

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

OUTLINE OF CHANGE

- The service procedures for left-hand drive vehicles have been established as described below. The service procedures for components not mentioned below are the same as for the preceding models.

STEERING WHEEL AND SHAFT <L.H. DRIVE VEHICLES>

REMOVAL AND INSTALLATION

CAUTION: SRS

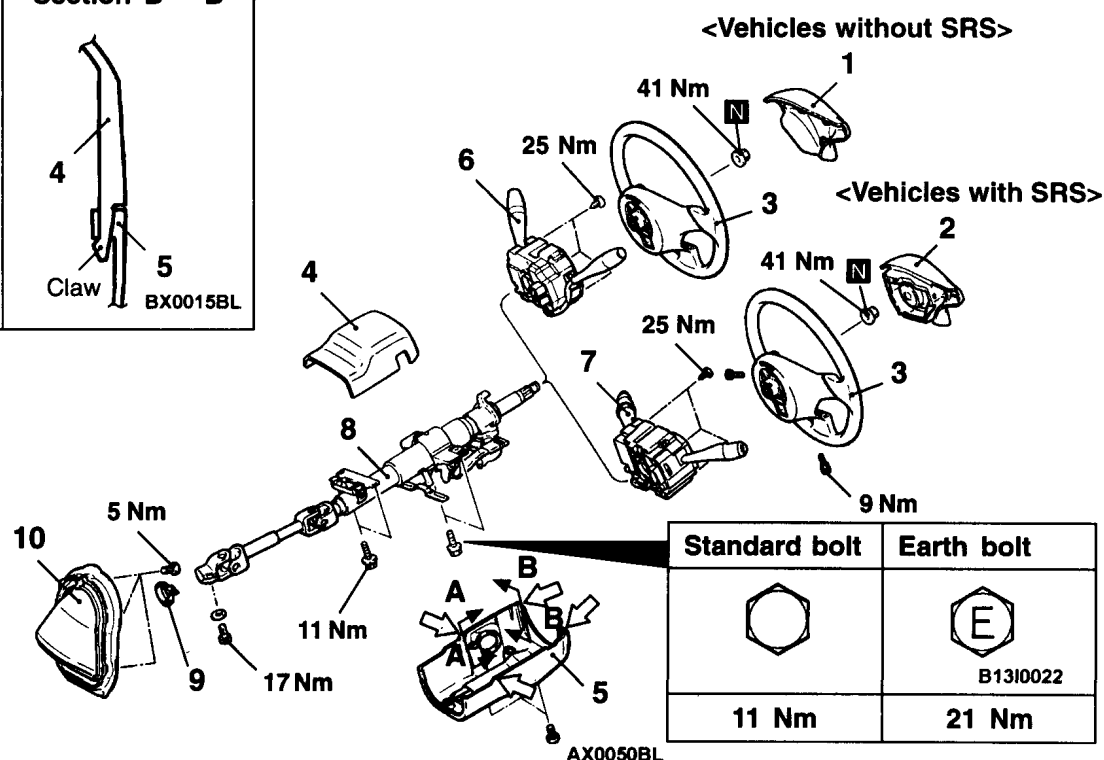
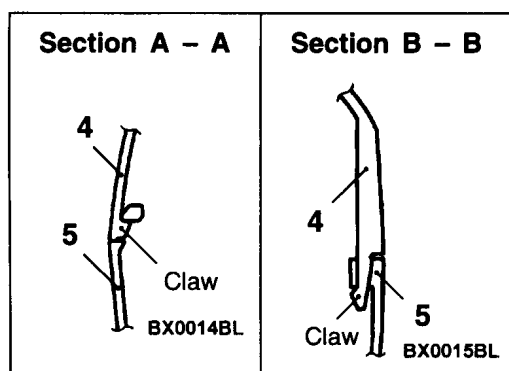
For vehicles with SRS, before removal of air bag module, refer to GROUP 52B – Service Precautions and Air Bag Module and Clock Spring.

Pre-removal Operation

Instrument Under Cover Removal

Post-installation Operation

- Instrument Under Cover Installation
- Checking Steering Wheel Position with Wheels Straight Ahead

**NOTE**

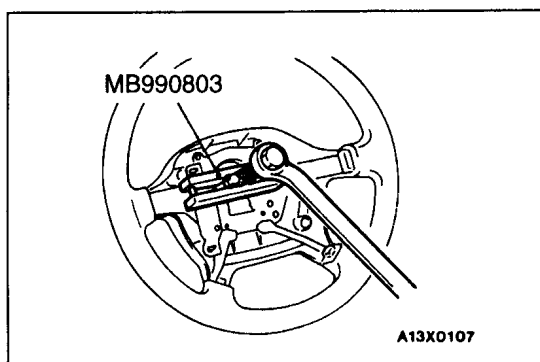
↔ : Claw position

Removal steps

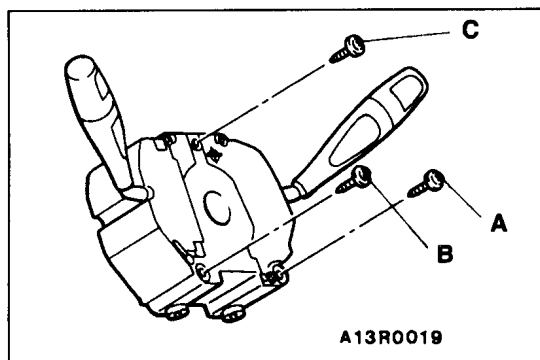
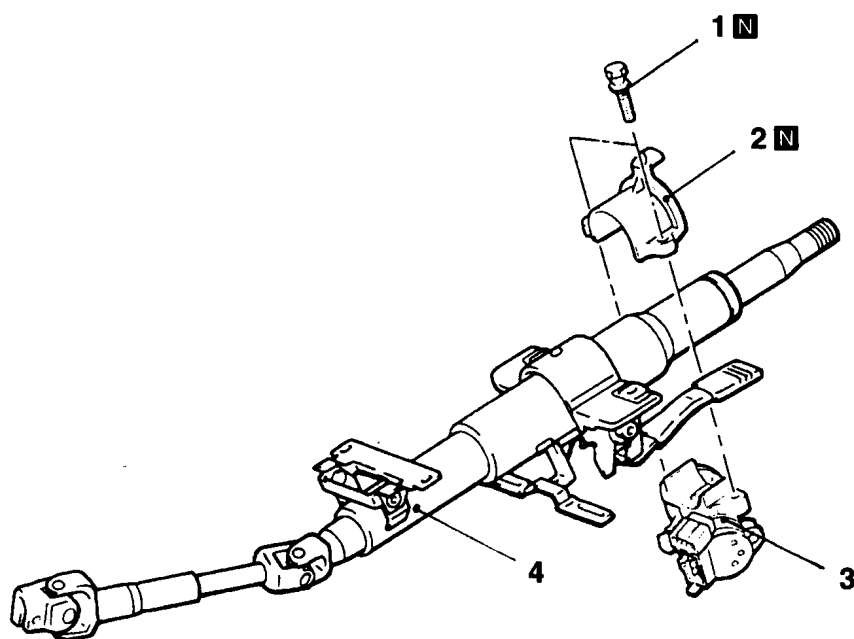
- Horn pad <Vehicles without SRS>
- Air bag module
(Refer to GROUP 52B – Air Bag Module and Clock Spring.)
- Steering wheel
- Upper column cover
- Lower column cover

