

# STEERING

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3710900061

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### WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

#### 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 and passenger (from rendering the SRS inoperative).
- (2) Service or maintenance of any SRS component or SRS-related component must be performed only at an 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.

#### NOTE

The SRS includes the following components: front impact sensors, SRS-ECU, SRS warning lamp, air bag module, clock spring and 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 (\*).

## GENERAL INFORMATION

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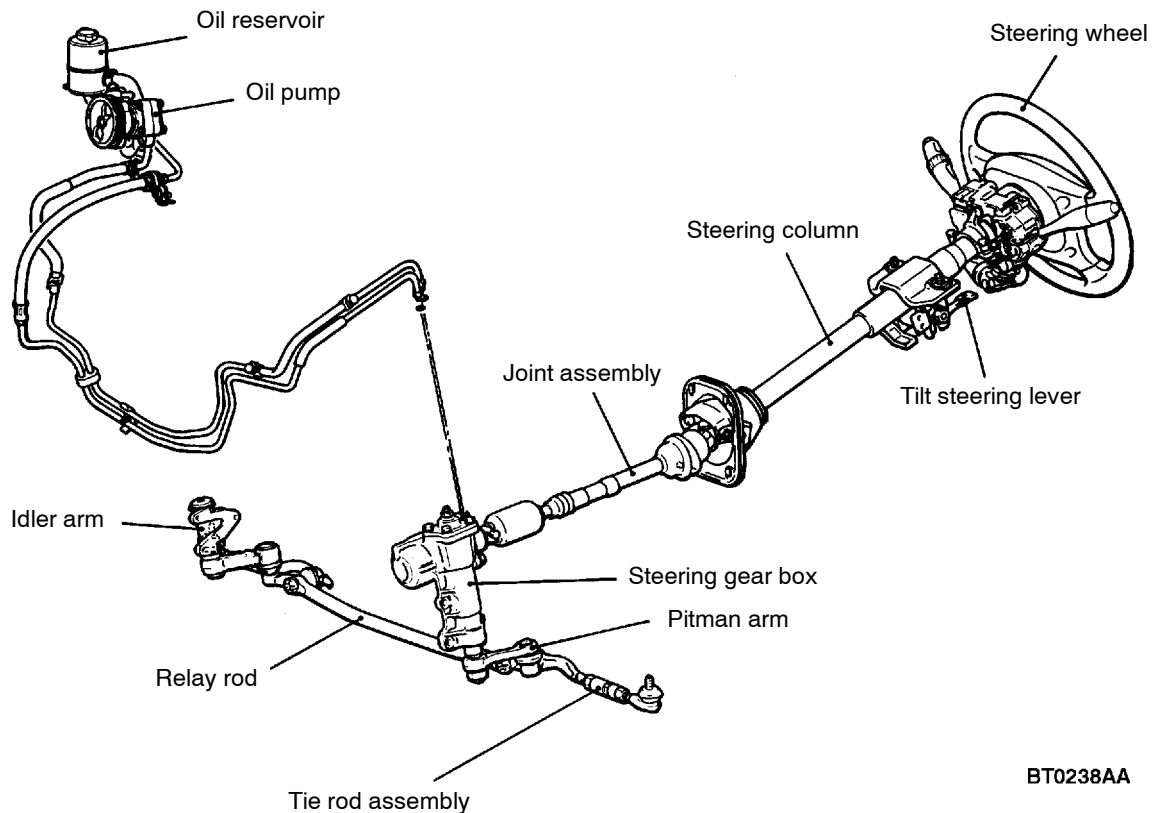
Engine speed-responsive hydraulic power steering has been used.

The main features are as follows. The steering wheel has four spokes. In addition, SRS (Supplemental Restraint System) is equipped in all vehicles.

The steering column in all vehicles has a shock absorber mechanism and a tilt steering mechanism. A vane-type oil pump with a fluid flow control system has been included. The steering gear and linkage is ball and nut type.

Items		Specifications
Power steering gear box	Type	Ball and nut type
	Gear ratio	14.2 – 15.6
Oil pump	Type	Vane type
	Displacement mL/rev.	9.6
	Relief set pressure MPa	8.3 – 9.0

## CONSTRUCTION DIAGRAM



BT0238AA

## SERVICE SPECIFICATIONS

37100030052

Items		Standard value	Limit
Steering wheel free play mm	With engine running	–	50
	With engine stopped	10 or less	–
Steering angle	Inner wheel	29° 20' – 32° 20'	–
	Outer wheel	29° 30'	–
Steering gear backlash mm		–	0.5
Variation of tie rod end ball joint shaft direction mm		–	1.5
Tie rod end ball joint starting torque Nm		3.0	–
Engine idle speed r/min	6G7	700 ± 100	–
	4D5	750 ± 100	–
Stationary steering effort N		39.2 or less	–
Oil pump pressure MPa	Oil pump relief pressure	8.3 – 9.0	–
	Pressure under no-load conditions	0.8 – 1.0	–
	Steering gear retention hydraulic pressure	8.3 – 9.0	–
Oil pressure switch operating pressure MPa	OFF → ON	1.5 – 2.0	–
	ON → OFF	0.7 – 1.2	–
Cross-shaft axial play mm		0.05 or less	–
Mainshaft total starting torque Nm		0.69 – 1.28	–
Backlash between ball groove of rack piston and balls mm		–	0.05
Pitman arm ball joint starting torque Nm		0.98 – 2.94	–
Idler arm sliding resistance N		2.4 – 16	–

## LUBRICANTS

37100040024

Items	Specified lubricants	Quantity L
Power steering fluid	Automatic transmission fluid DEXRON or DEXRON II	1.0
Cross-shaft, O-ring, oil seal, vane	Automatic transmission fluid DEXRON or DEXRON II	As required

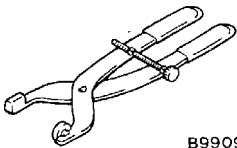
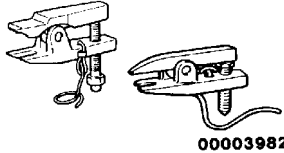

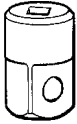
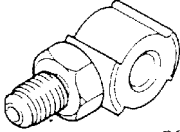
## SEALANTS

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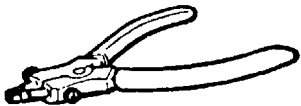

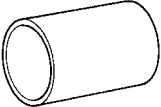
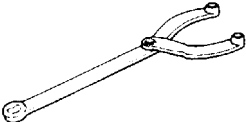
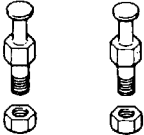
Items	Specified sealants	Remarks
Cover assembly installation hole Adjusting bolt, seal bolt, packing, adjusting shim, dust cover lip for ball joint	3M ATD Part No.8663 or equivalent	Semi-drying sealant

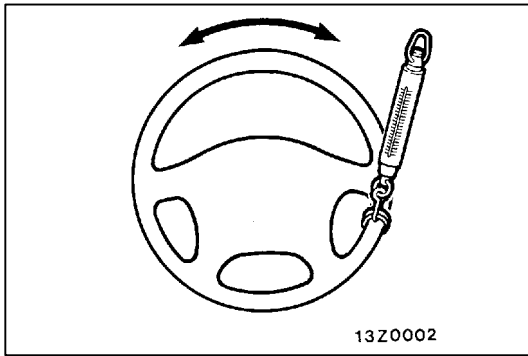
## SPECIAL TOOLS

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Tool	Number	Name	Use
 B990948	MB990948	Linkage joint gauge	Ball joint variation check for shaft direction
 00003982	MB991113 or MB990635	Steering linkage puller	Disconnection of ball joint
	MB990685 MB991151	Torque wrench	<ul style="list-style-type: none"> <li>• Measurement of the ball joint starting torque</li> <li>• Measurement of the pinion shaft preload</li> <li>• Measurement of the mainshaft starting torque</li> </ul>
	MB990326	Preload socket	Measurement of the ball joint starting torque
 B990993	MB990993 or MB991217	Power steering oil pressure gauge adapter (pump side)	Measurement of oil pressure

Tool	Number	Name	Use
<p>B990994</p>	MB990994	Power steering oil pressure gauge adapter (hose side)	Measurement of oil pressure
<p>B990662</p>	MB990662	Oil pressure gauge assembly	
<p>B990803</p>	MB990803	Steering wheel puller	Disconnection of the steering wheel
<p>B990915</p>	MB990915	Pitman arm puller	Removal of the pitman arm
<p>B990925</p>	MB990925	Bearing and oil seal installer set	Installation of the oil seal and bearing (Refer to GROUP 26 – Special Tools.)
<p>B991203</p>	MB991203	Oil seal & bearing installer	To press in the valve housing oil seal
<p>B991006</p>	MB991006 or MB990228	Preload socket	Measurement of the mainshaft total starting torque
<p>B990776</p>	MB990776	Front axle base	Installation of dust cover for tie rod end ball joint

Tool	Number	Name	Use
	MB990628	Snap ring pliers	To remove and install the snap ring of the pulley assembly
 <p data-bbox="318 537 396 554">B990956</p>	MB990956	Needle bearing installer	To press in the drive shaft assembly
	MB991172	Adapter	
	MB990767	End yolk holder	Securing the drive pulley
	MD998719 MD998754	or Crankshaft pulley holder pin	



## ON-VEHICLE SERVICE

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### STEERING WHEEL FREE PLAY CHECK

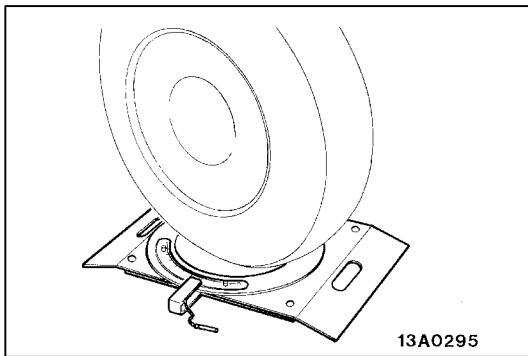
1. With engine running (hydraulic operation), set front wheels straight ahead.
2. Measure the play on steering wheel circumference before wheels start to move when slightly moving steering wheel in both directions.

**Limit: 50 mm**

3. When play exceeds the limit, check for play on steering shaft connection and steering linkage. Correct or replace.
4. If the free play still exceeds the limit value, set steering wheel straight ahead with engine stopped. Load 5 N towards steering wheel circumference and check play.

**Standard value (steering wheel play with engine stopped): 10 mm or less**

If the play exceeds the standard value, check the steering gear backlash and ball joint axial play.



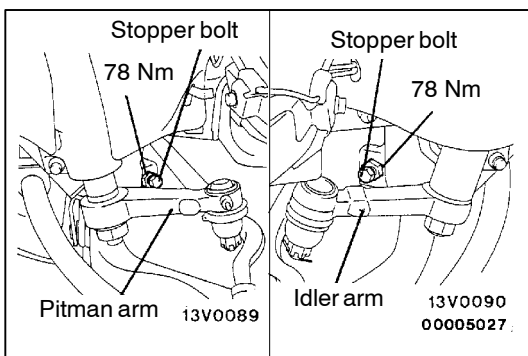
### STEERING ANGLE CHECK

37100100029

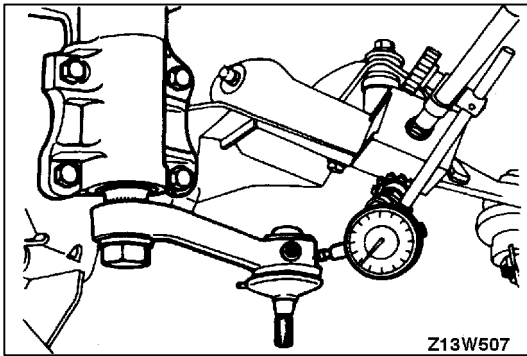
1. Place the front wheel on a turning radius gauge and measure the steering angle.

**Standard value:**

Items	Specifications
Inside wheel	29° 40' – 32° 40'
Outside wheel	29° 30'



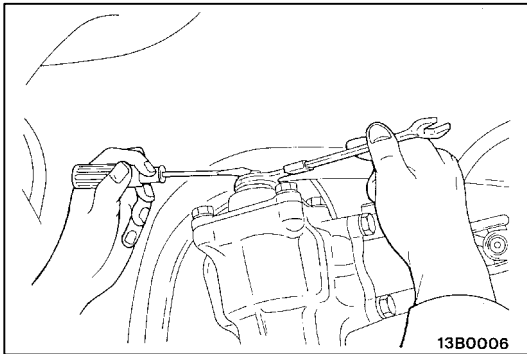
2. If the steering angle is outside the standard value after checking the toe-in (refer to GROUP 33A – On-vehicle Service), adjust the steering angle with the stopper bolt.



**STEERING GEAR BACKLASH CHECK** 37100120032

1. Jack up the vehicle front and hold the steering wheel in the straight ahead position.
2. Apart the pitman arm and the relay rod. (Refer to P.37A-41.)
3. Measure the steering gear backlash at the pitman arm top end with a dial indicator.

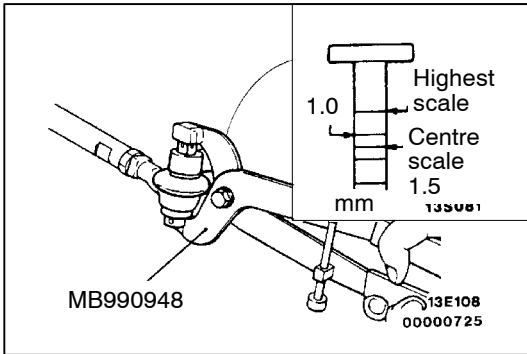
**Limit: 0.5 mm**



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



**TIE ROD END BALL JOINT VARIATION CHECK (SHAFT DIRECTION)**

37100130011

1. Hold the ball joint with the special tool.
2. Set the special tool scale at its highest and measure variation with ball stud compressed. The variation should locate between the highest and centre scales.

