STEERING

CONTENTS

NOTE
Shaded groups in the above list are not included in this manual.

NOTES

STEERING

CONTENTS

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 injuryordeathtoservicepersonnel (from inadvertentfiringoftheair 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) and GROUP 00 -Maintenance Service, before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE

The SRS includes the following components: impact sensors, SRS diagnosis unit, SRS warning light, 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 (*).

SPECIFICATIONS

GENERAL SPECIFICATIONS

Items		Specifications
Steering wheel	Steering wheel O.D. mm (in.)	390 (15.4)*1, 386 (15.2)*2
Gear box	Steering gear type	Rack and pinion
Power steering oil pump	Oil pump type	Vane type
	Displacement cm^3/rev. (cu.in./rev.)	9.6 (.59)
	Relief set pressure MPa (psi)	8 (1,138)

NOTE
*1: Up to 1993 models
*2: From 1994 models

SERVICE SPECIFICATIONS

Items			Standard value	Limit
Steering wheel free play (with engine stopped) mm (in.)			11 (.43)	–
Steering angle	FWD, AWD*1	Inner wheel	33°45' ± 2"	
		Outer wheel	28°21'	
	AWD*2	Inner wheel	31°45' ± 2"	–
		Outer wheel	27°10	
Tie rod end ball joint starting torque Nm (in.lbs.)		FWD	0.5–3.0 (4-26)	
		AWD	1 .O-3.0 (9-26)	
Stationary steering effort N (lbs.)			35 (8) or less	
Drive belt deflection mm (in.)	When belt tension is inspected		9.5–13.5 (.37–.53)	
	When belt tension is readjusted		10.5–12.5 (.41–.49)	
	When new belt is installed		7.5-9.0 (.30–.35)	
Oil pump pressure MPa (psi)	Pressure gauge valve closed		7.5-8.2 (1,067–1,166)	
	Pressure gauge valve opened		0.8–1.0 (114– 142)	–
Oil pressure switch operating pressure MPa (psi)	Oil pressure switch contacts closed (continuity)		1.5-2.0 (213-284)	–
	Oil pressure switch contacts opened (no continuity)		0.7–1.2 (100-171)	
Total pinion torque Nm (in.lbs.)			0.6-1.3 (5-11)	
Tie-rod joint swing resistance N (lbs.)			8-18 (1.8-4.0)	
Tie-rod joint swing torque Nm (in.lbs.)			2-5 (17-43)	–
Steering wheel free play (when hydraulic operation) mm (in.)				30 (1.2)
Variation of tie rod end ball joint shaft direction mm (in.)				1.5 (.059)
Oil pump pressure MPa (psi)	Pressure gauge valve opened			1.5 (213)
Space between vane and rotor mm (in.)				0.06 (.0024)

NOTE
*1: Up to 1993 models
*2: From 1994 models

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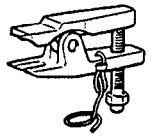
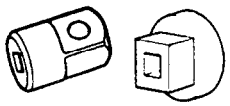
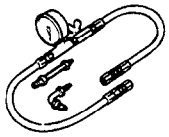
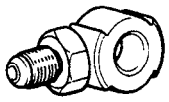
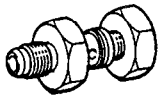
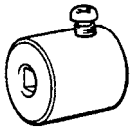
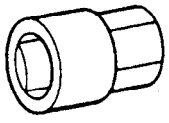
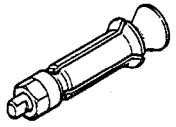
LUBRICANTS

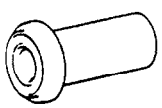
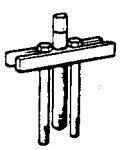
Items		Specified lubricant	Quantity
Gear box	Bearing	Automatic transmission fluid "DEXRON II"	As required
	O-ring		
	Oil seal		
	Special tool (MB991213)		
	Pinion and valve assembly seal ring part		
	Bellows	Silicone grease	As required
Oil pump	Power steering fluid	Automatic transmission fluid "DEXRON II"	0.9 dm^3 (.95 qt.)
	Flow control valve	Automatic transmission fluid "DEXRON II"	As required
	Friction surface of rotor, vane, cam ring and pump cover		
	O-ring		

SEALANT

Items		Specified sealant
Power steering gear box	End plug screw	3M ATD Part No. 8663 or equivalent
	Power steering rack support cover screw	
	Dust cover	

SPECIAL TOOLS

Tool	Tool number and name	Supersession	Application
	MB991113 Steering linkage puller	MB991113-01	Disconnection of tie-rod end
	MB990326 Preload socket	General service tool	Measurement of the ball joint starting torque
	MB990662 Power steering oil pressure gauge	MB990662-01	Measurement of oil pressure
	MB990993 Power steering oil pressure gauge adapter (pump side)	MB990993-01	
	MB990994 Power steering oil pressure gauge adapter (hose side)	MB990994-01	
	MB991006 Preload socket	MB991006-01	Measurement of the total pinion torque
	MB991204 Torque wrench socket	General service tool	Removal and installation of the rack support cover
	MB990925 Bearing and oil seal installer set	MB990925-01 or General service tool	Installation of oil seal and bearing For details of the installers, refer to GROUP 26 – Special Tools.
	MB991120 Needle bearing puller	Tool not available	Removal of rack housing needle bearing

Tool	Tool number and name	Supersession	Application
	MB991199 Oil seal installer	General service tool	To press in the oil seal for the rack
	MB991197 Bar (long type)	General service tool	To press in the oil seal for the rack
	MB991 202 Oil seal and bearing installer	General service tool	Press-fitting of rack housing bearing
	MB991213 Rack installer	General service tool	Rack installation
	MB991203 Oil seal and bearing installer	Tool not available	Installation of valve housing oil seal and bearing
	MB990941 Torque tube bearing installer	MB990941-01	Installation of valve housing oil seal
	MB990803 Steering wheel puller	General service tool	Removal of steering wheel

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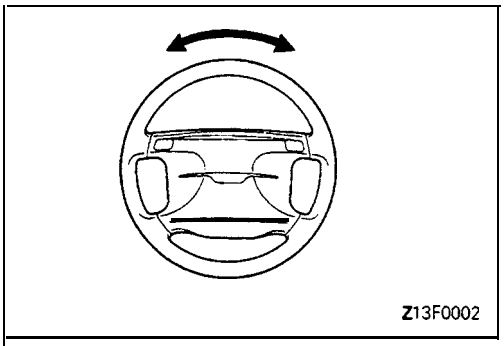

Z13F0002

ON-VEHICLE SERVICE

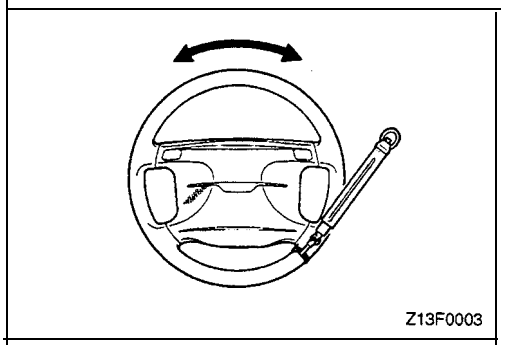
STEERING WHEEL FREE PLAY CHECK

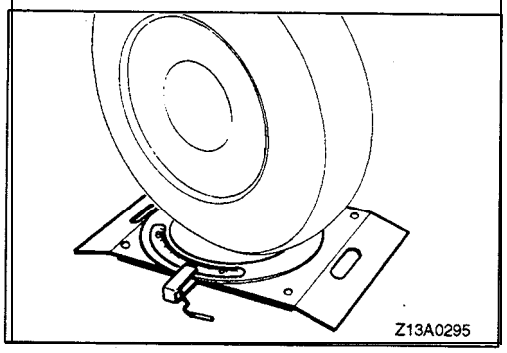
1. With engine running (hydraulic operation), set front wheels straight ahead.
2. Measure the play on steering wheel circumference before wheels start to move when slightly moving steering wheel in both directions.

   Limit: 30 mm (1.2 in.)
3. When the 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 (1 lb.) towards steering wheel circumference and check play.

   Standard values (steering wheel play with engine stopped): 11 mm (.43 in.)

   If the play exceeds the standard value, remove steering gear box and check total pinion torque.


Z13F0003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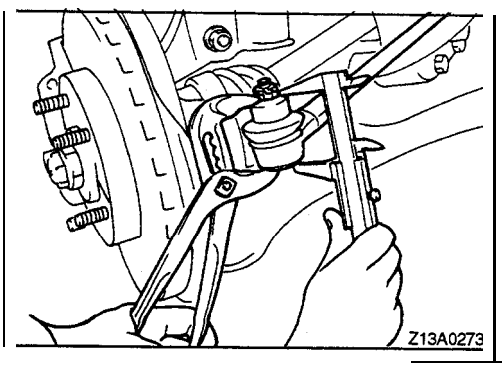
STEERING ANGLE CHECK

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

   Standard values:

   <FWD, AWD (Up to 1993 models)>
   Inner wheel 33°45' ± 2"
   Outer wheel 28°21'

   <AWD (From 1994 models)>
   Inner wheel 31°45' ± 2"
   Outer wheel 27°10'
2. When not within the standard value, it is probably a toe problem. Adjust toe (refer to GROUP 33A – Service Adjustment Procedures) and recheck.


Z13A0273

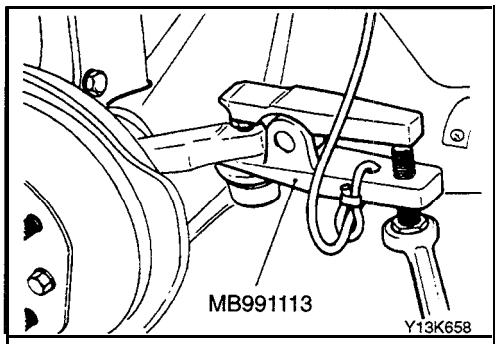
TIE ROD END BALL JOINT VARIATION CHECK (SHAFT DIRECTION)

1. Hold the ball joint with pliers.
2. Set a caliper gauge as illustrated and measure the displacement with the ball stud compressed.

   Limit: 1.5 mm (.059 in.)

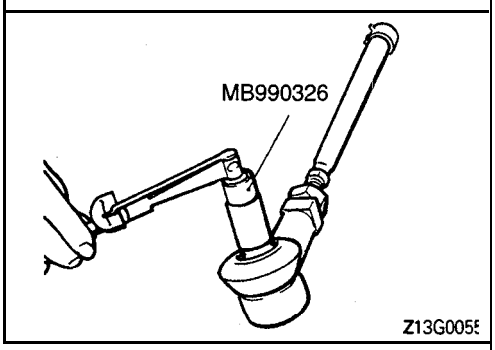
3. If the measured displacement exceeds the limit, replace the tie-rod end.

