2) Set the dial gauge as shown in the figure; then move the drive shaft in the axial direction and measure the play.

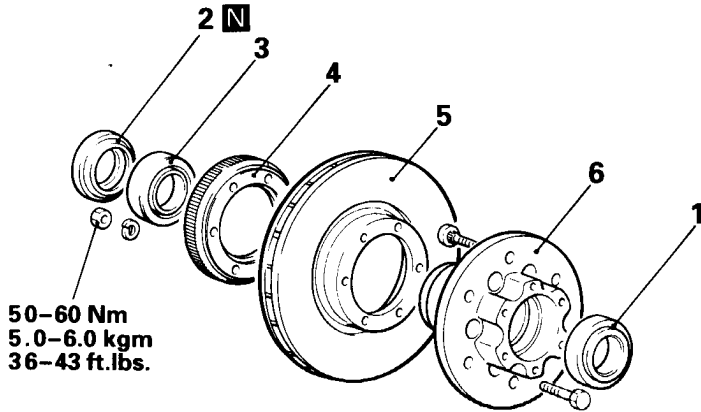
Standard value: 0.4–0.7 mm (0.016–0.028 in.)

- (3) If the play is out of standard value, adjust by adding or removing shims.

DISASSEMBLY AND REASSEMBLY (Front Axle Hub)

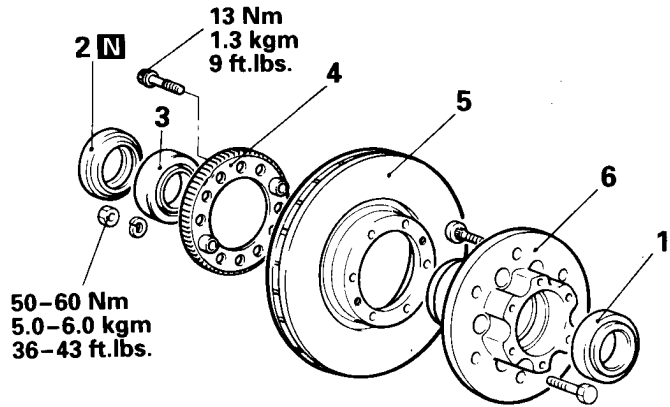
E26II--

<Vehicles built up to May, 1994>

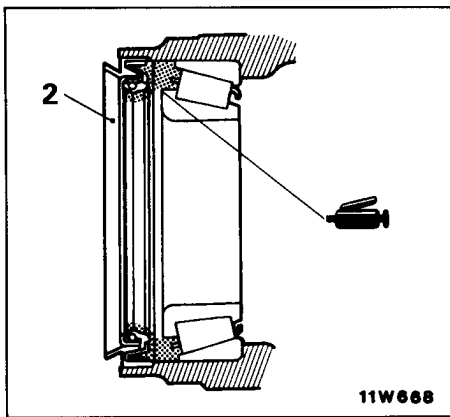


11E0077

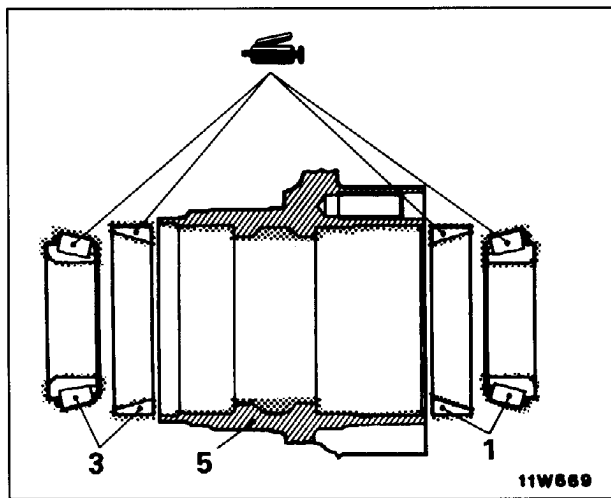
<Vehicles built from June, 1994>



11E0203



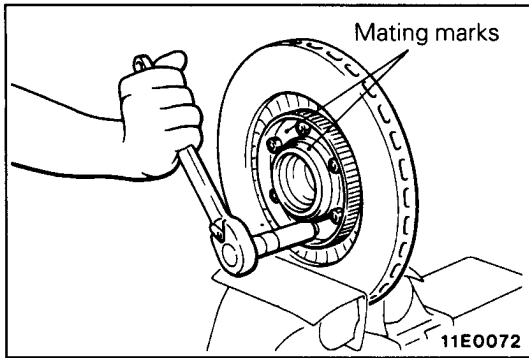
11W668



11W669

Disassembly steps

- 1. Outer bearing
- 2. Oil seal
- 3. Inner bearing
- 4. Rotor <Vehicles with ABS>
- 5. Brake disc
- 6. Front hub

**SERVICE POINTS OF DISASSEMBLY**

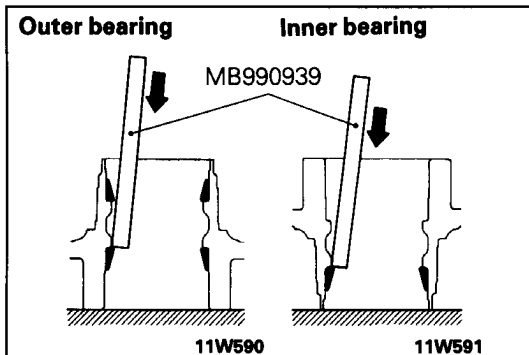
E26IJAB

5. REMOVAL OF BRAKE DISC

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

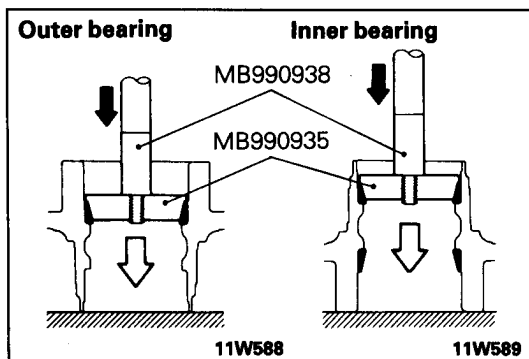
Caution

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

**BEARING REPLACEMENT**

E26IKAD

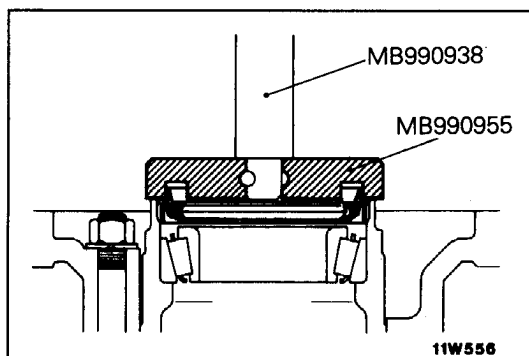
- (1) Wipe off grease from the front hub interior.
- (2) Using the special tool, drive out the inner and outer bearing outer races by tapping them uniformly.



- (3) Press-fit the inner and outer bearing outer races by using the special tools.

NOTE

The bearing inner race and bearing outer race should be replaced as an assembly.

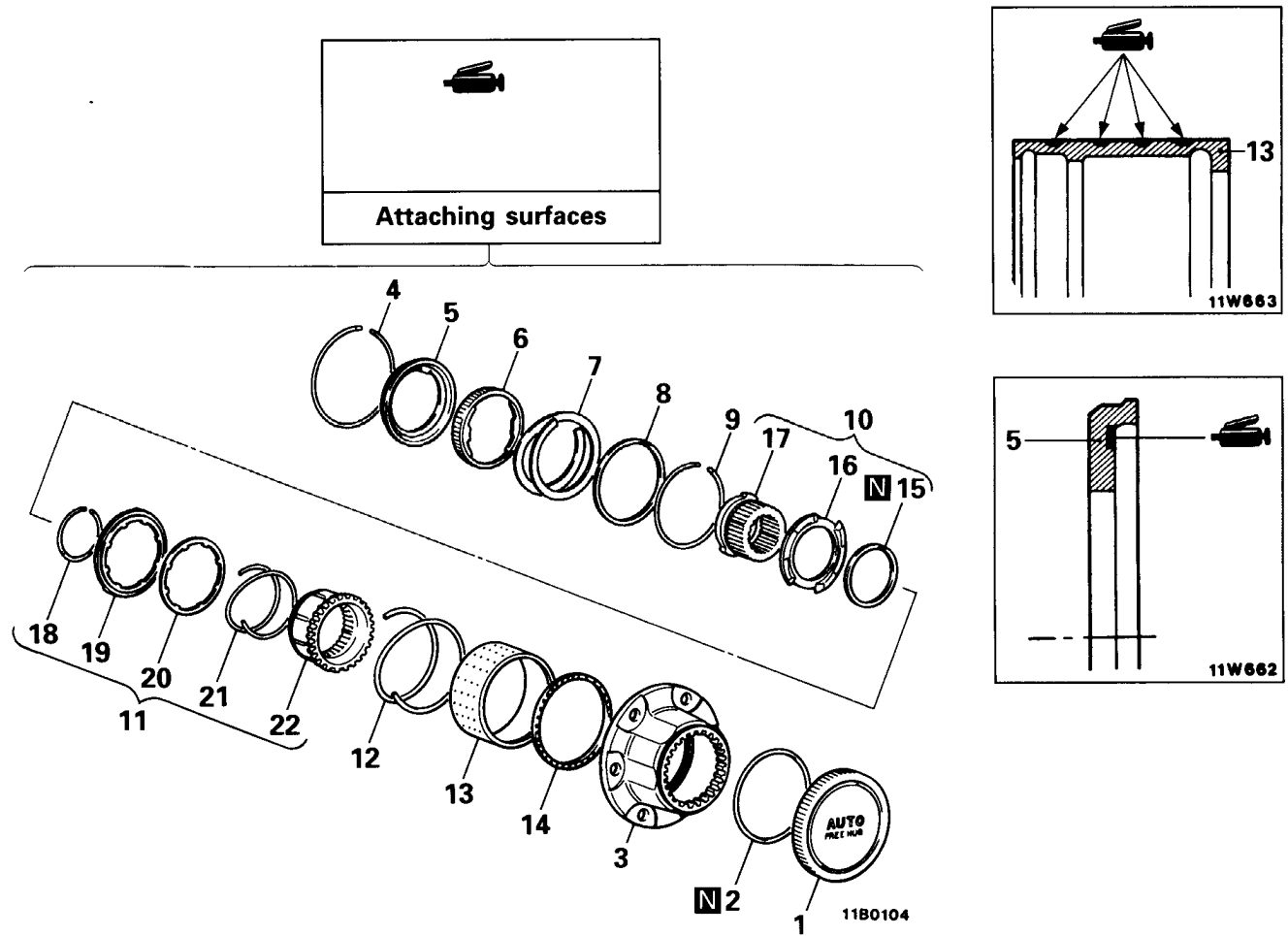
**SERVICE POINTS OF REASSEMBLY**

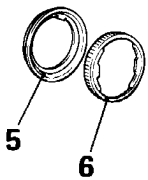
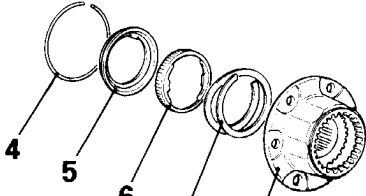
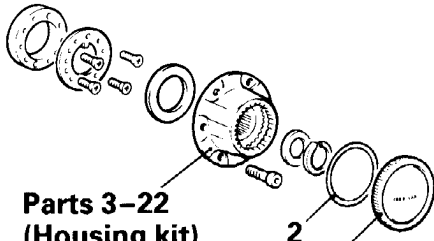
E26INAD

2. INSTALLATION OF OIL SEAL

AUTOMATIC FREE-WHEELING HUB

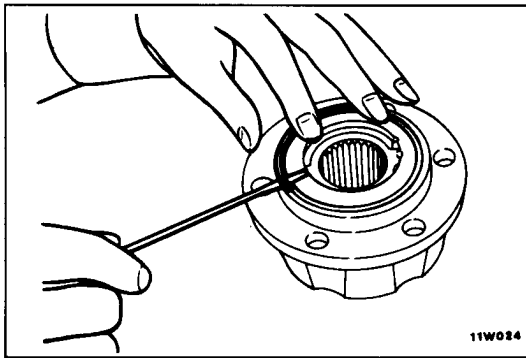
DISASSEMBLY AND REASSEMBLY



 <p>11E0134</p>	 <p>Parts 3, 8-22 (Housing assembly) 11E0133</p>	 <p>Parts 3-22 (Housing kit) 11E0132</p>
<p>Brake kit</p>	<p>Housing kit</p>	<p>Automatic free-wheeling hub kit</p>

Disassembly steps

- | | | | |
|---|-------------------------|-----|--------------------------|
| ↔ | 1. Hub cover | ↔ ↔ | 12. Return spring |
| | 2. O-ring | | 13. Retainer (B) |
| | 3. Housing | | 14. Retainer bearing |
| ↔ | 4. Housing C-ring | | 15. Drive gear snap ring |
| | 5. Brake (B) | | 16. Retainer (A) |
| | 6. Brake (A) | | 17. Drive gear |
| | 7. Brake spring | ↔ | 18. Slide gear C-ring |
| | 8. Housing snap ring | | 19. Cam |
| ↔ | 9. Retainer (B) C-ring | | 20. Spring holder |
| ↔ | 10. Drive gear assembly | | 21. Shift spring |
| ↔ | 11. Slide gear assembly | | 22. Slide gear |



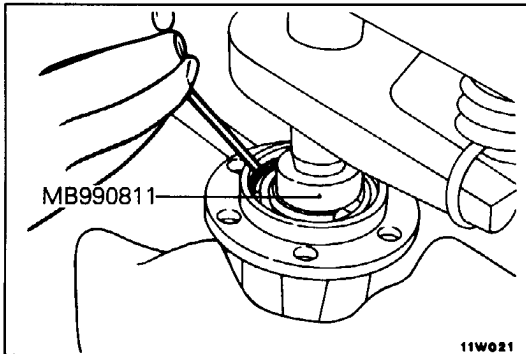
SERVICE POINTS OF DISASSEMBLY

E26JBAC

4. REMOVAL OF HOUSING C-RING

NOTE

The ring is easily removable by pushing the brake (B) in and using a small-end screwdriver, etc.



9. REMOVAL OF RETAINER (B) C-RING

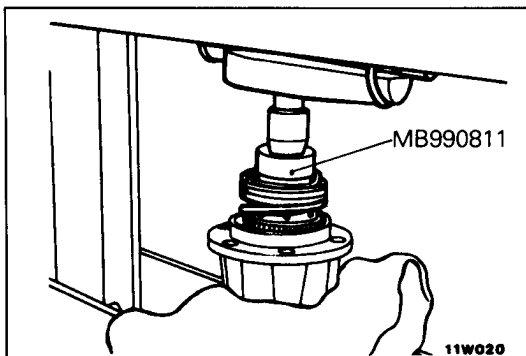
Using a special tool, lightly push the drive gear in and remove the retainer (B) C-ring.

NOTE

Since the return spring relaxes approx. 40 mm (1.57 in.), the stroke of the press should be set to more than 40 mm (1.57 in.)

Caution

1. Place a protective cover not to damage the cover attaching surface of the housing before setting on the press table.
2. Make sure that the pressing force does not exceed 200 N (20 kg, 44.1 lbs.).

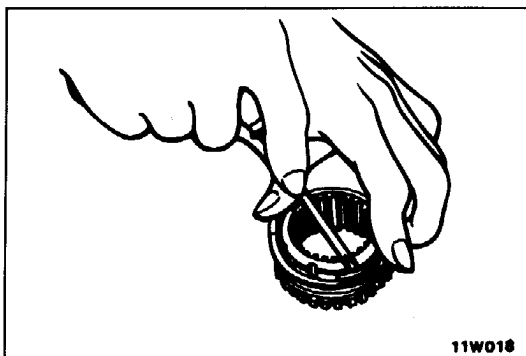


10. REMOVAL OF DRIVE GEAR ASSEMBLY/11. SLIDE GEAR ASSEMBLY/12. RETURN SPRING

Slowly reduce the pressure of the press until the return spring fully relaxes.

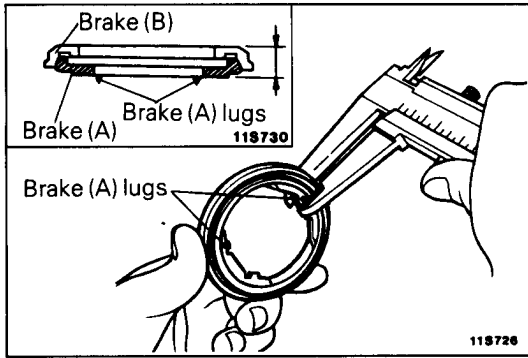
Caution

When the pressure of press is removed, make sure that the retainer (A) is not caught by the retainer (B).



18. REMOVAL OF SLIDE GEAR C-RING

Push the cam in and remove the slide gear C-ring with the spring compressed.



INSPECTION

E26ICAC

BRAKE ASSEMBLY THICKNESS

Check the brake assembly thickness by following the steps below.

- (1) Assemble brake (A) and brake (B) and then use slide calipers to measure the thickness of the assembly at the two lugs on brake (A).

Standard value: 10.5 mm (0.413 in.)

Limit: 9.6 mm (0.378 in.)

NOTE

Measure each side separately.

- (2) If the measured value is below the limit, replace brake (A) and brake (B) as a set.

DETERIORATION OF RETURN SPRING

Check the return spring for deterioration by following the steps below.

- (1) Measure the dimension A shown in illustration at the opposite side of spring end.

Limit: 35 mm (1.38 in.)

Caution

To measure the dimension A shown in illustration, measure the dimension from the outermost extremity of one wire diameter to that of the other wire diameter.

- (2) If the measured value is below the limit, replace the spring.

DETERIORATION OF SHIFT SPRING

Check the shift spring for deterioration by following the steps below.

- (1) Measure the dimension B shown in illustration at the opposite side of spring end.

Limit: 30 mm (1.18 in.)

Caution

To measure the dimension B shown in illustration, measure the dimension from the outermost extremity of one wire diameter to that of the other wire diameter.

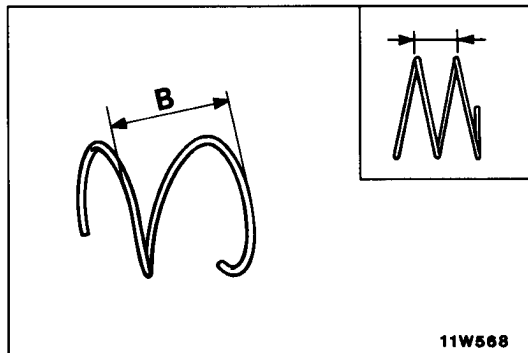
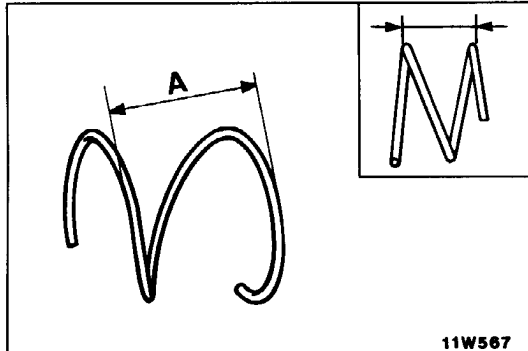
- (2) If the measured value is below the limit, replace the spring.

SERVICE POINTS OF REASSEMBLY

E26JDAC

12. INSTALLATION OF RETURN SPRING

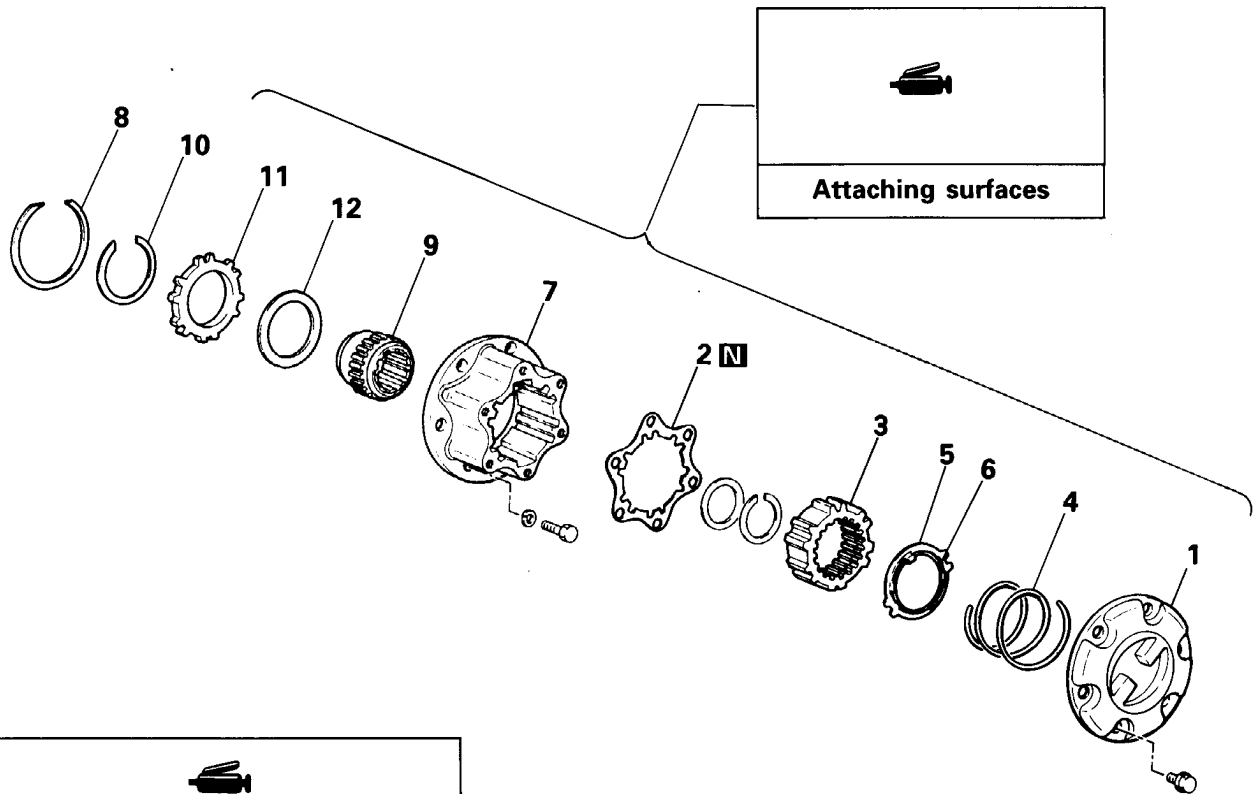
Install the return spring with the smaller coil diameter side toward the cam.