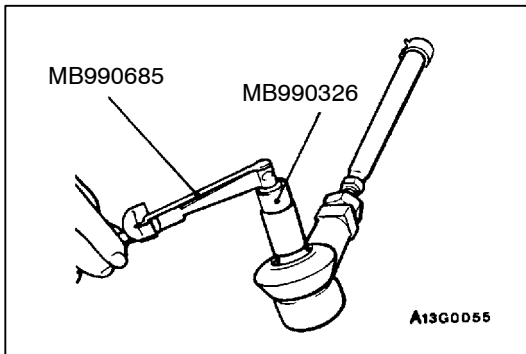
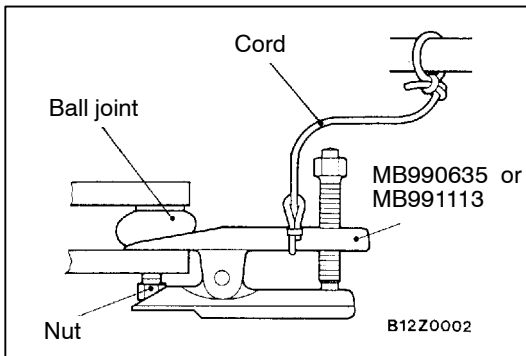
**Limit: 1.5 mm**

3. When the variation exceeds the centre scale, replace the tie rod end.

**Caution**

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





### TIE ROD END BALL JOINT STARTING TORQUE CHECK

37100140021

1. Use the special tool to disconnect the ball joint.

**Caution**

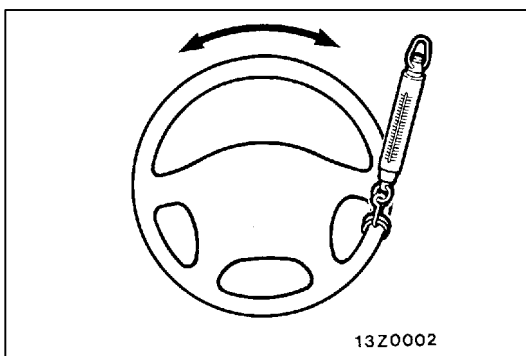
- (1) Only loosen tie rod end mounting nut; but do not remove it from the ball joint.
- (2) Support the special tool with a cord, etc. to prevent it from coming off.

2. Move the ball joint stud several times and install the nut on stud. Measure ball joint starting torque with special tools.

**Standard value: 3.0 Nm**

3. When the starting torque exceeds the standard value, replace the tie rod end.
4. When the starting torque is under the standard value, check ball joint for end play or ratcheting. If none of these, the ball joint is still serviceable.
5. Tighten the nut to the specified torque and install a new split pin.

**Tightening torque: 40 Nm**



### STATIONARY STEERING EFFORT CHECK

37200170221

1. With the vehicle stopped on a flat and paved surface, and turn the steering wheel to the straight ahead position.
2. Start the engine and check the engine idle speed.

**Standard value:**

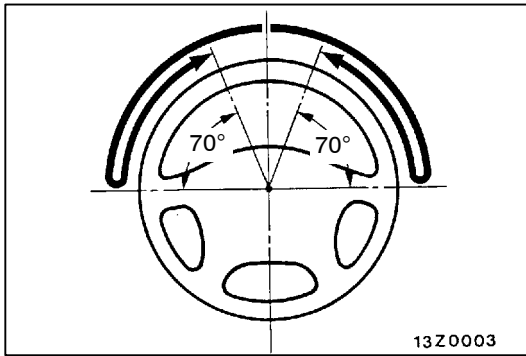
Engine idle speed r/min	Remarks
700 ± 100	6G7
750 ± 100	4D5

3. Attach a spring balance to the outer circumference of the steering wheel and measure the steering force required to turn the steering wheel from the straight ahead position to the left and right (within a range of 1.5 turns). Also check to be sure that there is no significant fluctuation of the required steering force.

**Standard value:**

**Steering effort: 39.2 N or less**

**Fluctuation allowance: 5 N or less**



## CHECKING STEERING WHEEL RETURN TO CENTRE

37200180170

Conduct a road test before this test.

1. Make both gradual and sudden turns and check the steering “feeling” to be sure that there is no difference in the steering force required and the wheel return between left and right turns.
2. At a speed of 35 km/h, turn the steering wheel 90° and release the steering wheel after 1 or 2 seconds. If the steering wheel then returns 70° or more, the return can be judged to be satisfactory.

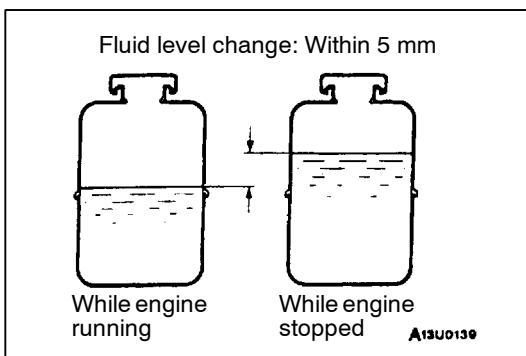
### NOTE

There will be a momentary feeling or “heaviness” when the wheel is turned quickly, but this is not abnormal. (this is because the oil pump discharge amount is especially apt to be insufficient during idling.)

## DRIVE BELT TENSION CHECK

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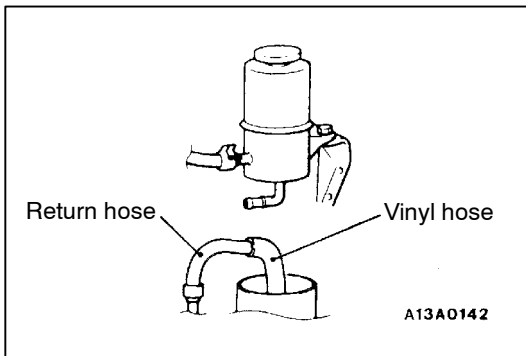
Refer to GROUP 11 – On-vehicle Service.



## FLUID LEVEL CHECK

37200200142

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.
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. Check the difference of the fluid level when the engine is stopped, and while it is running. If the change of the fluid level is 5 mm or more, air bleeding should be done.



## FLUID REPLACEMENT

37200210152

1. Raise the front wheels on a jack, and then support them with rigid racks.
2. Disconnect the return hose connection.
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.

### Caution

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

5. 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.
6. Connect the return hoses securely, and then secure it with the clip.
7. 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**

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.

**Caution**

**Be careful not to place the high-tension cable near the delivery pipe.**

5. 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 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.**

6. On vehicles with a petrol engine, connect the high-tension cable. On vehicles with a diesel engine, connect the fuel cut valve connector attached to the injection pump. Start the engine (idling).
7. Turn the steering wheel to the left and right until there are no air bubbles in the oil reservoir.
8. Confirm that the fluid is not milky, and that the level is up to the specified position on the level gauge.
9. Confirm that there is very little change in the fluid level when the steering wheel is turned left and right.

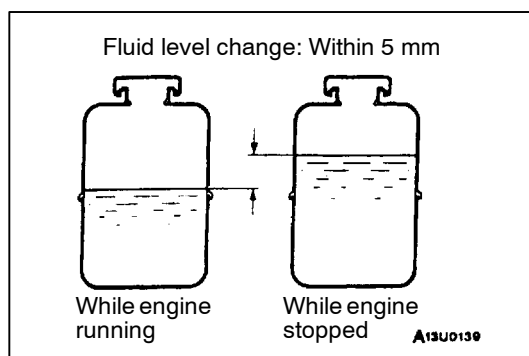
10. Check whether or not the change in the fluid level is within 5 mm when the engine is stopped and when it is running.

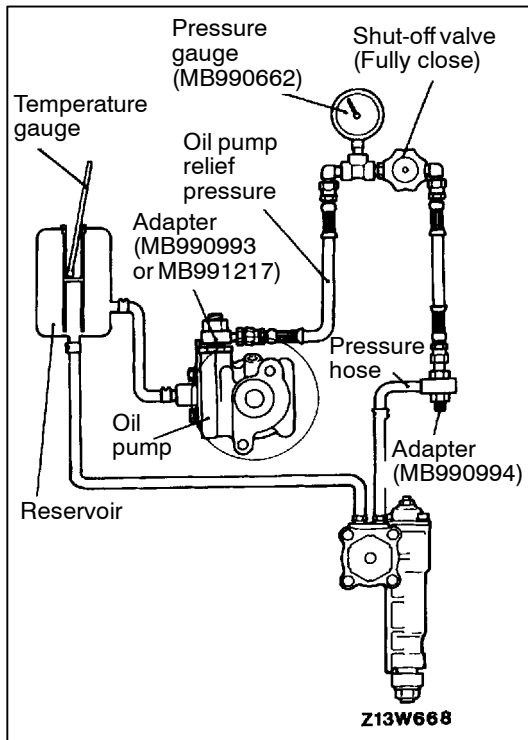
11. If the change of the fluid level is 5 mm or more, the air has not been completely bled from the system, and thus must be bled completely.

**Caution**

**(1) If the fluid level rises suddenly after the engine is stopped, the air has not been completely bled.**

**(2) 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

37200230233

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.
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: 8.3 – 9.0 MPa**

### Caution

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

5. If it is not within the standard value, replace the oil pump.
6. 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**

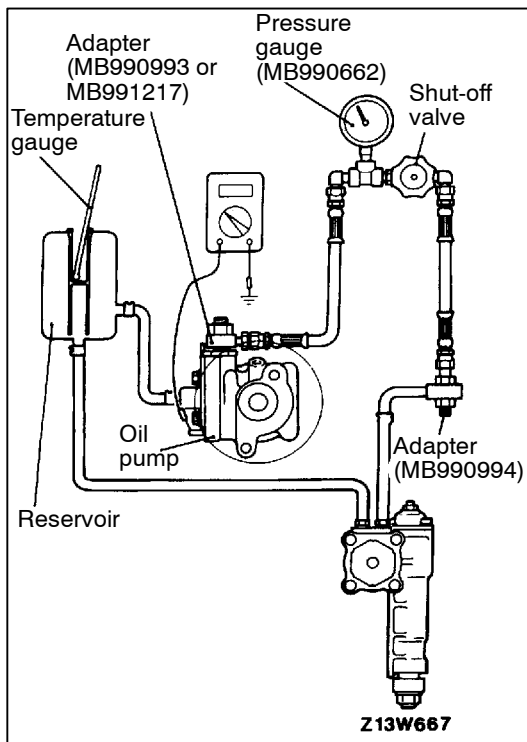
7. If it is not within the standard value, the probable cause is a malfunction of the oil line or steering gear box, so check these parts and repair as necessary.
8. Turn the steering wheel all the way to the left or right; then check whether or not the retention hydraulic pressure is the standard value.

**Standard value: 8.3 – 9.0 MPa**

9. When not within the standard value, overhaul the steering gear box.  
Remeasure fluid pressure.
10. Remove the special tools, and then tighten the pressure hose to the specified torque.

**Tightening torque: 18 Nm**

11. Bleed the system.



## POWER STEERING OIL PRESSURE SWITCH CHECK <Petrol-powered vehicle>

37200720211

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.
3. The engine should be idling.
4. Disconnect the connection of 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**

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. Remove the special tools, and then tighten the pressure hose to the specified torque.

**Tightening torque: 18 Nm**

8. Bleed the system

## BALL JOINT DUST COVER CHECK

37200860098

1. Press the dust cover with a finger to check whether the dust cover is cracked or damaged.
2. If the dust cover is cracked or damaged, replace the pitman arm, idler arm or tie rod end ball joint.

### NOTE

If the dust cover is cracked or damaged, the ball joint could be damaged.

# STEERING WHEEL AND SHAFT

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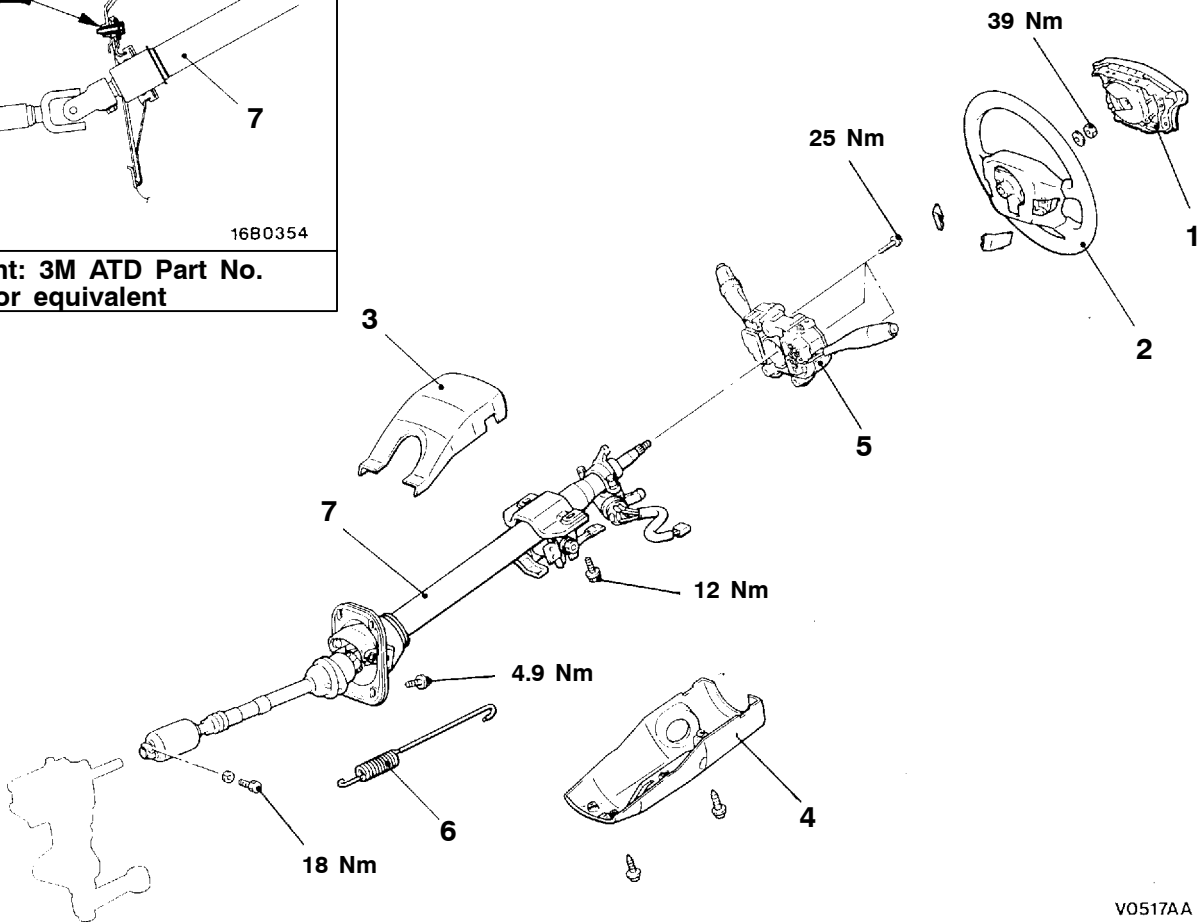
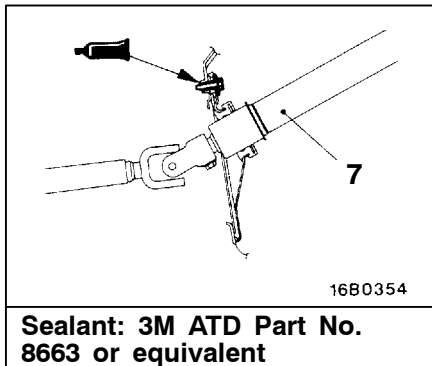
## REMOVAL AND INSTALLATION

**Caution: SRS**

- Before removal of the air bag module, refer to GROUP 52B – Service Precautions and Air Bag Module and Clock Spring.
- When removing and installing the steering wheel, do not let it bump against the air bag module.