- Column switch
<Vehicles without SRS>
- Clock spring and column switch
(Refer to GROUP 52B – Air Bag Module and Clock Spring.)
- Steering shaft assembly
- Band
- Steering cover assembly



REMOVAL SERVICE POINT**◀A▶ STEERING WHEEL REMOVAL****INSTALLATION SERVICE POINT****▶A◀ CLOCK SPRING AND COLUMN SWITCH / COLUMN SWITCH INSTALLATION**

Tighten the screws in an alphabetical order.

**DISASSEMBLY AND REASSEMBLY**

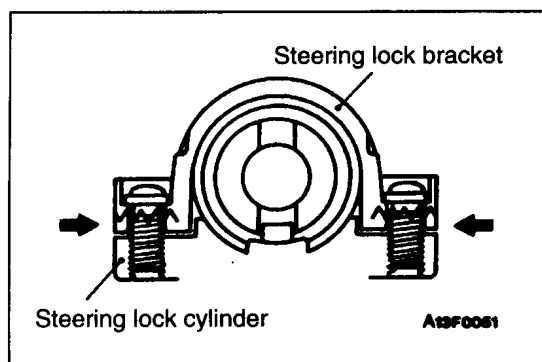
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Disassembly steps

◀A▶

▶A◀
▶A◀
▶A◀

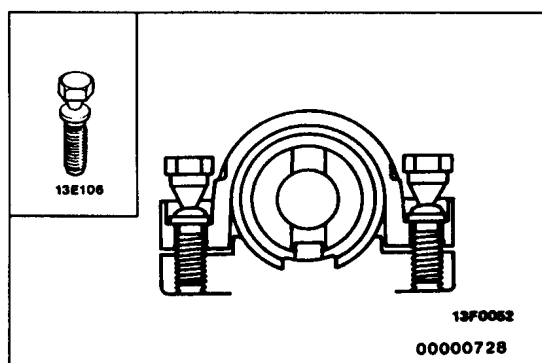
1. Special bolt
2. Steering lock bracket
3. Steering lock cylinder
4. Steering shaft

**DISASSEMBLY SERVICE POINT****◀A▶ STEERING LOCK BRACKET / STEERING LOCK CYLINDER REMOVAL**

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

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

1. When installing the steering lock cylinder and steering lock bracket to the column tube, temporarily install the steering lock in alignment with the column boss.



2. After checking that the lock works properly, tighten the special bolts until the head twists off.

Caution

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

POWER STEERING GEAR BOX <L.H. DRIVE VEHICLES>**REMOVAL AND INSTALLATION****CAUTION: SRS**

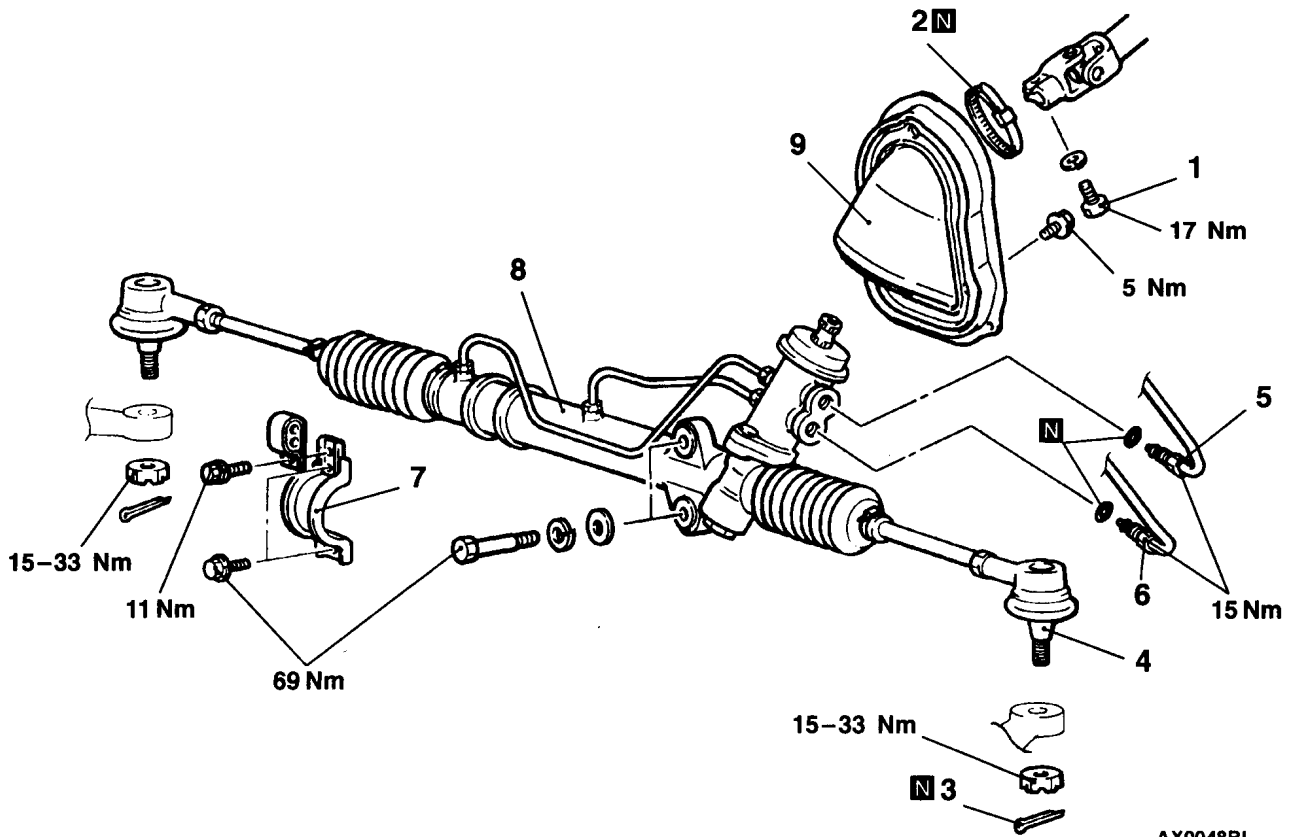
For vehicles with SRS, before removal of steering gear box, refer to GROUP 52B, centre front wheels and remove ignition key. Failure to do so may damage SRS clock spring and render SRS system inoperative, risking serious driver injury.