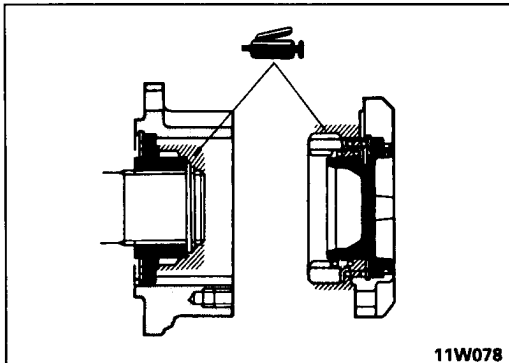
MANUAL FREE-WHEELING HUB

E26JA-B

DISASSEMBLY AND REASSEMBLY



11W574



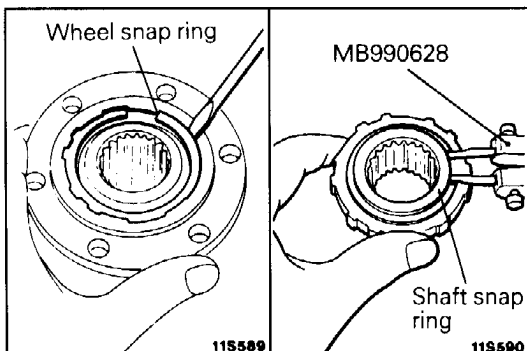
11W078

NOTE

A liberal amount of grease should be applied, especially when grease is wiped away or a new free-wheeling hub is installed.

Disassembly steps

1. Free-wheeling hub cover
2. Gasket
3. Free-wheeling hub clutch
4. Compression spring
5. Follower
6. Tension spring
7. Free-wheeling hub body
8. Wheel snap ring
9. Inner hub
10. Shaft snap ring
11. Free-wheeling hub ring
12. Spacer



SERVICE POINTS OF DISASSEMBLY

E26JBBC

8. REMOVAL OF WHEEL SNAP RING/10. SHAFT SNAP RING

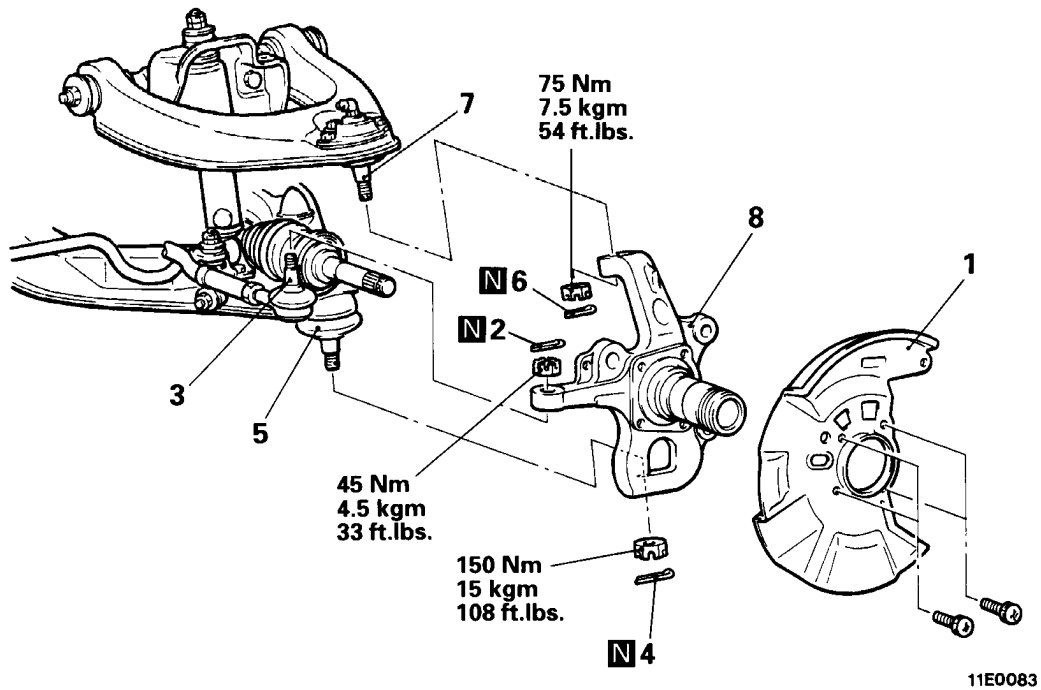
KNUCKLE

REMOVAL AND INSTALLATION

E26NA--

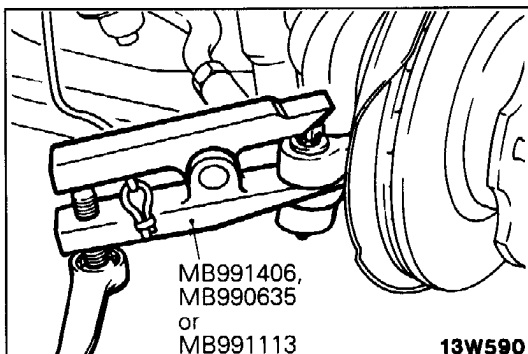
Pre-removal and post-installation Operation

- Removal and Installation of the Front Hub (Refer to P.26-12.)



Removal steps

1. Dust cover
2. Split pin
- ↔ 3. Connection for tie rod assembly and knuckle
- ↔ 4. Split pin
- ↔ 5. Connection for lower ball joint and knuckle
6. Split pin
- ↔ 7. Connection for upper ball joint and knuckle
8. Knuckle



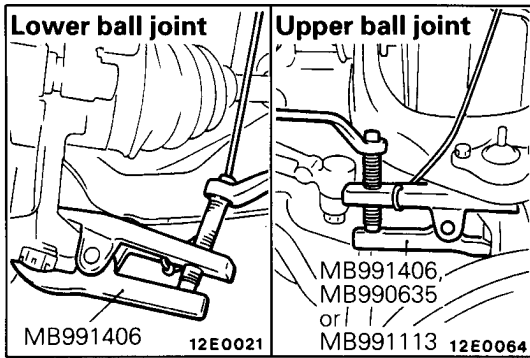
SERVICE POINTS OF REMOVAL

E26NBAF

3. DISCONNECTION OF TIE ROD ASSEMBLY AND KNUCKLE

Caution

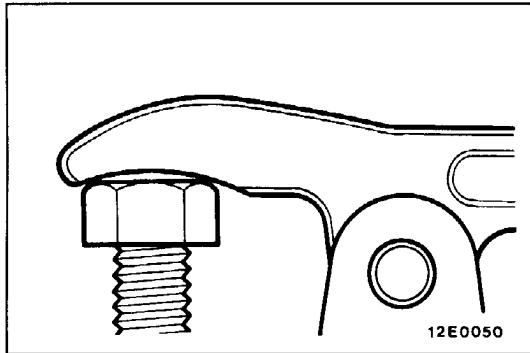
1. Use cord to bind the special tool closely so it won't become separated.
2. The nut should be loosened only, not removed.



5. DISCONNECTION OF LOWER BALL JOINT AND KNUCKLE/7. UPPER BALL JOINT AND KNUCKLE

Caution

1. Support the lower arm with a jack when removing the knuckle from the lower ball joint or the upper ball joint.
2. After the knuckle has been removed, lower the jack slowly.



3. Insert the special tool securely.

DISASSEMBLY AND REASSEMBLY

E26NJ--

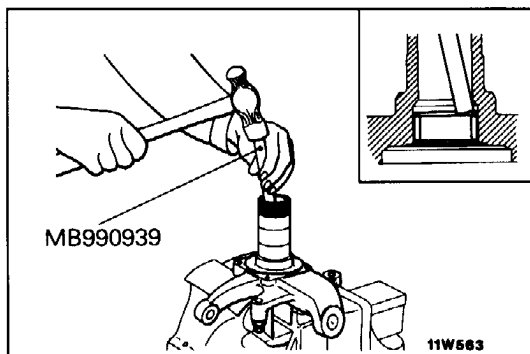
11W670

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11W660

Disassembly steps

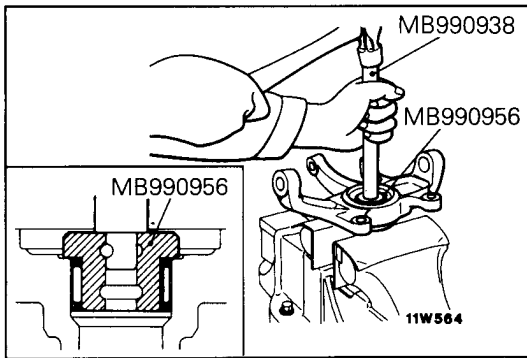
- ◆◆ 1. Oil seal
- ◆◆ 2. Spacer
- ◆◆ 3. Needle bearing
- ◆◆ 4. Knuckle



SERVICE POINTS OF DISASSEMBLY

E26NKAB

3. REMOVAL OF NEEDLE BEARING



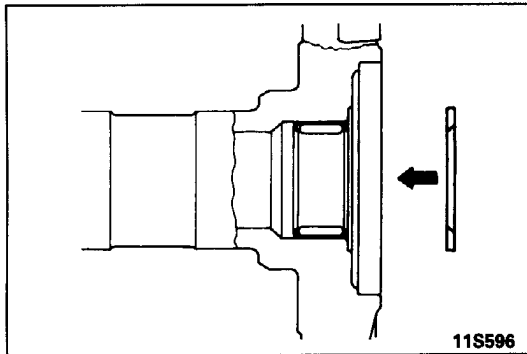
SERVICE POINTS OF REASSEMBLY

E26NMAB

3. INSTALLATION OF NEEDLE BEARING

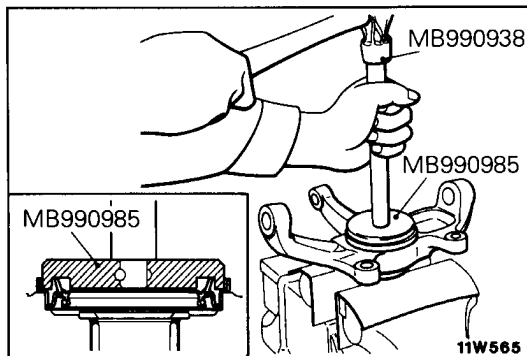
Caution

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



2. INSTALLATION OF SPACER

Install the spacer to the knuckle with the chamfered side toward the centre of vehicle.



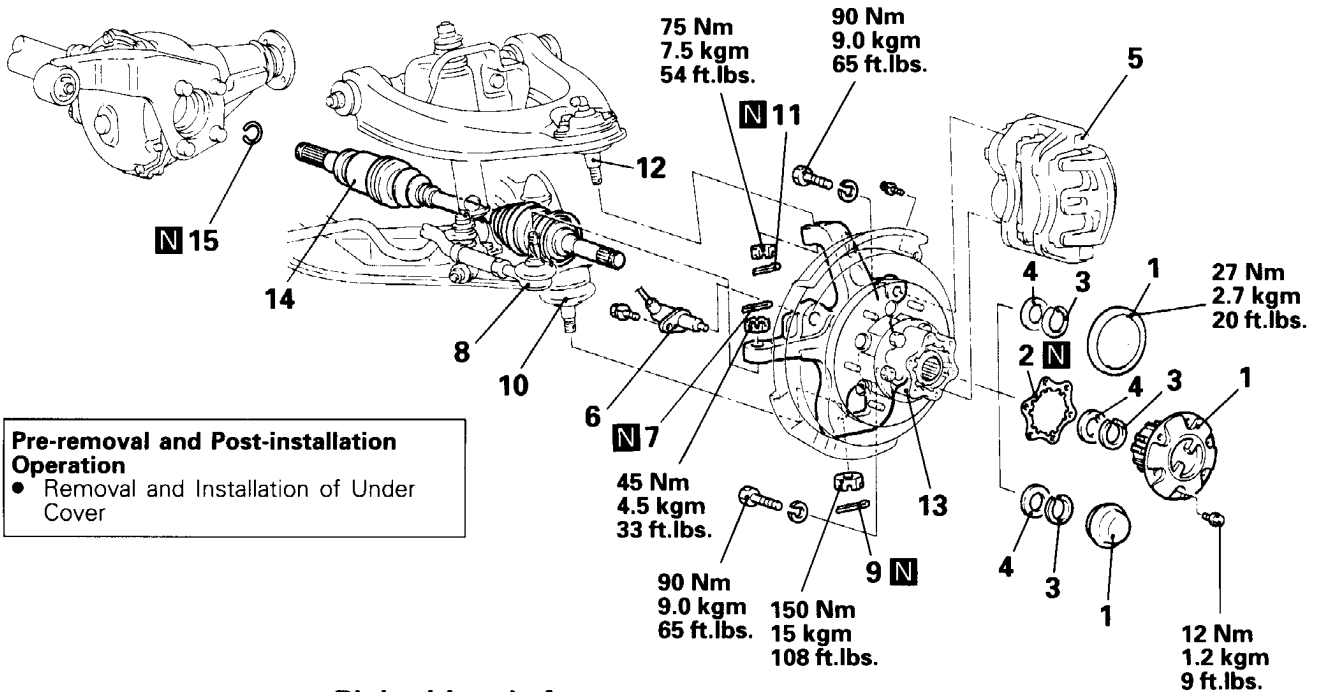
1. INSTALLATION OF OIL SEAL

DRIVE SHAFT

REMOVAL AND INSTALLATION

E26QA--

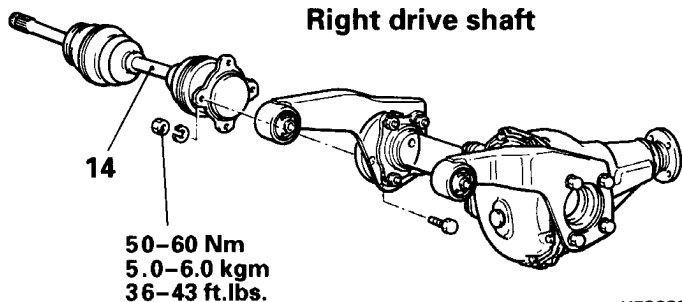
Left drive shaft



Pre-removal and Post-installation Operation

- Removal and Installation of Under Cover

Right drive shaft



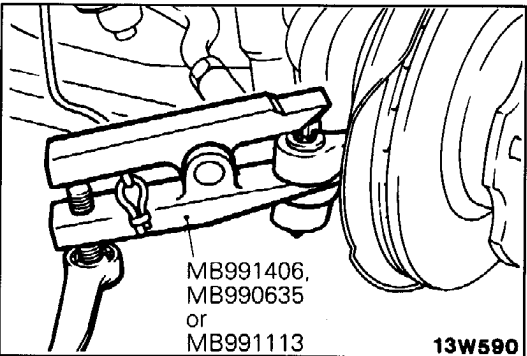
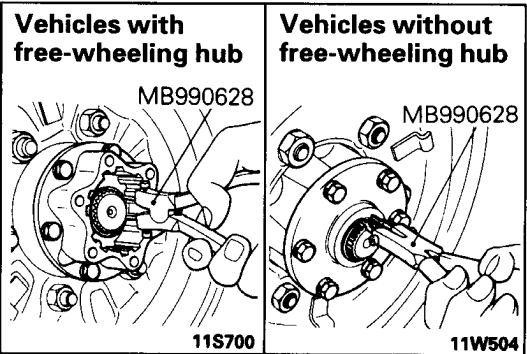
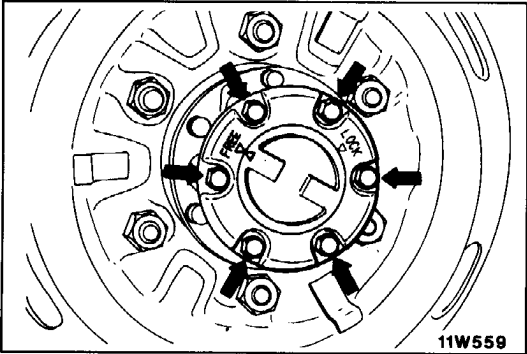
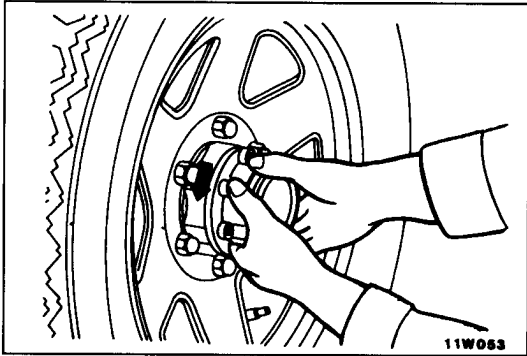
11E0150

11E0086

Sealant:
3M ATD Part No. 8661, No. 8663
or equivalent

Removal steps

- | | | | |
|---|---|---|--|
| ↔ | 1. Cover
<Automatic free-wheeling hub>
Free-wheeling hub cover
<Manual free-wheeling hub>
Hub cap
<Drive flange> | ↔ | 7. Split pin |
| ↔ | 2. Gasket (Manual free-wheeling hub) | ↔ | 8. Connection of tie rod assembly and knuckle |
| ↔ | 3. Snap ring | ↔ | 9. Split pin |
| ↔ | 4. Shim | ↔ | 10. Connection of lower ball joint and knuckle |
| ↔ | 5. Front brake assembly | ↔ | 11. Split pin |
| ↔ | 6. Speed sensor <Vehicles with ABS>
(Refer to GROUP 35 – Wheel Speed Sensor.) | ↔ | 12. Connection of upper ball joint and knuckle |
| | | ↔ | 13. Front hub and knuckle assembly |
| | | ↔ | 14. Drive shaft |
| | | ↔ | 15. Circlip |



SERVICE POINTS OF REMOVAL

E26IBAG

**1. REMOVAL OF COVER
<AUTOMATIC FREE-WHEELING HUB>**

- (1) Place the free-wheeling hub in the free condition.
NOTE
The free condition can be obtained by shifting the transfer shift lever to the 2H position and then moving in reverse for 1 to 2 meters (3.3 to 6.5 ft.).
- (2) Remove the automatic free-wheeling hub cover.

NOTE
When the cover cannot be loosened by hand, use an oil filter wrench with a protective cloth in between not to damage the cover.

**1. REMOVAL OF FREE-WHEELING HUB COVER
<MANUAL FREE-WHEELING HUB>**

- (1) Set the control handle to the FREE position.
- (2) Remove the free-wheeling hub cover.

3. REMOVAL OF SNAP RING

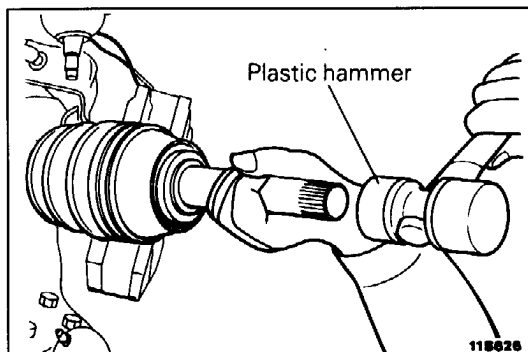
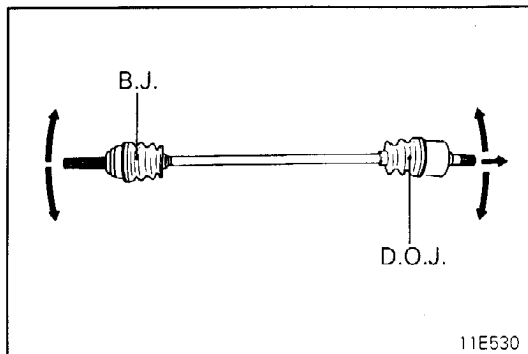
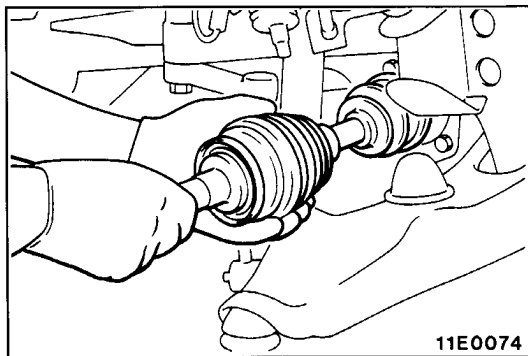
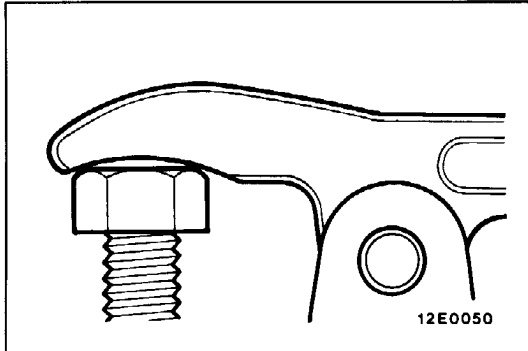
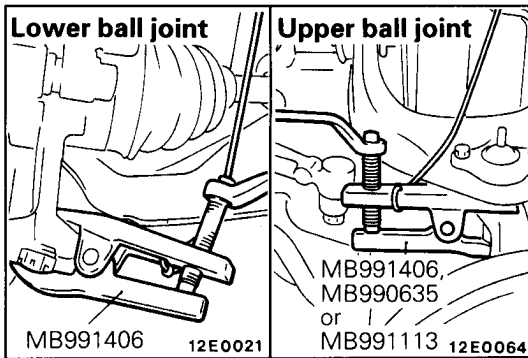
5. REMOVAL OF FRONT BRAKE ASSEMBLY

- (1) Remove the front brake assembly with the brake hose connected.
- (2) Use wire to suspend the front brake assembly from the upper arm so that the front brake assembly won't fall.