**Post-installation Operation**

- Checking Steering Wheel Position with Wheels Straight Ahead



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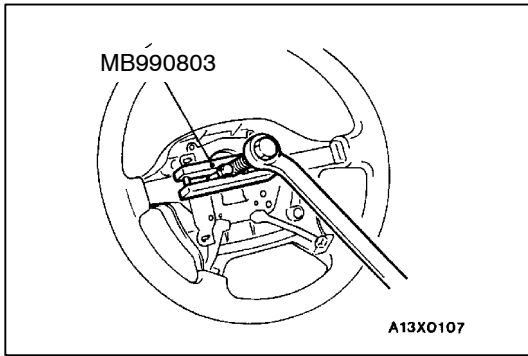
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**Removal steps**

1. Air bag module (Refer to Group 52B – Air Bag Module and Clock Spring.)
2. Steering wheel
  - Driver under cover (Refer to GROUP 52A – Instrument Panel.)

3. Upper column cover assembly
4. Lower column cover assembly
5. Clock spring and column switch
6. Brake pedal return spring
7. Steering column assembly





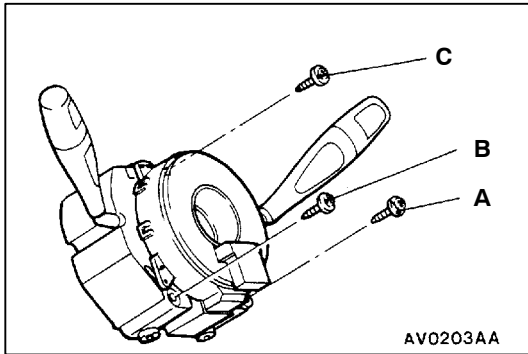
**REMOVAL SERVICE POINT**

**◀A▶ STEERING WHEEL REMOVAL**

Use special tool to remove the steering wheel.

**Caution**

**Do not hammer on the steering wheel to remove it; doing so may damage the collapsible mechanism.**



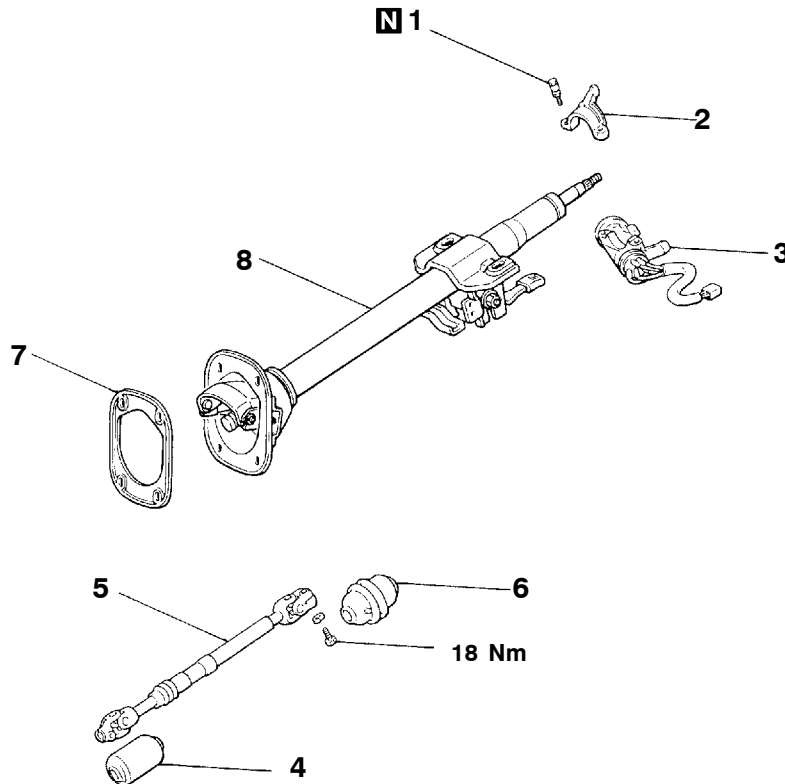
**INSTALLATION SERVICE POINT**

**▶A◀ CLOCK SPRING AND COLUMN SWITCH INSTALLATION**

1. Align the mating mark of clock spring. (Refer to GROUP 52B – Air Bag Modules and Clock Spring.)
2. Tighten the screws in the alphabetical order.

**DISASSEMBLY AND REASSEMBLY**

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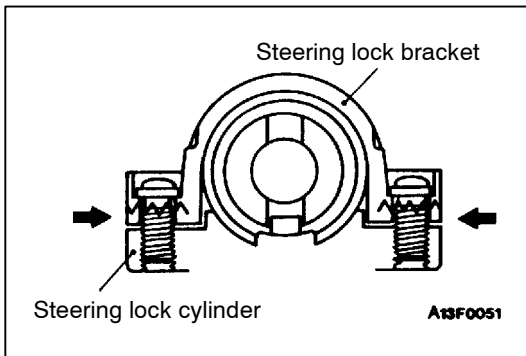


**Disassembly steps**

- ▶B◀ 1. Special bolt
- ▶B◀ 2. Steering lock bracket
- ▶B◀ 3. Steering lock cylinder
- ▶A◀ 4. Lower boot

- ▶A◀ 5. Joint assembly
- ▶A◀ 6. Upper boot
- ▶A◀ 7. Packing
- ▶A◀ 8. Column sub assembly

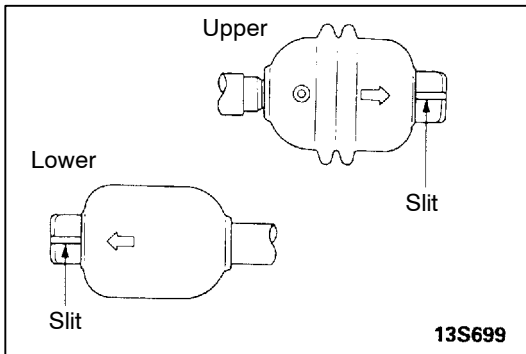




**DISASSEMBLY SERVICE POINT**

**◀A▶ STEERING LOCK BRACKET/STEERING LOCK CYLINDER REMOVAL**

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



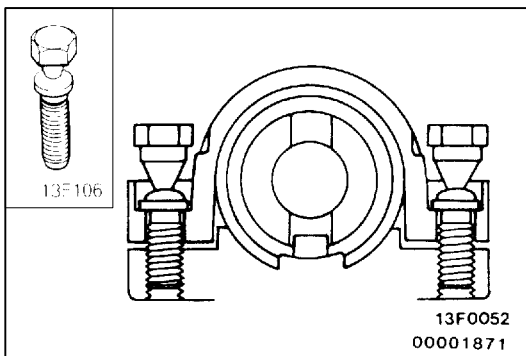
**REASSEMBLY SERVICE POINT**

**▶A◀ UPPER BOOT/LOWER BOOT INSTALLATION**

Assemble the upper and lower boots and the dust cover.

**NOTE**

Align the arrows on the upper and lower boots to the slit on the yokes in order to assemble.



**▶B◀ STEERING LOCK CYLINDER/STEERING LOCK BRACKET/SPECIAL BOLT INSTALLATION**

1. When installing the steering lock cylinder 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.**

## POWER STEERING GEAR BOX

37200390375

## REMOVAL AND INSTALLATION

**Caution: SRS**

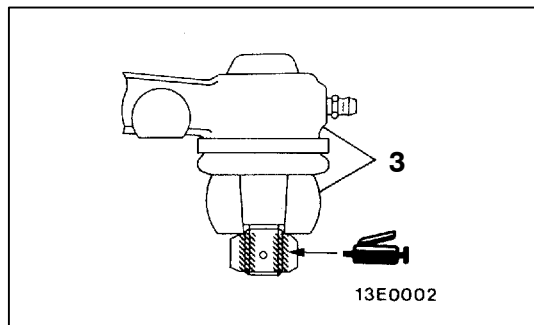
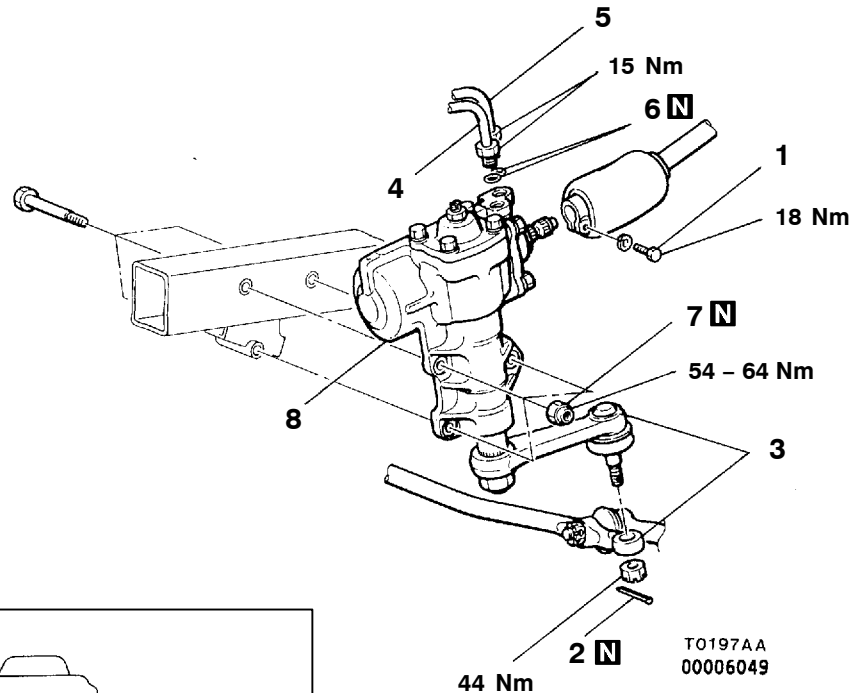
For vehicles with SRS, before removal of the steering gear box refer to GROUP 52B – Supplemental Restraint System (SRS), center the front wheels and remove the ignition key. Failure to do so may damage the SRS clock spring and render the SRS system inoperative, risking serious driver injury.

**Pre-removal Operation**

- Power Steering Fluid Draining (Refer to P.37A-11.)

**Post-installation Operation**

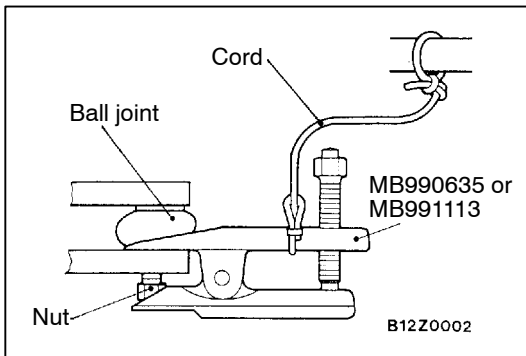
- Power Steering Fluid Supplying (Refer to P.37A-11.)
- Power Steering Fluid Line Bleeding (Refer to P.37A-12.)
- Checking Steering Wheel Position with Wheels Straight Ahead
- Front Wheel Alignment Adjustment (Refer to GROUP 33A – On-vehicle Service.)
- Press the dust cover with a finger to check whether the dust cover is cracked or damaged.

**Removal steps**

1. Connecting bolt for steering gear box and steering shaft
2. Split pin
3. Connection for pitman arm and relay rod

4. Pressure tube
5. Return tube
6. O-ring
7. Self-locking nut
8. Power steering gear box



**REMOVAL SERVICE POINT****◀A▶ PITMAN ARM AND RELAY ROD DISCONNECTION**

Use the special tool to disconnect the ball joint.

**Caution**

1. **Using the special tool, loosen the tie rod end mounting nut. Only loosen the nut; do not remove it from the ball joint.**
2. **Support the special tool with a cord, etc. to prevent it from coming off.**

**INSPECTION**

37200400184

**PITMAN ARM DUST COVER CHECK**

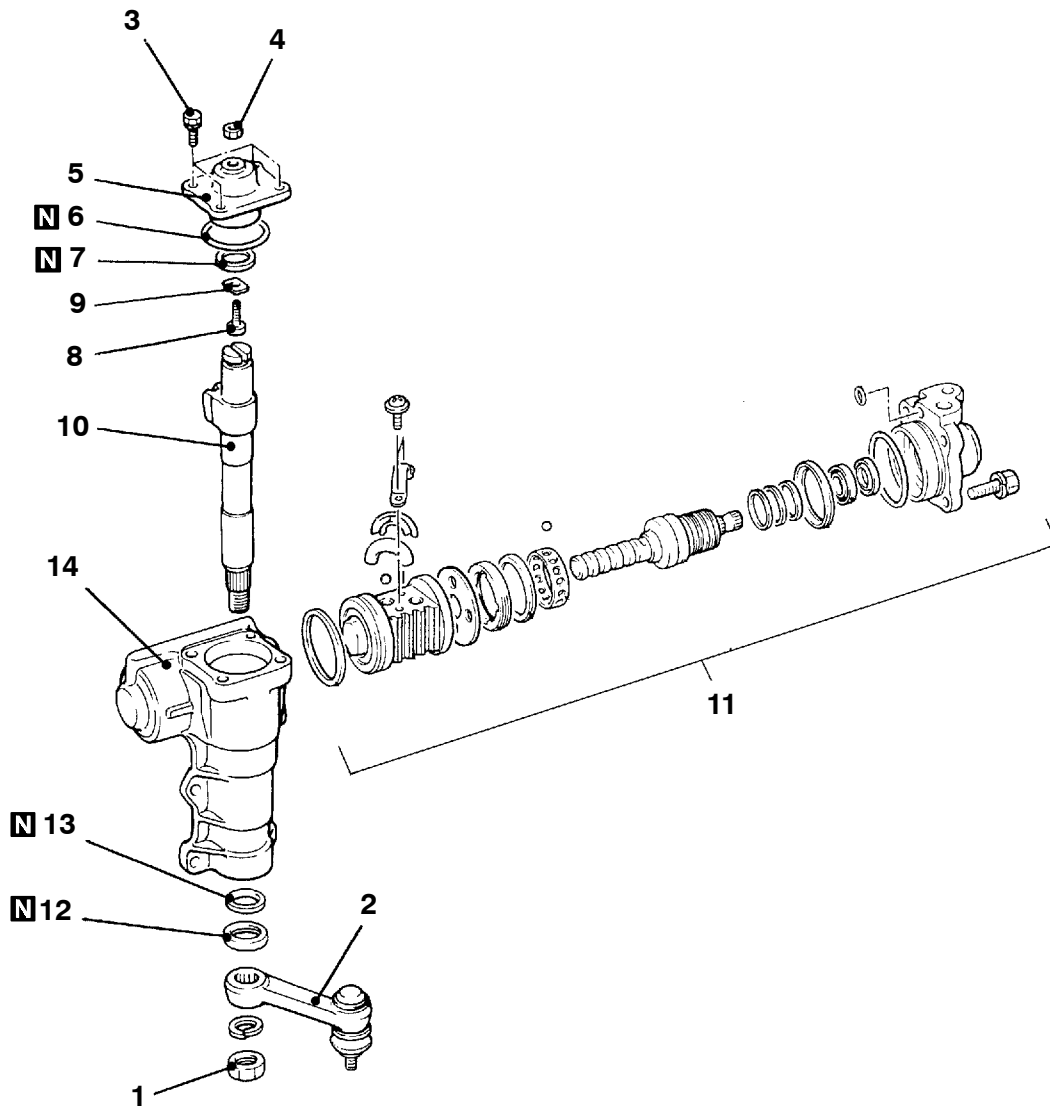
1. Press the dust cover with a finger to check whether the dust cover is cracked or damaged.
2. If there are any cracks in or damage to the dust cover, replace the pitman arm. (Refer to P.37A-20.)