Pre-removal Operation

- Power Steering Fluid Draining
- Center Member Removal
- Front Exhaust Pipe Removal

Post-installation Operation

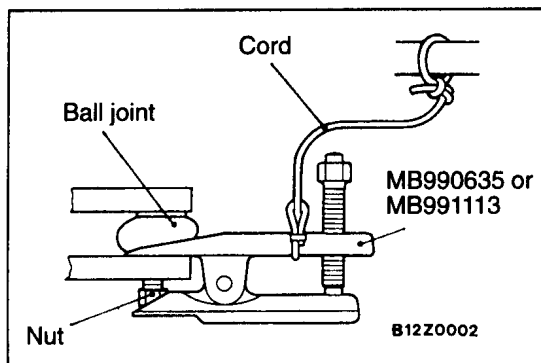
- Front Exhaust Pipe Installation
- Center Member Installation
- Power Steering Fluid Supplying
- Power Steering Fluid Line Bleeding
- Steering Wheel Position Check with Wheels Straight Ahead
- Front Wheel Alignment Adjustment
- Dust Cover Check for Cracks or Damage by Pushing it with Finger.

**Removal steps**

1. Steering shaft assembly and gear box connecting bolt
2. Band
3. Split pin
4. Tie-rod end and knuckle connection

5. Return tube connection
6. Pressure tube connection
7. Cylinder clamp
8. Gear box assembly
9. Steering cover assembly





REMOVAL SERVICE POINTS

◀A▶ TIE-ROD END AND KNUCKLE DISCONNECTION

Caution

1. In order not to damage the ball joint thread, the tie rod end mounting nut must be only loosened but not removed from the ball joint. Be sure to use the special tool.
2. Tie the special tool with a cord so as not to fall off.

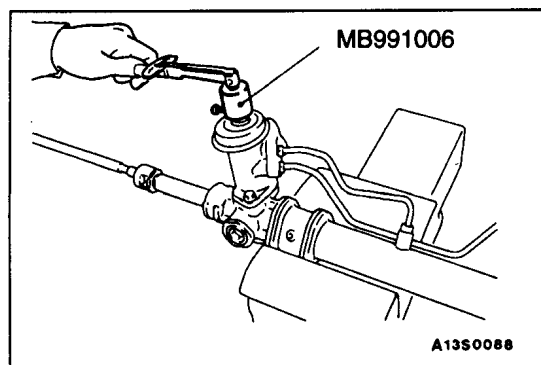
◀B▶ GEAR BOX ASSEMBLY REMOVAL

Caution

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

INSPECTION

- Check the rubber parts for cracks and breakage.



GEAR BOX TOTAL PINION TORQUE

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: 0.9 – 1.7 Nm
[Change in torque: 0.4 Nm]

Caution

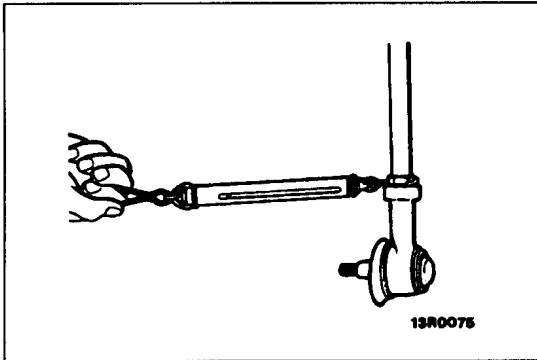
When holding the steering gear box assembly in a vice, secure its mounting positions. If it is secured in any other places, the gear housing may become deformed or damaged.

NOTE

When measuring, remove the bellows from the rack housing. Measure the pinion torque through the whole stroke of the rack.

If the measured value is not within the standard range, first adjust the rack support cover, and then check the total pinion starting torque again.

If the total pinion starting torque cannot be adjusted to within the standard range by adjusting the rack support cover, check the rack support cover, rack support spring, rack support and replace any parts if necessary.



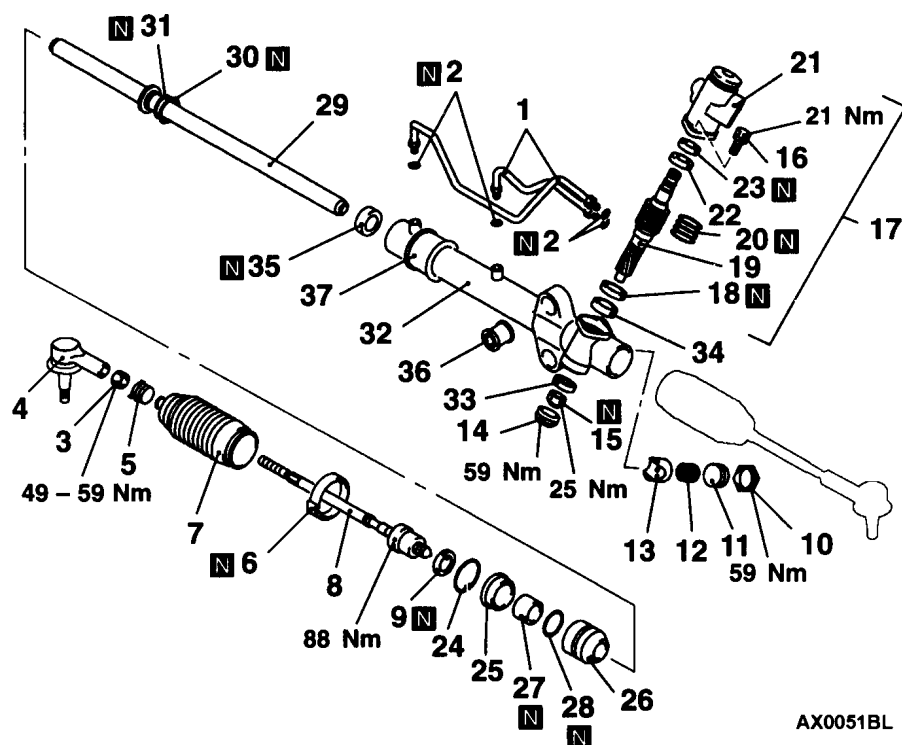
CHECK THE TIE ROD FOR SWING RESISTANCE

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

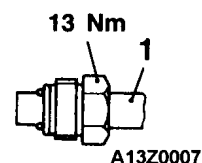
Standard value: 5–18 N [1.5–4.9 Nm]

