STEERING

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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: 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 (*).

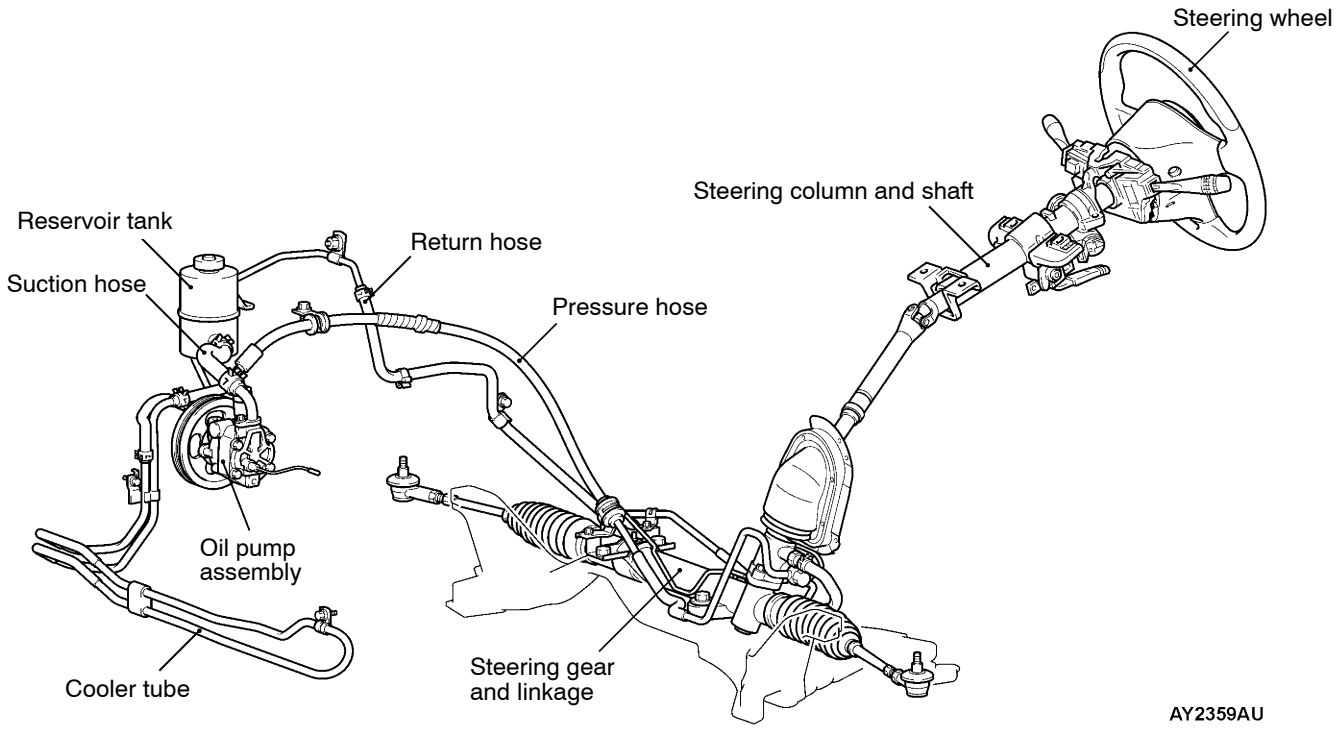
GENERAL INFORMATION

The system has been equipped with the MOMO leather 3-spoke-type steering wheel with built-in SRS airbag.
The steering column is equipped with tilt steering mechanism.
The power steering is an integral rack and pinion type that combines the steering gear and linkage into one light-weight and compact assembly.
The steering system uses a vane oil pump with a fluid flow control system, so that steering effort varies with engine speed.

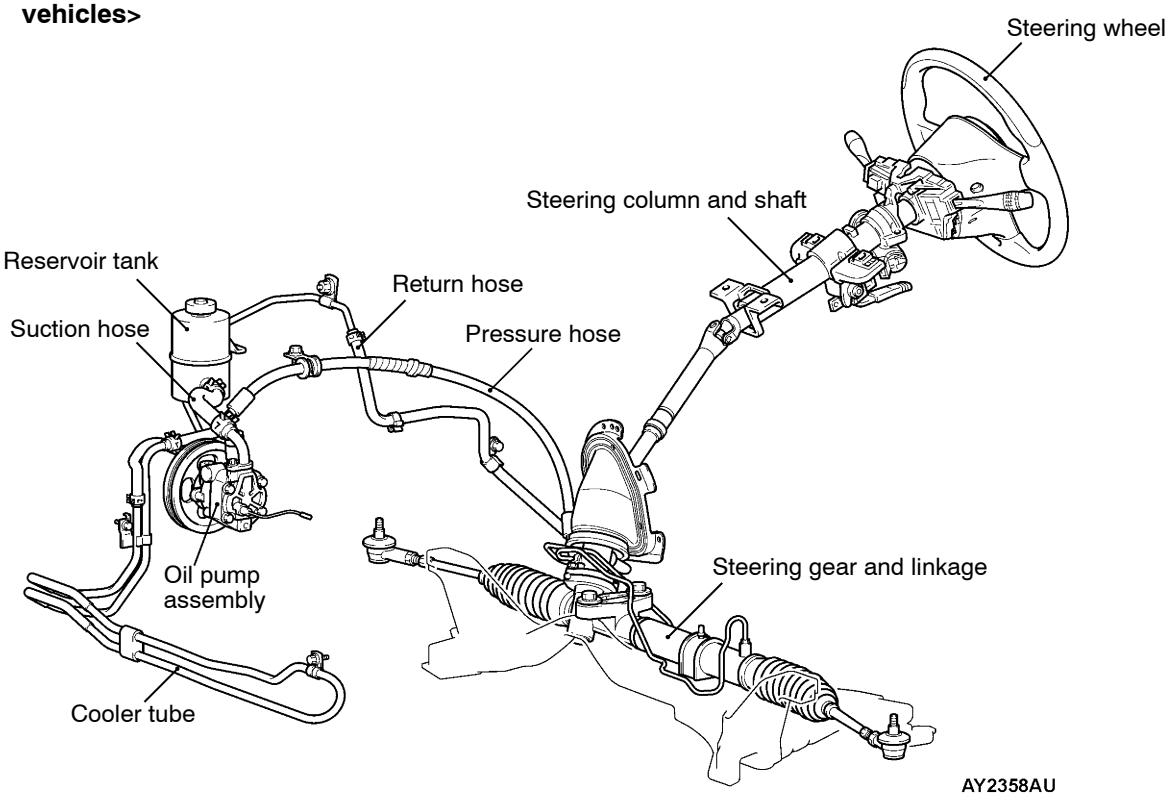
Item		Lancer EVOLUTION-**VII**
Steering wheel	Type	MOMO 3-spoke type
	Outside diameter mm	380 <RS (standard)>, 365 <RS(option), RS-II>
	Maximum number of turns	2.1
Steering column	Column mechanism	Tilt steering
Power steering type		Integral type
Oil pump	Type	Variable capacity type (vane pump)
	Basic discharge amount cm^3/rev.	9.6
	Relief pressure MPa	8.3 - 9.0
	Reservoir type	Separate type
	Pressure switch	Equipped
Steering gear and linkage	Type	Rack and pinion
	Stroke ratio (Rack stroke/Steering wheel Maximum turning radius)	68.61
	Rack stroke mm	146
Steering angle	Inner wheel	32°
	Outer wheel (for reference)	27°
Power steering fluid	Specified lubricants	Automatic transmission fluid DEXRON II
	Quantity L	Approximately 1.0

CONSTRUCTION DIAGRAM

<L.H. drive vehicles>



<R.H. drive vehicles>



SERVICE SPECIFICATIONS

Items		Standard value	Limit
Steering wheel free play mm	when engine running	-	30 or less
	with engine stopped	0 - 10	-
Steering angle	Inner wheel	31°45' ± 1°30'	-
	Outer wheel <for reference>	27°15'	-
Ball joint turning torque N·m		1.0 - 3.0	-
Stationary steering effort N	Steering effort	32 or less	-
	Fluctuation allowance	6.0 or less	-
Oil pump relief pressure MPa		8.4 - 9.0	-
Pressure under no-load conditions MPa		0.2 - 0.8	-
Steering gear retention hydraulic pressure MPa		8.4 - 9.0	-
Oil pressure switch operating pressure MPa	OFF→ON	1.8 - 2.4	-
	ON→OFF	1.0 - 2.4	-
Total pinion torque N·m	Total rotation torque	0.8 - 1.8	-
	Torque variation	0.49 or less	-
Tie rod joint swing resistance N (Tie rod joint swing torque N·m)		8 - 27 (1.5 - 4.9)	-
Opening dimension of special tool (MB991561) mm		2.9	-
Band crimped width mm		2.4 - 2.8	-

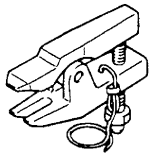
LUBRICANTS

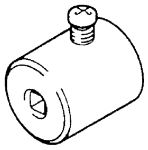
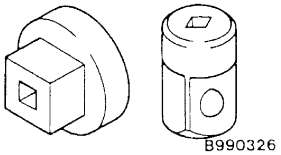
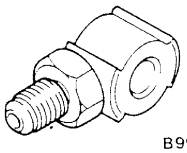
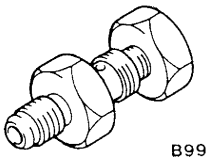
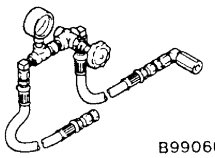
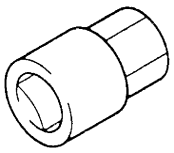
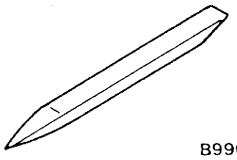
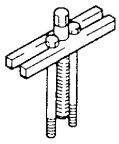
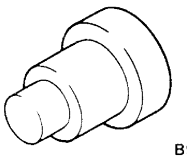
Items	Specified lubricant	Quantity
Power steering fluid	Automatic transmission fluid DEXRON II	Approx. 1.0 L
Tie rod bellows	Silicone grease	As required
Pinion and valve assembly	Repair kit grease	As required
Rack assembly		

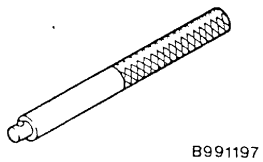
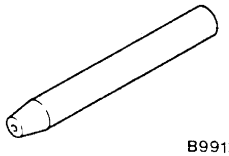
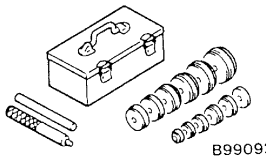
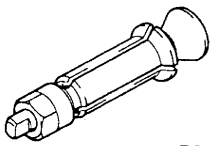
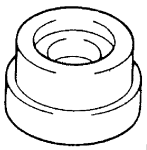
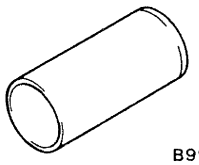
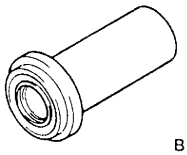
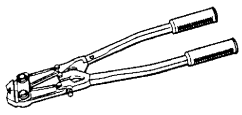
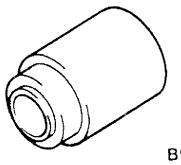
SEALANT

Items	Specified sealant	Remarks
Toe boad (steering shaft cover mounting bolt hole)	3M ATD Part No. 8513 or equivalent	Drying sealant
Rack support cover end plug	3M ATD Part No. 8661, 8663 or equivalent	Semi-drying sealant

SPECIAL TOOLS

Tool	Number	Name	Use
 B991113	MB990635, MB991113 or MB991406	Steering linkage puller	Disconnection of tie rod end

Tool	Number	Name	Use
 B991006	MB991006	Preload socket	Measurement of the total pinion torque
 B990326	MB990326	Preload socket	Measurement of the ball joint turning torque
 B990993	MB990993	Power steering oil pressure gauge adapter (pump side)	Measurement of oil pressure
 B990994	MB990994	Power steering oil pressure gauge adapter (hose side)	
 B990662	MB990662	Oil pressure gauge assembly	Measurement of oil pressure
 B991204	MB991204	Torque wrench socket	• Adjustment of rack support • Removal of rack support cover
 B990784	MB990784	Ornament remover	Removal of steering wheel cover <RS (OPTION), RS-II>
 B990803	MB990803	Steering wheel puller	Disconnection of the steering wheel
 B991202	MB991199	Oil seal and bearing installer	• Press fitting of rack housing bearing • To press in the oil seal for the rack

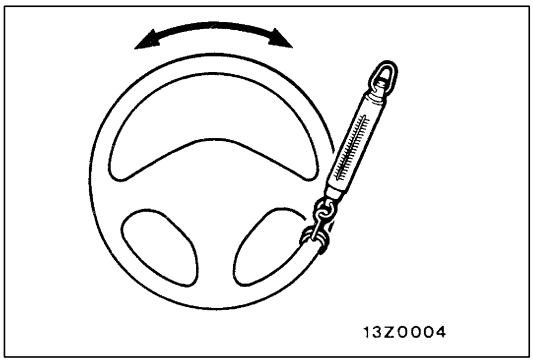
Tool	Number	Name	Use
 B991197	MB991197	Bar (long type)	• Press fitting of rack housing bearing • To press in the oil seal for the rack
 B991212	MB991214	Rack installer	Rack installation
 B990925	MB990925	Bearing and oil seal installer set	Installation of the oil seal and bearing (Refer to GROUP 26 - Special Tools.)
 B991120	MB991120	Needle bearing puller	Removal of rack housing needle bearing
 B991203	MB991203	Oil seal and bearing installer	To press in the valve housing oil seal and bearing
 B991317	MB991317	Seal ring installer	Compression of the seal rings after replacement of the pinion seal rings
 B990941	MB990941	Torque tube bearing installer	Installation of valve housing oil seal
	MB991561	Boot band crimping tool	Installation of bellows band
 B990776	MB990776	Front axle base	Installation of dust cover for tie rod end ball joint

ON-VEHICLE SERVICE

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: 30 mm or less



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: 0 - 10 mm

5. If the play exceeds the standard value, remove steering gear box and check total pinion torque. (Refer to P.37A-17.)

STEERING ANGLE CHECK

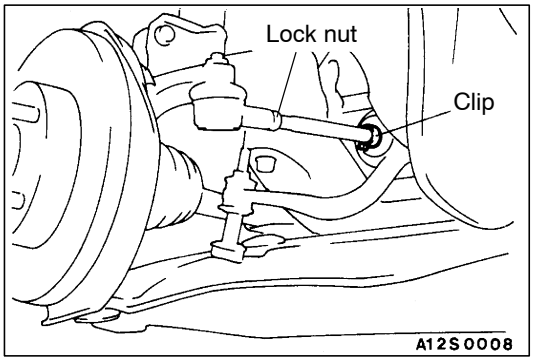
1. Locate front wheels on turning radius gauge and measure steering angle.