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



TIE ROD END BALL JOINT STARTING TORQUE CHECK

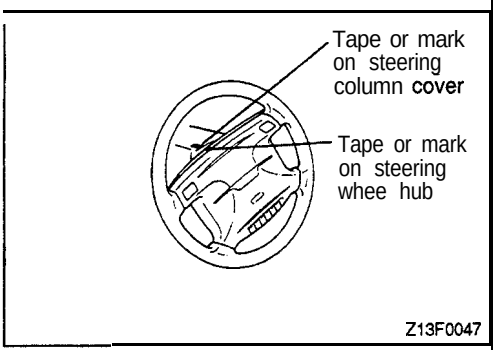
1. Disconnect tie rod and knuckle with special tool.



2. Move ball joint stud several times and install nut on stud. Using the special tool, measure ball joint starting torque.

Standard value:
<FWD> 0.5–3.0 Nm (4-26 in.lbs.)
<AWD> 1.0-3.0 Nm (9-26 in.lbs.)

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

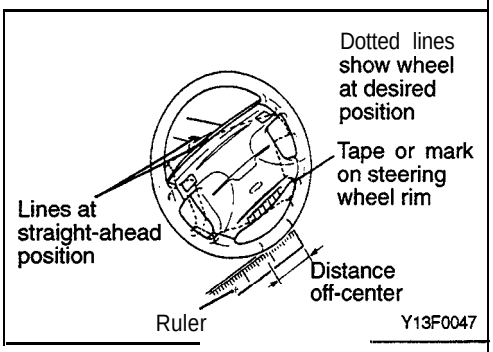


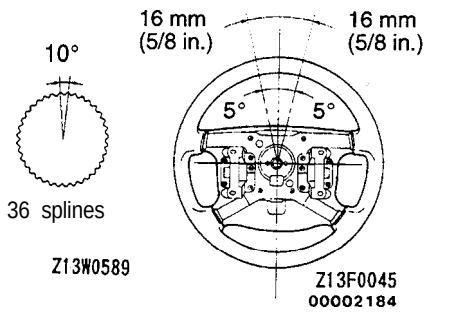
STEERING WHEEL CENTERING

SIMPLIFIED STEERING WHEEL CENTERING

Determining Steering Wheel's Off Center

1. For the road test, take along chalk or tape and a ruler.
2. Drive straight ahead on an uncambered level surface.
3. When the vehicle's wheels are pointing straight ahead, mark the steering wheel hub and column cover with a chalk or tape line.
4. Stop the vehicle and line up the marks on the hub and column cover.
5. Place a tape strip or mark on the steering wheel rim.
6. Hold a ruler next to the rim as shown in the illustration, and then steer the steering wheel until it is in the desired centered position.
7. Record the distance the strip or mark on the rim has moved.
   This is how far the steering wheel is off center. If it is more than 16 mm (5/8 in.) off center, it can be centered by indexing it ten degrees towards the center.

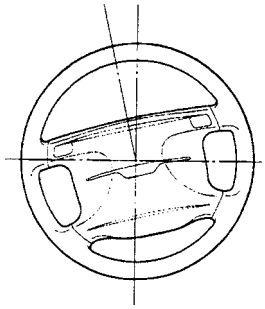




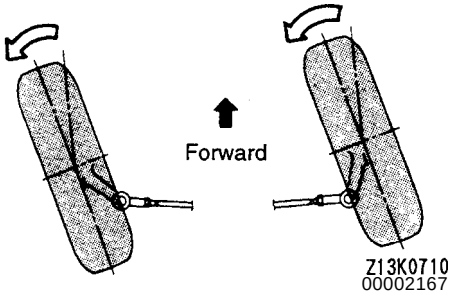
Indexing Steering Wheel to Center It

The steering wheel shaft has 36 splines, a lowing the steering wheel to be indexed in ten-degree increments.

1. Remove the steering wheel.
2. Without disturbing the position of the steering wheel shaft, re-install the wheel as near on-center as possible.

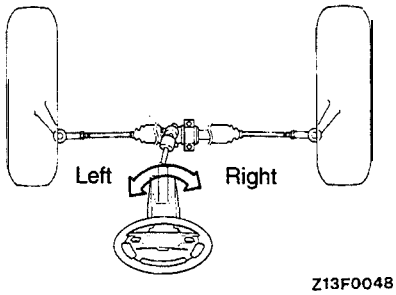


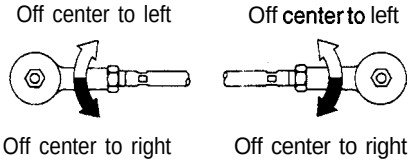
Steering wheel off center left



PRECISION STEERING WHEEL CENTERING

In general, the tie rods are adjusted to steer the front wheels in the same direction that the steering wheel is off center. If the steering wheel is off center to the left, center it by adjusting the tie rods to make the front wheels steer toward the left, and vice versa.





Turn both tie rods in the same direction.

Z13R0555
00002168

1. Mark the tie rods and tie rod ends with chalk before loosening the lock nuts.
2. Hold the tie rod with a wrench and loosen the lock nut.
3. Hold the tie rod end with a wrench and turn the tie rod the desired number of turns.

   For 2° or 6 mm (.25 in.) at the steering wheel rim 1/5 turn of tie rods

4. Tighten the lock nut to specified torque, taking care not to turn the tie rod.

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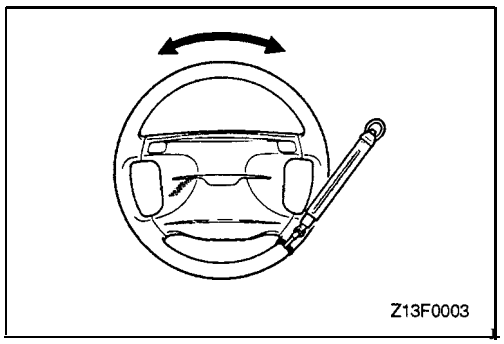

Z13F0003

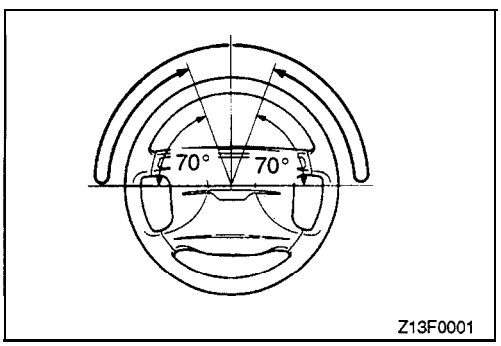
STATIONARY STEERING EFFORT CHECK

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 rpm.

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

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 35 N (8 lbs.) or less
Fluctuation allowance 6 N (1.3 lbs.) or less



Z13F0001

STEERING WHEEL RETURN TO CENTER CHECK

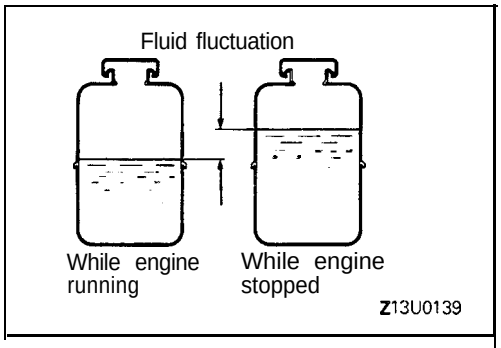
To make this test, conduct a road test and check as follows.

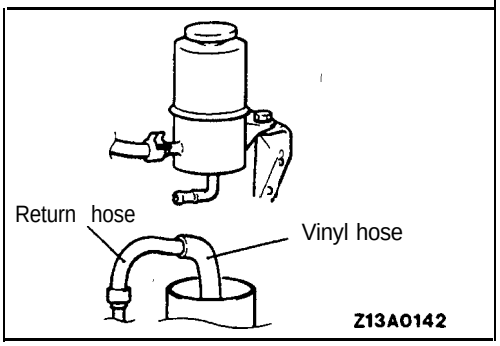
1. Make both gradual and sudden turns and check the steering "feeling" to be sure that there is no difference in the steering force required and the wheel return between left and right turns.
2. At a speed of 35 km/h (22 mph), turn the steering wheel 90°, and release the steering wheel after 1 or 2 seconds. If the steering wheel then returns 70° or more, the return can be judged to the satisfactory.

NOTE
There will be a momentary feeling of "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 11 – On-vehicle Service.





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 (122–140°F).
2. With the engine running, turn the wheel all the way to the left and right several times.
3. Check the fluid in the oil reservoir for foaming or milkiness. 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

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 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 delivery pipe.

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

Specified fluid:
Automatic transmission fluid "DEXRON II"

BLEEDING

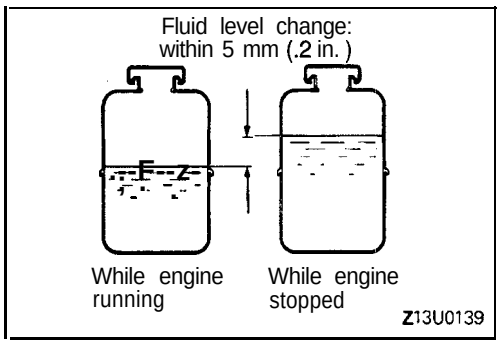
1. Jack up the front wheels and support them by using a floor stand.
2. Manually turn the oil pump pulley a few times.
3. Turn the steering wheel all the way to the left and to the right several times.
4. Disconnect the high-tension cable, and then, while operating the starting motor intermittently, turn the steering wheel all the way to the left and right several times (for 15 to 20 seconds).

Caution

1. During air bleeding, replenish 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 (idling).
6. Turn the steering wheel to the left and right until there are no air bubbles in the oil reservoir.
7. Confirm that the fluid is not milky, and that the level is up to the specified position on the level gauge.
8. Confirm that there is very little change in the fluid level when the steering wheel is turned left and right.



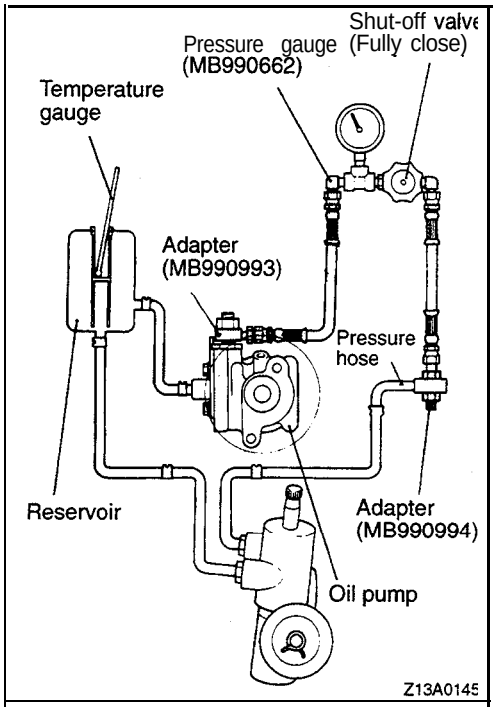
9. Check whether or not the change in the fluid level is within 5 mm (.2 in.) when the engine is stopped and when it is running.