Caution
Do not twist the brake hose.

8. DISCONNECTION OF TIE ROD ASSEMBLY AND KNUCKLE

- Caution**
- 1. Use cord to bind the special tool closely so it won't become separated.
 - 2. The nut should be loosened only, not removed.



10. DISCONNECTION OF LOWER BALL JOINT AND KNUCKLE/12. UPPER BALL JOINT AND KNUCKLE

Caution

1. Support the lower arm with a jack when removing the knuckle from the lower ball joint or the upper ball joint.
2. After the knuckle has been removed, lower the jack slowly.

3. Insert the special tool securely.

14. REMOVAL OF DRIVE SHAFT

FOR LEFT DRIVE SHAFT

Caution

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

INSPECTION

E26QCAC

- Check ball joint for operating condition and excessive looseness.

SERVICE POINTS OF INSTALLATION

E26QDAG

14. INSTALLATION OF DRIVE SHAFT

FOR LEFT DRIVE SHAFT

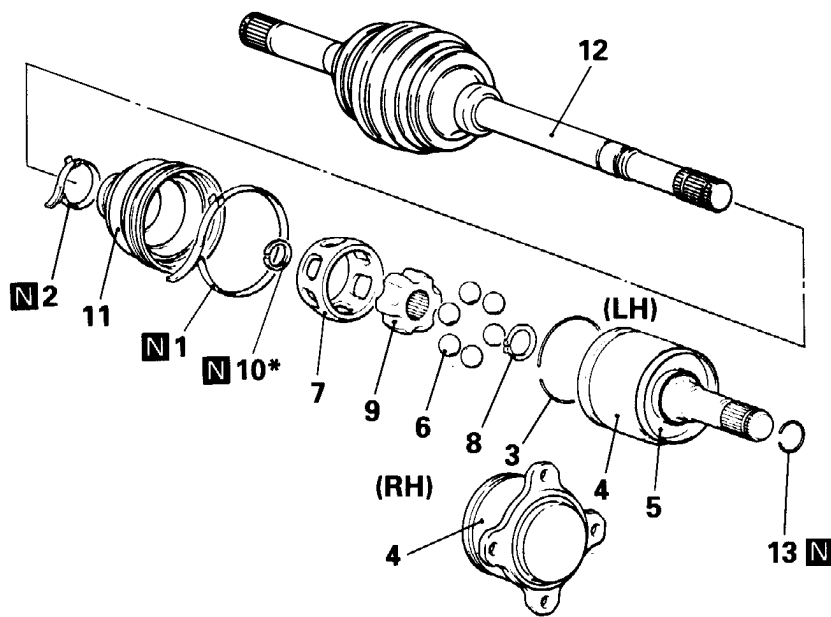
Caution

Be careful not to damage the lip of the oil seal. Replace the circlip which is attached to the B.J. side spline part with a new one.

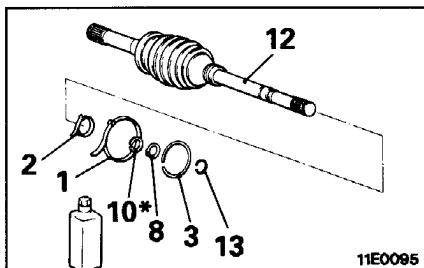
DISASSEMBLY AND REASSEMBLY

E26QE--

Left drive shaft

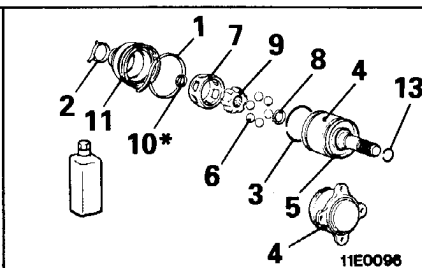


11E0078



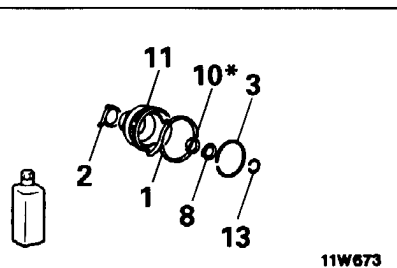
11E0095

B.J. repair kit LH



11E0096

D.O.J. repair kit



11W673

Boot repair kit (D.O.J.)

Disassembly steps

1. D.O.J. boot band (large)
2. D.O.J. boot band (small)
3. Circlip
4. D.O.J. outer race
5. Dust cover
6. Balls
7. D.O.J. cage
8. Snap ring
9. D.O.J. inner race
10. Circlip
11. D.O.J. boot
12. B.J. assembly
13. Circlip



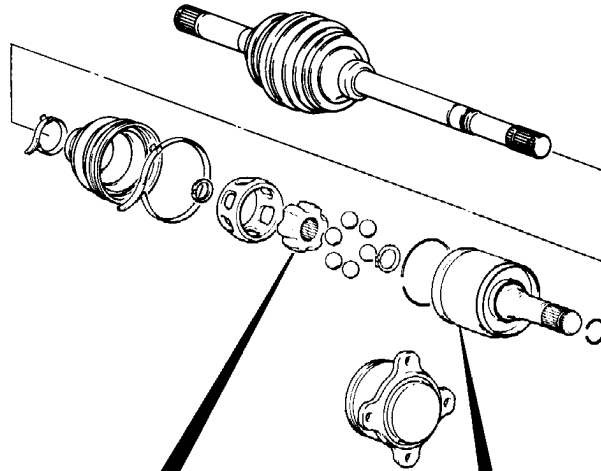
Reassembly steps

12. B.J. assembly
2. D.O.J. boot band (small)
11. D.O.J. boot
1. D.O.J. boot band (large)
7. D.O.J. cage
10. Circlip
9. D.O.J. inner race
8. Snap ring
6. Balls
4. D.O.J. outer race
3. Circlip
13. Circlip
5. Dust cover

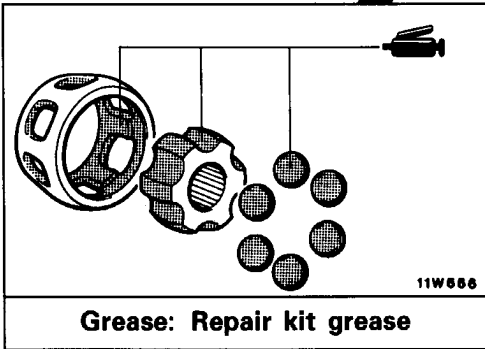


NOTE
*: 3000-M/T

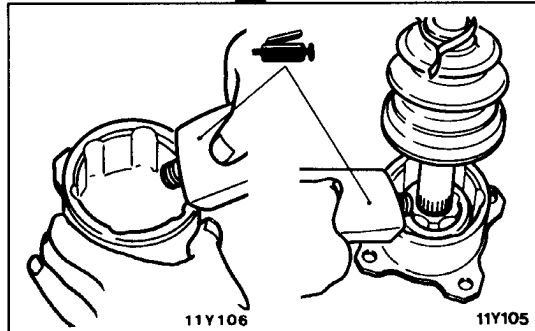
LUBRICATION POINTS



11E0078



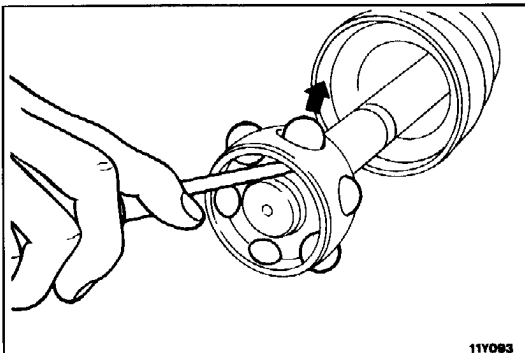
Grease: Repair kit grease



Grease: Repair kit grease
100 g (3.5 oz.)

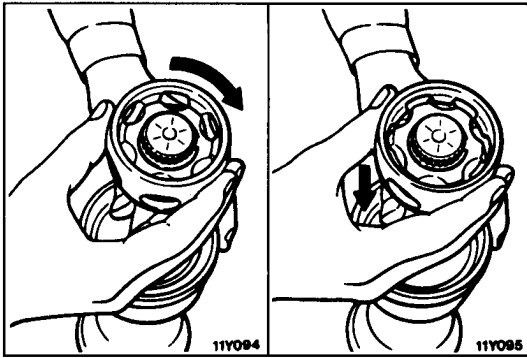
NOTE

The grease in the repair kit should be divided in half for use, respectively, at the joint and inside the boot.



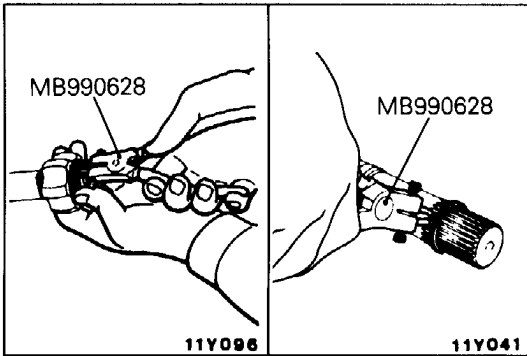
SERVICE POINTS OF DISASSEMBLY
6. REMOVAL OF BALLS

E26QFAK



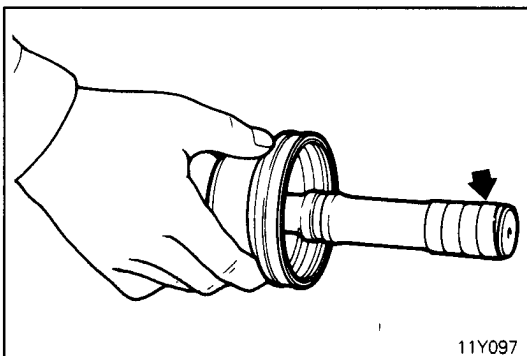
7. REMOVAL OF D.O.J. CAGE

Remove the D.O.J. cage from the D.O.J. inner race in the direction of the B.J.



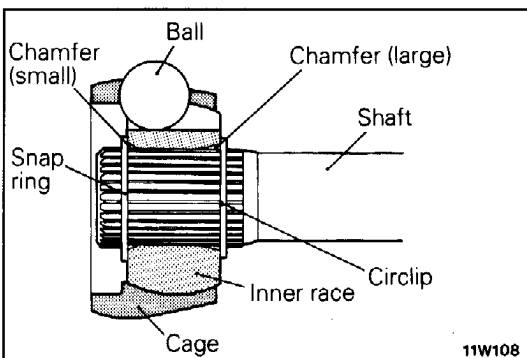
8. REMOVAL OF SNAP RING/10. CIRCLIP

- (1) Remove the snap ring from the drive shaft with special tool, and then withdraw the D.O.J. inner race and D.O.J. cage from the drive shaft.
- (2) Remove the circlip from the drive shaft with special tool.



11. REMOVAL OF D.O.J. BOOT

- (1) Wrap plastic tape around the spline part on the D.O.J. side of the drive shaft so that D.O.J. boot is not damaged when they are removed.
- (2) Withdraw the D.O.J. boot from the drive shaft.



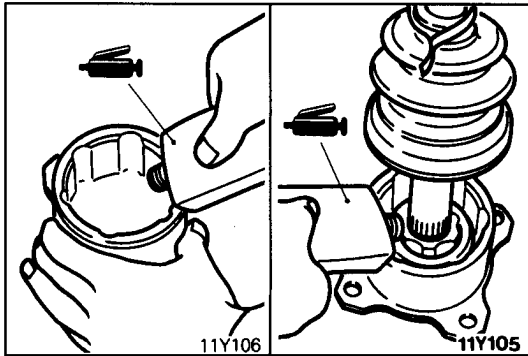
SERVICE POINTS OF REASSEMBLY

7. INSTALLATION OF D.O.J. CAGE/9. D.O.J. INNER RACE/8. SNAP RING/6. BALLS

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

Caution

For 3000-M/T, the inner race should be installed so that the large chamfer on the spline section is on the drive shaft side.



4. INSTALLATION OF D.O.J. OUTER RACE

- (1) Fill the inside of the D.O.J. outer race and D.O.J. boot with the specified grease.

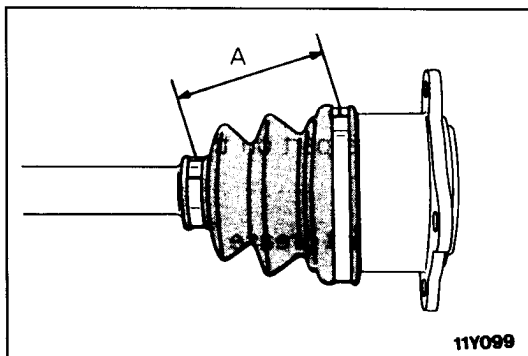
Specified grease: Repair kit grease 100g (3.5 oz.)

NOTE

The grease in the repair kit should be divided in half for use, respectively, at the joint and inside the boot.

Caution

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



- (2) Install the circlip onto the D.O.J. outer race. Place the D.O.J. boot over the D.O.J. outer race, and then use boot band (small) to secure the boot.

Caution

Do not secure the boot band (large).

- (3) Secure the driveshaft, and then move the D.O.J. outer race until it is at the position where the D.O.J. boot assembly dimension is the standard value.

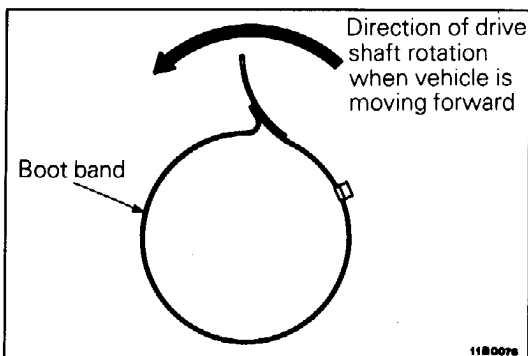
Standard value (A): 77–83 mm (3.03–3.27 in.)

- (4) Remove a part of the D.O.J. boot from the D.O.J. outer race and release the air within the boot.

- (5) Secure the boot band (large) on D.O.J. boot.

Caution

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



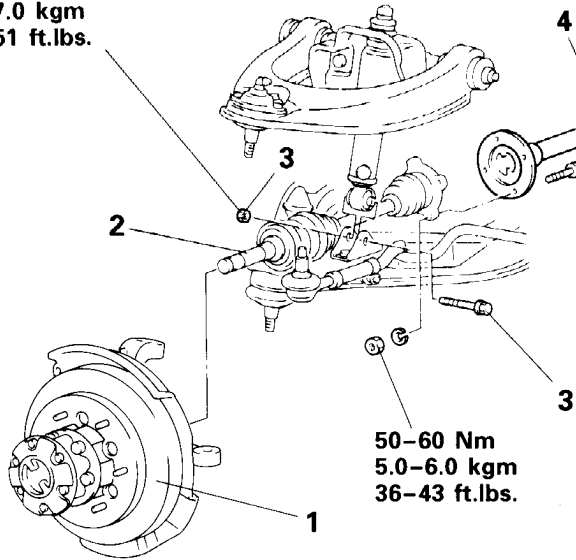
INNER SHAFT

REMOVAL AND INSTALLATION

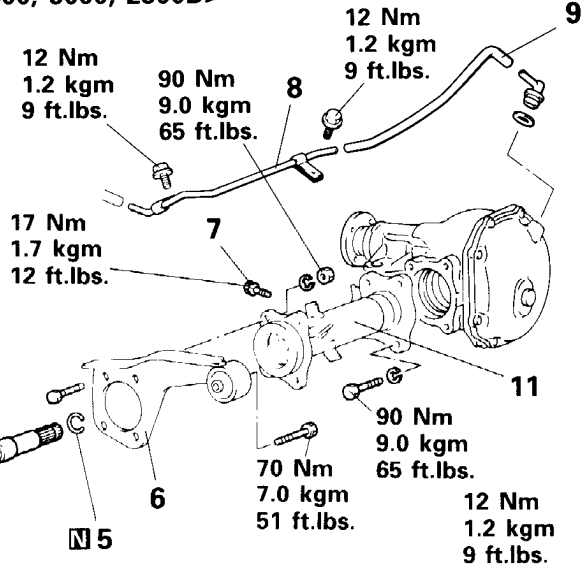
Pre-removal and Post-installation Operation
 • Removal and Installation of Under Cover

(Bolt head mark 10T)
 90–105 Nm
 9.0–10.5 kgm
 65–76 ft.lbs.

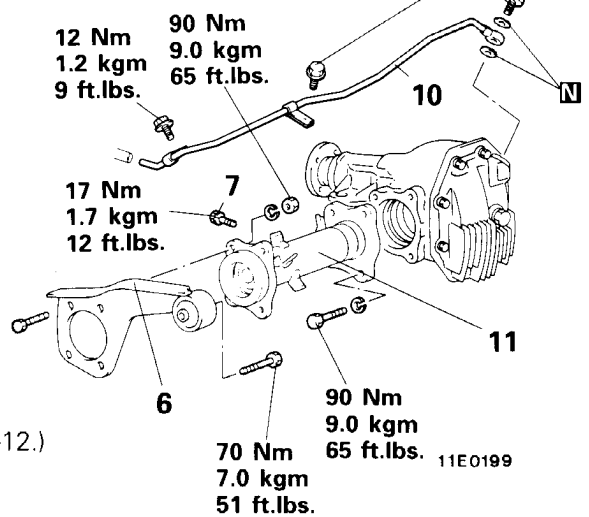
(Bolt head mark 8T)
 70 Nm
 7.0 kgm
 51 ft.lbs.



<2400, 3000, 2500D>

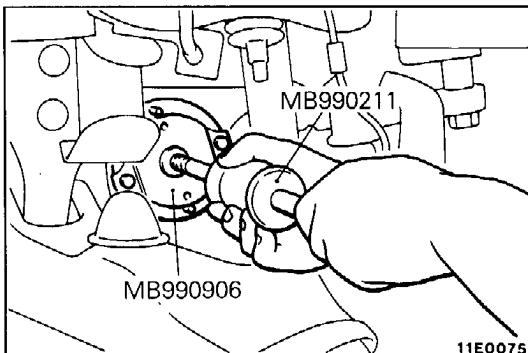


<3500, 2800D>



Removal steps

1. Front hub and knuckle assembly (Refer to P.26-12.)
2. Drive shaft assembly (R.H.) (Refer to P.26-26.)
3. Shock absorber lower mounting bolt and nut
4. Inner shaft
5. Circlip
6. Differential mounting bracket (R.H.)
7. Actuator mounting bolt <Super Select 4WD>
8. Breather pipe } <Vehicles built from
9. Breather hose } November, 1993>
10. Breather pipe
11. Housing tube



SERVICE POINTS OF REMOVAL

4. REMOVAL OF INNER SHAFT

Attach the special tools to the flange of the shaft, and pull the inner shaft out from the front differential carrier.

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.

SERVICE POINTS OF INSTALLATION

E26TDAD

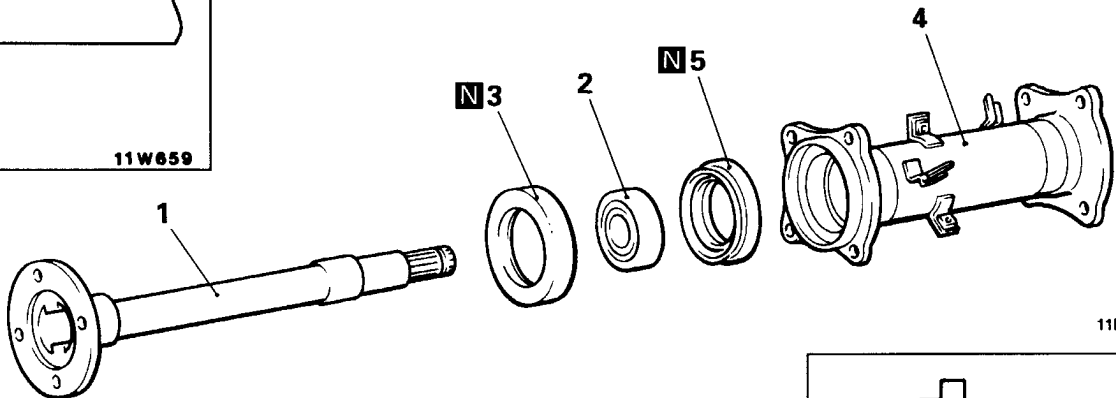
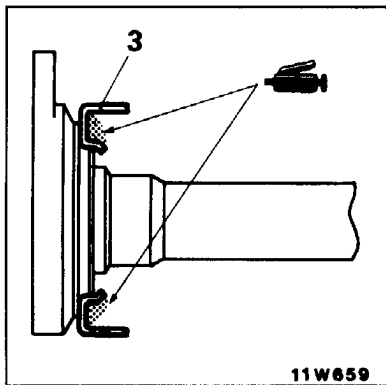
4. INSTALLATION OF INNER SHAFT

Drive the inner shaft into the front differential carrier by using the special tools (MB990906 and MB990211).

Caution

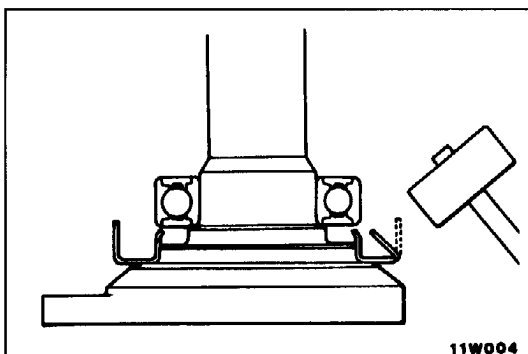
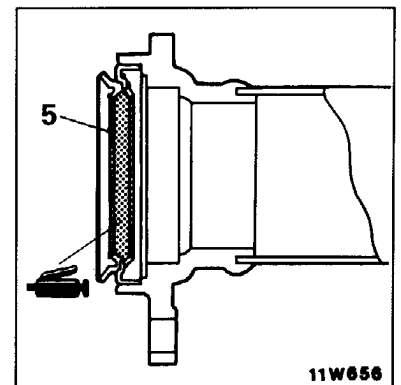
Be careful not to damage the lip of the dust seal and oil seal.