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

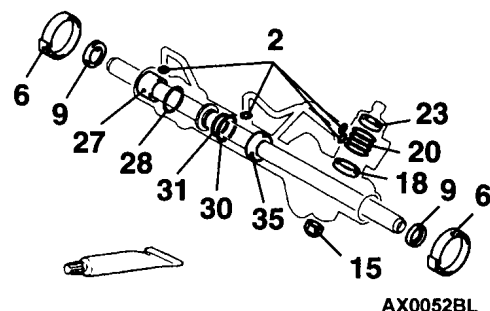
DISASSEMBLY AND REASSEMBLY



Flare nut



Steering gear seal set

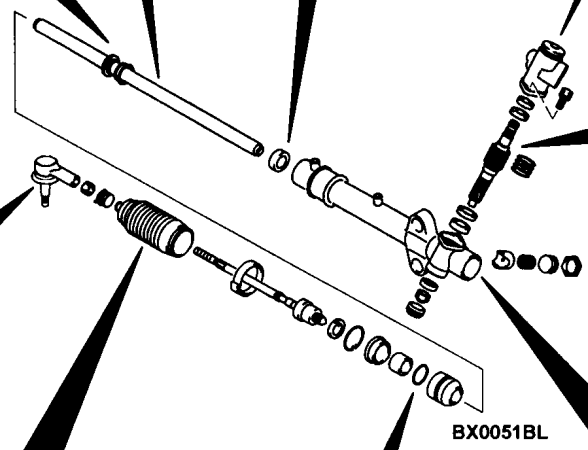
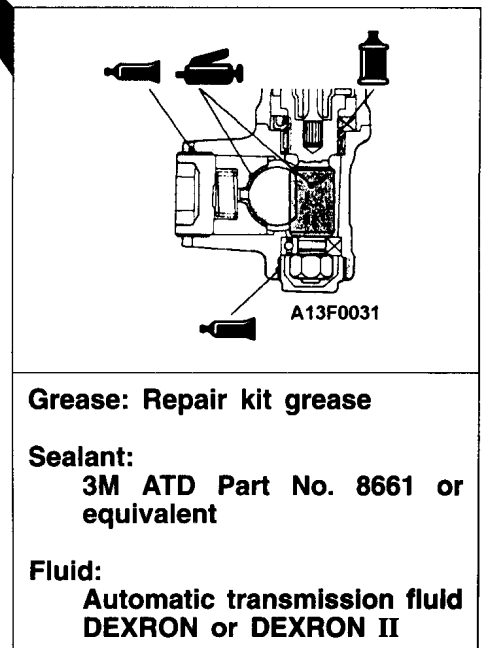
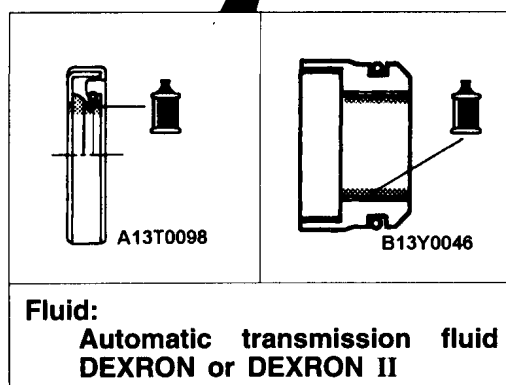
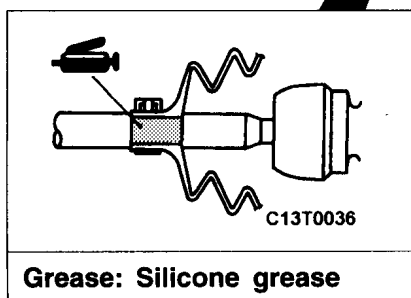
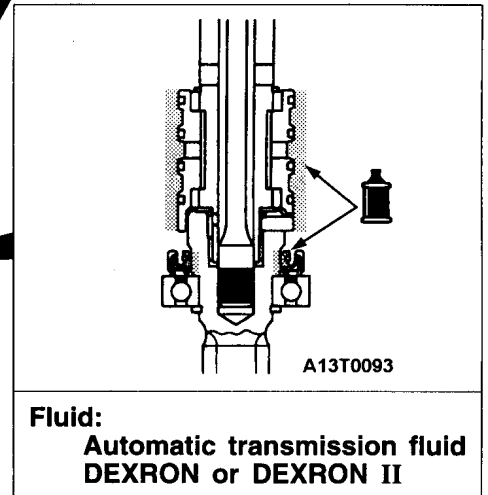
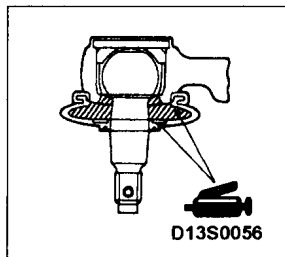
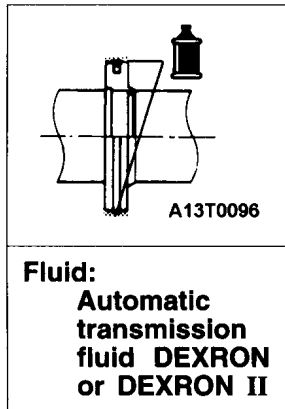
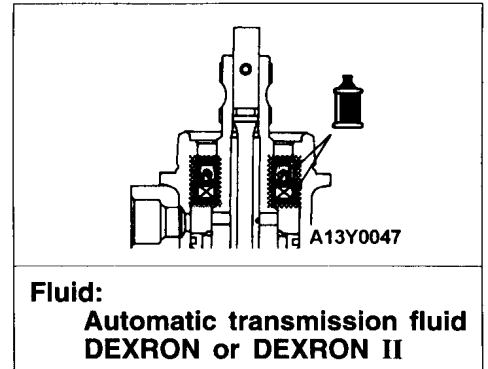
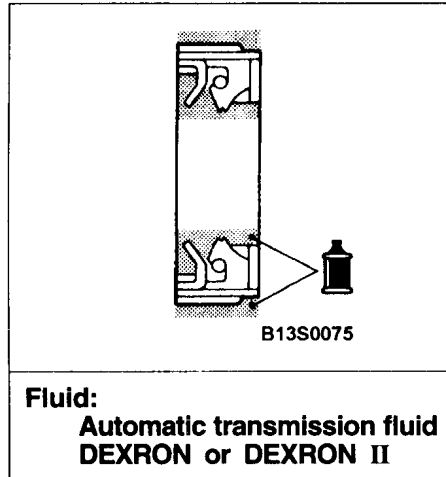
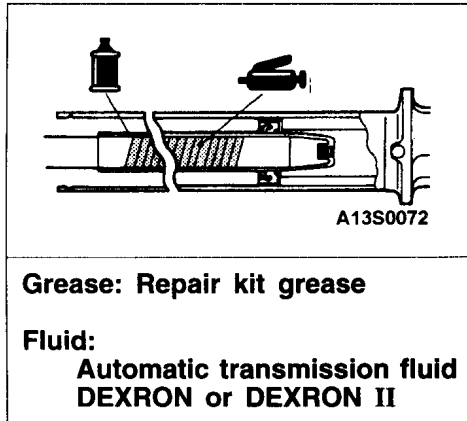


