

STEERING

CONTENTS

37209000118

GENERAL INFORMATION	2	Checking Steering Wheel Return to Center	8
SERVICE SPECIFICATIONS	3	Oil Pump Belt Tension Check, Adjustment	8
LUBRICANTS	3	Fluid Level Check	8
SEALANTS	4	Fluid Replacement	9
SPECIAL TOOLS	4	Bleeding	9
ON-VEHICLE SERVICE	7	Oil Pump Pressure Test	10
Steering Wheel Free Play Check	7	Power Steering Pressure Switch Check	11
Steering Angle Check	7	STEERING WHEEL AND SHAFT*	12
Tie Rod End Ball Joint Starting Torque Check	7	POWER STEERING GEAR BOX*	16
Stationary Steering Effort Check	8	POWER STEERING OIL PUMP	29
		POWER STEERING HOSES	35

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: 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

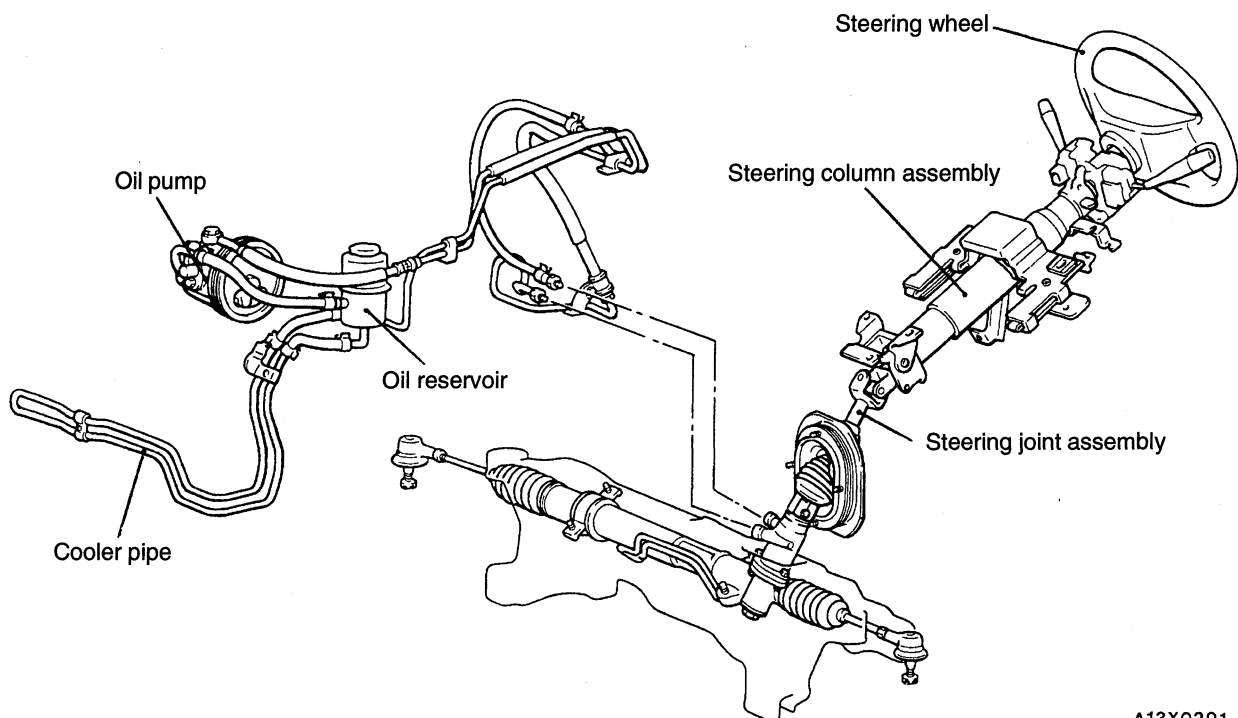
37200010097

The type of power steering which is responsive to engine speed has been adopted in all models. The main features are as follows.
Four-spoke steering wheel has been adopted. In addition, SRS (Supplemental Restraint System) is provided as a standard 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 included has been adopted.
The steering gear and linkage is an integral rack and pinion type.

Items		Specifications
Gear box	Steering gear type	Rack and pinion
Oil pump	Oil pump type	Vane type
	Displacement ml /rev.	10.5
	Relief set pressure MPa	8.8

CONSTRUCTION DIAGRAM



A13X0291

SERVICE SPECIFICATIONS

37200030086

Items		Standard value	Limit
Steering wheel free play mm	with engine stopped	15 or less	–
	with hydraulic operation	–	30
Steering angle	Inner wheel	$32^{\circ}30' \pm 2^{\circ}$	–
	Outer wheel	$27^{\circ}00'$	–
Tie rod end ball joint starting torque Nm		0.5–2.5	–
Stationary steering effort N		34 or less	–
Fluctuation allowance N		5.9 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	–
Power steering pressure switch operating pressure MPa	ON OFF	1.5–2.0	–
	OFF ON	0.7–2.0	–
Total pinion torque Nm		0.7–1.4	–
Tie-rod swing resistance N		8–20	–
Tie-rod swing torque Nm		2–5	–
Clearance between shaft and oil pump body mm		–	0.07

LUBRICANTS

37200040072

Items		Specified lubricant	Quantity
Gear box	Bearing	Automatic Transmission Fluid DEX- RON or DEXRON II	As required
	O-ring		
	Oil seal		
	Special tool (MB991214)		
	Pinion and valve assembly seal ring part		
	Bellows	Silicone grease	As required
Oil pump	Power steering fluid	Automatic Transmission Fluid DEX- RON or DEXRON II	0.9 ml
	Flow control valve	Automatic Transmission Fluid DEX- RON or DEXRON II	As required
	Friction surface of rotor vane, cam ring and pump cover		
	O-ring		

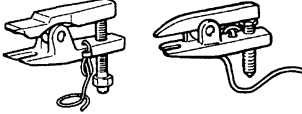
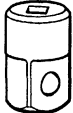
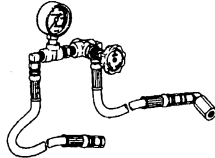
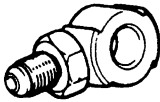
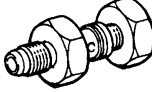
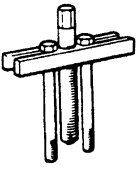
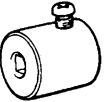
SEALANTS

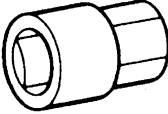
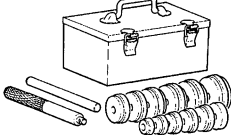
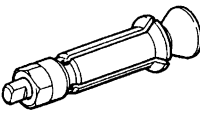
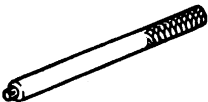
37200050068

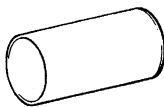
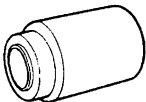
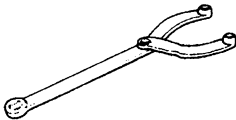
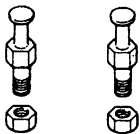
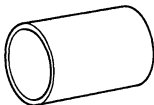
Items		Specified sealant
Power steering gear box	End plug screw	3M ATD Part No. 8661 or equivalent
	Power steering rack support cover screw	
	Dust cover lip for tie rod end ball joint	

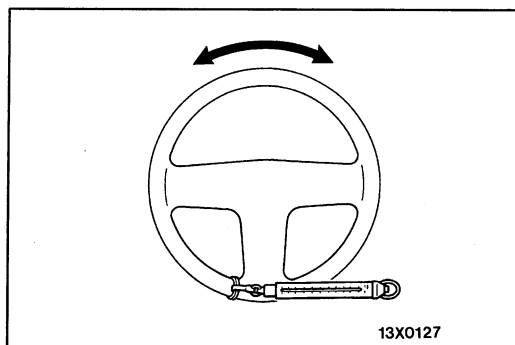
SPECIAL TOOLS

37200060108

Tool	Number	Name	Application
	MB991113 or MB990635	Steering linkage puller	Tie-rod end and knuckle disconnection
	MB990326	Preload socket	Tie rod end ball joint starting torque check
	MB990662	Oil pressure gauge assembly	Oil pump pressure test
	MB991548	Power steering oil pressure gauge adapter (pump side)	
	MB991549	Power steering oil pressure gauge adapter (hose side)	
	MB990803	Steering wheel puller	Steering wheel removal
	MB991006	Preload socket	Total pinion torque measurement

Tool	Number	Name	Application
	MB991204	Torque wrench socket	• Rack support adjustment • Rack support cover removal
	MB990925	Bearing and oil seal installer set	• Ball bearing removal MB990939 • Rack bush oil seal installation MB990927 • Oil seal and bearing installation MB990938
	MB991120	Needle bearing puller	Needle roller bearing removal
	MB991197	Bar (long type)	Back-up washer and oil seal installation Oil seal installer guide
	MB991199	Oil seal installer	
	MB991099	Oil seal installer attachment	
	MB991202	Oil seal & bearing installer	• Needle roller bearing installation • Ball bearing installation
	MB991214	Rack installer	Rack installation
	MB991203	Oil seal & bearing installer	Oil seal and bearing installation

Tool	Number	Name	Application
	MB991317	Seal ring installer	Seal ring installation
	MB991152	Dust cover installer	Oil seal installation
	MB990776	Front axle base	Dust cover installation
	MB990767	End yolk holder	Drive pulley removal and installation
	MD998719 or MD998754	Crankshaft pulley holder pin	
	MB990956	Needle bearing installer	Drive shaft assembly installation
	MB991172	Adapter	



ON-VEHICLE SERVICE

STEERING WHEEL FREE PLAY CHECK 37200100077

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: 30 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): 15 mm or less

5. If the play exceeds the standard value, remove steering gear box and check total pinion torque (Refer to P.37A-19).

STEERING ANGLE CHECK 37200110094

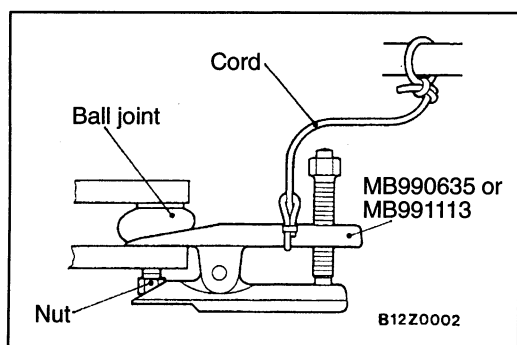
1. Locate front wheels on turning radius gauge and measure steering angle.

Standard value:

Inside wheel: $32^{\circ}30' \pm 2^{\circ}$

Outside wheel: $27^{\circ}00'$

2. When the angle is not within the standard value, the toe is probably incorrect. Adjust toe (Refer to GROUP 33A – On-vehicle Service) and recheck steering angle.

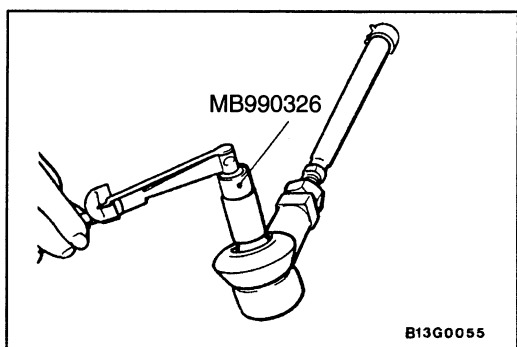


TIE ROD END BALL JOINT STARTING TORQUE CHECK 37200150089

1. Disconnect tie rod and knuckle with special tool.

Caution

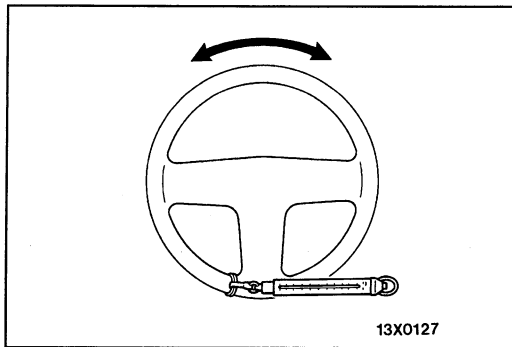
1. Be sure to tie the cord of the special tool to a nearby part.
2. Loosen the nut but do not remove it.



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

Standard value: 0.5–2.5 Nm

3. When the starting torque exceeds the standard value, replace 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 joint is still serviceable.



STATIONARY STEERING EFFORT CHECK

37200170085

1. With the vehicle stopped on a flat, paved surface, turn the steering wheel to the straight ahead position.
2. Start the engine and set it to $1,000 \pm 100$ r/min.

Caution

After checking the engine rpm., there must be a return to the standard idling rpm.