**NOTE**

Cranked or damaged dust cover may cause damage to the ball joint. In addition, if the dust cover is damaged during service work, replace the dust cover. (Refer to P.37A-25.)

DISASSEMBLY

37200420029



B13V0108

**Disassembly steps**

◀A▶

- 1. Jam nut
- 2. Pitman arm
- 3. Bolts
- 4. Adjusting bolt locking nut
- 5. Side cover
- 6. O-ring
- 7. Y-packing

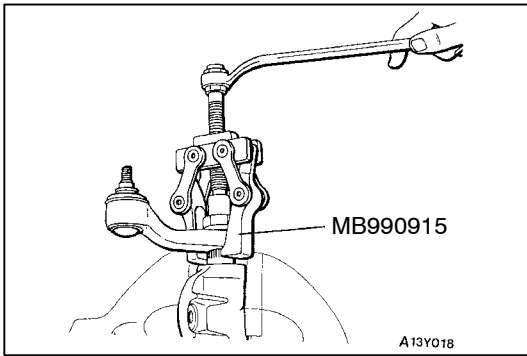
◀C▶

- 8. Adjusting bolt
- 9. Adjusting plate
- 10. Cross-shaft
- 11. Mainshaft and valve assembly
- 12. Oil seal
- 13. Y-packing
- 14. Gear box housing

◀B▶

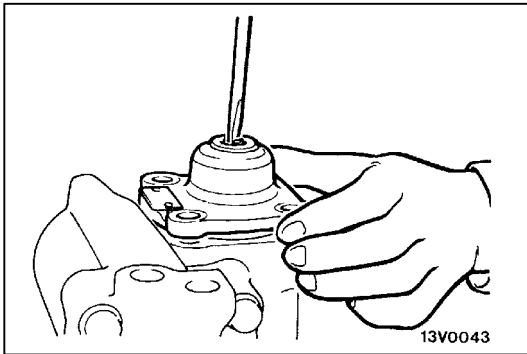
**DISASSEMBLY SERVICE POINTS**

**◀A▶ PITMAN ARM REMOVAL**



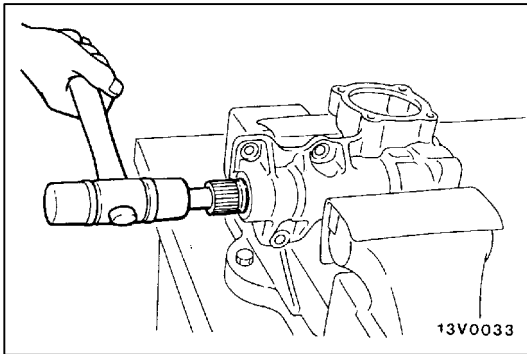
**◀B▶ SIDE COVER REMOVAL**

1. Loosen the lock nut and then turn the adjusting bolt anti-clockwise slightly.
2. Screw in the adjusting bolt without turning the side cover, and then remove the side cover.

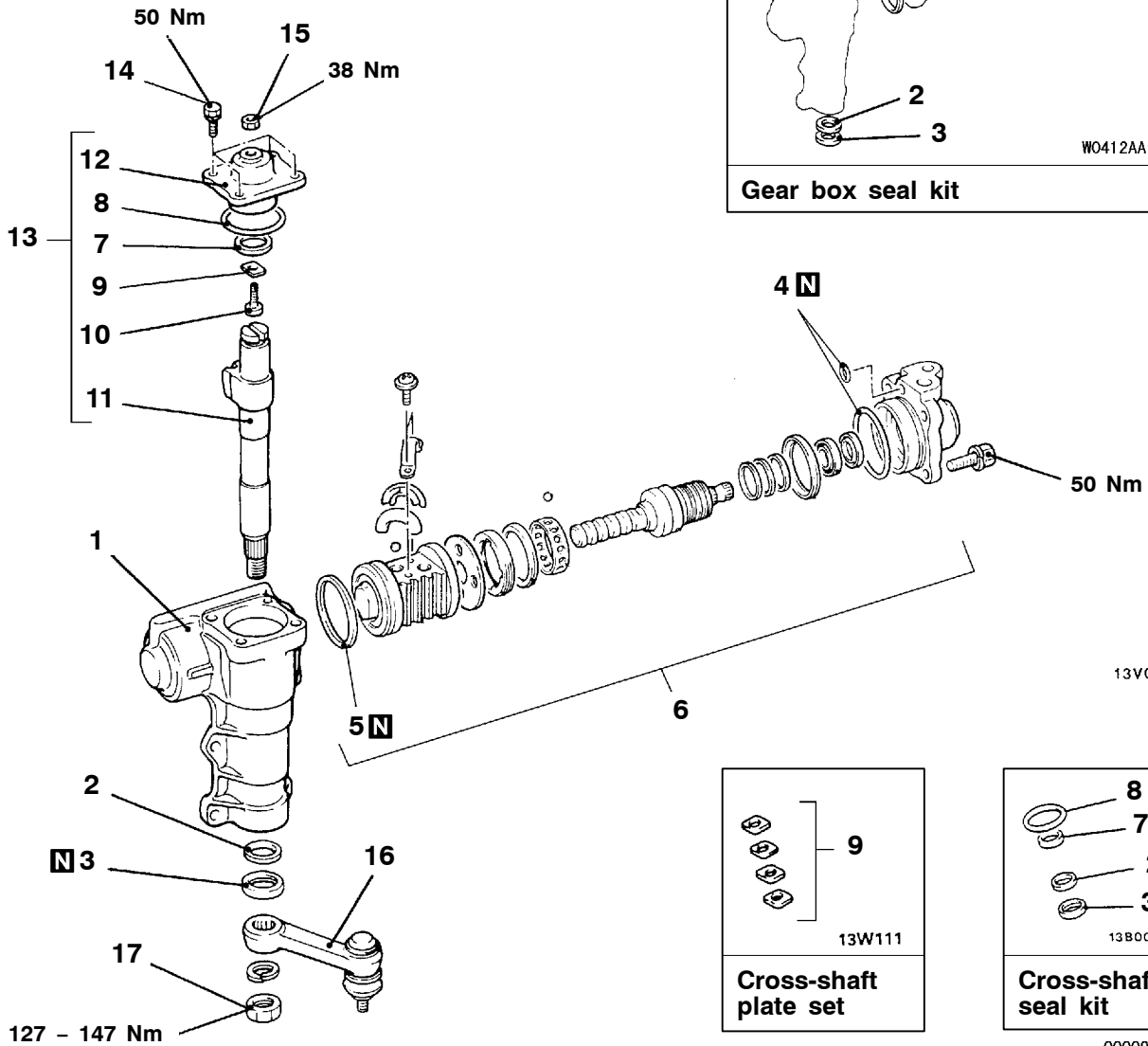


**◀C▶ CROSS-SHAFT REMOVAL**

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.



REASSEMBLY

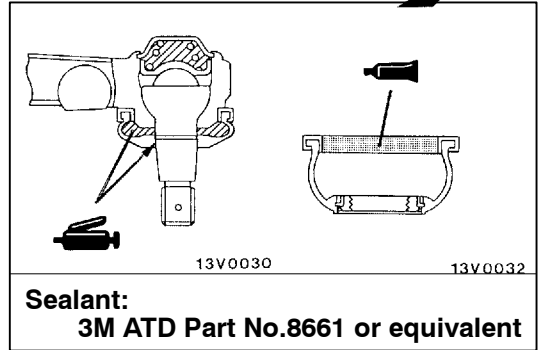
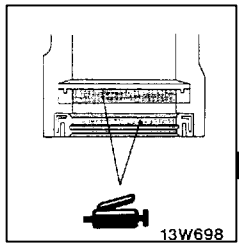
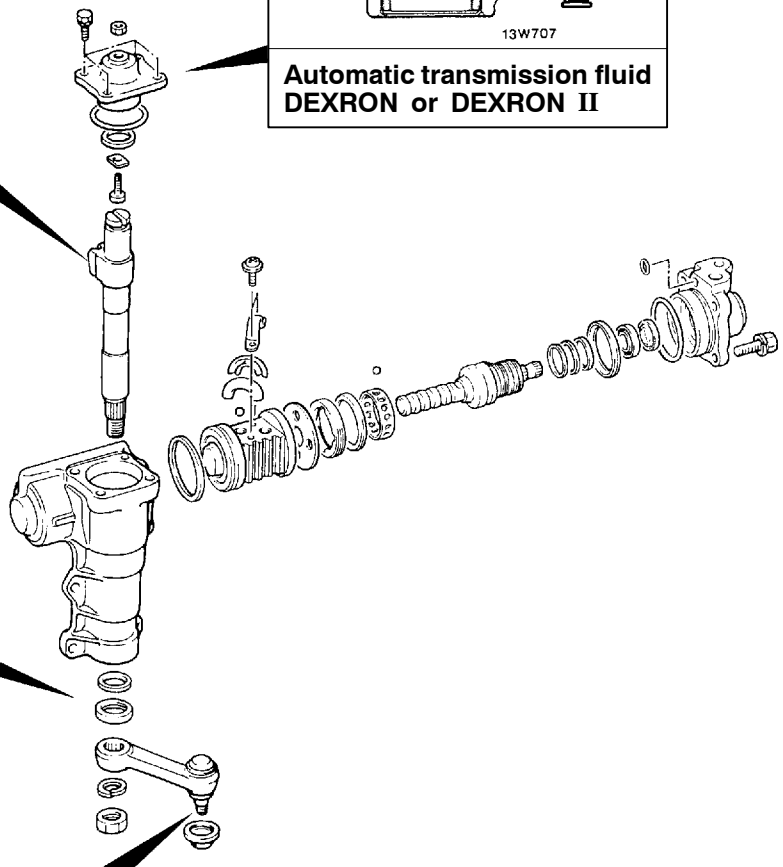
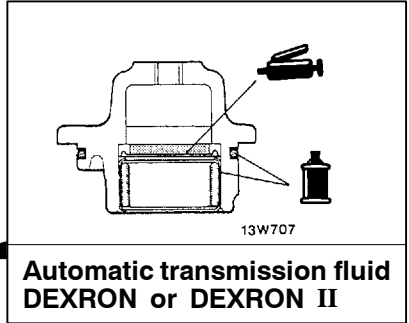
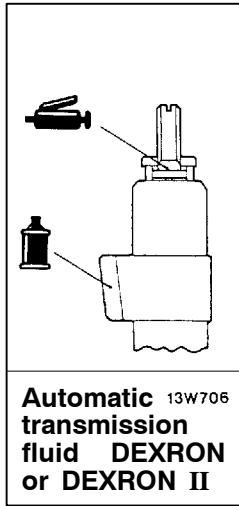


Reassembly steps

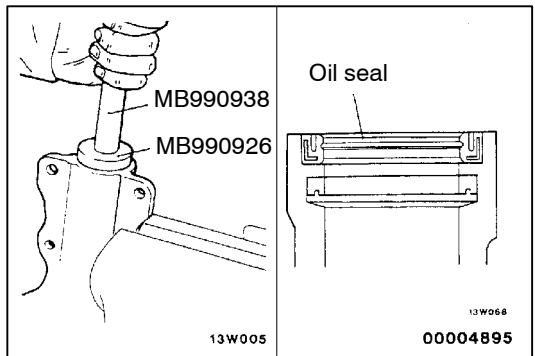
- 1. Gear box housing
- ▶A◀ 2. Y-packing
- ▶A◀ 3. Oil seal
- 4. O-ring
- 5. Seal ring
- 6. Mainshaft and valve assembly
- 7. Y-packing
- 8. O-ring
- ▶B◀ ● Cross-shaft axial play adjustment
- 9. Adjusting plate
- 10. Adjusting bolt

- ▶C◀ 11. Cross-shaft
- 12. Side cover
- 13. Side cover and cross-shaft assembly
- 14. Bolt
- ▶D◀ ● Mainshaft total starting torque adjustment
- 15. Adjusting bolt lock nut
- ▶E◀ 16. Pitman arm
- 17. Jam nut

LUBRICATION AND SEALING POINTS



00009702

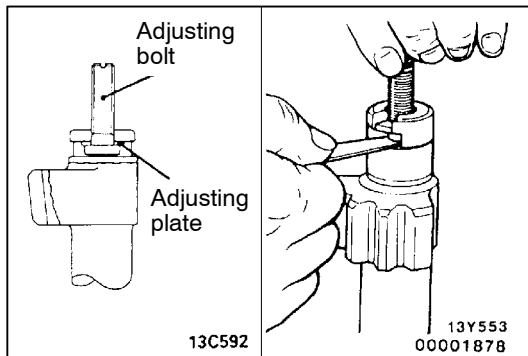


REASSEMBLY SERVICE POINTS

▶◀ OIL SEAL INSTALLATION

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



### ►B◄ CROSS-SHAFT AXIAL PLAY ADJUSTMENT

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: 0.05 mm or less**

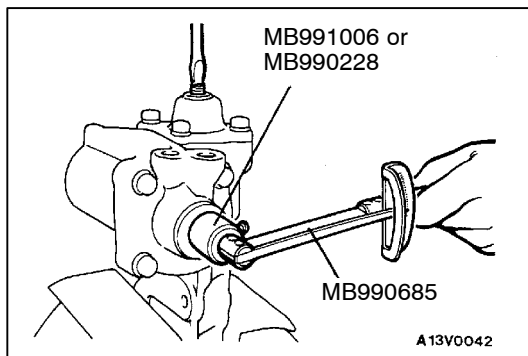
3. If the clearance exceeds the standard value, replace with a suitable adjusting plate.

### ►C◄ CROSS-SHAFT INSTALLATION

Set the rack piston in the neutral position and install the cross-shaft.

#### Caution

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



### ►D◄ MAINSHAFT TOTAL STARTING TORQUE ADJUSTMENT

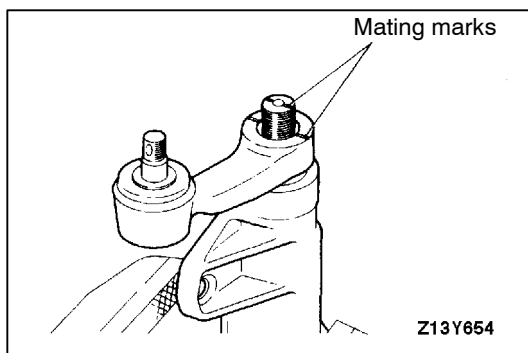
1. While turning the adjusting bolt, measure the mainshaft total starting torque by using the special tools.