   Standard value:

Inner wheel	31°45' ± 1°30'
Outer wheel<For reference>	27°15'

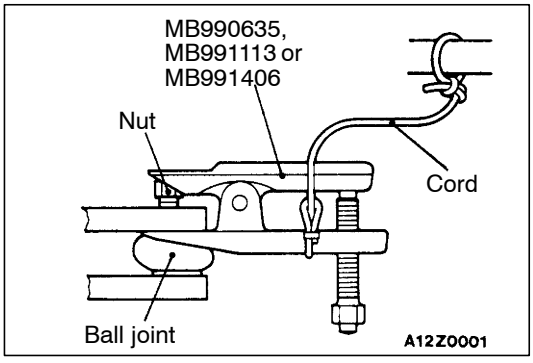
2. When the angle is not within the standard value, the toe-in is probably incorrect. Adjust the toe-in.

   Standard value: 0 ± 2 mm



   Adjust the toe-in by undoing the clip and lock nut, and turning the left and right tie rod turnbuckles by the same amount (in opposite directions).

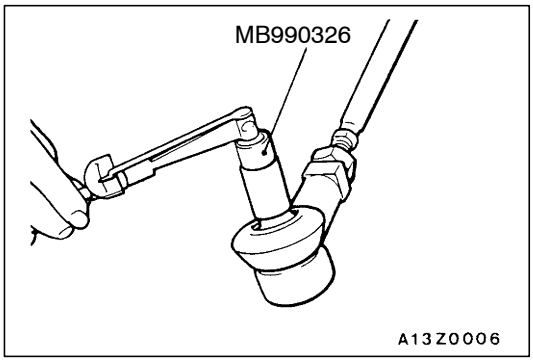
3. Recheck the steering angle.



TIE ROD END BALL JOINT TURNING TORQUE CHECK

1. Disconnect tie rod and knuckle with special tool.

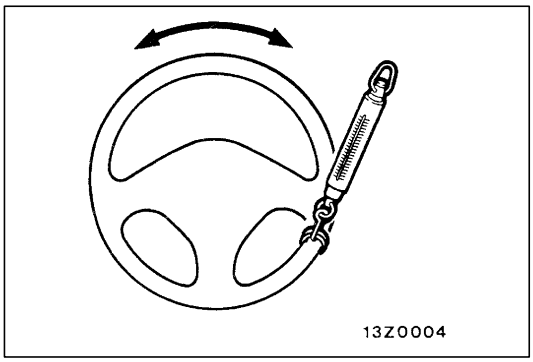
   Caution
   (1) Loosen the nut of the special tool, but do not remove it. If it is removed, the ball joint thread may be damaged.
   (2) Tie the special tool with a cord so as not to fall off.



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

   Standard value: 1.0 - 3.0 N·m

3. When the turning torque exceeds the standard value, replace tie rod end.
4. When the turning torque is under the standard value, check ball joint for end play or ratcheting. If none of these, the joint is still serviceable.



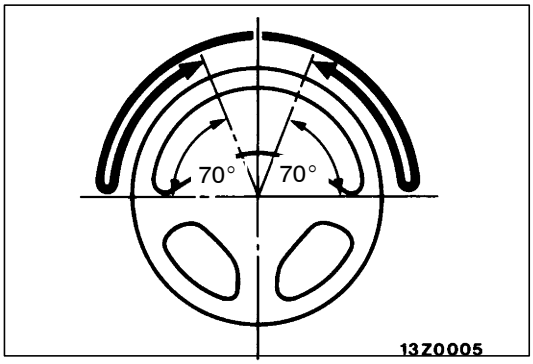
STATIONARY STEERING EFFORT CHECK

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±100 r/min.
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 0.9 turns). Also check to be sure that there is no significant fluctuation of the required steering force.

   Standard value:

Steering effort	32 N or less
Fluctuation allowance	6.0 N or less

4. If the standard values are not met, check and adjust the related parts.



CHECKING STEERING WHEEL RETURN TO CENTRE

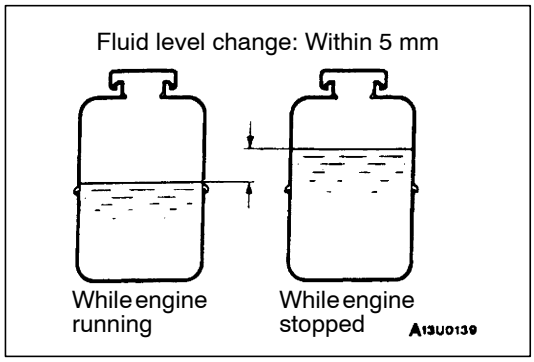
To make this test, conduct a road test and check as follows.

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 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.)

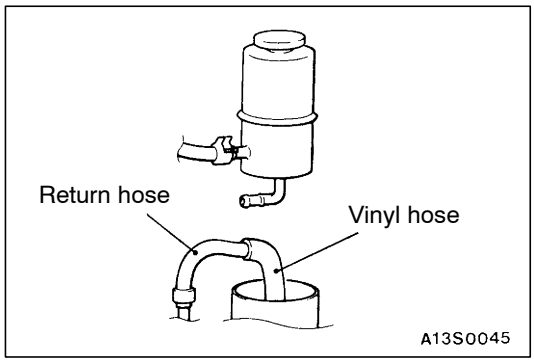
DRIVE BELT TENSION CHECK

Refer to GROUP 11A - On-vehicle Service.



POWER STEERING FLUID LEVEL CHECK

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.



POWER STEERING FLUID REPLACEMENT

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. Disconnect the ignition coil connectors. (Refer to GROUP16 - Ignition System.)
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 specified fluid up to the lower position of the filter, and then bleed air.

   Specified fluid:
   Automatic transmission fluid DEXRON II

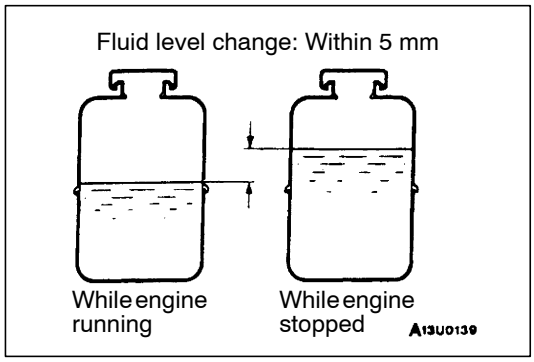
   Caution
   Do not use ATF-SP II M and ATF-SP III.

POWER STEERING SYSTEM BLEEDING

1. Jack up the vehicle and support the front wheels with rigid racks.
2. Disconnect the ignition coil connectors. (Refer to GROUP16 - Ignition System.)
3. Cranking the engine with the starter several times intermittently (during 15 to 20 seconds), turn the steering wheel left and right fully five or six times.

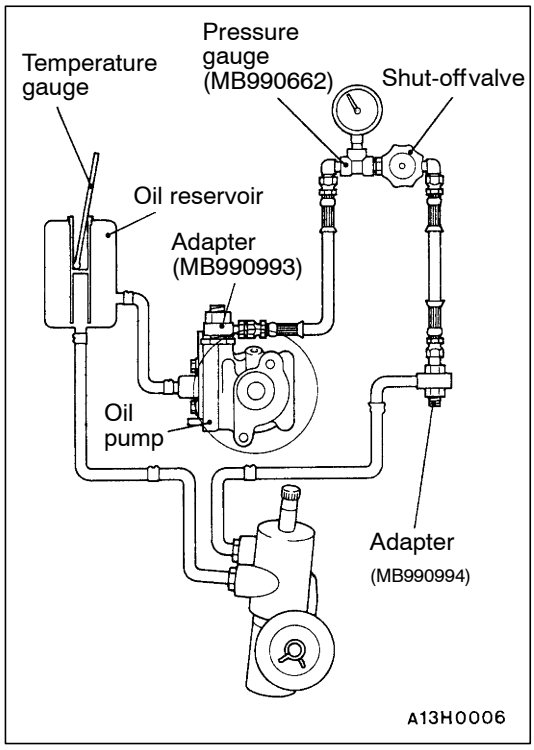
   Caution
   (1) During the bleeding, refill the fluid so that the level never falls below the lower position of the filter.
   (2) Be sure to bleed air only while cranking. If the bleeding is done with the engine running, the air will be broken up and absorbed into the fluid.

4. Connect the ignition coil connectors and idle the engine.
5. Turn the steering wheel left and right fully until no bubbles comes out in the oil reservoir.
6. See that the fluid is not milky and that the fluid level is up to the specified position on the level gauge.
7. See that the fluid level changes little when the steering wheel is turned left and right.
8. Check difference in fluid levels between the engine stopped and running.



9. If the level changes more than 5 mm, the air is badly bled. So, bleed air again.

Caution
(1) If the fluid level rises suddenly after the engine is stopped, the bleeding is incomplete.
(2) Incomplete bleeding causes abnormal noises from the pump and the flow-control valve. This could lessen the life of the pump and the other parts.



OIL PUMP PRESSURE TEST

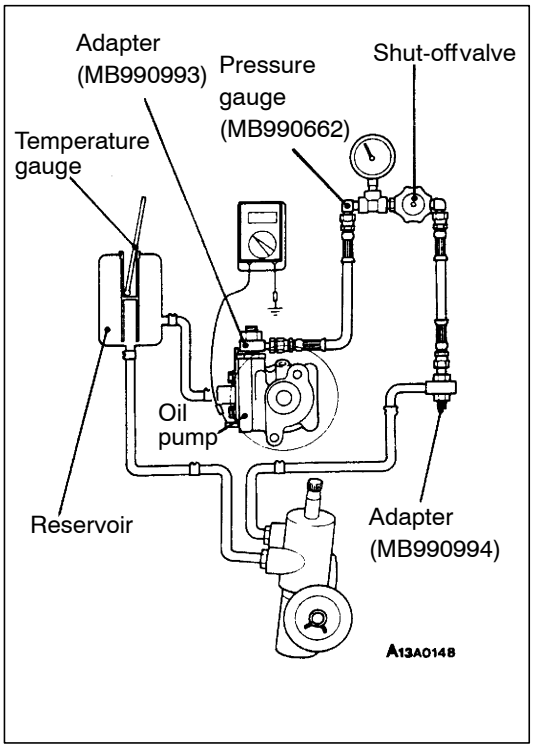
1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50 - 60°C.
3. Start the engine and idle it at 1,000±100 r/min.
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: 8.4 - 9.0 MPa
5. If the standard value is not met, the oil pump is defective. So, replace the oil pump. Then, measure oil pressure again.
6. With the pressure gauge shut - off valve fully open, check the hydraulic pressure in unladen condition.

   Standard value: 0.2 - 0.8 MPa
7. If the standard value is not met, the oil line or steering gear is probably defective. So, repair and measure oil pressure again.
8. Turn the steering wheel fully either left or right and check the retention hydraulic pressure.

   Standard value: 8.4 - 9.0 MPa
9. If the pressure is below the standard value, disassemble and reassemble the steering gear. If above, replace the oil pump. Then, measure oil pressure again.
10. Remove the special tools, and tighten the pressure hose to the specified torque.

    Tightening torque: 18 ± 3 N·m
11. Bleed the system.



POWER STEERING OIL PRESSURE SWITCH 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. The engine should be idling.
4. Disconnect the connection of the connector for the oil pressure switch, and set 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: 1.8 - 2.4 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: 1.0 - 2.4 MPa
7. Remove the special tools, and then tighten the pressure hose to the specified torque.

   Tightening torque: 18 ± 3 N·m
8. Bleed the system.

BALL JOINT DUST COVER CHECK

1. Check the dust cover for cracks or damage by pushing it with finger.
2. If the dust cover is cracked or damaged, replace the tie rod end.

   NOTE
   Cracks or damage of the dust cover may cause damage of the ball joint.

STEERING WHEEL

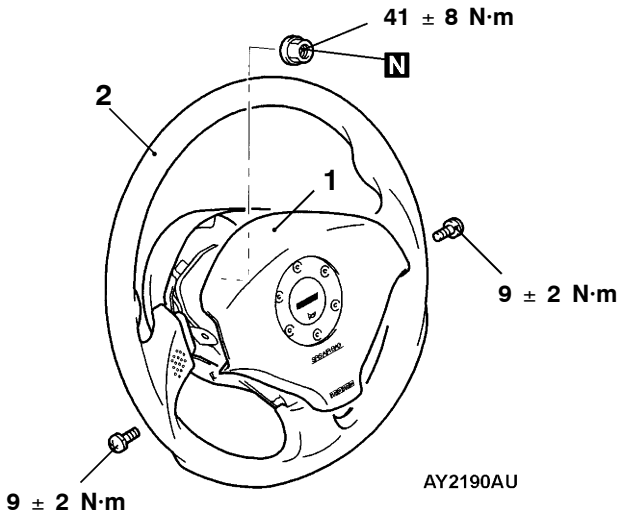
REMOVAL AND INSTALLATION

Caution:

Before removing the steering wheel and air bag module assembly, refer to GROUP 52B – Service Precautions and Air Bag Module and Clock Spring.

