

# STEERING

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### SUPPLEMENTAL RESTRAINT SYSTEM (SRS) – AIR BAG

- (1) An SRS air bag for the driver's side seat is optional equipment in this vehicle.
- (2) The SRS includes the following components: impact sensors, SRS diagnosis unit, SRS warning lamp, air bag module, clock spring, interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (\*).

### WARNING!

- (1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver (from rendering the SRS inoperative).
- (2) Service or maintenance of any SRS component or SRS-related component must be performed only at authorized MITSUBISHI dealer.
- (3) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS), before beginning any service or maintenance of any component of the SRS or any SRS-related component.

## SPECIFICATIONS

## SERVICE SPECIFICATIONS

E37CB--

Items	Specifications
Standard value	
Steering angle	
Inner wheel	32°40' – $\frac{0}{3}$
Outer wheel	29°45'
Steering gear oil level	mm (in.) 25 (0.98)
Stationary steering effort	N (kg, lbs.) 37 (3.7, 8.2)
Drive belt tension	mm (in.)
2400	
When checked	6.0–10.0 (0.236–0.394)
When a new belt is installed	5.5 (0.217)
When an old belt is installed	7.0 (0.276)
3000 –12 VALVE	
When checked	9.0–14.5 (0.354–0.571)
When a new belt is installed	8.0 (0.315)
When an old belt is installed	10.0 (0.394)
3000–24 VALVE	
When checked	10.5–14.5 (0.413–0.571)
When a new belt is installed	9.5–11.5 (0.374–0.452)
When an old belt is installed	11.5–13.5 (0.452–0.531)
3500	
When checked	13.0–17.0 (0.511–0.669)
When a new belt is installed	11.0–13.0 (0.433–0.511)
When an old belt is installed	14.0–16.0 (0.551–0.630)
2500D	
<Vehicles built up to October, 1993>	
When checked	9.0–11.0 (0.354–0.433)
When a new belt is installed	7.0 (0.276)
When an old belt is installed	9.5 (0.374)
<Vehicles built from November, 1993>	
When checked	8.0–12.0 (0.315–0.3472)
When a new belt is installed	6.0–8.0 (0.236–0.315)
When an old belt is installed	9.0–11.0 (0.354–0.433)
Oil pump pressure	MPa (kg/cm <sup>2</sup> , psi)
<2400, 3000 –12 VALVE, 2500D>	
Oil pump relief pressure	7.5–8.2 (75–82, 1,067–1,166)
Pressure under no-load conditions	0.8–1.0 (8–10, 114–142)
Steering gear retention hydraulic pressure	7.5–8.2 (75–82, 1,067–1,166)
<3000–24 VALVE, 3500, 2800D>	
Oil pump relief pressure	8.3–9.0 (83–90, 1,195–1,280)
Pressure under no-load conditions	0.8–1.0 (8–10, 114–142)
Steering gear retention hydraulic pressure	8.3–9.0 (83–90, 1,195–1,280)

Items	Specifications
Pressure switch activation oil pressure	MPa (kg/cm <sup>2</sup> , psi)
OFF → ON	1.5–2.0 (15–20, 213–284)
ON → OFF	0.7–1.2 (7–12, 100–171)
Mainshaft starting torque (Manual steering)	Nm (kgcm, in.lbs.)
Mainshaft axial play (Power steering)	mm (in.)
Cross-shaft axial play	mm (in.)
Manual steering	0.05 (0.0020)
Power steering	0.05 (0.0020)
Mainshaft total starting torque	Nm (kgcm, in.lbs.)
Manual steering	0.65–0.85 (6.5–8.5, 5.7–7.3)
Power steering	0.45–1.25 (4.5–12.5, 4–11)
Ball joint starting torque	Nm (kgcm, in.lbs.)
Tie rod end	1–3 (10–30, 8.9–26)
Idler arm	0.5–2.0 (5–20, 4–17)
Idler arm turning torque	Nm (kgcm, in.lbs.)
Spring balance reading	N (kg, lbs)
Limit	
Steering wheel free play	mm (in.)
Manual steering	50 (1.97)
Power steering	50 (1.97)
Steering gear backlash	mm (in.)
Ball joint axial play	mm (in.)
Backlash between ball groove of rack piston and balls	mm (in.)
Gap between vane and rotor groove	mm (in.)
Clearance between oil pump drive shaft and pump body	mm (in.)

## LUBRICANTS

E37CD--

Items	Specified lubricant	Quantity
Manual steering gear oil	Hypoid gear oil API GL-4 or higher SAE 80	210 cm <sup>3</sup> (12.81 cu.in.)
Power steering fluid L.H. drive vehicles <2800D>  <Except 2800D>  R.H. drive vehicles <2800D>  <Except 2800D>	Automatic transmission fluid DEXRON or DEXRON II	1.11 dm <sup>3</sup> (1.17 U.S.qts., 0.98 Imp.qts.) 1.06 dm <sup>3</sup> (1.12 U.S.qts., 0.93 Imp.qts.)  1.02 dm <sup>3</sup> (1.08 U.S.qts., 0.90 Imp.qts.) 0.97 dm <sup>3</sup> (1.02 U.S.qts., 0.85 Imp.qts.)
Power steering gear box Bearing, O-ring and oil seal	Automatic transmission fluid DEXRON or DEXRON II	As required
Oil pump Flow control valve and O-ring Friction surface of rotor, vane, cam ring and pump cover	Automatic transmission fluid DEXRON or DEXRON II	As required

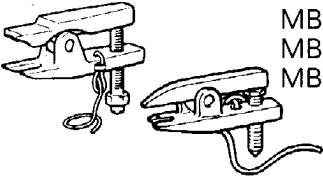
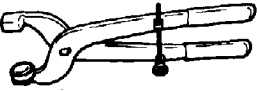
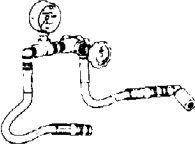
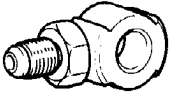
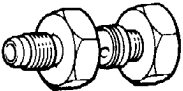
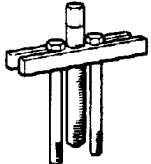


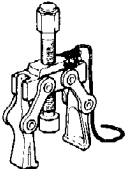
## SEALANTS AND ADHESIVES

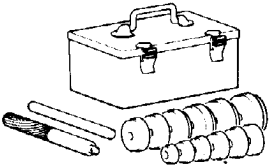

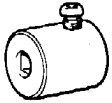
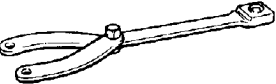


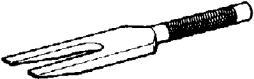
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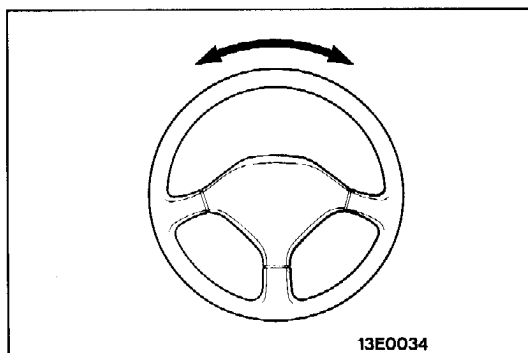
Items	Specified sealant and adhesive	Remarks
Steering column cover assembly installation hole Dash panel cover installed surface Manual steering gear box top cover packing Manual steering gear box cross-shaft adjusting and lock nut Manual steering gear box top cover bolt Manual steering gear box adjusting shim Tie-rod end dust cover installed surface	3M ATD Part No. 8661 or equivalent	Semi-drying sealant
Inside of steering column lower pipe bearing Connection of steering column upper and steering column lower (Nut side)	3M Stud Locking Part No. 4170 or equivalent	Semi-drying sealant
Steering column upper bearing	3M ATD Part No. 8001 or equivalent	Semi-drying sealant

**SPECIAL TOOLS**

E37DA--

Tool	Number	Name	Use
	MB990635, MB991113 or MB991406	Steering linkage puller	Disconnection of the steering linkage
	MB990948	Steering linkage joint gauge	Measurement of the ball joint axial play
	MB990662	Oil pressure gauge	Measurement of the oil pump pressure
	MB990993	Power steering oil pressure gauge adapter (pump side)	Measurement of the oil pump pressure
	MB990994	Power steering oil pressure gauge adapter (hose side)	
	MB990803	Steering wheel puller	Removal of the steering wheel
	MB990826	Torx wrench	Removal and installation of the steering column
	MB990628	Snap ring pliers	Removal and installation of snap ring
	MB990915	Pitman arm puller	Removal of the pitman arm

Tool	Number	Name	Use
	MB990925	Bearing and oil seal installer set	Installation of the oil seal and the ball bearing (Refer to GROUP 26.) MB990938, MB990928, MB990926, MB991203
	MB991151 MB990685	Torque wrench	Measurement of the mainshaft starting torque
	MB991006 or MB990228	Preload socket	Measurement of the mainshaft total starting torque
	MB991367	Special spanner	Removal and installation of the lock nut
	MB991394	Pin set	
	MB990326	Preload socket	Measurement of the ball joint starting torque
	MB990778	Ball joint remover	Disconnection of idler arm from relay rod



13E0034

## SERVICE ADJUSTMENT PROCEDURES

### STEERING WHEEL FREE PLAY CHECK

#### MANUAL STEERING

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**Standard value:** 26.6 mm (1.05 in.) or less  
**Limit:** 50 mm (1.97 in.)

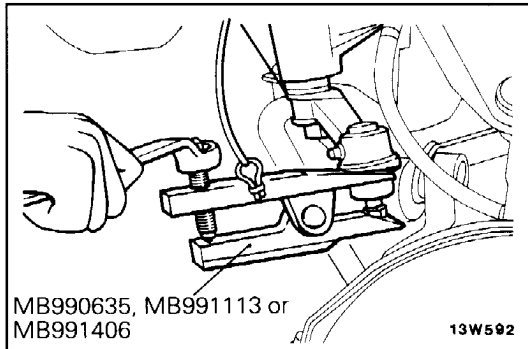
If the measured value exceeds the repair limit, check the steering gear backlash and ball joint axial play.

**POWER STEERING**

1. With the engine stationary and the steering wheel in the straight-ahead position, apply a force of 5 N (0.5 kg, 1.1 lbs.) to the steering wheel in the peripheral direction.

**Standard value:** 26.6 mm (1.05 in.) or less  
**Limit:** 50 mm (1.97 in.)

2. If the measured value exceeds the repair limit, check the steering gear backlash and ball joint axial play.



**STEERING GEAR BACKLASH CHECK**

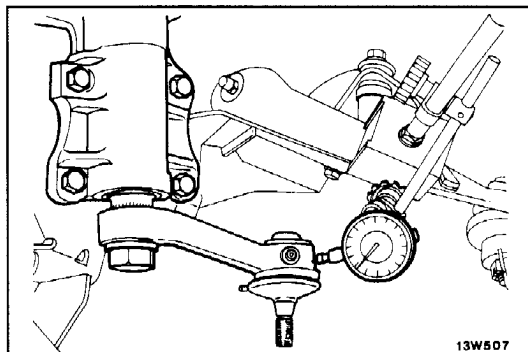
E37FBAC

1. Jack up to the vehicle front and hold the steering wheel in the straight ahead position.
2. Apart the pitman arm and the relay rod.

**Caution**

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

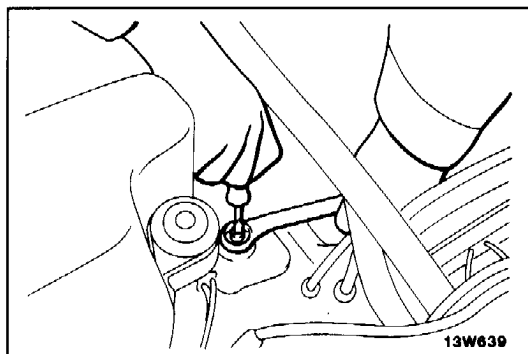
**Limit:** 0.5 mm (0.020 in.)



3. If the measured value exceeds the limit, screw in the steering gear box adjusting bolt until steering wheel free play is within the range of standard value.

**Caution**

1. Be sure to make the adjustment with the steering wheel in the straight-ahead position.
2. If the adjusting bolt is overtightened, more steering effort will be required, and return of the wheel will be adversely affected.



**BALL JOINT AXIAL PLAY CHECK (TIE ROD END AND PITMAN ARM)**

E37FCAG

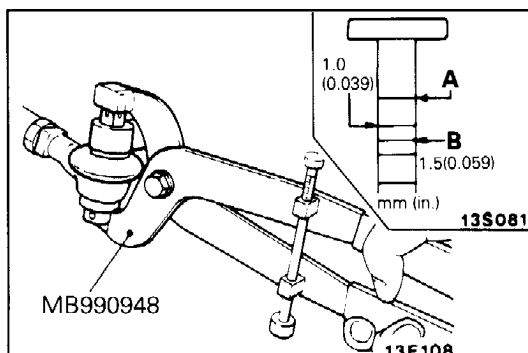
1. Hold the ball joint by using the special tool.
2. Set the scale of special tool to the upper limit (A), compress the ball stud, and measure the axial play. The measured displacement should be between the upper limit (A) and the centre graduation (B).

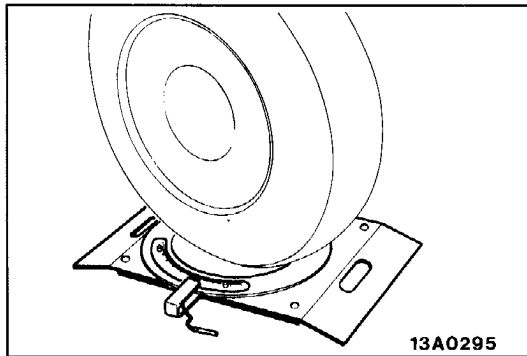
**Limit:** 1.5 mm (0.059 in.)

3. If the measured displacement exceeds the centre graduation (B), replace the ball joint.

**Caution**

**Even if the variation is within the limit, check ball joint starting torque.**

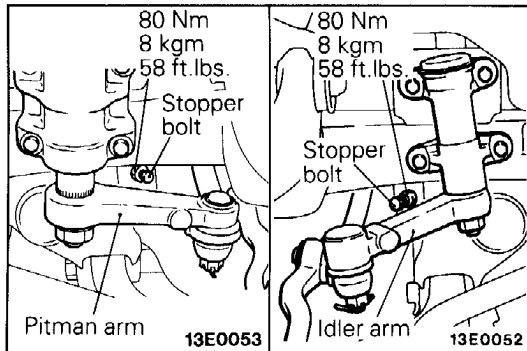


**STEERING ANGLE CHECK**

E37FDAH

1. Place the front wheel on a turning radius gauge and measure the steering angle.

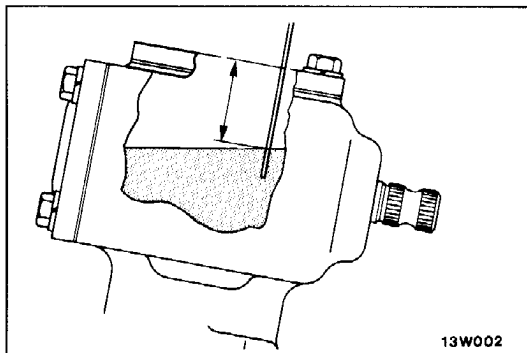
**Standard value:**                    **Inner wheel 32°40'  $\frac{0}{-3}$**   
    **Outer wheel 29°45'**



2. If the steering angle is outside the standard value, after checking the toe-in, (Refer to GROUP 33–Service Adjustment Procedures), adjust the steering angle with the stopper bolt.

**STEERING GEAR OIL LEVEL CHECK (MANUAL STEERING)**

E37FEAAa

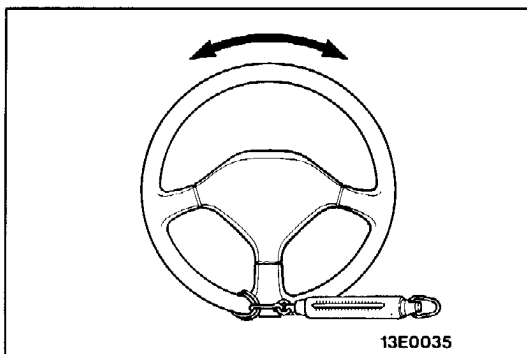


Remove the breather plug and check the oil level in the steering gear box by using a special gauge or a thin screwdriver.

**Standard value: 25 mm (0.98 in.)**

**STATIONARY STEERING EFFORT CHECK (POWER STEERING)**

E37FFAG



1. Place the vehicle on a level surface and place the steering wheel in the straight-ahead position.
2. Set the engine speed to 1,000 r/min.

**Caution**

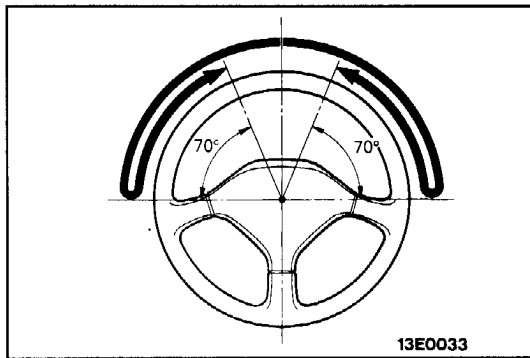
**After checking the engine r/min., there must be a return to the standard idling r/min.**

3. Measure the tangential force with a spring balance by turning the steering wheel clockwise and counterclockwise one and a half turns.

**Standard value: 37 N (3.7 kg, 8.21 lbs.) or less**

4. If the stationary steering effort exceeds the standard value, check for belt slackness, damage, insufficient oil, air mixed into oil, collapsed or twisted hoses, etc., and repair if found.





**CHECKING OF THE STEERING WHEEL RETURN TO CENTRE (POWER STEERING)**

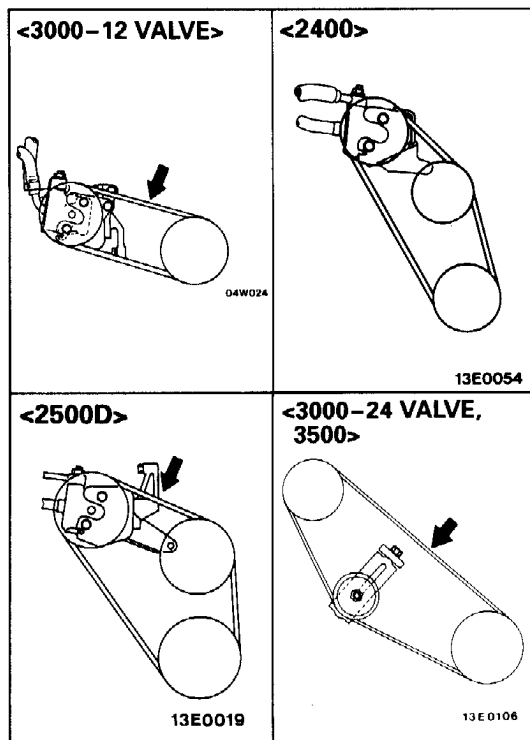
E37FGAA

To check for the return of steering wheel to centre, carry out drive test and check the following points.

1. Make gentle and sharp turns and check to get a feel for that there is no appreciable difference in steering effort and return to centre between right and left turns.
2. Drive at a speed of about 35 km/h (22 mph), turn the steering wheel 90° clockwise or counterclockwise, and release the wheel a second or two later. If the wheel returns more than 70°, the return may be considered good.

**NOTE**

When the steering wheel is turned abruptly, momentary hard steering might result, but this does not mean any problem. It is caused by low oil pump delivery during idling.



**DRIVE-BELT TENSION CHECK (POWER STEERING)**

E37FHAI

1. Measure the flexion of the V belt when it is subjected to a force of 10 kg in the place shown.

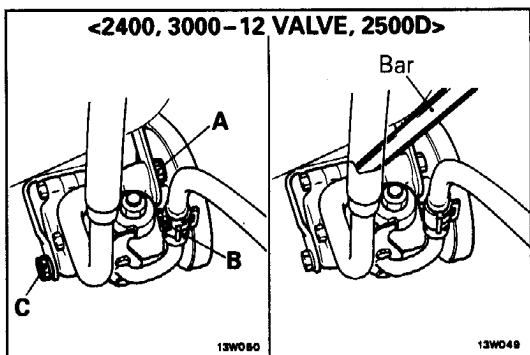
**Standard value:**

mm (in.)

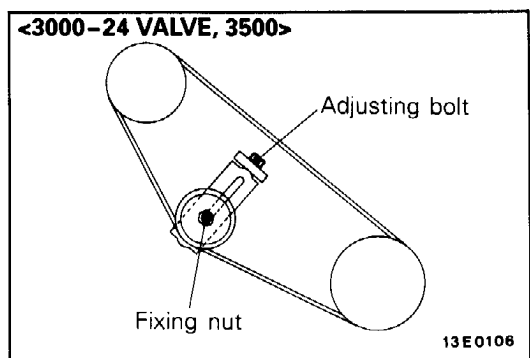
	2400	3000-12 VALVE	3500
When checked	6.0-10.0 (0.236-0.394)	9.0-14.5 (0.354-0.571)	13.0-17.0 (0.511-0.669)
When a new belt is installed	5.5 (0.217)	8.0 (0.315)	11.0-13.0 (0.433-0.511)
When an old belt is installed	7.0 (0.276)	10.0 (0.394)	14.0-16.0 (0.551-0.630)

	3000 - 24 VALVE	2500D	
		V type	V-ribbed type
When checked	10.5-14.5 (0.413-0.571)	9.0-11.0 (0.354-0.433)	8.0-12.0 (0.315-0.472)
When a new belt is installed	9.5-11.5 (0.374-0.452)	7.0 (0.276)	6.0-8.0 (0.236-0.315)
When an old belt is installed	11.5-13.5 (0.452-0.531)	9.5 (0.374)	9.0-11.0 (0.354-0.433)

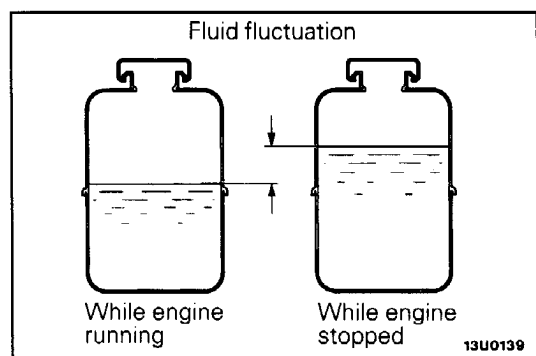
2. If the flexion value is outside the standard value, adjust by the following procedure.

**<2400, 3000-12 VALVE, 2500D>**

- (1) Loosen oil pump fixing bolts A, B and C.
- (2) Adjust the amount of flexion in the belt by setting a bar against the body of the oil pump and tightening the belt by hand to the appropriate amount.
- (3) Tighten the fixing bolts A, B and C in that order.

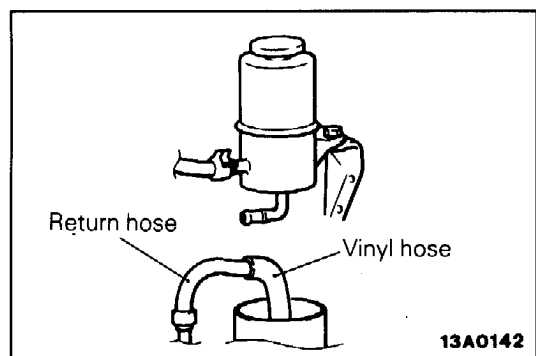
**<3000-24 VALVE, 3500>**

- (1) Loosen tension pulley fixing nut.
- (2) Adjust belt tension with adjusting bolt.
- (3) Tighten fixing nut.