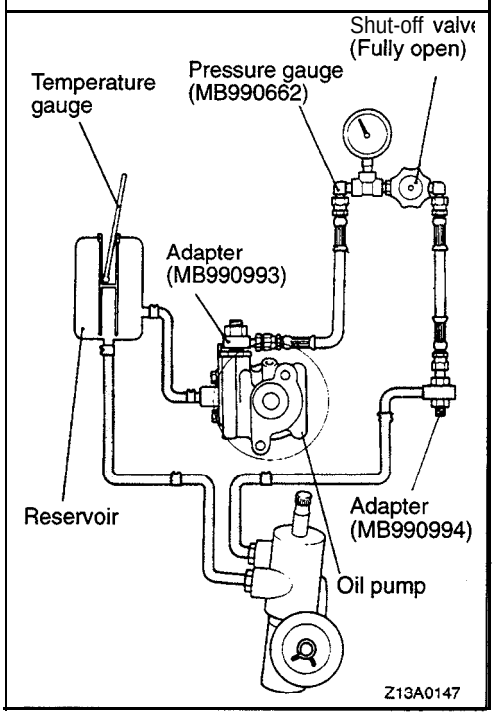
Caution

1. If the change of the fluid level is 5 mm (.2 in.) or more, the air has not been completely bled from the system, and thus must be bled completely.

2. If the fluid level rises suddenly after the engine is stopped, the air has not been completely bled.

3. If air bleeding is not complete, there will be abnormal noises from the pump and the flow-control valve, and this condition could cause a lessening of the life of the pump, etc.





OIL PUMP PRESSURE TEST

CHECKING THE OIL PUMP RELIEF PRESSURE

1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50–60°C (122–140°F).
3. Start the engine and idle it at 1,000 ±100 rpm.
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.

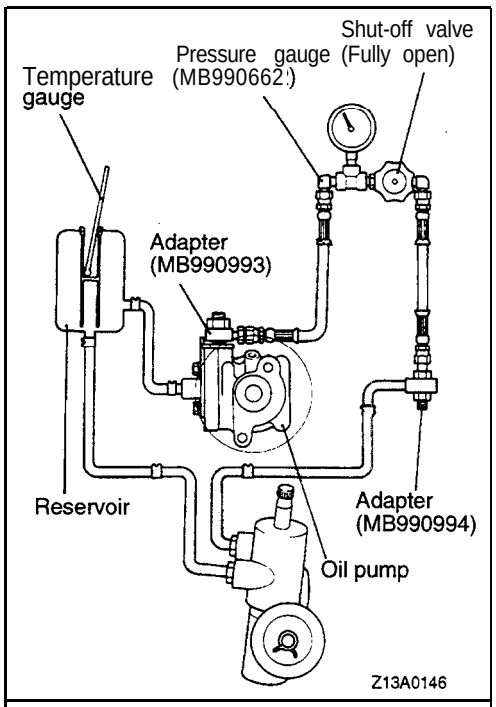
   Standard value: 7.5-8.2 MPa (1,067–1,166 psi)

   Caution
   Pressure gauge shut off valve must not remain closed for more than 10 seconds.
5. If it is not within the standard value, overhaul the oil pump.
6. Remove the special tools, and then tighten the pressure hose to the specified torque.
7. Bleed the system.

CHECKING THE PRESSURE UNDER NO-LOAD CONDITIONS

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

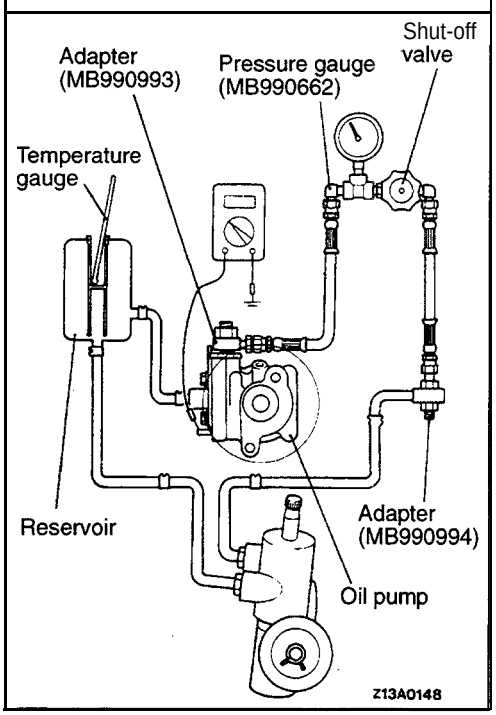
   Standard value: 0.8-1.0 MPa (114-142 psi)
   Limit: 1.5 MPa (213 psi)
5. If it is not within the standard value, the probable cause is a malfunction of the oil line or steering gear box, so check these parts and repair as necessary.
6. Remove the special tools, and then tighten the pressure hose to the specified torque.
7. Bleed the system.



CHECKING THE STEERING GEAR RETENTION HYDRAULIC PRESSURE

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

   Standard value: 7.5-8.2 MPa (1,067–1,166 psi)
6. When not within the standard value, overhaul the steering gear box.
   Remeasure fluid pressure.
7. Remove the special tools, and then tighten the pressure hose to the specified torque.
8. Bleed the system.



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 (122–140°F).
3. The engine should be idling.
4. Disconnect the connector for the oil pressure switch, and place an ohmmeter in position.
5. Gradually close the shut-off valve of the pressure gauge and increase the hydraulic pressure then check whether or not the hydraulic pressure that activates the switch is the standard value.

   Standard value: 1.5-2.0 MPa (213-284 psi)
6. Gradually open the shut-off valve and reduce the hydraulic pressure; then check whether the hydraulic pressure that deactivates the switch is the standard value.

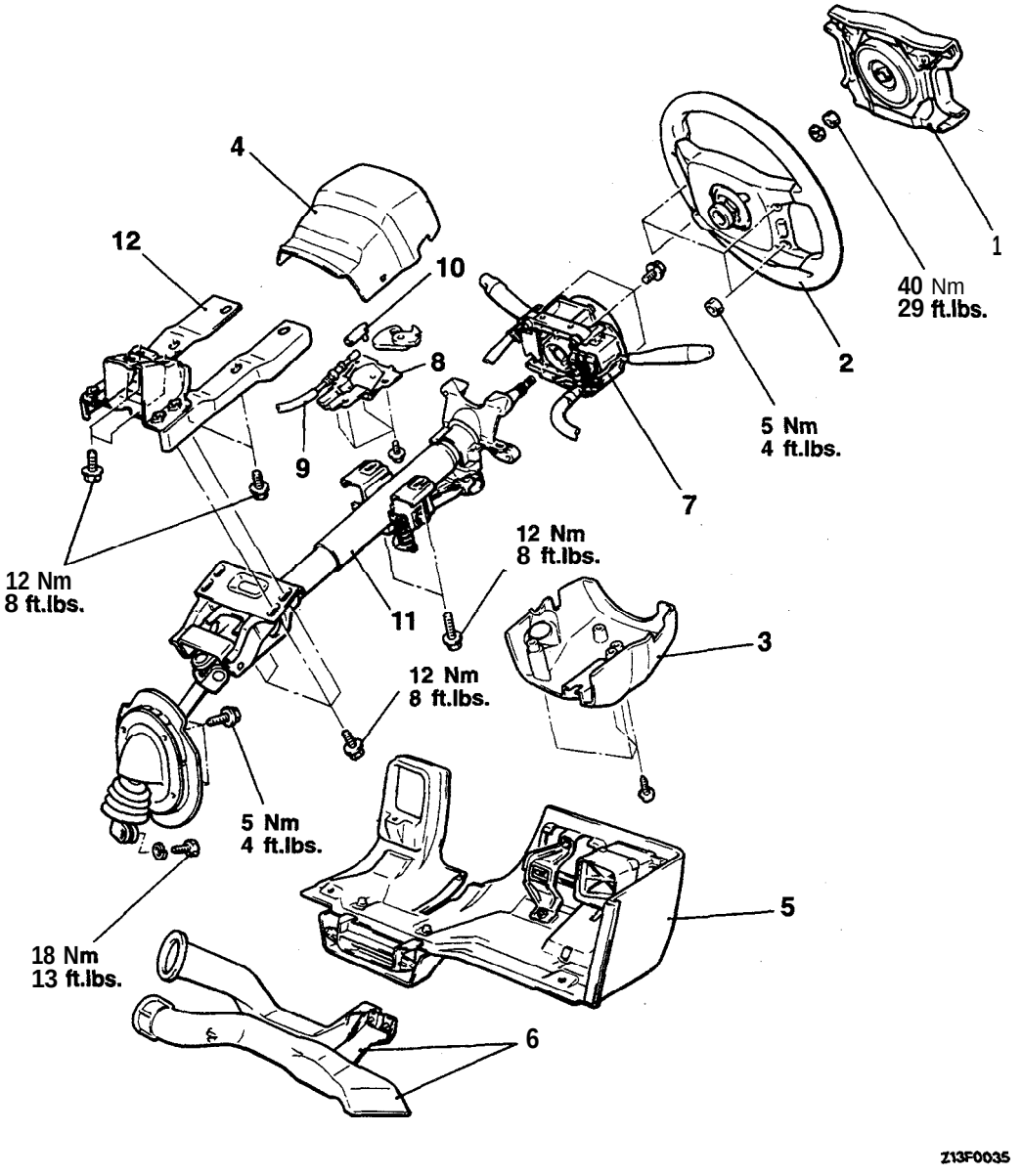
   Standard value: 0.7-1.2 MPa (100–171 psi)
7. Remove the special tools, and then tighten the pressure hose to the specified torque.
8. Bleed the system.