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

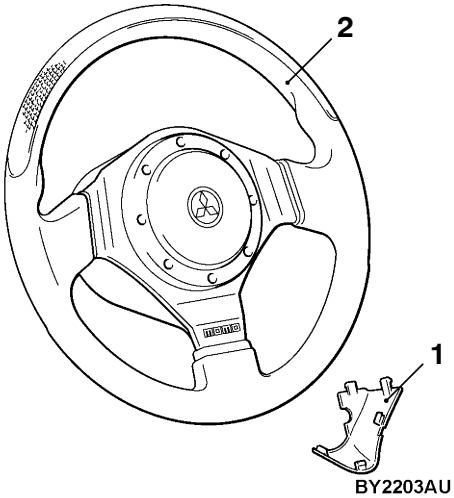
<RS (standard)>

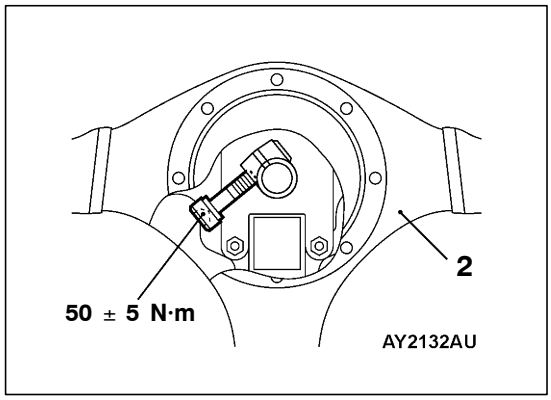


Removal steps

1. Air bag module assembly
◀A▶ 2. Steering wheel

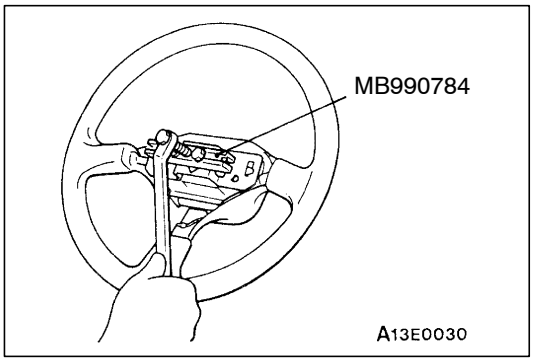
<RS (option), RS-II>





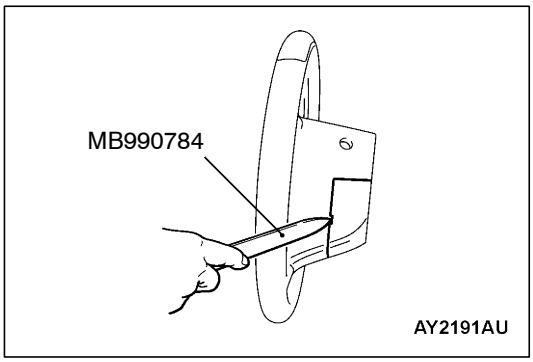
Removal steps

◀B▶ 1. Cover
◀C▶ 2. Steering wheel and air bag module assembly



REMOVAL SERVICE POINTS

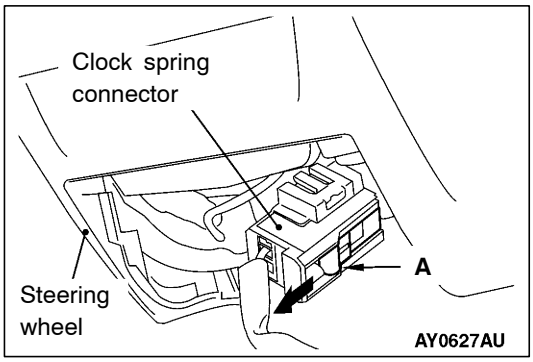
◀A▶ STEERING WHEEL REMOVAL <RS (standard)>



◀B▶ COVER REMOVAL <RS (option), RS-II>

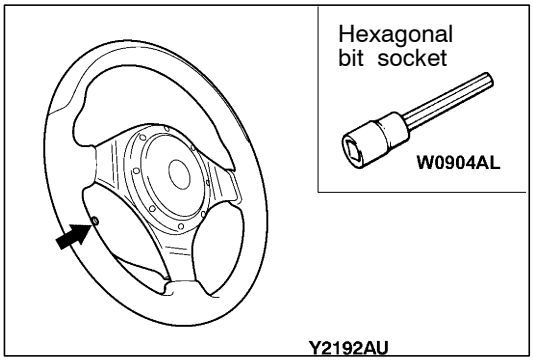
Insert the special tool from the indicated position to remove the cover.

NOTE
The special tool can be inserted through the notch behind the position shown.



◀C▶ STEERING WHEEL AND AIRBAG MODULE ASSEMBLY REMOVAL <RS (option), RS-II>

1. By sliding section A of the clock spring connector shown in the illutration in the arrow direction, disconnect the connector.



2. Loosen the bolt completely. Then, remove the steering wheel and airbag module assembly.

   NOTE
   Use a hexagonal bit socket or a hexagonal wrench having an effective length of 75 mm or more in the hexagonal section and the diameter of 8 mm or more.

STEERING SHAFT

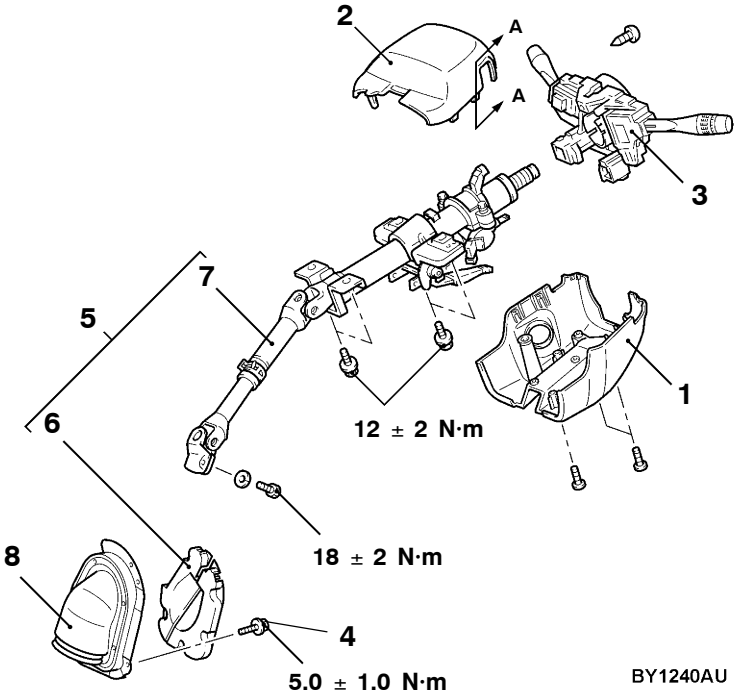
REMOVAL AND INSTALLATION

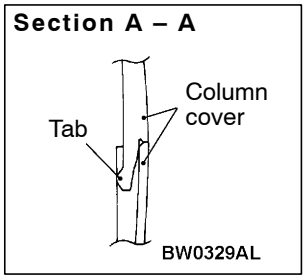
Caution:

Before removing clock spring, refer to GROUP 52B – Service Precautions and Air Bag Module and Clock Spring.

Pre-removal Operation
- Steering Wheel Removal (Refer to P.37A-12.)
- Instrument Under Cover Removal (Refer to GROUP 52A.)

Post-installation Operation
- Instrument Under Cover Installation (Refer to GROUP 52A.)
- Steering Wheel Installation (Refer to P.37A-12.)
- Checking Steering Wheel Position with Wheels Straight Ahead



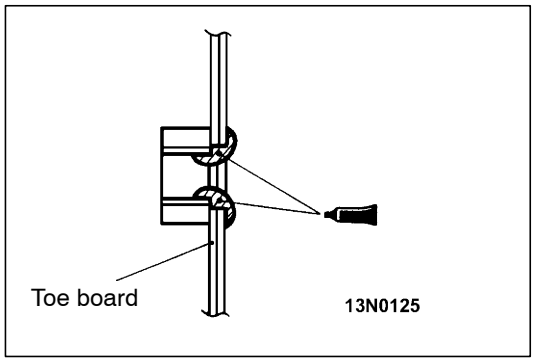


Removal steps

1. Lower column cover
2. Upper column cover
3. Clock spring and column switch assembly (Refer to GROUP 52B.)

▶A◀ 4. Bolt

5. Steering column shaft assembly and Shaft cover
6. Shaft cover
7. Steering column shaft assembly
8. Cover assembly



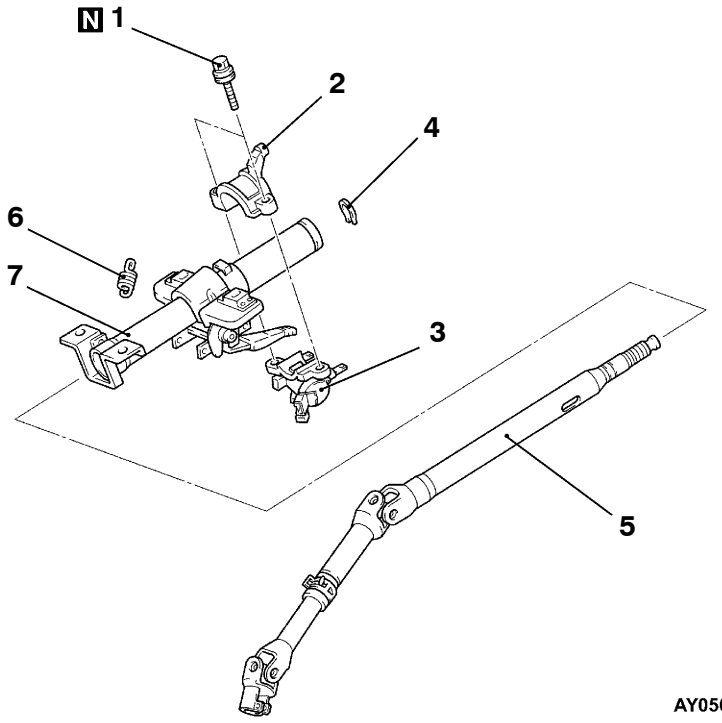
INSTALLATION SERVICE POINT

▶A◀ BOLT INSTALLATION

Before installing the bolt, coat the mounting hole on the toe board with the specified sealant.

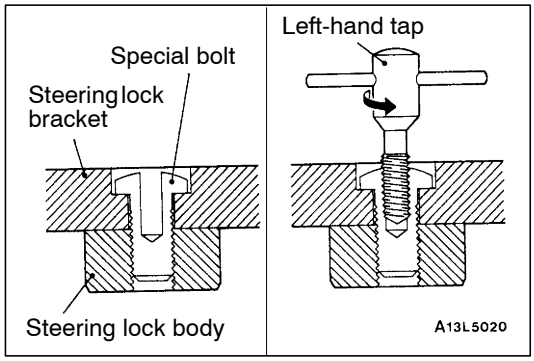
Specified sealant: 3M ATD Part No.8513 or equivalent

DISASSEMBLY AND REASSEMBLY



Disassembly steps

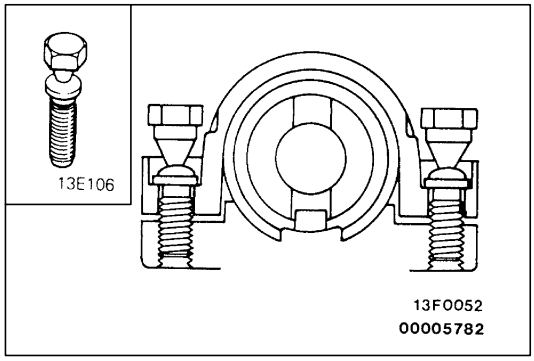
◀A▶ ▶A◀ 1. Special bolt
▶A◀ 2. Steering lock bracket
▶A◀ 3. Steering lock cylinder assembly
4. Snap ring
5. Steering shaft assembly
6. Tilt spring
7. Steering column assembly



DISASSEMBLY SERVICE POINT

◀A▶ SPECIAL BOLT REMOVAL

1. Drill in the special bolt a hole deep enough for the tap to stand.
2. Remove the special bolt with a left-hand tap.



REASSEMBLY SERVICE POINT

▶A◀ STEERING LOCK CYLINDER ASSEMBLY/ STEERING LOCK BRACKET/SPECIAL BOLT INSTALLATION

1. When installing the steering lock cylinder assembly and steering lock bracket to the steering column assembly, temporarily install the steering lock in alignment with the column boss.
2. Check that the steering lock works properly. Then, tighten the special bolts until the heads twists off.