**FLUID LEVEL CHECK (POWER STEERING)**

E37FIAD

1. Park the vehicle on a flat, level surface, start the engine, and then turn the steering wheel several times to raise the temperature of the fluid to approximately 50–60°C (122–140°F).
2. With the engine running, turn the wheel all the way to the left and right several times.
3. Check the fluid in the oil reservoir for foaming or milkiness.
4. Check the difference of the fluid level when the engine is stopped, and while it is running. If the fluid level changes considerably, air bleeding should be done.

**FLUID REPLACEMENT (POWER STEERING)**

E37FJAG

1. Raise the front wheels on a jack, and then support them with rigid racks.
2. Disconnect the return hose.
3. Connect a vinyl hose to the return hose, and drain the oil into a container.
4. On vehicles with a petrol engine, disconnect the high-tension cable. On vehicles with a diesel engine, remove the fuel cut valve connector attached to the injection pump.

While operating the starting motor intermittently, turn the steering wheel all the way to the left and right several times to drain all of the fluid.

**Caution**

**Be careful not to position the high-tension cable near the carburettor or the delivery pipe.**

5. Connect the return hoses securely, and then secure it with the clip.
6. Fill the oil reservoir with the specified fluid up to the lower position of the filter, and then bleed the air.

**Specified fluid: Automatic transmission fluid DEXRON or DEXRON II**

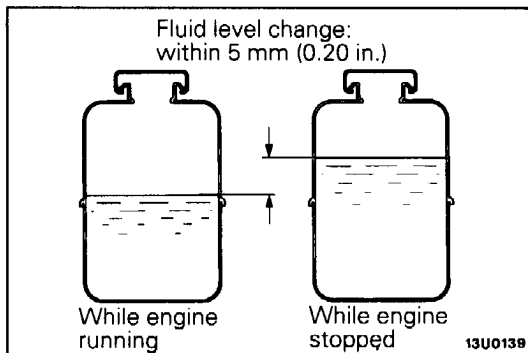
**BLEEDING**

E37FKAI

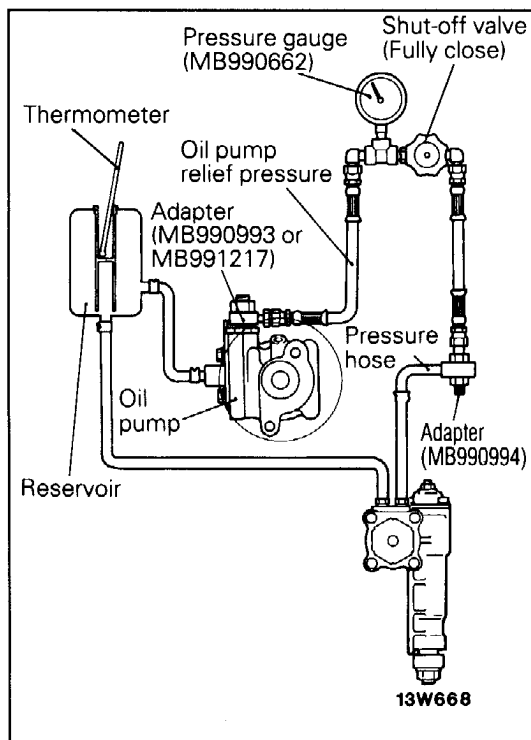
1. Jack up the front wheels and support them by using a rigid rack.
2. Manually turn the oil pump pulley a few times.
3. Turn the steering wheel all the way to the left and to the right five or six times.
4. On vehicles with a petrol engine, disconnect the high-tension cable. On vehicles with a diesel engine, remove the fuel cut valve connector attached to the injection pump. While operating the starting motor intermittently, turn the steering wheel all the way to the left and right five or six times (for 15 to 20 seconds).

**Caution**

1. **During air bleeding, refill the fluid supply so that the level never falls below the lower position of the filter.**
2. **If air bleeding is done while engine is running, the air will be broken up and absorbed into the fluid; be sure to do the bleeding only while cranking.**
5. On vehicles with a petrol engine, connect the ignition cable. On vehicles with a diesel engine, connect the fuel cut valve connector attached to the injection pump. Start the engine (idling).
6. Turn the steering wheel to the left and right until there are no air bubbles in the oil reservoir.
7. Confirm that the fluid is not milky, and that the level is up to the specified position on the level gauge.
8. Confirm that there is very little change in the fluid level when the steering wheel is turned left and right.
9. Check whether or not the change in the fluid level is within 5 mm (0.20 in.) when the engine is stopped and when it is running.

**Caution**

1. **If the change of the fluid level is 5 mm (0.20 in.) or more, the air has not been completely bled from the system, and thus must be bled completely.**
2. **If the fluid level rises suddenly after the engine is stopped, the air has not been completely bled.**
3. **If air bleeding is not complete, there will be abnormal noises from the pump and the flow-control valve, and this condition could cause a lessening of the life of the pump, etc.**

**OIL PUMP PRESSURE TEST****CHECKING THE OIL PUMP RELIEF PRESSURE**

1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50–60°C (122–140°F).
3. Start the engine and idle it at 1,000 ± 100 r/min.
4. Fully close the shut-off valve of the pressure gauge and measure the oil pump relief pressure to confirm that it is within the standard value range.

**Standard value: <2400, 3000–12 VALVE, 2500D>**

**7.5–8.2 MPa**

**(75–82 kg/cm<sup>2</sup>, 1,067–1,166 psi.)**

**<3000–24 VALVE, 3500, 2800D>**

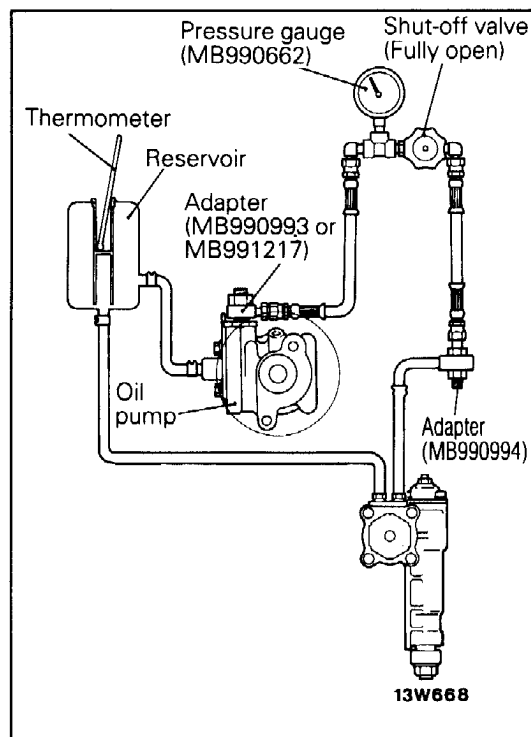
**8.3–9.0 MPa**

**(83–90 kg/cm<sup>2</sup>, 1,195–1,280 psi.)**

**Caution**

**Pressure gauge shut off valve must not remain closed for more than 10 seconds.**

5. If it is not within the standard value, overhaul the oil pump.
6. Remove the special tools, and then tighten the pressure hose to the specified torque.
7. Bleed the system.

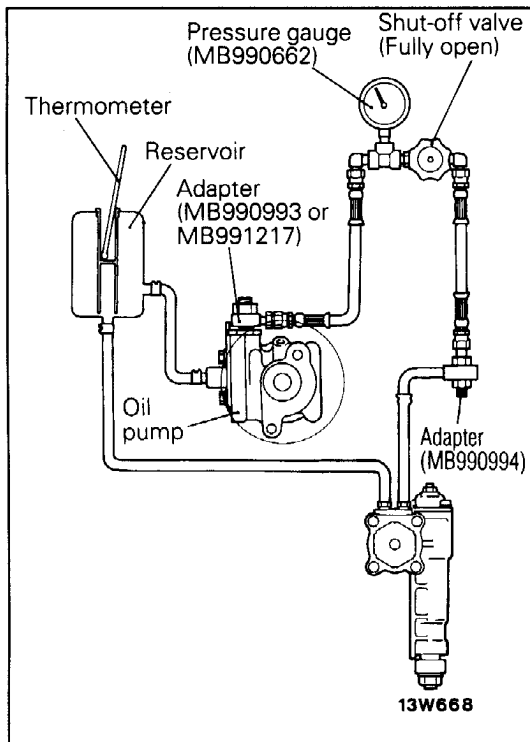
**CHECKING THE PRESSURE UNDER NO-LOAD CONDITIONS**

1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid raises to approximately 50–60°C (122–140°F).
3. Start the engine and idle it at 1,000 ± 100 r/min.
4. Check whether or not the hydraulic pressure is the standard value when no-load conditions are created by fully opening the shut-off valve of the pressure gauge.

**Standard value: 0.8–1.0 MPa**

**(8–10 kg/cm<sup>2</sup>, 114–142 psi.)**

5. If it is not within the standard value, the probable cause is a malfunction of the oil line or steering gear box, so check these parts and repair as necessary.
6. Remove the special tools, and then tighten the pressure hose to the specified torque.
7. Bleed the system.

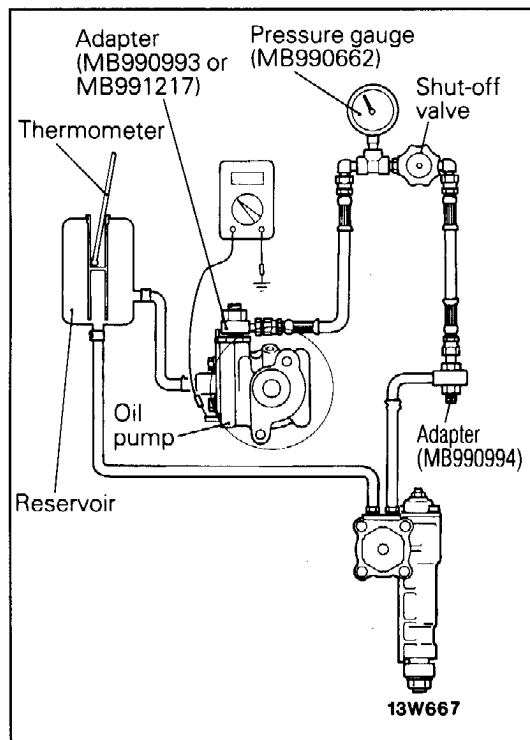


**CHECKING THE STEERING GEAR RETENTION HYDRAULIC PRESSURE**

1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50–60°C (122–140°F).
3. Start the engine and idle it at 1,000±100 r/min.
4. Fully close and fully open the shut-off valve of the pressure gauge.
5. Turn the steering wheel all the way to the left or right; then check whether or not the retention hydraulic pressure is the standard value.

**Standard value: <2400, 3000–12 VALVE, 2500D>**  
 7.5–8.2 MPa  
 (75–82 kg/cm<sup>2</sup>, 1,067–1,166 psi.)  
**<3000–24 VALVE, 3500, 2800D>**  
 8.3–9.0 MPa  
 (83–90 kg/cm<sup>2</sup>, 1,195–1,280 psi.)

6. When not within the standard value, overhaul the steering gear box. Remeasure fluid pressure.
7. Remove the special tools, and then tighten the pressure hose to the specified torque.
8. Bleed the system.



**POWER STEERING OIL PRESSURE SWITCH CHECK**

E37FOAA

1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50–60°C (122–140°F).
3. The engine should be idling.
4. Disconnect the connector for the oil-pressure switch, and place an ohmmeter in position.
5. Gradually close the shut-off valve of the pressure gauge and increase the hydraulic pressure then check whether or not the hydraulic pressure that activates the switch is the standard value.

**Standard value: 1.5–2.0 MPa**  
 (15–20 kg/cm<sup>2</sup>, 213–284 psi.)

6. Gradually open the shut-off valve and reduce the hydraulic pressure; then check whether or not the hydraulic pressure that deactivates the switch is the standard value.

**Standard value: 0.7–1.2 MPa**  
 (7–12 kg/cm<sup>2</sup>, 100–171 psi.)

7. Remove the special tools, and then tighten the pressure hose to the specified torque.
8. Bleed the system.

STEERING COLUMN AND SHAFT

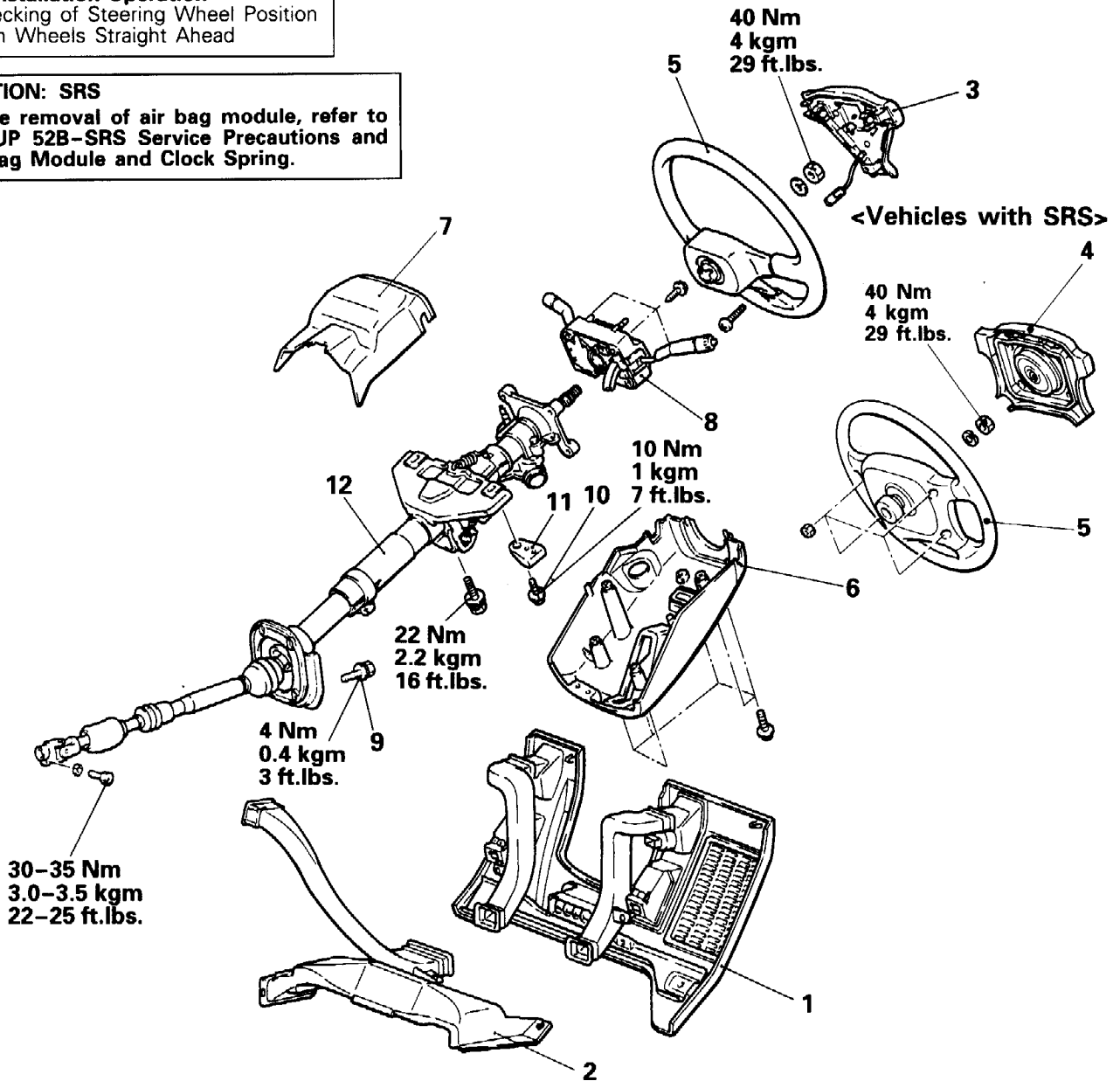
REMOVAL AND INSTALLATION

E37HA--

**Post-installation Operation**  
 • Checking of Steering Wheel Position with Wheels Straight Ahead

**CAUTION: SRS**  
 Before removal of air bag module, refer to GROUP 52B–SRS Service Precautions and Air Bag Module and Clock Spring.

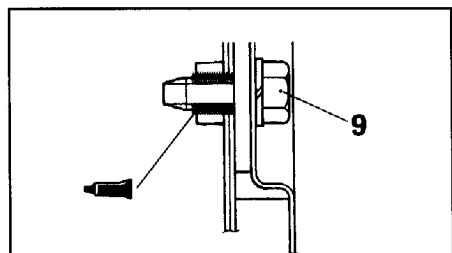
<Vehicles without SRS>



**Removal steps**

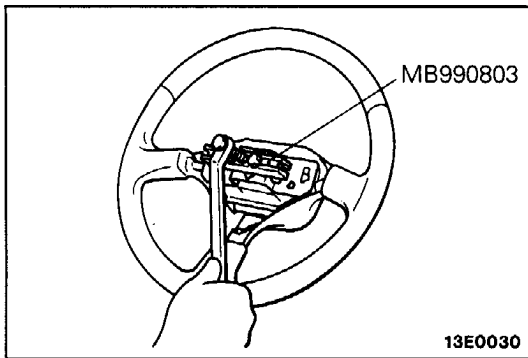
1. Instrument under cover  
(Refer to GROUP 52A–Instrument Panel.)
2. Lap cooler duct and foot shower duct  
(Refer to GROUP 55–Ventilators.)
3. Horn pad
4. Air-bag module (Refer to GROUP 52B–Air Bag Module and Clock Spring.)
- ↔ 5. Steering wheel assembly
- ↔ 6. Lower column cover
- ↔ 7. Upper column cover
- ↔ 8. Column switch
- ↔ 9. Cover attaching bolt
- ↔ 10. Special screw
- ↔ 11. Special washer
- ↔ 12. Steering column and shaft assembly

13E0065



13N0124

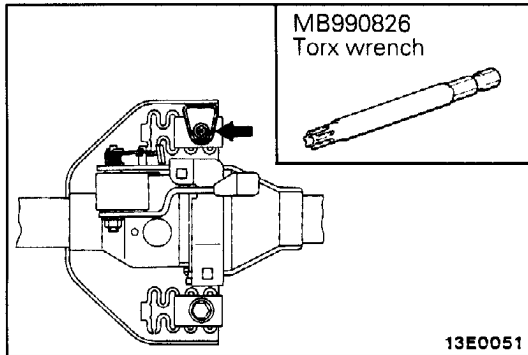
**Sealant: 3M ATD Part No. 8661 or equivalent**



**SERVICE POINTS OF REMOVAL**

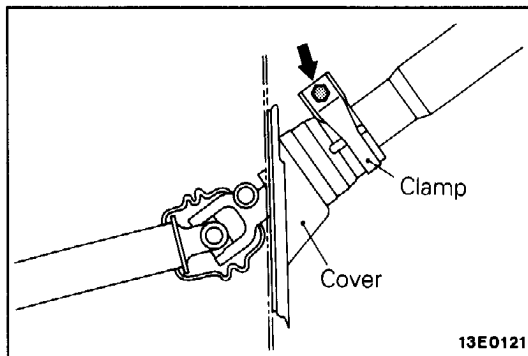
E37HBAT

**5. REMOVAL OF STEERING WHEEL ASSEMBLY**



**10. REMOVAL OF SPECIAL SCREW**

Remove the special screw by using the special tool.

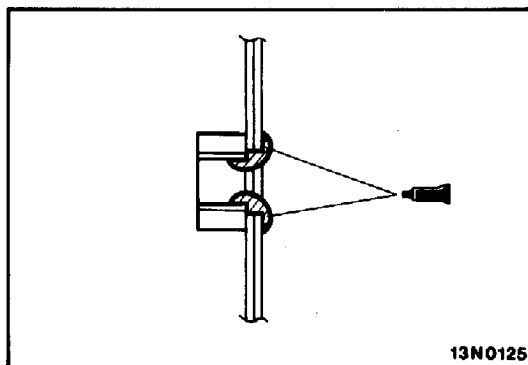


**SERVICE POINTS OF INSTALLATION**

E37HDAI

**12. INSTALLATION OF STEERING COLUMN AND SHAFT ASSEMBLY**

Never loosen the clamp bolt (arrow mak in the figure) when installing the steering column and shaft assembly to the body side.



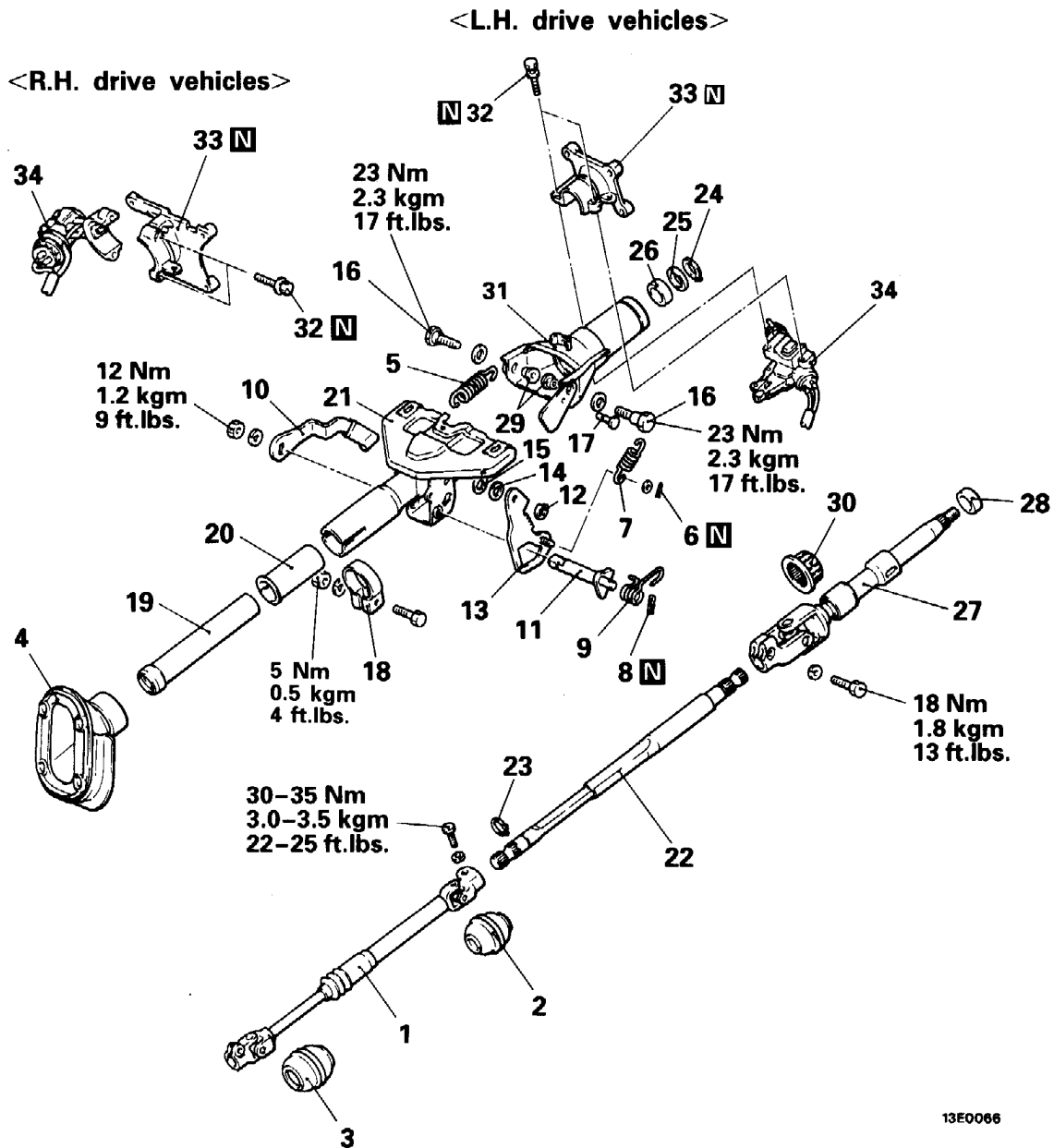
**9. INSTALLATION OF COVER ATTACHING BOLT**

Before installing the bolt, apply specified sealant to the toeboard mounting hole.