STEERING WHEEL AND SHAFT

REMOVAL AND INSTALLATION

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

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



Removal steps

1. Air bag module (Refer to GROUP 52B – Air Bag Module and Clock Spring.)
◀A▶ ▶A◀ 2. Steering wheel
3. Lower column cover
4. Upper column cover
5. Knee protector (Refer to GROUP 52A – Instrument Panel.)
6. Lap cooler duct and foot shower duct
7. Column switch assembly
8. Cover* (Refer to GROUP 23 – Transaxle Control.)
9. Key interlock cable* (Refer to GROUP 23 – Transaxle Control.)
10. Slide lever* (Refer to GROUP 23 – Transaxle Control.)
11. Steering column assembly
12. Column support assembly

NOTE
● : <Automatic transaxle vehicles>

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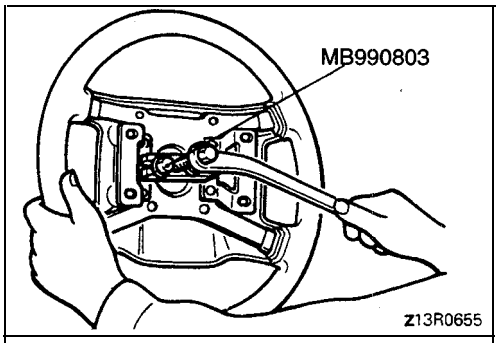
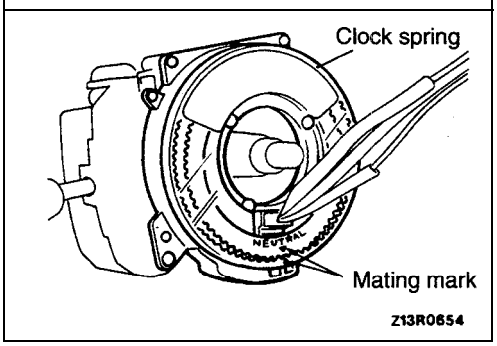


REMOVAL SERVICE POINT

(A, STEERING WHEEL REMOVAL

Remove the steering wheel by using the special tool.

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



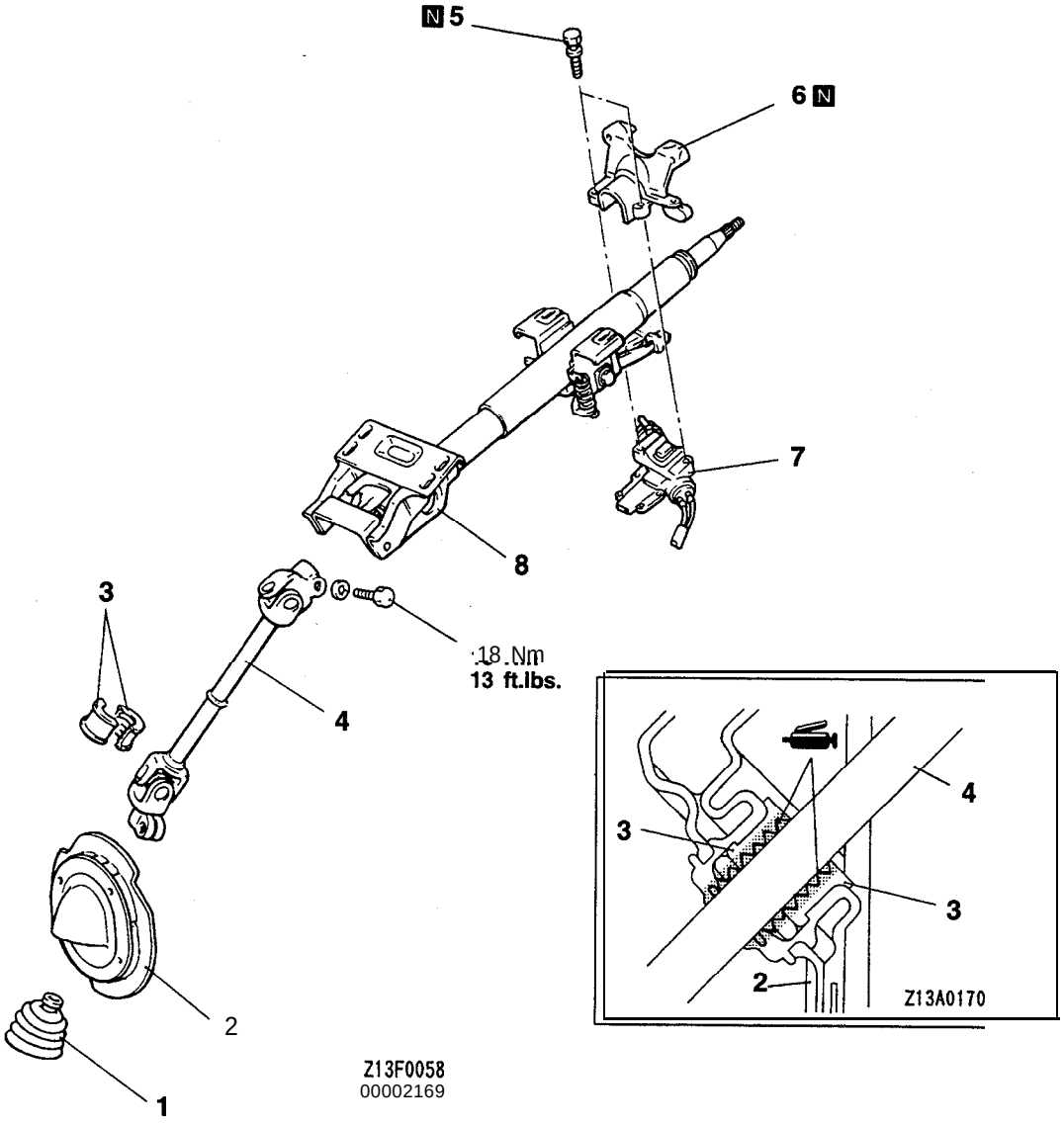
INSTALLATION SERVICE POINT

,A(STEERING WHEEL INSTALLATION

Line up the “NEUTRAL” mark of the clock spring with the mating mark before installing the steering wheel.

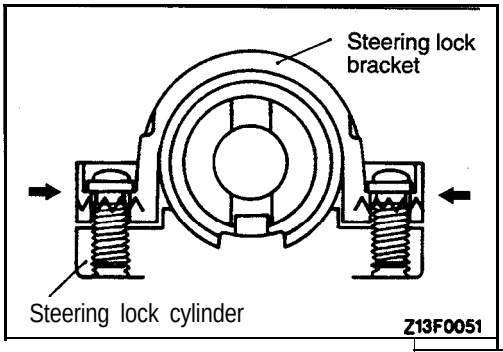
Caution
If the clock spring’s mating mark is not properly aligned, the steering wheel may not be completely rotational during a turn, or the flat cable within the clock spring may be severed, obstructing normal operation of the SRS and possibly leading to serious injury to the vehicle’s driver.

DISASSEMBLY AND REASSEMBLY



Disassembly steps

1. Boot
2. Cover assembly
▶B◀ 3. Bearing
4. Joint assembly
▶A◀ 5. Special bolts
◀A▶ ▶A◀ 6. Steering lock bracket
◀A▶ ▶A◀ 7. Steering lock cylinder
8. Steering column assembly



DISASSEMBLY SERVICE POINT

◀A▶ STEERING LOCK BRACKET / STEERING LOCK CYLINDER REMOVAL

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

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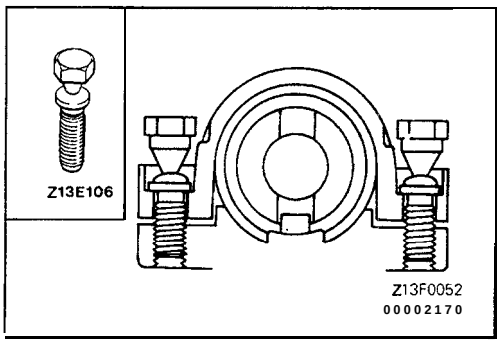
REASSEMBLY SERVICE POINTS

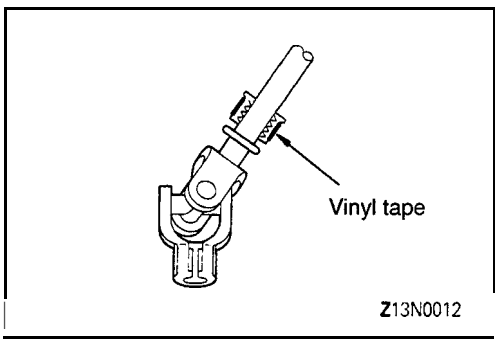
▶A◀ STEERING LOCK CYLINDER / STEERING LOCK BRACKET / SPECIAL BOLT INSTALLATION

(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 cylinder is installed.



▶B◀ 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 vinyl tape approximately one and one-half times around the concave circumferences of the bearings, and then press fit the bearings into the cover assembly.

INSPECTION

- 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.