POWER STEERING GEAR BOX AND LINKAGE

REMOVAL AND INSTALLATION

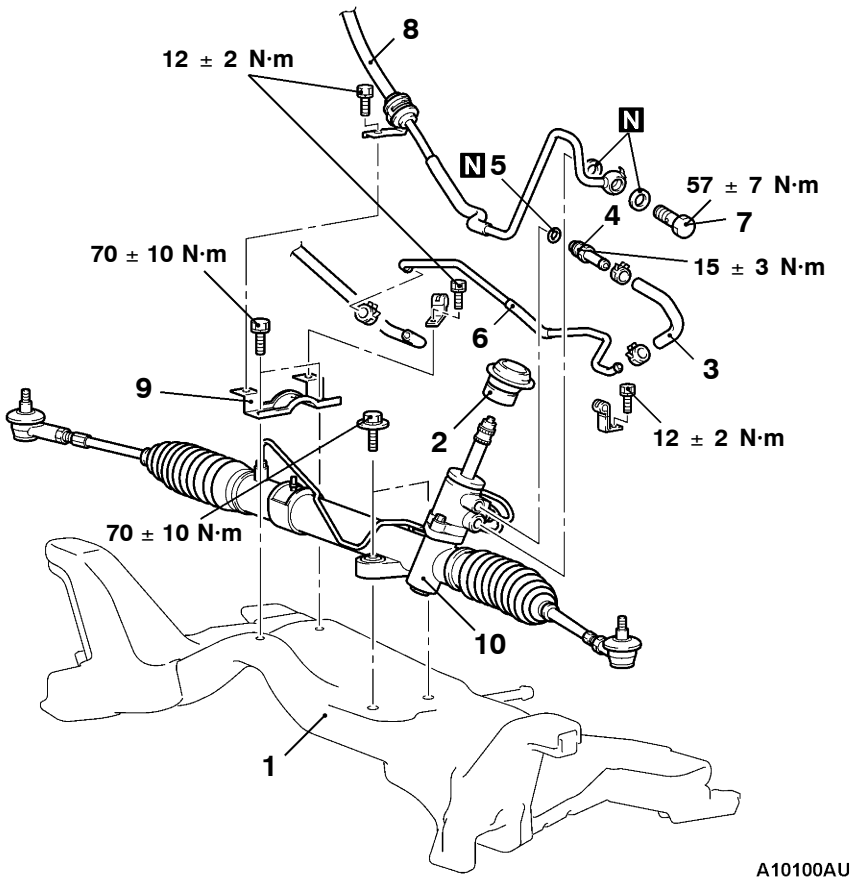
Caution: SRS
Before removing steering gear box, refer to GROUP 52B. Also, put the front wheels in straight-ahead position. Failure to do so may damage the SRS clock spring and render the SRS air bag inoperative, which results serious driver injury.

Caution
If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe out quickly.

Pre-removal Operation
- Clock Spring Removal (Refer to GROUP 52B.)
- Power Steering Fluid Draining (Refer to P.37A-9.)

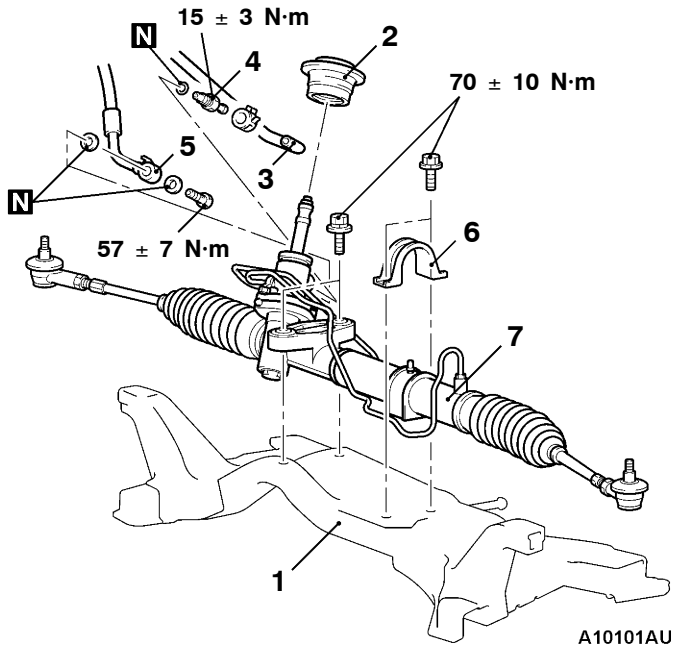
Post-installation Operation
- Clock Spring Installation (Refer to GROUP 52B.)
- Power Steering Fluid Supplying and bleeding (Refer to P.37A-9.)
- Checking Steering Wheel Position with Wheels Straight Ahead

<L.H. drive vehicles>



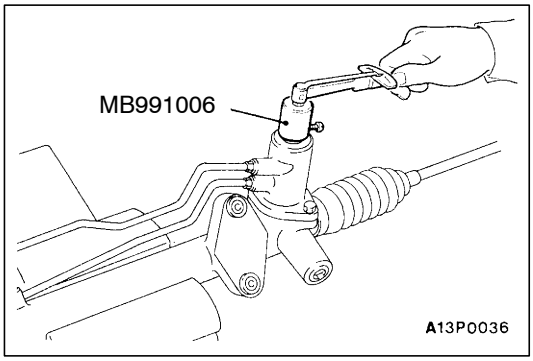
Removal steps
1. Crossmember (Refer to GROUP 32.)
- Rear roll stopper(Refer to GROUP 32.)
2. Joint cover grommet
3. Return hose
4. Return tube
5. O ring
6. Return tube
7. Eye bolt
8. Pressure hose assembly
9. Clamp
10. Steering gear and linkage

<R.H. drive vehicles>



Removal steps

1. Crossmember (Refer to GROUP 32.)
2. Joint cover grommet
3. Return hose connection
4. Return tube
5. Pressure hose connection
6. Clamp
7. Steering gear and linkage



INSPECTION

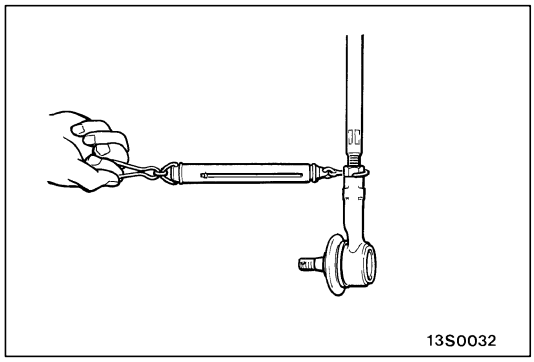
GEAR BOX PINION TOTAL ROTATION TORQUE CHECK

Caution
Secure the steering gear box and linkage in their mounting positions only. Otherwise, deformation or damage could result.

1. Using the special tool, turn the pinion gear at a speed of one rotation per 4 to 6 seconds to measure total rotation torque.

   Standard values:
   Total rotation torque: 0.8 – 1.8 N·m
   Torque fluctuation: 0.49 N·m or less

   NOTE
   (1) Remove the bellows from the rack housing before measuring.
   (2) Measure the total rotation torque by turning the special tool left and right 180° from the neutral position.
2. If the standard values are not met, adjust the pinion total rotation torque. (Refer to P.37A-26.)
3. In case the adjustment is impossible, disassemble and check the components, and repair if necessary.



TIE ROD SWING RESISTANCE CHECK

1. Swing the tie rod 10 times hardly.
2. With the tie rod end downwards as shown, use a spring scale to measure swing resistance (swing torque).

   Standard value: 8 - 27 N (1.5 - 4.9 N·m)

3. If the measured value is above the standard value, replace the tie rod.
4. If below, check the ball joint for looseness or ratcheting. The tie rod is still serviceable when the ball joint swings smoothly.

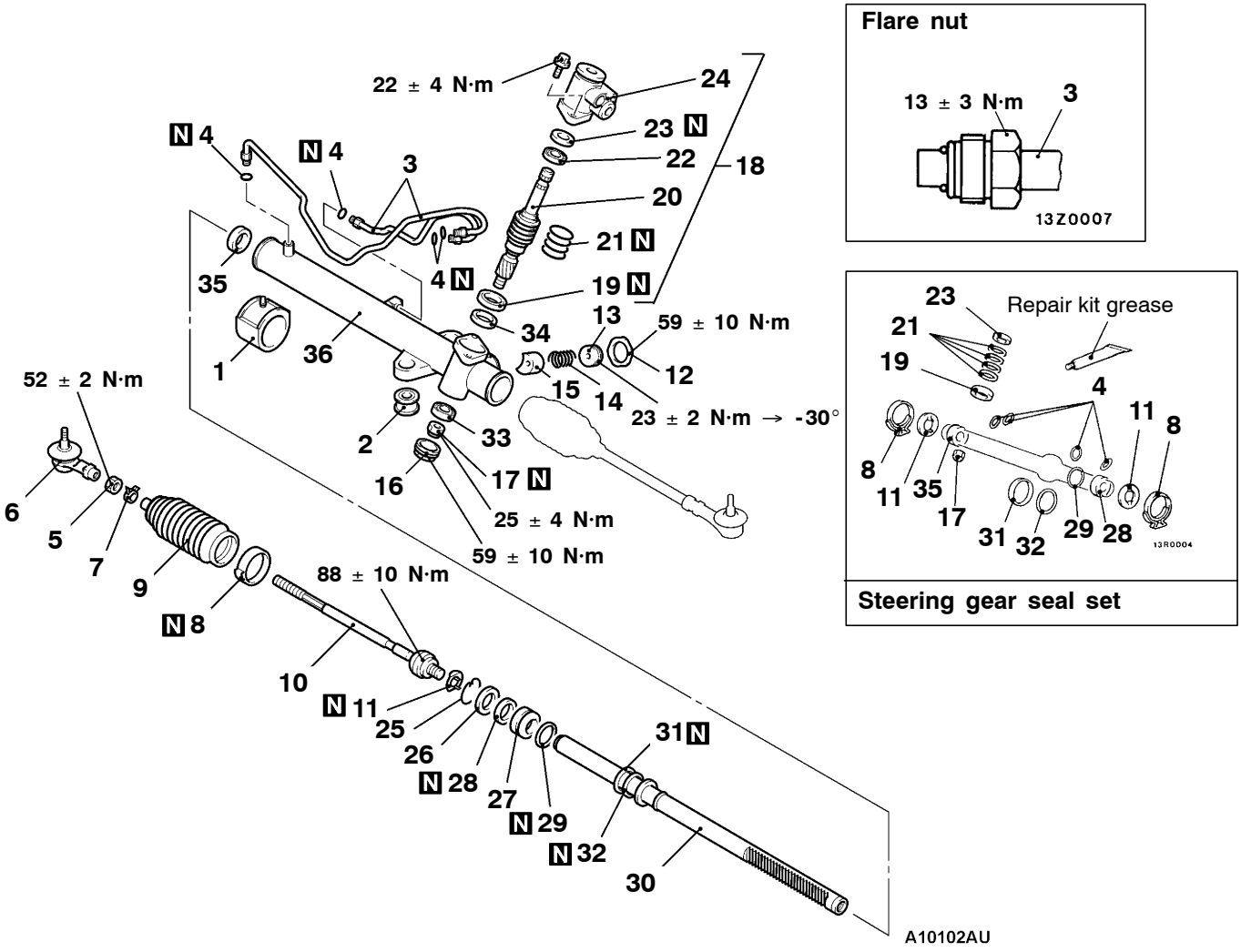
TIE ROD END BALL JOINT DUST COVER CHECK

1. Check the dust cover for cracks or damage by pushing it with finger.
2. If the dust cover is cracked or damaged, replace the tie rod end. (Refer to P.37A-19, 20.)

   NOTE
   A cracked or damaged dust cover may damage the ball joint. Replace the dust cover when it is damaged during service work.