DISASSEMBLY AND REASSEMBLY

E37HE--

<Vehicles without SRS>



13E0066

Disassembly steps

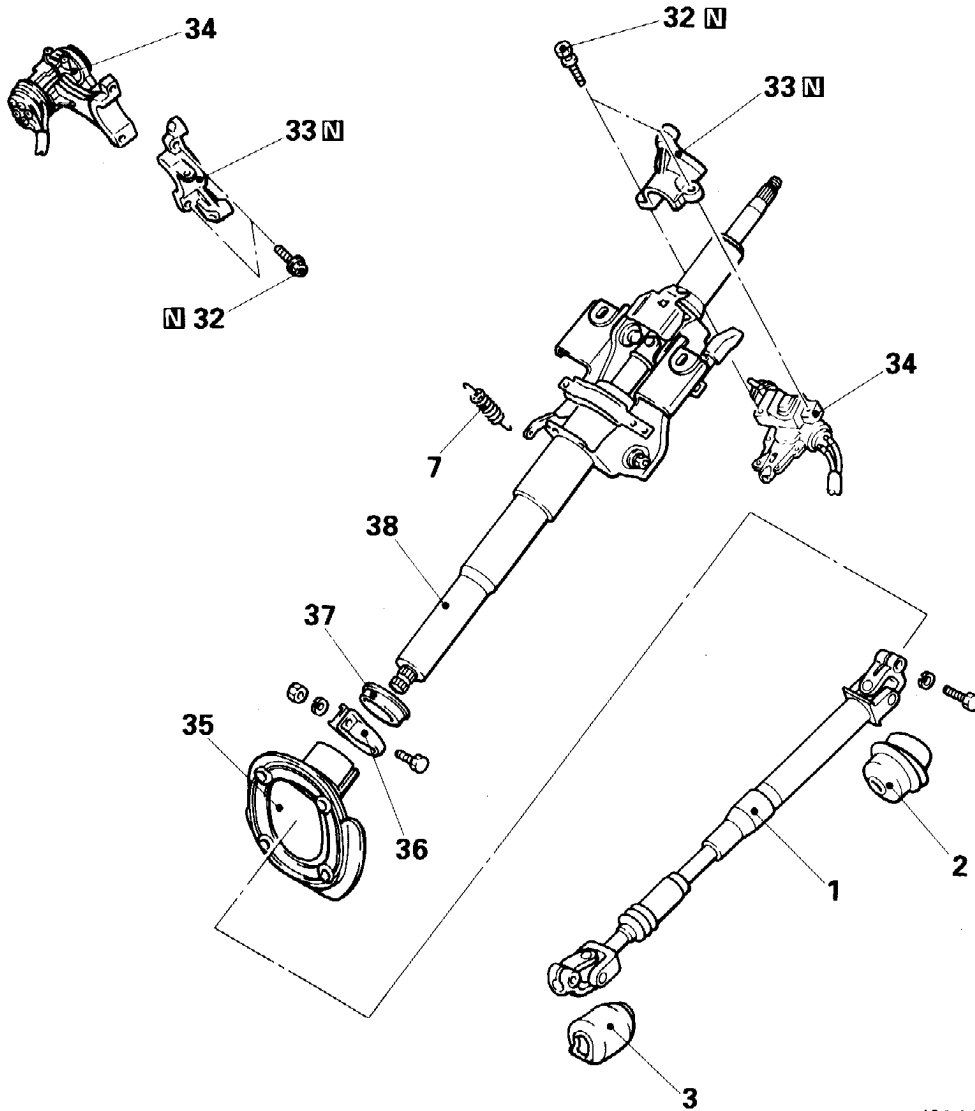
- |    |                   |    |                             |
|----|-------------------|----|-----------------------------|
| ◆◆ | 1. Joint assembly | ◆◆ | 18. Clamp                   |
|    | 2. Upper boot     | ◆◆ | 19. Lower pipe              |
|    | 3. Lower boot     |    | 20. Steering column bushing |
|    | 4. Cover assembly |    | 21. Steering column, lower  |
|    | 5. Return spring  | ◆◆ | 22. Steering shaft, lower   |
|    | 6. Split pin      |    | 23. Snap ring               |
|    | 7. Return spring  | ◆◆ | 24. Snap ring               |
|    | 8. Split pin      |    | 25. Stopper                 |
|    | 9. Return spring  |    | 26. Bearing spacer          |
|    | 10. Tilt lever    |    | 27. Steering shaft, upper   |
|    | 11. Shaft         |    | 28. Bearing spacer          |
|    | 12. Snap ring     |    | 29. Bushing                 |
|    | 13. Lock plate    |    | 30. Bearing                 |
|    | 14. Washer        |    | 31. Steering column, upper  |
|    | 15. Wave washer   | ◆◆ | 32. Special bolt            |
|    | 16. Bolt          | ◆◆ | 33. Steering lock bracket   |
| ◆◆ | 17. Clevis pin    | ◆◆ | 34. Steering lock cylinder  |



<Vehicles with SRS>

<R.H. drive vehicles>

<L.H. drive vehicles>



13E0118

**Disassembly steps**

- ◆◆ 1. Joint assembly
- 2. Upper boot
- 3. Lower boot
- 7. Return spring
- ◆◆ 32. Special bolt
- ◆◆◆ 33. Steering lock bracket
- ◆◆◆ 34. Steering lock cylinder
- ◆◆◆ 35. Cover assembly
- ◆◆◆ 36. Clamp
- ◆◆◆ 37. Bush
- ◆◆◆ 38. Steering column assembly

**37-16-2**

**NOTES**

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LUBRICATION, SEALING AND ADHESION POINTS

<Vehicles with SRS>

13E0110

<Vehicles without SRS>

13E0018

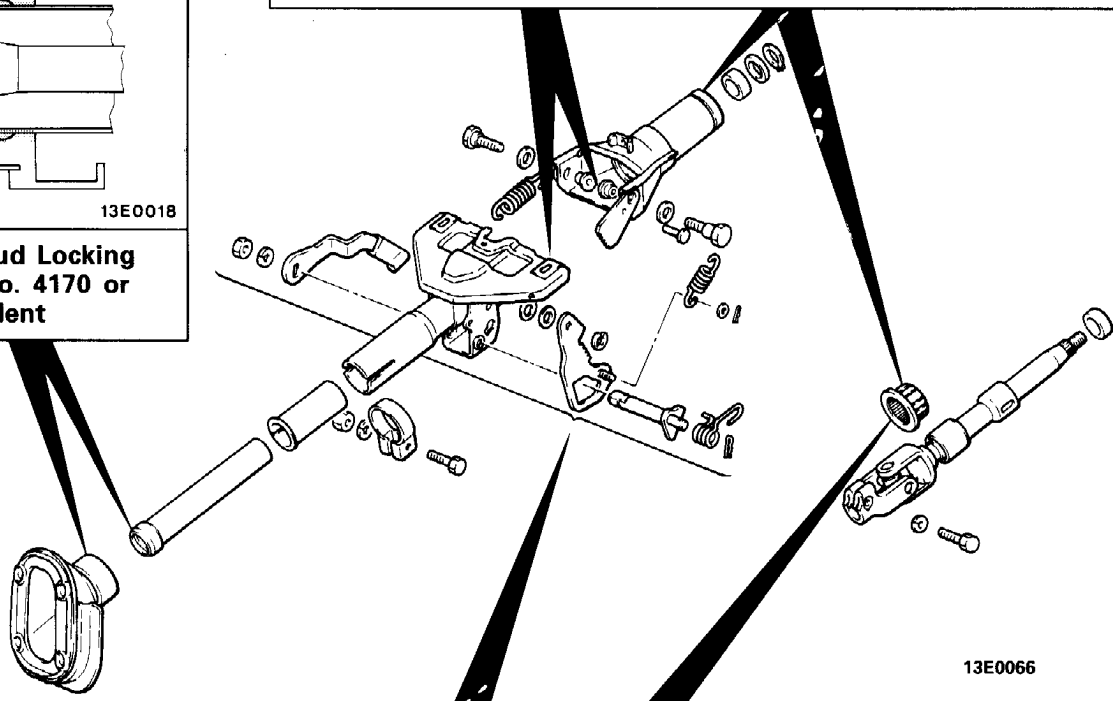
Adhesive: 3M Stud Locking Part No. 4170 or equivalent

<Vehicles without SRS>

13E0017

Caution  
 (1) Do not apply adhesive to the bolt side.  
 (2) If any adhesive is adhering to the inside of the nut, remove it before applying new adhesive.

Adhesive: 3M Stud Locking Part No. 4170 or equivalent



<Vehicles without SRS>

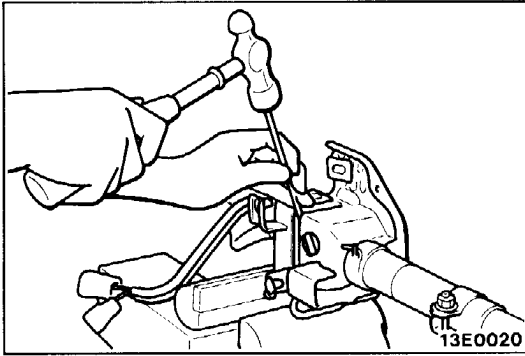
13E0016

<Vehicles without SRS>

10 mm (0.39 in.)

13E0041

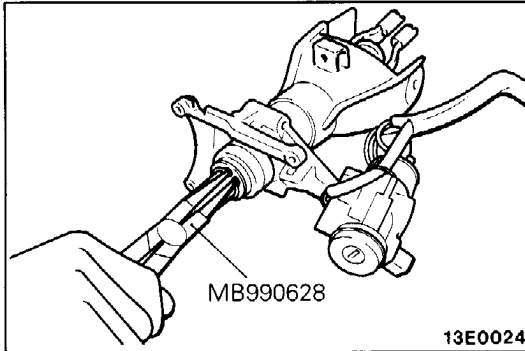
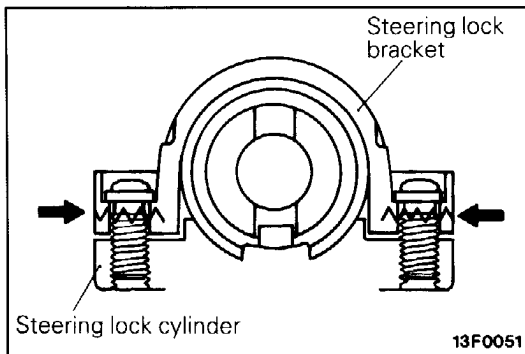
Adhesive: 3M ATD Part No. 8001 or equivalent

**SERVICE POINTS OF DISASSEMBLY**

E37HFAR

**17. REMOVAL OF CLEVIS PIN**

Knock the clevis pin out from the inside of the steering column.

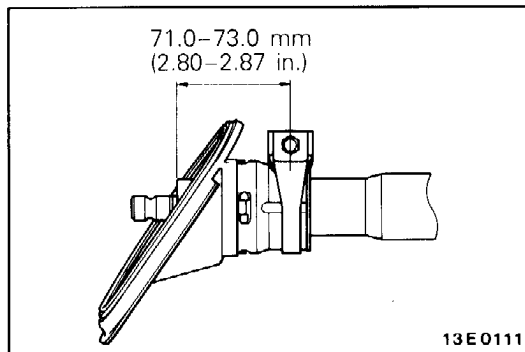
**24. REMOVAL OF SNAP RING****33. REMOVAL OF STEERING LOCK BRACKET/34. STEERING LOCK CYLINDER**

If it is necessary to remove the steering lock cylinder, use a hacksaw to cut the special bolts at the steering lock bracket side.

**INSPECTION**

E37HGAN

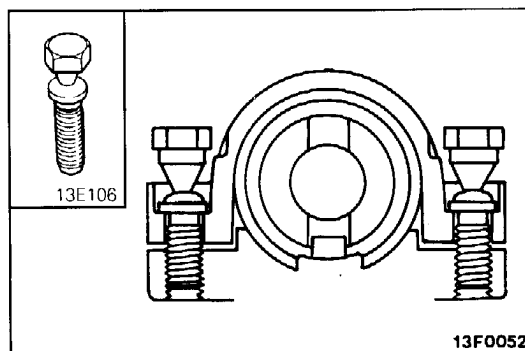
Check the steering shaft and joint for play or faulty operation.

**SERVICE POINTS OF REASSEMBLY**

E37HHAP

**36. INSTALLATION OF CLAMP/35. COVER ASSEMBLY**

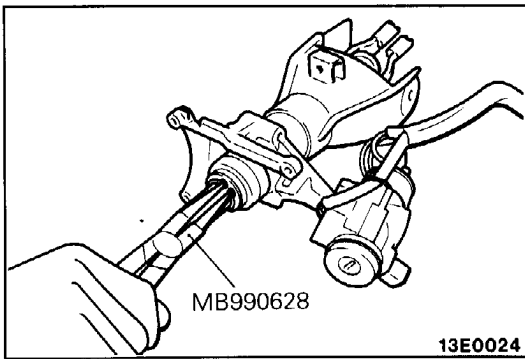
Install the clamp to the steering column assembly as shown in the illustration.

**34. INSTALLATION OF STEERING LOCK CYLINDER/33. STEERING LOCK BRACKET/32. SPECIAL BOLT**

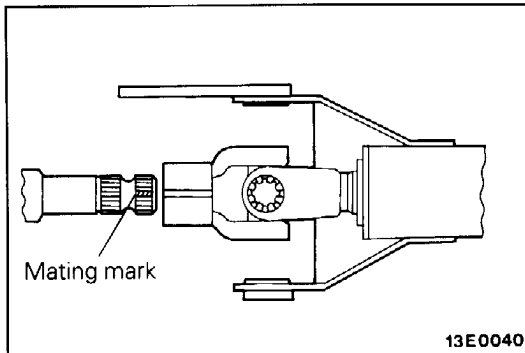
- (1) When installing the steering lock and steering lock bracket to the column tube, temporarily install the steering lock in alignment with the column boss.
- (2) After checking that the lock works properly, tighten the special bolts until the head twists off.

**Caution**

The steering lock bracket and bolts must be replaced with new ones when the steering lock is installed.

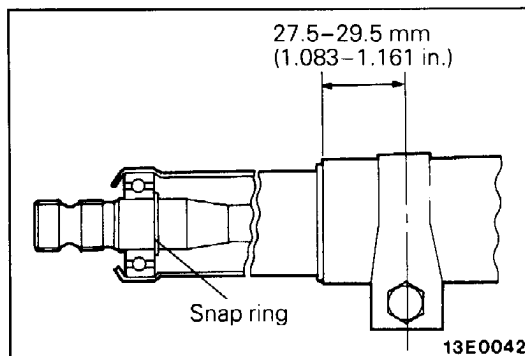


**24. INSTALLATION OF SNAP RING**



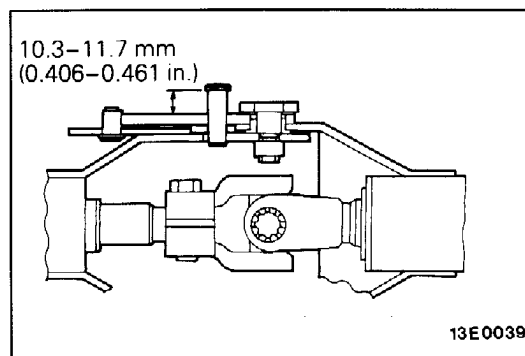
**22. INSTALLATION OF STEERING SHAFT, LOWER**

When installing, align the mating mark (yellow line) on the steering shaft lower with the groove on the steering shaft upper yoke.



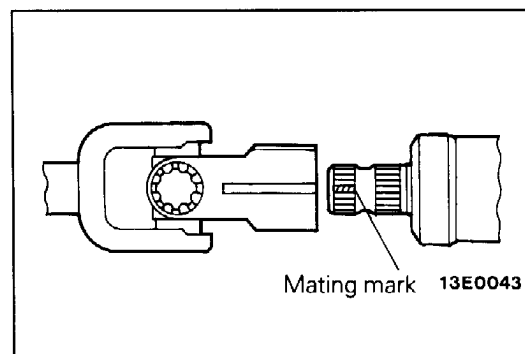
**19. INSTALLATION OF LOWER PIPE/18. CLAMP**

- (1) Insert the lower pipe into the steering column lower until the bearing touches the snap ring on the steering shaft lower.
- (2) Install the clamp in the position shown in the illustration.



**17. INSTALLATION OF CLEVIS PIN**

Insert the clevis pin by tapping it until the protruding length is as shown in the illustration.



**1. INSTALLATION OF JOINT ASSEMBLY**

When installing, align the groove on the joint yoke with the mating mark (yellow line) on the steering shaft lower.

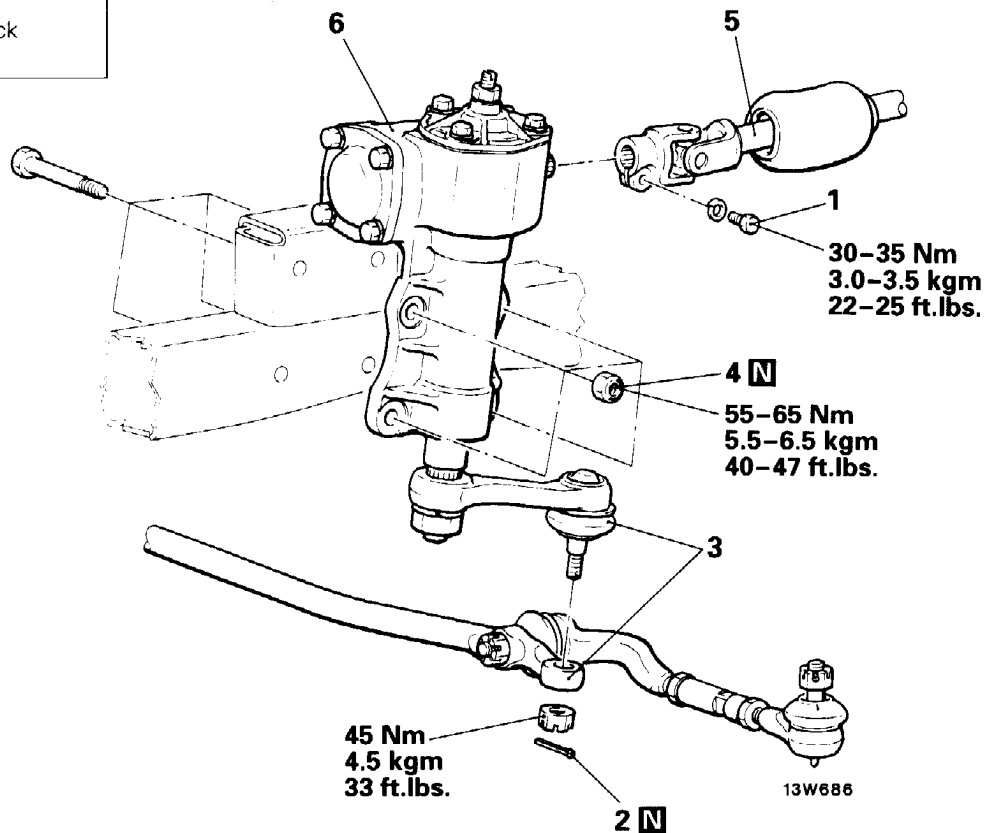
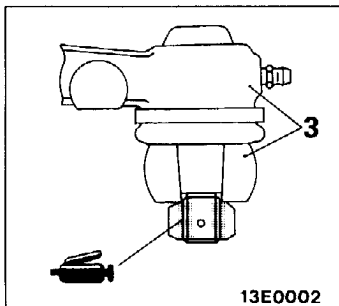
## MANUAL STEERING GEAR BOX

E37JA--

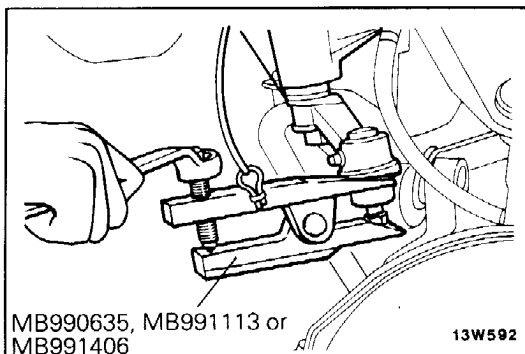
## REMOVAL AND INSTALLATION

**Pre-installation Operation**

- Steering Gear Oil Level Check (Refer to P.37-8.)