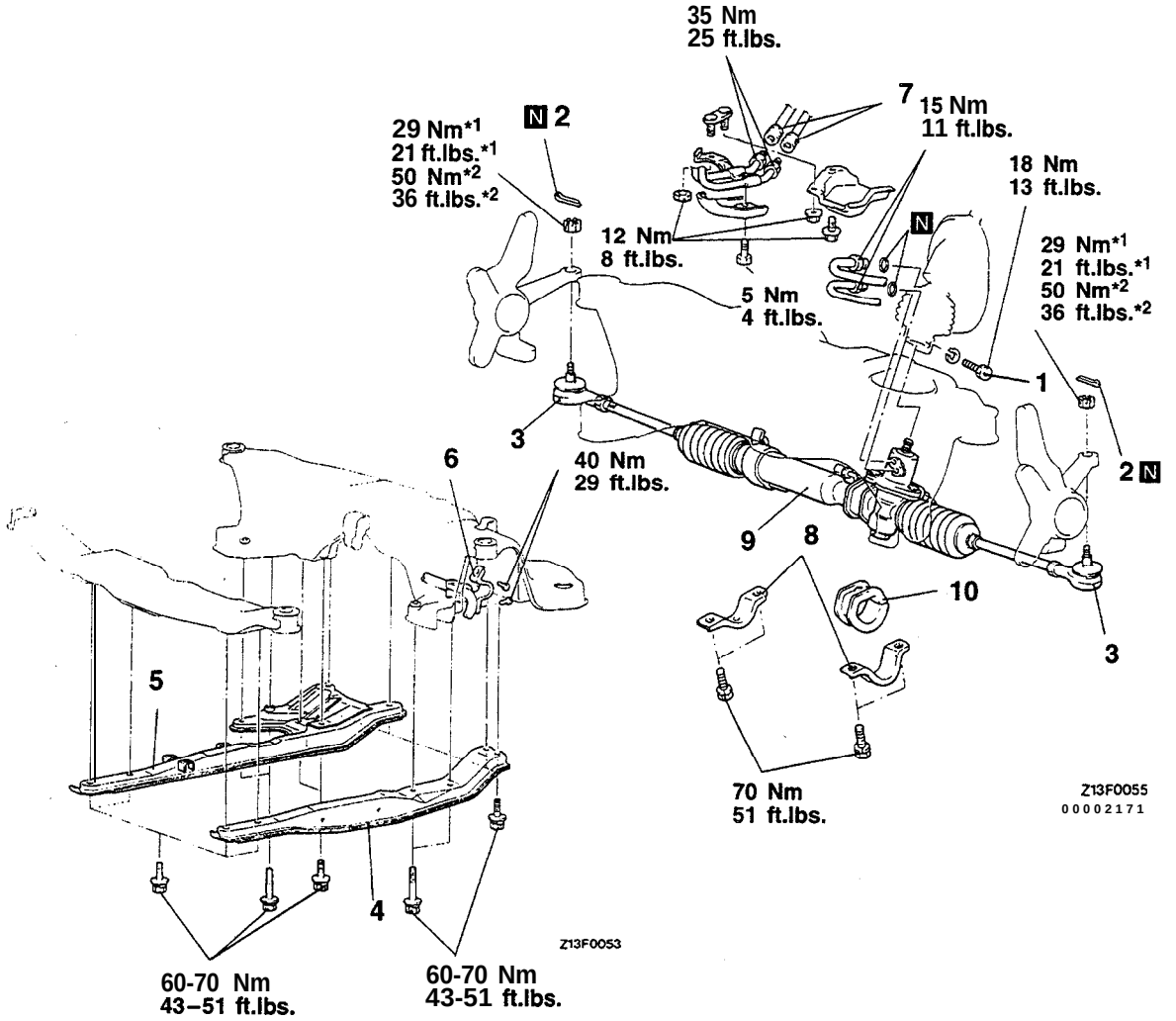
POWER STEERING GEAR BOX

REMOVAL AND INSTALLATION

Pre-removal Operation
- Power Steering Fluid Draining (Refer to P.37A-10.)
- Front Exhaust Pipe Removal (Refer to GROUP 15 – Exhaust Pipe and Main Muffler.)
- Transfer Assembly Removal (Refer to GROUP 22 – Transfer.)

CAUTION: SRS
Before removal of steering gearbox, refer to GROUP 52B – SRS, center front wheels and remove ignition key. Failure to do so may damage SRS clock spring and render SRS system inoperative, risking serious driver injury.

Post-installation Operation
- Transfer Assembly installation (Refer to GROUP 22 – Transfer.)
- Front Exhaust Pipe Installation (Refer to GROUP 15 – Exhaust Pipe and Main Muffler.)
- Power Steering Fluid Supplying (Refer to P.37A-10.)
- Power Steering Fluid Line Bleeding (Refer to P.37A-11.)
- Steering Wheel Position with Wheels Straight Ahead Checking
- Front Wheel Alignment Adjustment (Refer to GROUP 33A – On-vehicle Service.)



Removal steps

1. Joint assembly and gear box connecting bolt
2. Cotter pin
◀A▶ 3. Tie-rod end and knuckle connecting nut
4. Left member
5. Right member
6. Stabilizer bar bracket
7. Connection of steering gear box with 4WS oil line
8. Clamp
◀B▶ ▶A◀ 9. Gear box assembly
▶A◀ 10. Mounting rubber

NOTE
*1: FWD
*2: AWD

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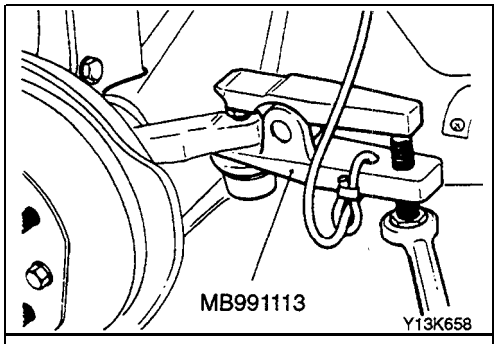
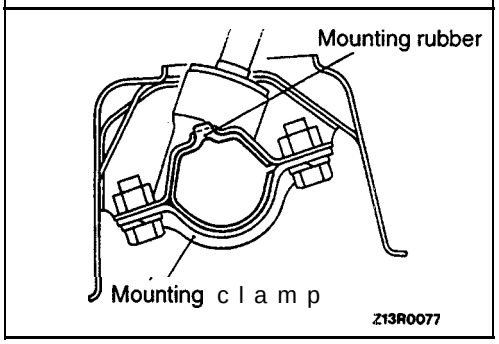




REMOVAL SERVICE POINTS

◀A▶ TIE-ROD END DISCONNECTION

Using the special tool, disconnect the tie rod from the knuckle.

◀B▶ GEAR BOX ASSEMBLY REMOVAL

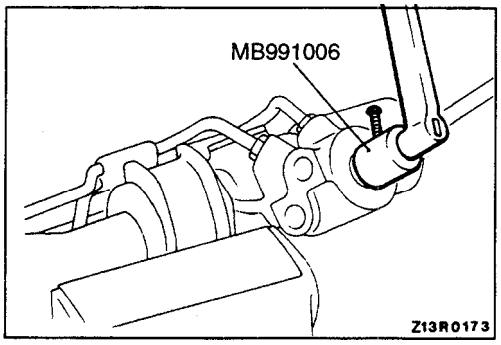
(1) Move the rack completely to the right and then remove the gear box from the crossmember.
(2) While tilting the gear box downward, remove it to the left.

Caution
When removing the gear box, pull it out carefully and slowly to avoid damaging the boots.

INSTALLATION SERVICE POINTS

▶A◀ MOUNTING RUBBER / GEAR BOX ASSEMBLY INSTALLATION

When installing the mounting rubber, align the projection of the mounting rubber with the indentation in the crossmember to install the gear box.



INSPECTION

GEAR BOX FOR 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: 0.6-1.3 Nm (5-11 in.lbs.)

NOTE
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 necessary.

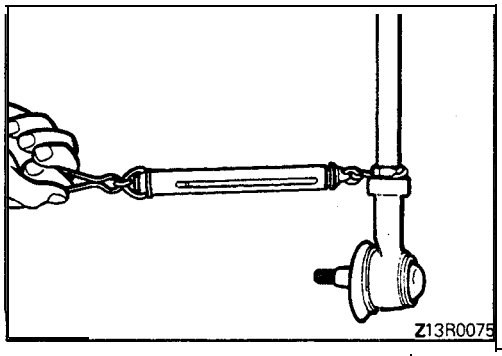
CHECK THE TIE ROD FOR SWING RESISTANCE

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

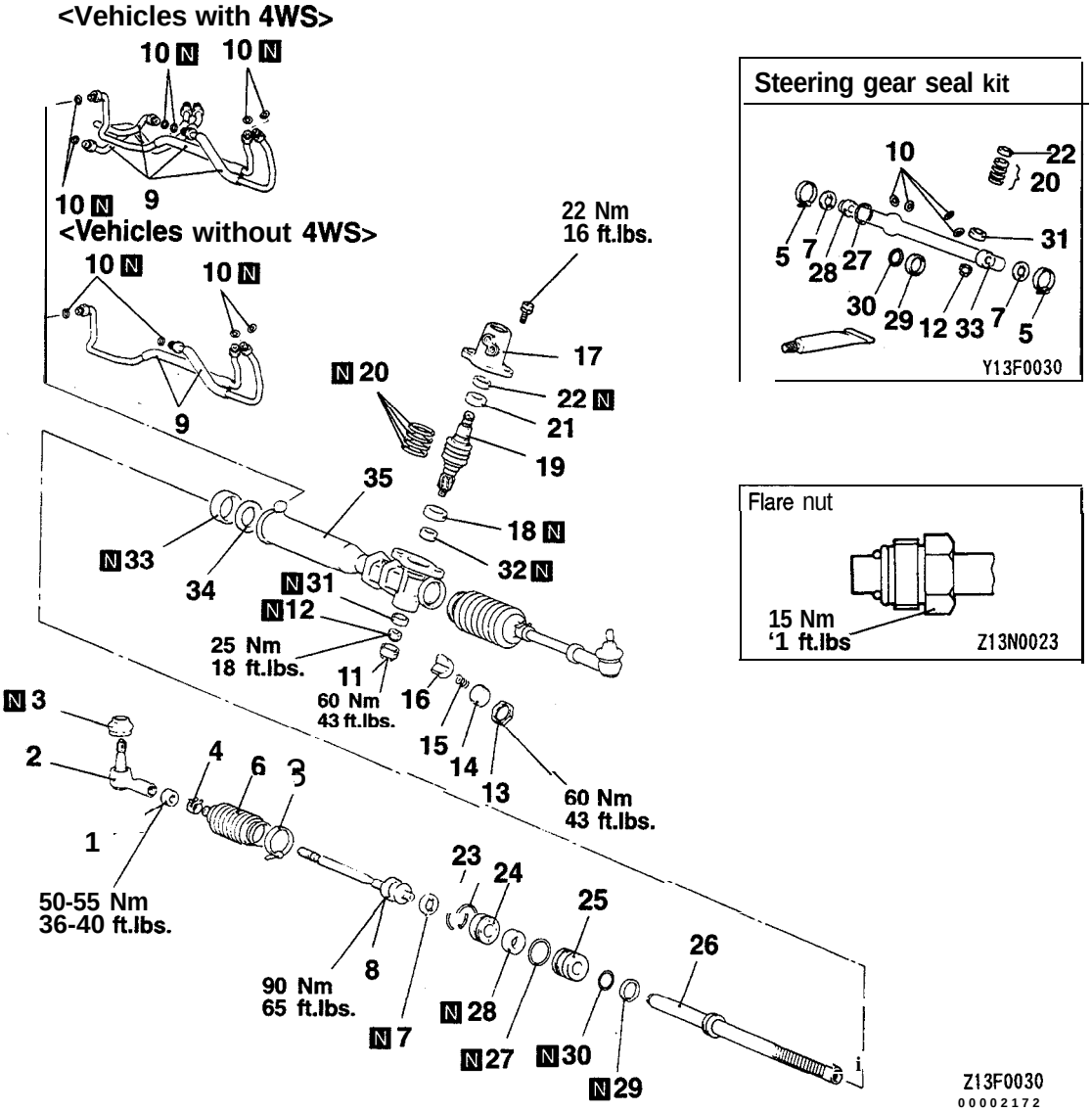
Standard value:
8-18 N (1.8–4.0 lbs.) [2–5 Nm (17-43 in.lbs.)]

(3) If the measured value exceeds the standard value, replace tie rod assembly.