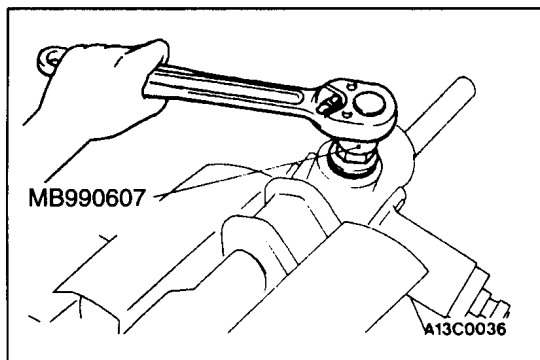
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Disassembly steps

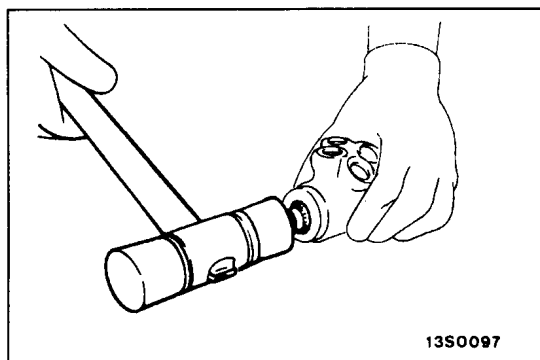
- | | |
|--------------------------------------|--------------------------------------|
| 1. Feed pipe | 19. Pinion and valve assembly |
| 2. O-ring | 20. Seal ring |
| ▶N◀ 3. Tie-rod end locking nut | 21. Valve housing assembly |
| ▶N◀ 4. Tie-rod end | 22. Ball bearing |
| ▶M◀ 5. Bellows clip | 23. Oil seal |
| ▶L◀ 6. Bellows band | 24. Circlip |
| ▶L◀ 7. Bellows | 25. Rack stopper |
| ▶L◀ 8. Tie-rod | 26. Rack bushing |
| ▶L◀ 9. Tab washer | 27. Oil seal |
| ▶K◀ • Total pinion torque adjustment | 28. O-ring |
| ◀A▶ 10. Locking nut | 29. Rack |
| 11. Rack support cover | 30. Piston ring |
| 12. Rack support spring | 31. O-ring |
| 13. Rack support | 32. Rack housing assembly |
| ▶J◀ 14. End plug | 33. Ball bearing |
| 15. Self-locking nut | 34. Needle roller bearing |
| 16. Bolt | 35. Oil seal |
| 17. Valve assembly | 36. Gear housing mounting bushing |
| ◀B▶ ▶I◀ 18. Oil seal | ▶A▶ 37. Gear housing mounting rubber |

Lubrication and Sealing Points

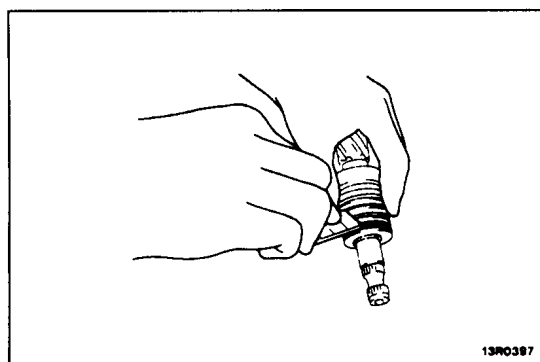


**DISASSEMBLY SERVICE POINTS****◀A▶ RACK SUPPORT COVER REMOVAL**

Use the special tool to remove the rack support cover from the gear box.

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

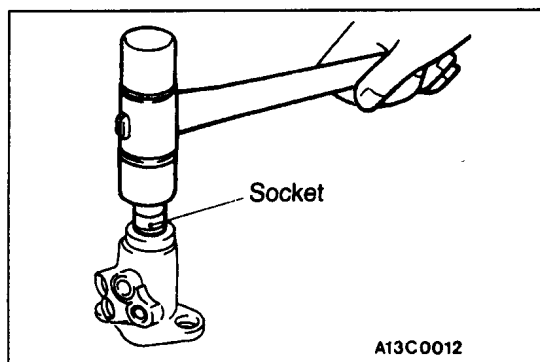
Using a plastic hammer, gently tap the pinion to remove it.

**◀C▶ SEAL RING REMOVAL**

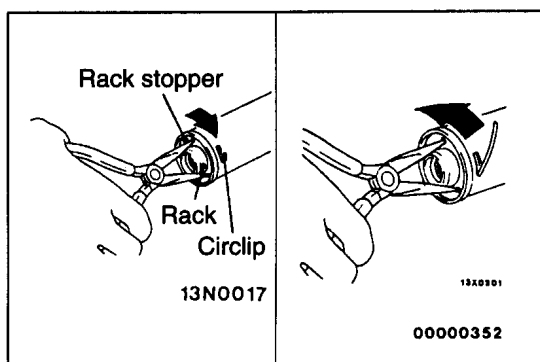
Cut the seal ring and remove it from the pinion and valve assembly and the rack.

Caution

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

**◀D▶ BALL BEARING / OIL SEAL REMOVAL**

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

**◀E▶ CIRCLIP REMOVAL**

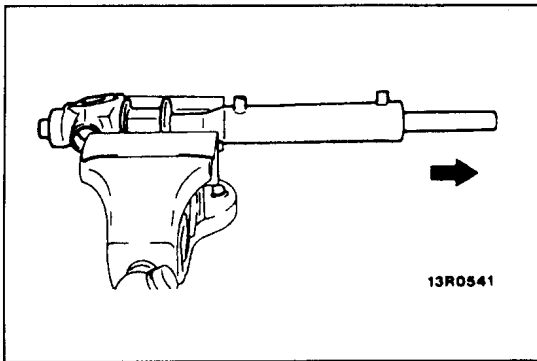
1. Turn the rack stopper clockwise until the end of the circlip comes out of the slot in the rack housing.
2. Turn the rack stopper anticlockwise to remove the circlip.

Caution

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

◀F▶ RACK STOPPER / RACK BUSHING / RACK REMOVAL

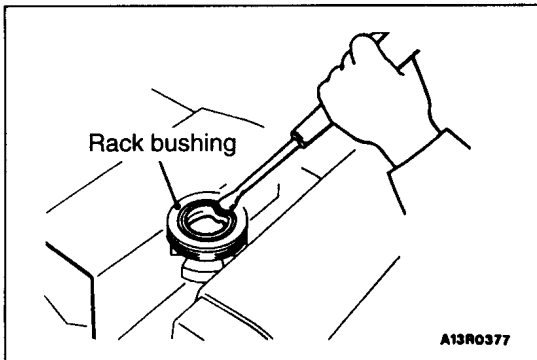
Pull out the rack assembly gently, and remove the rack stopper and rack bushing together.