DISASSEMBLY AND REASSEMBLY

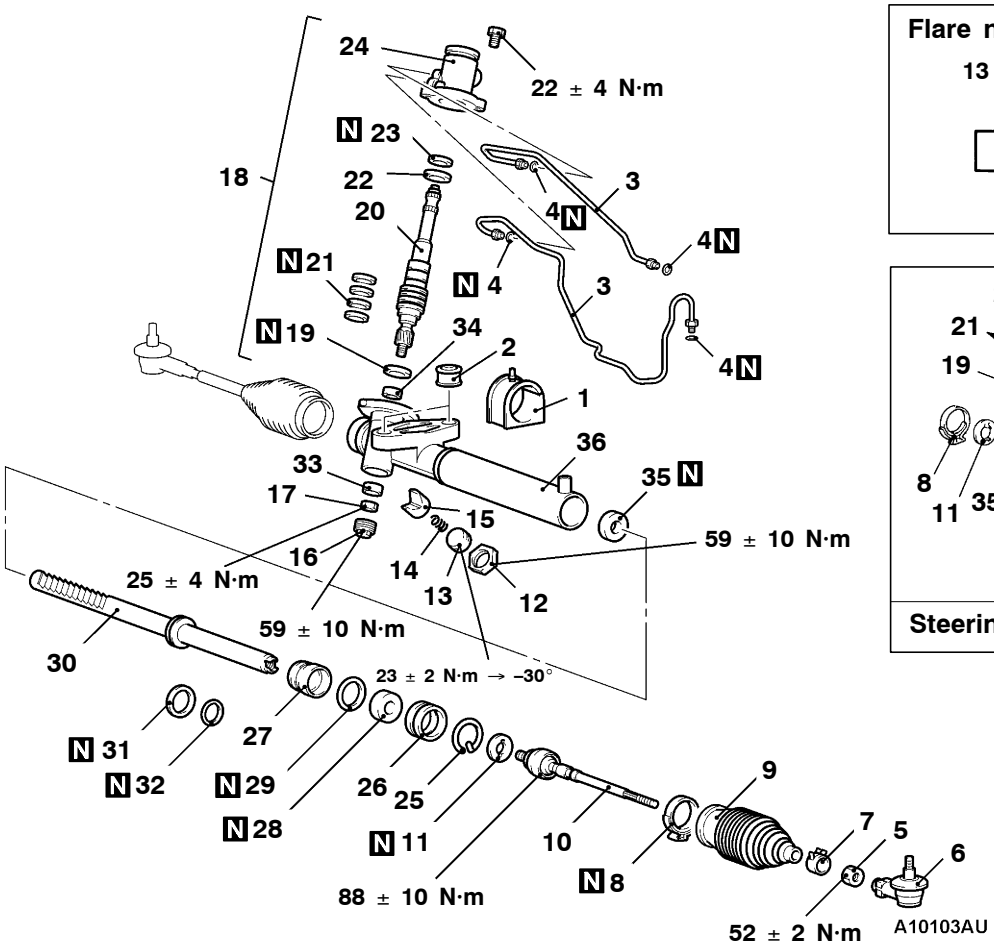
<L.H. drive vehicles>

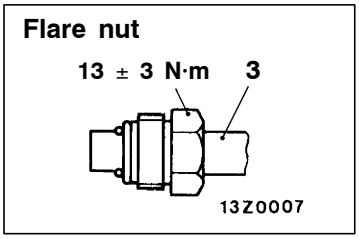


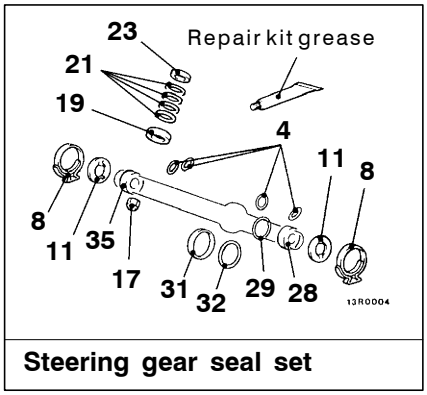
Disassembly steps

- ▶O◀ 1. Gear mounting rubber cushion
- 2. Gear housing mounting bushing
- 3. Feed pipe
- 4. O-ring
- ▶N◀ 5. Lock nut
- ▶N◀ 6. Tie rod end
- 7. Clip
- ▶M◀ 8. Band
- 9. Bellows
- ▶L◀ 10. Tie rod
- ▶L◀ 11. Tab washer
- ▶K◀ ● Total pinion rotating torque adjustment
- ▶J◀ 12. Lock nut
- ◀A▶ ▶J◀ 13. Rack support cover
- 14. Support spring
- 15. Rack support
- ▶I◀ 16. End plug
- 17. Lock nut
- 18. Valve housing assembly
- ◀B▶ ▶H◀ 19. Lower oil seal
- ◀B▶ 20. Pinion and valve assembly
- ◀C▶ ▶G◀ 21. Seal ring
- ◀D▶ ▶F◀ 22. Upper bearing
- ◀D▶ ▶F◀ 23. Upper oil seal
- 24. Valve housing
- ◀E▶ ▶E◀ 25. Circlip
- ◀F▶ 26. Rack stopper
- ◀F▶ ▶D◀ 27. Rack bushing
- ◀F▶ ▶D◀ 28. Oil seal
- ◀F▶ 29. O-ring
- ◀F▶ ▶C◀ 30. Rack assembly
- ◀C▶ 31. Seal ring
- 32. O-ring
- ◀G▶ ▶B◀ 33. Lower bearing
- ◀H▶ ▶B◀ 34. Needle bearing
- ◀I▶ ▶A◀ 35. Oil seal
- 36. Gear housing

<R.H. drive vehicles>



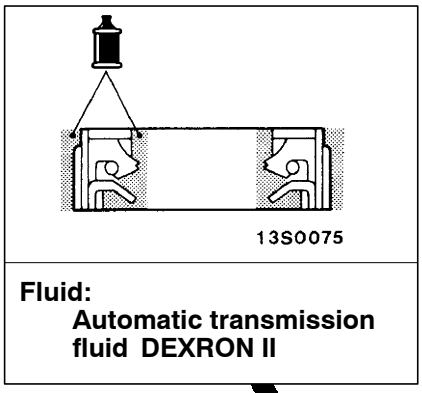




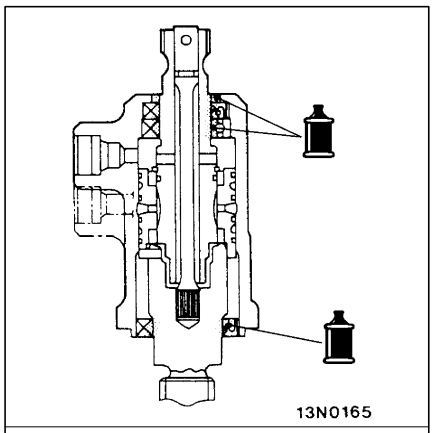
Disassembly steps

- ▶O◀ 1. Gear mounting rubber cushion
- 2. Gear housing mounting bushing
- 3. Feed pipe
- 4. O-ring
- ▶N◀ 5. Lock nut
- ▶N◀ 6. Tie rod end
- 7. Clip
- ▶M◀ 8. Band
- 9. Bellows
- ▶L◀ 10. Tie rod
- ▶L◀ 11. Tab washer
- ▶K◀ ● Total pinion rotating torque adjustment
- ▶J◀ 12. Lock nut
- ◀A▶ ▶J◀ 13. Rack support cover
- 14. Support spring
- 15. Rack support
- ▶I◀ 16. End plug
- 17. Lock nut
- 18. Valve housing assembly
- ◀B▶ ▶H◀ 19. Lower oil seal
- ◀B▶ 20. Pinion and valve assembly
- ◀C▶ ▶G◀ 21. Seal ring
- ◀D▶ ▶F◀ 22. Upper bearing
- ◀D▶ ▶F◀ 23. Upper oil seal
- 24. Valve housing
- ◀E▶ ▶E◀ 25. Circlip
- ◀F▶ 26. Rack stopper
- ◀F▶ ▶D◀ 27. Rack bushing
- ◀F▶ ▶D◀ 28. Oil seal
- ◀F▶ 29. O-ring
- ◀F▶ ▶C◀ 30. Rack assembly
- ◀C▶ 31. Seal ring
- 32. O-ring
- ◀G▶ ▶B◀ 33. Lower bearing
- ◀H▶ ▶B◀ 34. Needle bearing
- ◀I▶ ▶A◀ 35. Oil seal
- 36. Gear housing

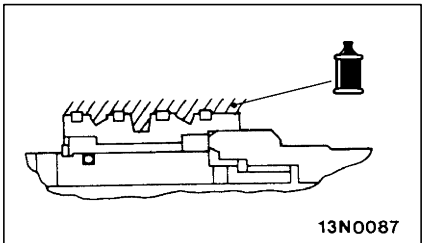
Lubrication and Sealing Points



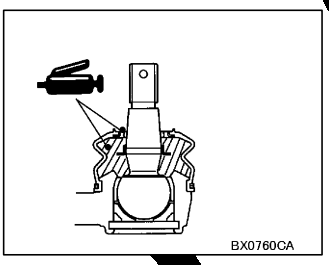
Fluid:
Automatic transmission fluid DEXRON II

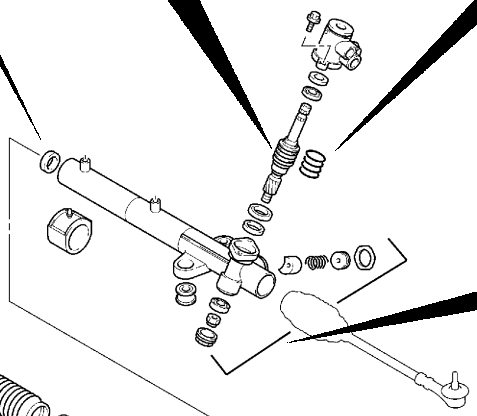


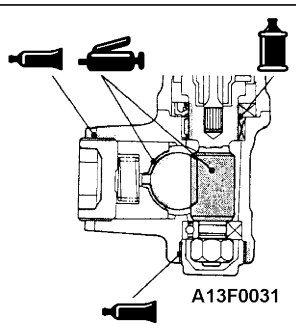
Fluid:
Automatic transmission fluid DEXRON II



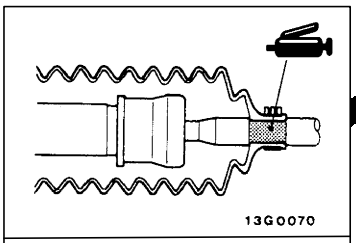
Fluid:
Automatic transmission fluid DEXRON II



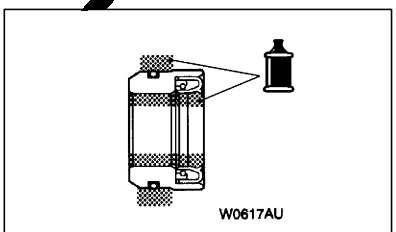




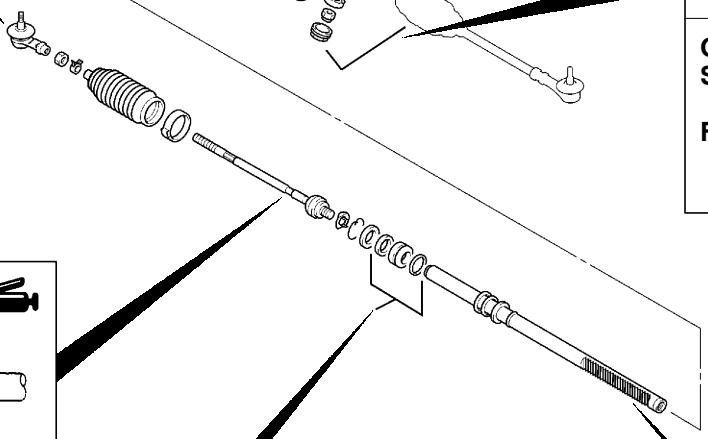
Grease: Repair kit grease
Sealant: 3M ATD part No. 8661, 8663 or equivalent
Fluid:
Automatic transmission fluid DEXRON II

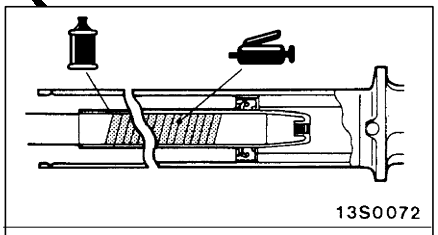


Grease: Silicone grease

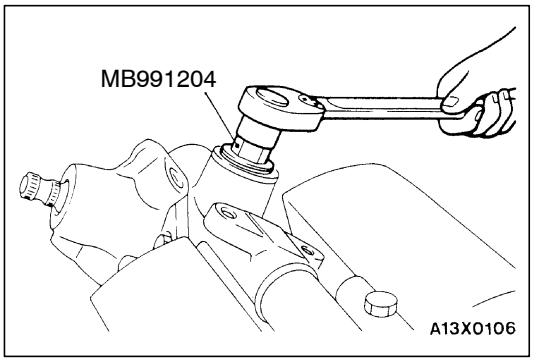


Fluid:
Automatic transmission fluid DEXRON II



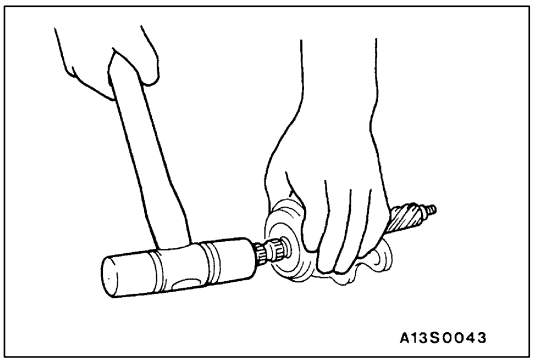


Grease: Repair kit grease
Fluid:
Automatic transmission fluid DEXRON II



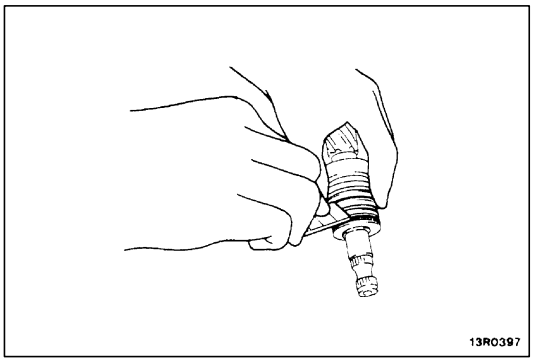
DISASSEMBLY SERVICE POINTS

◀A▶ RACK SUPPORT COVER REMOVAL



◀B▶ LOWER OIL SEAL/PINION AND VALVE ASSEMBLY REMOVAL

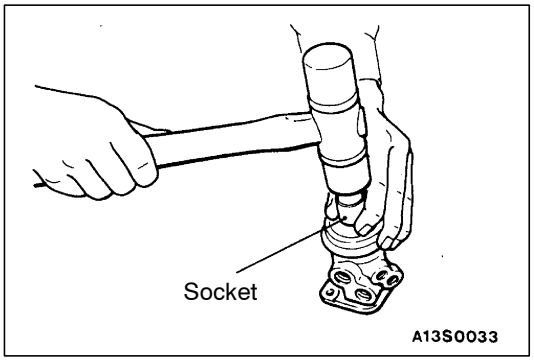
With a plastic hammer, lightly tap the pinion and valve assembly in its spline to remove the lower oil seal and pinion and valve assembly from the valve housing.



◀C▶ SEAL RING REMOVAL

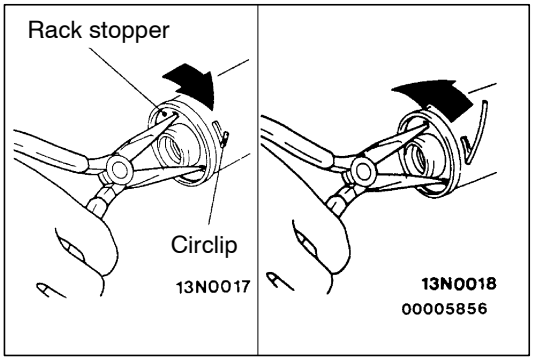
Cut the seal ring to remove from the pinion and valve assembly.