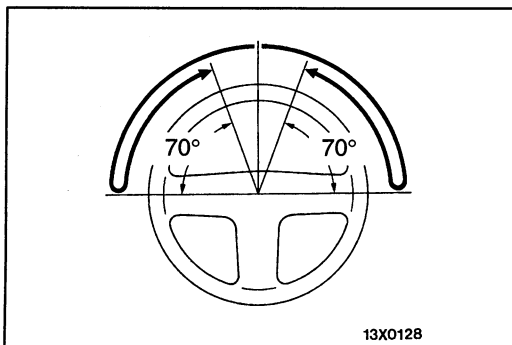
3. Attach a spring balance to the outer circumference of the steering wheel and measure the steering force required to turn the steering wheel from the straight ahead position to the left and right (within a range of 1.5 turns). Also check to be sure that there is no significant fluctuation of the required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

Standard value:

Steering effort: 34 N or less

Fluctuation allowance: 5.9 N or less

4. If the measured force exceeds the standard value, refer to the troubleshooting and make the checks and adjustments described there.



CHECKING STEERING WHEEL RETURN TO CENTER

37200180088

To make this test, conduct a road test and check as follows.

1. Make both gradual and sudden turns and check the steering "feeling" to be sure that there is not difference in the steering force required and the wheel return between left and right turns.
2. At a speed of 20–30 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.

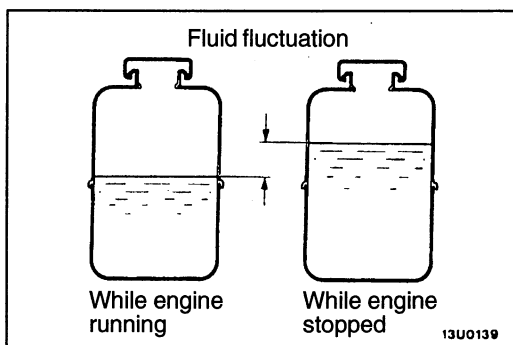
NOTE

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.)

OIL PUMP BELT TENSION CHECK, ADJUSTMENT

37200190043

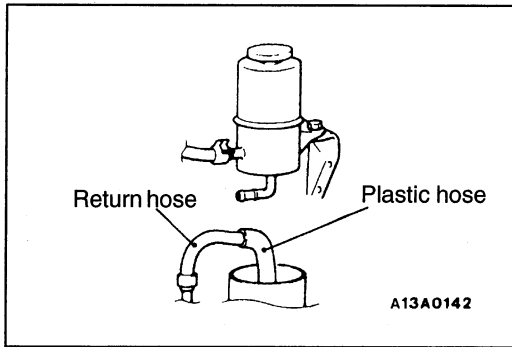
Refer to Group 11A – On-vehicle Service.



FLUID LEVEL CHECK

37200200074

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 $50-60^\circ\text{C}$.
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.
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

37200210077

1. Raise the front wheels on a jack, and then support them with rigid racks.
2. Disconnect the return hose connection.
3. Connect a plastic hose to the return hose, and drain the oil into a container.
4. Disconnect the high-tension cable, and then 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 carburetor or the fuel rail.

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

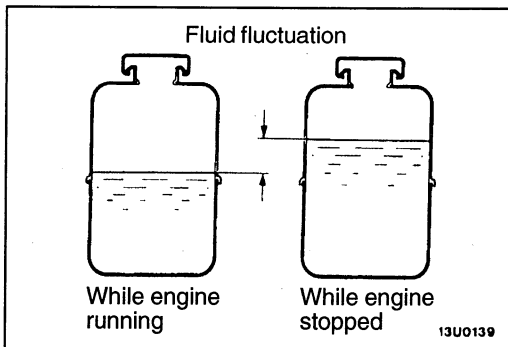
BLEEDING

37200220070

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. Disconnect the high-tension cable, and then, 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

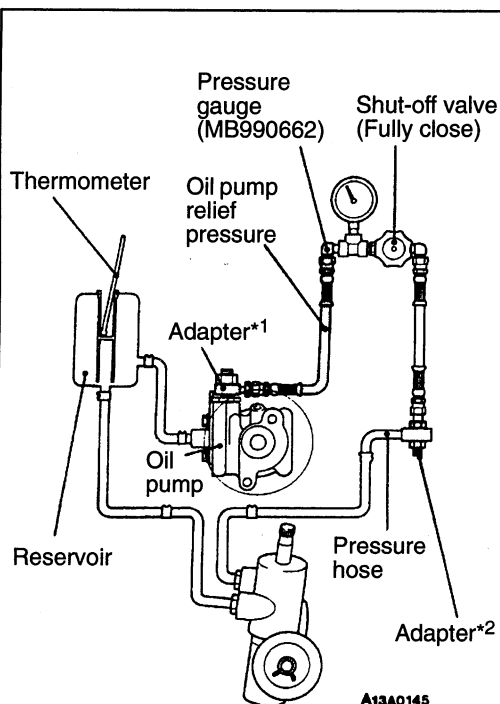
1. **During air bleeding, refill the fluid supply so that the level never falls below the lower position of the filter.**
2. **If air bleeding is done while engine is running, the air will be broken up and absorbed into the fluid; be sure to do the bleeding only while cranking.**
5. Connect the ignition cable, and then start the engine (idle).
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 dipstick.
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 when the engine is stopped and when it is running.
10. 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 lessen the life of the pump, etc.



NOTE

*1: MB991548

*2: MB991549

OIL PUMP PRESSURE TEST

37200230097

OIL PUMP RELIEF PRESSURE CHECK

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 $1,000 \pm 100$ 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

5. If it is not within the standard value, overhaul the oil pump. Remeasure fluid pressure.
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 repair these parts and remeasure fluid pressure.

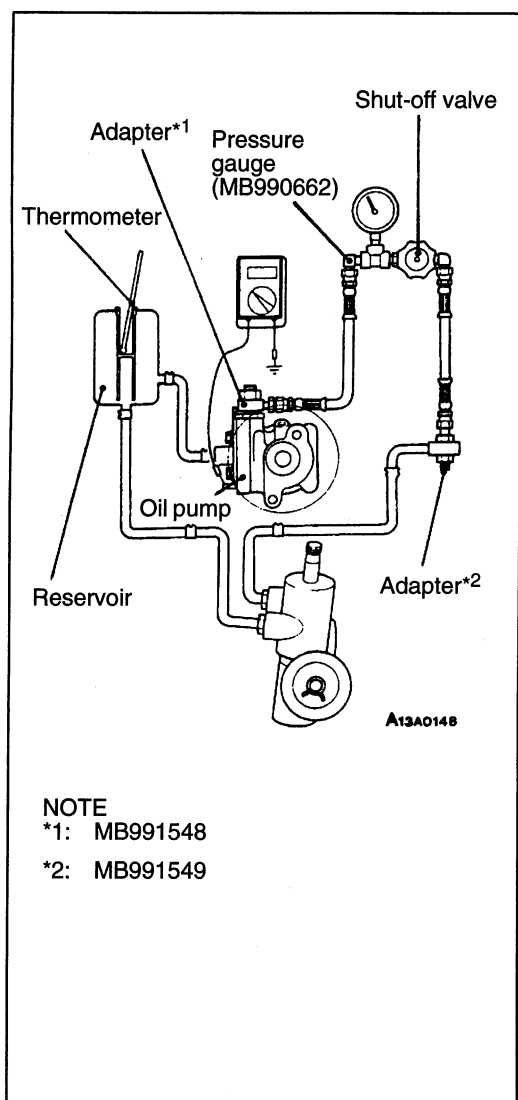
8. Turn the steering wheel all the way to the left or right; then check whether or not the retention hydraulic pressure is the standard value.

Standard value: 8.3–9.0 MPa

9. When it is lower than the standard value, disassemble and reassemble the steering gear. When it is higher, disassemble and reassemble the oil pump flow control valve, and measure the hydraulic pressure again.
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 PRESSURE SWITCH CHECK

37200720075

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 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: 0.8 MPa or less