**◀G▶ OIL SEAL REMOVAL**

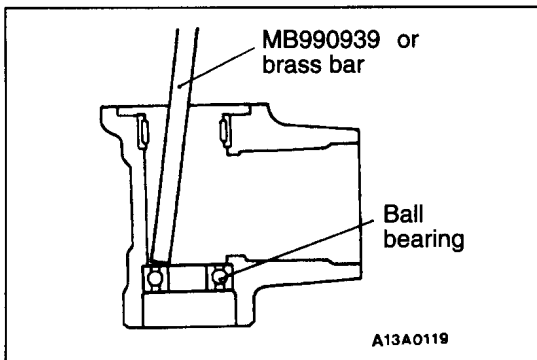
Partially bend the oil seal to remove from the rack bushing.

Caution

Do not damage the oil seal press fitting surface of the rack bushing.

**◀H▶ BALL BEARING REMOVAL**

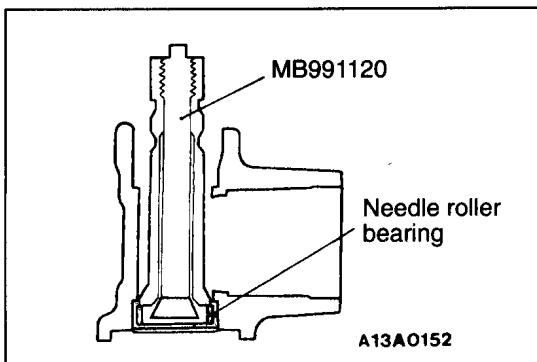
Use a brass bar or the special tool to remove the ball bearing from the gear housing.

**◀I▶ NEEDLE ROLLER BEARING REMOVAL**

Use the special tool to remove the needle roller bearing from the rack housing.

Caution

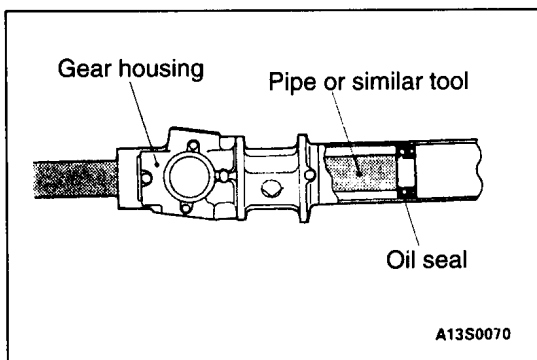
Do not open the special tool excessively to prevent damaging housing interior.

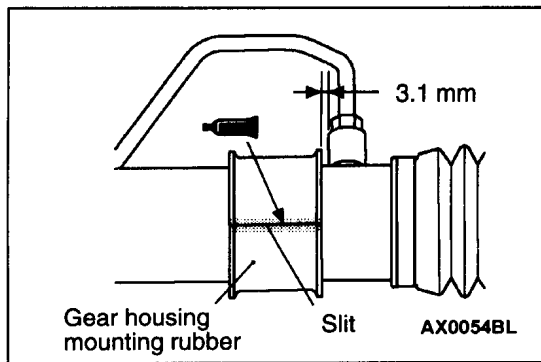
**◀J▶ OIL SEAL REMOVAL**

Use a piece of pipe or similar tool to remove the 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◄ GEAR HOUSING MOUNTING RUBBER INSTALLATION**

1. Install the gear housing mounting rubber on the rack housing so that the dimension shown is achieved.

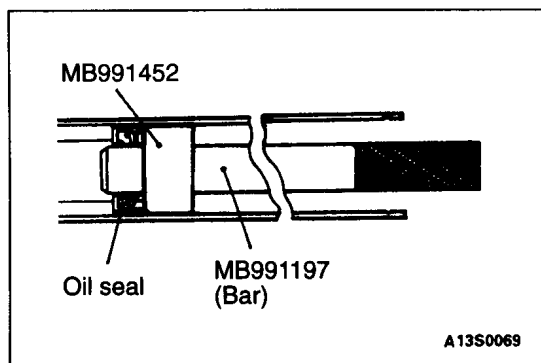
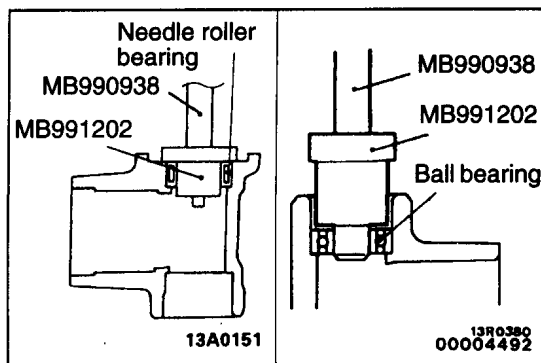
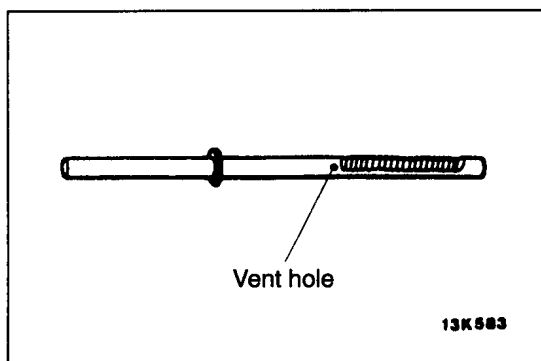
NOTE

The gear housing mounting rubber can be installed regardless of the installation direction of the slit.

2. Apply specified adhesive to the slit of the gear housing mounting rubber.

Specified adhesive:

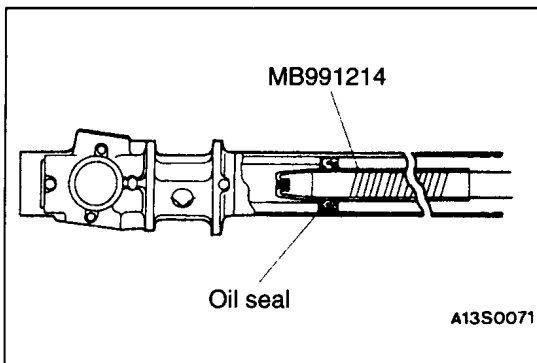
3M ATD Part No. 8155 or equivalent

**►B◄ OIL SEAL INSTALLATION****►C◄ NEEDLE ROLLER BEARING / BALL BEARING INSTALLATION****►D◄ RACK INSTALLATION**

1. Apply a coating of repair kit grease to the rack tooth face.

Caution

Do not close the vent hole in the rack with grease.



2. Cover rack serrations with special tool.
3. Apply the specified fluid on the special tool.

Specified fluid:

**Automatic transmission fluid
DEXRON or DEXRON II**

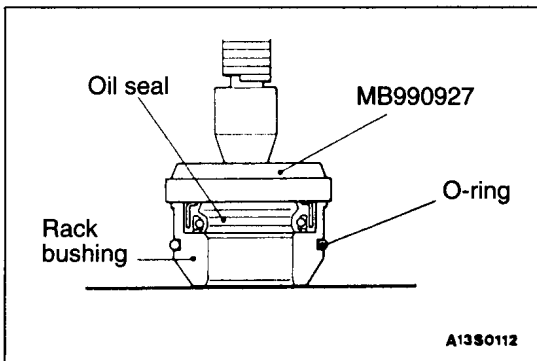
4. Match the oil seal centre with rack to prevent retainer spring from slipping and slowly insert rack from power cylinder side.