**Removal steps**

1. Bolt
2. Split pin
3. Connection for relay rod and pitman arm
4. Self locking nuts
5. Joint assembly connection
6. Steering gear box

**SERVICE POINTS OF REMOVAL**

E37JBAD

**3. DISCONNECTION OF RELAY ROD AND PITMAN ARM****Caution**

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

**SERVICE POINTS OF INSTALLATION**

E37JDAC

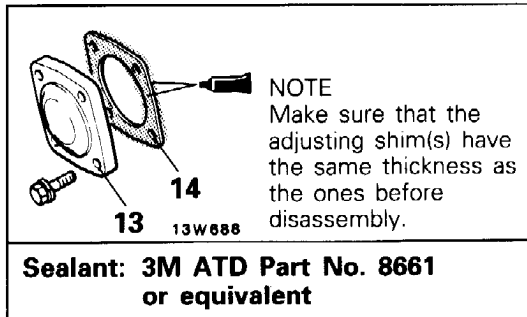
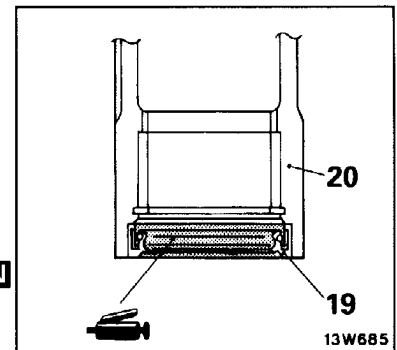
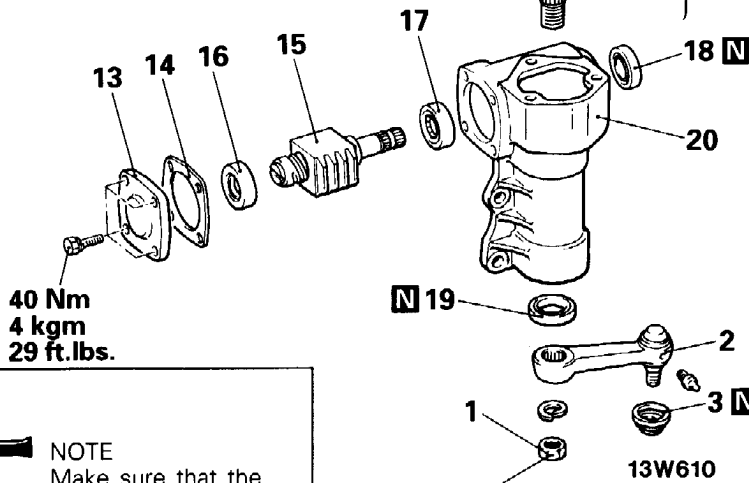
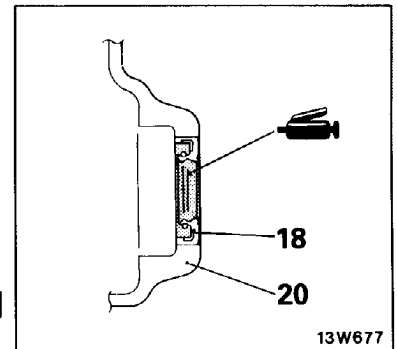
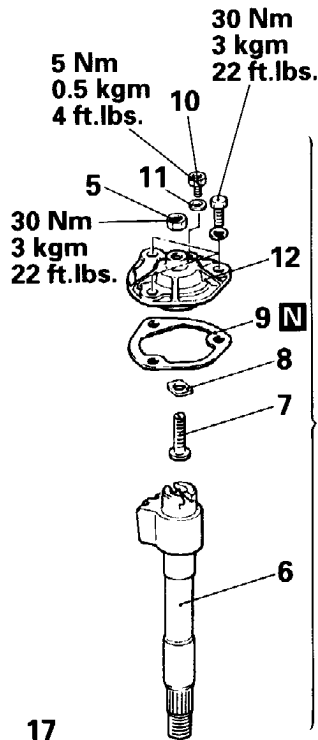
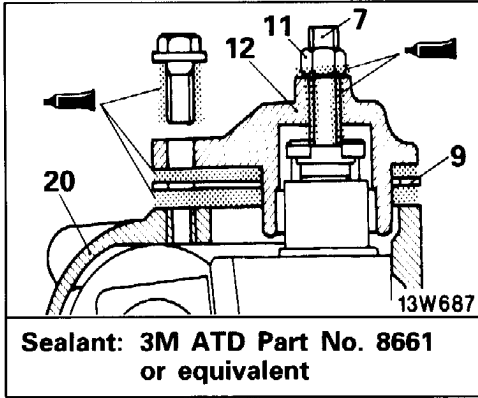
**6. INSTALLATION OF STEERING GEAR BOX**

Install the steering gear box to the frame after inserting the steering gear box mainshaft into the joint assembly.

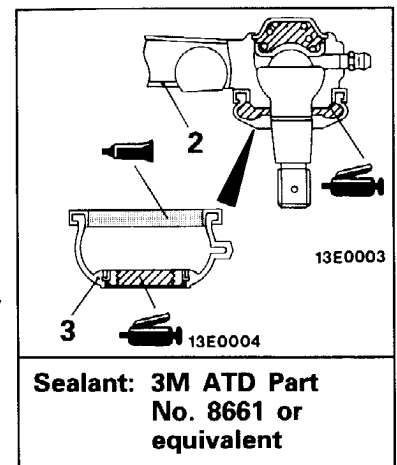
DISASSEMBLY AND REASSEMBLY

**Pre-removal Operation**

- Remove the breather plug, and drain the steering gear oil.



**130-150 Nm**  
**13-15 kgm**  
**94-108 ft.lbs.**

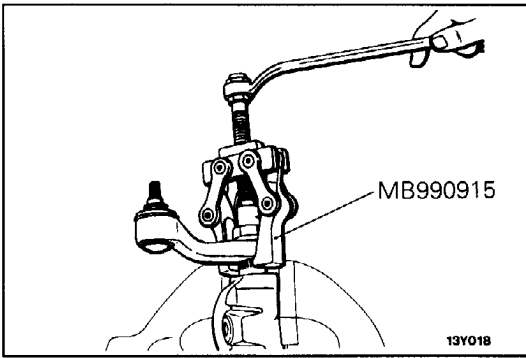


**Disassembly steps**

- 1. Jam nut
- ↔ ↔ 2. Pitman arm
- ↔ ↔ 3. Dust cover
- ↔ ↔ 4. Top cover and cross-shaft assembly
- 5. Lock nut
- 6. Cross-shaft
- 7. Adjusting bolt
- ↔ ↔ 8. Adjusting spacer
- 9. Packing
- 10. Breather plug

- 11. Gasket
- 12. Top cover
- ↔ ↔ 13. End cover
- 14. Adjusting shim
- 15. Mainshaft assembly
- 16. Bearing
- 17. Bearing
- ↔ ↔ 18. Oil seal
- ↔ ↔ 19. Oil seal
- 20. Gear box housing

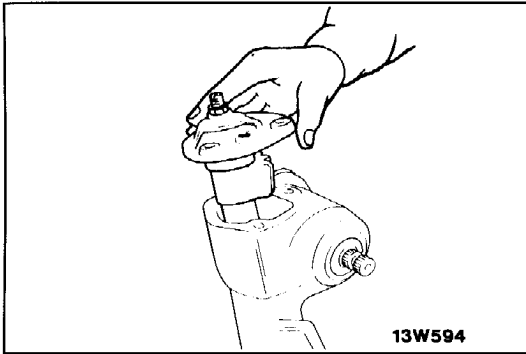
**Caution**  
Do not disassemble the ball nut from the mainshaft.



**SERVICE POINTS OF DISASSEMBLY**

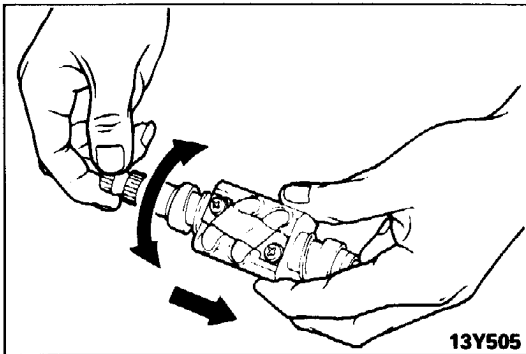
E37JFAE

**2. REMOVAL OF PITMAN ARM**



**4. REMOVAL OF TOP COVER AND CROSS-SHAFT ASSEMBLY**

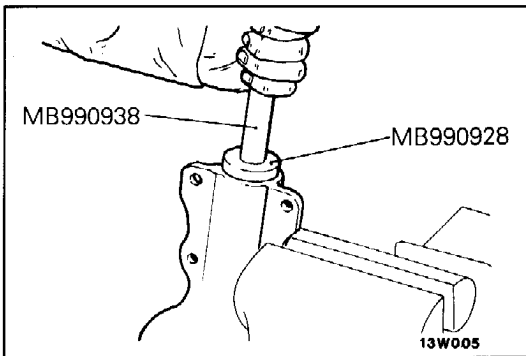
With the mainshaft and cross-shaft placed in the straight ahead position, tap the bottom of cross-shaft with a plastic hammer to take out the cross-shaft together with the top cover.



**INSPECTION**

E37JGAB

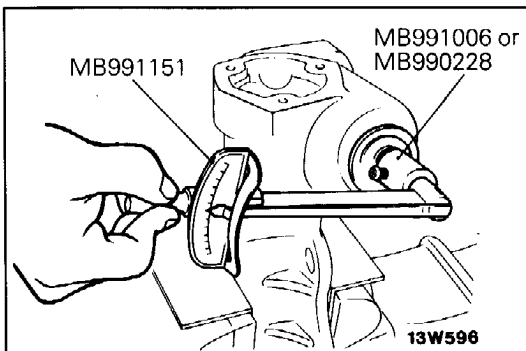
- Check the ball nut for smooth rotation and axial play.
- Check the bearing for seizure and discolouration, and the rough rolling surface of ball nut raceway.



**SERVICE POINTS OF REASSEMBLY**

E37JHAE

**19./18. INSTALLATION OF OIL SEALS**

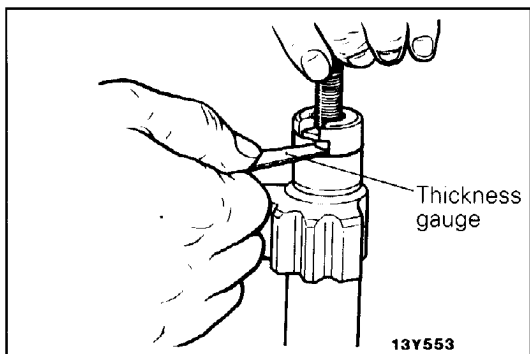


**13. INSTALLATION OF END COVER**

**Standard value: 0.35–0.55 Nm  
(3.5–5.5 kgcm, 3–5 in.lbs.)**

- (1) If the measured value is not within the standard value, make adjustment by changing the adjusting shim(s).
- (2) Remove the shim(s) to increase starting torque. Add shim(s) to reduce starting torque.





### 8. INSTALLATION OF ADJUSTING SPACER

- (1) Install the adjusting spacer to the adjusting bolt and measure the cross-shaft axial play.

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

- (2) If the measured value is not within the standard value, make adjustment by changing the adjusting spacer.

### 4. INSTALLATION OF TOP COVER AND CROSS-SHAFT ASSEMBLY

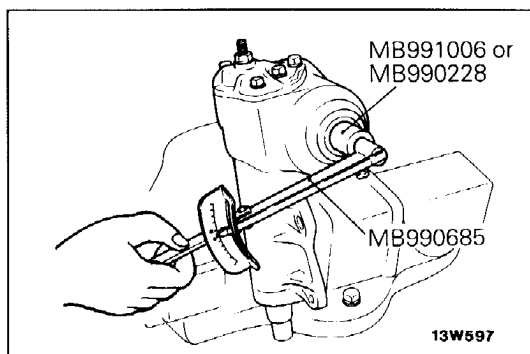
Lubricate the bearings and the gear teeth of each shaft.

- (1) Move the ball nut of the mainshaft to the centre position (straight-ahead position).

**Caution**

**Use care not to damage the cross-shaft oil seal.**

- (2) Turn the adjusting bolt 2 or 3 times until the tooth surfaces are in contact.



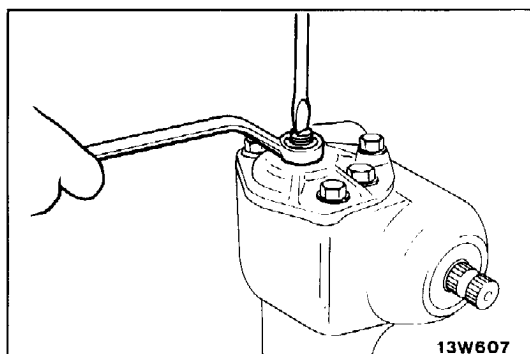
- (3) Measure the mainshaft total starting torque.

- ① Secure the flange part of the gear box housing in a vise.
- ② Measure the mainshaft total starting torque by using the special tools.

**Standard value: 0.65–0.85 Nm  
(6.5–8.5 kgcm, 5.7–7.3 in.lbs.)**

**NOTE**

The mainshaft should rotate smoothly across the entire range.



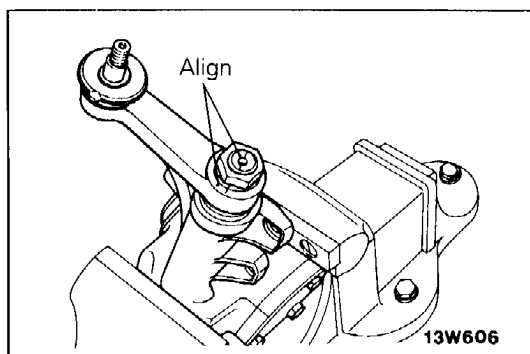
- ③ If the measured value is not within the standard value, adjust by turning the adjusting bolt in or out.

- ④ If it can not be adjusted to the standard value by turning the adjusting bolt, check the following points.

- A. Cross-shaft eccentricity due to improperly installed top cover
- B. Cross-shaft needle roller bearing damaged
- C. End cover improperly installed

### 2. INSTALLATION OF PITMAN ARM

Install the pitman arm to the gear box with the mating marks aligned.



## POWER STEERING GEAR BOX

E37NA--

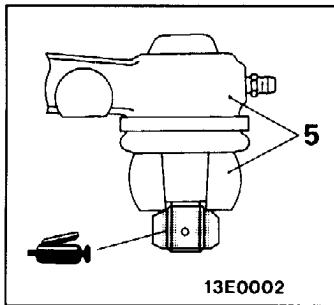
## REMOVAL AND INSTALLATION

**Pre-removal Operation**

- Draining of the Power Steering Fluid (Refer to P.37-10.)

**Pre-installation Operation**

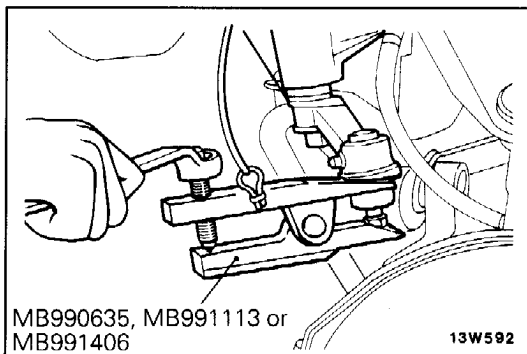
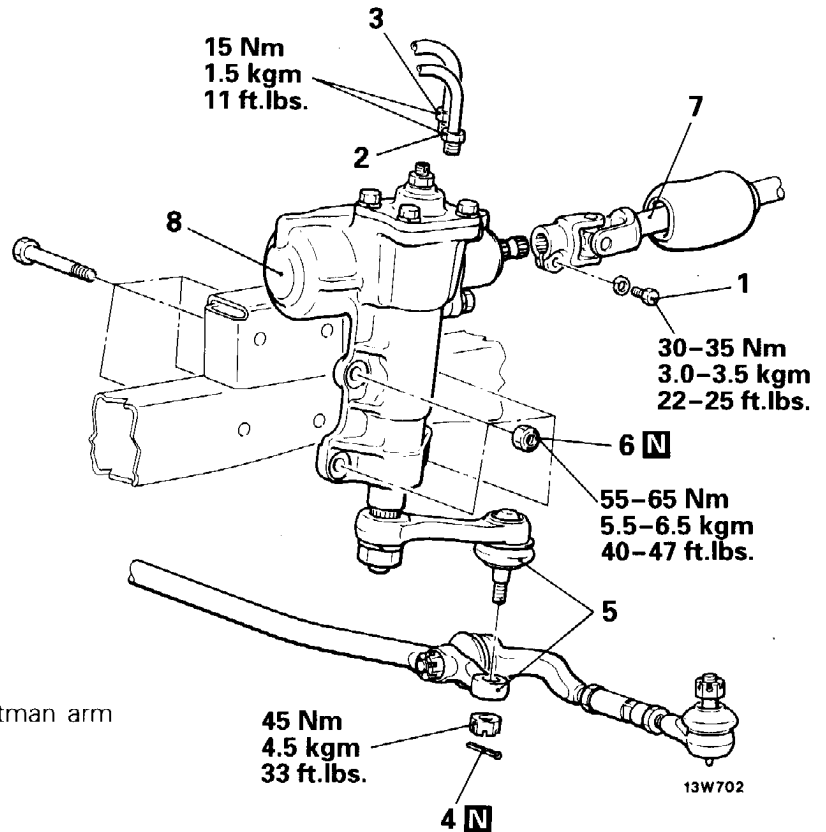
- Supplying of Power Steering Fluid (Refer to P.37-10.)
- Bleeding of the Power Steering Fluid Line (Refer to P.37-11.)

**Removal steps**

1. Bolt
2. Connection for pressure hose
3. Connection for return hose
4. Split pin
5. Connection for relay rod and pitman arm
6. Self-locking nuts
7. Connection for joint assembly
8. Power steering gear box

**CAUTION: SRS**

For vehicles with SRS, before removal of steering gear box, refer to GROUP 52B-SRS, center front wheels and remove ignition key. Failure to do so may damage SRS clock spring and render SRS system inoperative, risking serious driver injury.

**SERVICE POINTS OF REMOVAL**

E37NBAD

**5. DISCONNECTION OF RELAY ROD AND PITMAN ARM****Caution**

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

**SERVICE POINTS OF INSTALLATION**

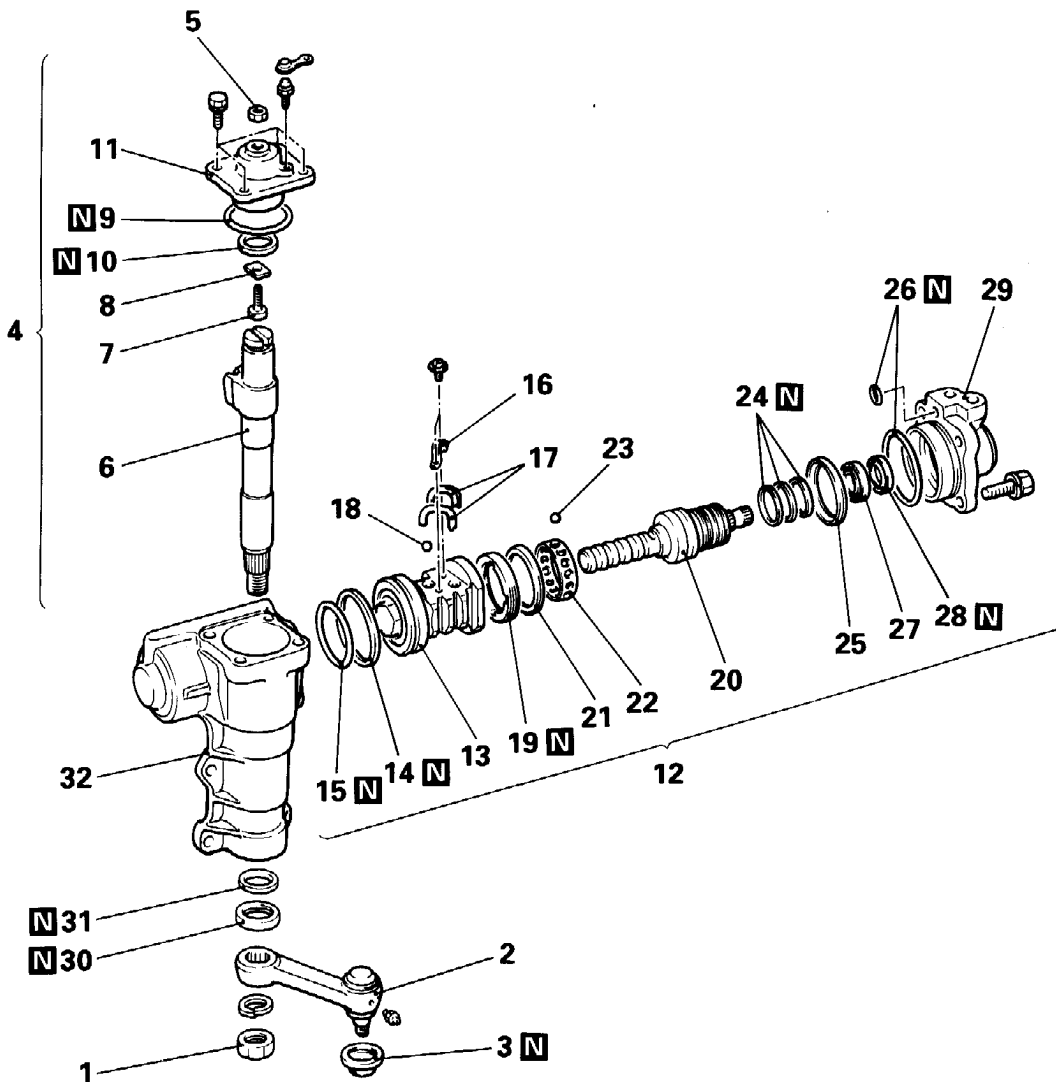
E37NDAAa

**8. INSTALLATION OF POWER STEERING GEAR BOX**

Install the power steering gear box to the frame after inserting the power steering gear box mainshaft into the joint assembly.

DISASSEMBLY

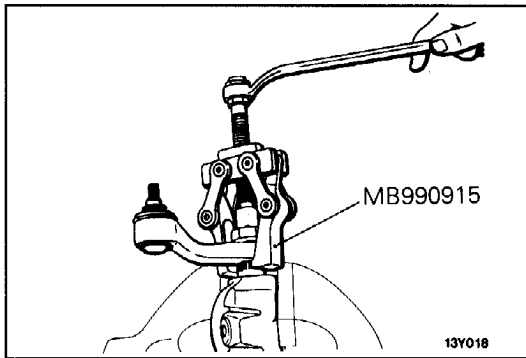
E37NF--



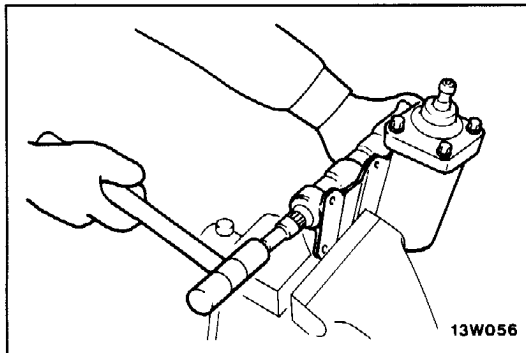
13W703

**Disassembly steps**

- |   |  |   |                      |
|---|--|---|----------------------|
| ↔ | 1. Jam nut                             | ↔ | 17. Circulator       |
| ↔ | 2. Pitman arm                          | ↔ | 18. Ball             |
| ↔ | 3. Dust cover                          | ↔ | 19. Lock nut         |
| ↔ | 4. Side cover and cross-shaft assembly | ↔ | 20. Main shaft       |
|   | 5. Adjusting bolt lock nut             | ↔ | 21. Bearing race     |
|   | 6. Cross-shaft                         | ↔ | 22. Cage             |
|   | 7. Adjusting bolt                      | ↔ | 23. Ball             |
|   | 8. Adjusting plate                     | ↔ | 24. Seal ring        |
|   | 9. O-ring                              | ↔ | 25. Bearing race     |
| ↔ | 10. Y-packing                          | ↔ | 26. O-ring           |
| ↔ | 11. Side cover                         | ↔ | 27. Bearing          |
| ↔ | 12. Main shaft and valve assembly      | ↔ | 28. Oil seal         |
| ↔ | 13. Rack piston                        | ↔ | 29. Valve housing    |
|   | 14. Seal ring                          |   | 30. Oil seal         |
|   | 15. O-ring                             |   | 31. Y-packing        |
|   | 16. Circulator holder                  |   | 32. Gear box housing |

**SERVICE POINTS OF DISASSEMBLY****2. REMOVAL OF PITMAN ARM****4. REMOVAL OF SIDE COVER AND CROSS-SHAFT ASSEMBLY**

With the mainshaft and cross-shaft placed in the straight ahead position, tap the bottom of the cross-shaft with a plastic hammer to take out the cross-shaft together with the side cover.