NOTE
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



Disassembly steps

1. Tie rod end locking nuts
▶P◀ **2. Tie** rod ends
◀A▶ ▶O◀ 3. Dust shield
4. Bellows clips
◀B▶ 5. Bellows bands
6. Bellows
◀C▶ 7. Tab washers
▶N◀ **8.** Tie rods
9. Feed tubes
10. O-rings
▶M◀ • Total pinion torque adjustment
◀D▶ ▶L◀ 11. End plug
12. Self-locking nut
13. Locking nut
◀E▶ 14. Rack support cover
15. Rack support spring
16. Rack support
17. Valve housing
◀F▶ ▶K◀ **18.** Oil seal
19. Pinion and valve assembly
▶J◀ 20. Seal rings
◀G▶ ▶I◀ 21. Ball bearing
◀G▶ ▶H◀ **22.** Oil seal
◀H▶ ▶G◀ 23. **Circlip**
24. Rack stopper
▶F◀ **25.** Rack bushing
◀I▶ ▶E◀ **26.** Rack
▶D◀ **27.** O-ring
◀J▶ ▶D◀ **28.** Oil seal
29. Seal rings
30. O-ring
◀K▶ ▶C◀ **31. Ball bearing**
◀L▶ ▶B◀ **32.** Needle roller bearing
◀M▶ ▶A◀ **33.** Oil seal
◀M▶ ▶A◀ 34. Back-up washer
35. Rack housing

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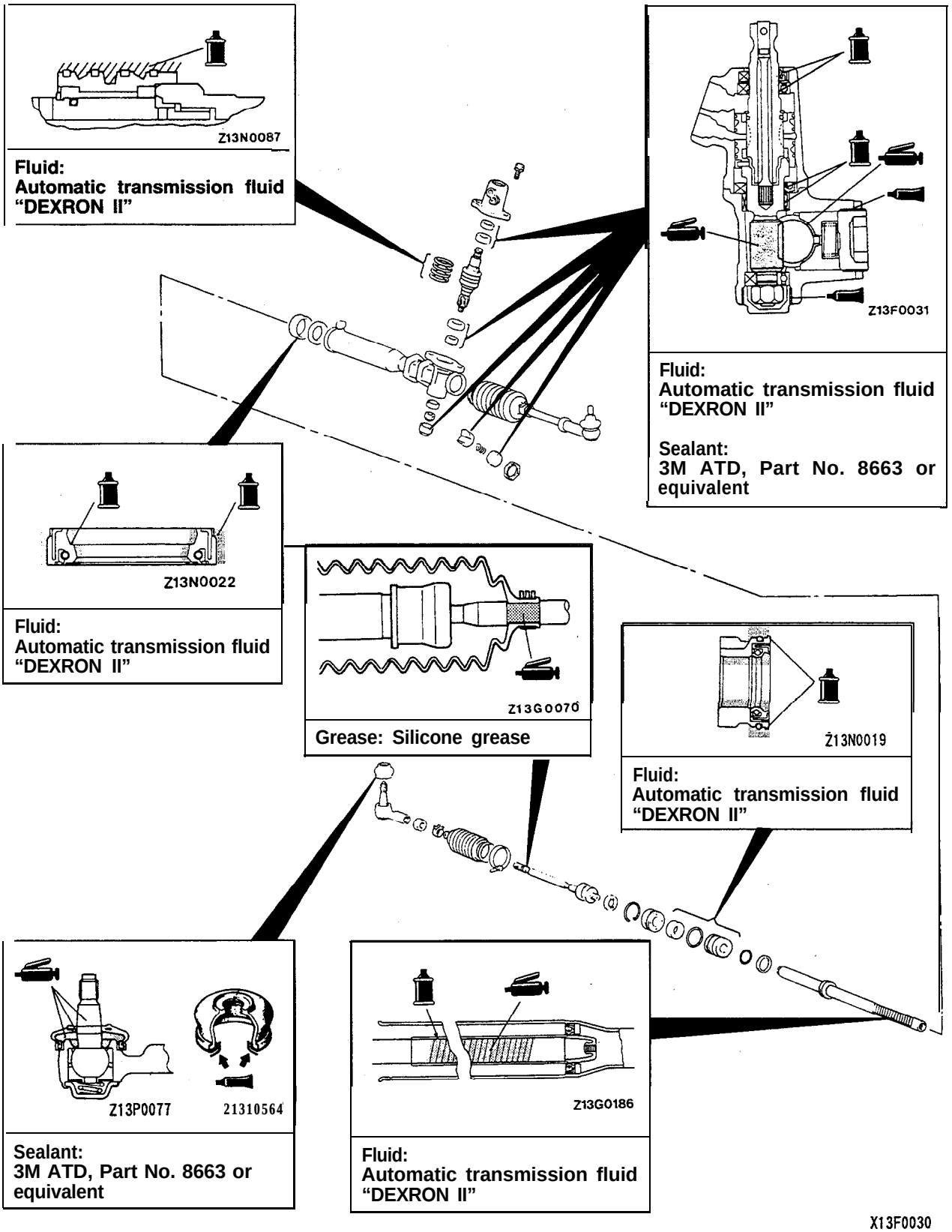
LUBRICATION AND SEALING POINTS



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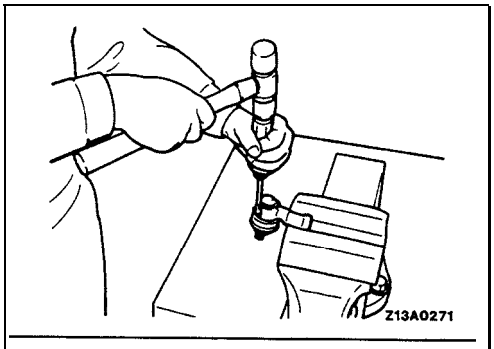
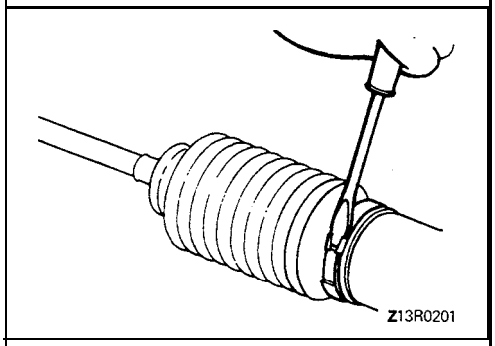


DISASSEMBLY SERVICE POINTS

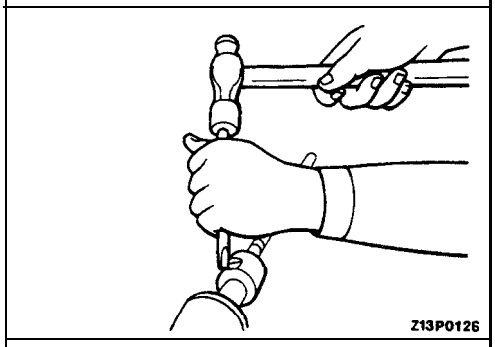
◀A▶ DUST SHIELD REMOVAL

Remove the dust shield from the tie rod end.



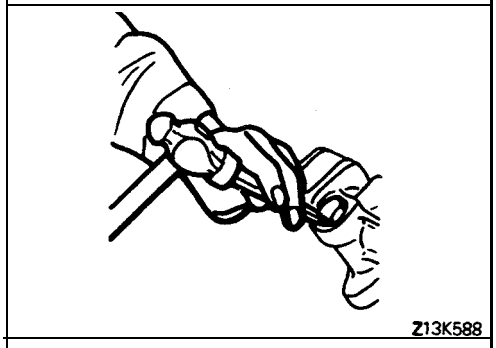
◀B▶ BELLOWS BANDS REMOVAL

Using a screwdriver or similar tool, loosen and then remove the boot retaining band.



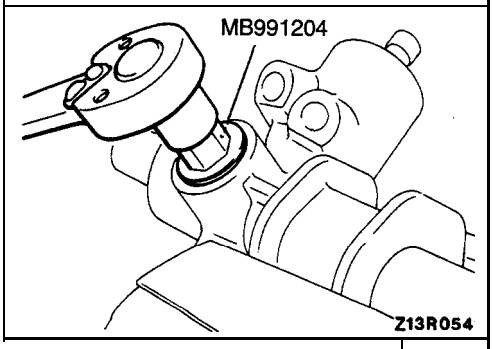
◀C▶ TAB WASHER REMOVAL

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



◀D▶ END PLUG REMOVAL

Disconnect end plug caulking and remove end plug.



◀E▶ RACK SUPPORT COVER REMOVAL

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

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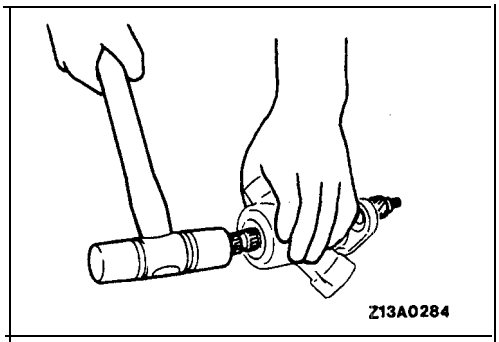
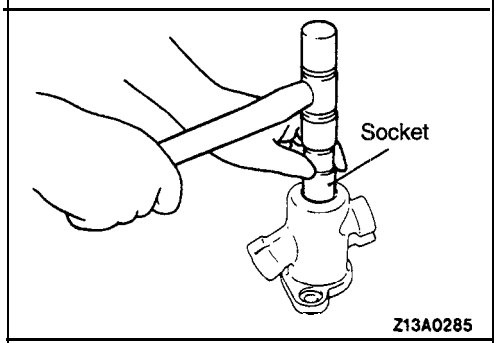


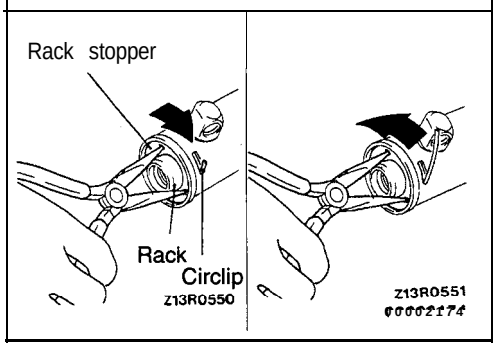
◀F▶ OIL SEAL REMOVAL

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



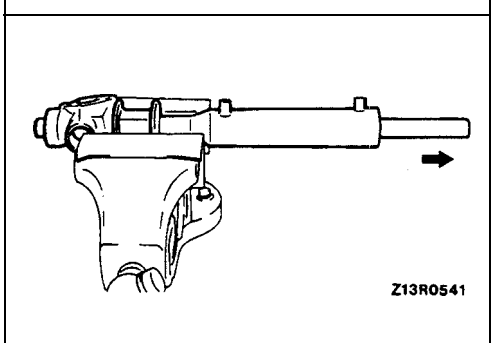
◀G▶ BALL BEARING / OIL SEAL REMOVAL

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



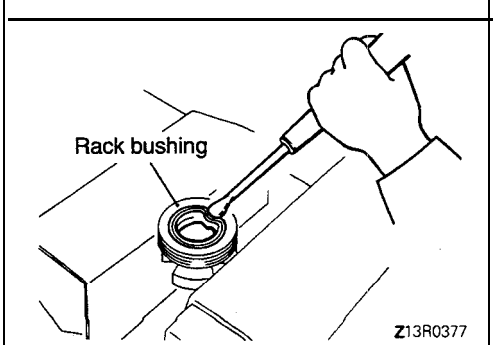
◀H▶ CIRCLIP REMOVAL

(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.