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

STEERING WHEEL AND SHAFT

REMOVAL AND INSTALLATION

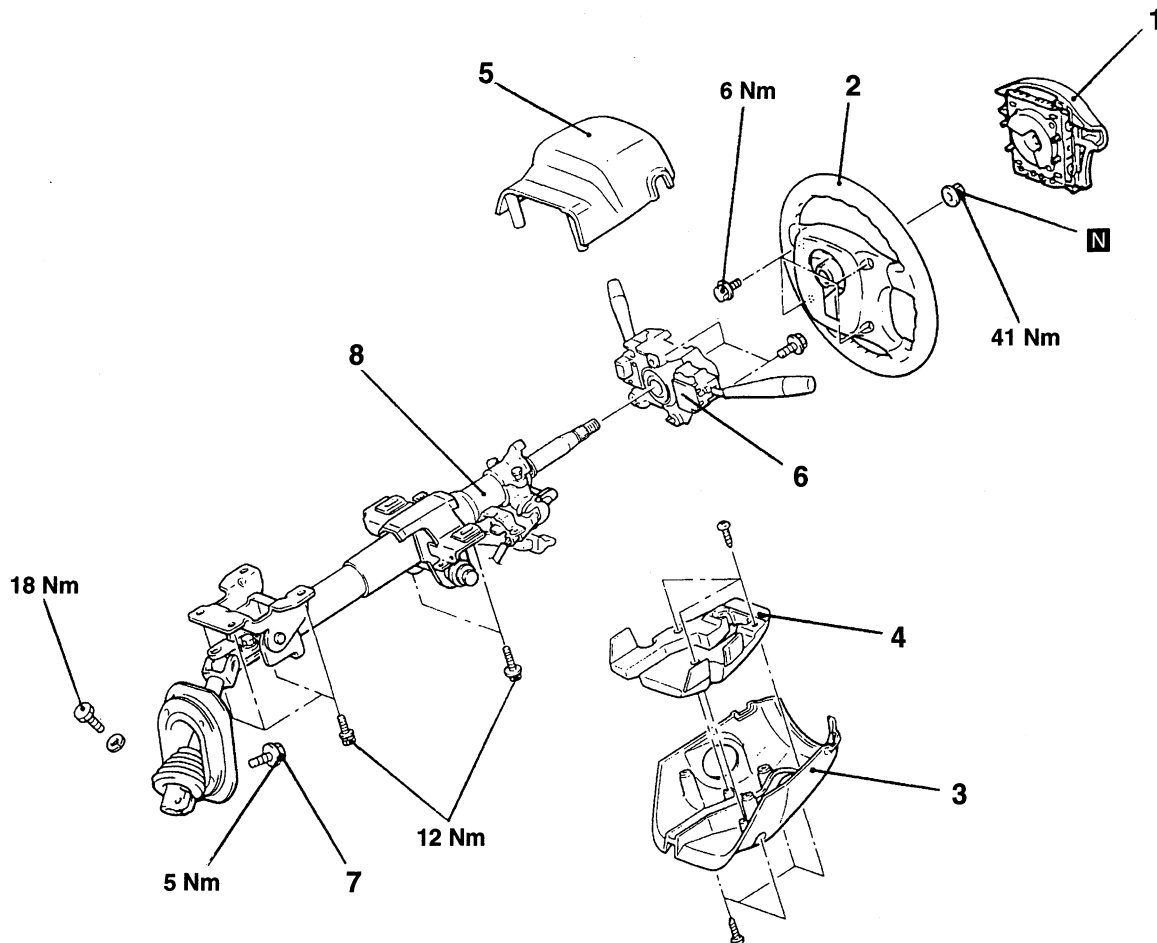
37200260119

CAUTION: SRS

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

Post-installation Operation

- Checking Steering Wheel Position with Wheels Straight Ahead



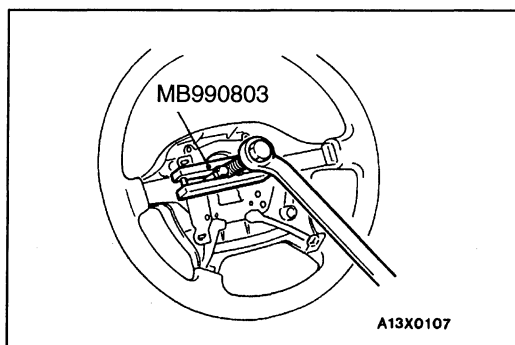
A13X0305

Removal steps

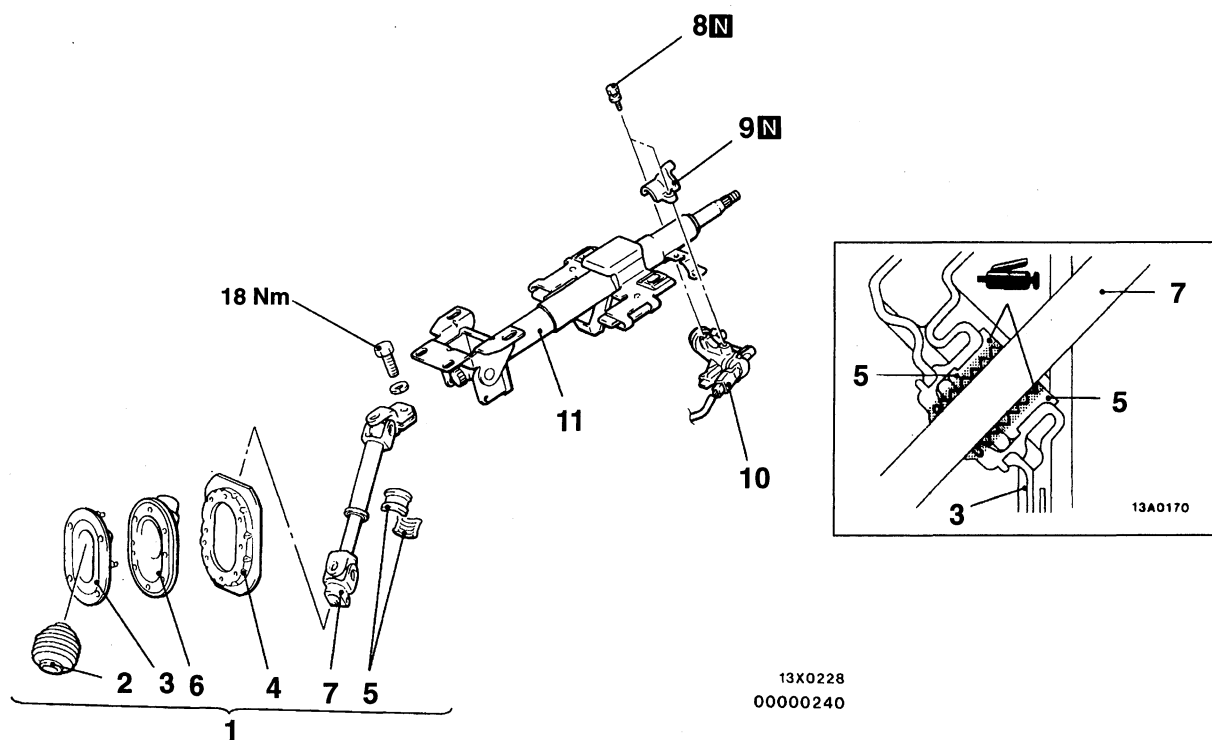
1. Air bag module (Refer to GROUP 52B)
2. Steering wheel
3. Lower column cover
4. Column pad

5. Upper column cover
6. Clock spring and column switch assembly (Refer to GROUP 52B.)
7. Retainer attachment bolt
8. Steering column assembly



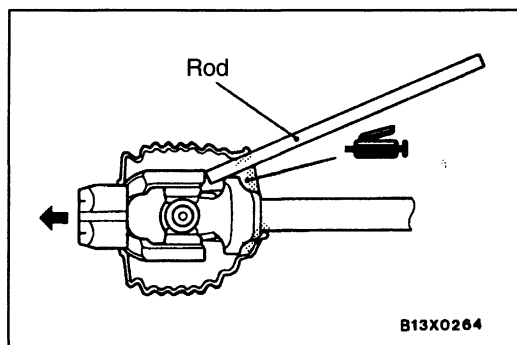
**REMOVAL SERVICE POINT****◀A▶ STEERING WHEEL REMOVAL****DISASSEMBLY AND REASSEMBLY**

37200280092

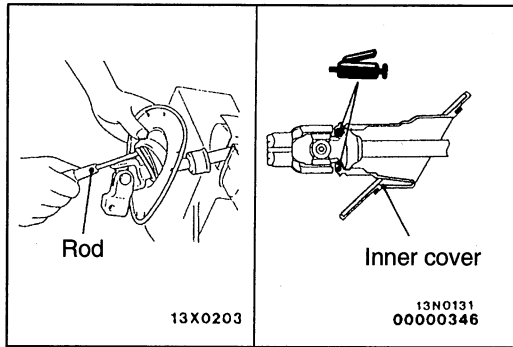
**Disassembly steps**

- ◀A▶ ▶D▶ 1. Joint assembly
 2. Boot
 3. Outer cover
 4. Retainer
 ▶C▶ ▶B▶ 5. Bearing
 6. Inner cover

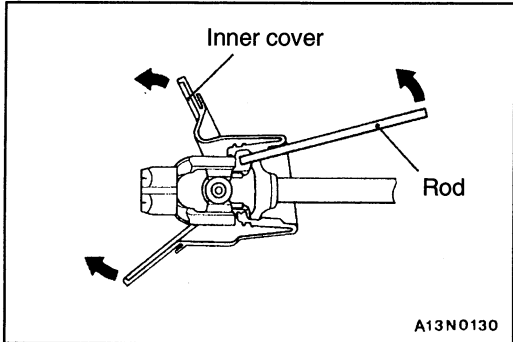
7. Joint
 ▶A▶ ▶A▶ ▶A▶ 8. Special bolt
 9. Steering lock bracket
 ▶C▶ ▶C▶ 10. Steering lock cylinder
 11. Steering column assembly

**DISASSEMBLY SERVICE POINTS****◀A▶ BOOT REMOVAL**

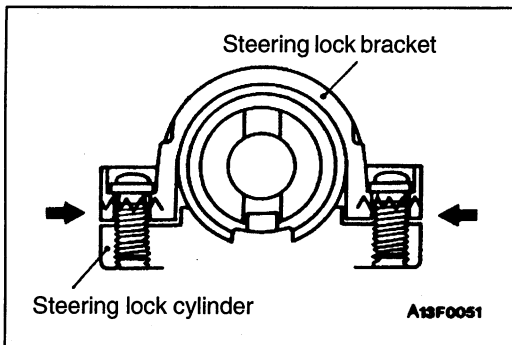
- (1) Apply grease to the inside lip of the boot.
 (2) Remove the boot while using a rod to widen the lip section.

**◀B▶ INNER COVER REMOVAL**

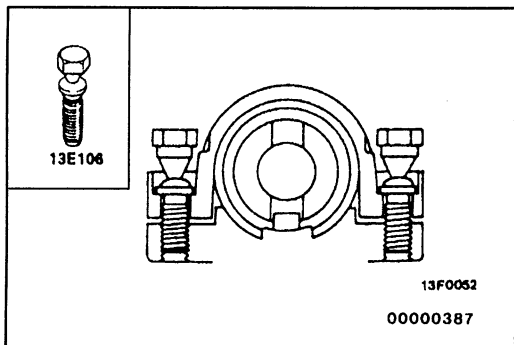
- (1) Apply grease to the inside lip of the inner cover.
- (2) Cover the joint while using a rod to widen the lip section.



- (3) While using the rod to widen the inner cover from behind, pull the cover to remove it from the joint.

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

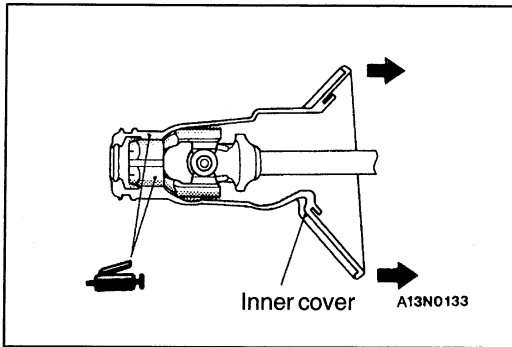
If it is necessary to remove the steering lock cylinder, use a hacksaw to cut the special bolts at the steering lock bracket side.

**REASSEMBLY SERVICE POINTS****▶A▶ STEERING LOCK CYLINDER/STEERING LOCK BRACKET/SPECIAL BOLT INSTALLATION**

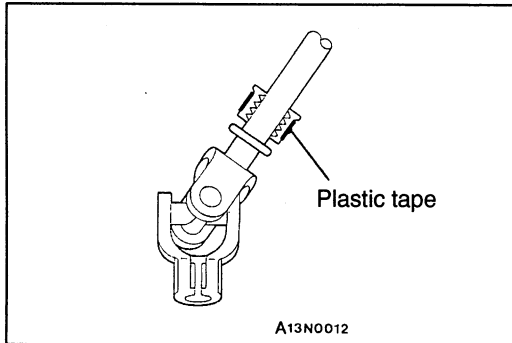
- (1) When installing the steering lock and steering lock bracket to the column tube, temporarily install the steering lock in alignment with the column boss.
- (2) After checking that the lock works properly, tighten the special bolts until the head twists off.

Caution

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

**►B◄ INNER COVER INSTALLATION**

Cover the inside lip of the inner cover with grease and pull the outside of the cover onto the joint.

**►C◄ BEARING INSTALLATION**

- (1) Fill the inside of the bearing with multipurpose grease.
- (2) Install the bearings to the shaft on the joint assembly.
- (3) Wrap plastic tape approximately one and one-half times around the concave circumferences of the bearings, and then press fit the bearings into the cover assembly.

►D◄ BOOT INSTALLATION

Apply grease to the inside of the lip section of the boot, and then install the boot to the joint.

INSPECTION

37200290057

- Check the steering shaft for play and round movement.
- Check the joints for play, damage, or rough movement.
- Check the joint bearing for wear and damage.
- Check the dust shield for damage.

POWER STEERING GEAR BOX

REMOVAL AND INSTALLATION

Pre-removal Operation

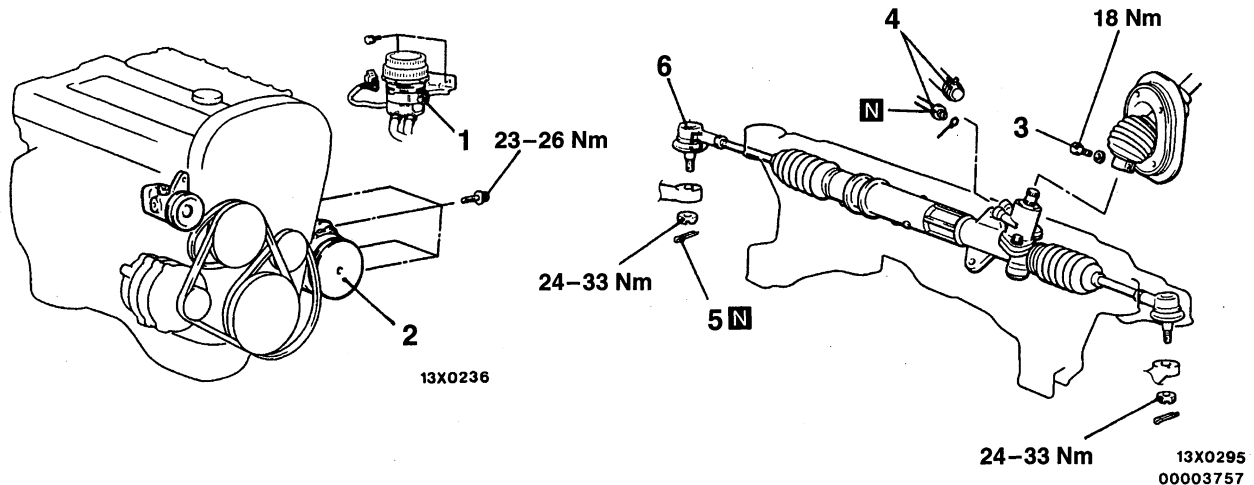
- (1) Power Steering Fluid Draining (Refer to P.37A-9.)
- (2) Stabilizer Bar Removal (Refer to GROUP 33A)

CAUTION: SRS

Before removal of steering gear box, refer to GROUP 52B – General Information, 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.

Post-installation Operation

- (1) Stabilizer Bar Installation (Refer to GROUP 33A)
- (2) Drive-belt Tension Adjustment
(Refer to GROUP 11A – On-vehicle Service.)
- (3) Power Steering Fluid Supplying (Refer to P.37A-9.)
- (4) Power Steering Fluid Line Bleeding (Refer to P.37A-9.)
- (5) Steering Wheel Position with Wheels Straight Ahead Checking
- (6) Front Wheel Alignment Adjustment
(Refer to GROUP 33A – On-vehicle Service.)