**10. REMOVAL OF Y-PACKING**

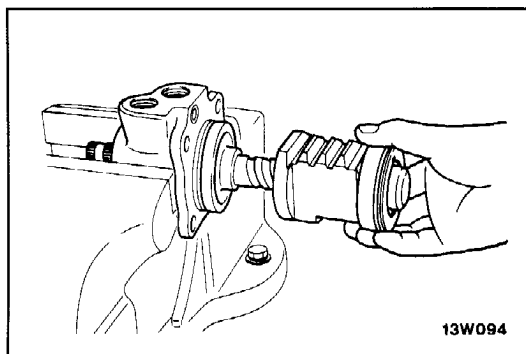
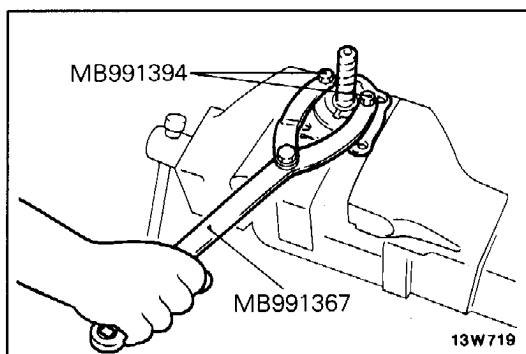
Do not remove the Y-packing at the rear of the needle bearing unless there is fluid leakage from the threads of the adjusting bolt. If there is leakage, replace the Y-packing with a new one.

**13. REMOVAL OF RACK PISTON**

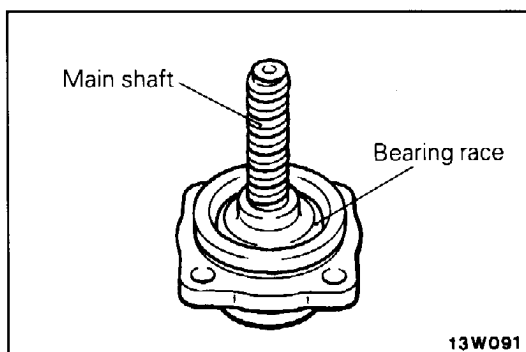
Remove the rack piston from the mainshaft by turning it counterclockwise.

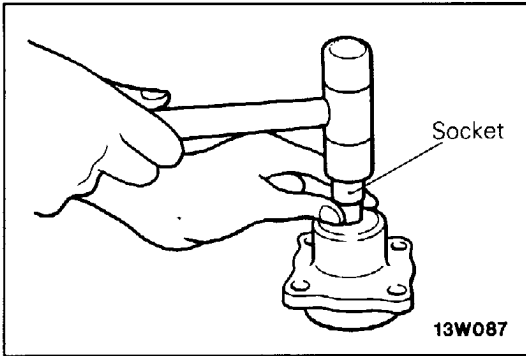
**Caution**

**Be careful not to lose the 26 balls inside the rack piston.**

**19. REMOVAL OF LOCK NUT****20. REMOVAL OF MAIN SHAFT/21. BEARING RACE/22. CAGE/23. BALL**

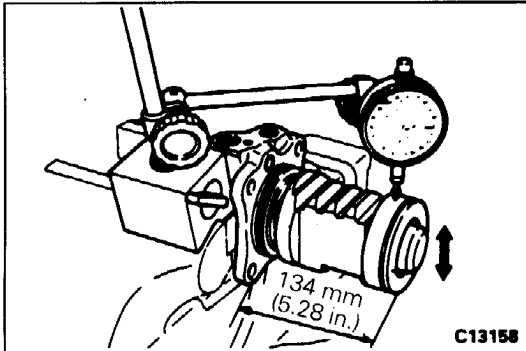
When removing the main shaft, remove it while pressing the bearing race so that the balls do not come out.





**27. REMOVAL OF BEARING/28. OIL SEAL**

Using a socket, remove the oil seal and the bearing from the valve housing simultaneously.



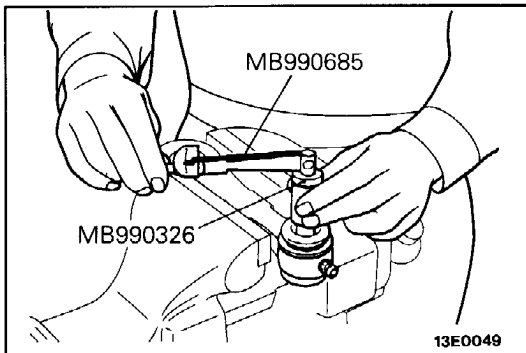
**INSPECTION**

E37NHAD

**BACKLASH BETWEEN BALL GROOVE OF RACK PISTON AND BALLS**

Set the rack piston to the position shown in the figure, and then measure the backlash by using a dial gauge.

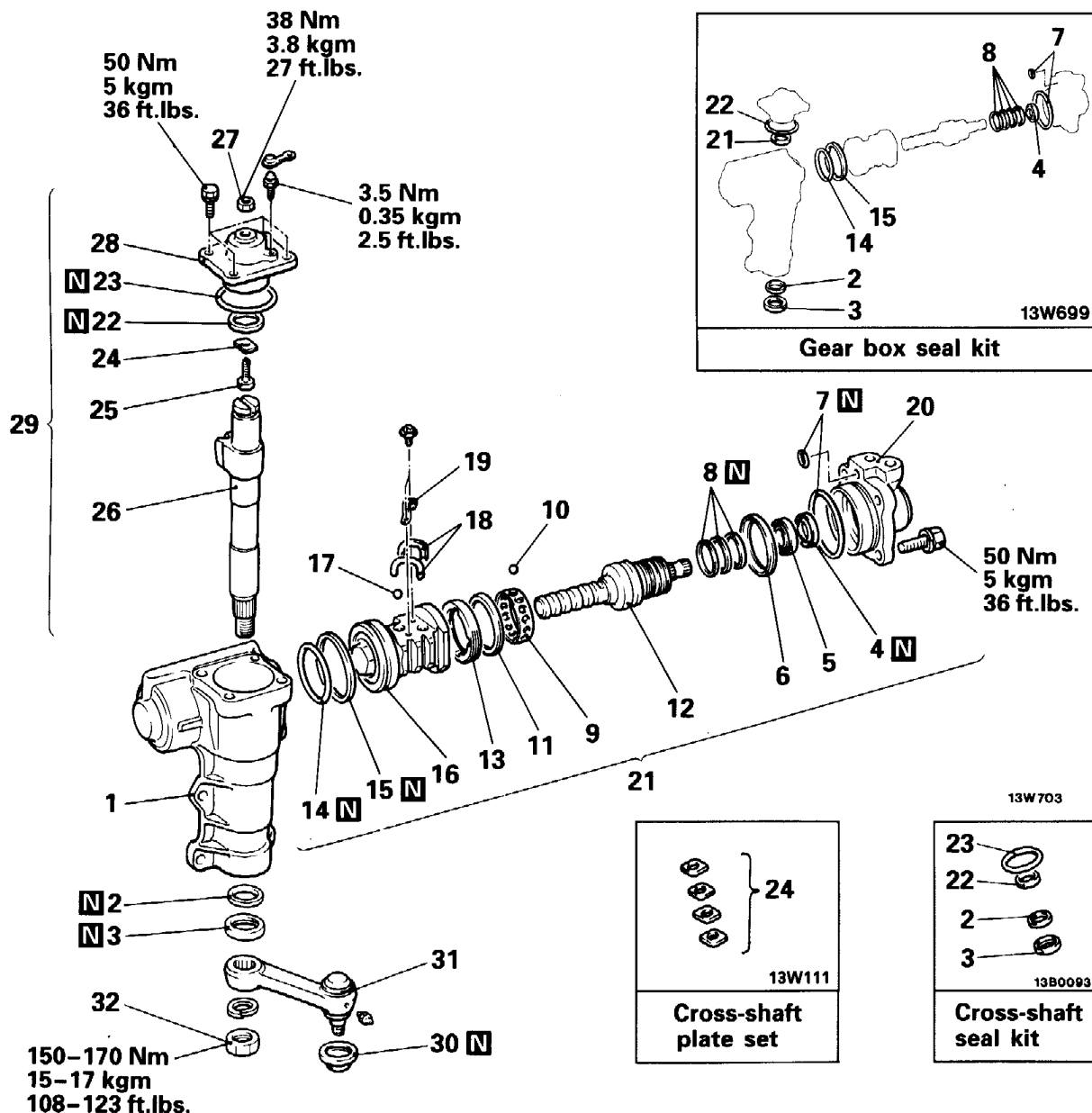
**Limit: 0.05 mm (0.0020 in.)**



**PITMAN ARM BALL JOINT STARTING TORQUE**

**Standard value: 1–3 Nm (10–30 kgcm, 9–26 in.lbs.)**

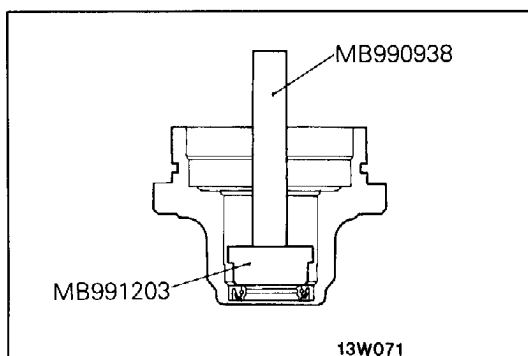
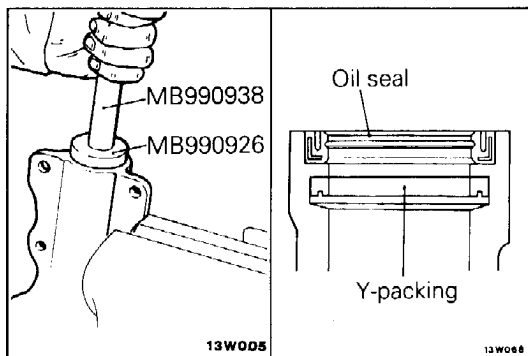
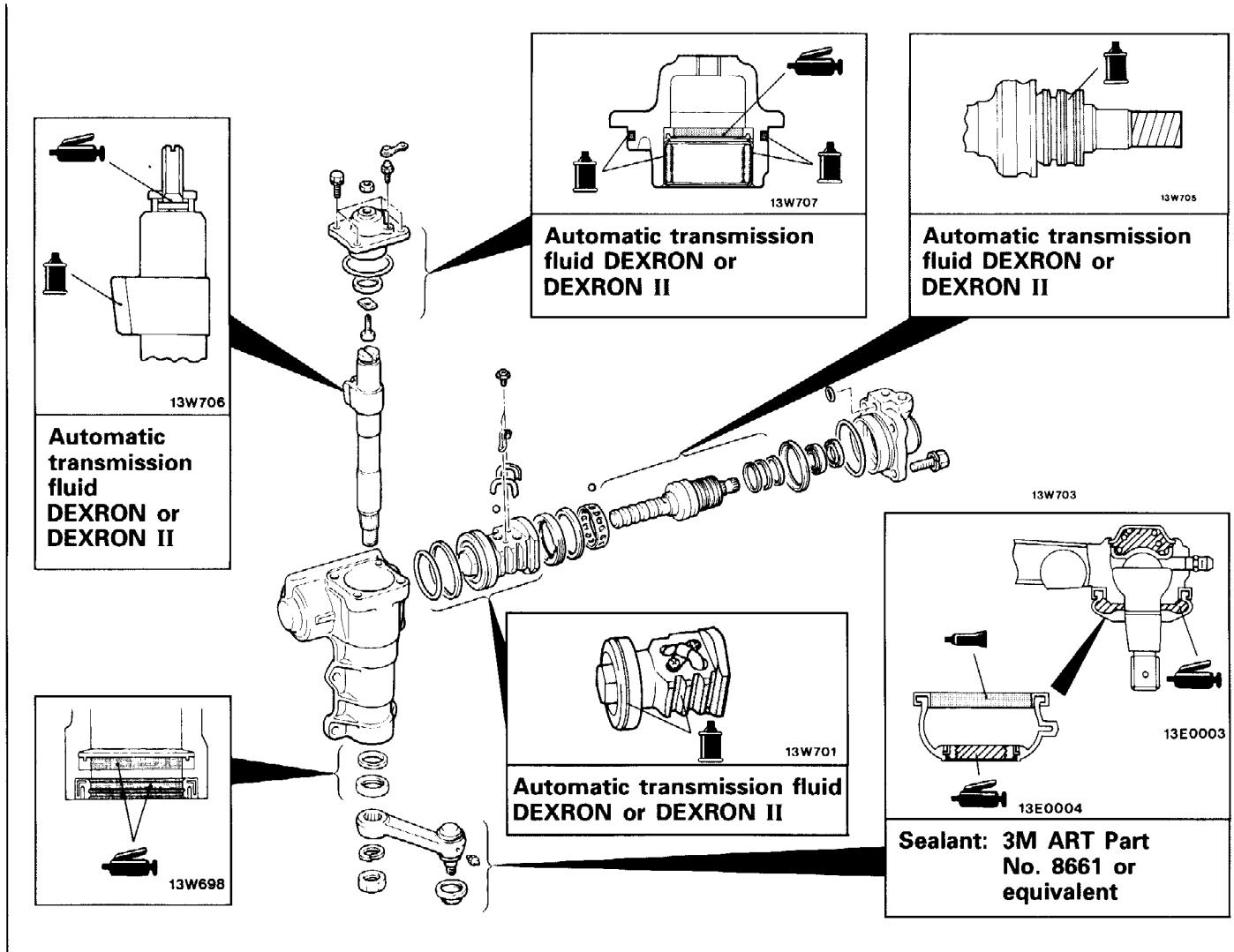
REASSEMBLY



Reassembly steps

- 1. Gear box housing
- ◆◆ 2. Y-packing
- ◆◆ 3. Oil seal
- ◆◆ 4. Oil seal
- ◆◆ 5. Bearing
- ◆◆ 6. Bearing race
- ◆◆ 7. O-ring
- ◆◆ 8. Seal ring
- ◆◆ 9. Cage
- ◆◆ 10. Ball
- ◆◆ 11. Bearing race
- ◆◆ 12. Main shaft
- ◆◆ 13. Lock nut
- ◆◆ • Adjustment of main shaft axial play
- ◆◆ 14. O-ring
- ◆◆ 15. Seal ring
- ◆◆ 16. Rack piston
- ◆◆ 17. Ball
- ◆◆ 18. Circulator
- ◆◆ 19. Circulator holder
- ◆◆ 20. Valve housing
- ◆◆ 21. Main shaft and valve assembly
- ◆◆ 22. Y-packing
- ◆◆ 23. O-ring
- ◆◆ 24. Adjusting plate
- ◆◆ 25. Adjusting bolt
- ◆◆ 26. Cross-shaft
- ◆◆ 27. Adjusting bolt lock nut
- ◆◆ 28. Side cover
- ◆◆ 29. Side cover and cross-shaft assembly
- ◆◆ • Adjustment of main shaft total starting torque
- ◆◆ 30. Dust cover
- ◆◆ 31. Pitman arm
- ◆◆ 32. Jam nut

LUBRICATION AND SEALING POINTS



SERVICE POINTS OF REASSEMBLY

E37NJAE

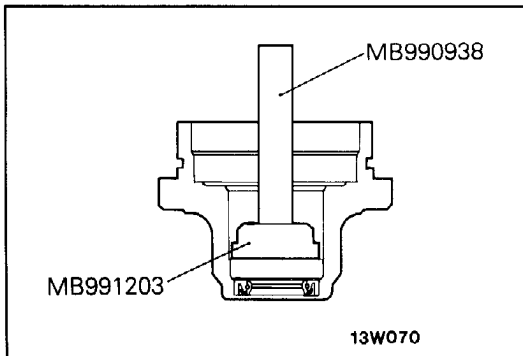
2. INSTALLATION OF Y-PACKING/3. OIL SEAL

- (1) Install the Y-packing facing the direction shown in the illustration.
- (2) Use the special tool to press-fit the oil seal to the gearbox housing so that it faces in the direction shown in the illustration.

4. INSTALLATION OF OIL SEAL

Apply a coating of the specified fluid to the outside of the oil seal. Using the special tools, press the oil seal into the valve housing.

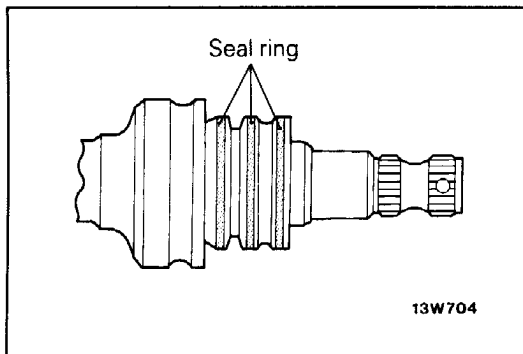
**Specified fluid: Automatic transmission fluid DEXRON or DEXRON II**



### 5. INSTALLATION OF BEARING

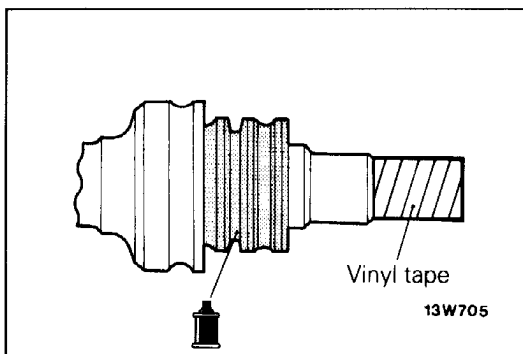
Apply a coating of the specified fluid to the outside of the bearing. Using the special tools, press the oil seal into the valve housing.

**Specified fluid: Automatic transmission fluid DEXRON or DEXRON II**



### 8. INSTALLATION OF SEAL RING

When installing seal ring, press firmly into valve groove.



### 9. INSTALLATION OF CAGE/10. BALL/11. BEARING RACE/12. MAIN SHAFT

(1) Apply specified fluid to valve body.

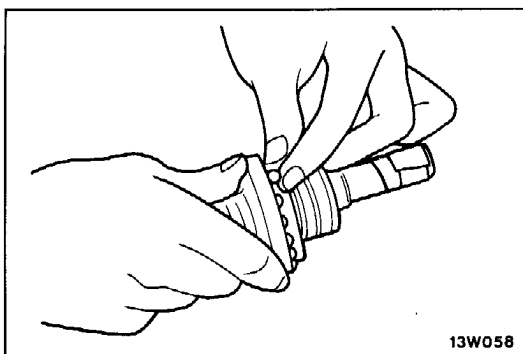
**Specified fluid: Automatic transmission fluid DEXRON or DEXRON II**

(2) Wrap vinyl tape around the serrated part so that the oil seal won't be damaged when the valve body is installed to the valve housing.

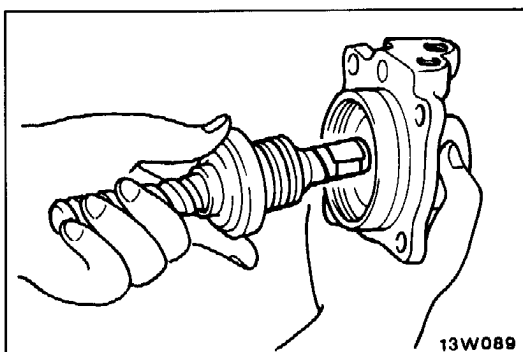
(3) Mount the valve body to the valve housing.

(4) Align the cage's hole and the channel in the main shaft, and insert two or three balls.

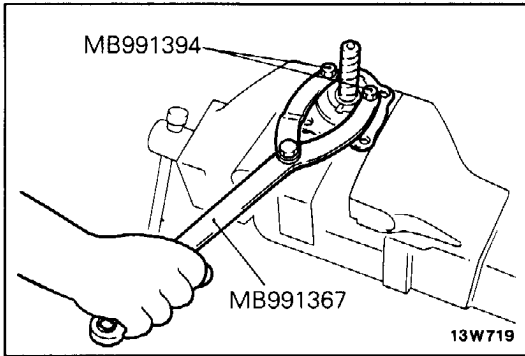
(5) Insert the remainder of the balls into the cage's hole while pressing the ball with the bearing race.



(6) When installing the main shaft, connect it to the valve housing while pressing the bearing race so that the balls do not come out.

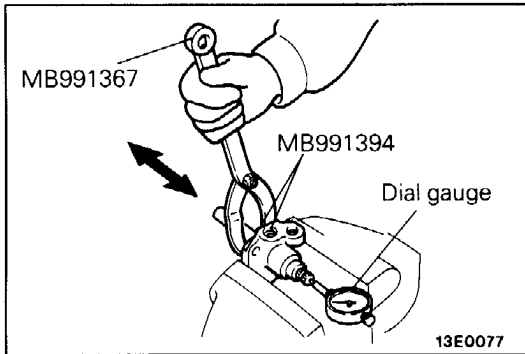






**13. INSTALLATION OF LOCK NUT**

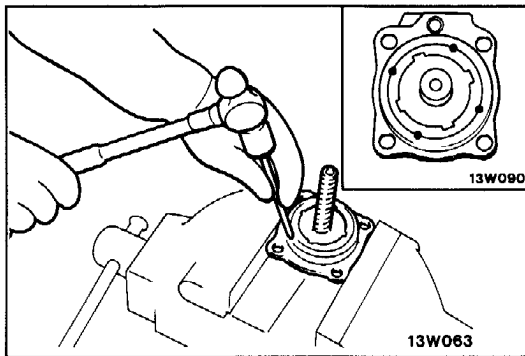
Using the special tool, tighten carefully until the lock nut contacts the bearing race.



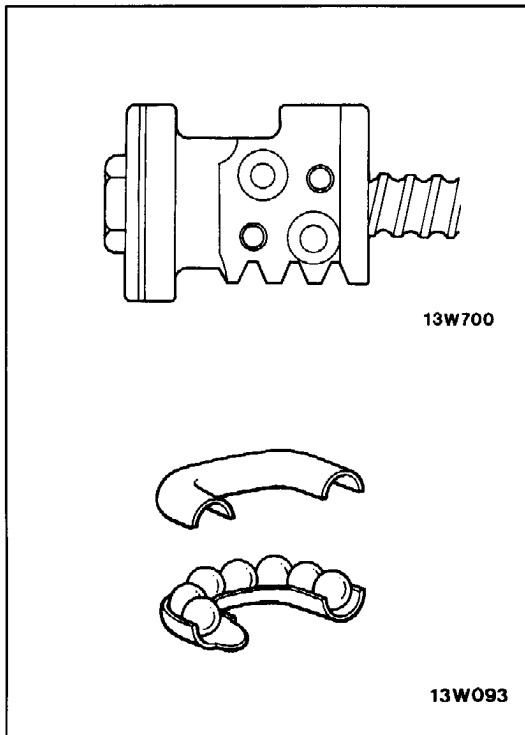
• **ADJUSTMENT OF MAIN SHAFT AXIAL PLAY**

(1) Adjust the play by tightening the lock nut gradually so that the mainshaft axial play will meet the range of standard value.

**Standard value: 0.03 mm (0.0012 in.) or less**



(2) Use a punch to crimp the circumference of the lock nut so as to secure the lock nut.  
 (3) Check to be sure that the mainshaft rotates smoothly.



**16. INSTALLATION OF RACK PISTON**

(1) Install the rack piston until it comes in contact with the edge of the main shaft.  
 (2) Rotate the main shaft to align the ball raceway with the 19-ball insertion hole.

**NOTE**

The balls must be inserted so that there is no clearance between the balls.