►E◄ OIL SEAL / RACK BUSHING INSTALLATION

1. Apply the specified fluid to the outer surface of the oil seal. Press-fit the oil seal using the special tool until it is flush with the bushing end face.

Specified fluid:

**Automatic transmission fluid
DEXRON or DEXRON II**

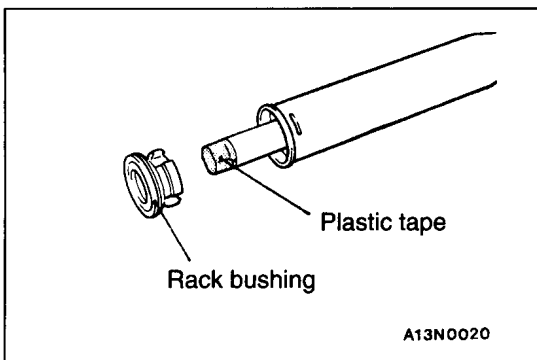


2. Apply the specified fluid to the oil seal inner surface and the O-ring.

Specified fluid:

**Automatic transmission fluid
DEXRON or DEXRON II**

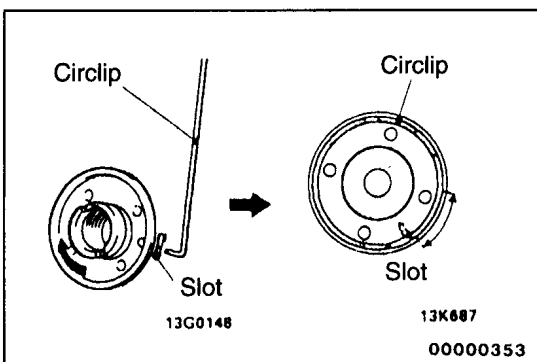
3. Wrap the rack end with plastic tape, and push the rack bushing onto the rack.

**►F◄ CIRCLIP INSTALLATION**

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

Caution

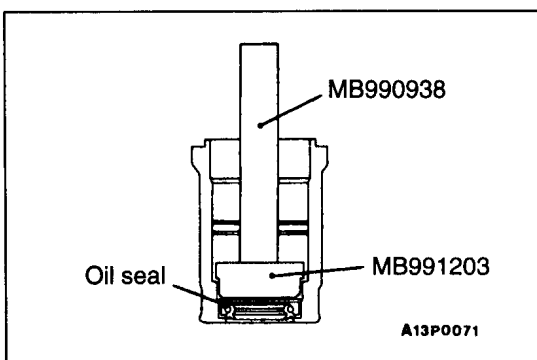
Insert the circlip to the rack stopper hole while turning the rack stopper clockwise.

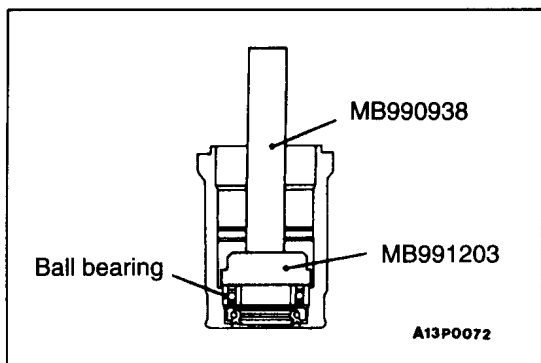
**►G◄ OIL SEAL / BALL BEARING INSTALLATION**

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

Specified fluid:

**Automatic transmission fluid
DEXRON or DEXRON II**

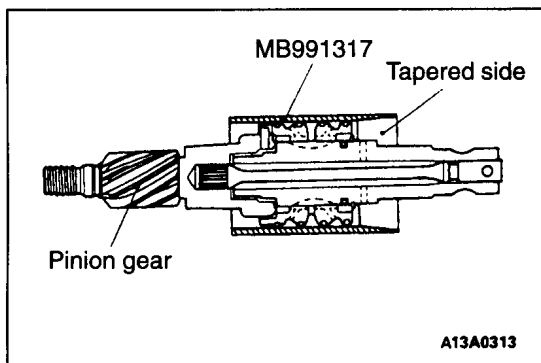




2. Apply a coating of the specified fluid to the outside of the ball bearing. Using the special tools, press the ball bearing into the valve housing.

Specified fluid:

**Automatic transmission fluid
DEXRON or DEXRON II**



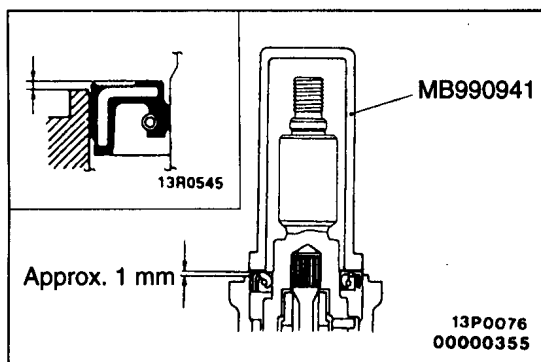
►H◄ SEAL RING INSTALLATION

1. Knead the seal ring to soften it.
2. Apply the specified fluid to the seal ring, and install to the rack groove.

Specified fluid:

**Automatic transmission fluid
DEXRON or DEXRON II**

3. Insert the tapered side of the special tool from the pinion gear side, and compress the seal ring.

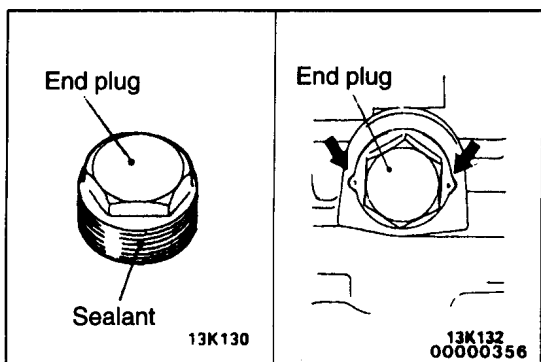


►I◄ OIL SEAL INSTALLATION

Use the special tool to press the oil seal into the valve housing. The upper surface of the oil seal should project outwards approx. 1 mm from the housing edge surface.

Caution

If the oil seal is flush with or lower than the housing edge, it will cause oil leaks and require reassembly.