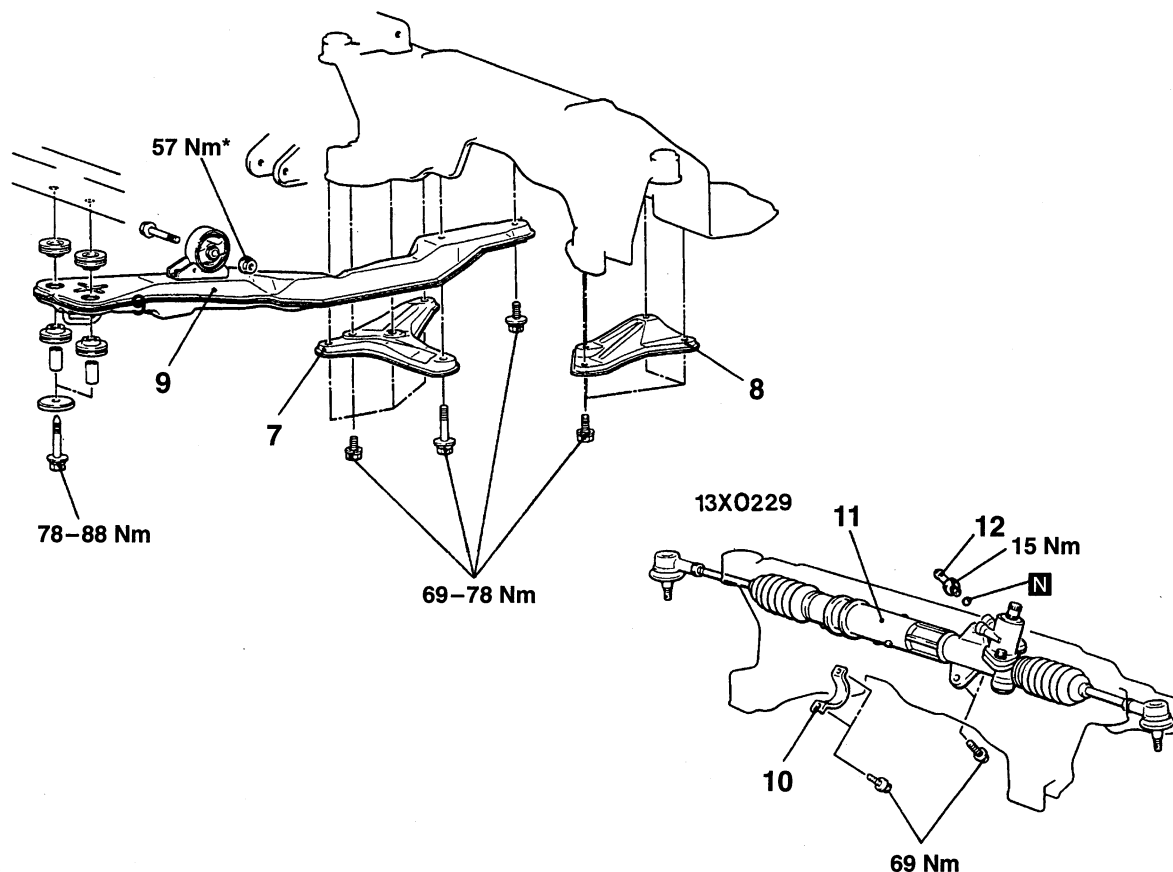


Removal steps



1. Brake fluid reservoir assembly
2. A/C compressor
3. Joint assembly and gear box connecting bolt
4. Power steering pipe connection
5. Split pin
6. Tie-rod end and knuckle connection





13X0296
00003758

Removal steps

7. Stay (L.H.)
8. Stay (R.H.)
9. Centermember assembly
10. Clamp
11. Gear box assembly
12. Return tube



Caution

The fasteners marked * should be temporarily tightened before they are finally tightened once the total weight of the engine has been placed on the vehicle body.

REMOVAL SERVICE POINTS

◀A▶ BRAKE FLUID RESERVOIR ASSEMBLY REMOVAL

Disconnect the brake fluid level sensor connector and remove the brake fluid reservoir assembly from the dash panel with the hose still attached.

NOTE

Place the removed reservoir assembly in a place where it will not be a hindrance when removing and installing the power steering gear box, and tie it with a cord.

◀B▶ A/C COMPRESSOR REMOVAL

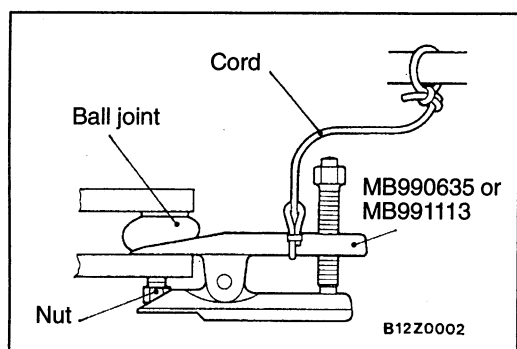
Disconnect the A/C compressor connector and remove the compressor from the compressor bracket with the hose still attached.

NOTE

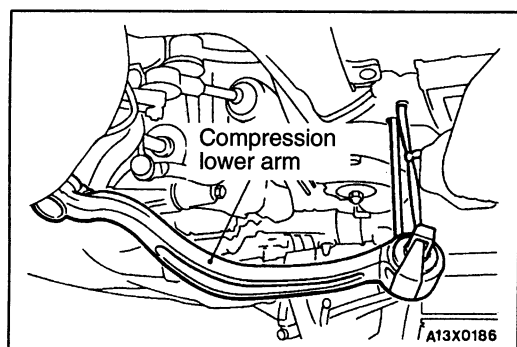
Place the removed A/C compressor in a place where it will not be a hindrance when removing and installing the brake fluid reservoir assembly, and tie it with a cord.

Caution

Do not damage the joint between the A/C hose and the A/C pipe.

**◀C▶ TIE-ROD END AND KNUCKLE DISCONNECTION****Caution**

1. Tie the cord of the special tool to a nearby part.
2. Loosen the nut but do not remove it.

**◀D▶ GEAR BOX ASSEMBLY REMOVAL**

- (1) Remove the installation section (vehicle side) of the compression lower arm left side.

Caution

The compression lower arm should be suspended so that undue force is not applied to the ball joint.

- (2) Remove the connection between the gear box assembly and joint assembly, and remove the gear box assembly from the crossmember at the left side.

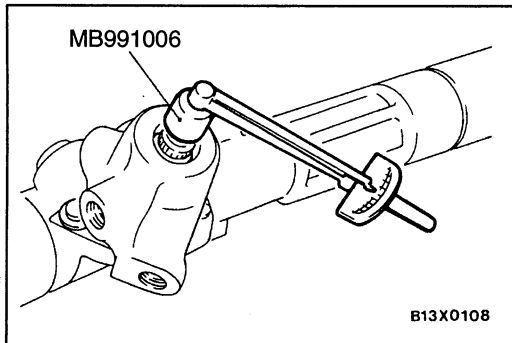
Caution

Be careful not to damage the bellows and the tie-rod end dust cover when removing the gear box assembly.

INSPECTION

37200400061

- Check the rubber parts for cracks and breakage.

**TOTAL PINION TORQUE CHECK**

Using the special tools, rotate the pinion gear at the rate of one rotation in approximately 4 to 6 seconds to check the total pinion torque.

Standard value: 0.7–1.4 Nm

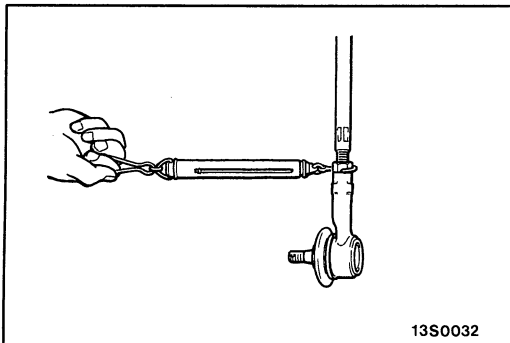
[Change in torque: 0.4 Nm]

NOTE

1. When measuring, remove the bellows from the rack housing.
2. Rotate the pinion gear 180° clockwise and anticlockwise from the neutral position to measure the total pinion torque.
3. If the measured value is not within the standard range, first adjust the total pinion starting torque. (Refer to P.37A-26)
4. If the total pinion torque cannot be adjusted to within the standard range, check the rack support cover, rack support spring, rack support and replace any parts if necessary.

Caution

The power steering gear box assembly should be secured at the mounting sections. If it is secured in any other places, the gear housing may become deformed or damaged.

**TIE ROD SWING RESISTANCE CHECK**

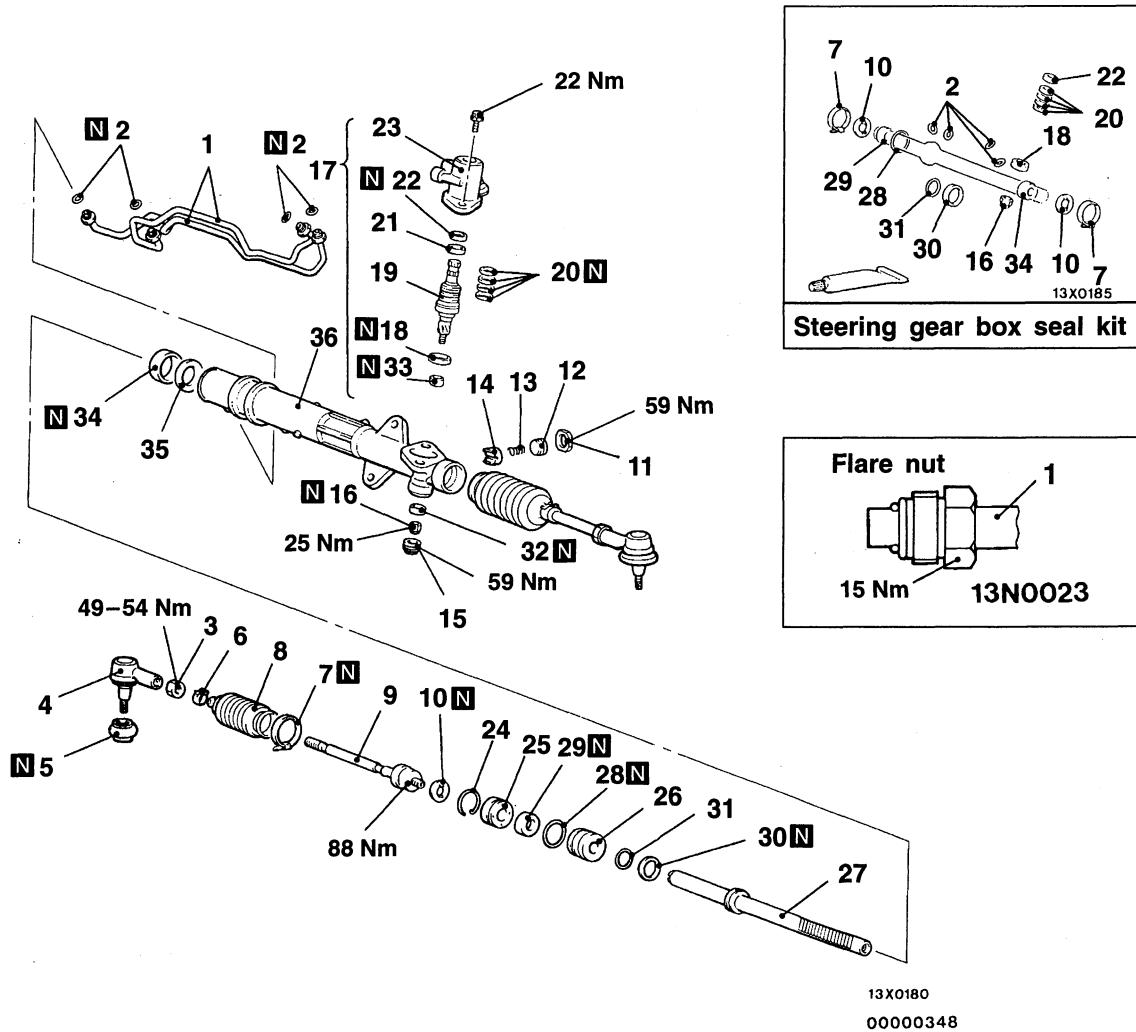
- (1) Give 10 hard swings to the tie rod.
- (2) Measure the tie rod swing resistance with a spring balance.

Standard value: 7.8–27 N [1.5–4.9 Nm]

- (3) If the measured value exceeds the standard value, replace tie rod assembly.
- (4) Even if the measured value is below the standard value, the tie rod which swings smoothly without excessive play may be used.