DISASSEMBLY AND REASSEMBLY



Disassembly steps

- ↔ 1. Inner shaft
- ➡ 2. Bearing
- ➡ 3. Dust cover
- ➡ 4. Housing tube
- ➡ 5. Dust seal

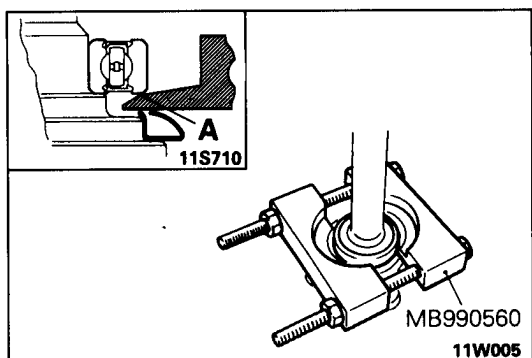


SERVICE POINTS OF DISASSEMBLY

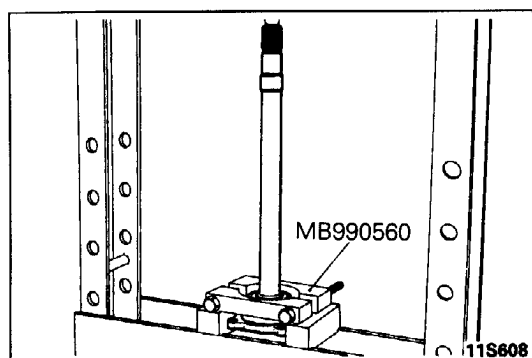
E26TFAC

2. REMOVAL OF BEARING

- (1) Bend the outside periphery of dust cover inward with a hammer.



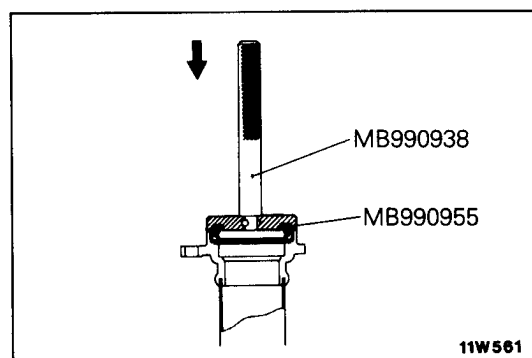
(2) After the special tool has been installed as shown, tighten the nut of the special tool until the portion "A" of the special tool touches the bearing outer race.



(3) Press out the inner shaft from the bearing.

Caution

Do not allow the inner shaft to drop.

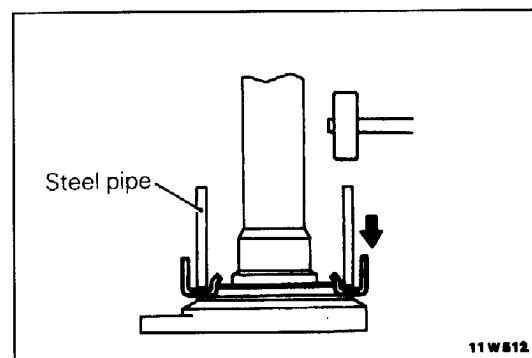


SERVICE POINTS OF REASSEMBLY

E26TGAC

5. INSTALLATION OF DUST SEAL

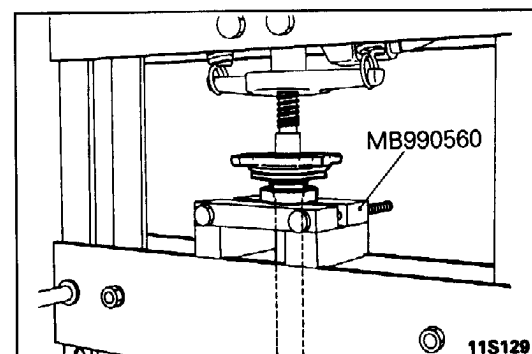
Press-fit the new dust seal into the housing tube by using the special tools, until it is flush with the housing tube end face.



3. INSTALLATION OF DUST COVER

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

Steel pipe	mm (in.)
Overall length	50 (1.7)
Outside diameter	75 (3.0)
Wall thickness	4 (0.2)



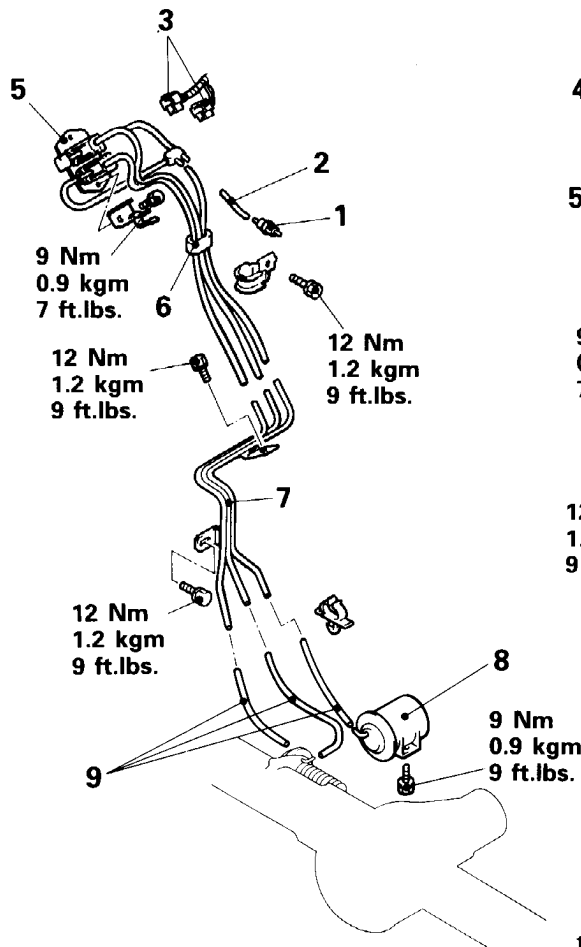
2. INSTALLATION OF BEARING

Using the special tool, force the bearing onto the inner shaft.

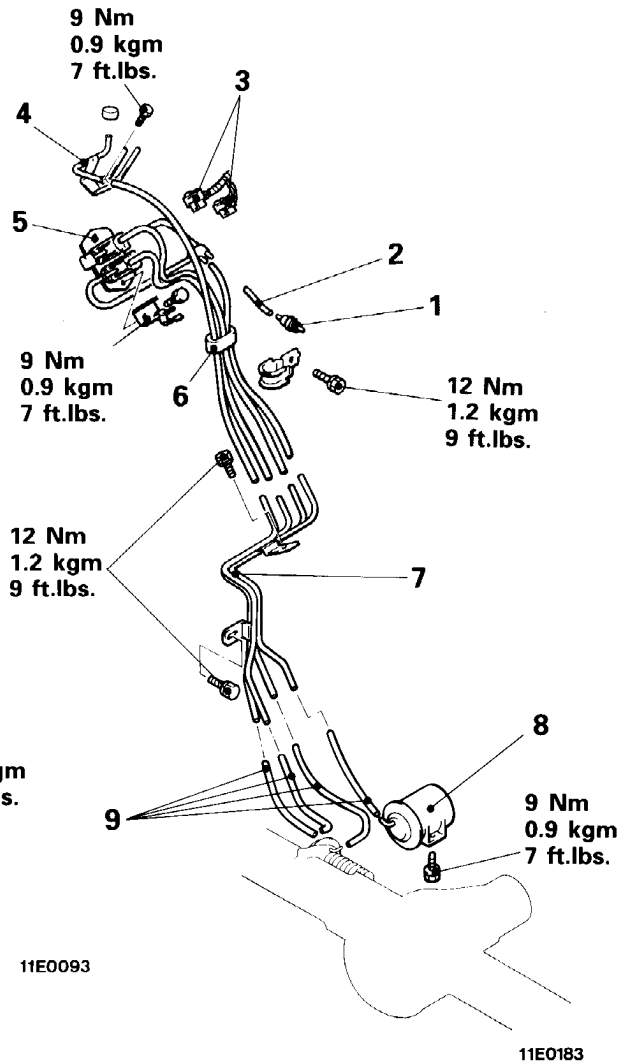
SOLENOID VALVE AND VACUUM HOSE

REMOVAL AND INSTALLATION

<Vehicles built up to October, 1993>

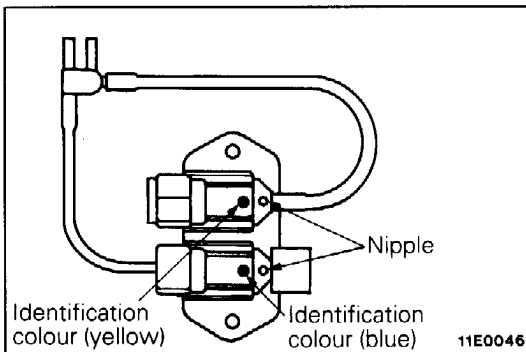


<Vehicles built from November, 1993>



Removal steps

1. Check valve
2. Vacuum hose
3. Solenoid valve connector
4. Vacuum pipe
- ◆◆ 5. Solenoid valve assembly
- ◆◆ 6. Vacuum hose
7. Vacuum pipe assembly
8. Vacuum tank
- ◆◆ 9. Vacuum hose



SERVICE POINTS OF INSTALLATION

9. INSTALLATION OF VACUUM HOSE

Install the vacuum hose so that the identification colours match those of the pipe assembly and the actuator. Furthermore, there are no identification colours on the vacuum hose at the vacuum tank connection.

6. INSTALLATION OF VACUUM HOSE/5. SOLENOID VALVE ASSEMBLY

Install the vacuum hose and solenoid valve assembly so that the colours of the identification marks are matched.

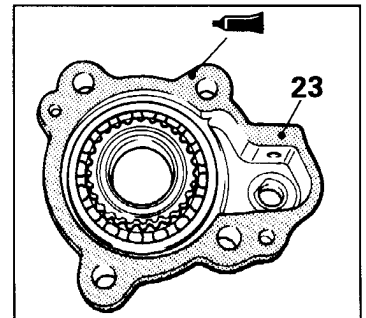
NOTES

DIFFERENTIAL CARRIER AND FREE-WHEELING CLUTCH

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operations

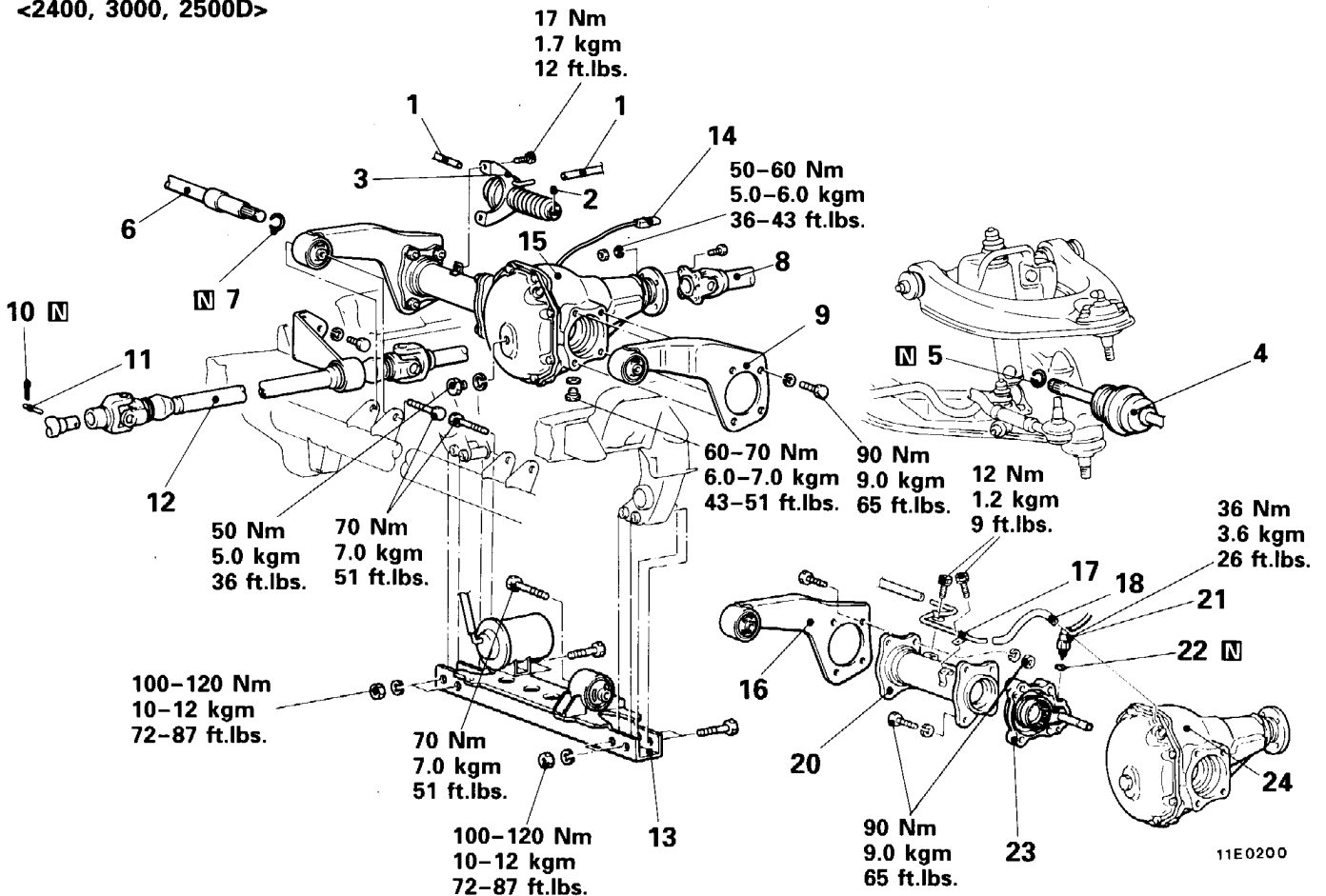
- (1) Removal and Installation of Under Cover
- (2) Draining and Supplying of Gear Oil (Refer to P.26-8.)



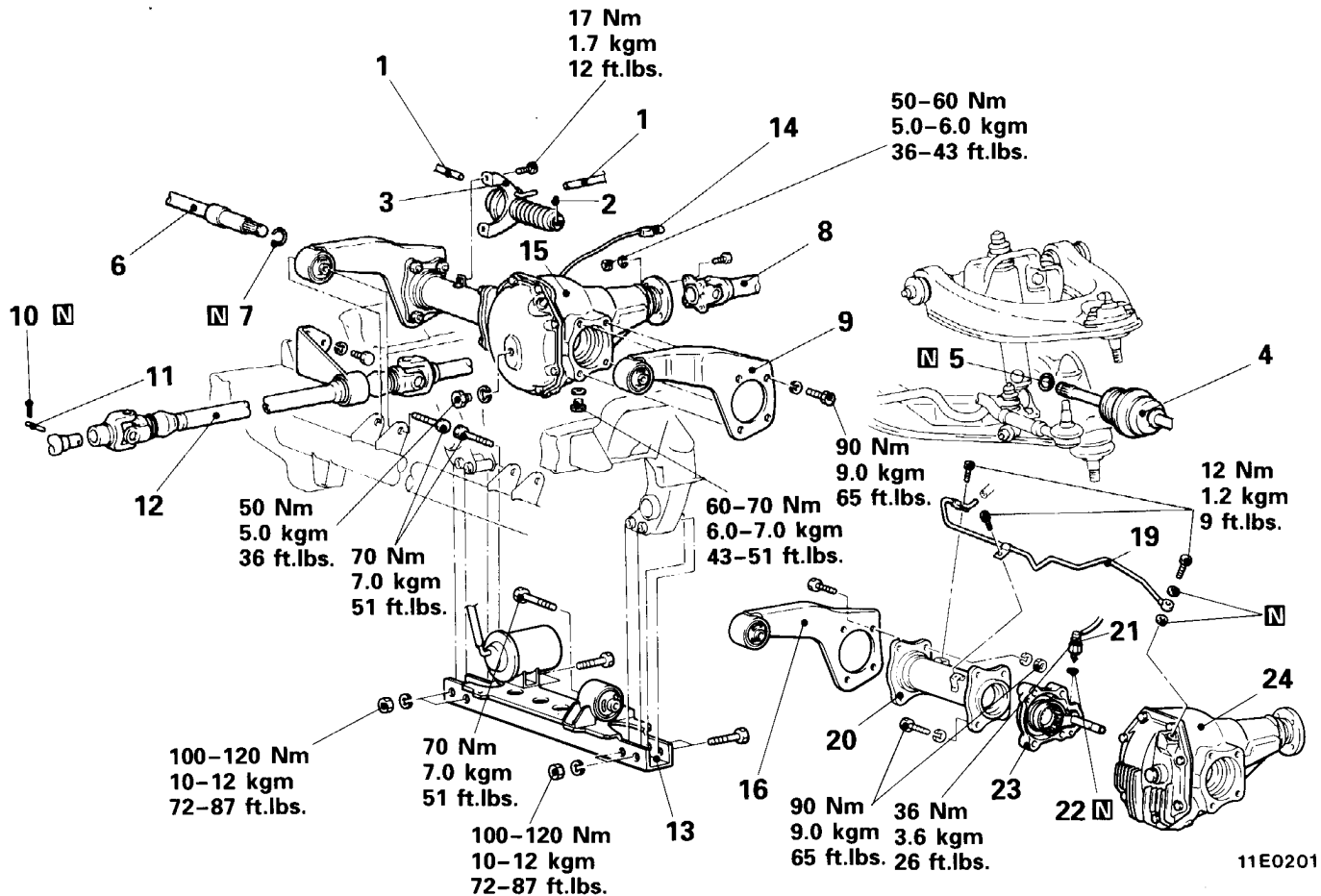
11E0058

Sealant: 3M ATD Part No. 8663, 8661 or equivalent

<2400, 3000, 2500D>



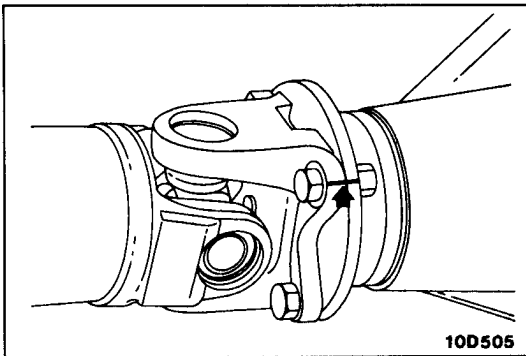
<3500, 2800D>



11E0201

Removal steps

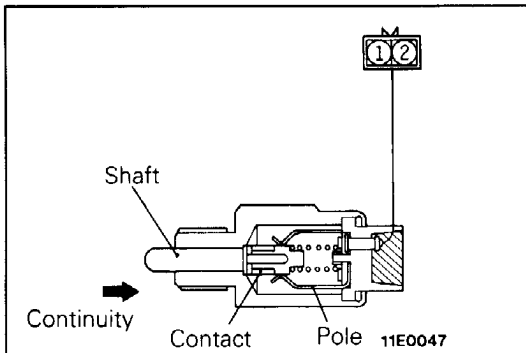
- ◆◆ 1. Vacuum hose
- 2. Pin
- 3. Actuator assembly
- 4. Drive shaft (Refer to P.26-26.)
- 5. Circlip
- 6. Inner shaft (Refer to P.26-33.)
- 7. Circlip
- ◆◆◆ 8. Connection for front propeller shaft
- 9. Differential mounting bracket (L.H.)
- 10. Split pin } <M/T>
- 11. Share pin }
- 12. Front shaft assembly
- 13. Front suspension crossmember
- 14. Free-wheeling engage switch connector
- 15. Front differential carrier assembly, housing tube and differential mounting bracket (R.H.)
- 16. Differential mounting bracket (R.H.)
- 17. Breather pipe } <Vehicles built from
- 18. Breather hose } November, 1993>
- 19. Breather pipe
- 20. Housing tube
- 21. Free-wheeling engage switch
- 22. Gasket
- ◆◆ 23. Free-wheeling clutch assembly
- 24. Front differential carrier assembly



SERVICE POINTS OF REMOVAL

8. REMOVAL OF FRONT PROPELLER SHAFT

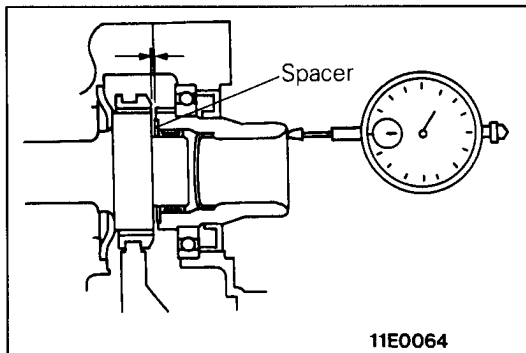
Install the front propeller shaft so that the mating marks of the flange yoke and the differential carrier companion flange are aligned.



INSPECTION

FREE-WHEEL ENGAGE SWITCH

The switch is normal if there is continuity when the shaft is pushed in, and no continuity when the shaft is released.



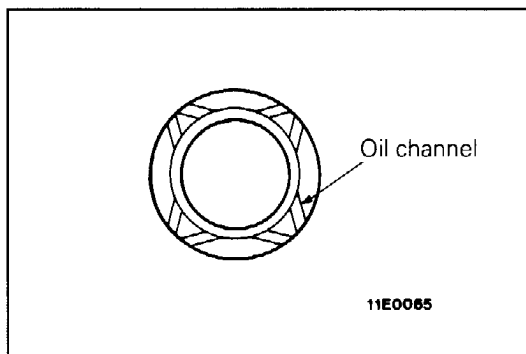
SERVICE POINTS OF INSTALLATION

23. INSTALLATION OF FREE-WHEELING CLUTCH ASSEMBLY

- (1) After installing the free-wheeling clutch assembly, select a spacer so that the clutch gear play (bearing looseness) is within the standard value.

Standard value: 0.05–0.40mm (0.0020–0.0160in.)

- (2) Install the spacer so that the oil channel side is on the differential gear side.