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



◀D▶ UPPER BEARING/UPPER OIL SEAL REMOVAL

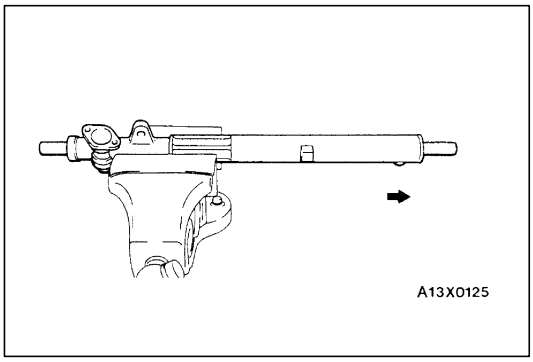
Using a socket, pull out the upper oil seal and bearing from the valve housing.



◀E▶ CIRCLIP REMOVAL

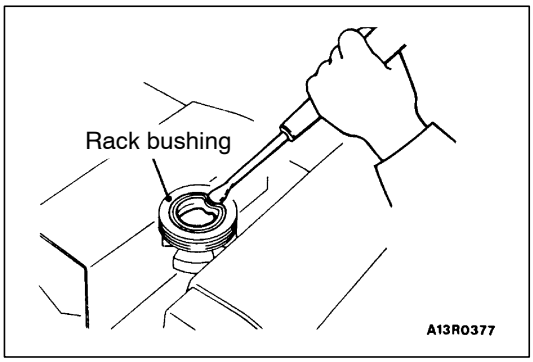
1. Turn the rack stopper clockwise until the circlip end comes out of the slot in the rack housing.
2. Turn the rack stopper anticlockwise to remove the circlip.

Caution
Do not turn the rack stopper anticlockwise first. Otherwise, the circlip will get caught in the slot in the housing, which makes the rack stopper unable to turn.



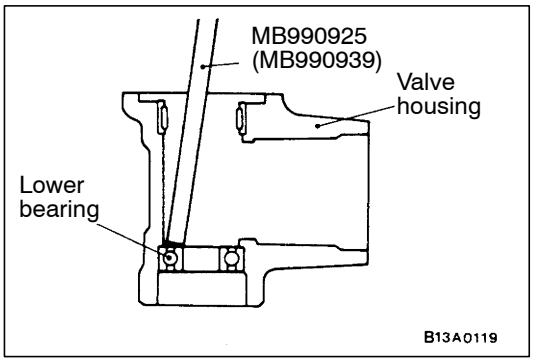
◀F▶ RACK STOPPER/RACK BUSHING/OIL SEAL/ O-RING/RACK ASSEMBLY REMOVAL

1. Remove the rack stopper, rack bushing, oil seal and O-ring together by pulling out the rack gently.

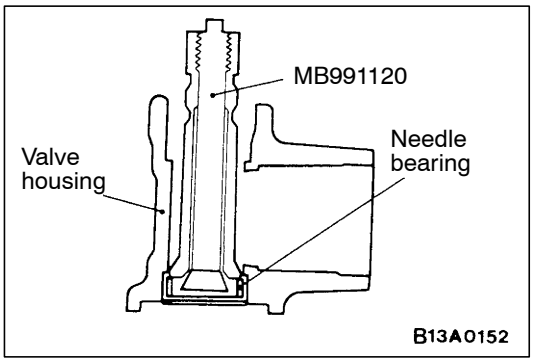


2. Partially bend the oil seal to remove from the rack bushing.

Caution
Use care not to damage the oil seal press-fitting surface of the rack bushing.

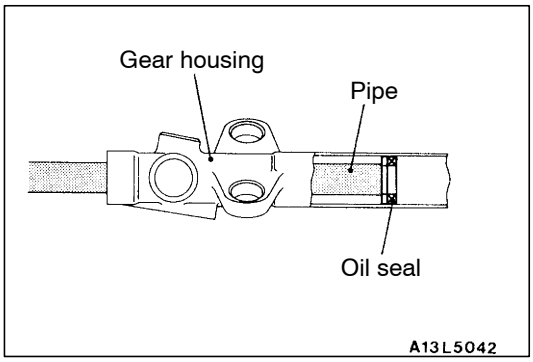


◀G▶ LOWER BEARING REMOVAL



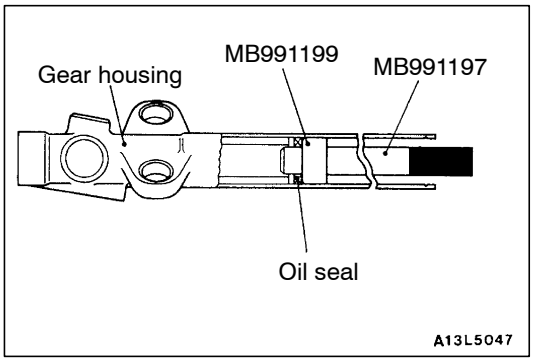
◀H▶ NEEDLE BEARING REMOVAL

Caution
Do not open the special tool to much, otherwise it may damage the inside surface of the valve housing.



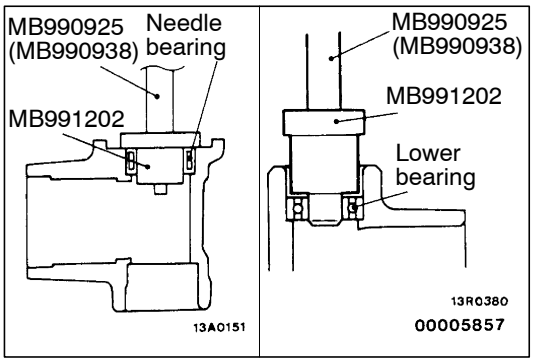
◀I▶ OIL SEAL REMOVAL

Use a pipe or the like to pull out the oil seal.

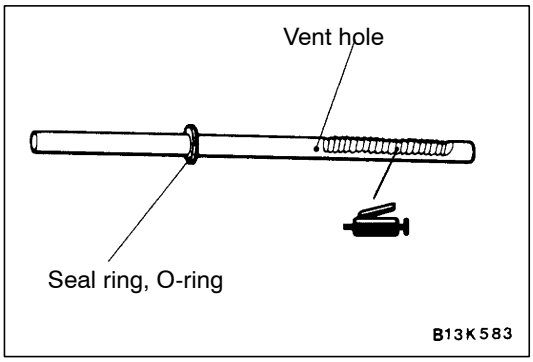


REASSEMBLY SERVICE POINTS

▶A◀ OIL SEAL INSTALLATION



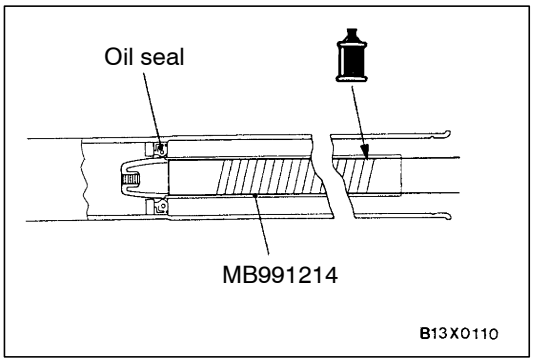
▶B◀ NEEDLE BEARING/LOWER BEARING INSTALLATION



▶C◀ RACK ASSEMBLY INSTALLATION

1. Apply repair kit grease to the teeth of the rack assembly.

   Caution
   Use care not to close the vent hole in the rack with grease.



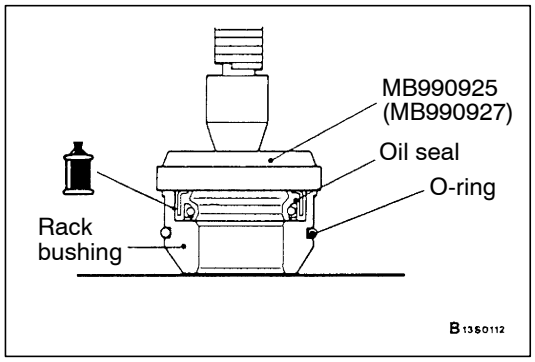
2. Cover the serrations of the rack assembly with the special tool.
3. Apply specified fluid to the outer surfaces of the special tool, seal ring and O-ring.

   Specified fluid:
   Automatic transmission fluid DEXRON II

   Caution
   Do not use ATF-SP II M and ATF-SP III.

4. Slowly insert the rack covered with the special tool from the power cylinder side of the gear housing.

   Caution
   Carefully push in the rack with the oil seal centre and the special tool end matched. This is to avoid the retainer spring coming off.

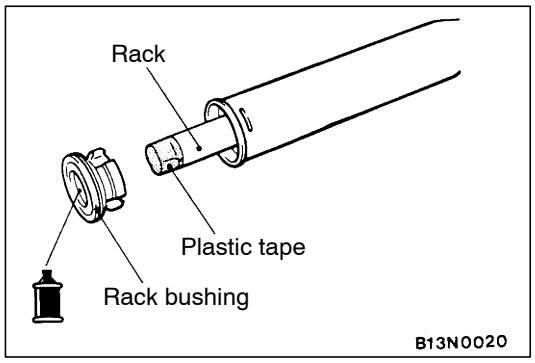


▶D◀ OIL SEAL/RACK BUSHING INSTALLATION

1. Apply specified fluid to the outer surface of the oil seal. Using the special tool, press in the oil seal until it is flush with the bushing end face.

   Specified fluid:
   Automatic transmission fluid DEXRON II

   Caution
   Do not use ATF-SP II M and ATF-SP III.

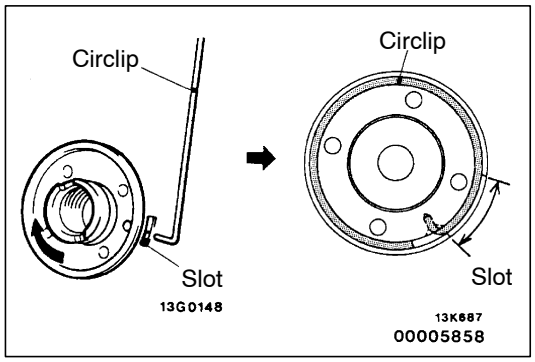


2. Apply the specified fluid to the oil seal inner surface and the O-ring.

   Specified fluid:
   Automatic transmission fluid DEXRON II

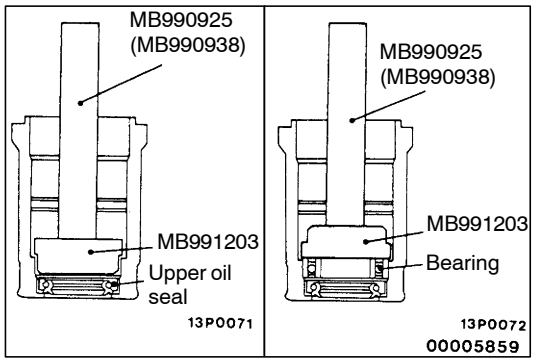
   Caution
   Do not use ATF-SP II M and ATF-SP III.

3. Wrap the rack end with plastic tape, and push the rack bushing onto the rack.

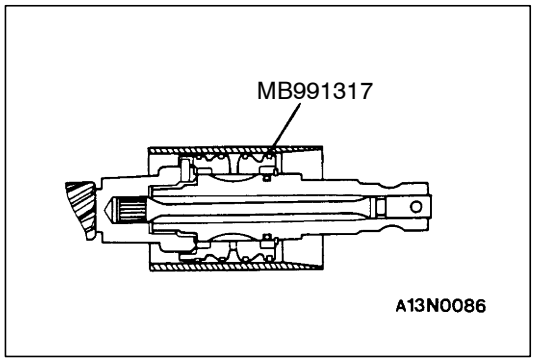


▶E◀ CIRCLIP INSTALLATION

Align the mark on the rack stopper and the slot in the cylinder. Then, insert the circlip into the rack stopper hole through the cylinder hole. Turn the rack stopper clockwise and insert the circlip firmly.

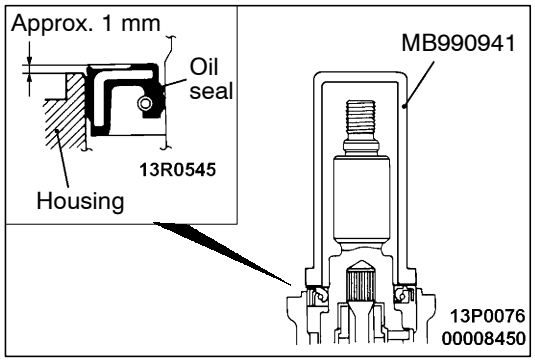


▶F◀ UPPER OIL SEAL/UPPER BEARING INSTALLATION



▶G◀ SEAL RING INSTALLATION

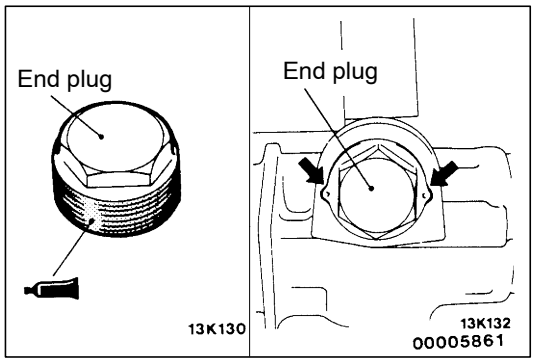
After installation, using the special tool or by hand, compress seal rings that expand during installation.



▶H◀ LOWER OIL SEAL INSTALLATION

Using the special tool, press the oil seal into the valve housing. The upper surface of the oil seal must project outwards about 1 mm from the housing end surface.

Caution
When the oil seal is flush with or lower than the housing edge, reassemble the components. Otherwise, oil leaks will result.