**Standard value: 0.69 – 1.28 Nm**

#### Caution

**Adjust by turning adjusting bolt so that the starting torque at the centre position of the rack piston is approximately 0.2 Nm higher than the values at the both ends of the rack piston.**

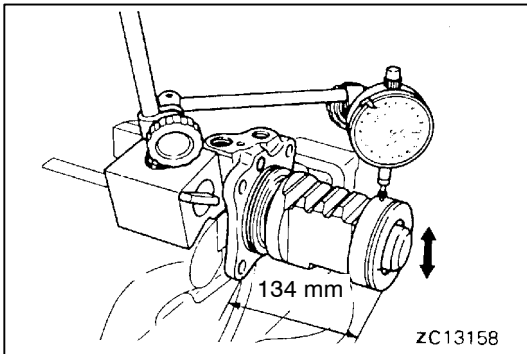
2. Tighten the adjusting bolt lock nut to the specified torque.



### ►E◄ PITMAN ARM INSTALLATION

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





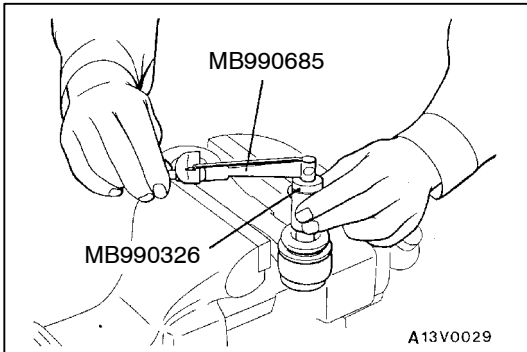
**INSPECTION**

37200440155

**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.

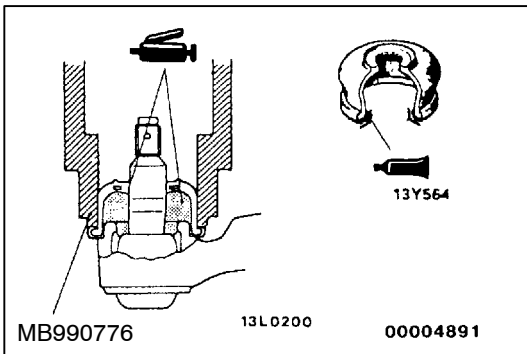
**Limit: 0.05 mm**



**PITMAN ARM BALL JOINT STARTING TORQUE**

After shaking the ball joint stud several times, install the nut to the stud and use the special tool to measure the starting torque of the ball joint.

**Standard value: 0.98 – 2.94 Nm**



**DUST COVER REPLACEMENT**

Only when the dust cover is damaged accidentally during service work, replace the dust cover only as follows:

1. Fill inside the dust cover with multipurpose grease.
2. Apply specified sealant to the mounting surface of the dust cover at the pitman arm.

**Specified sealant:**

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

3. Using the special tool, install the dust cover to the pitman arm.

# POWER STEERING OIL PUMP

37200520422

## REMOVAL AND INSTALLATION

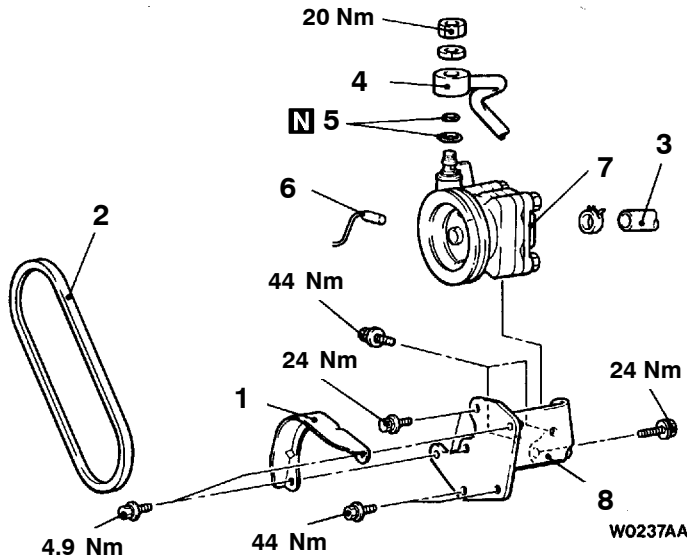
### Pre-removal Operation

- Power Steering Fluid Draining (Refer to P.37A-11.)

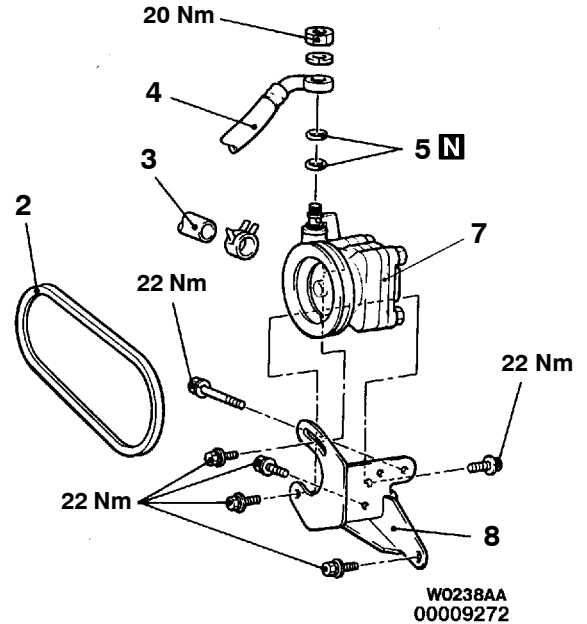
### Post-installation Operation

- Power Steering Fluid Supplying (Refer to P.37A-11.)
- Drive Belt Tension Check (Refer to P.37A-10.)
- Power Steering Fluid Line Bleeding (Refer to P.37A-12.)
- Oil Pump Pressure Check (Refer to P.37A-13.)

<6G7>



<4D5>

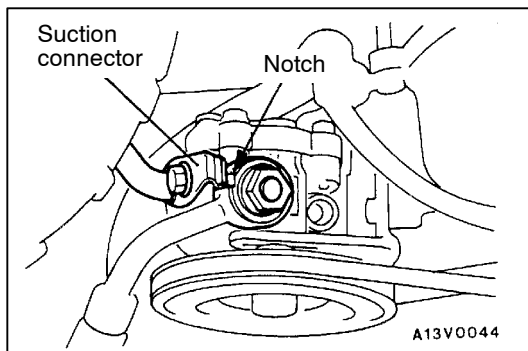


### Removal steps

1. Pulley cover <6G7>
2. Drive belt
3. Suction hose
4. Pressure tube



5. O-ring
6. Pressure switch connector <6G7>
7. Oil pump
8. Oil pump bracket



## INSTALLATION SERVICE POINT

### ▶A◀ PRESSURE HOSE INSTALLATION

Connect the pressure hose so that the notched part contacts the suction connector.

### INSPECTION

Check the drive belt for cracks.  
Check the pulley assembly for uneven rotation.

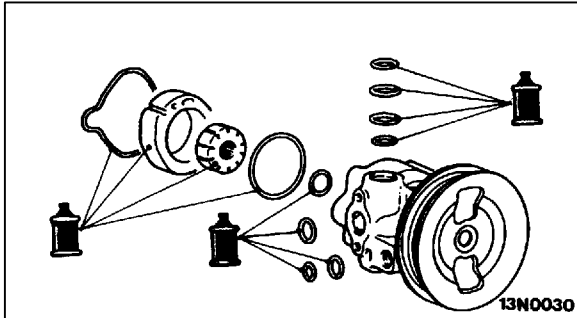
37200530067

DISASSEMBLY AND REASSEMBLY <6G7>

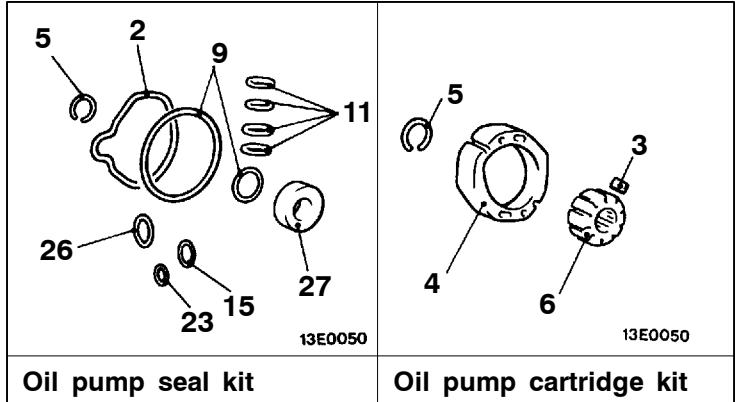
37200540299

Caution

Do not disassemble the flow control valve.

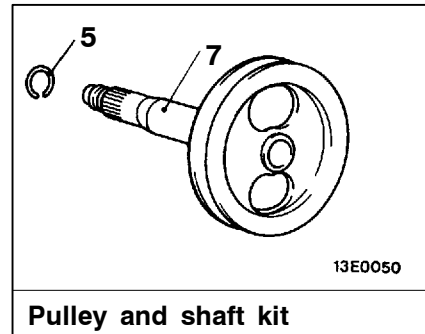
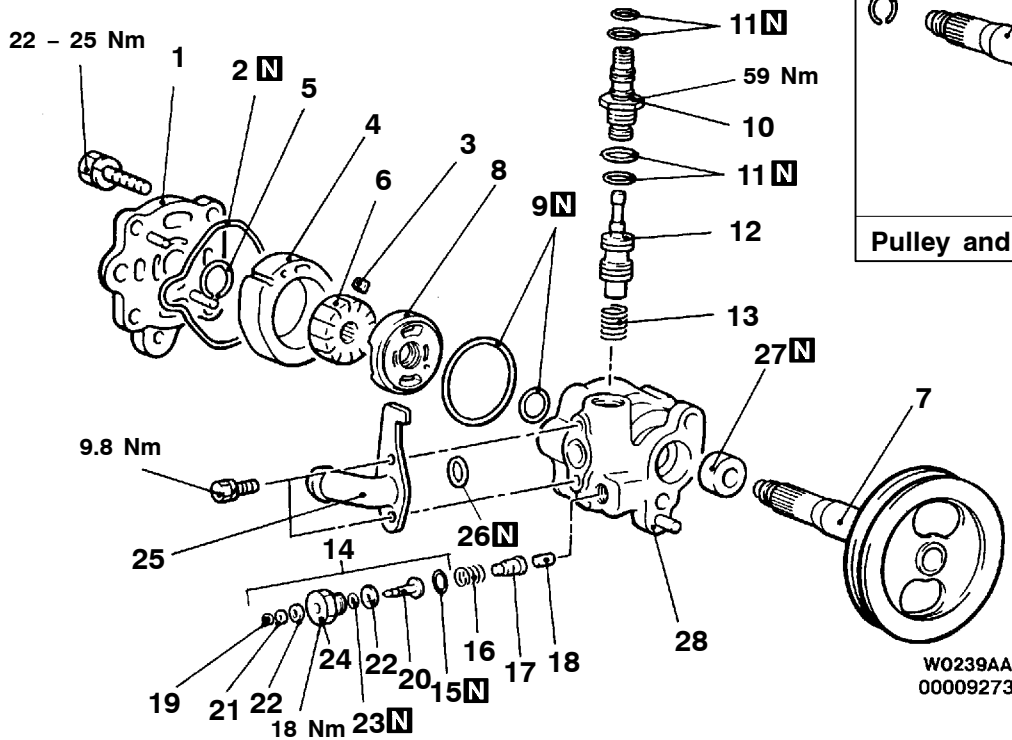


Fluid:  
Automatic transmission fluid  
DEXRON or DEXRON II



Oil pump seal kit

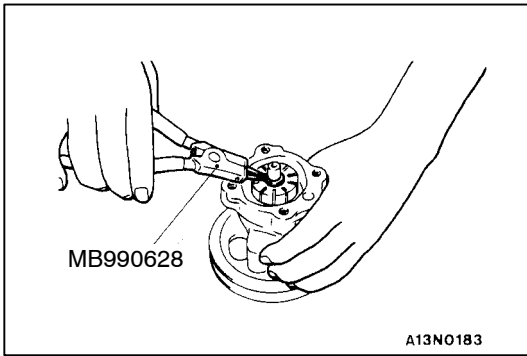
Oil pump cartridge kit



Pulley and shaft kit

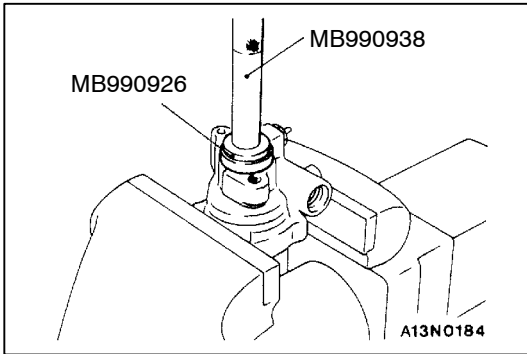
Disassembly steps

- |     |                         |     |                       |
|-----|-------------------------|-----|-----------------------|
|     | 1. Pump cover           |     | 16. Spring            |
|     | 2. O-ring               |     | 17. Plunger           |
|     | 3. Vanes                | ▶C◀ | 18. Piston rod        |
| ▶H◀ | 4. Cam ring             |     | 19. Snap ring         |
| ▶G◀ | 5. Snap ring            |     | 20. Terminal          |
| ▶F◀ | 6. Rotor                |     | 21. Washer            |
| ▶E◀ | 7. Pulley assembly      |     | 22. Insulator         |
|     | 8. Side plate           | ▶D◀ | 23. O-ring            |
|     | 9. O-ring               | ▶B◀ | 24. Plug              |
|     | 10. Connector           |     | 25. Suction connector |
|     | 11. O-ring              | ▶B◀ | 26. O-ring            |
|     | 12. Flow control valve  | ▶A◀ | 27. Oil seal          |
|     | 13. Flow control spring |     | 28. Oil pump body     |
|     | 14. Terminal assembly   |     |                       |
| ▶B◀ | 15. O-ring              |     |                       |



**DISASSEMBLY SERVICE POINT**

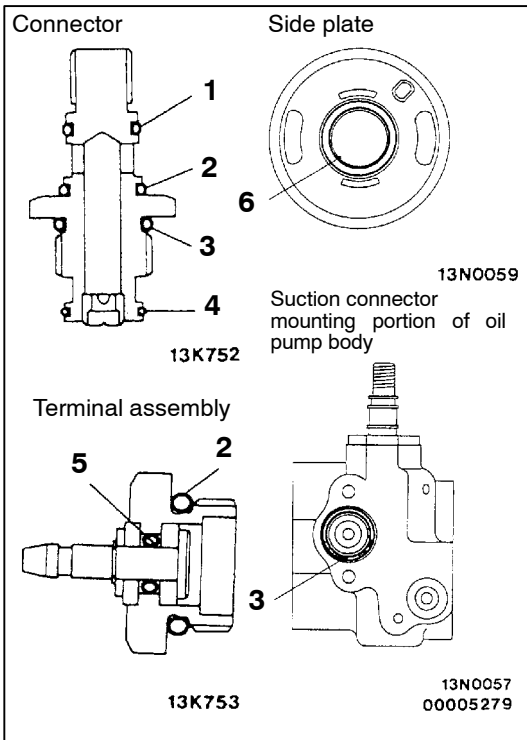
◀A▶ SNAP RING REMOVAL



**REASSEMBLY SERVICE POINTS**

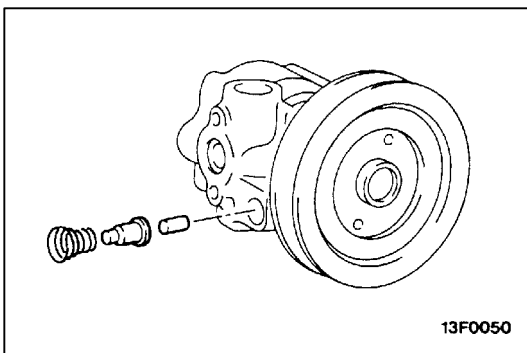
▶A◀ OIL SEAL INSTALLATION

Use special tool to install the oil seal.