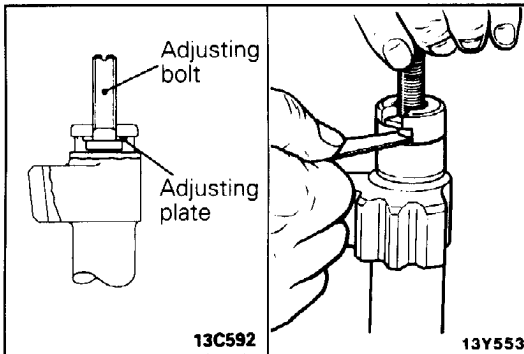
(3) Set the remaining seven balls in the circulator, and install the circulator to the rack piston.

**20. INSTALLATION OF VALVE HOUSING**

- (1) Apply specified automatic transmission fluid to the seal ring of the rack piston.

**Specified fluid: Automatic transmission fluid DEXRON or DEXRON II**

- (2) Insert the valve housing.
- (3) Rotate the main shaft until the rack piston moves to the neutral position (center).

**24. INSTALLATION OF ADJUSTING PLATE/25. ADJUSTING BOLT**

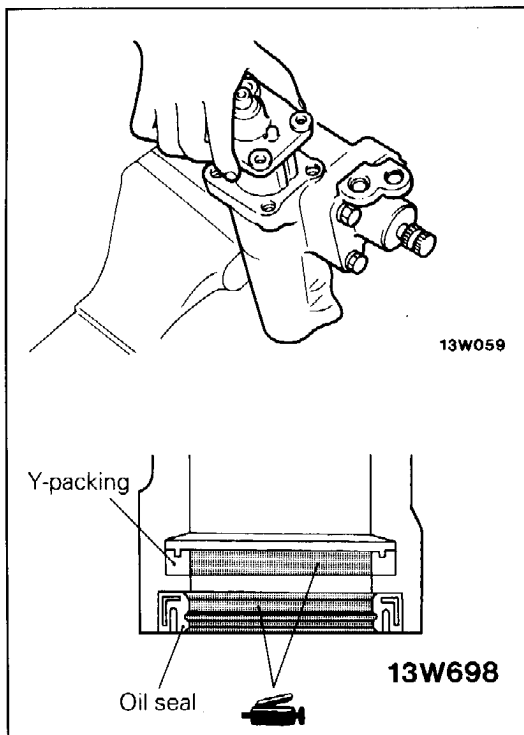
- (1) Install the adjusting plate so that the beveled part is facing downward.
- (2) Using a thickness gauge, measure the clearance between the adjusting bolt and cross-shaft.

**Standard value: 0–0.05 mm (0–0.002 in.)**

- (3) If the clearance is exceeded the standard value, replace with a suitable adjusting plate.

**26. INSTALLATION OF CROSS-SHAFT/27. ADJUSTING BOLT LOCK NUT**

Install the cross-shaft to the side cover, and then temporarily tighten the adjusting bolt lock nut.

**29. INSTALLATION OF SIDE COVER AND CROSS-SHAFT ASSEMBLY**

Install the side cover assembly (with the cross-shaft) to the gear box.

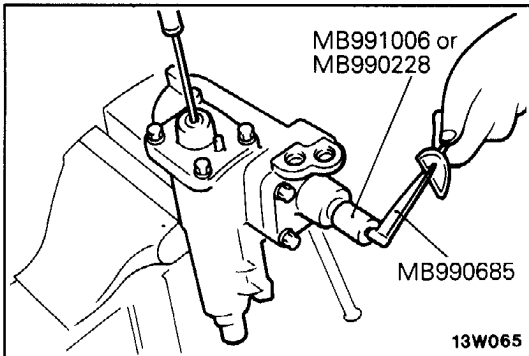
**NOTE**

Apply specified automatic transmission fluid to the teeth and shaft areas of the rack piston, and apply multipurpose grease to the oil seal lip.

**Specified fluid: Automatic transmission fluid DEXRON or DEXRON II**

**Caution**

**Do not rotate the side cover during installation. Take care not to damage the cross-shaft oil seal.**



• **ADJUSTMENT OF MAIN SHAFT TOTAL STARTING TORQUE**

- (1) While turning the adjusting bolt, measure the main shaft total starting torque by using the special tool.

**Standard value: 0.45–1.25 Nm**  
(4.5–12.5 kgcm, 4–11 in.lbs.)

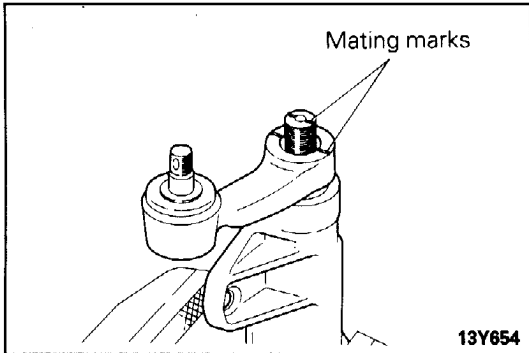
**Caution**

**Adjust by turning the adjusting bolt so that the starting torque at the centre position of the rack piston is approximately 0.2 Nm (2 kgcm, 2 in.lbs.) higher than the values at the both ends of the rack piston.**

- (2) Tighten the adjusting bolt lock nut to the specified torque.

**31. INSTALLATION OF PITMAN ARM**

Install the pitman arm to the gear box with the mating marks aligned.



# POWER STEERING OIL PUMP

## REMOVAL AND INSTALLATION

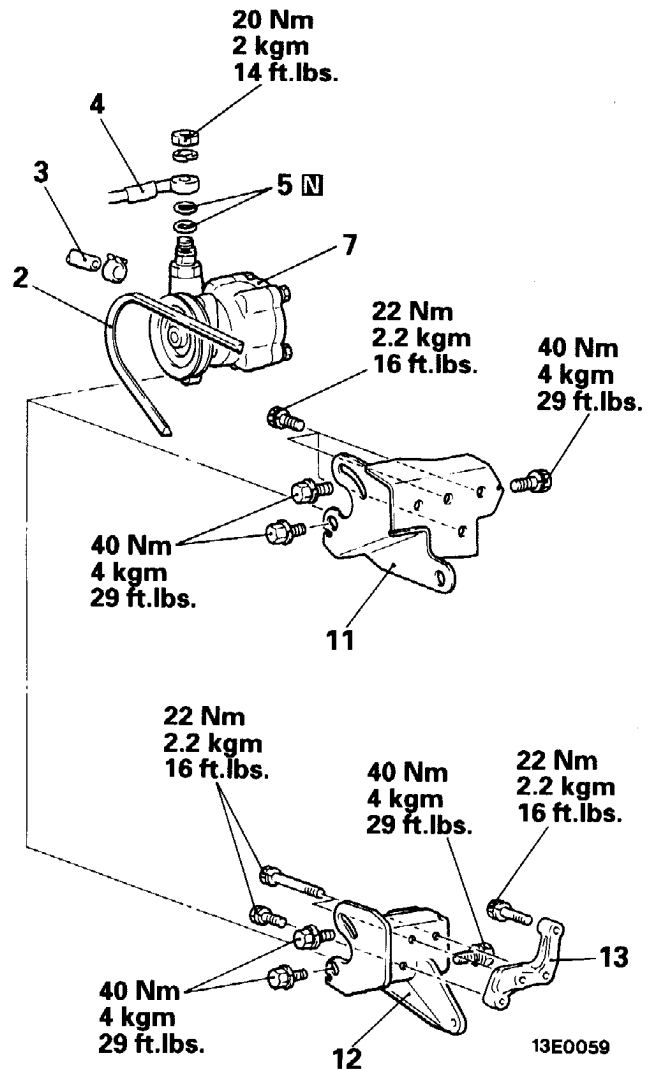
### Pre-removal Operation

- Draining of the Power Steering Fluid (Refer to P.37-10.)

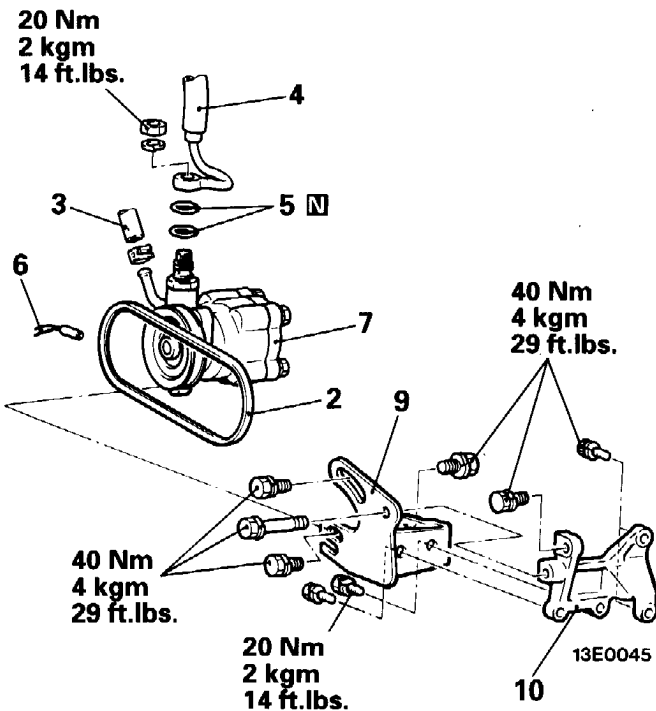
### Post-installation Operation

- Supplying of the Power Steering Fluid (Refer to P.37-10.)
- Adjusting V-belt Tension (Refer to P.37-9.)
- Bleeding of the Power Steering Fluid Line (Refer to P.37-11.)
- Check the Oil Pump Pressure (Refer to P.37-12.)

<2400,2500D>



<3000-12 VALVE>

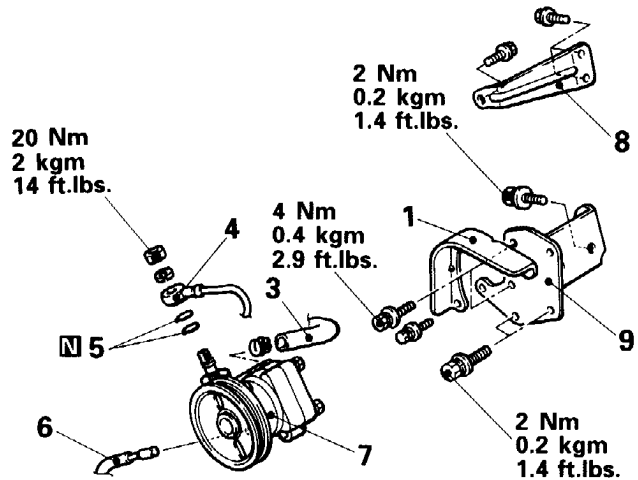


### Removal steps

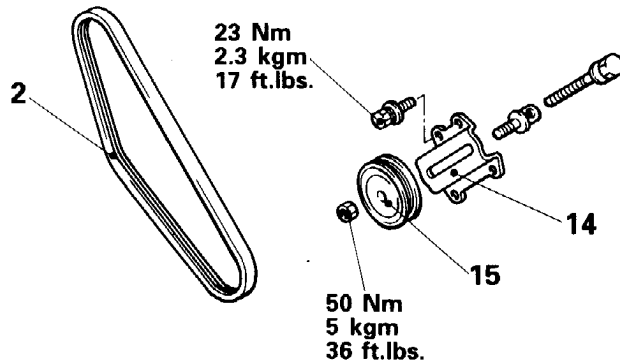
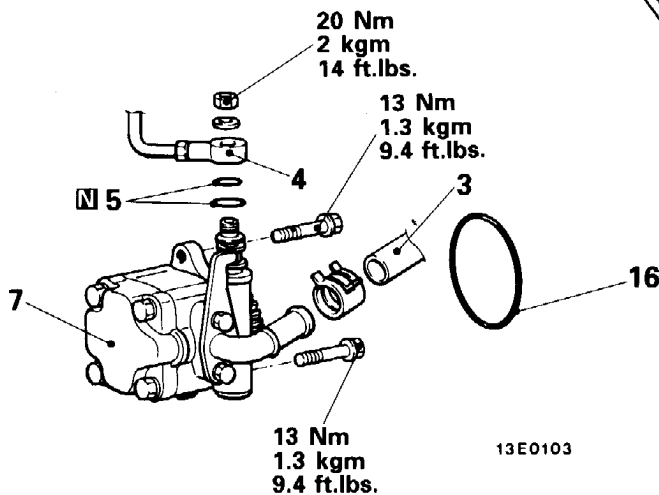
1. Oil pump pulley cover
2. V-belt
3. Suction hose
- ◆◆ 4. Pressure hose
5. O-ring
6. Pressure switch connector <A/T>
7. Oil pump
8. Oil pump stay

9. Oil pump bracket
10. Oil pump mounting bracket
11. Oil pump bracket <2400>
12. Oil pump bracket <2500D>
13. Oil pump bracket stay <2500D>
14. Oil pump belt tensioner bracket
15. Oil pump belt tension pulley
16. Oil pump O-ring

<3000-24 VALVE, 3500>

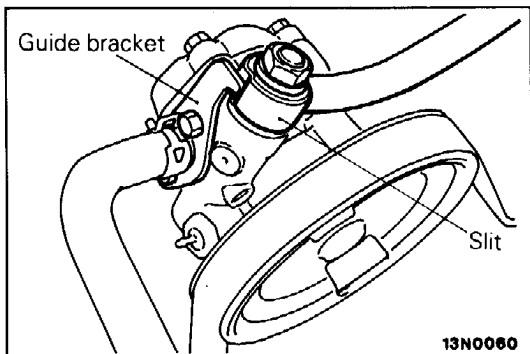


<2800D>



13E0104

13E0103



**SERVICE POINTS OF INSTALLATION**

E37RDAJ

**4. INSTALLATION OF PRESSURE HOSE**

Connect the pressure hose so that its slit part contacts the oil pump's guide bracket.

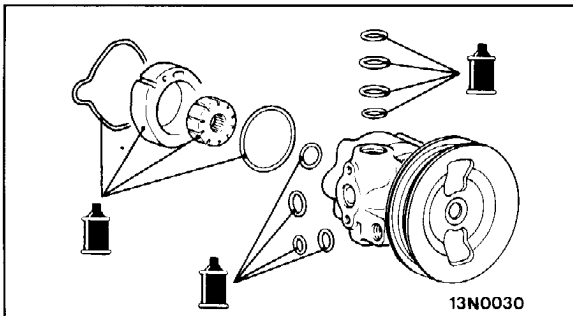
**37-34-2**

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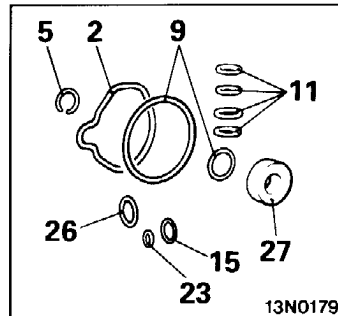
**NOTES**

DISASSEMBLY AND REASSEMBLY <Except 2800D>

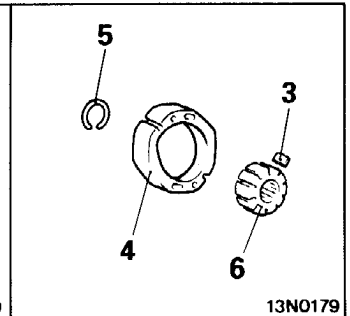
E37RE--



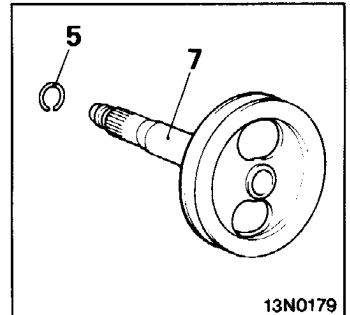
Fluid: Automatic transmission fluid  
DEXRON or DEXRON II



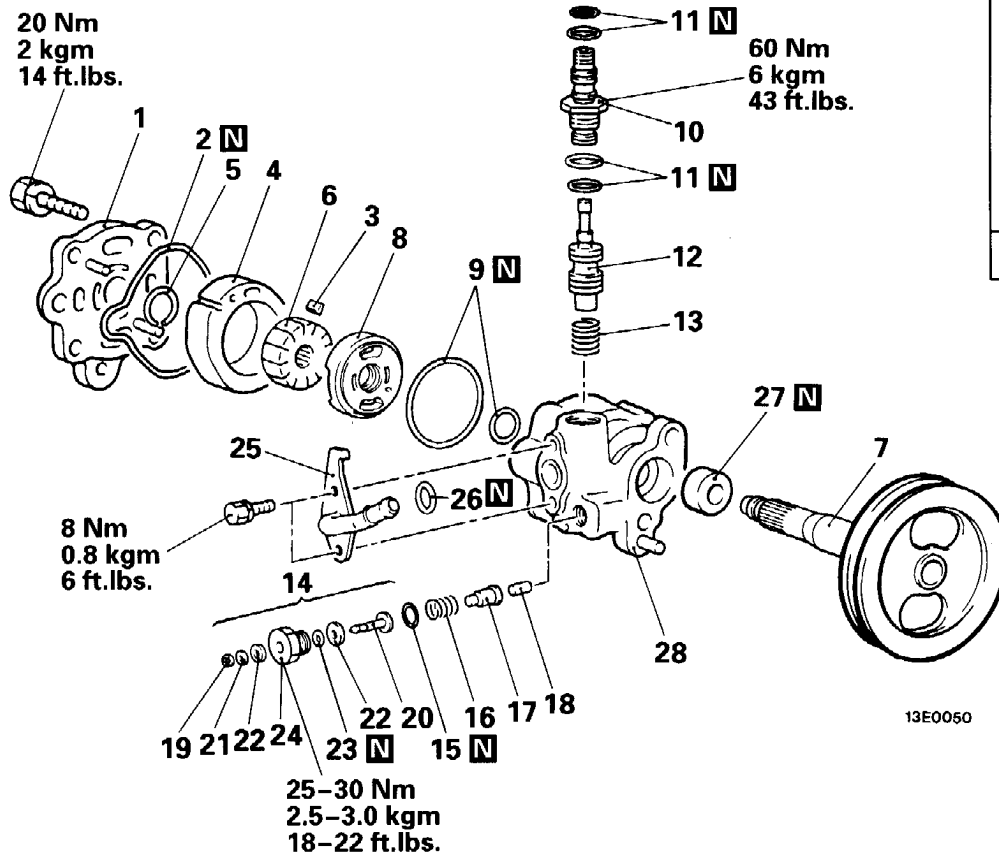
Oil pump seal kit



Oil pump cartridge kit



Pulley and shaft kit



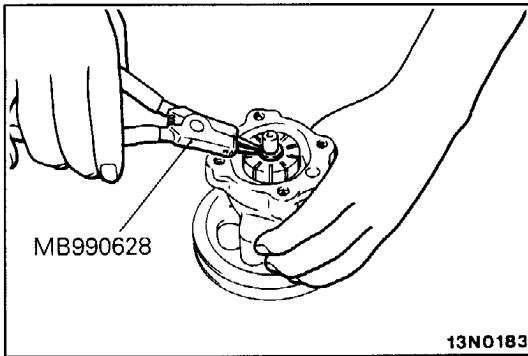
Disassembly steps

- 1. Pump cover
  - 2. O-ring
  - 3. Vanes
  - 4. Cam ring
  - 5. Snap ring
  - 6. Rotor
  - 7. Pulley assembly
  - 8. Side plate
  - 9. O-ring
  - 10. Connector
  - 11. O-ring
  - 12. flow control valve
  - 13. Flow control spring
  - 14. Terminal assembly
  - 15. O-ring
- 3000-A/T, 3500-A/T

- 16. Spring
  - 17. Plunger
  - 18. Piston rod
  - 19. Snap ring
  - 20. Terminal
  - 21. Washer
  - 22. Insulator
  - 23. O-ring
  - 24. Plug
  - 25. Suction connector
  - 26. O-ring
  - 27. Oil seal
  - 28. Oil pump body
- 3000-A/T, 3500-A/T

Caution

Do not disassemble the flow control valve.

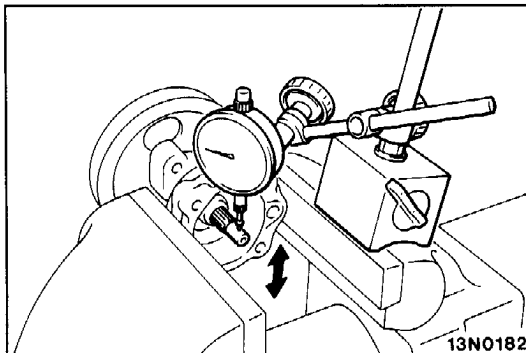
**SERVICE POINTS OF DISASSEMBLY**

E37RFAH

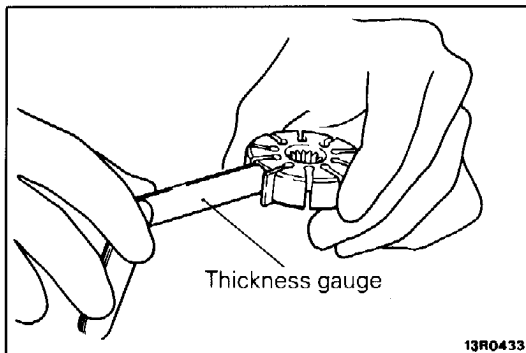
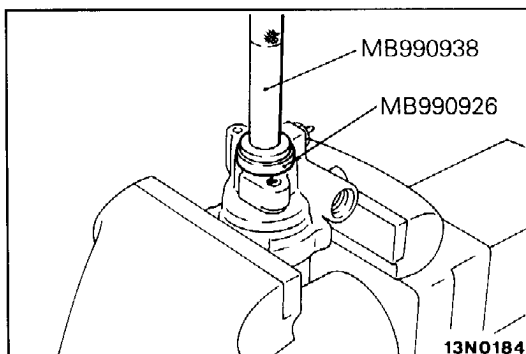
**5. REMOVAL OF SNAP RING****INSPECTION**

E37RGAH

- Check the flow control valve for clogging.
- Check the pulley assembly for wear or damage.
- Check the groove of rotor and vane for "Stepped" wear.
- Check the contact surface of cam ring and vanes for "Stepped" wear.
- Check the vanes for damage.

**CLEARANCE BETWEEN SHAFT AND PUMP BODY**

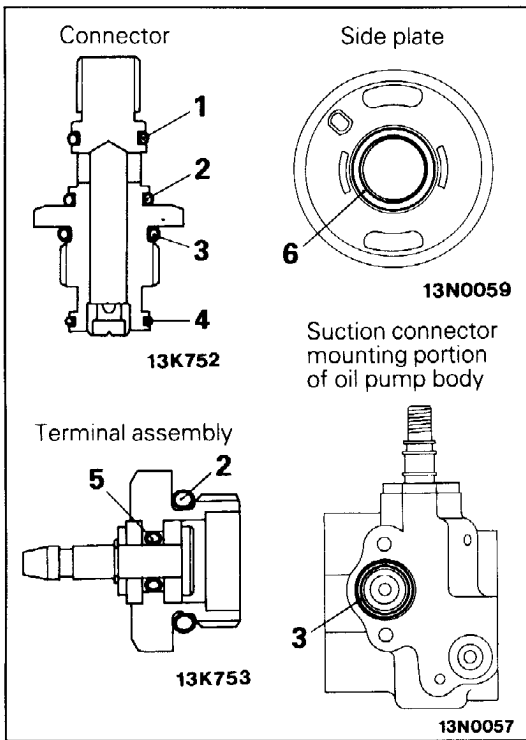
- (1) Place the dial gauge against the end of the pulley assembly's shaft.
- (2) Move the pulley assembly up and down and measure the play.