8. INSTALLATION OF FRONT PROPELLER SHAFT

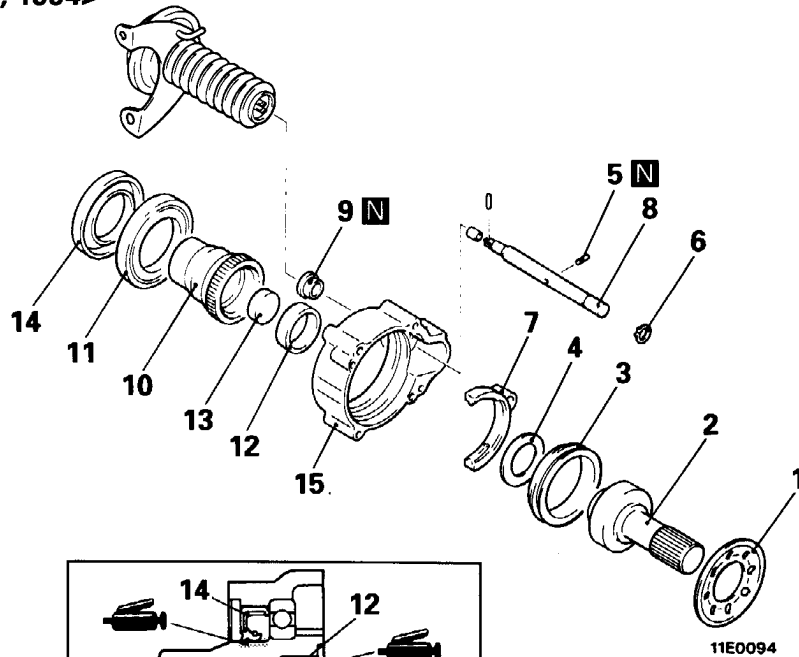
Install the front propeller shaft so that the mating marks of the flange yoke and the differential carrier companion flange are aligned.

1. INSTALLATION OF VACUUM HOSE

Install the vacuum hoses so that they match the identification colours of the actuator assembly nipple.

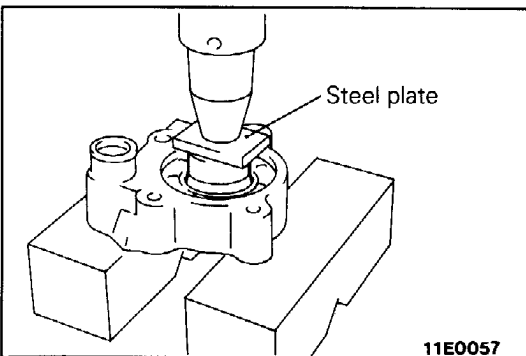
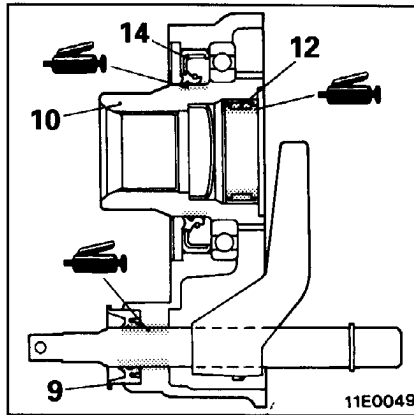
**FREE-WHEELING CLUTCH
DISASSEMBLY AND REASSEMBLY**

<Vehicles built up to May, 1994>



Removal steps

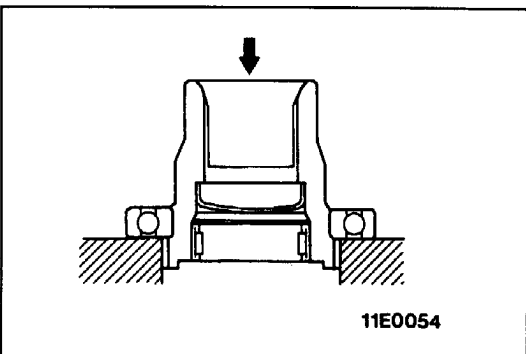
- ◆◆ 1. Thrust bushing
- ◆◆ 2. Main shaft
- ◆◆ 3. Clutch sleeve
- ◆◆ 4. Spacer
- ◆◆ 5. Spring pin
- ◆◆ 6. Snap ring
- ◆◆ 7. Shift fork
- ◆◆ 8. Shift rod
- ◆◆ 9. Oil seal
- ◆◆◆ 10. Clutch gear
- ◆◆◆ 11. Bearing
- ◆◆◆ 12. Needle bearing
- ◆◆◆ 13. Cap
- ◆◆◆ 14. Oil seal
- ◆◆◆ 15. Clutch housing



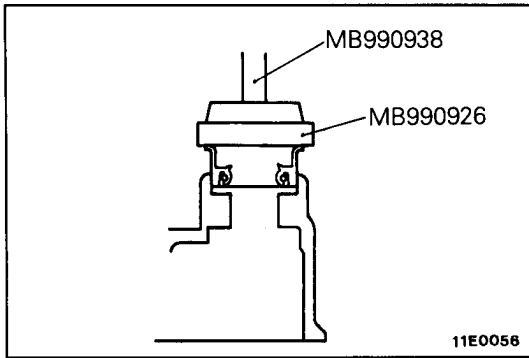
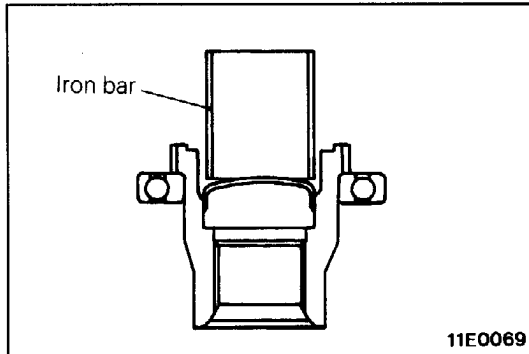
SERVICE POINTS OF DISASSEMBLY

10. REMOVAL OF CLUTCH GEAR/11. BEARING

- (1) Use a press and steel plate to remove the clutch gear and bearing together.



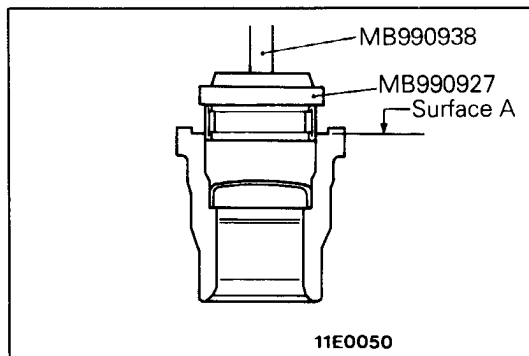
- (2) Use a press to hold the supports against the bearing inner race, and separate the clutch gear and bearing.

**SERVICE POINTS OF REASSEMBLY****14. INSTALLATION OF OIL SEAL****13. INSTALLATION OF CAP**

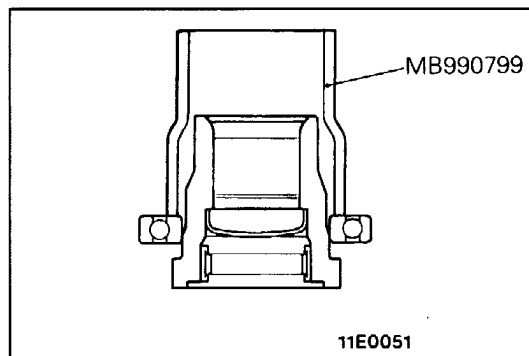
Use an iron bar with an outside diameter of approximately 30–35 mm (1.18–1.38 in.) to push in the sealing cap.

Caution

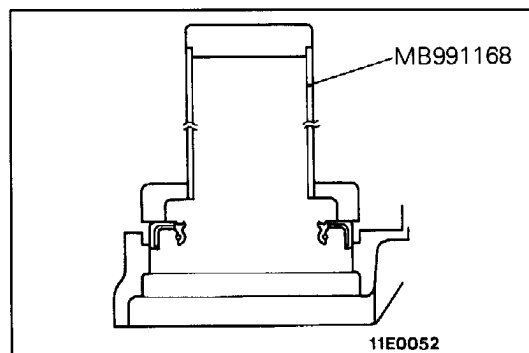
Be careful not to make a dent in the curved surface of the cylinder cap.

**12. INSTALLATION OF NEEDLE BEARING**

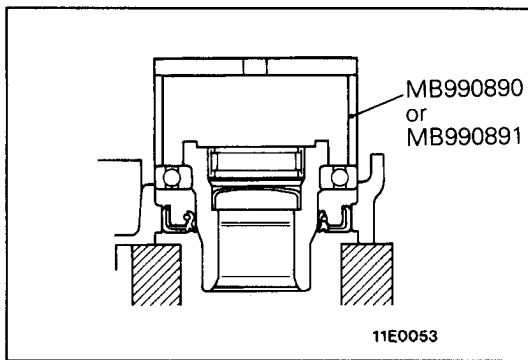
Use the special tools to press-fit the clutch cap until it is flush with surface A of the clutch gear.

**11. INSTALLATION OF BEARING/10. CLUTCH GEAR/9. OIL SEAL**

(1) Use the special tool to press-fit the bearing to the shoulder of the clutch gear.



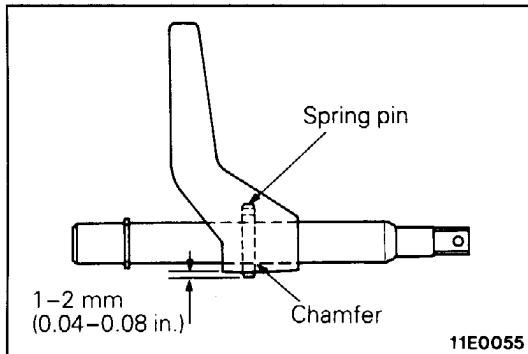
(2) Use the special tool to tap the oil seal until it is flush with the clutch housing.



(3) Use the special tool to press-fit the bearing to the side of the clutch housing.

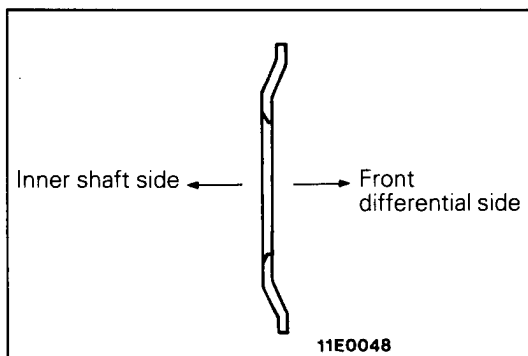
Caution

Place the special tool against the outer race of the bearing.



5. INSTALLATION OF SPRING PIN

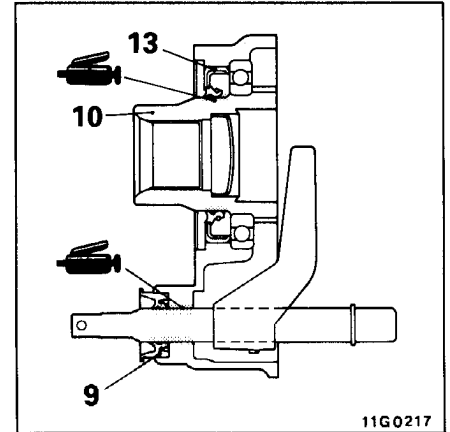
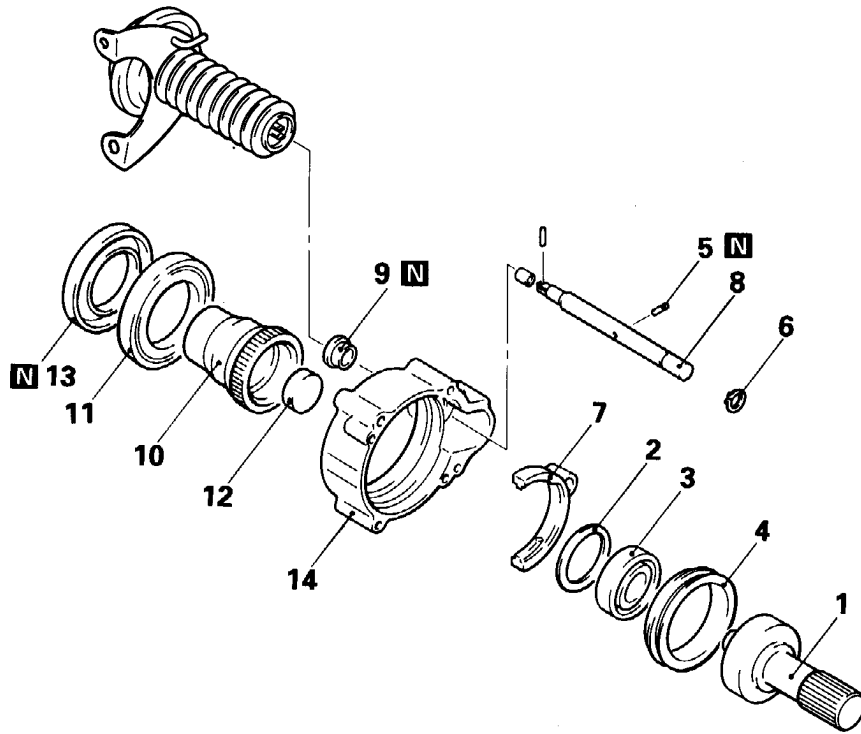
Tap the spring pin from the chamfered side of the shift rod until the projection length is at the length shown in the illustration.



1. INSTALLATION OF THRUST BUSHING

Install the thrust bushing in the direction shown in the illustration.

<Vehicles built from June, 1994>



11G0217

11G0222

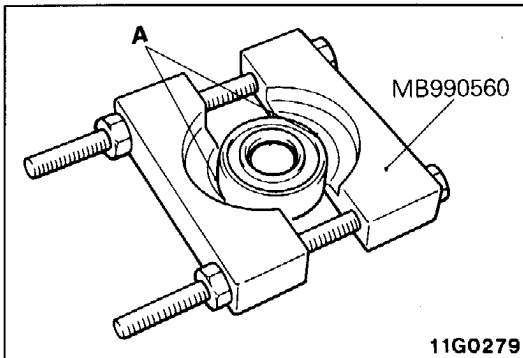
Removal steps

- | | | | | | |
|----|------------------|----|--|----|--------------------|
| ◄◄ | 1. Main shaft | | | | |
| ◄◄ | 2. Spacer | ◄◄ | | | |
| ◄◄ | 3. Bearing | ◄◄ | | ◄◄ | 8. Shift rod |
| ◄◄ | 4. Clutch sleeve | ◄◄ | | ◄◄ | 9. Oil seal |
| ◄◄ | 5. Spring pin | ◄◄ | | ◄◄ | 10. Clutch gear |
| | 6. Snap ring | ◄◄ | | ◄◄ | 11. Bearing |
| | 7. Shift fork | ◄◄ | | ◄◄ | 12. Cap |
| | | | | ◄◄ | 13. Oil seal |
| | | | | ◄◄ | 14. Clutch housing |

SERVICE POINTS OF DISASSEMBLY

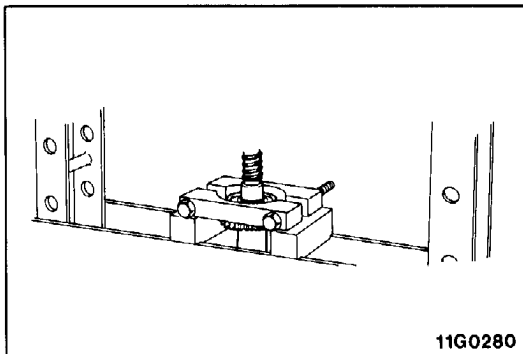
1. REMOVAL OF MAIN SHAFT / 3. BEARING

(1) Install the special tool as shown in the figure and tighten the nut of the special tool until the portion "A" touches the bearing outer race.

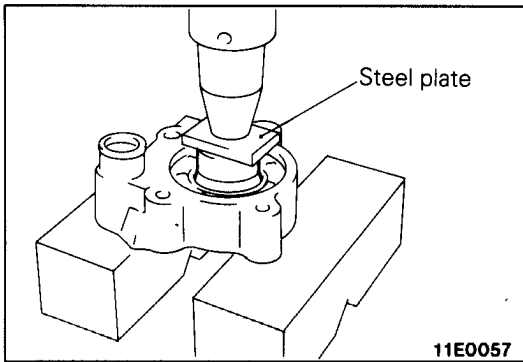


11G0279

(2) Remove the bearing from the main shaft with a press.

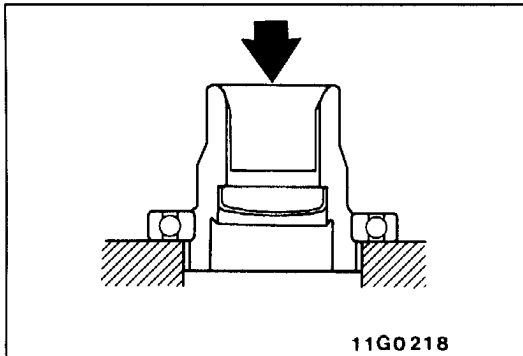


11G0280

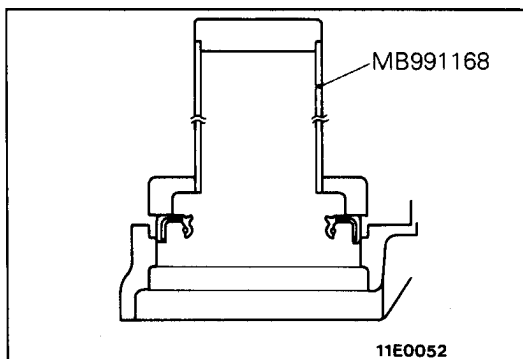


10. REMOVAL OF CLUTCH GEAR / 11. BEARING

(1) Use a press and steel plate to remove the clutch gear and bearing together.



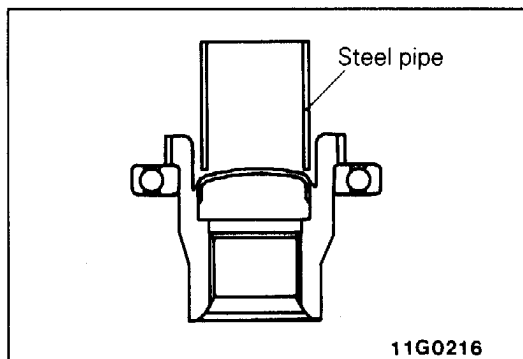
(2) Use a press to hold the supports against the bearing inner race, and separate the clutch gear and bearing.



SERVICE POINTS OF REASSEMBLY

13. INSTALLATION OF OIL SEAL

Use the special tool to tap the oil seal until it is flush with the clutch housing.

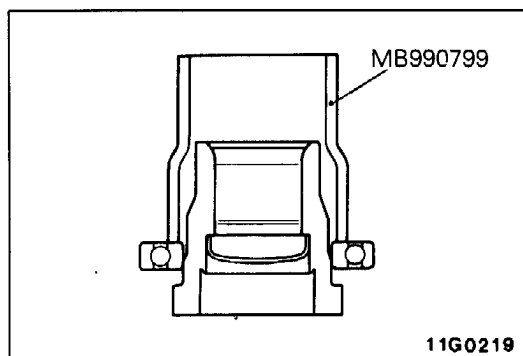


12. INSTALLATION OF CAP

Use a steel pipe with an outside diameter of approximately 30 – 35 mm (1.18 – 1.38 in.) to push in the sealing cap.

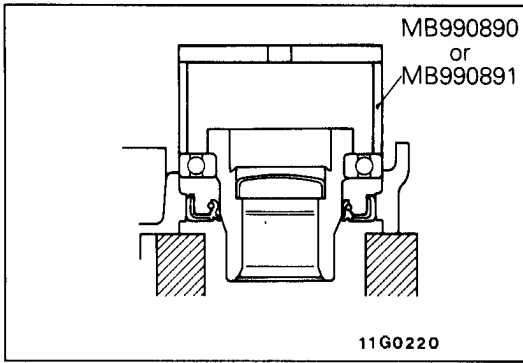
Caution

Be careful not to make a dent in the curved surface of the cylinder cap.



11. INSTALLATION OF BEARING / 10. CLUTCH GEAR

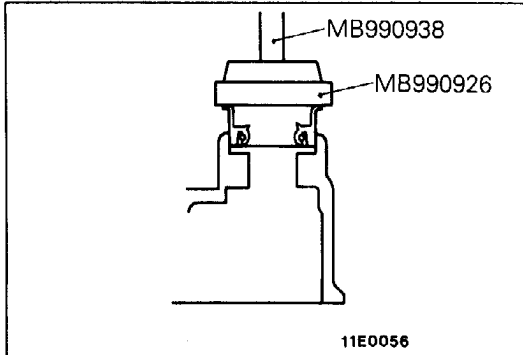
(1) Use the special tool to press-fit the bearing to the shoulder of the clutch gear.



- (2) Use the special tool to press-fit the bearing to the side of the clutch housing.

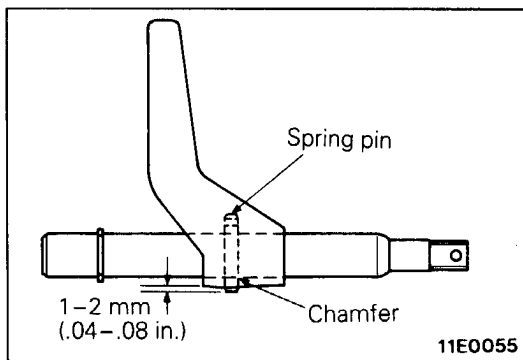
Caution

Place the special tool against the outer race of the bearing.



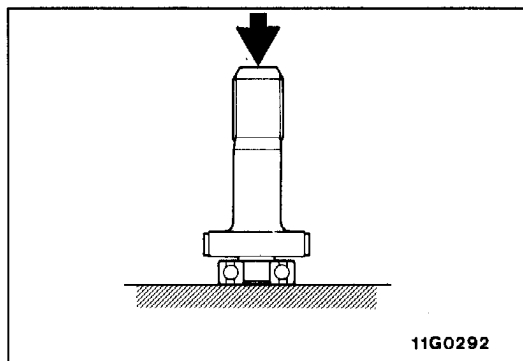
9. INSTALLATION OF OIL SEAL

Use the special tool to tap the oil seal.