DISASSEMBLY AND REASSEMBLY

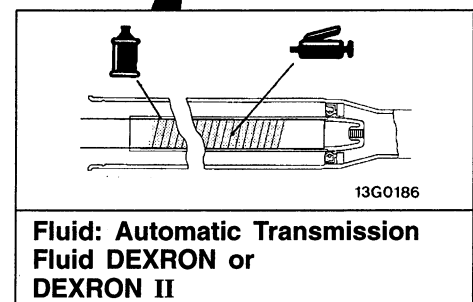
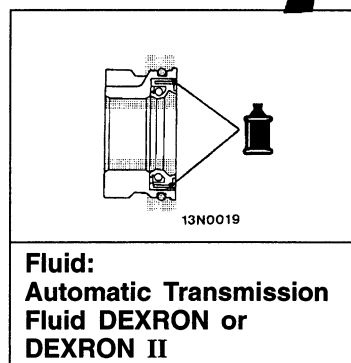
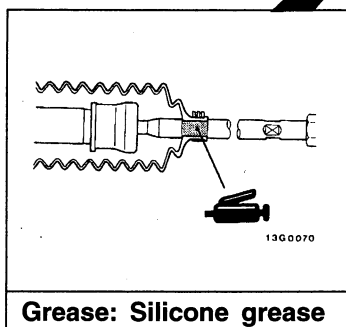
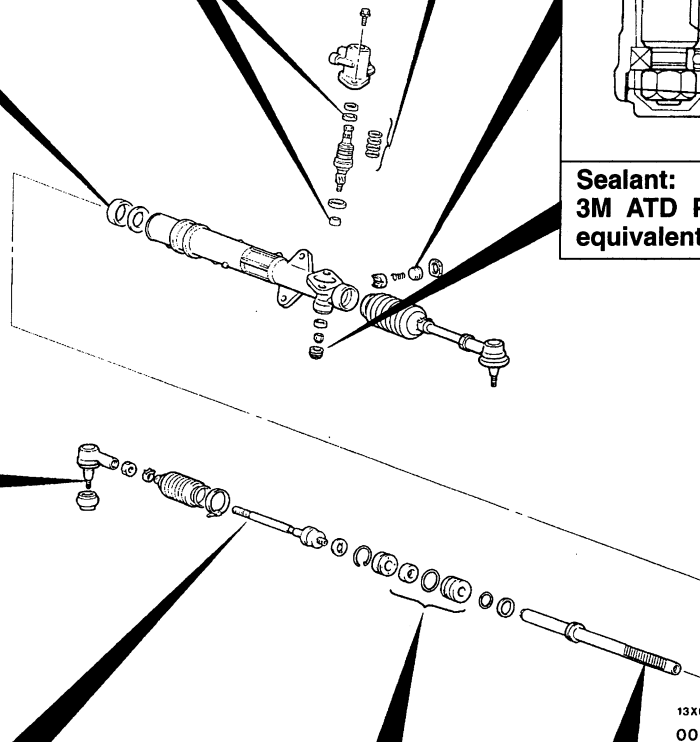
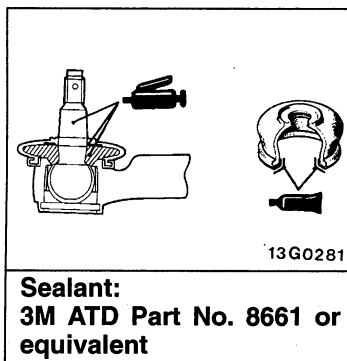
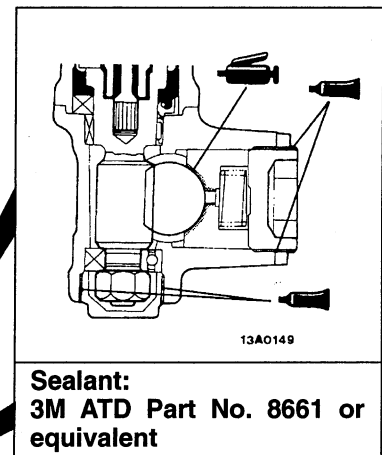
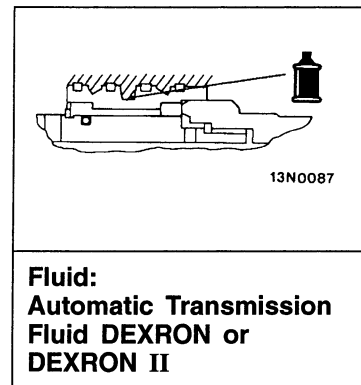
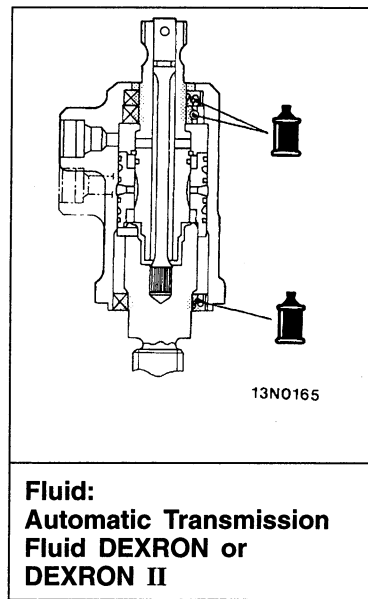
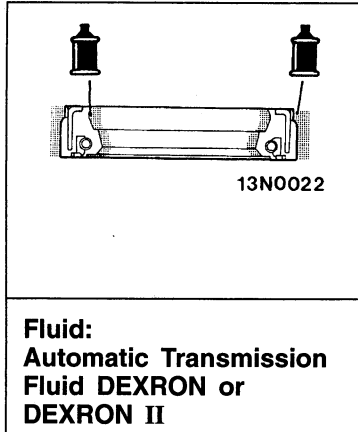
37200410071

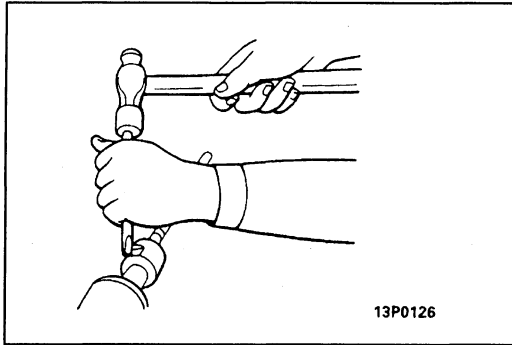


Disassembly steps

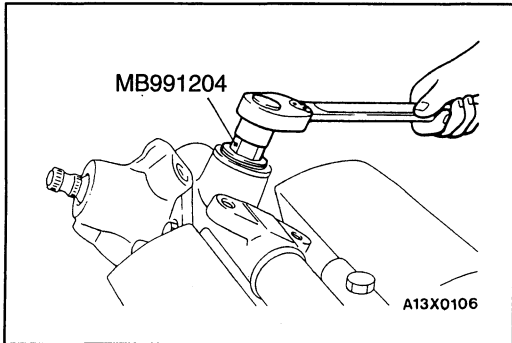
- | | |
|----------------------------------|-------------------------------|
| 1. Feed tube | 19. Pinion and valve assembly |
| 2. O-ring | 20. Seal ring |
| 3. Tie rod end locking nut | 21. Ball bearing |
| 4. Tie rod end | 22. Oil seal |
| 5. Dust cover | 23. Valve housing |
| 6. Bellows clip | 24. Circlip |
| 7. Bellows band | 25. Rack stopper |
| 8. Bellows | 26. Rack bushing |
| 9. Tie rod | 27. Rack |
| 10. Tab washer | 28. O-ring |
| • Total pinion torque adjustment | 29. Oil seal |
| 11. Locking nut | 30. Seal ring |
| 12. Rack support cover | 31. O-ring |
| 13. Rack support spring | 32. Ball bearing |
| 14. Rack support | 33. Needle roller bearing |
| 15. End plug | 34. Oil seal |
| 16. Self-locking nut | 35. Back-up washer |
| 17. Valve housing assembly | 36. Rack housing |
| 18. Oil seal | |

LUBRICATION AND SEALING POINTS

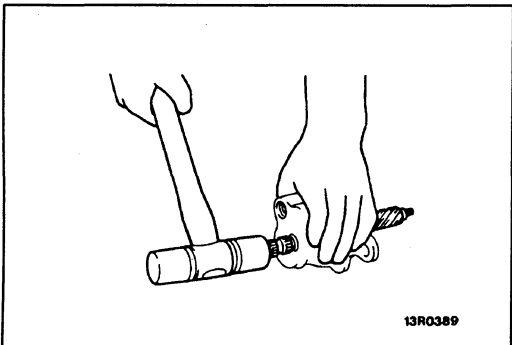


**DISASSEMBLY SERVICE POINTS****◀A▶ TIE ROD/TAB WASHER REMOVAL**

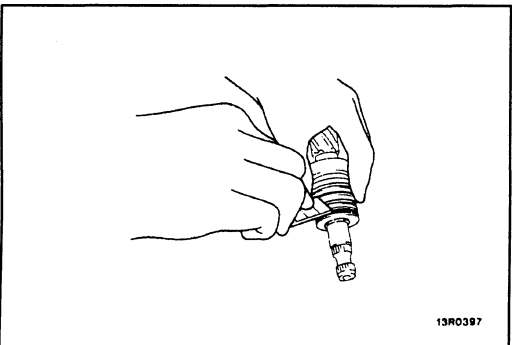
Unstake the tab washer which fixes the tie rod and rack with a chisel.

**◀B▶ RACK SUPPORT COVER REMOVAL**

Using the special tool, remove the rack support cover from the gear box.

**◀C▶ OIL SEAL/PINION AND VALVE ASSEMBLY REMOVAL**

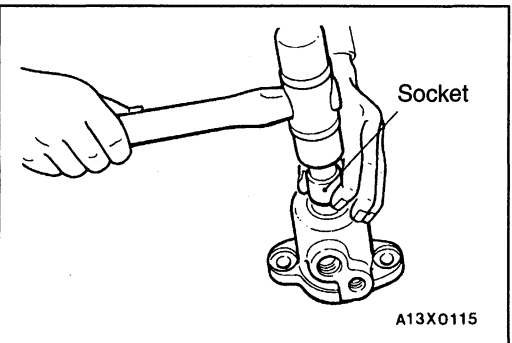
Using a plastic hammer, gently tap the pinion to remove it.

**◀D▶ SEAL RING REMOVAL**

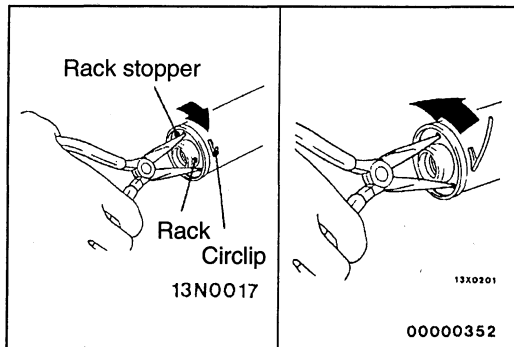
Cut the seal ring and remove it from the pinion and valve assembly and the rack.

Caution

When cutting the seal ring, be careful not to damage the pinion and valve assembly or the rack.

**◀E▶ BALL BEARING/OIL SEAL REMOVAL**

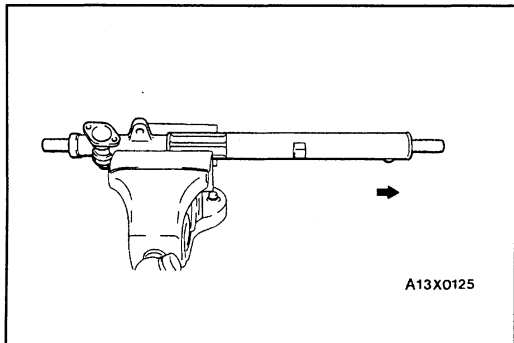
Using a socket, remove the oil seal and the ball bearing from the valve housing simultaneously.

**◀F▶ CIRCLIP REMOVAL**

- (1) Turn the rack stopper clockwise until the end of the circlip comes out of the slot in the rack housing.
- (2) Turn the rack stopper counterclockwise to remove the circlip.

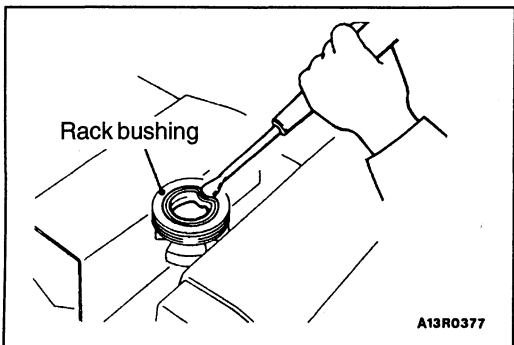
Caution

Note that if the rack stopper is first turned counterclockwise, the circlip will get caught in the slot in the housing and the rack stopper will not turn.

**◀G▶ RACK REMOVAL**

Pull out the rack slowly.

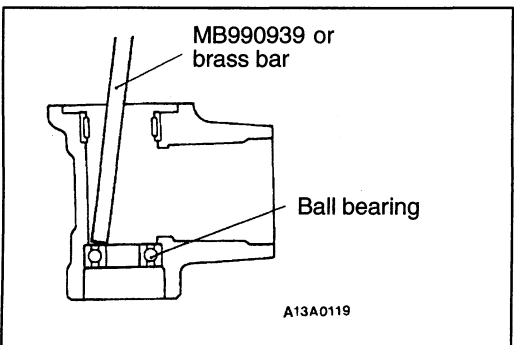
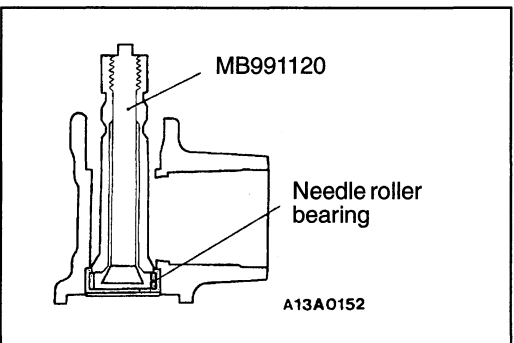
At this time also take out the rack stopper and the rack bushing simultaneously.