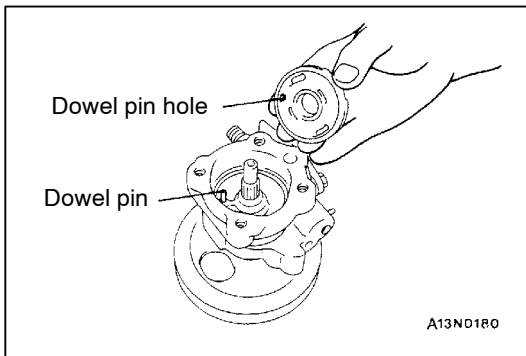
▶B◀ O-RINGS INSTALLATION

No.	I.D. X Width mm
1	11 × 1.9
2	13 × 1.9
3	17.8 × 2.4
4	13.5 × 1.5
5	3.8 × 1.9
6	16.8 × 2.4



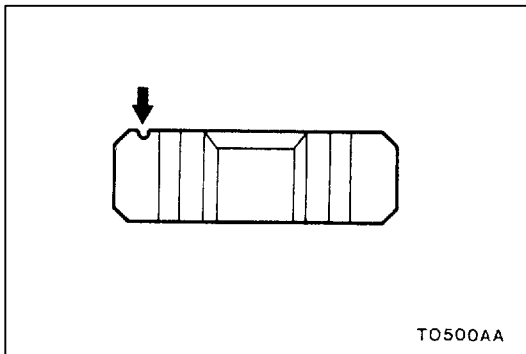
▶C◀ SPRING INSTALLATION

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



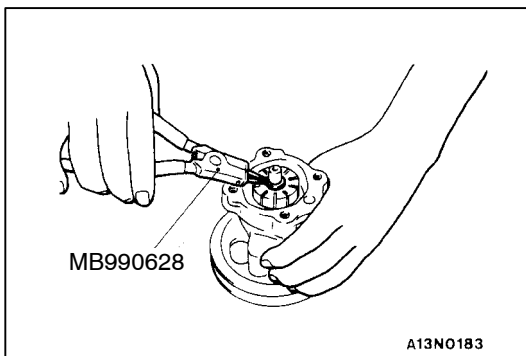
**►D◄ SIDE PLATE INSTALLATION**

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



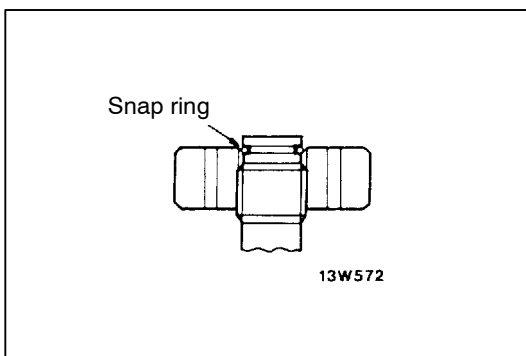
**►E◄ ROTOR INSTALLATION**

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



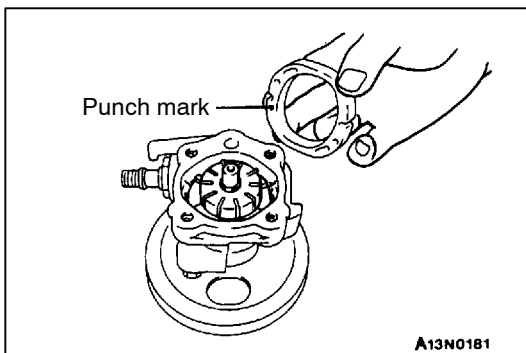
**►F◄ SNAP RING INSTALLATION**

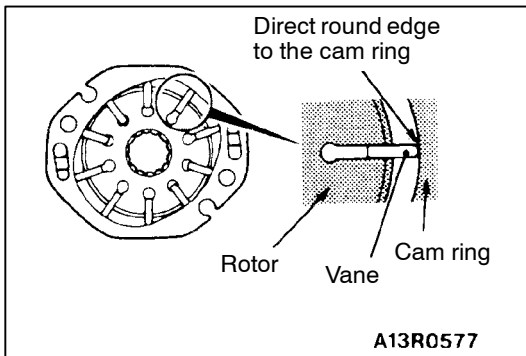
After installation of the snap ring, lift the rotor and check that the snap ring has entered the countersunk part.



**►G◄ CAM RING INSTALLATION**

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





### ▶H◀VANES INSTALLATION

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

### INSPECTION

37200550087

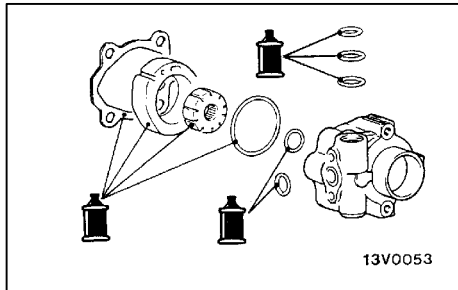
- Check the flow control valve for clogging.
- Check the pulley assembly for wear or damage.
- Check the rotor and vane groove for “stepped” wear.
- Check the contact surface of cam ring and vanes for “stepped” wear.
- Check the vanes for damage.

DISASSEMBLY AND REASSEMBLY <4D5>

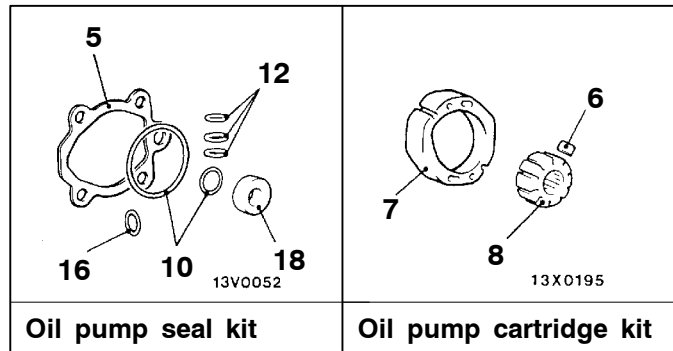
37200540305

Caution

Do not disassemble the flow control valve.

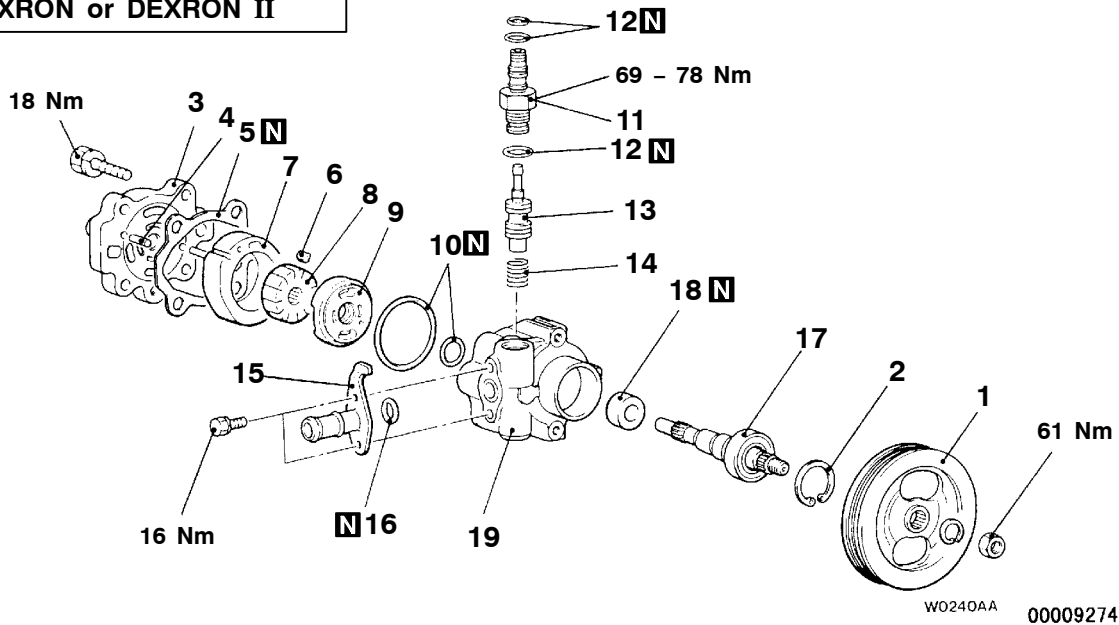


Fluid:  
Automatic transmission fluid  
DEXRON or DEXRON II



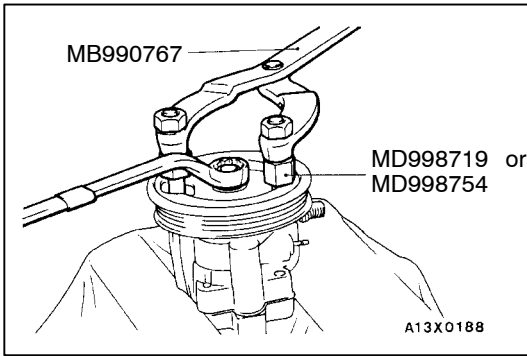
Oil pump seal kit

Oil pump cartridge kit



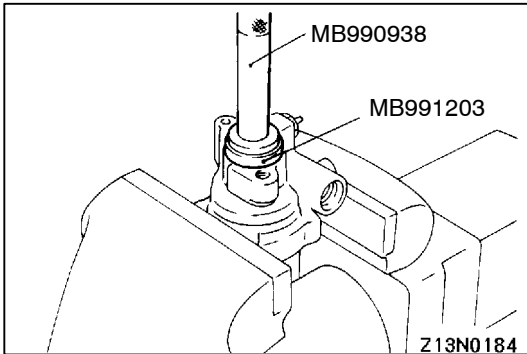
Disassembly steps

- ◀A▶ ▶G▶ 1. Drive pulley
- ▶F▶ ▶E▶ ▶D▶ 2. Snap ring
- ▶E▶ ▶D▶ 3. Pump cover
- ▶E▶ ▶D▶ 4. Lock pin
- ▶F▶ ▶E▶ ▶D▶ 5. Seal washer
- ▶E▶ ▶D▶ 6. Vanes
- ▶E▶ ▶D▶ 7. Cam ring
- ▶D▶ 8. Rotor
- ▶D▶ 9. Side plate
- ▶C▶ 10. O-ring
- ▶C▶ 11. Connector
- ▶C▶ 12. O-ring
- ▶C▶ 13. Flow control valve
- ▶C▶ 14. Flow control spring
- ▶C▶ 15. Suction connector
- ▶B▶ ▶A▶ 16. O-ring
- ▶B▶ ▶A▶ 17. Drive shaft assembly
- ▶A▶ 18. Oil seal
- ▶A▶ 19. Oil pump body



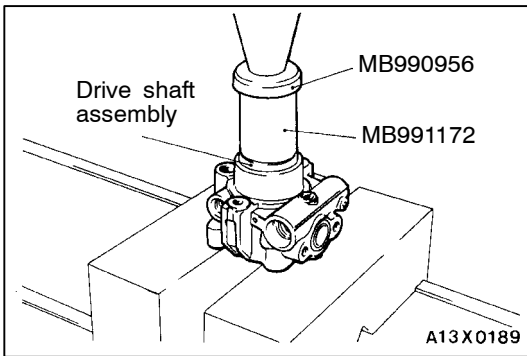
**DISASSEMBLY SERVICE POINT**

◀A▶ DRIVE PULLEY REMOVAL

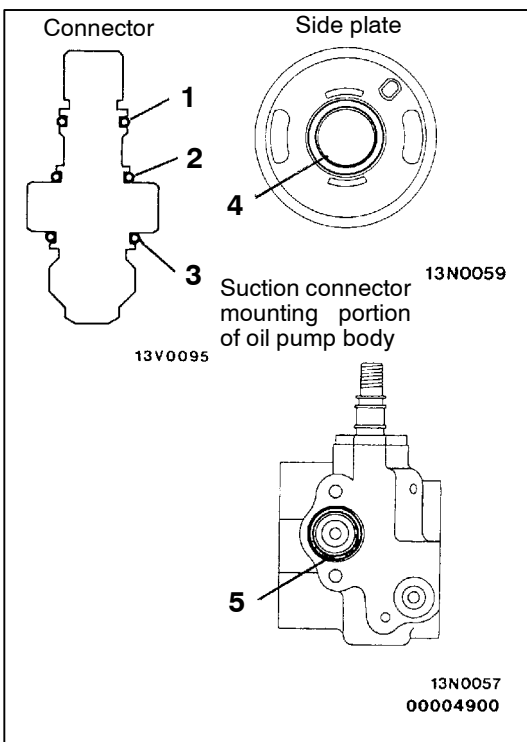


**REASSEMBLY SERVICE POINTS**

▶A◀ OIL SEAL INSTALLATION



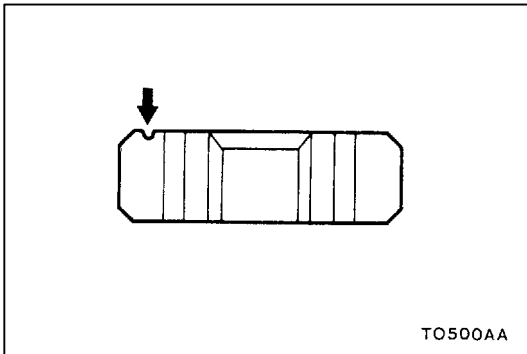
▶B◀ DRIVE SHAFT ASSEMBLY INSTALLATION



▶C◀ O-RINGS INSTALLATION

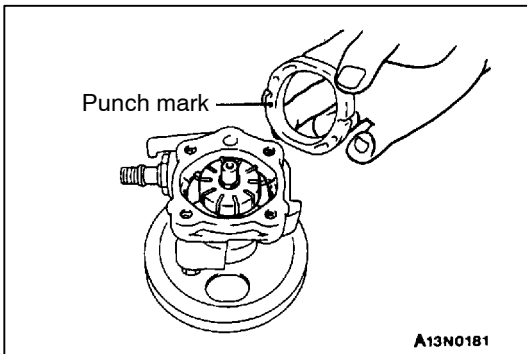
No.	I.D. x Width mm
1	11 x 1.9
2	13 x 1.9
3	15.5 x 2.4
4	14.6 x 2.4
5	19.4 x 1.9