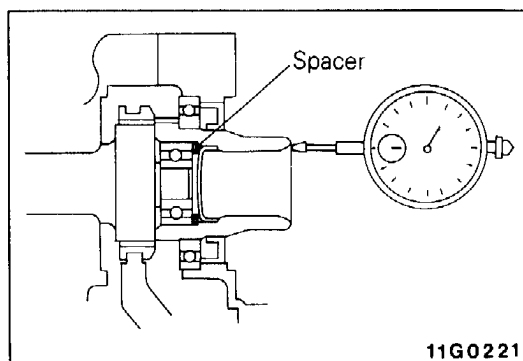
5. INSTALLATION OF SPRING PIN

Tap the spring pin from the chamfered side of the shift rod until the projection length is at the length shown in the illustration.



3. INSTALLATION OF BEARING

Press in the bearing up to the shoulder of the main shaft.



2. INSTALLATION OF SPACER

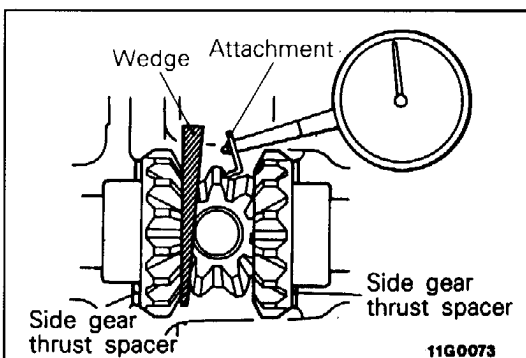
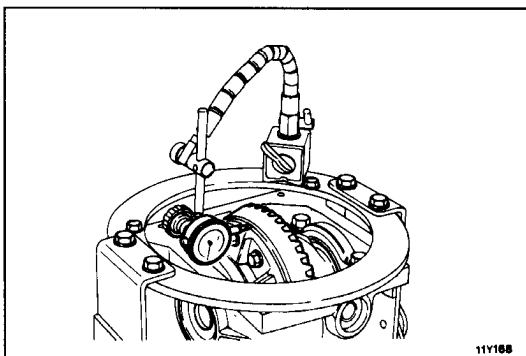
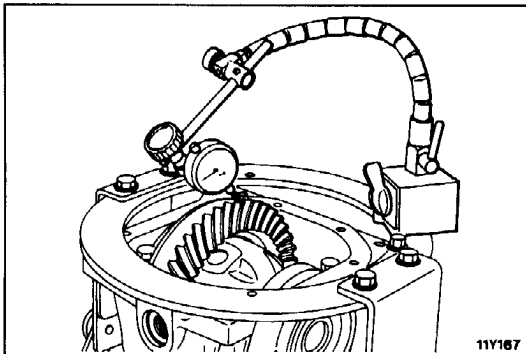
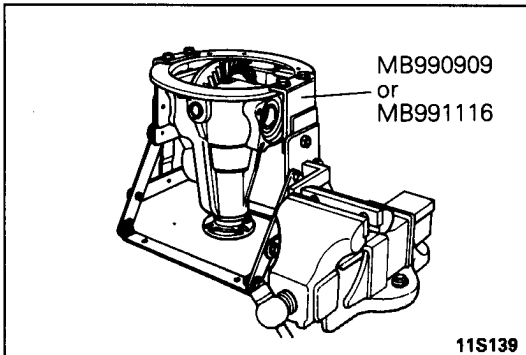
- (1) Install the free-wheeling clutch and then select a spacer so that the axial play of the clutch gear (bearing play) is within the standard value.

Standard value: 0.05 – 0.30 mm (0.0020 – 0.0120 in.)

- (2) If the axial play is not within the standard value, disassemble the clutch and select a spacer again.

NOTE

Spacer thickness is every 0.25 mm (0.010 in.).



DIFFERENTIAL CARRIER

E26WCAC

INSPECTION BEFORE DISASSEMBLY

Remove the cover and gasket. Hold the special tool in a vise, and install the differential carrier assembly to the special tool.

FINAL DRIVE GEAR BACKLASH

Check the final drive gear backlash by following the steps below.

- (1) With the drive pinion locked in place, measure the final 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 (0.0043–0.0063 in.)

- (2) If the backlash is not within the standard value, adjust it by using the side bearing adjustment spacers.

DRIVE GEAR RUNOUT

Check the drive gear runout by following the steps below.

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

Limit: 0.05 mm (0.0020 in.)

- (2) If the runout exceeds the limit, check for improper tightening of the drive gear and differential case.

DIFFERENTIAL GEAR BACKLASH

<EXCLUDING 4 PINION DIFFERENTIAL>

Check the differential gear backlash by following the steps below.

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

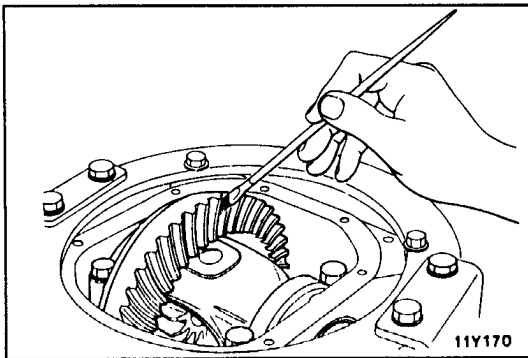
NOTE

The measurement should be made for both pinion gears individually.

Standard value: 0–0.076 mm (0–0.0030 in.)

Limit: 0.2 mm (0.0079 in.)

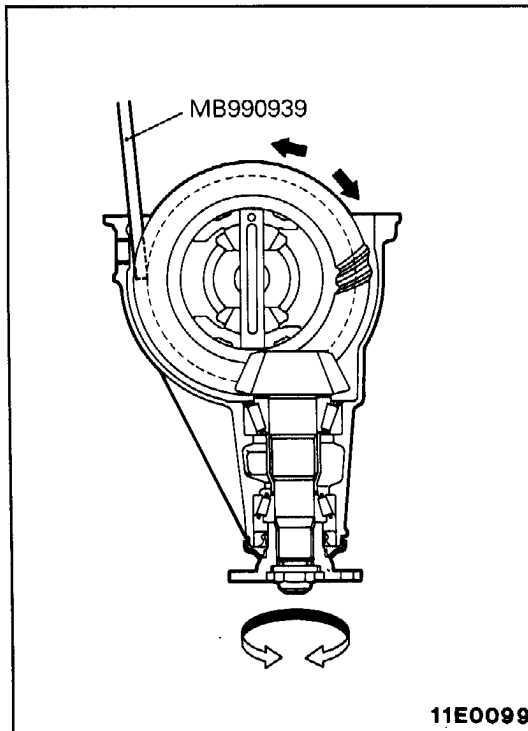
- (2) If the backlash exceeds the limit, adjust by using the side gear thrust spacers.



FINAL DRIVE GEAR TOOTH CONTACT

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

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



- (2) Insert a brass rod 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 2.5–3.0 Nm (25–30 kgcm, 28–33 in.lbs.)] is applied to the drive pinion.

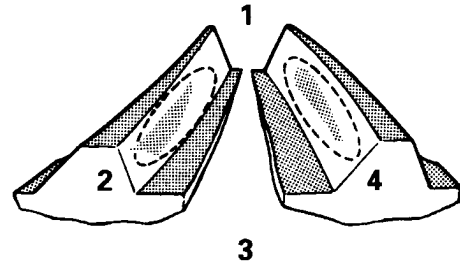
Caution

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

- (3) Check the tooth-contact condition of the drive gear and drive pinion.

Standard tooth contact pattern

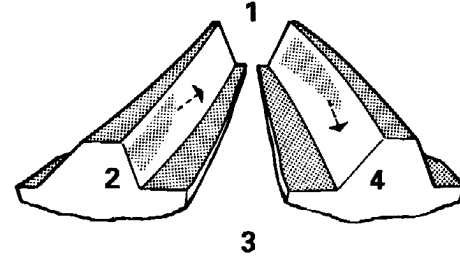
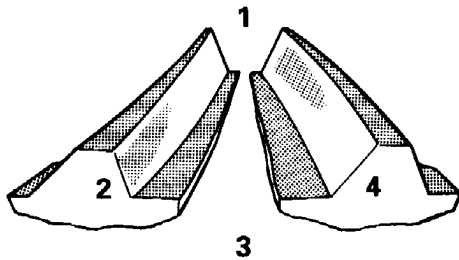
- 1 Narrow tooth side
- 2 Drive-side tooth surface (the side applying power during forward movement)
- 3 Wide tooth side
- 4 Coast-side tooth surface (the side applying power during reverse movement)



Problem

Solution

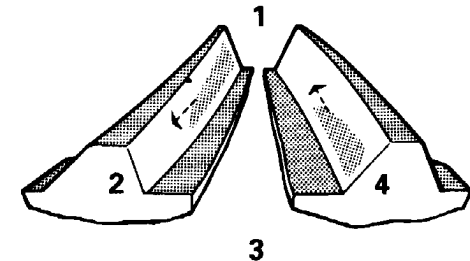
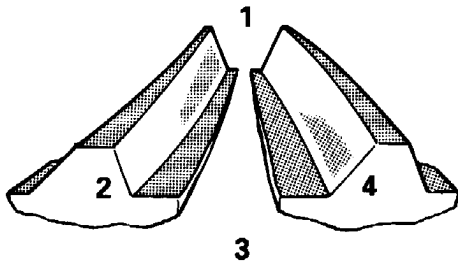
Tooth contact pattern resulting from excessive pinion height



The drive pinion is positioned too far from the centre of the drive gear.

Increase the thickness of the pinion height adjusting shim, and position the drive pinion closer to the centre 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



The drive pinion is positioned too close to the centre of the drive gear.

Decrease the thickness of the pinion height adjusting shim, and position the drive pinion farther from the centre of the drive gear. Also, for backlash adjustment, position the drive gear closer to the drive pinion.

11S642

NOTE

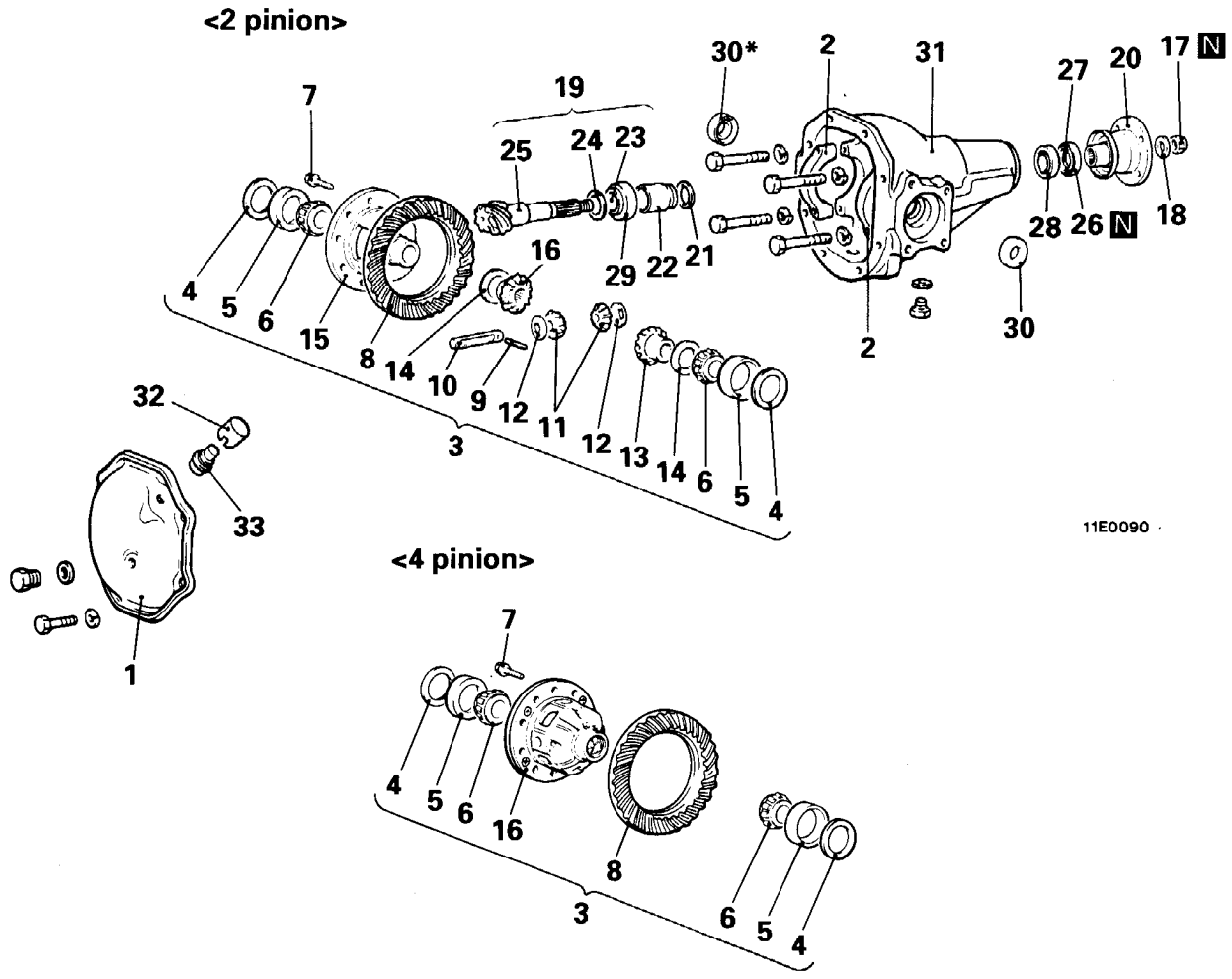
Checking the tooth contact pattern is the way to confirm that the adjustments of the pinion height and backlash have been done properly. Continue to adjust the pinion height and backlash until the tooth contact pattern resembles the standard pattern.

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.

DISASSEMBLY

Inspection before Disassembly

- Final Drive Gear Backlash
 - Drive Gear Runout
 - Differential Gear Backlash <excluding 4 pinion>
 - Final Drive Gear Tooth Contact
- } Refer to P.26-41.



Disassembly steps

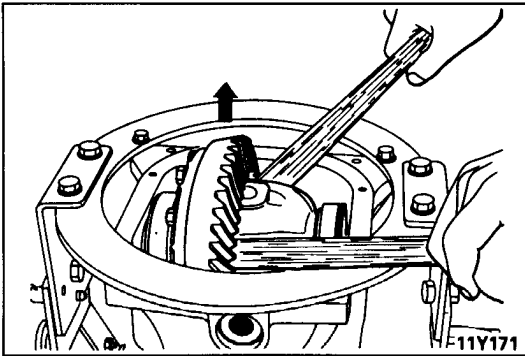
- 1. Cover
- 2. Bearing cap
- ↔ 3. Differential case assembly
- ↔ 4. Side bearing adjusting spacer
- ↔ 5. Side bearing outer race
- ↔ 6. Side bearing inner race
- 7. Bolt (10)
- ↔ 8. Drive gear
- ↔ 9. Lock pin
- 10. Pinion shaft
- 11. Pinion gear
- 12. Pinion washer
- 13. Side gear
- 14. Side gear thrust spacer
- 15. Differential case
- 16. 4 pinion case assembly
- ↔ 17. Companion flange self-locking nut
- 18. Washer
- ↔ 19. Drive pinion assembly

- 21. Drive pinion rear shim (for preload adjustment)
- 22. Drive pinion spacer
- ↔ 20. Companion flange
- ↔ 23. Drive pinion front bearing inner race
- 24. Drive pinion front shim (for pinion height adjustment)
- 25. Drive pinion
- 27. Drive pinion rear bearing inner race
- 26. Oil seal
- ↔ 28. Drive pinion rear bearing outer race
- ↔ 29. Drive pinion front bearing outer race
- 30. Oil seal
- 31. Gear carrier
- 32. Plug cover
- 33. Vent plug

NOTE
*: Part Time 4WD

SERVICE POINTS OF DISASSEMBLY

E26WFAD



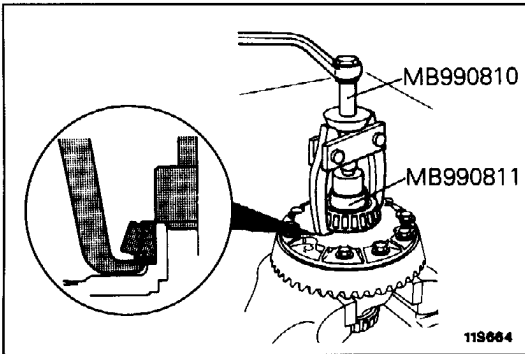
3. REMOVAL OF DIFFERENTIAL CASE ASSEMBLY

Caution

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

NOTE

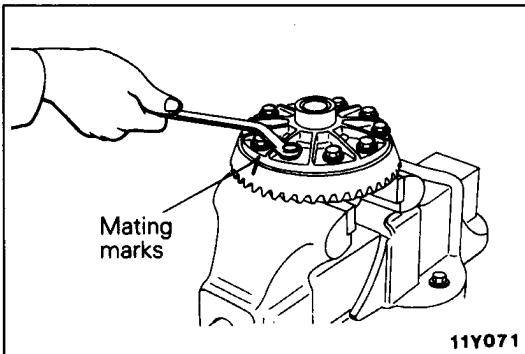
Keep the right and left side bearings and side bearing adjusting spacers separate, so that they do not become mixed at the time of reassembly.



6. REMOVAL OF SIDE BEARING INNER RACE

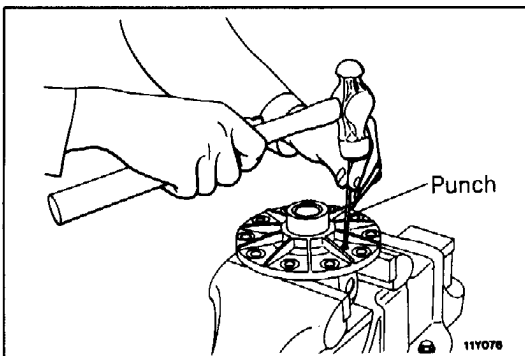
NOTE

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

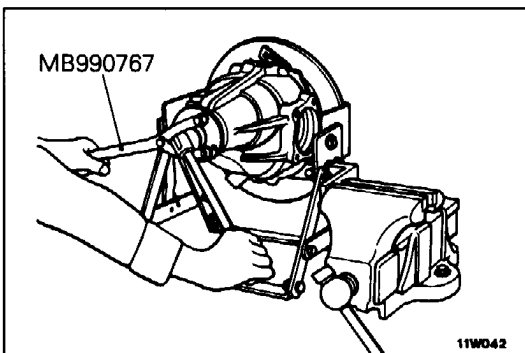


8. REMOVAL OF DRIVE GEAR

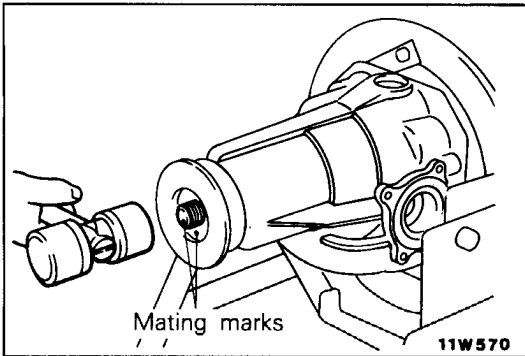
- (1) Make the mating marks to the differential case and the drive gear.
- (2) Loosen the drive gear attaching bolts in diagonal sequence to remove the drive gear.



9. REMOVAL OF LOCK PIN



17. REMOVAL OF COMPANION FLANGE SELF-LOCKING NUT

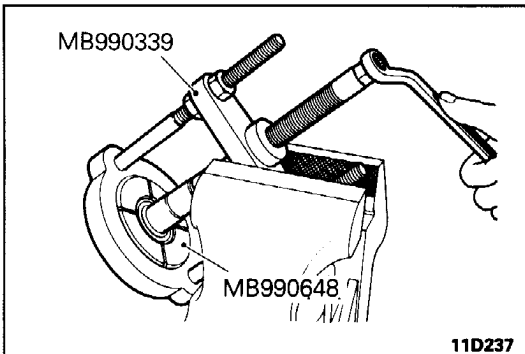
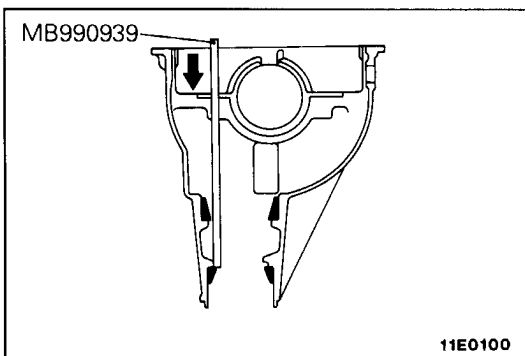
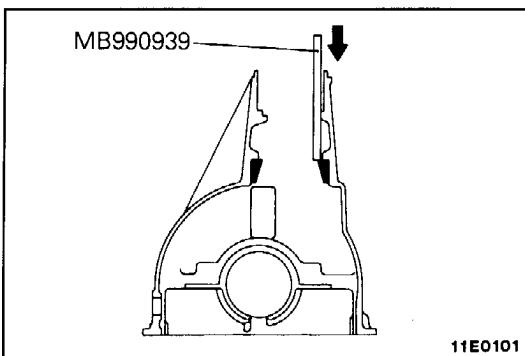
**19. REMOVAL OF DRIVE PINION ASSEMBLY**

- (1) Make mating marks on the drive pinion and companion flange.