**◀H▶ OIL SEAL REMOVAL**

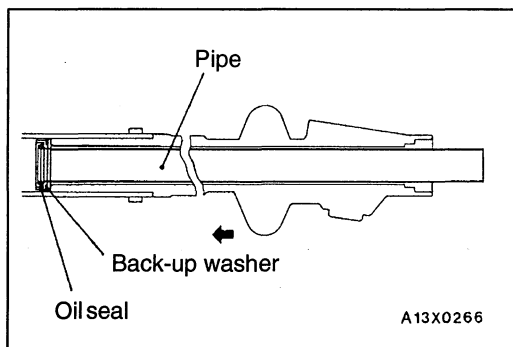
Partially bend oil seal and remove from rack bushing.

Caution

Do not damage oil seal press fitting surface.

**◀I▶ BALL BEARING REMOVAL****◀J▶ NEEDLE ROLLER BEARING REMOVAL****Caution**

Do not open special tool excessively, or the inner surface will be damaged.

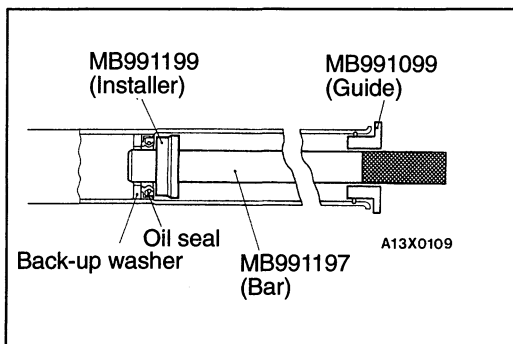


◀K▶ OIL SEAL/BACK-UP WASHER REMOVAL

Use a piece of pipe or similar tool to remove the back-up washer and oil seal from the gear housing.

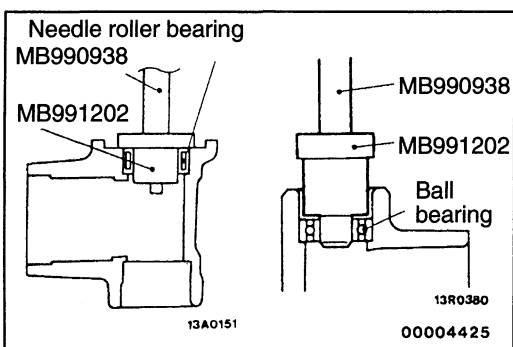
Caution

Be careful not to damage the inner surface of the rack cylinder of the gear housing.

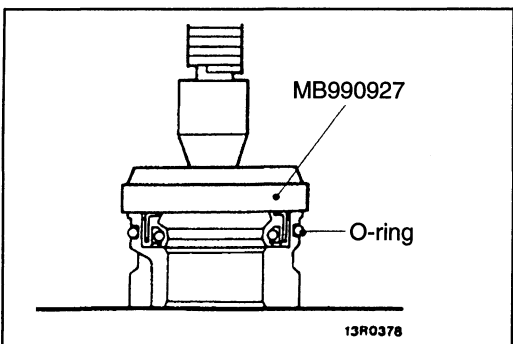


REASSEMBLY SERVICE POINTS

▶A◀ BACK-UP WASHER/OIL SEAL INSTALLATION



▶B◀ NEEDLE ROLLER BEARING/BALL BEARING INSTALLATION



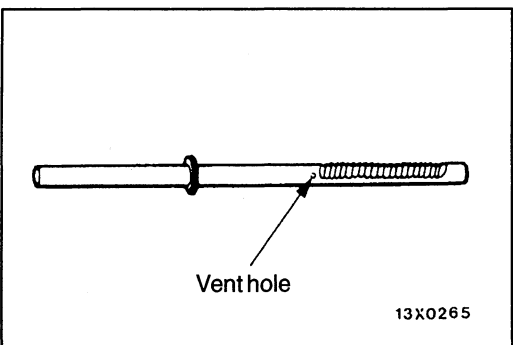
▶C◀ OIL SEAL/O-RING INSTALLATION

- (1) Apply a coating of the specified fluid to the outside of the oil seal and O-ring.

Specified fluid:

Automatic transmission Fluid DEXRON or DEXRON II

- (2) Use special tool to press fit oil seal until touches rack bush end.

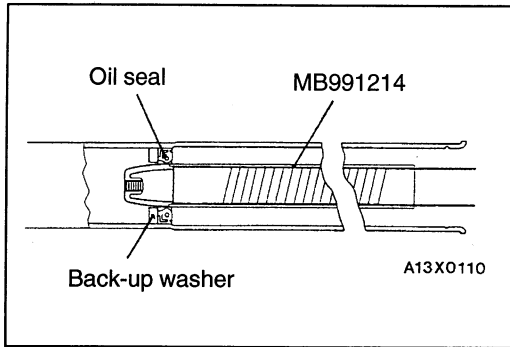


▶D◀ RACK INSTALLATION

- (1) Apply a coating of multipurpose grease to the rack teeth face.

Caution

Do not grease the vent hole in the rack.



- (2) Cover rack serrations with special tool.
- (3) Apply specified fluid on special tool.

Specified fluid:

Automatic transmission Fluid DEXRON or DEXRON II

- (4) Press in the special tool slowly, which the rack is inserted into, from the gear housing power cylinder side.

Caution

When inserting the rack, be sure to align the tip of the special tool with the centre of the oil seal to prevent the oil seal retainer spring from falling off.

►E◄ RACK BUSHING INSTALLATION

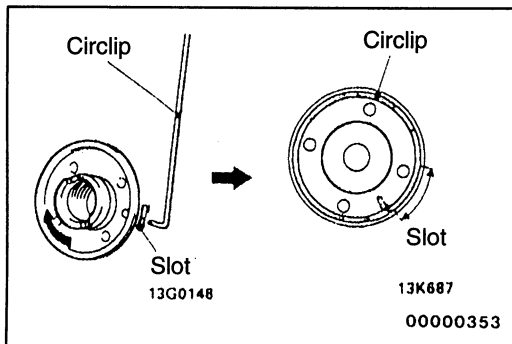
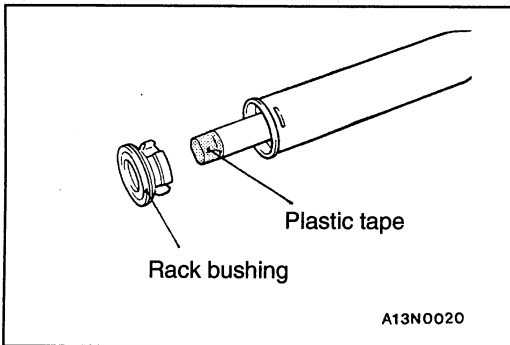
Wrap the rack end with plastic tape, apply a coating of the specified fluid, and then install the rack bushing and rack stopper.

Specified fluid:

Automatic transmission Fluid DEXRON or DEXRON II

Caution

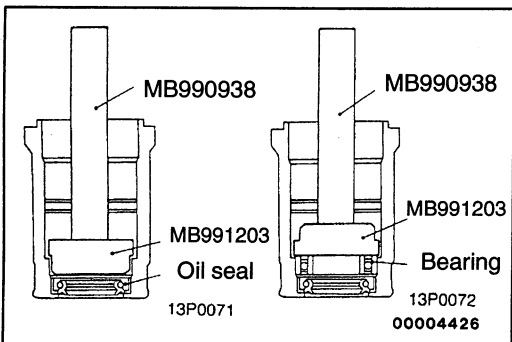
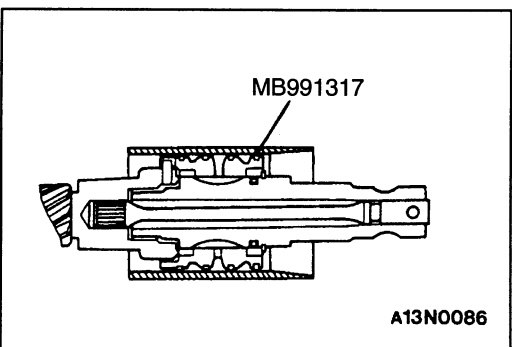
Do not allow oil seal retainer spring to slip out.

**►F◄ CIRCLIP INSTALLATION**

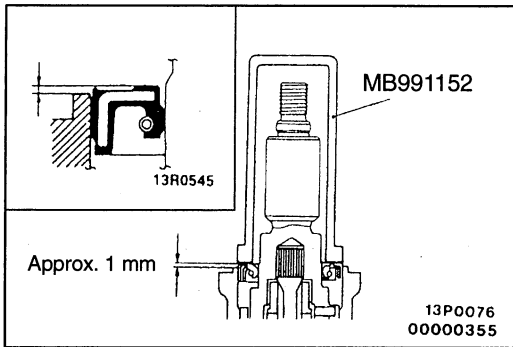
Insert circlip to rack stopper hole through cylinder hole. Turn rack stopper clockwise and insert circlip firmly.

Caution

Insert circlip to rack stopper hole while turning rack stopper clockwise.

**►G◄ OIL SEAL/BALL BEARING INSTALLATION****►H◄ SEAL RING INSTALLATION**

Because the seal rings expand at the time of installation, tighten after installation by using the special tool to compress the rings, or press down by hand.

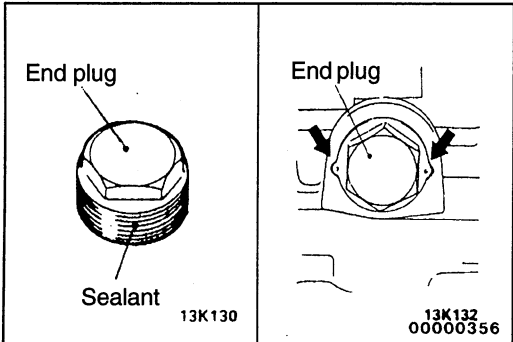


►I◄ OIL SEAL INSTALLATION

Using the special tool, press the oil seal into the valve housing.

Caution

In order to eliminate a seal malfunction at the valve housing alignment surface, the upper surface of the oil seal should project outward approximately 1 mm from the housing edge surface.

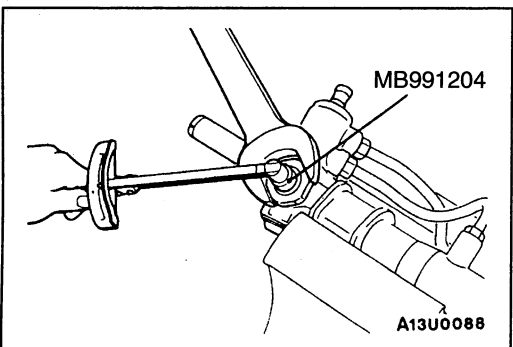


►J◄ END PLUG INSTALLATION

- (1) Apply the specified sealant to the threaded part of the end plug.

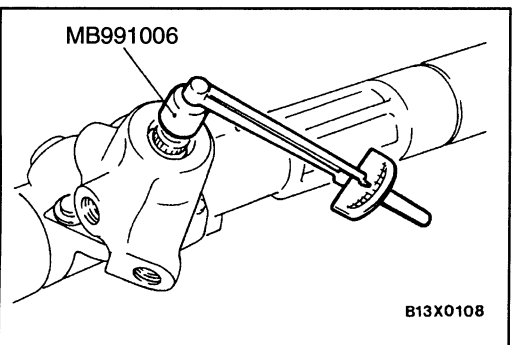
Specified sealant: 3M ATD Part No. 8661 or equivalent

- (2) Secure the threaded portion of the end plug at two places by using a punch.



►K◄ TOTAL PINION TORQUE ADJUSTMENT

- (1) Position rack at its centre. Tighten rack support cover to 15 Nm.
- (2) Return rack support cover about 30°.



- (3) Using the special tools, rotate the pinion gear at the rate of one rotation in approximately 4 to 6 seconds to check the total pinion torque.

Standard value: 0.7–1.4 Nm

[Change in torque: 0.4 Nm]

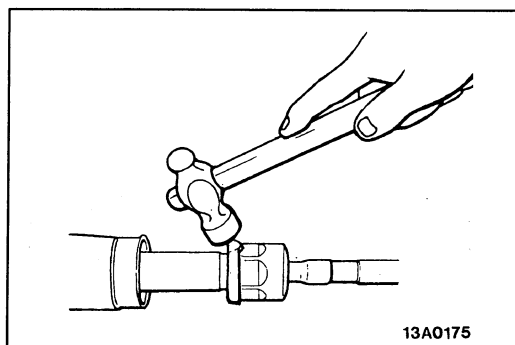
- (4) If the total pinion torque and change in torque are not within the standard value, turn back the rack support cover 0°–30° to adjust.