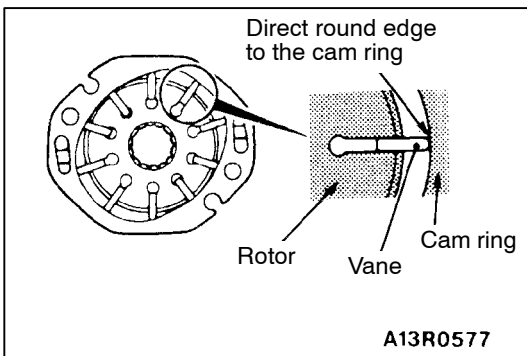
**►D◄ ROTOR INSTALLATION**

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



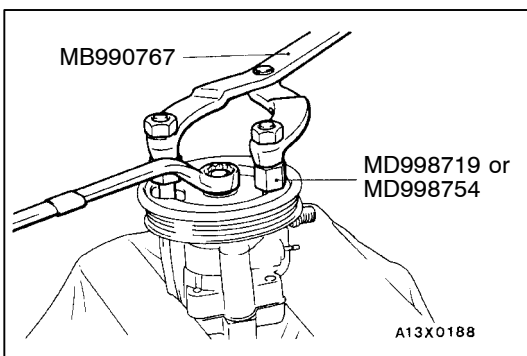
**►E◄ CAM RING INSTALLATION**

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



**►F◄ VANE INSTALLATION**

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



**►G◄ DRIVE PULLEY INSTALLATION**

**INSPECTION**

37200550087

- 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.

POWER STEERING HOSES

37200570403

REMOVAL AND INSTALLATION

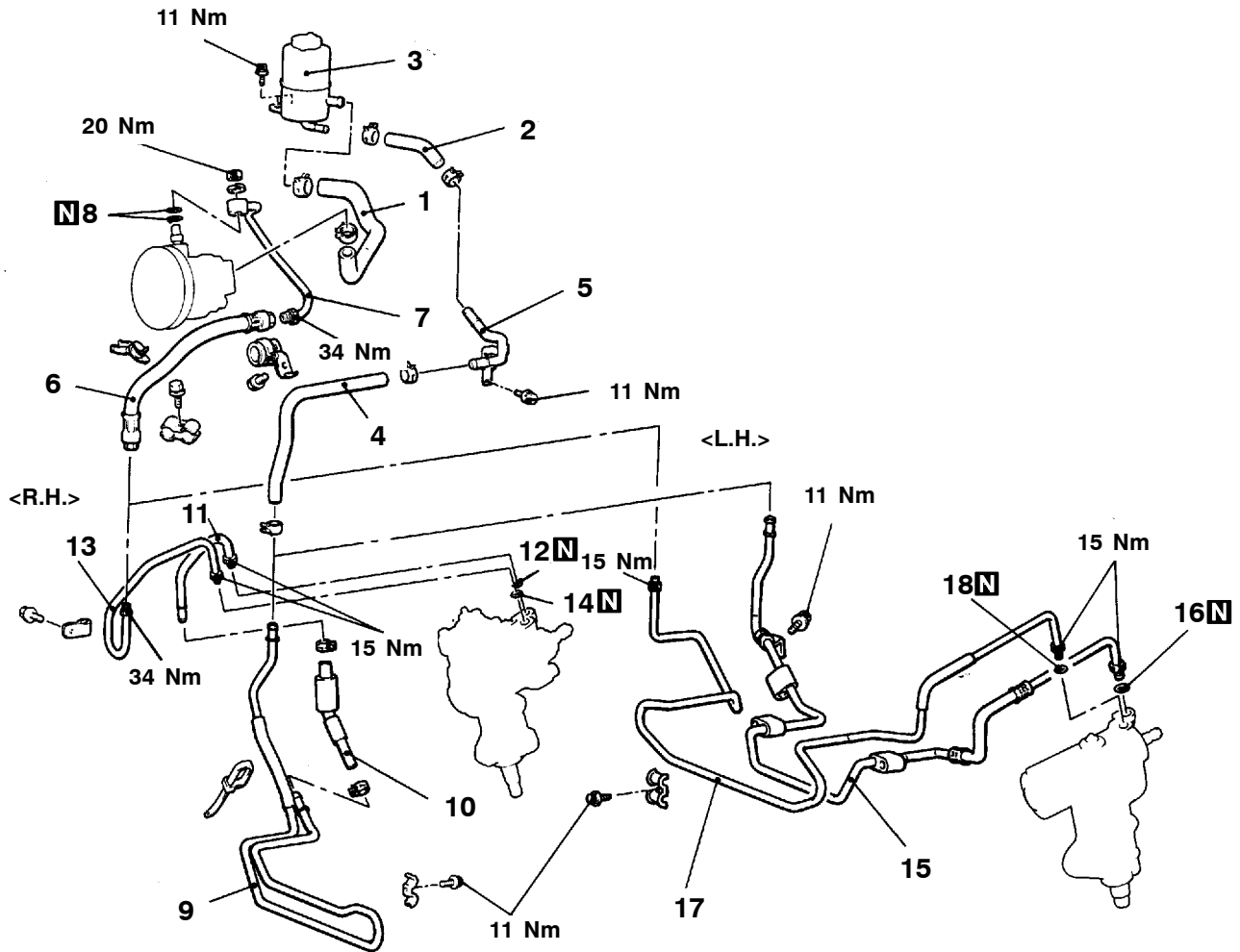
Pre-removal Installation

- Power Steering Fluid Draining (Refer to P.37A-11.)
- Radiator Grille Removal

Post-installation Operation

- Radiator Grille Installation
- Power Steering Fluid Supplying (Refer to P.37A-11.)
- Power Steering Fluid Line Bleeding (Refer to P.37A-12.)

<6G7>



AW0241AA

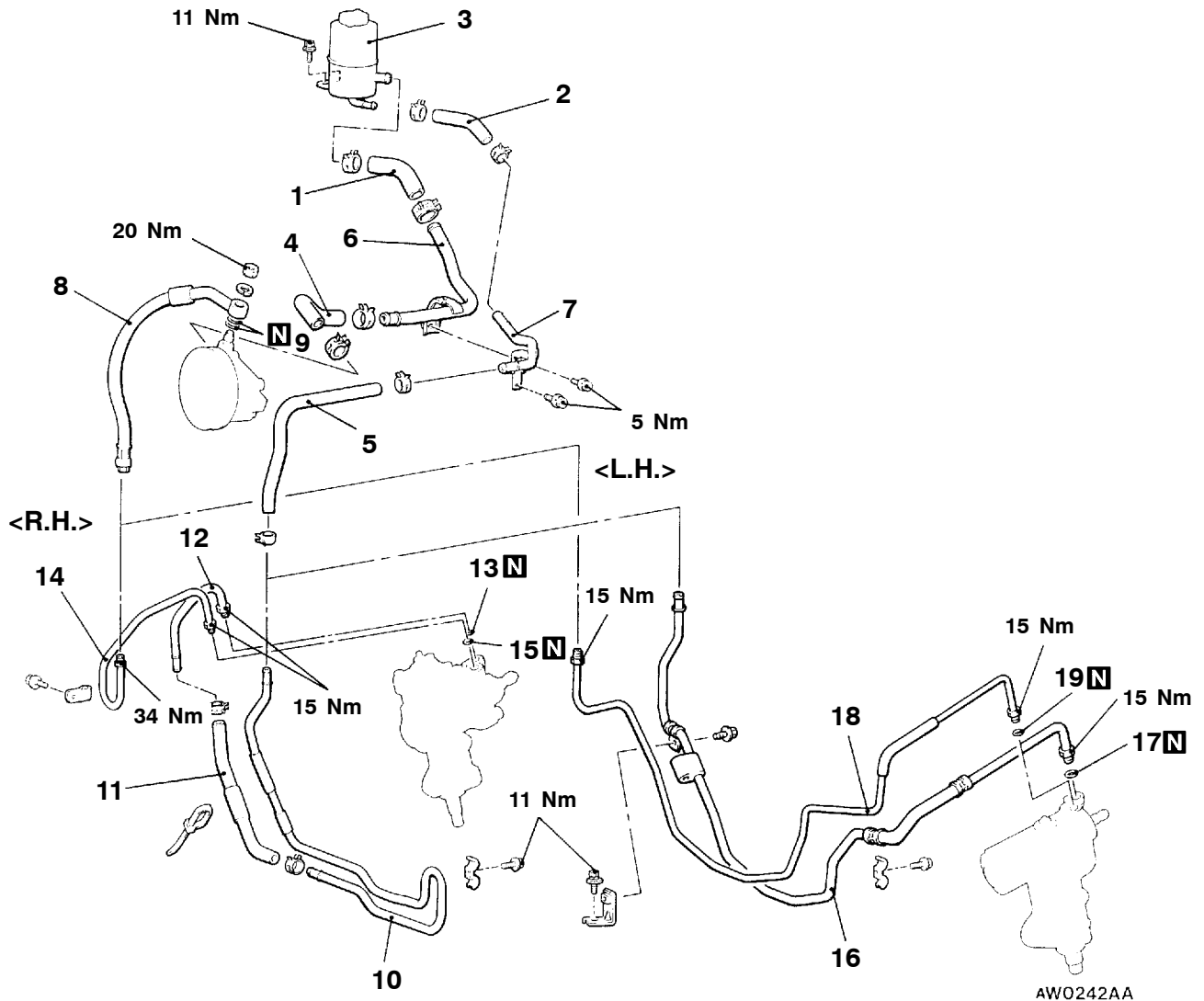
Removal steps

- ▶E◀
- ▶E◀
- ▶D◀
- ▶C◀
- ▶C◀
- ▶B◀

1. Suction hose
2. Return hose
3. Oil reservoir
4. Return hose
5. Return tube
6. Pressure hose
7. Pressure tube
8. O-ring
9. Return tube

10. Return hose
11. Return tube
12. O-ring
- ▶A◀ 13. Pressure tube
- ▶B◀ 14. O-ring
- ▶B◀ 15. Return tube
- ▶A◀ 16. O-ring
- ▶A◀ 17. Pressure tube
18. O-ring

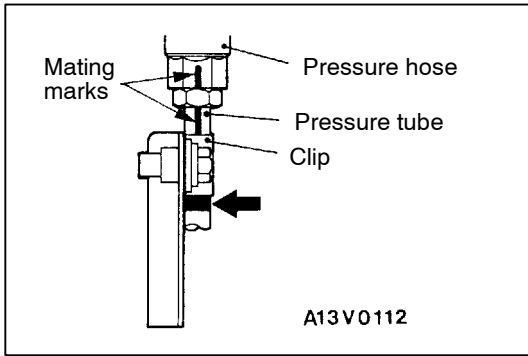
<4D5>



**Removal steps**

- ▶E◀ 1. Suction hose
- ▶E◀ 2. Return hose
- 3. Oil reservoir
- ▶E◀ 4. Suction hose
- ▶D◀ 5. Return hose
- 6. Suction tube
- 7. Return tube
- ▶C◀ 8. Pressure tube
- 9. O-ring
- ▶B◀ 10. Return tube

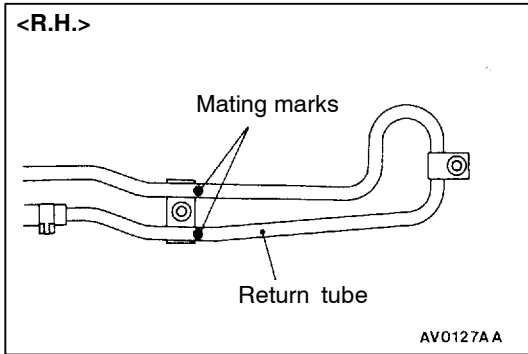
- 11. Return hose
- 12. Return tube
- 13. O-ring
- ▶A◀ 14. Pressure tube
- ▶B◀ 15. O-ring
- ▶B◀ 16. Return tube
- ▶A◀ 17. O-ring
- ▶A◀ 18. Pressure tube
- 19. O-ring



**INSTALLATION SERVICE POINTS**

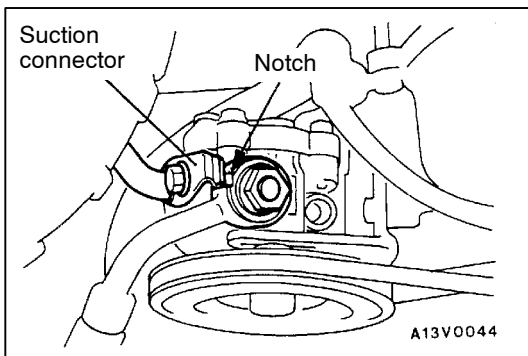
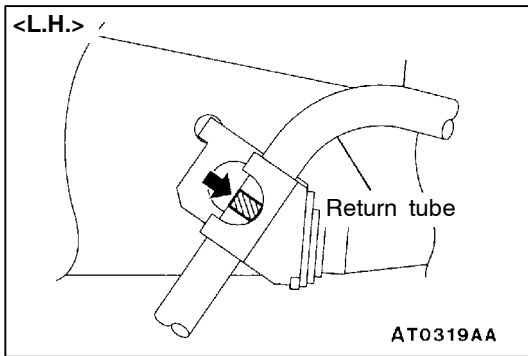
**▶A◀ PRESSURE TUBE INSTALLATION**

1. Connect the pressure tube so that the marking is positioned as shown in the illustration.
2. Align the pressure tube and pressure hose alignment marks and install.



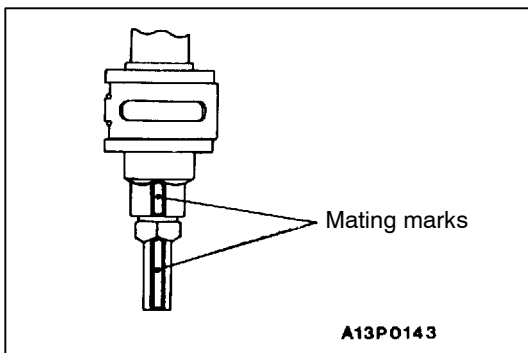
**▶B◀ RETURN TUBE INSTALLATION**

Connect the return tube so that the marking is positioned as shown in the illustration.