Caution

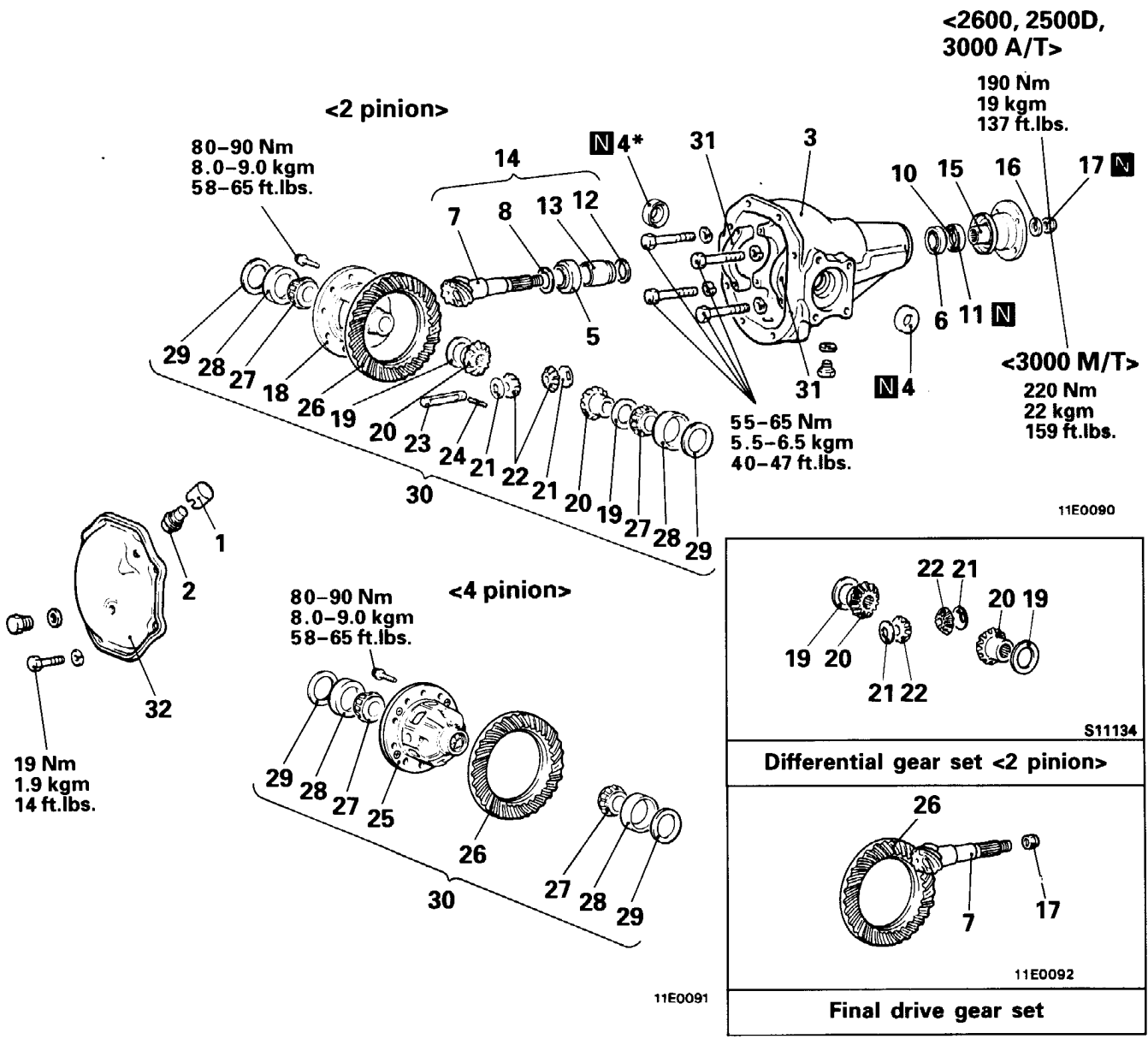
The mating mark made on the companion flange must not be on the coupling surface of the flange yoke and the front propeller shaft.

- (2) Drive out the drive pinion together with the drive pinion spacer and drive pinion shims.

**23. REMOVAL OF DRIVE PINION FRONT BEARING INNER RACE****28. REMOVAL OF DRIVE PINION REAR BEARING OUTER RACE****29. REMOVAL OF DRIVE PINION FRONT BEARING OUTER RACE**

REASSEMBLY

E26WP--



11E0090

S11134

11E0092

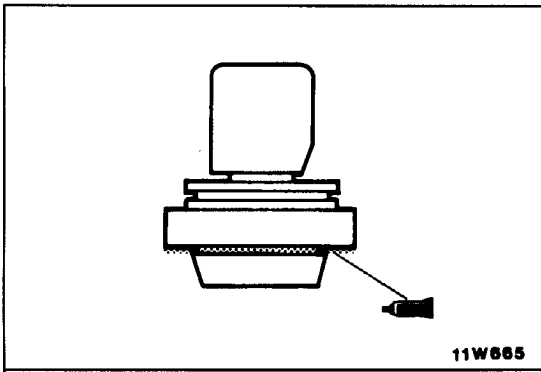
11E0091

Reassembly steps

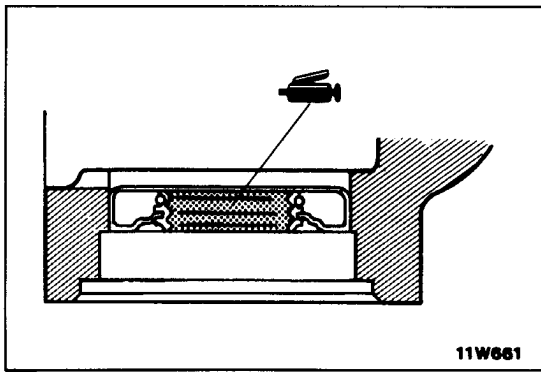
- 1. Vent plug
- 2. Plug cover
- 3. Gear carrier
- ◆◆ 4. Oil seal
- ◆◆ 5. Drive pinion front bearing outer race
- ◆◆ 6. Drive pinion rear bearing outer race
- ◆◆ • Adjustment of pinion height
- 7. Drive pinion
- 8. Drive pinion front shim (for pinion height adjustment)
- 9. Drive pinion front bearing inner race
- ◆◆ • Adjustment of drive pinion turning torque
- 10. Drive pinion rear bearing inner race
- 11. Oil seal
- 12. Drive pinion rear shim (for turning torque adjustment)
- 13. Drive pinion spacer
- 14. Drive pinion assembly
- 15. Companion flange
- 16. Washer
- 17. Companion flange self-locking nut
- 18. Differential case
- 19. Side gear thrust spacer
- 20. Side gear
- 21. Pinion washer
- 22. Pinion gear
- ◆◆ • Adjustment of differential gear backlash <2 pinion>
- 23. Pinion shaft
- ◆◆ 24. Lock pin
- 25. 4 pinion case assembly
- ◆◆ 26. Drive gear
- ◆◆ 27. Side bearing inner race
- ◆◆ 28. Side bearing outer race
- ◆◆ • Adjustment of final drive gear backlash
- 29. Side bearing adjusting spacer
- 30. Differential case assembly
- 31. Bearing cap
- 32. Cover

NOTE
*: Part Time 4WD

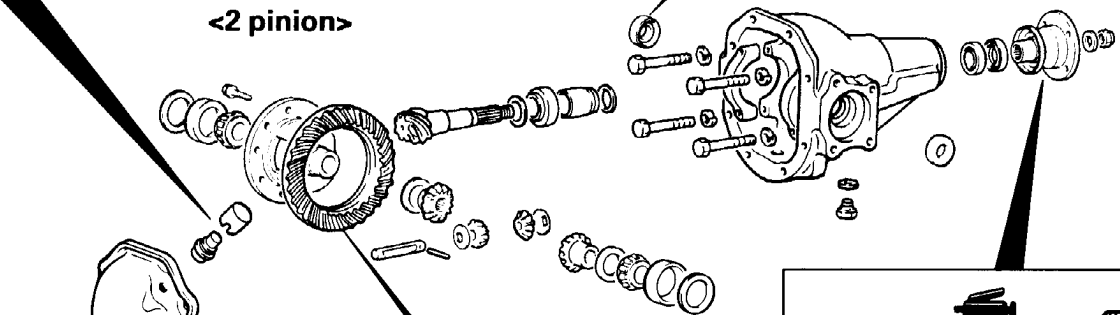
LUBRICATION, SEALING AND ADHESION POINTS



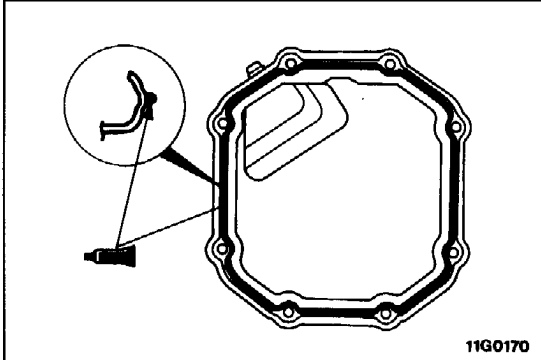
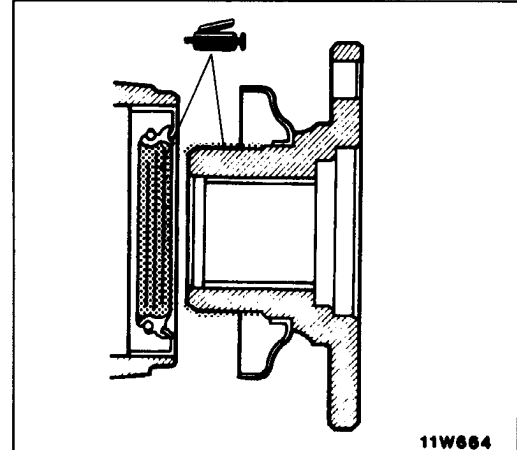
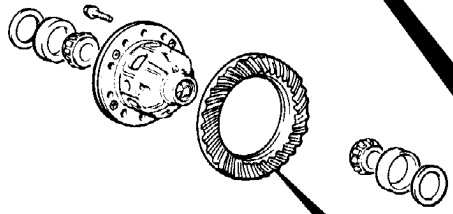
Sealant:
3M ATD Part No. 8661, 8663 or
equivalent



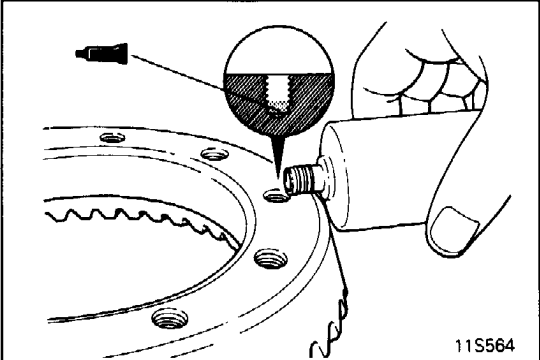
<2 pinion>



<4 pinion>



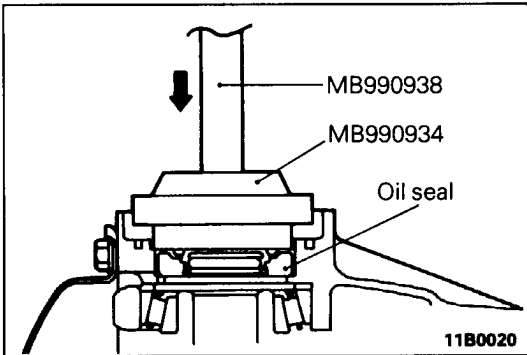
Sealant:
3M ATD Part No. 8661, 8663 or
equivalent



Adhesive:
3M Stud Locking 4170 or equivalent

SERVICE POINTS OF REASSEMBLY

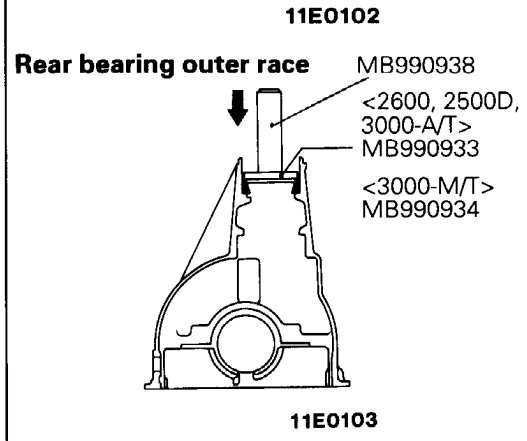
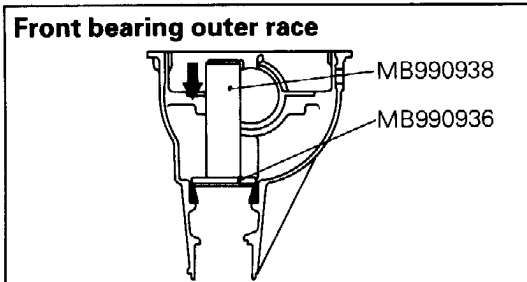
4. INSTALLATION OF OIL SEAL



5. INSTALLATION OF DRIVE PINION FRONT BEARING OUTER RACE/6. DRIVE PINION REAR BEARING OUTER RACE

NOTE

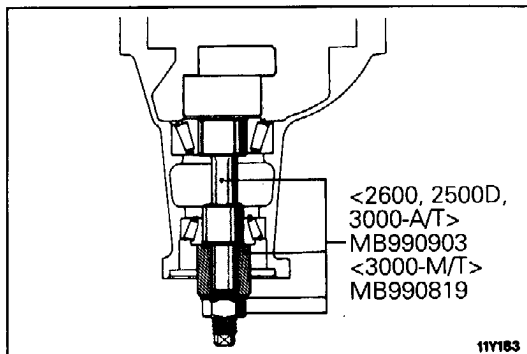
Perform press-fitting carefully so as not to tilt the outer race.



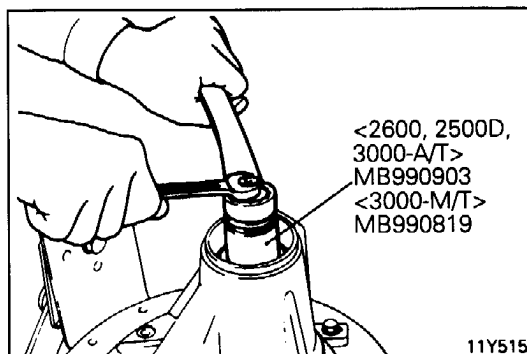
● **ADJUSTMENT OF PINION HEIGHT**

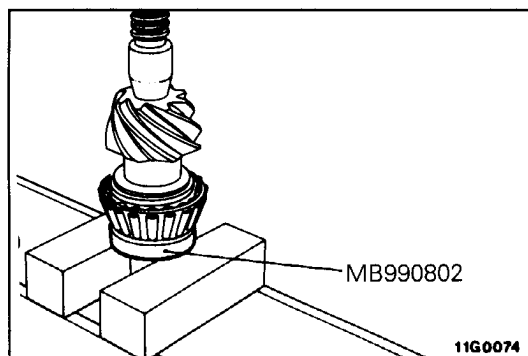
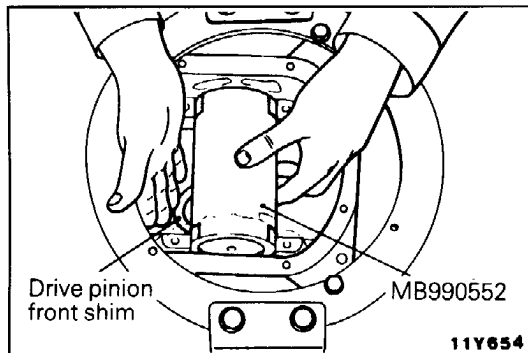
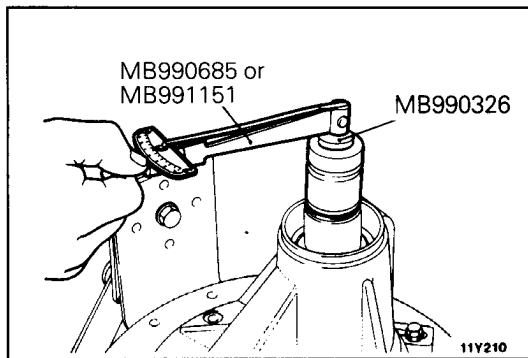
Adjust the drive pinion height by the following procedures:

(1) Install special tools and drive pinion front and rear bearing inner races to the gear carrier in the sequence shown in the illustration.



(2) Tighten the nut of the special tool until the standard value of drive pinion rotation torque is obtained.





- (3) Measure the drive pinion rotation torque (without the oil seal) by using the special tools.

Standard value:

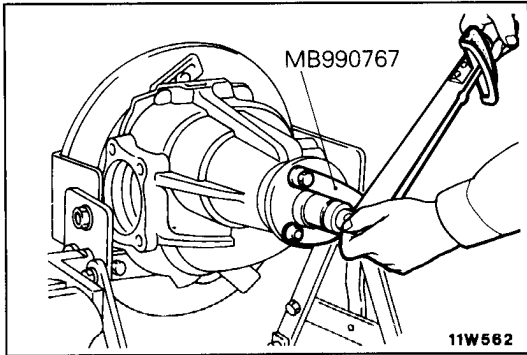
Bearing division	Bearing lubrication	Rotation torque
New	None (With anti-rust agent)	0.3–0.5 Nm 3.0–5.0 kgcm 2.6–4.3 in.lbs.
New/reusing	Gear oil applied	0.15–0.25 Nm 1.5–2.5 kgcm 1.3–2.2 in.lbs.

NOTE

1. Gradually tighten the nut of the special tool while checking the drive pinion preload.
 2. Because one rotation can't be made when the special tool is in contact with the gear carrier, move it a few times and, after seating the bearing, measure the rotation torque.
- (4) Position the special tool in the side bearing seat of the gear carrier, and then select a drive pinion front shim of a thickness which corresponds to the gap between the special tools.

NOTE

1. Be sure to clean the side bearing seat thoroughly. When positioning the special tool, be sure that the cut-out sections of the special tool are in the position shown in the illustration, and also confirm that the special tool is in close contact with the side bearing seat.
 2. When selecting the drive pinion front shims, keep the number of shims to a minimum.
- (5) Fit the selected drive pinion front shim(s) to the drive pinion, and press-fit the drive pinion front bearing inner race by using the special tool.



● **ADJUSTMENT OF DRIVE PINION TURNING TORQUE**

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

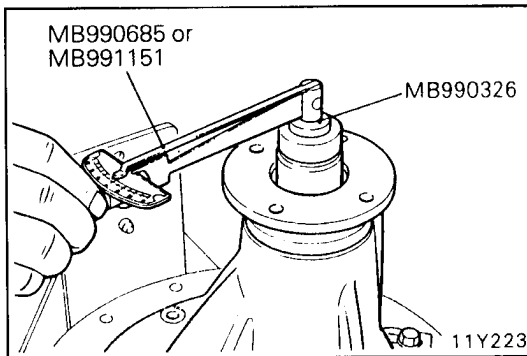
Without Oil Seal

- (1) Insert the drive pinion into the gear carrier, and then install, from the front side of the carrier, 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 the special tool.



- (3) Measure the drive pinion rotation torque (without the oil seal) by using the special tools.

Standard value:

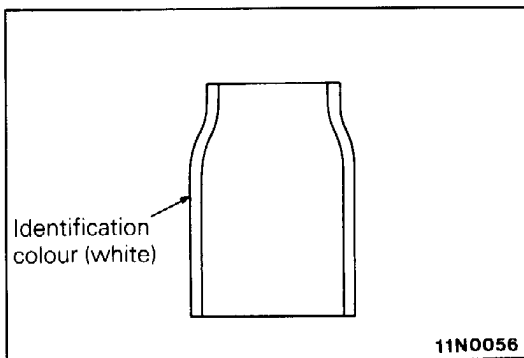
Bearing division	Bearing lubrication	Rotation torque
New	None (With anti-rust agent)	0.3–0.5 Nm
		3.0–5.0 kgcm 2.6–4.3 in.lbs.
New/reusing	Gear oil applied	0.15–0.25 Nm
		1.5–2.5 kgcm 1.3–2.2 in.lbs.

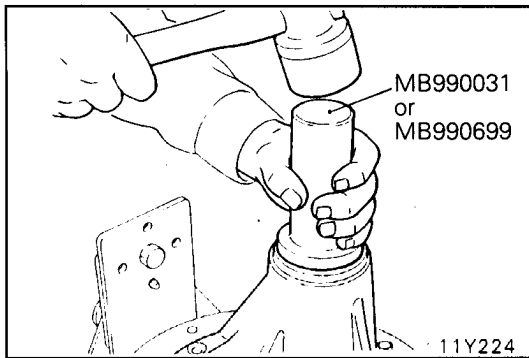
- (4) If the drive pinion rotation torque is not within the range of the standard value, adjust the preload by replacing the drive pinion front shim(s) or the drive pinion spacer.

NOTE

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

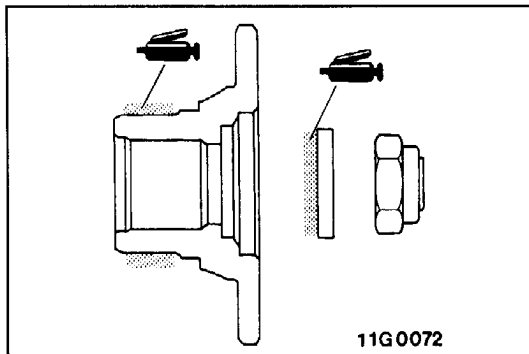
Also, select the drive pinion spacer from the following two types.





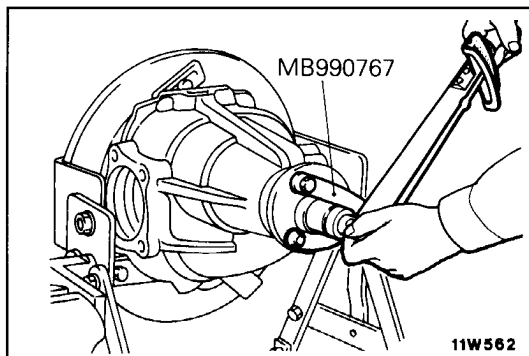
Item	<2600, 2500D, 3000-A/T>	<3000-M/T>
Height of drive pinion spacer mm (in.)	46.67 (1.837) With identification colour	56.67 (2.231) With identification colour
	47.01 (1.851) No identification colour	57.01 (2.244) No identification colour

- (5) Remove the companion flange and drive pinion once again.

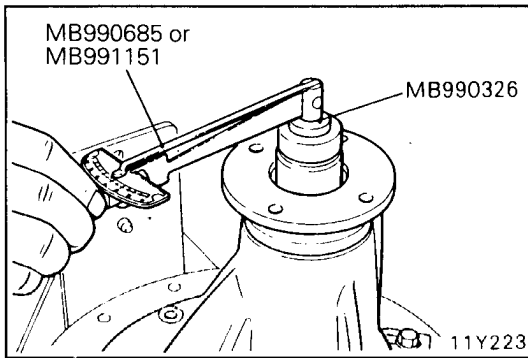


With Oil Seal

- (1) After setting the drive pinion rear bearing inner race, drive the oil seal into the gear carrier front lip by using the special tool.
- (2) Apply multi-purpose grease to the contact surfaces of the companion flange oil seal and the washer companion flange.