**Limit: 0.1 mm (0.004 in.)****GAP BETWEEN VANE AND ROTOR GROOVE****Limit: 0.06 mm (0.0024 in.)****SERVICE POINTS OF REASSEMBLY**

E37RHAL

**27. INSTALLATION OF OIL SEAL**

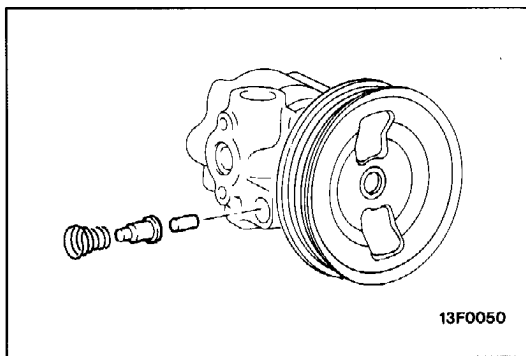




**26./23./15./11./9. INSTALLATION OF O-RINGS**

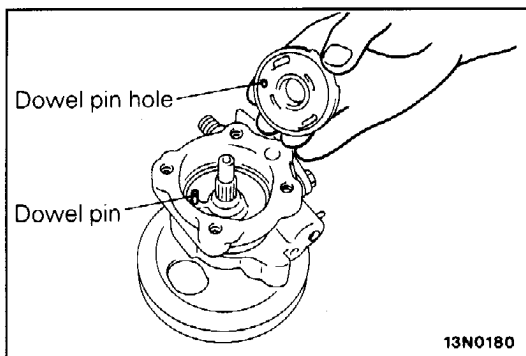
Apply specified fluid on O-rings to install.

No.	I.D.×Width	mm (in.)
1	11×1.9	(0.433×0.075)
2	13×1.9	(0.512×0.075)
3	17.8×2.4	(0.701×0.094)
4	13.5×1.5	(0.531×0.059)
5	3.8×1.9	(0.150×0.075)
6	16.8×2.4	(0.661×0.094)



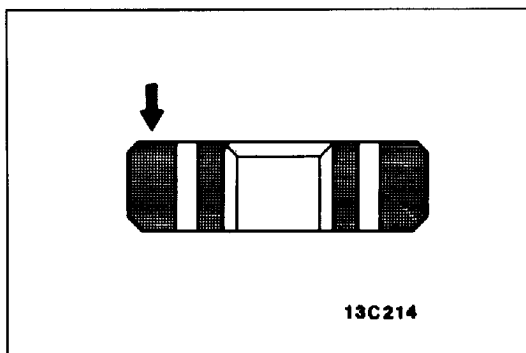
**16. INSTALLATION OF SPRING**

Fit the spring to the oil pump body with the larger-diameter end at the terminal assembly side.



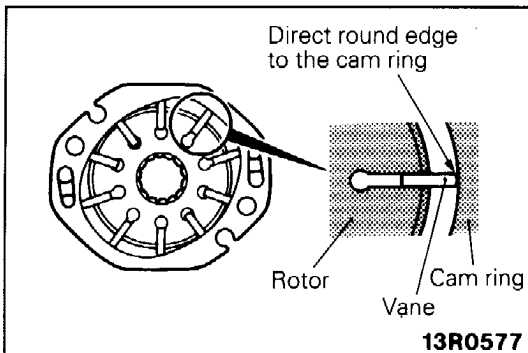
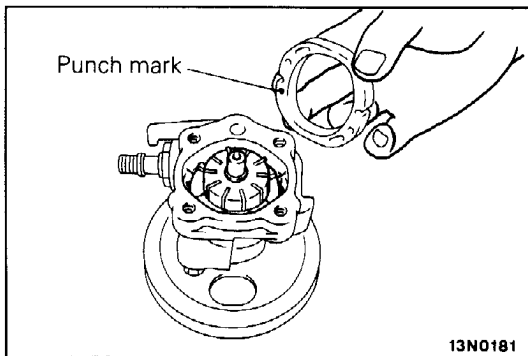
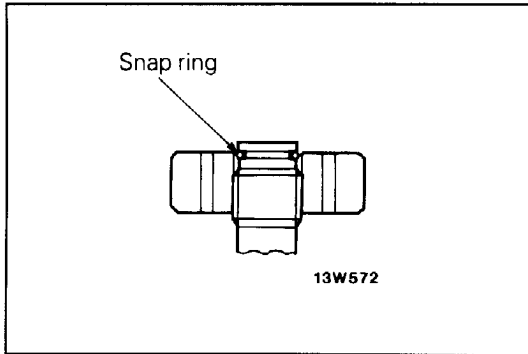
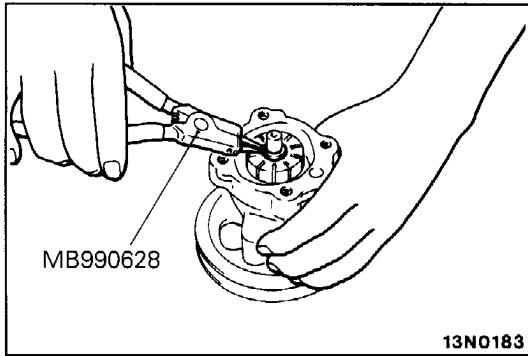
**8. INSTALLATION OF SIDE PLATE**

Line up the dowel pin hole of the side plate with the dowel pin of the pump body when installing the side plate.



**6. INSTALLATION OF ROTOR**

Install the rotor to the pulley assembly so that the rotor's punch mark is at the pump cover side.



#### 5. INSTALLATION OF SNAP RING

After installation of the snap ring, lift the rotor and check that the snap ring has entered the countersunk part.

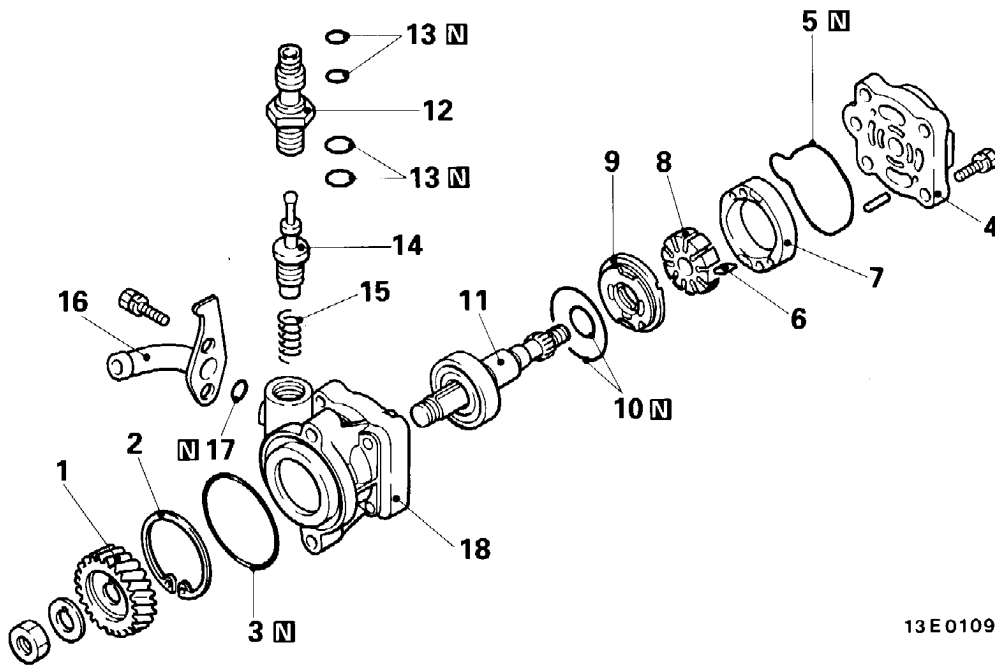
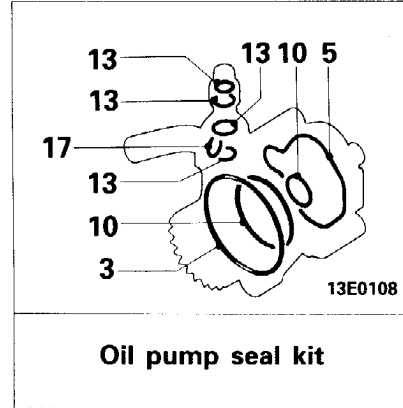
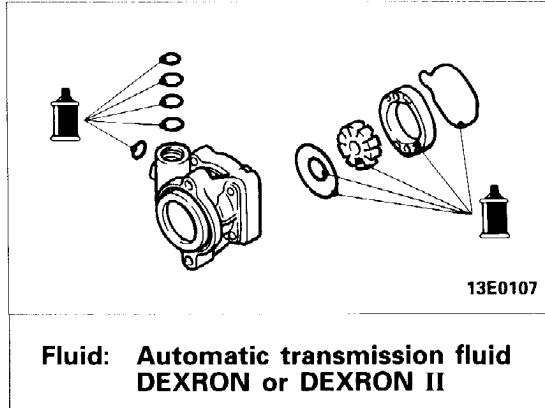
#### 4. INSTALLATION OF CAM RING

Install the cam ring with the punch mark facing the side plate.

#### 3. INSTALLATION OF VANES

Install the vanes on the rotor, paying close attention to the installation direction.

DISASSEMBLY AND REASSEMBLY <2800D>



13E0109

**Disassembly steps**

1. Drive gear
2. Snap ring
3. O-ring
4. Pump cover
5. O-ring
6. Vanes
7. Cam ring
8. Rotor
9. Side plate
10. O-ring
11. Propeller shaft

12. Connector
13. O-ring
14. Flow control valve
15. Flow control spring
16. Suction connector
17. O-ring
18. Oil pump body

**Caution**  
Do not disassemble the flow control valve.

**37-38-2**

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**NOTES**

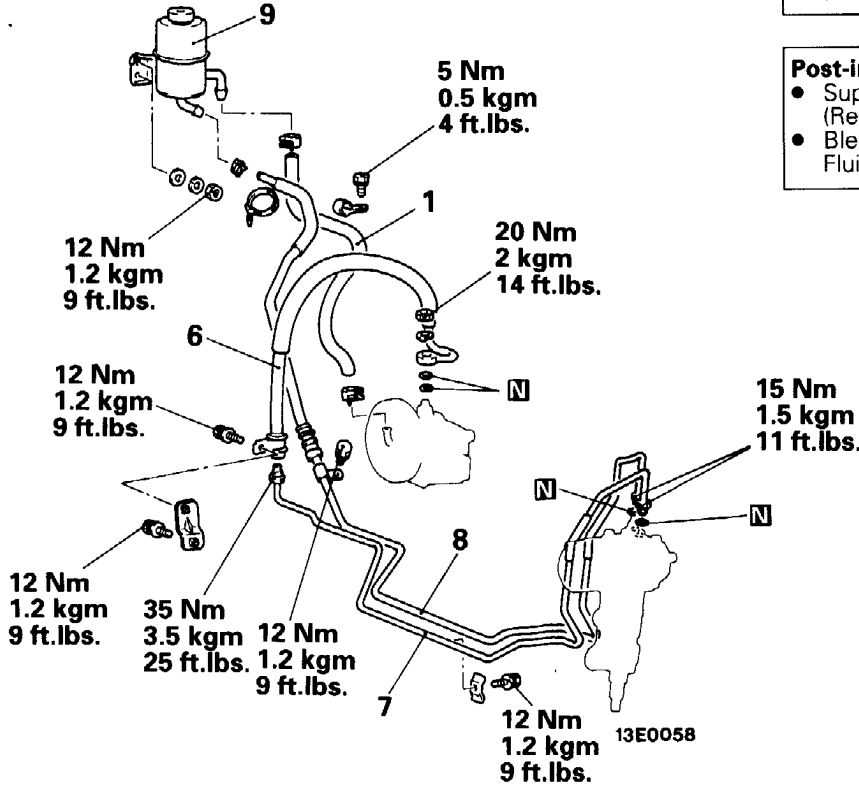
STEERING HOSES

E37TA--

REMOVAL AND INSTALLATION

<L.H. driver vehicles>

<3000-12 VALVE>



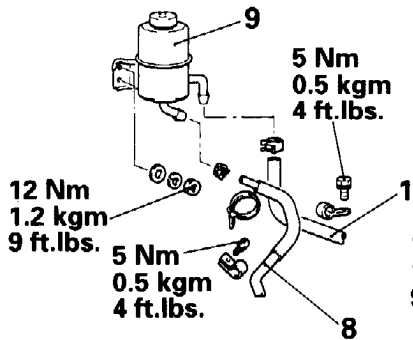
**Pre-removal Operation**

- Draining of the Power Steering Fluid (Refer to P.37-10.)

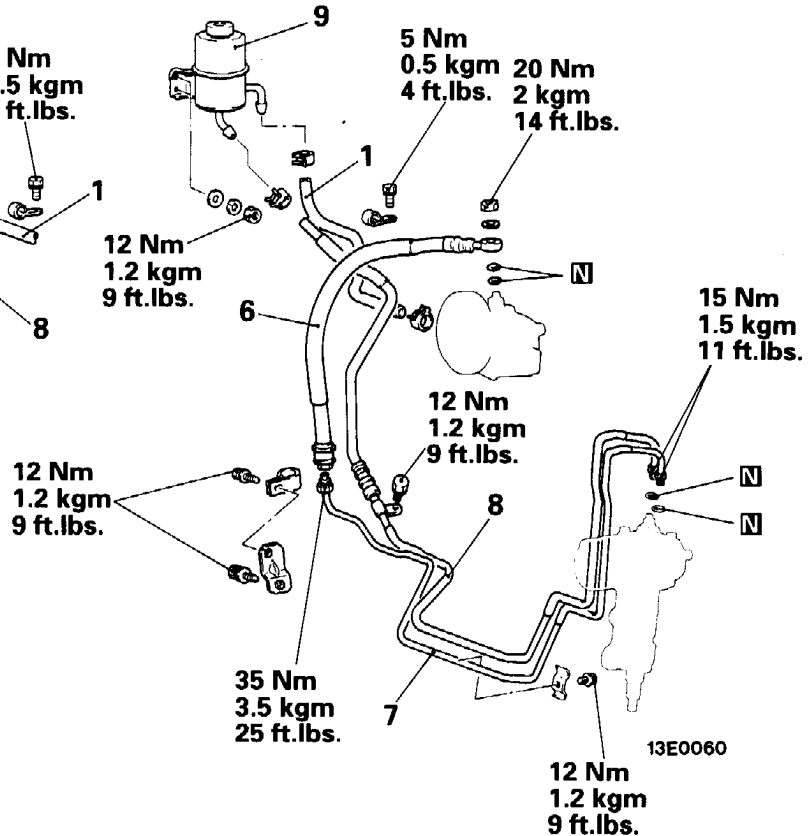
**Post-installation Operation**

- Supplying of Power Steering Fluid (Refer to P.37-10.)
- Bleeding of the Power Steering Fluid Line (Refer to P.37-11.)

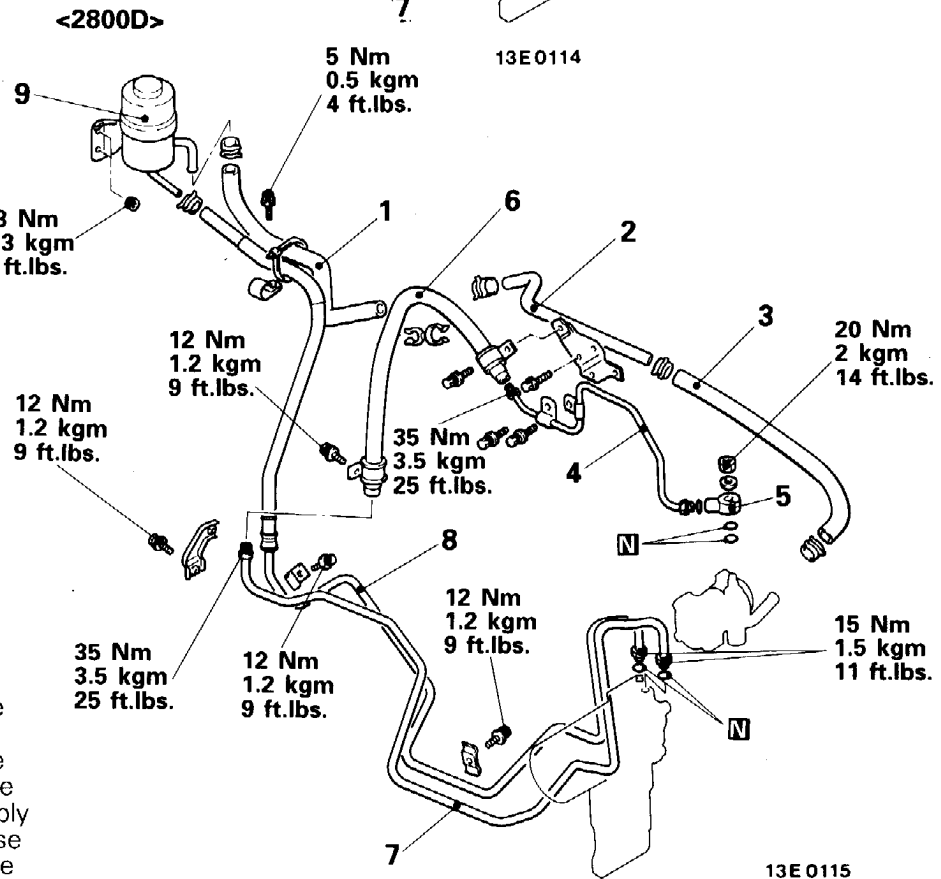
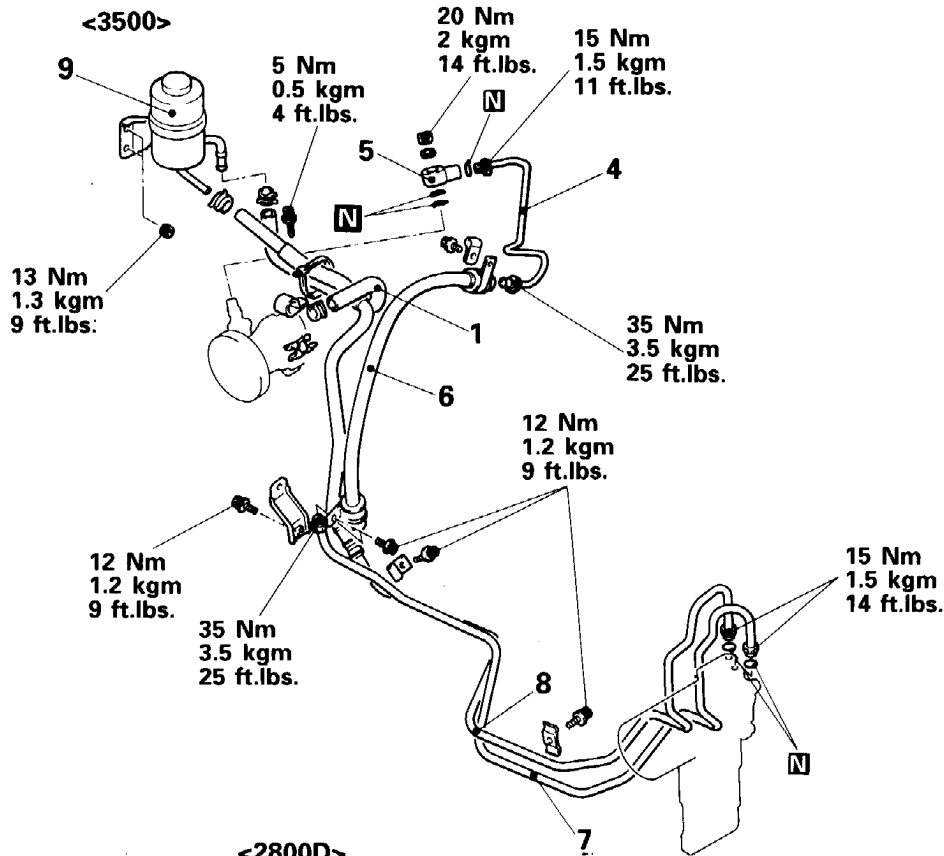
<2400>



<2500D>

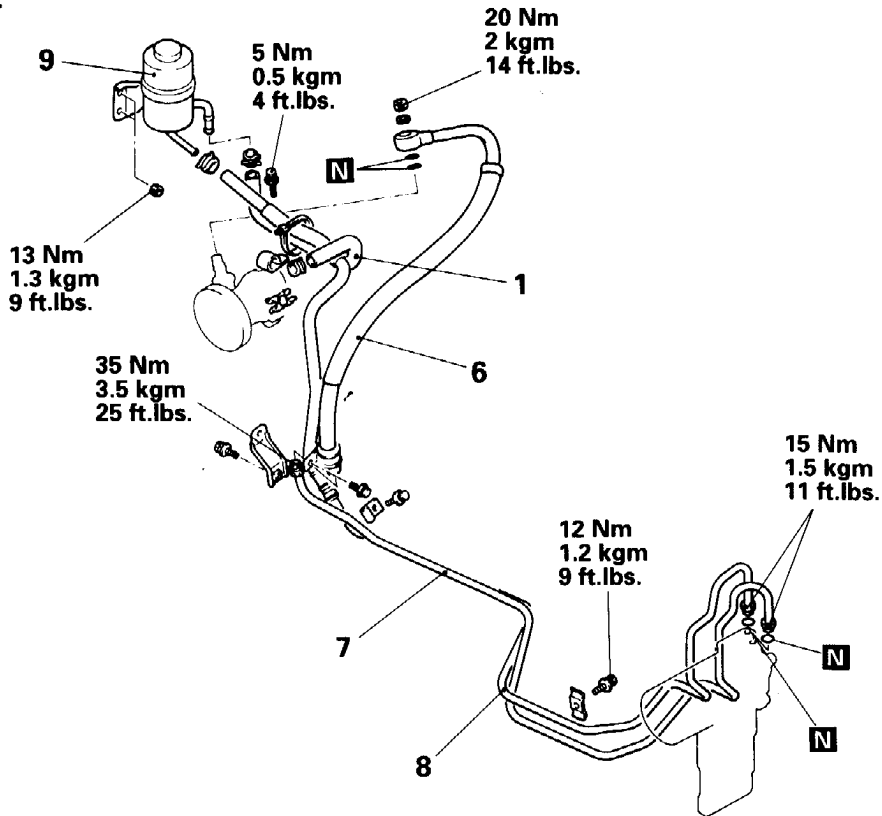


- 1. Suction hose
- 6. Pressure hose
- 7. Pressure pipe
- 8. Return pipe
- 9. Oil reservoir



- 1. Suction hose
- 2. Suction pipe
- 3. Suction hose
- 4. Pressure pipe
- 5. Joint assembly
- 6. Pressure hose
- 7. Pressure pipe
- 8. Return pipe
- 9. Oil reservoir