◀I▶ RACK REMOVAL

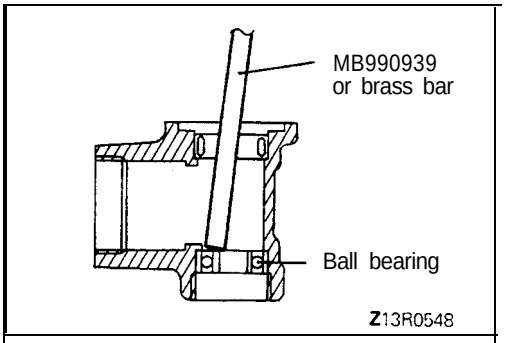
Pull out the rack slowly.
At this time also take out the rack stopper and the rack bushing simultaneously.



◀J▶ OIL SEAL REMOVAL

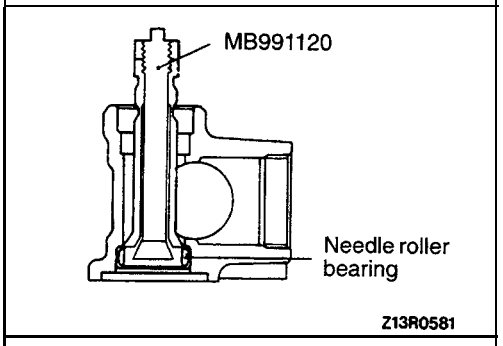
Partially bend oil seal and remove from rack bushing.

Caution
Do not damage oil seal press fitting surface.



◀K▶ BALL BEARING REMOVAL

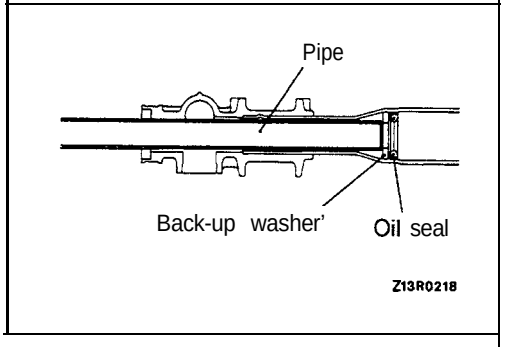
Use a brass bar to remove the ball bearing from the gear housing.



◀L▶ NEEDLE ROLLER BEARING REMOVAL

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

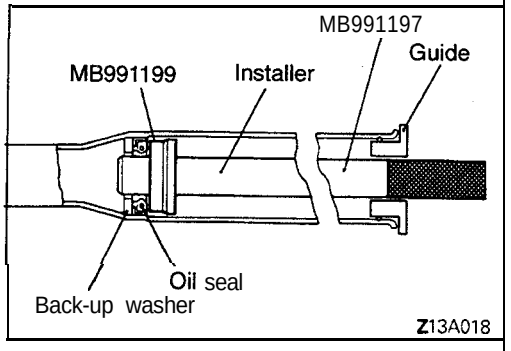
Caution
Do not open special tool excessively to prevent damaging housing interior.



◀M▶ 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.



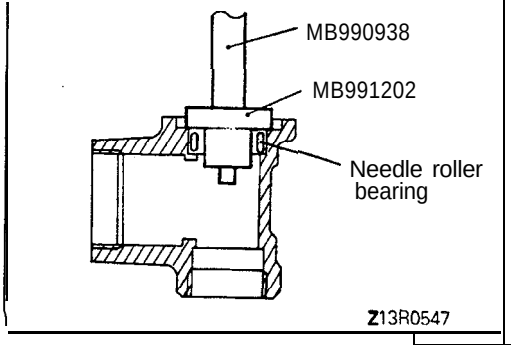
REASSEMBLY SERVICE POINTS

▶A◀ BACK-UP WASHER / OIL SEAL INSTALLATION

(1) Apply a coating of the specified fluid to the outside of the oil seal.

Specified fluid:
Automatic transmission fluid "DEXRON II"

(2) Using the special, tool, press the back-up washer and the oil seal into the rack housing to the specified position (where the upper surface of the press-in guide coincides with the stepped part of the press-in tool).



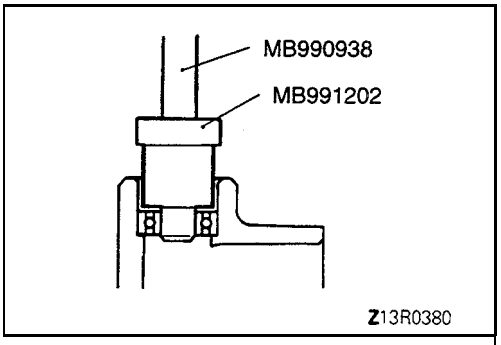
▶B◀ NEEDLE ROLLER BEARING INSTALLATION

(1) Apply specified fluid to housing, bearing and oil seal press fitting surface.

Specified fluid:
Automatic transmission fluid "DEXRON II"

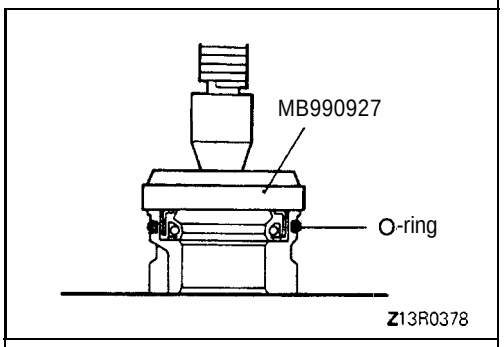
(2) Using the special tools, press fit needle roller bearing.

Caution
Press fit straight as valve housing is aluminium.



▶C◀ BALL BEARING INSTALLATION

Use the special tools to press fit ball bearing.

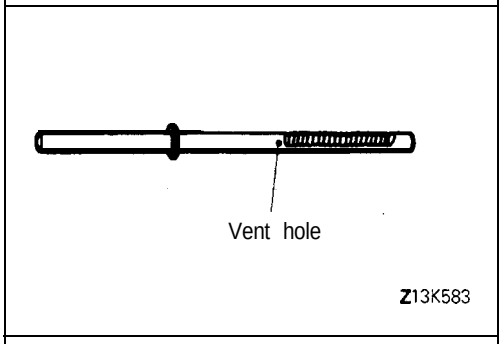


▶D◀ OIL SEAL / O-RING INSTALLATION

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

Specified fluid:
Automatic transmission fluid "DEXRON II"

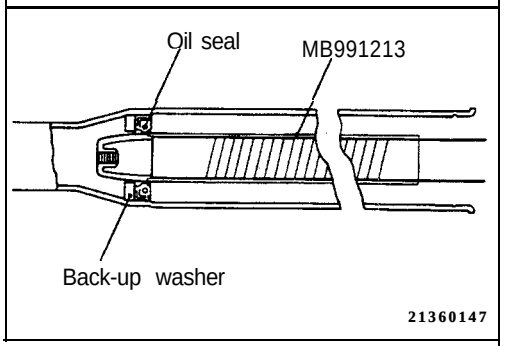
(2) Using the special tool, press fit oil seal until it touches rack bush end.



▶E◀ RACK INSTALLATION

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

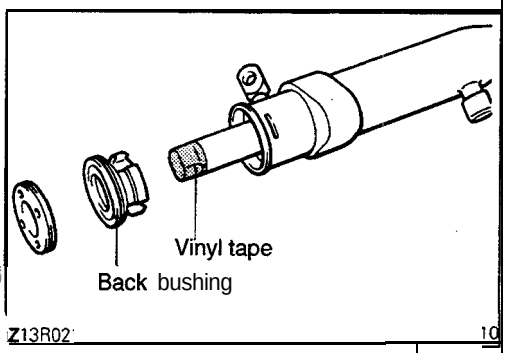
Caution
Do not close the vent hole in the rack with grease.



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

Specified fluid:
Automatic transmission fluid "DEXRON II"

(4) Match oil seal center with rack to prevent retainer spring from slipping and slowly insert rack from power cylinder side.

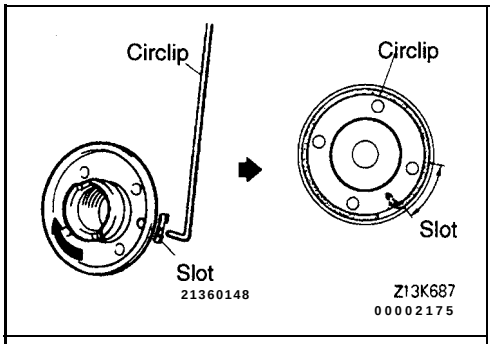


▶F◀ RACK BUSHING INSTALLATION

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

Specified fluid:
Automatic transmission fluid "DEXRON II"

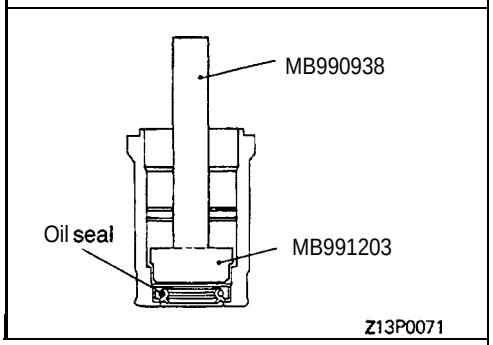
Caution
Do not allow oil seal retainer spring to slip out.



▶G◀ CIRCLIP INSTALLATION

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

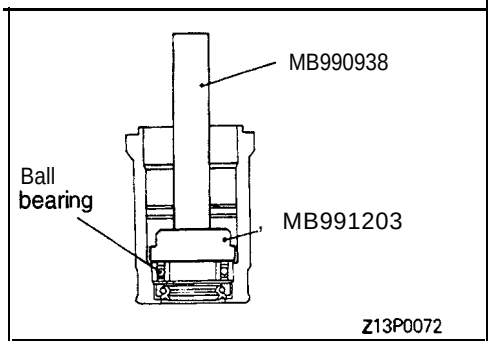
Caution
Insert circlip to rack stopper hole while turning rack stopper clockwise.