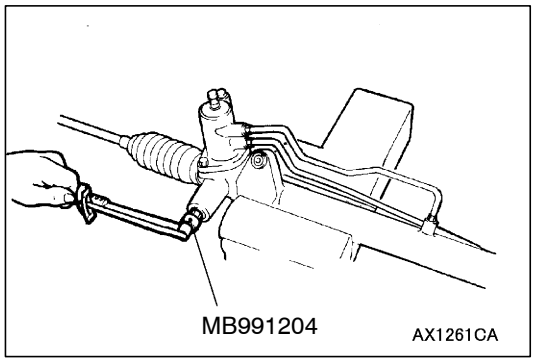


▶I◀ END PLUG INSTALLATION

1. Apply specified sealant to the threaded section of the end plug, and then install the end plug to the gear housing.

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

2. Use a punch to bend over the two tabs on the sides of the end plug to stop the end plug from turning.

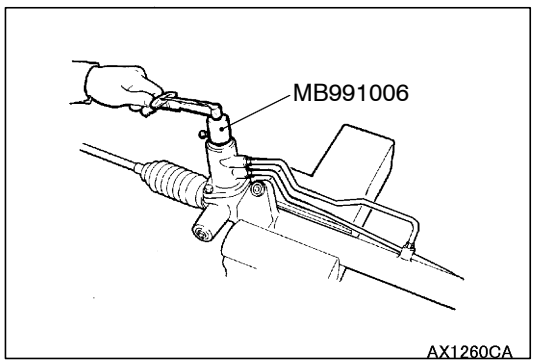


▶J◀ RACK SUPPORT COVER/LOCKING NUT INSTALLATION

1. Apply specified sealant to the rack support cover thread.

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

2. Using the special tool, tighten the rack support cover to 23 ± 2 N·m.
3. Return the rack support cover by about 30°.
4. Tighten the locking nut to the specified torque, using the special tool to prevent the rack support cover from spinning.



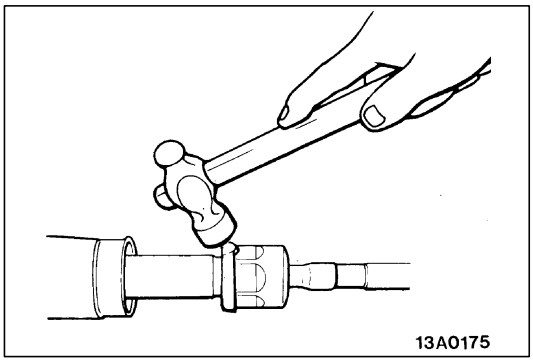
▶K◀ PINION TOTAL ROTATION TORQUE ADJUSTMENT

1. Using the special tool, measure total rotation torque by turning the pinion gear at a speed of one rotation per 4 to 6 seconds.

   Standard value:
   Total rotation torque: 0.8 - 1.8 Nm
   Torque fluctuation: 0.49 Nm or less

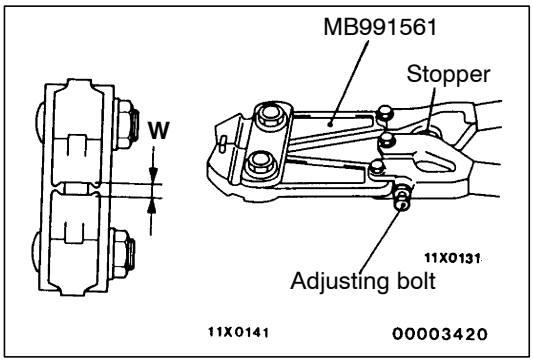
2. If the total rotation torque or torque fluctuation does not meet the standard values, adjust by returning the rack support cover within a range of 0 to 30°.

   Caution
   (1) Adjust around the maximum limit of the standard values.
   (2) See that no ratcheting or catching are present when operating the rack towards the shaft direction.
   (3) Measure the total pinion torque through the whole stroke of the rack.
3. If the adjustment is impossible in the given range, check the components of the rack support cover, and replace if necessary.



▶L◀ TAB WASHER/TIE ROD INSTALLATION

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



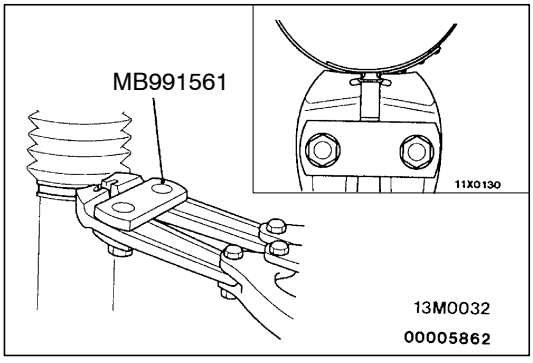
▶M◀BELLOWS BAND INSTALLATION

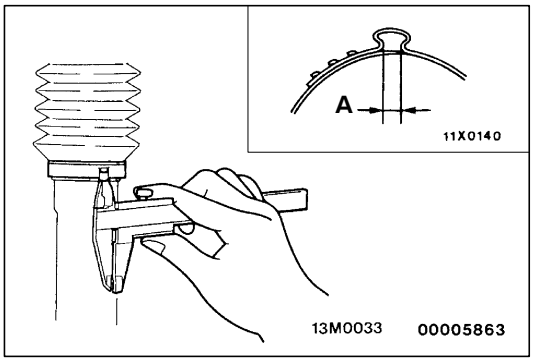
1. Turn the adjusting bolt of the special tool to adjust the opening dimension (W) to the standard value.

   Standard value (W): 2.9 mm
   <When more than 2.9 mm>
   Screw in the adjusting bolt.
   <When less than 2.9 mm>
   Loosen the adjusting bolt.

   NOTE
   (1) The dimension (W) is adjusted by about 0.7 mm per one turn.
   (2) Do not turn the adjusting bolt more than one turn.
2. Use the special tool to crimp the bellows band.

   Caution
   (1) Hold the rack housing, and use the special tool to crimp the bellows band securely.
   (2) Crimp the bellows band until the special tool touches the stopper.





3. See that the crimped width (A) meets the standard value.

Standard value (A): 2.4 - 2.8 mm

<When more than 2.8 mm>

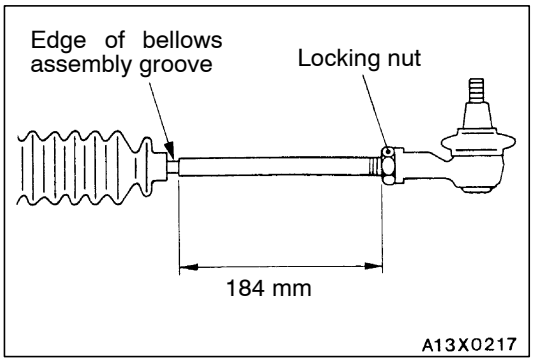
Readjust the dimension (W) of step (1) to the value calculated by the following equation, and repeat step (2).

W = 5.5 mm - A [Example: If (A) is 2.9 mm, (W) is 2.6 mm.]

<When less than 2.4 mm>

Remove the bellows band, readjust the dimension (W) of step (1) to the value calculated by the following equation, and use a new bellows band to repeat steps (2) to (3).

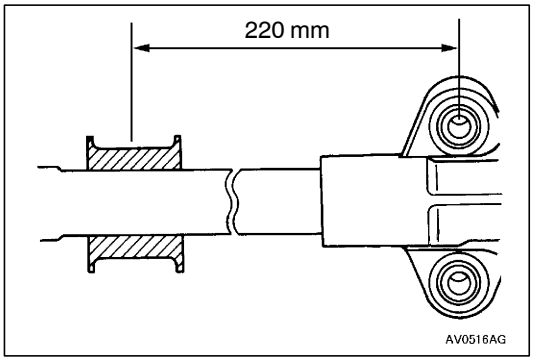
W = 5.5 mm - A [Example: If (A) is 2.3 mm, (W) is 3.2 mm.]



▶N◀ TIE ROD END/LOCKING NUT INSTALLATION

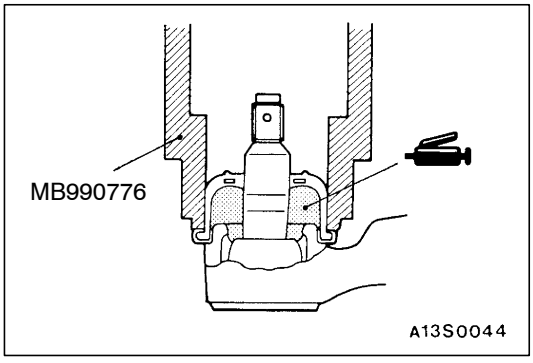
Screw in the tie rod end until the dimension shown is achieved. Then, temporarily tighten with the locking nut.

NOTE
The locking nut must be tightened securely only after the power steering gear box and linkage are installed to the vehicle and toe-in is adjusted.



▶O◀ GEAR MOUNTING RUBBER INSTALLATION

Install the gear mounting rubber to the rack housing so that the distance is as shown in the illustration.



TIE ROD END BALL JOINT DUST COVER REPLACEMENT

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

1. Apply grease to the inside of the dust cover.
2. Drive in the dust cover with special tool until it is fully seated.
3. Check the dust cover for cracks or damage by pushing it with finger.

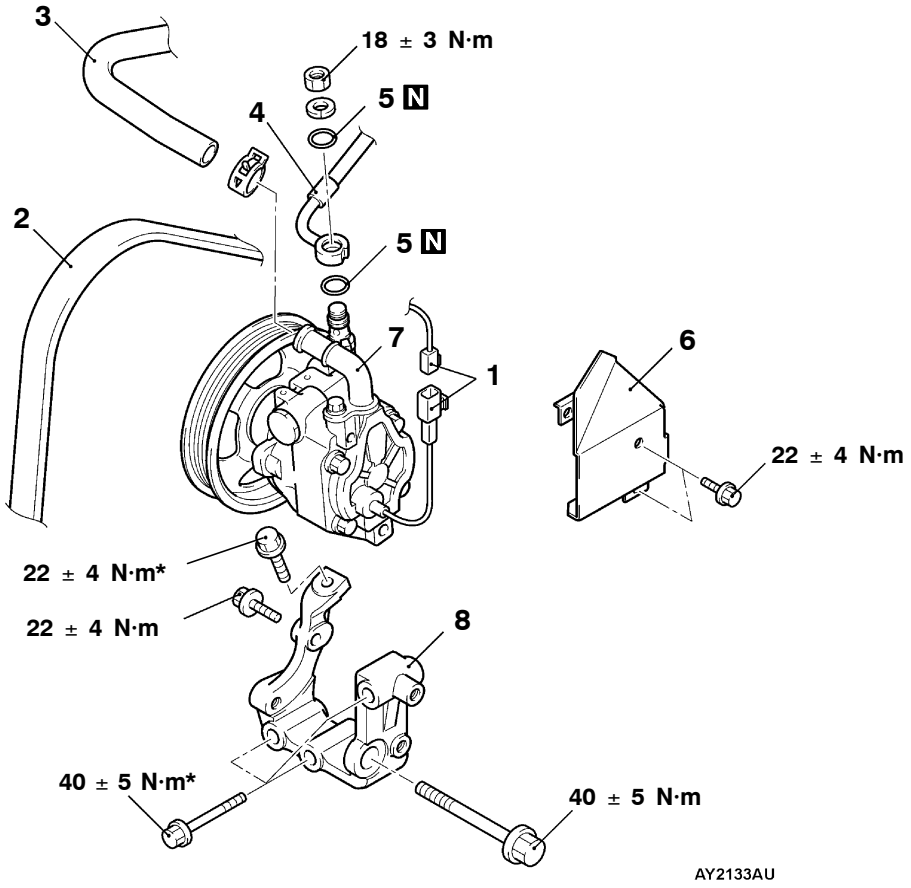
POWER STEERING OIL PUMP

REMOVAL AND INSTALLATION

Caution
After temporary tightening all bolts in * part, tighten in specific torque.

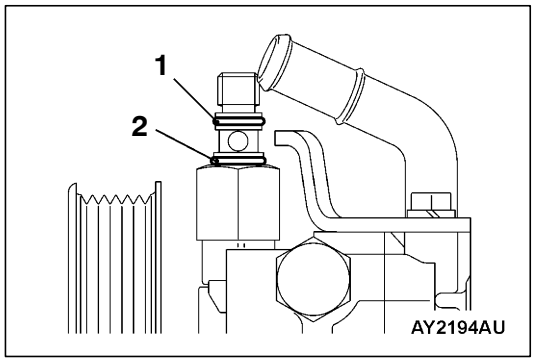
Pre-removal Operation
Power Steering Fluid Draining (Refer to P.37A-9.)

Post-installation Operation
- Power Steering Fluid Supplying and Bleeding (Refer to P.37A-9.)
- Drive Belt Tension Adjusting (Refer to GROUP 11A – On-vehicle Service.)