Caution

1. When adjusting, set the standard value at its highest value.
2. Assure no ratcheting or catching when operating rack towards the shaft direction.
3. Measure the total pinion torque all the way around the gear turning circle.

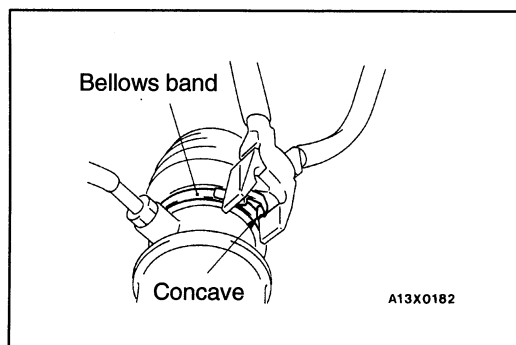
NOTE

When it cannot be adjusted within the specified return angle, check rack support cover components or replace.



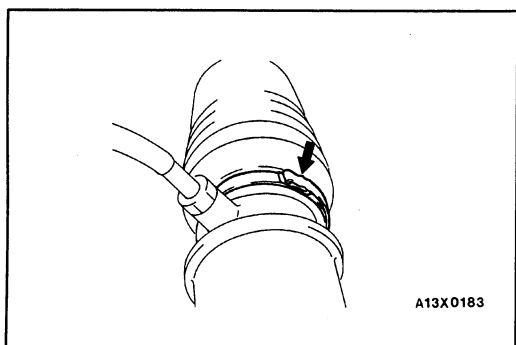
►L◄ TAB WASHER/TIE ROD INSTALLATION

After installing tie-rod to rack, fold tab washer end (2 locations) to tie rod notch.

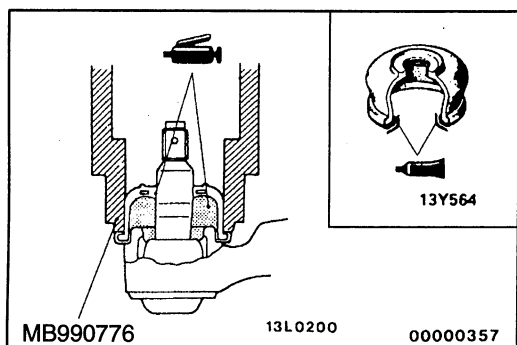


►M◄ BELLOWS BAND INSTALLATION

(1) Touch pliers against the concave section of the bellows band and tighten the bellows band.



(2) Use a plastic hammer or similar to bend the convex section of the bellows band as shown in the illustration.

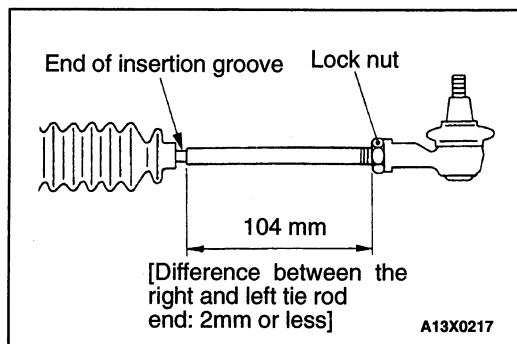


►N◄ DUST COVER INSTALLATION

- (1) Pack dust cover interior with multipurpose grease.
- (2) Apply specified sealant to dust cover lip.

Specified sealant: 3M ATD Part No. 8661 or equivalent

- (3) Using the special tool, install the dust cover to the tie rod end ball joint.



►O◄ TIE ROD END INSTALLATION

Screw in tie-rod end to have the shown dimension. Lock with lock nut.

INSPECTION

37200440063

RACK

- Check the rack tooth surfaces for damage or wear.
- Check the oil seal contact surfaces for uneven wear.
- Check the rack for bends.

PINION AND VALVE ASSEMBLY

- Check the pinion gear tooth surfaces for damage or wear.
- Check for worn or defective seal ring.

BEARING

- Check for roughness or abnormal noise during bearing operation.
- Check the bearing for play.
- Check the needle roller bearings for roller slip-off.

OTHERS

- Check the cylinder inner surface of the rack housing for damage.
- Check the boots for damage, cracking or deterioration.
- Check the rack support for uneven wear or dents.
- Check the rack bushing for uneven wear or damage.

37200520125

POWER STEERING OIL PUMP

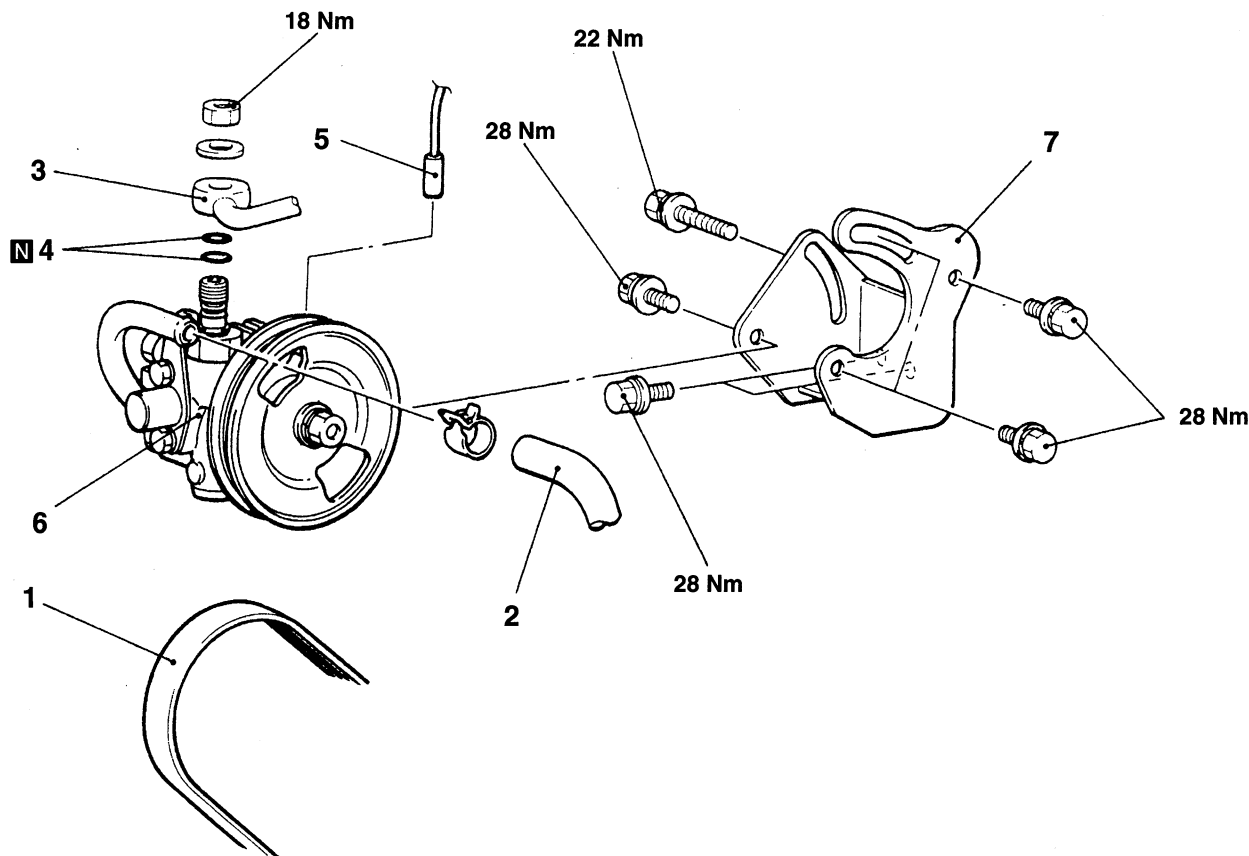
REMOVAL AND INSTALLATION

Pre-removal Operation

- Power Steering Fluid Draining
(Refer to P.37A-9.)

Post-installation Operation

- (1) Power Steering Fluid Supplying (Refer to P.37A-9.)
- (2) Drive-belt Tension Adjusting
(Refer to GRUP 11A – On-vehicle Service.)
- (3) Power Steering Fluid Line Bleeding
(Refer to P.37A-9.)
- (4) Oil Pump Pressure Check (Refer to P.37A-10.)

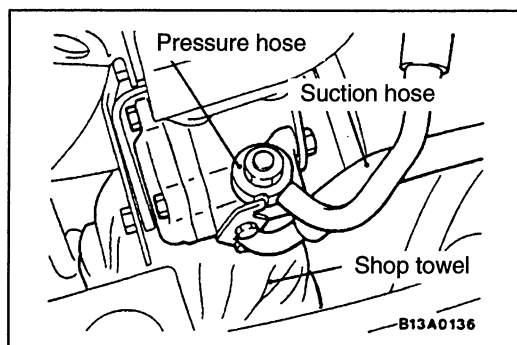


A13X0231

Removal steps

1. Drive-belt
2. Suction hose
3. Pressure hose
4. O-ring

5. Pressure switch connector
6. Oil pump
7. Oil pump bracket

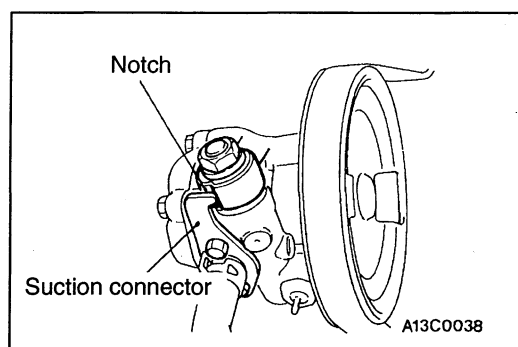


REMOVAL SERVICE POINT

◀▶ SUCTION HOSE/PRESSURE HOSE REMOVAL

Caution

Alternator is below the oil pump, so cover the alternator with a shop towel before removing any of the hoses.

**INSTALLATION SERVICE POINT****►A◄ PRESSURE HOSE INSTALLATION**

Connect the pressure hose so that its notch part contacts the suction connector.

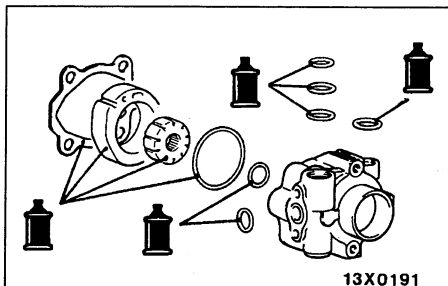
INSPECTION

37200530050

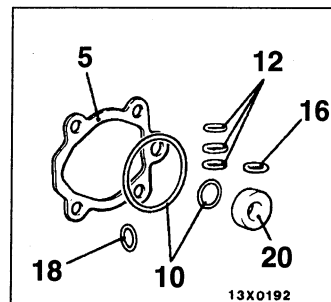
- Check the drive-belt for cracks
- Check the pulley assembly for uneven rotation.

DISASSEMBLY AND REASSEMBLY

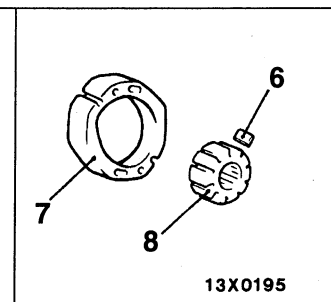
37200540091



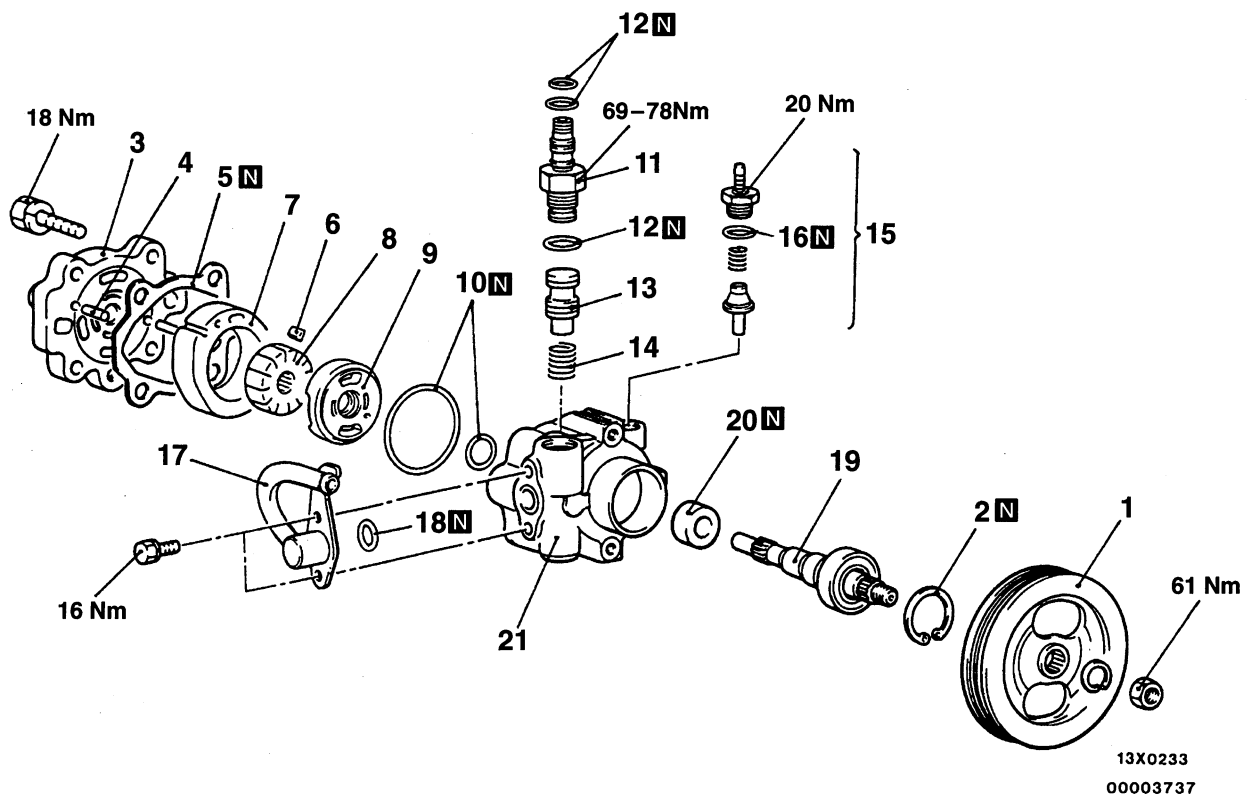
Fluid:
Automatic Transmission Fluid
DEXRON or DEXRON II