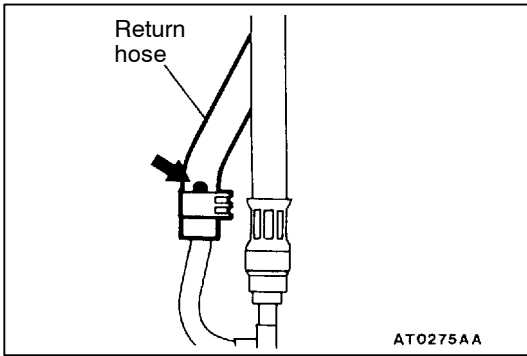


**▶C◀ PRESSURE TUBE/PRESSURE HOSE/PRESSURE TUBE INSTALLATION**

1. Connect the pressure tube so that the its notched part contacts the suction connector.

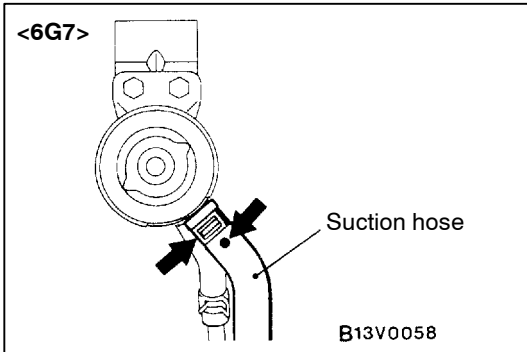


2. Align the mating marks on the pressure hose and pressure tube, and install the pressure hose.



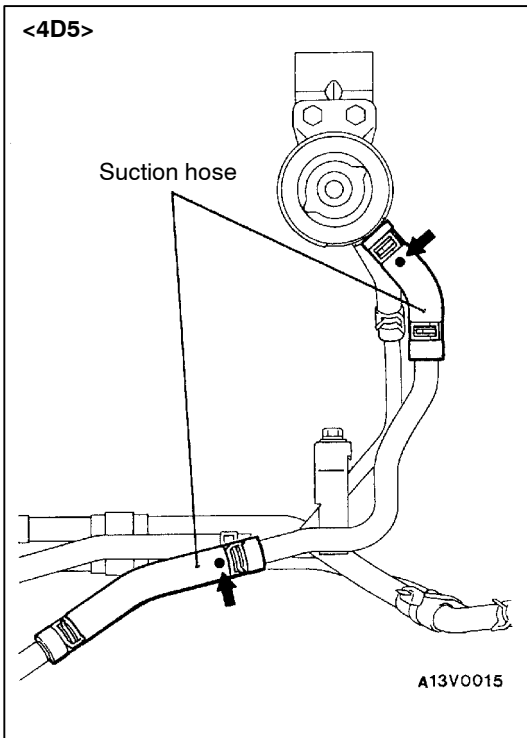
►D◄ RETURN HOSE INSTALLATION

Install the return hose so that the marking faces towards front of the vehicle.



►E◄ RETURN HOSE/SUCTION HOSE INSTALLATION

Connect the return hose and suction hose so that the marking is positioned as shown in the illustration.

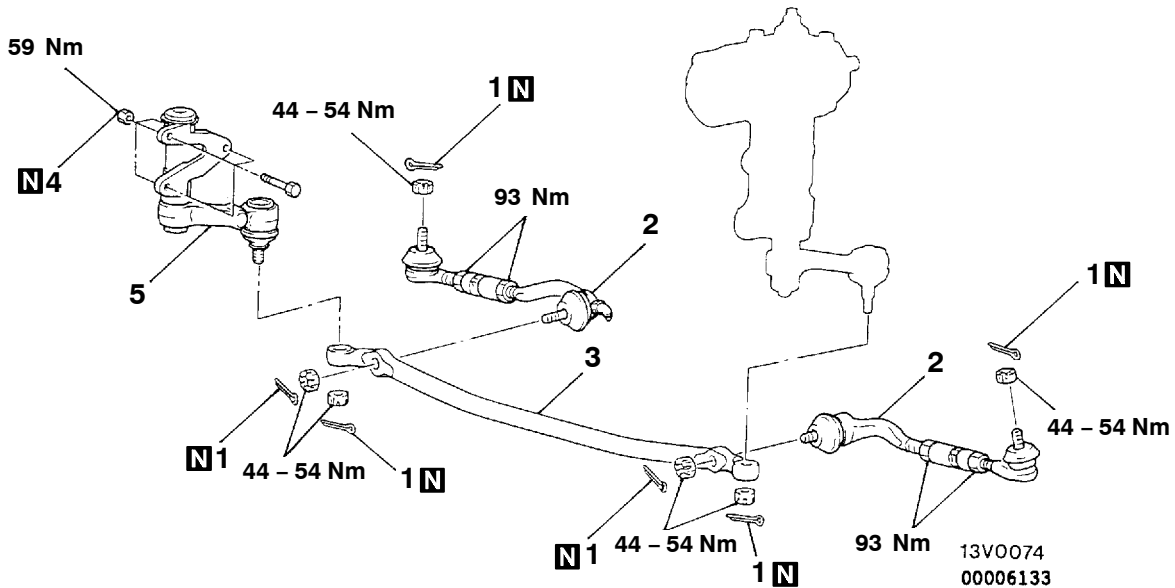
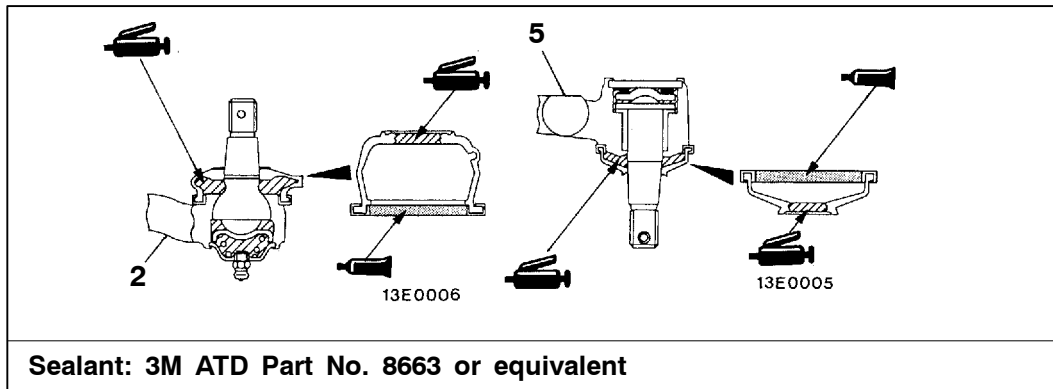


# STEERING LINKAGE

## REMOVAL AND INSTALLATION

### Post-installation Operation

- Checking Steering Wheel Position with the Wheels Straight Ahead
- Front Wheel Alignment (Refer to GROUP 33A – On-vehicle Service.)
- Press the dust cover with a finger to check whether the dust cover is cracked or damaged.



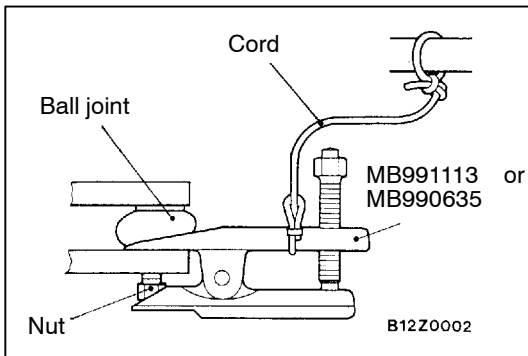
### Removal steps



1. Cotter pin
2. Tie rod assembly
3. Relay rod



4. Self-locking nut
5. Idler arm assembly



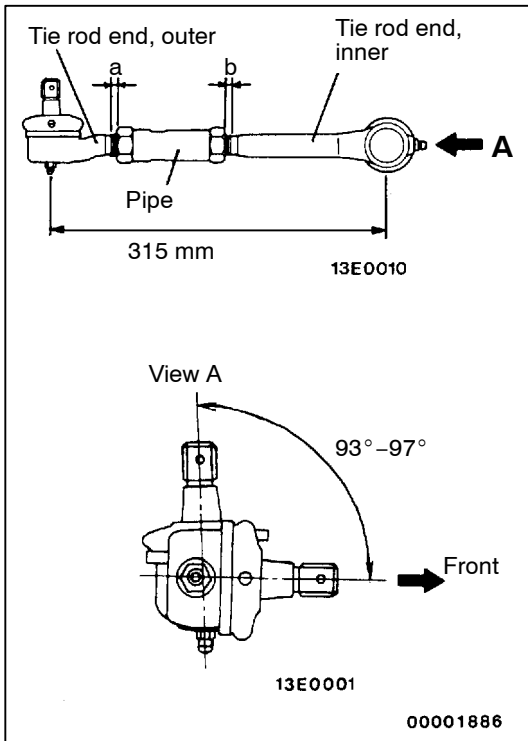
**REMOVAL SERVICE POINT**

**◀A▶ TIE ROD ASSEMBLY/RELAY ROD/IDLER ARM ASSEMBLY REMOVAL**

Use special tool to disconnect the ball joint.

**Caution**

1. Support special tool with a cord, etc. to prevent it from coming off.
2. Only loosen mounting nut, do not remove it from the ball joint.



**INSTALLATION SERVICE POINT**

**▶A◀ TIE ROD ASSEMBLY INSTALLATION**

1. Install the tie rod assembly so that the dimension is as shown in the illustration.

**Caution**

The outer end of the tie rod end has a left thread.

**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 between dimensions (a) and (b) is 1.5 mm or less, and then temporarily 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.

**INSPECTION**

37100310040

Check the rubber parts for cracks and break.

**DUST COVER CHECK**

1. Press the dust cover with a finger to check whether the dust cover is cracked or damaged.
2. If there are any cracks in or damage to the dust cover, replace the tie rod end assembly or idler arm. (Refer to P.37A-38.)

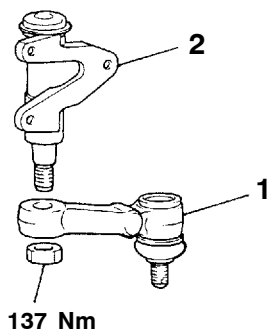
**NOTE**

Cracked or damaged dust cover may cause damage to the ball joint. In addition, if the dust cover is damaged during service work, replace the dust cover. (Refer to P.37A-41.)

**DISASSEMBLY AND REASSEMBLY**

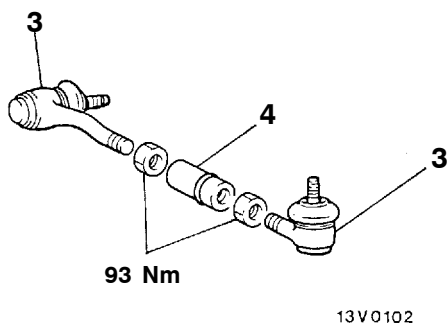
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**Idler arm**

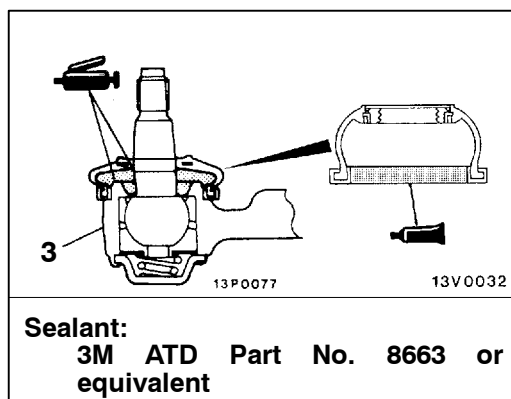


13V0104

**Tie rod assembly**



13V0102



**Sealant:**  
**3M ATD Part No. 8663 or equivalent**

00006103

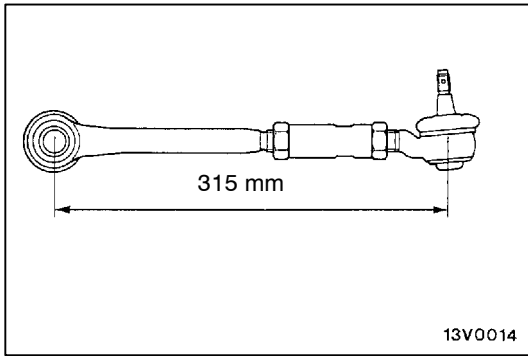
**Idler arm disassembly steps**

1. Idler arm
2. Idler arm support

**Tie rod disassembly steps**

- ▶A◀
3. Tie rod end assembly
  4. Pipe

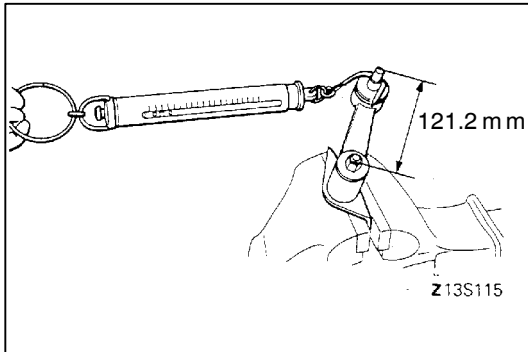




**REASSEMBLY SERVICE POINT**

**▶◀TIE ROD END ASSEMBLY INSTALLATION**

1. Apply multipurpose grease to the threaded section of the tie rod end.
2. Screw in the right and left tie rod ends to the pipe by the same amount, and then and provisionally tighten the tie rod end fixing nut.

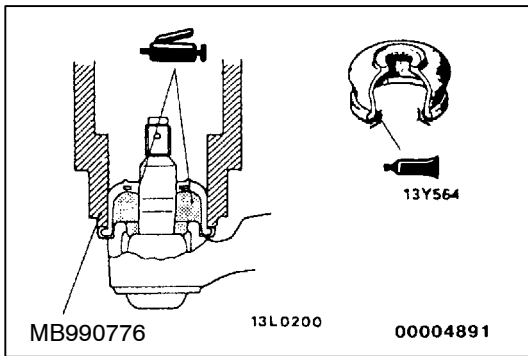


**INSPECTION**

37100350042

**IDLER ARM SLIDING RESISTANCE**

**Standard value: 2.4 – 16 N**  
**[Starting torque 0.3 – 2.0 Nm]**



**DUST COVER REPLACEMENT**

When the dust cover is damaged accidentally during service work, replace the dust cover only as follows:

1. Fill inside the dust cover with multipurpose grease.
2. Apply the specified sealant to the dust cover lip.

**Specified sealant:**

**3M ATD Part No. 8663 or equivalent**

3. Using special tool, install the dust cover to the tie rod end ball joint.
4. Press the dust cover with a finger to check whether the dust cover is cracked or damaged.

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## NOTES