Removal steps

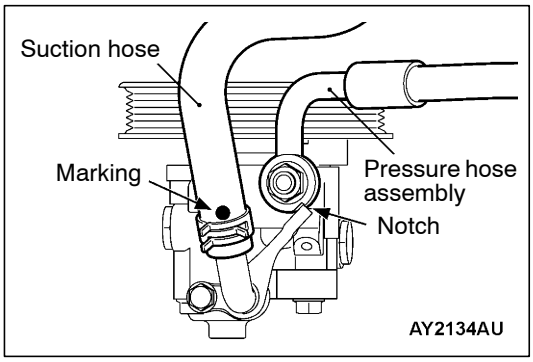
1. Pressure switch connector
2. Drive belt (Refer to GROUP 11A.)
▶B◀ 3. Suction hose connection
▶B◀ 4. Pressure hose connection
▶A◀ 5. O ring
6. Heat protecter
7. Oil pump assembly
8. Power steering pump bracket



INSTALLATION SERVICE POINTS

▶A◀ O-RING INSTALLATION

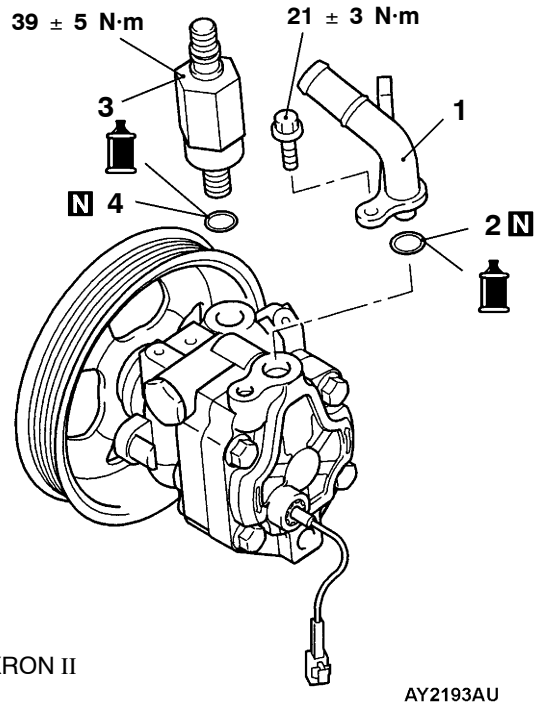
No.	ID × Width mm
1	11.0 × 1.9
2	13.0 × 1.9



▶B◀ PRESSURE HOSE ASSEMBLY/SUCTION HOSE REMOVAL

Install the pressure hose assembly and suction hose as illustrated.

DISASSEMBLY AND REASSEMBLY



NOTE

: Automatic transmission fluid DEXRON II

Disassembly steps

1. Suction connector
2. O-ring
3. Connector
4. Gasket

POWER STEERING OIL HOSES

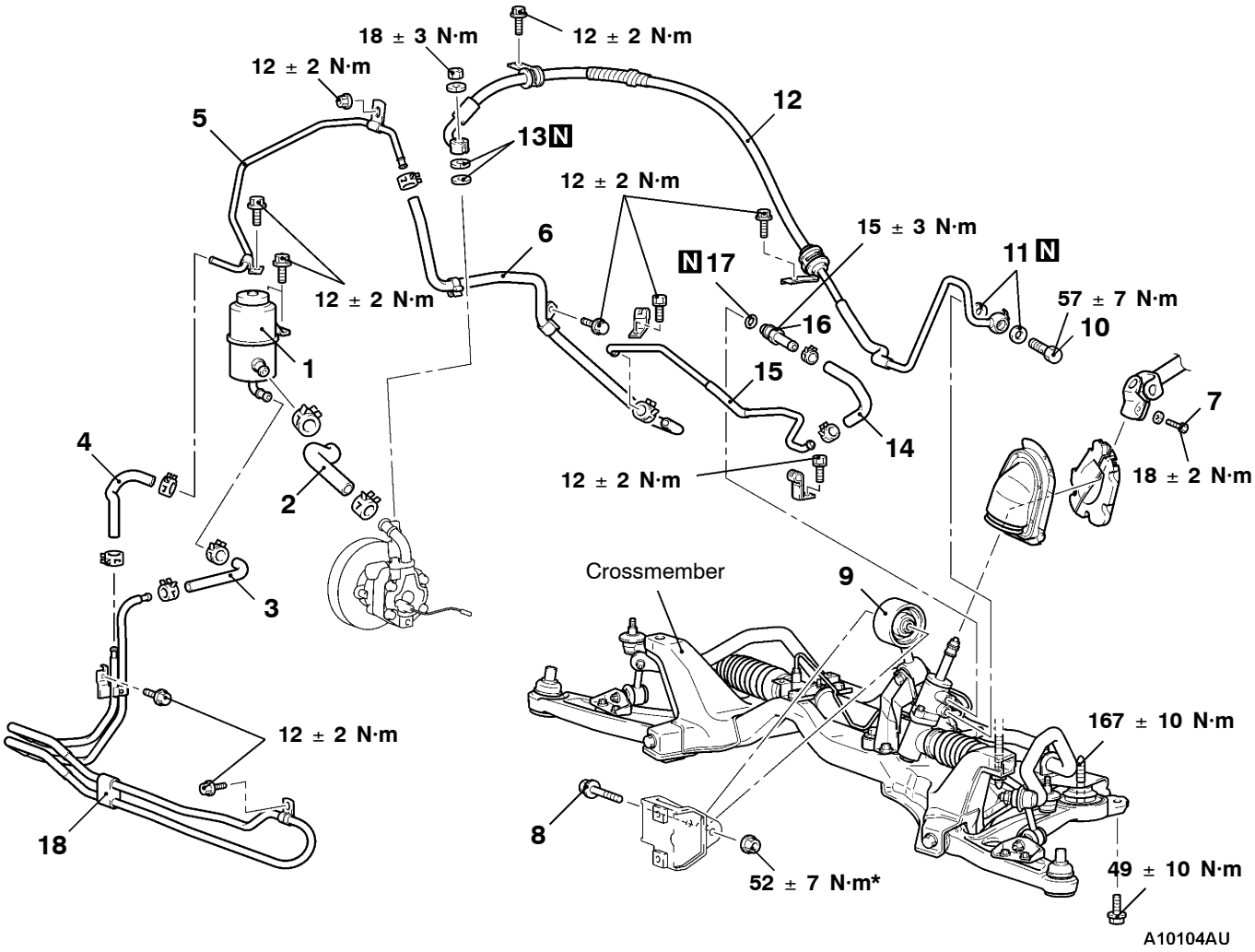
REMOVAL AND INSTALLATION

Caution

1. **Before removing the clock spring, always see GROUP 52B - Caution for Service and Air Bag Module Clock Spring**
2. **If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper, because the paint of caliper will be scratched.**
3. **On the tightening section indicated in the mark (*), lightly tighten the nut first, and then finally tighten it with the engine weight applied on the body.**

<L.H. drive vehicles>

Pre-removal and Post-installation Operation
Power Steering Fluid Draining and Refilling (Refer to P.37A-9.)

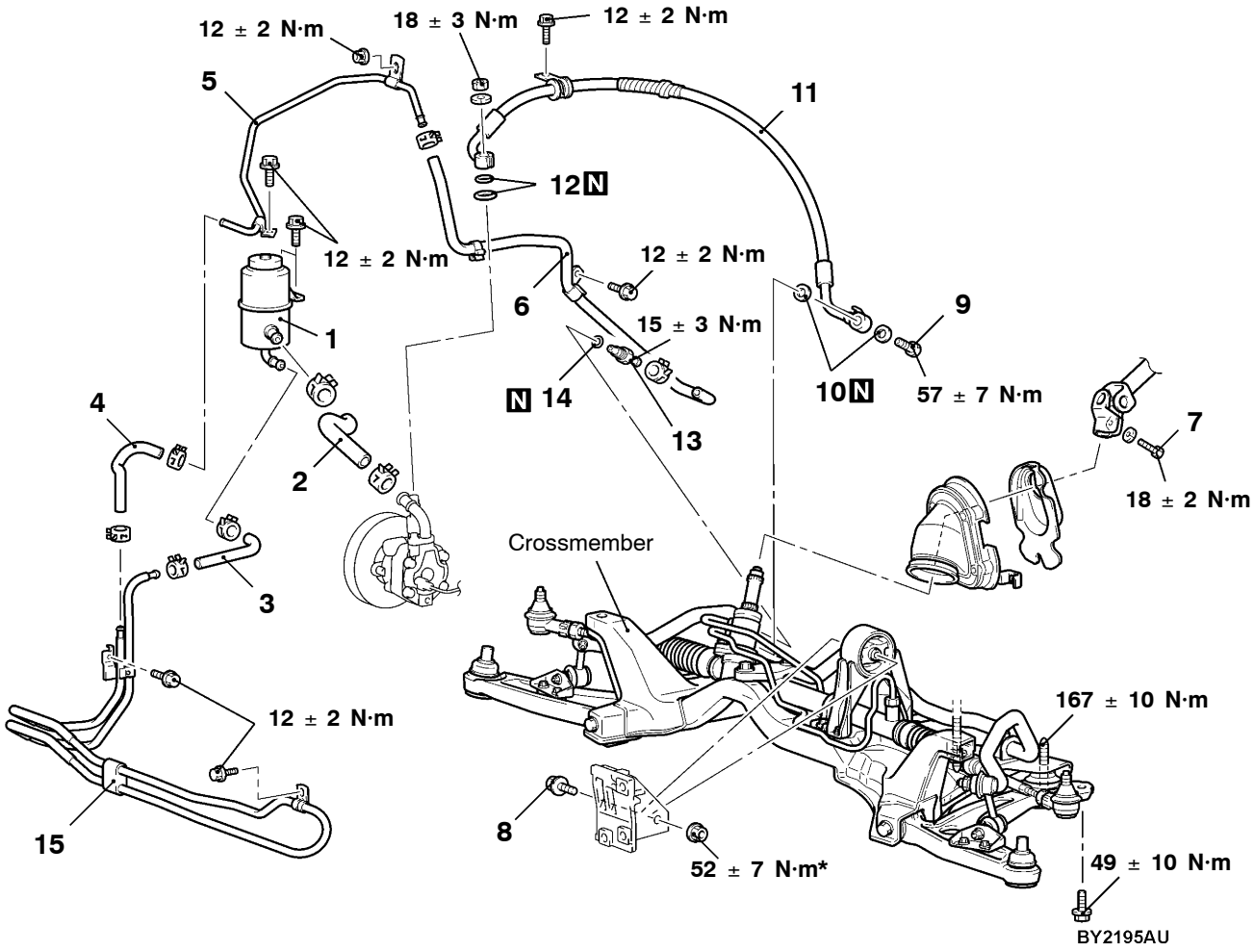


Removal steps

- ▶B◀ 1. Oil reservoir
- ▶B◀ 2. Suction hose
- 3. Return hose
- 4. Return hose
- 5. Return tube
  - Strut tower bar (Refer to GROUP 42.)
- 6. Return hose
  - Clock spring (Refer to GROUP 52B.)
  - Crossmember bar (Refer to GROUP 33A.)
  - Center member (Refer to GROUP 32.)
  - Front exhaust pipe (Refer to GROUP 15.)
- 7. Steering gear and joint connecting bolt
- 8. Rear roll stopper connecting bolt
- 9. Rear roll stopper (Refer to GROUP 32.)
- ◀A▶ 10. Eye bolt
- 11. Gasket
- ▶B◀ 12. Pressure hose assembly
- ▶A◀ 13. O ring
- 14. Return hose
- 15. Return tube
- ◀A▶ 16. Return tube
- 17. O ring
  - Front bumper (Refer to GROUP 51.)
  - Intercooler (Refer to GROUP 15.)
- 18. Cooler tube assembly

<R.H. drive vehicles>

Pre-removal and Post-installation Operation
Power Steering Fluid Draining and Refilling (Refer to P.37A-9.)



Removal steps

1. Oil reservoir
▶B◀ 2. Suction hose
3. Return hose
4. Return hose
5. Return tube
- Strut tower bar (Refer to GROUP 42.)

6. Return hose
- Clock spring (Refer to GROUP 52B.)
- Crossmember bar (Refer to GROUP 33A.)
- Center member (Refer to GROUP 32.)
- Front exhaust pipe (Refer to GROUP 15.)

7. Steering gear and joint connecting bolt
8. Rear roll stopper connecting bolt
◀A▶ 9. Eye bolt
10. Gasket
▶B◀ 11. Pressure hose assembly
▶A◀ 12. O ring
◀A▶ 13. Return tube
14. O ring
- Front bumper (Refer to GROUP 51.)
- Intercooler (Refer to GROUP 15.)

15. Cooler tube assembly

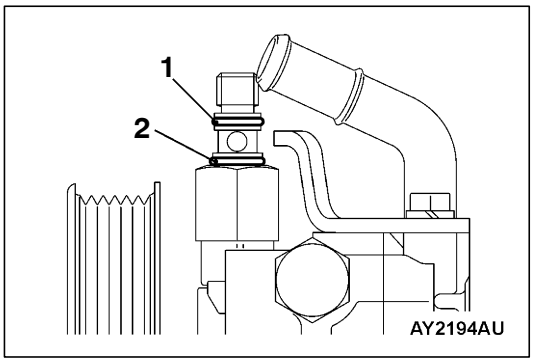
REMOVAL SERVICE POINT

◀A▶ EYE BOLT/RETURN TUBE REMOVAL

1. Loosen the crossmember mounting bolts and nuts, and lower the crossmember to a position so that the eye bolts or return tube at the steering gear side can be removed.

   NOTE

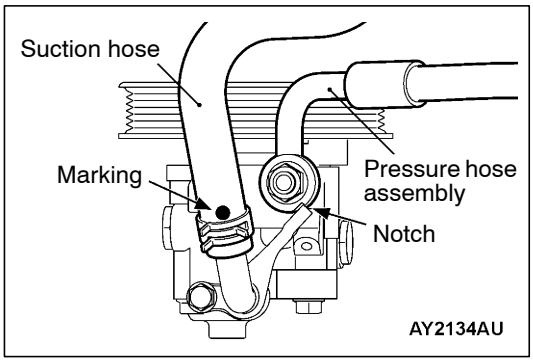
   In this case, do not remove the crossmember mounting bolts and nuts.
2. Remove the eye bolts or return tube.



INSTALLATION SERVICE POINTS

▶A◀ O RING INSTALLATION

No.	ID × Width mm
1	11.0 × 1.9
2	13.0 × 1.9



▶B◀ PRESSURE HOSE ASSEMBLY/SUCTION HOSE INSTALLATION

Install the pressure hose assembly and suction hose as illustrated.

NOTES