- (3) 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 the special tools.

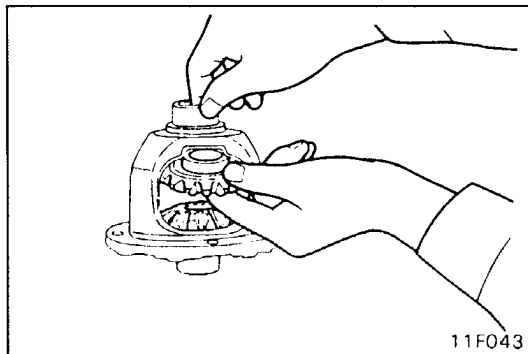


- (4) Measure the drive pinion rotation torque (with oil seal) by using the special tools to verify that the drive-pinion preload complies with the standard value.

Standard value:

Bearing division	Bearing lubrication	Rotation torque
New	None (With anti-rust agent)	0.5–0.7 Nm 5.0–7.0 kgcm 4.3–6.1 in.lbs.
New/reusing	Gear oil applied	0.35–0.45 Nm 3.5–4.5 kgcm 3.1–3.9 in.lbs.

- (5) If the measured value is not within the standard value range, check for faulty installation of the oil seal or faulty tightening of the self-locking nut.

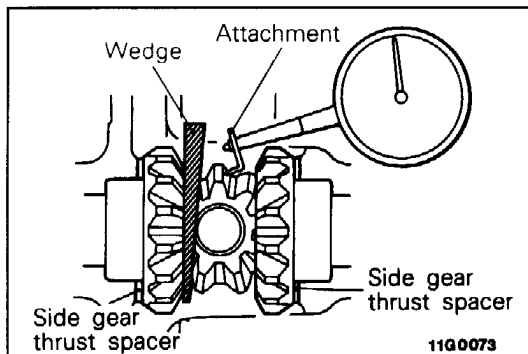


• **ADJUSTMENT OF DIFFERENTIAL GEAR BACKLASH <2 PINION>**

- (1) Assemble the side gears, side gear thrust 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.

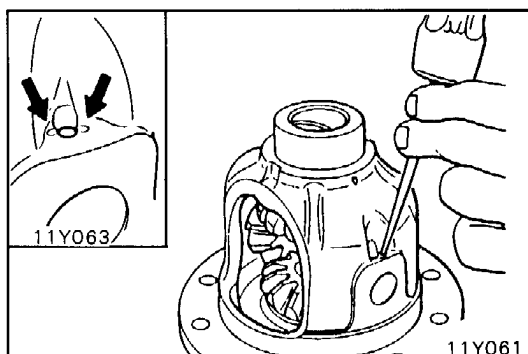
Standard value: 0–0.076 mm (0–0.0030 in.)

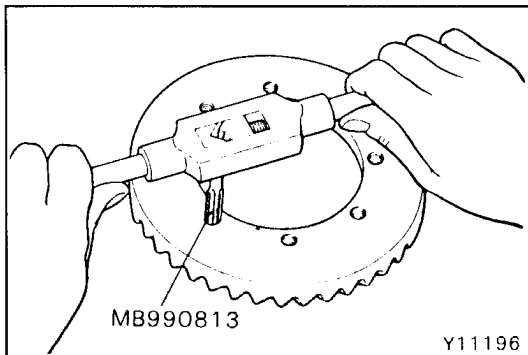
Limit: 0.2 mm (0.0079 in.)

- (5) If the differential gear backlash exceeds the limit, adjust the backlash by installing thicker side gear thrust spacers.
- (6) Measure the differential gear backlash once again, and confirm that it is within the limit.
If adjustment is not possible, replace the side gears and pinion gears as a set.

24. INSTALLATION OF LOCK PIN

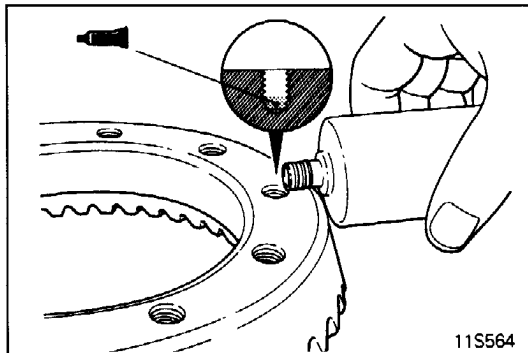
- (1) Align the pinion shaft lock pin hole with the differential case lock pin hole, and drive in the lock pin.
- (2) Stake the lock pin with a punch at two points.





26. INSTALLATION OF DRIVE GEAR

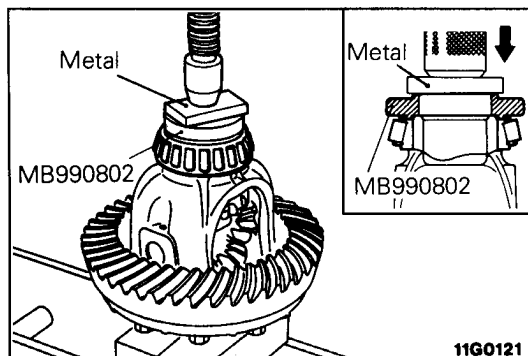
- (1) Clean the drive gear attaching bolts.
- (2) Remove the adhesive adhered to the threaded holes of the drive gear by turning the special tool (tap M10 × 1.25), and then clean the threaded holes by applying compressed air.



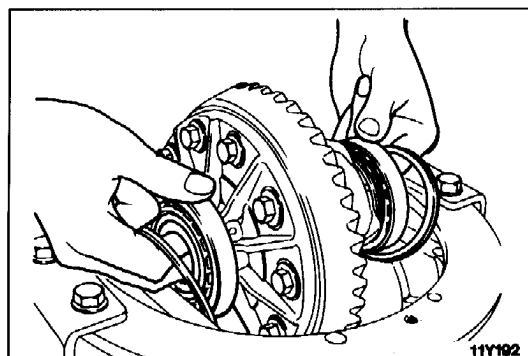
- (3) Apply the specified adhesive to the threaded holes of the drive gear.

Specified adhesive: 3M Stud Locking 4170 or equivalent

- (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.



27. INSTALLATION OF SIDE BEARING INNER RACE



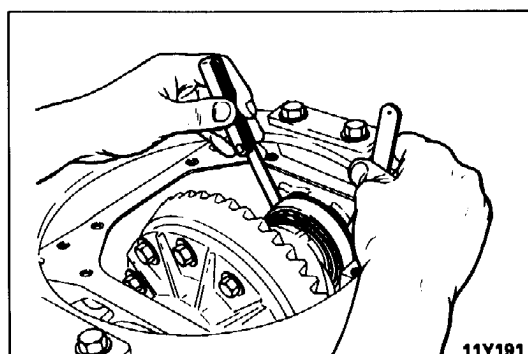
• ADJUSTMENT OF FINAL DRIVE GEAR BACKLASH

Adjust the final drive gear backlash by the following procedures:

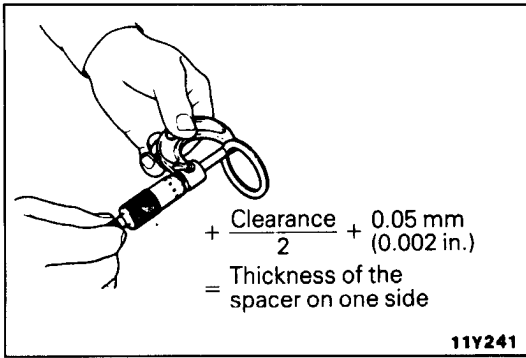
- (1) Install the side bearing spacers, which are thinner than those removed, to the side bearing outer races, and then mount the differential case assembly into the gear carrier.

NOTE

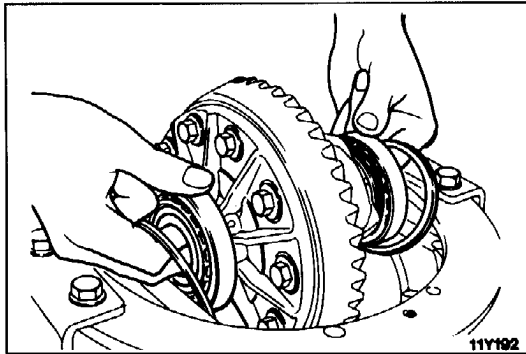
Select side bearing spacers with the same thickness for both the drive pinion side and the drive gear side.



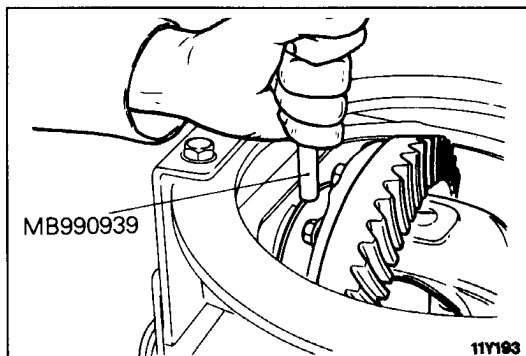
- (2) Push the differential case assembly to one side, and measure the clearance between the gear carrier and the side bearing adjusting spacer with a thickness gauge.



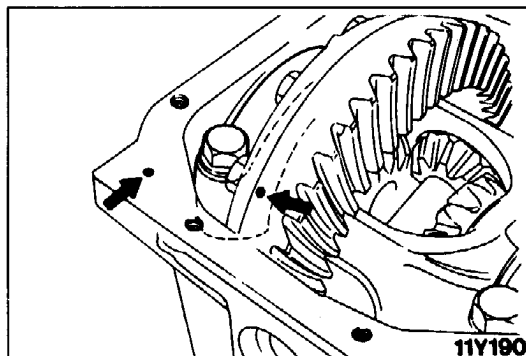
- (3) Measure the thickness of the side bearing adjusting spacers on one side, select two pairs of spacers which correspond to that thickness plus one half of the clearance plus 0.05 mm (0.002 in.), and then install one pair each to the drive pinion side and the drive gear side.



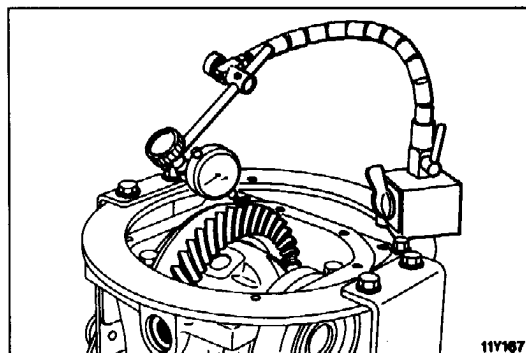
- (4) Install the side bearing adjusting spacers and differential case assembly, as shown in the illustration, to the gear carrier.



- (5) Tap the side bearing adjusting spacers with the special tool to fit them to the side bearing outer race.



- (6) Align the mating marks on the gear carrier and the bearing cap, and then tighten the bearing cap.

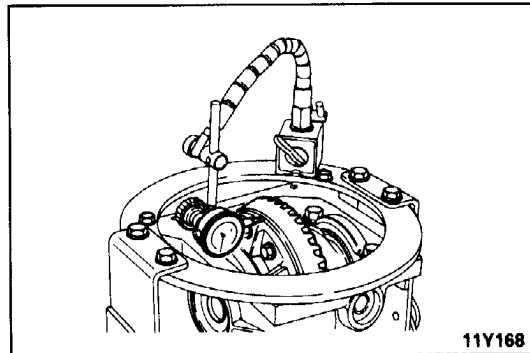
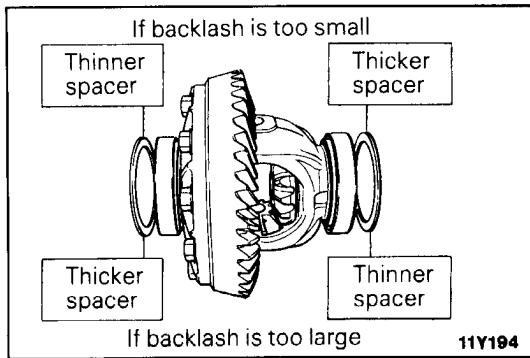


- (7) With the drive pinion locked in place, measure the final drive gear backlash with a dial indicator on the drive gear.

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 in.)



(8) Change the side bearing adjusting spacers as illustrated, and then adjust the final 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.26-42)

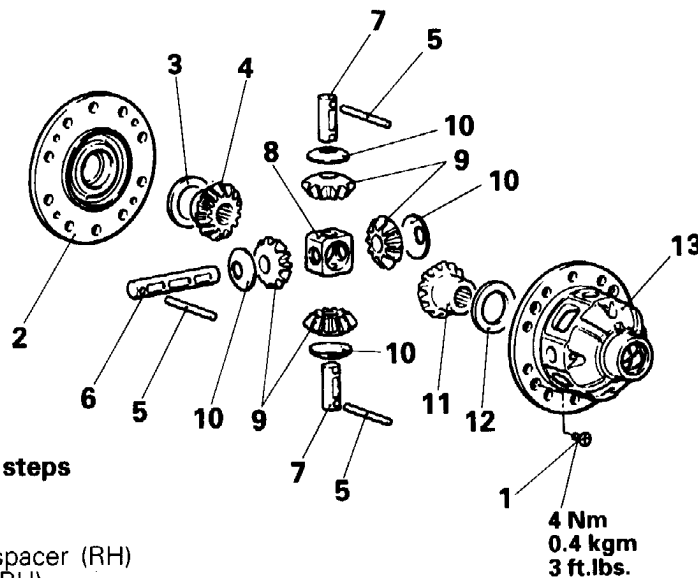
(10) Measure the drive gear runout at the shoulder on the reverse side of the drive gear.

Limit: 0.05 mm (0.0020 in.)

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

OVERHAUL (4 PINION CASE ASSEMBLY)

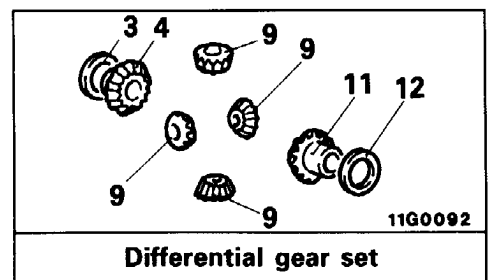
E26WK--



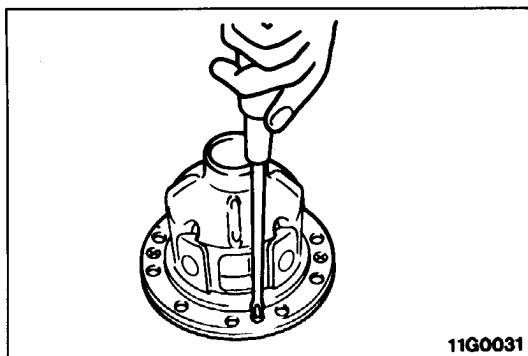
Disassembly steps

- ↔ 1. Screw
- ↔ 2. Case A
- ↔ 3. Side gear spacer (RH)
- ↔ 4. Side gear (RH)
- ↔ • Backlash adjustment on differential gear case A side
- ↔ • Differential gear backlash check
- ↔ 5. Lock pin
- ↔ 6. Pinion shaft-A
- ↔ 7. Pinion shaft-B
- ↔ 8. Pinion shaft holder
- ↔ 9. Pinion gear
- ↔ 10. Washer
- ↔ 11. Side gear (LH)
- ↔ 12. Side gear spacer (LH)
- ↔ • Backlash adjustment on differential gear case B side
- ↔ 13. Case B

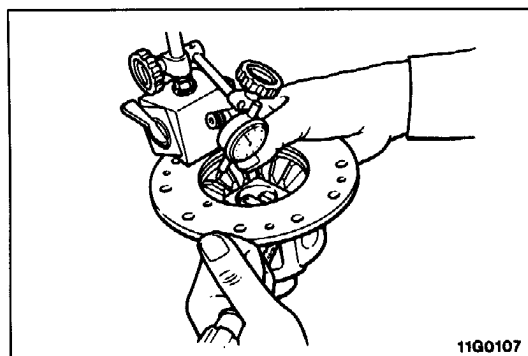
11G0011



Differential gear set



11G0031



11G0107

SERVICE POINTS OF DISASSEMBLY

E26WLAB

1. REMOVAL OF SCREW

- (1) Evenly loosen 4 screws on case A and B to remove.
- (2) Set case B downward and remove case A, side gear spacer (RH) and side gear (RH).

NOTE

Check differential gear backlash to determine necessity of disassembling side gear (RH) and onward.

- **DIFFERENTIAL GEAR BACKLASH CHECK**

Check differential gear backlash as follows.

- (1) Insert cloth wrapped screwdriver through side of case B and lock side gear (LH) and pinion gear. (one piece)
- (2) Contact dial gauge on pinion gear facing the locked pinion gear and measure backlash within the standard value.

NOTE

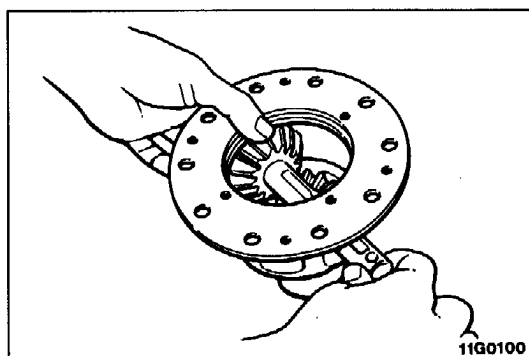
Measure 2 pinion gears.

Standard value: 0.01–0.25 mm
(0.0004–0.0098 in.)

- (3) When backlash exceeds the standard value, adjust side gear spacer (LH).

NOTE

If backlash is within the standard value, assure appropriate gear spacer (RH) thickness and assemble 4 pinion case assembly. (Refer to P.26-57.)



11G0100

SERVICE POINTS OF REASSEMBLY

E26WNAB

- **BACKLASH ADJUSTMENT ON DIFFERENTIAL GEAR CASE B SIDE**

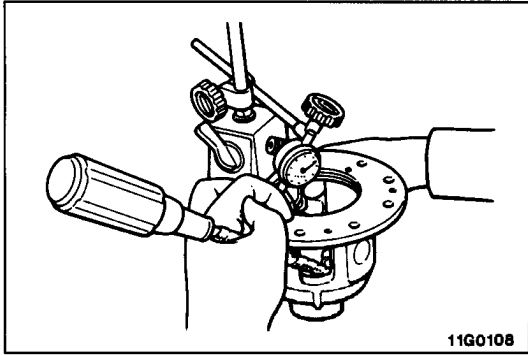
Adjust backlash on differential gear case B side as follows.

- (1) Temporarily install side gear spacer (LH), side gear (LH), washers, 2 pinion gears and pinion shaft A on case B.

NOTE

Do not assemble pinion shaft holder, pinion shaft-B or the remaining pinion gears (2).

- (2) Insert wrapped screwdriver through side of case B to lock one side of pinion gear and side gear (LH).



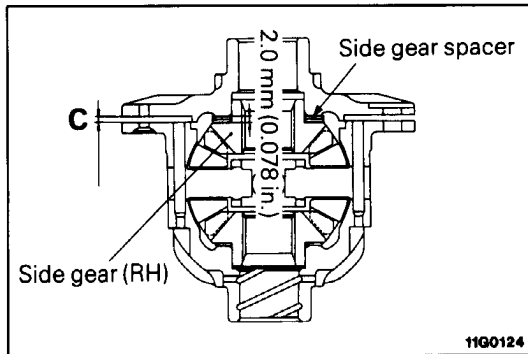
- (3) Place dial gauge on unlocked pinion gear and measure differential gear backlash within the standard value.

NOTE

Measure 2 pinion gears.

**Standard value: 0.01–0.25 mm
(0.0004–0.0098 in.)**

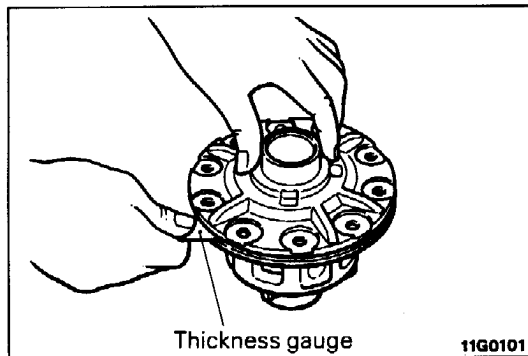
- (4) When backlash exceeds the standard value, adjust with selected side gear spacer (LH).
- (5) Install washers, pinion gears, pinion shaft holder and pinion shaft-A and B. Lock with lock pin through case B.



● **BACKLASH ADJUSTMENT ON DIFFERENTIAL GEAR CASE A SIDE**

Adjust backlash as follows.

- (1) Install side gear (RH) and 2 side gear spacers [1.0 mm (0.039 in.) thick]. Press differential case A to differential case B.

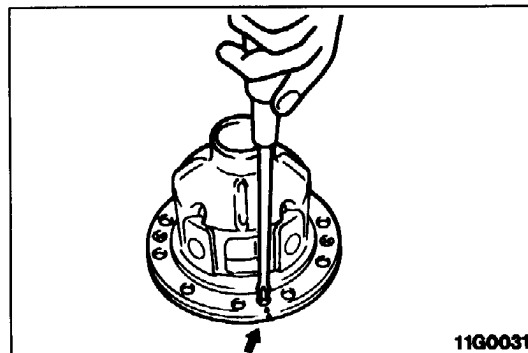


- (2) Measure flange space (C) between differential case A and B with thickness gauge.

- (3) Calculate side gear spacer (RH) thickness (D) as follows:

$$D = 2.0 \text{ mm (0.078 in.)} - [C + 0.2 \text{ mm (0.008 in.)}]$$

- (4) Choose spacer with a thickness nearest D in (3) and adjust differential gear backlash on the right side.



- (5) Match the match marks and assemble cases A and B.

- (6) Assure smooth rotation of inner shaft.