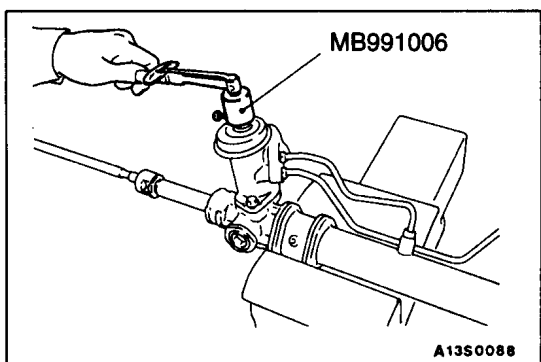
►J◄ END PLUG INSTALLATION

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

Specified sealant:

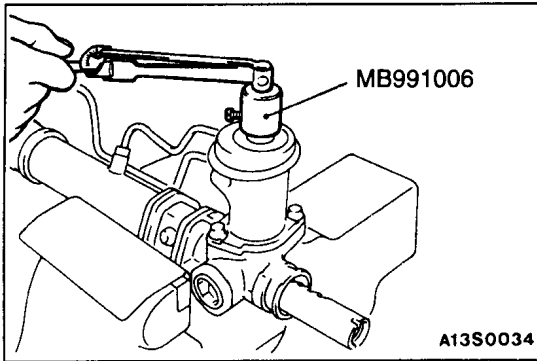
3M ATD Part No.8661 or equivalent

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



►K◄ TOTAL PINION TORQUE ADJUSTMENT

1. Position the rack at its centre. Tighten the rack support cover to 15 Nm.
2. In neutral position, rotate the pinion shaft clockwise one turn/4 – 6 seconds with the special tool. Return the rack support cover 30° – 60° and adjust torque to the standard value.



- 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: 0.9 – 1.7 Nm

[Change in torque: 0.4 Nm]

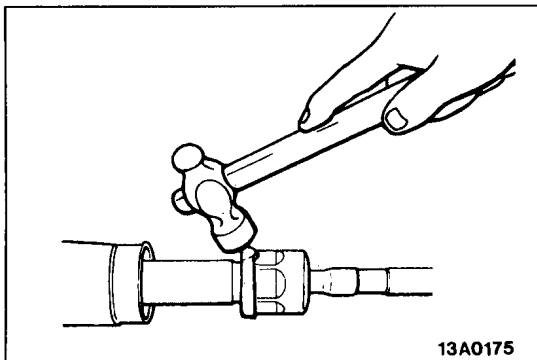
Caution

- When adjusting, set the standard value at its highest value.
- Assure no ratcheting or catching when operating the rack towards the shaft direction.

NOTE

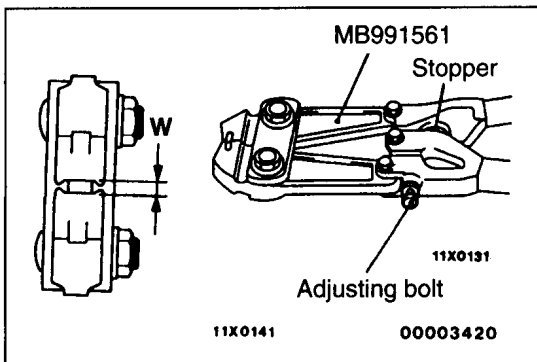
When it cannot be adjusted within the specified return angle, check or replace the rack support cover components.

- After adjusting, lock the rack support cover with lock nut.



►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

- 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>

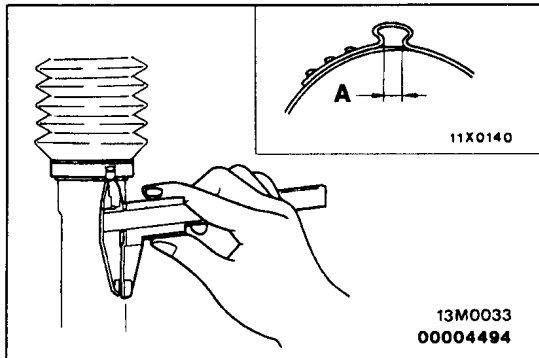
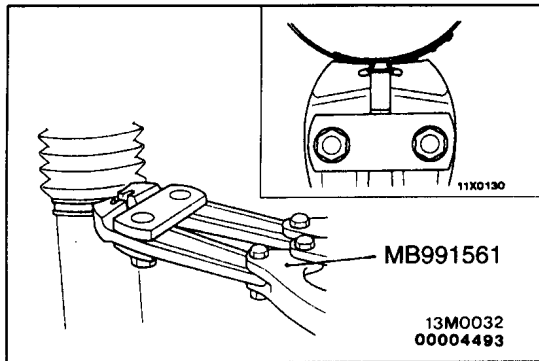
Screw in the adjusting bolt.

<When less than 2.9 mm>

Loosen the adjusting bolt.

NOTE

- The dimension (W) is adjusted by approx. 0.7 mm per one turn.
- 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. Check that the crimped width (A) is within the standard value.

Standard value (A): 2.4 – 2.8 mm

<When more than 2.8 mm>

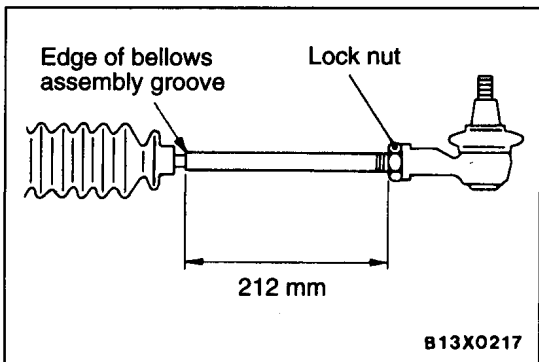
Readjust the dimension (W) of step (1) to the value calculated by the following equation, and repeat step (2).

$W = 5.5 \text{ mm} - A$ [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).

$W = 5.5 \text{ mm} - A$ [Example: If (A) is 2.3 mm, (W) is 3.2 mm.]

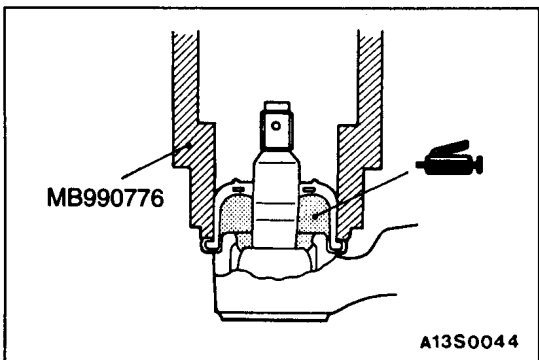


►◄ TIE-ROD END / TIE-ROD END LOCKING NUT INSTALLATION

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.



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 inside a new dust cover.
2. Using the special tool, press in the dust cover to the tie rod end.
3. Check the dust cover for cracks or damage by pushing it with finger.

INSPECTION**RACK CHECK**

- 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

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

BEARING CHECK

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

OTHER CHECK

- 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.