Oil pump seal kit



Oil pump cartridge kit



Disassembly steps

◀A▶ ▶H▶

1. Drive pulley
2. Snap ring
3. Pump cover
4. Lock pin
5. Seal washer
6. Vanes
7. Cam ring
8. Rotor
9. Side plate
10. O-ring
11. Connector
12. O-ring

▶G▶

▶F▶

▶E▶

▶C▶

▶C▶

13. Flow control valve
14. Flow control spring
15. Pressure switch assembly
16. O-ring
17. Suction connector
18. O-ring
19. Drive shaft assembly
20. Oil seal
21. Oil pump body

▶D▶

▶C▶

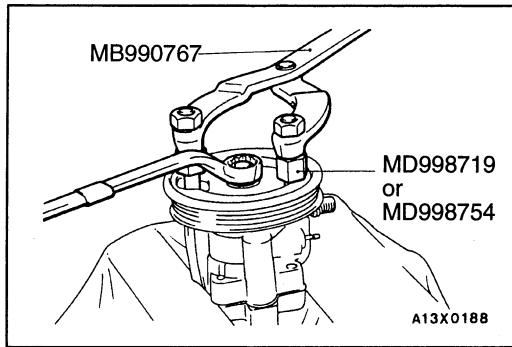
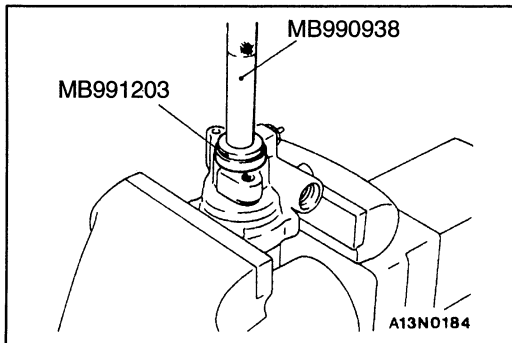
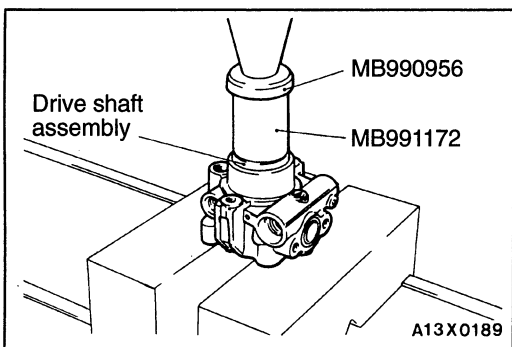
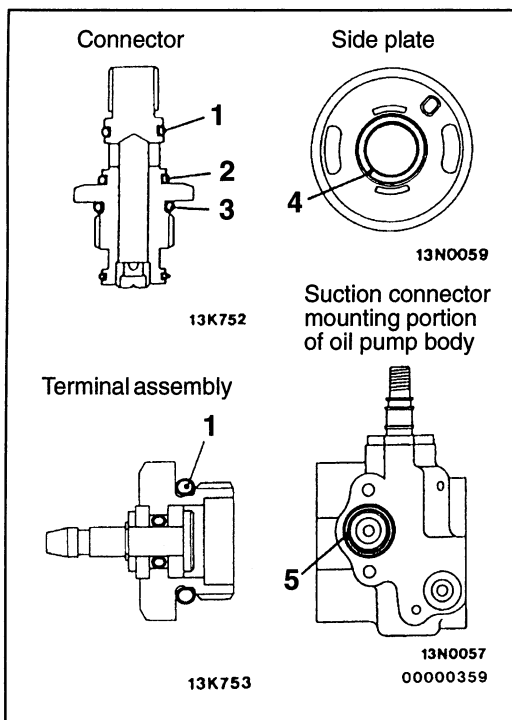
▶C▶

▶B▶

▶A▶

Caution

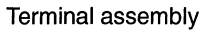
Do not disassemble the flow control valve.

**DISASSEMBLY SERVICE POINT****◀A▶ DRIVE PULLEY REMOVAL****REASSEMBLY SERVICE POINTS****▶A◀ OIL SEAL INSTALLATION****▶B◀ DRIVE SHAFT ASSEMBLY INSTALLATION****▶C◀ O-RINGS INSTALLATION**

Apply specified fluid on O-rings.

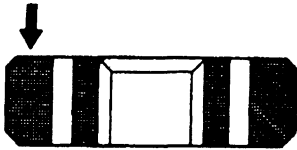
No.	I.D.xWidth mm
1	11×1.9
2	13×1.9
3	15.5×2.4
4	14.8×2.4
5	19.4×1.9

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



A13X0212

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



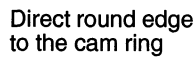
13C214

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



A13N01B1

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



Rotor / Cam ring
Vane

A13R0577

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



MD998719
or
MD998754

A13X0188

▶H◀ DRIVE PULLEY INSTALLATION

INSPECTION

37200550070

- 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.

37200570120

POWER STEERING HOSES

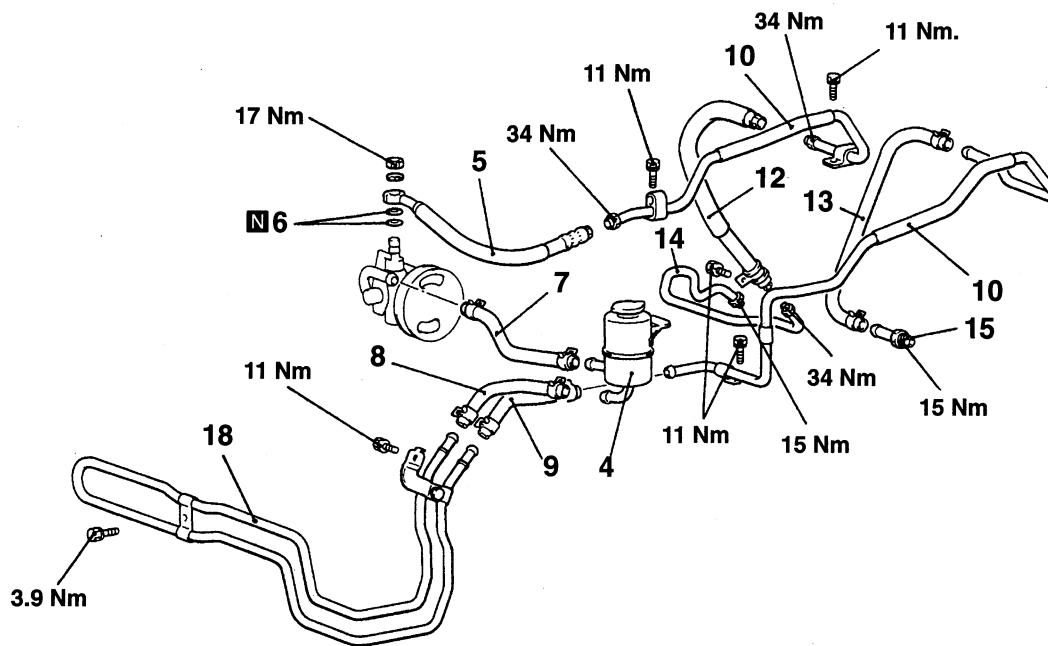
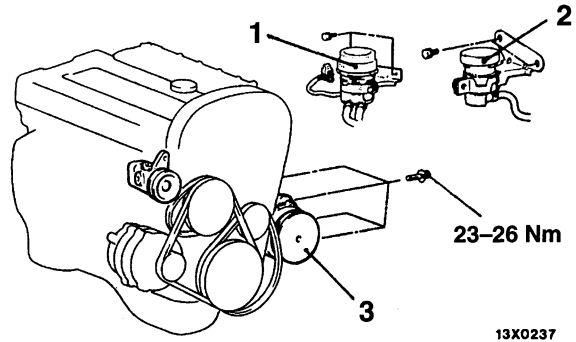
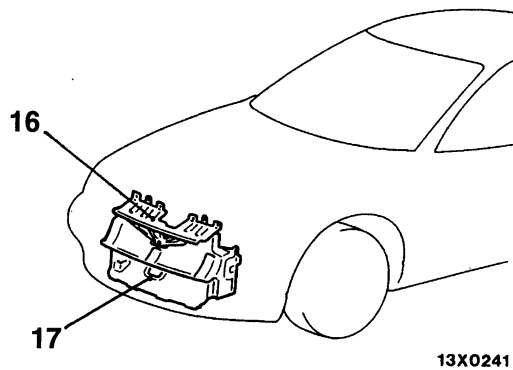
REMOVAL AND INSTALLATION

Pre-removal Operation

- (1) Power Steering Fluid Draining (Refer to P.37A-9.)
- (2) Front Bumper Removal (Refer to GROUP 51A)

Post-installation Operation

- (1) Front Bumper Installation (Refer to GROUP 51)
- (2) Drive-belt Tension Adjustment (Refer to GROUP 11A – On-vehicle Service.)
- (3) Power Steering Fluid Supplying (Refer to P.37A-9.)
- (4) Power Steering Fluid Line Bleeding (Refer to P.37A-9.)

**Removal steps**

1. Brake fluid reservoir assembly
2. Clutch fluid reservoir assembly
3. A/C compressor
4. Oil reservoir
5. Pressure hose
6. O-ring
7. Suction hose
8. Return hose
9. Return hose



10. Return tube
11. Pressure tube
12. Pressure hose
13. Return hose
14. Pressure tube
15. Return tube
16. Front fascia bracket
17. Air guide duct
18. Cooler tube

REMOVAL SERVICE POINTS**◀A▶ BRAKE FLUID RESERVOIR ASSEMBLY REMOVAL**

Disconnect the brake fluid level sensor connector and remove the brake fluid reservoir assembly from the dash panel with the hose still attached.

NOTE

Place the removed reservoir assembly in a place where it will not be a hindrance when removing and installing the power steering gear box, and tie it with a cord.

◀B▶ CLUTCH FLUID RESERVOIR ASSEMBLY REMOVAL

Remove the clutch fluid reservoir assembly from the dash panel with the hose still attached.

NOTE

Place the removed reservoir assembly in a place where it will not be a hindrance when removing and installing the power steering hoses, and tie it with a cord.

◀C▶ A/C COMPRESSOR REMOVAL

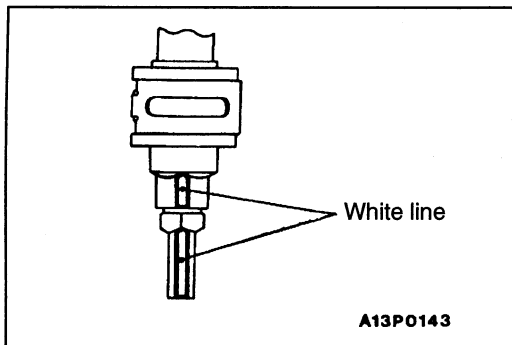
Disconnect the A/C compressor connector and remove the compressor from the compressor bracket with the hose still attached.

NOTE

Place the removed in a where it will not be a hindrance when removing and installing the power steering hoses and tie it with a cord.

Caution

Do not damage the joint between the A/C hose and the A/C pipe.

**INSTALLATION SERVICE POINT****▶A◀ PRESSURE HOSE INSTALLATION**

When the pressure hose is installed, align the white line on the pressure hose with the white line on the pressure tube so that together they form a straight line.