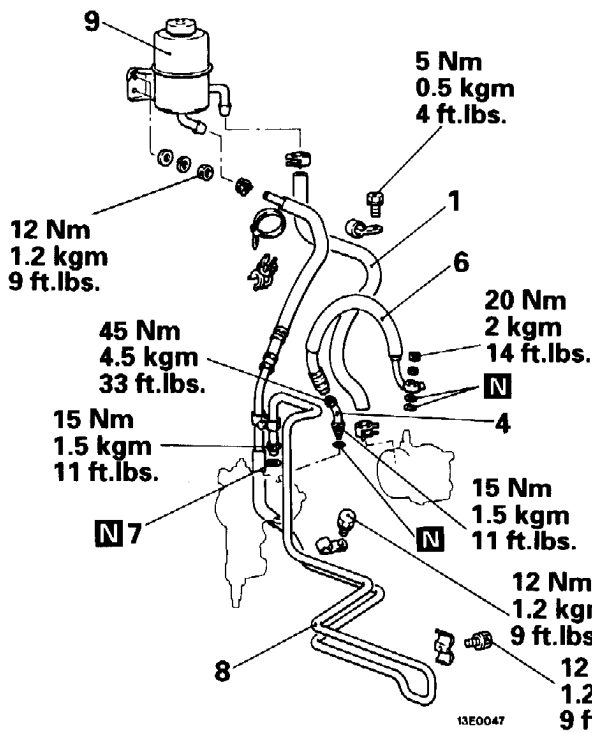
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13E0122

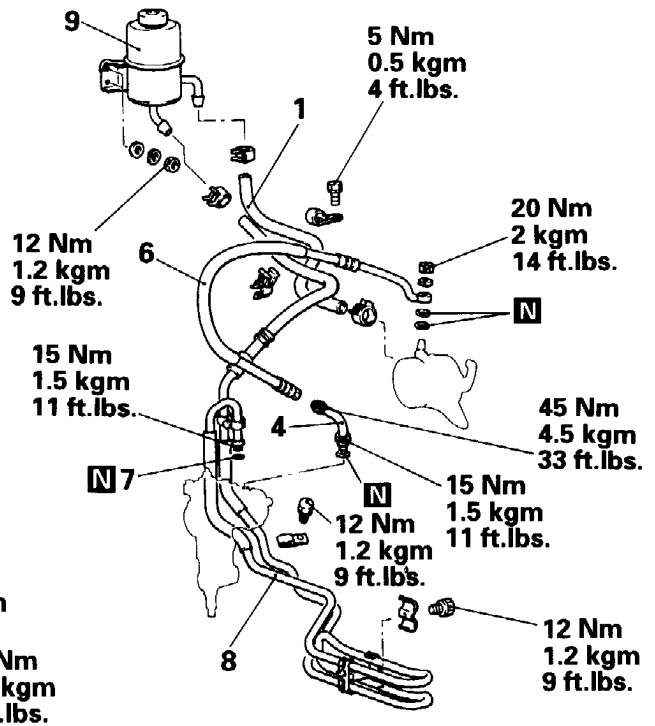
<R.H. drive vehicles>

<3000 - 12VALVE>



13E0047

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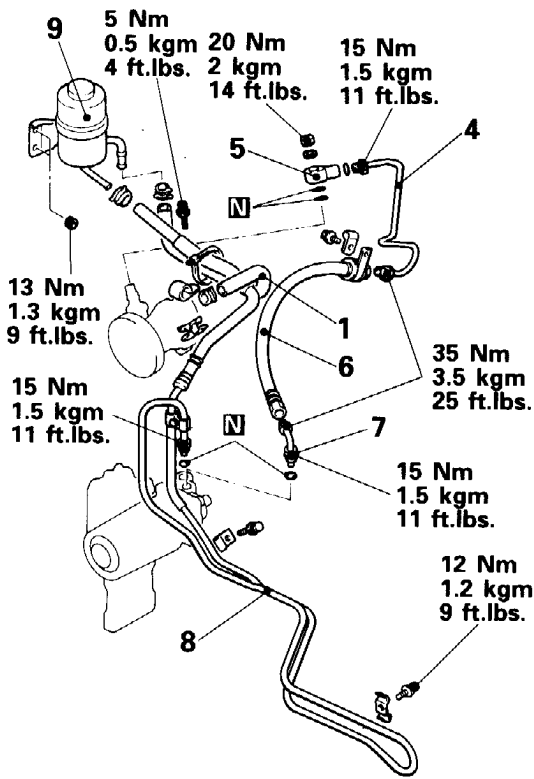


13E0048

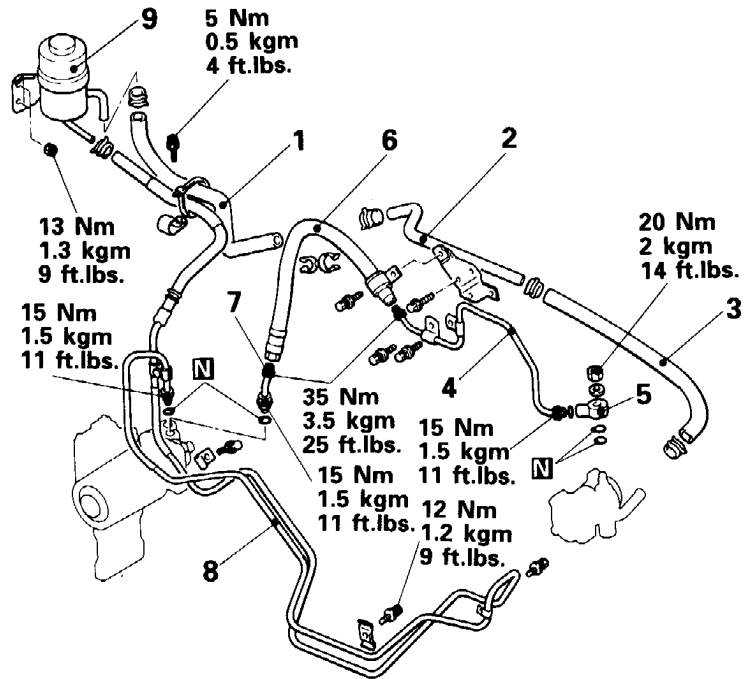
- |                      |                     |
|----------------------|---------------------|
| 1. Suction hose      | ◆◆ 6. Pressure hose |
| 2. Suction pipe      | ◆◆ 7. Pressure pipe |
| 3. Suction hose      | 8. Return pipe      |
| ◆◆ 4. Pressure pipe  | 9. Oil reservoir    |
| ◆◆ 5. Joint assembly |                     |

<3500>

<2800D>

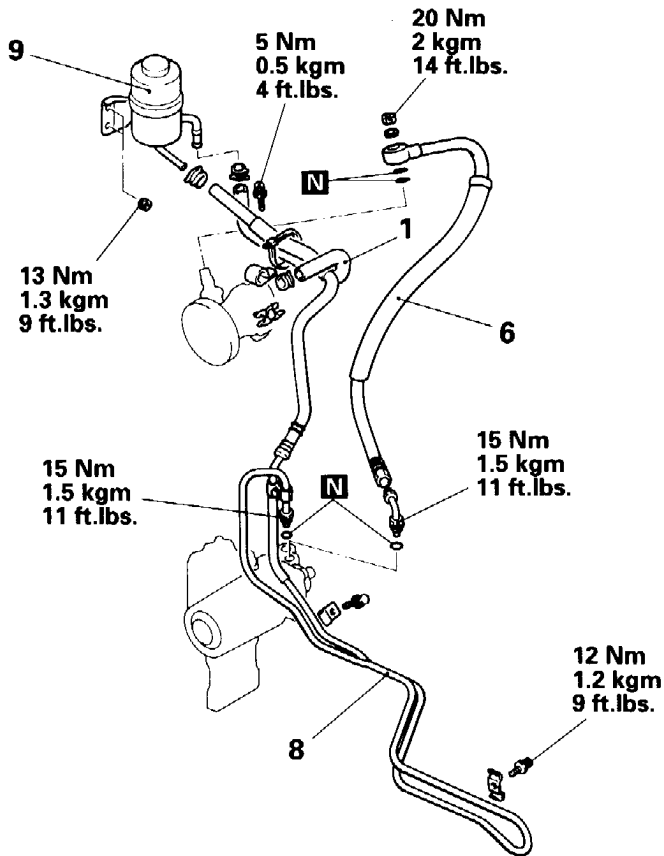


13E0113



13E0112

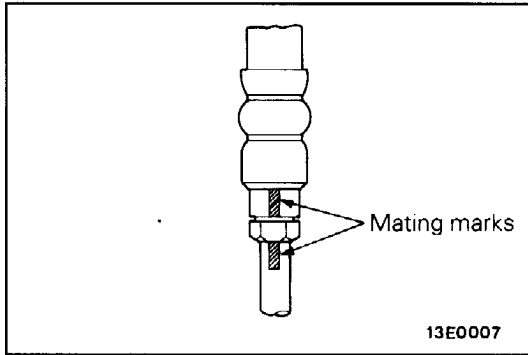
<3000 - 24VALVE>



13E0123

- 1. Suction hose
- 2. Suction pipe
- 3. Suction hose
- 4. Pressure pipe
- 5. Joining assembly
- 6. Pressure hose
- 7. Pressure pipe
- 8. Return pipe
- 9. Oil reservoir



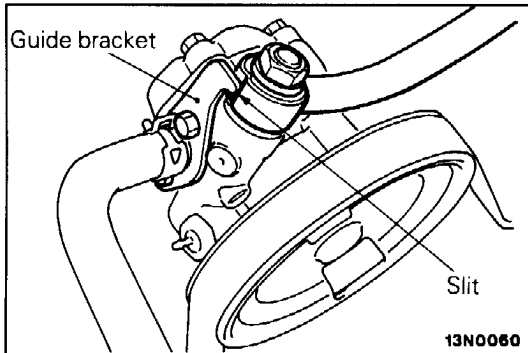


**SERVICE POINT OF INSTALLATION**

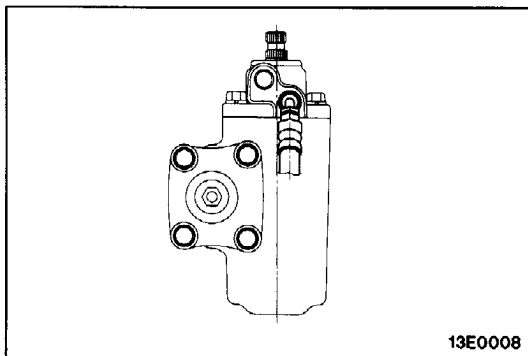
E37TDAG

**7. INSTALLATION OF PRESSURE PIPE/6. PRESSURE HOSE/5. JOINT ASSEMBLY/4. PRESSURE PIPE**

(1) Install so that the pressure pipe and pressure hose mating marks are aligned.

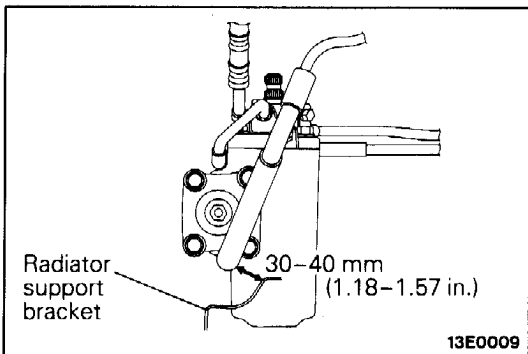


(2) Connect the pressure hose so that its slit part contacts the oil pump's guide bracket.



(3) <R.H. drive vehicles-3000>

Install the pressure pipe to the gearbox so that the pressure pipe is parallel to the centre line of the gearbox.



<R.H. drive vehicles-2500D>

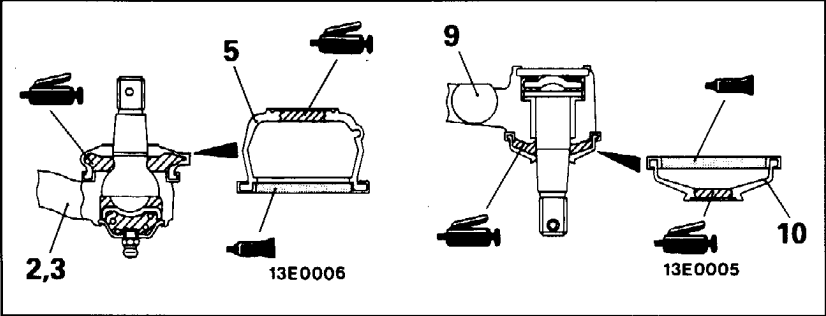
Install the pressure hose to the gearbox so that the clearance between the pressure hose and the radiator support bracket is at the distance shown in the illustration.

STEERING LINKAGE

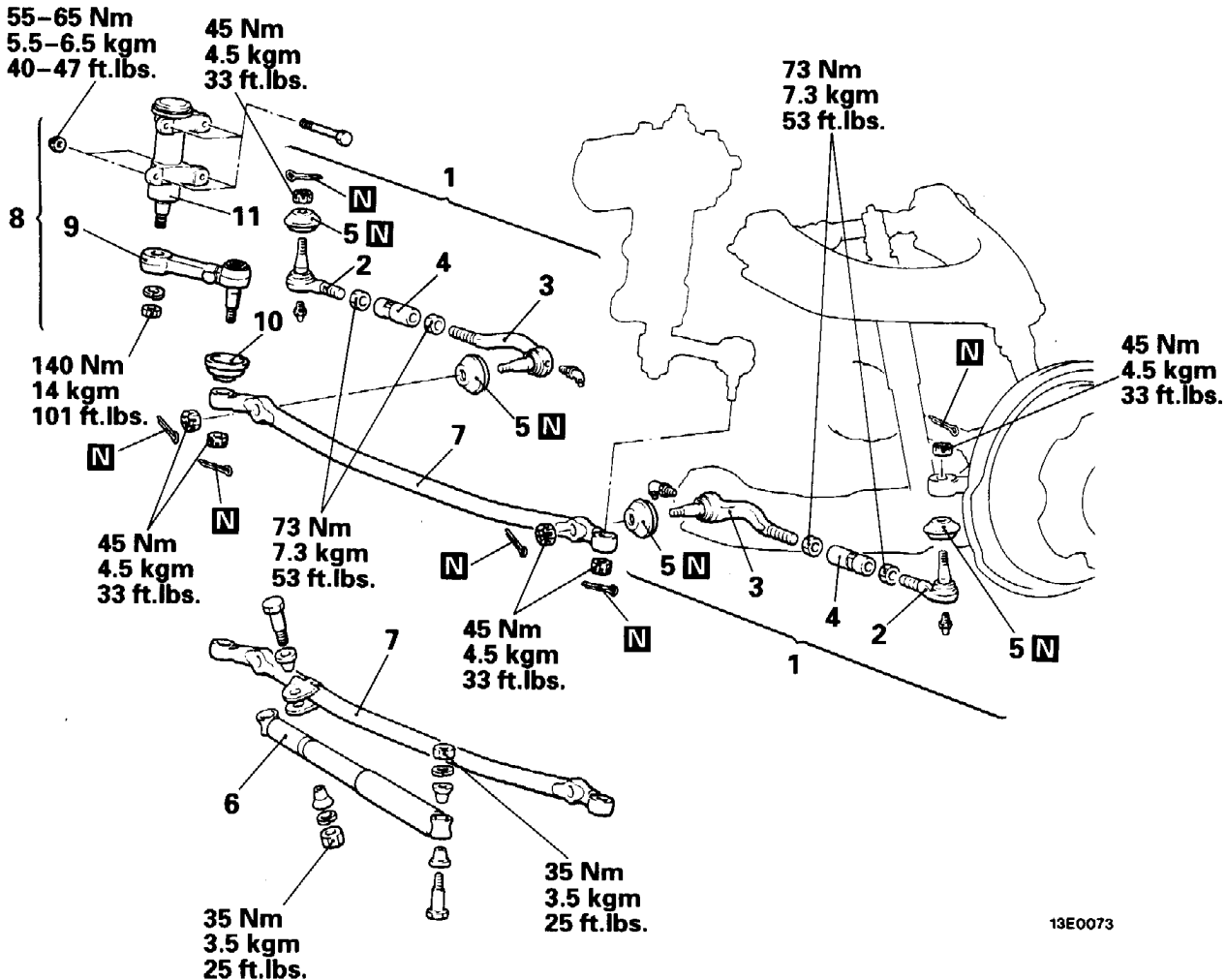
E37VA--

REMOVAL AND INSTALLATION

**Post-installation Operation**  
 • Adjustment of the Front Wheel Alignment (Toe-in)  
 (Refer to GROUP 33-Service Adjustment Procedures.)



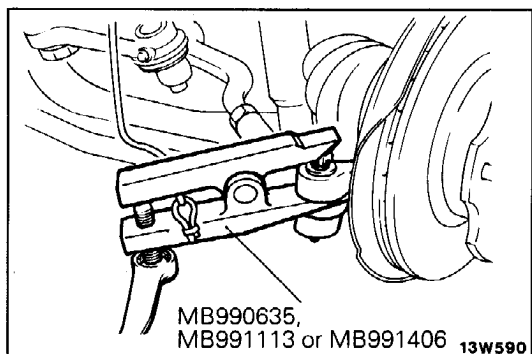
Sealant: 3M ATD Part No. 8661 or equivalent



13E0073

**Removal steps**

- |    |                       |   |                         |
|----|-----------------------|---|-------------------------|
| ↔  | 1. Tie rod assembly   | ↔ | 7. Relay rod            |
| ↔↔ | 2. Tie rod end, outer | ↔ | 8. Idler arm (complete) |
| ↔↔ | 3. Tie rod end, inner | ↔ | 9. Idler arm            |
| ↔↔ | 4. Pipe               | ↔ | 10. Dust cover          |
|    | 5. Dust cover         |   | 11. Idler arm support   |
|    | 6. Damper             |   |                         |



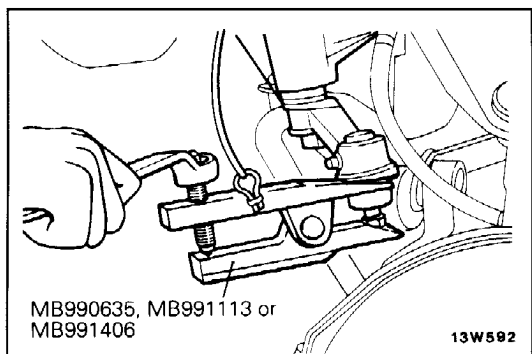
**SERVICE POINTS OF REMOVAL**

E37VBAD

**1. DISCONNECTION OF TIE ROD ASSEMBLY**

**Caution**

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

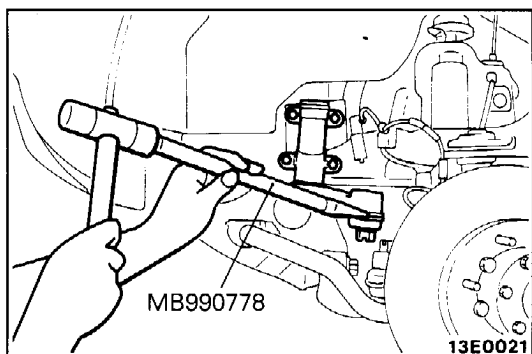


**7. REMOVAL OF RELAY ROD**

**<Pitman arm side>**

**Caution**

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

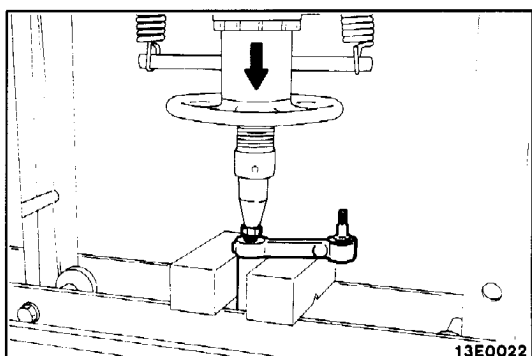


**<Idler arm side>**

Hammer the special tool to remove the relay rod from the idler arm.

**Caution**

The nut should be loosened only, not removed.

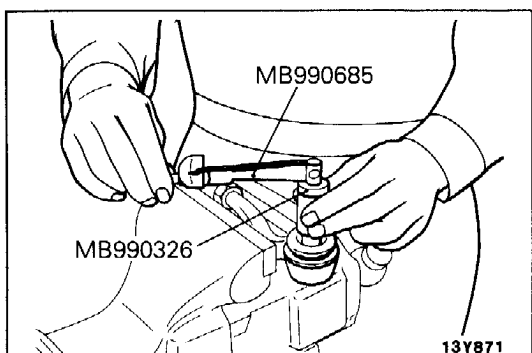


**9. REMOVAL OF IDLER ARM**

Use a bench press to remove the idler arm.

**Caution**

The nut should be loosened only, not removed.



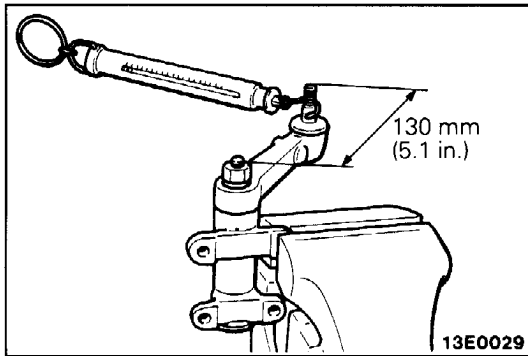
**INSPECTION**

E37VCAB

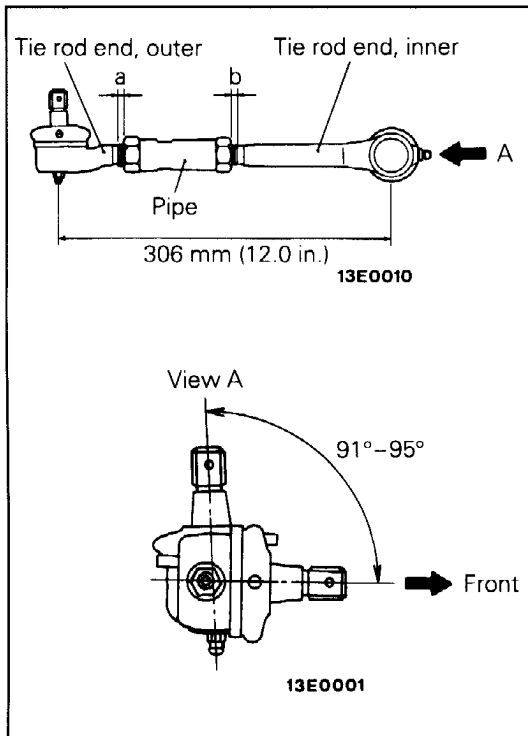
**BALL JOINT STARTING TORQUE**

**Standard value:**

- Tie rod end 1–3 Nm (10–30 kgcm, 9–26 in.lbs.)
- Idler arm 0.5–2.0 Nm (5–20 kgcm, 4–17 in.lbs.)

**IDLER ARM STARTING TORQUE**

**Standard value: 0.3–2.0 Nm (3–20 kgcm, 3–17 in.lbs.)**  
**[2.3–15.4 N (0.23–1.54 kg, 0.5–33.9 lbs.)]**

**SERVICE POINTS OF INSTALLATION**

E37VFAD

**4. INSTALLATION OF PIPE/3. TIE ROD END, INNER/2. TIE ROD END, OUTER**

- (1) Install the tie rod assembly so that the dimension is as shown in the diagram.

**NOTE**

The illustration at left shows the left-side tie rod assembly. The right-side tie rod assembly is symmetrical to the left-side assembly.

- (2) Adjust the pipe so that the difference in dimensions a and b is 1.5 mm (0.059 in.) or less, and then provisionally tighten the lock nut.

**NOTE**

Fully tighten the lock nut after the tie rod assembly is installed to the body and the toe-in has been adjusted.