▶H◀ OIL SEAL INSTALLATION

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

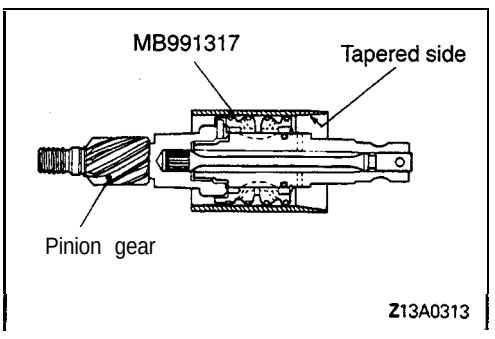
Specified fluid:
Automatic transmission fluid "DEXRON II"



▶I◀ BALL BEARING INSTALLATION

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 II"

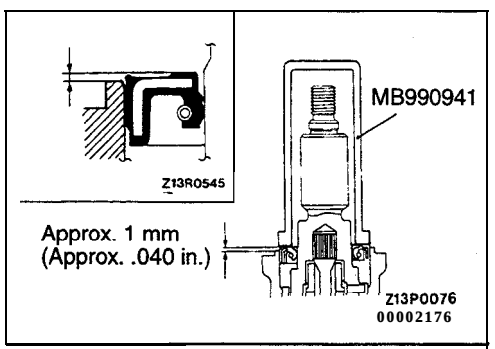


▶J◀ SEAL RING INSTALLATION

(1) Kneed 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 II"

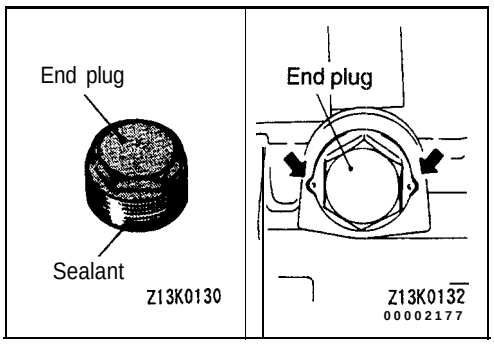
(3) Insert the tapered side of the special tool from the pinion gear side, and compress the seal ring.



▶K◀ 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 (.040 in.) from the housing edge surface.

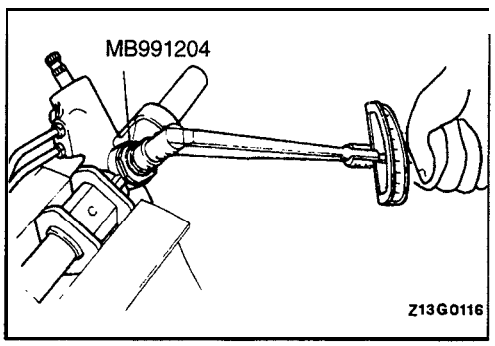


▶L◀ END PLUG INSTALLATION

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

Specified sealant:
3M ATD Part No. 8663 or equivalent

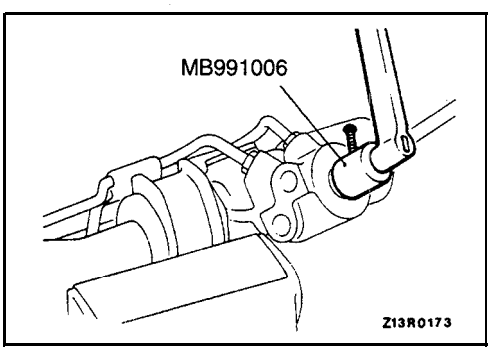
(2) Secure the threaded portion of the end plug at two places by using a punch.



▶M◀ TOTAL PINION TORQUE ADJUSTMENT

(1) Position rack at its center. With special tool, tighten rack support cover to 15 Nm (11 ft.lbs.).
(2) In neutral position, rotate pinion shaft clockwise one turn/4 – 6 seconds with special tool. Return rack support cover 30° – 60° and adjust torque to the standard value.

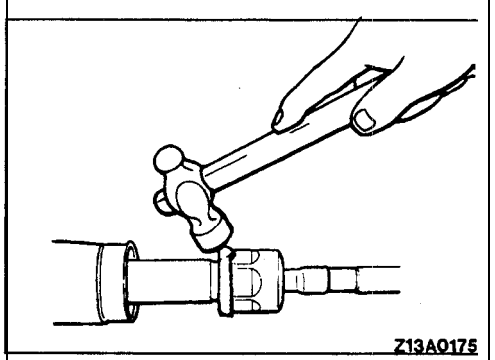
Standard value: 0.6–1.3 Nm (5–11 in.lbs.)



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.

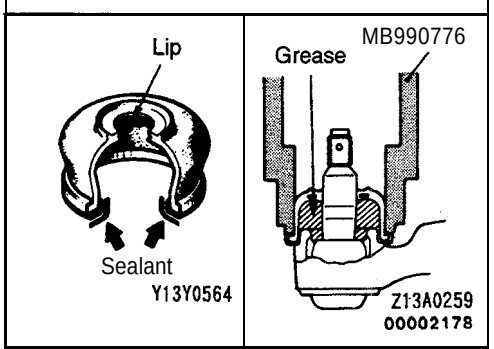
NOTE
When it cannot be adjusted within the specified return angle, check rack support cover components or replace.

(3) After adjusting, lock rack support cover with lock nut.



▶N◀ TIE ROD INSTALLATION

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

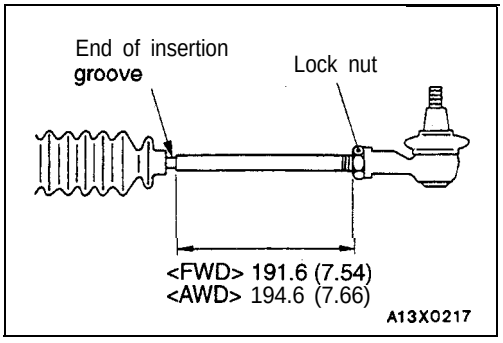


▶O◀ DUST SHIELD INSTALLATION

(1) Pack dust shield interior and lip with multipurpose grease.
(2) Apply semi-drying sealant to dust shield.

Specified sealant:
3M ATD Part No. 8663 or equivalent

(3) Using the special tool, press dust shield to tie rod end.



▶P◀ TIE ROD END INSTALLATION

Screw in tie rod end to have its right and left length as illustrated. Lock with lock nut.

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 bearings for roller slip-off.

OTHERS CHECK

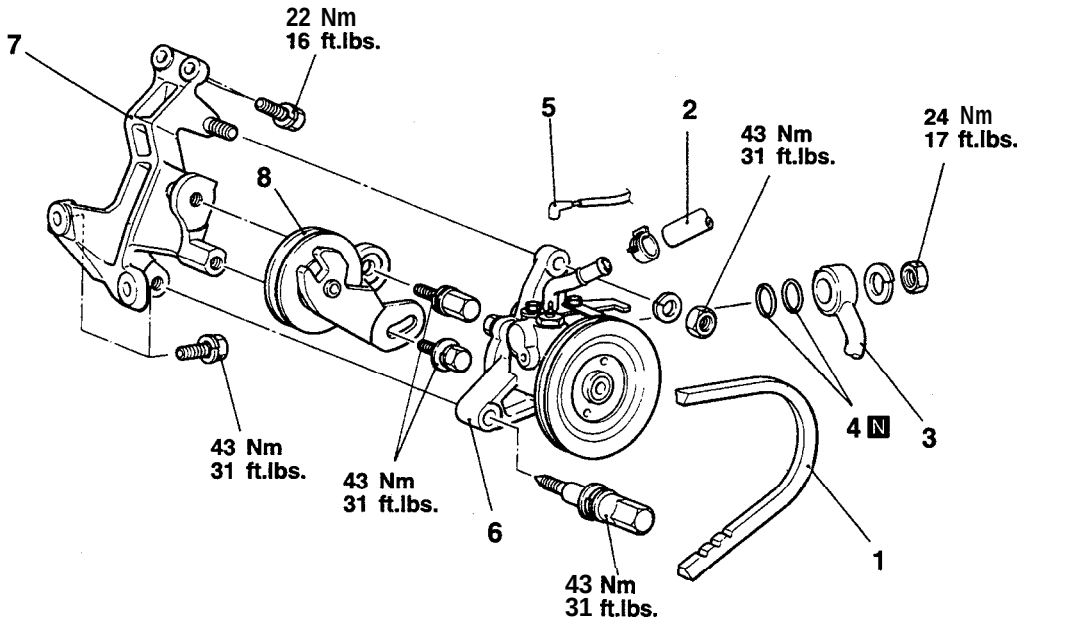
- Check the cylinder inner surface of the rack housing for damage.
- Check the boots for damage, cracking or deterioration.
- Check the rack support for uneven wear or dents.
- Check the rack bushing for uneven wear or damage.

POWER STEERING OIL PUMP

REMOVAL AND INSTALLATION

Pre-removal Operation
- Power Steering Fluid Draining

Pre-installation Operation
- Power Steering Fluid Supplying
- Drive Belt Tension Adjusting (Refer to P.37A-9.)
- Power Steering Fluid Line Bleeding (Refer to P.37A-11.)
- Oil Pump Pressure Checking (Refer to P.37A-12.)

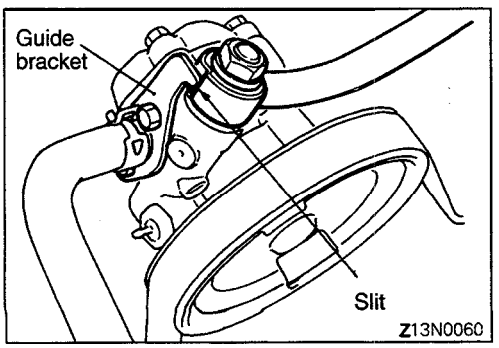


Removal steps

1. Drive belt
2. Suction hose
▶A◀ 3. Pressure hose
4. O-ring
5. Pressure switch connector
6. Oil pump
7. Oil pump bracket
8. Tensioner pulley

INSPECTION

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



INSTALLATION SERVICE POINT

▶A◀ PRESSURE HOSE INSTALLATION

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

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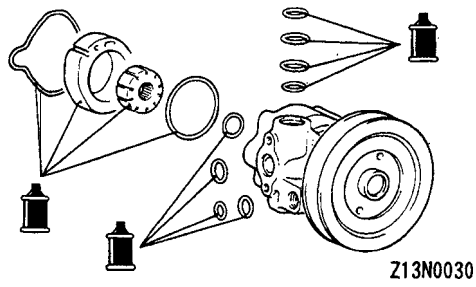
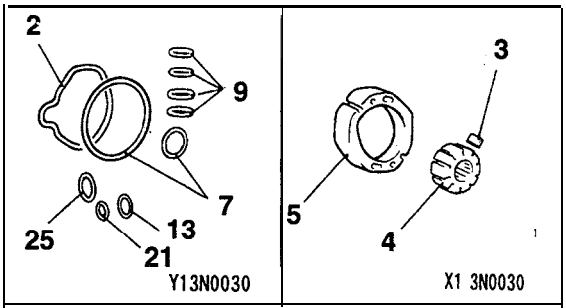
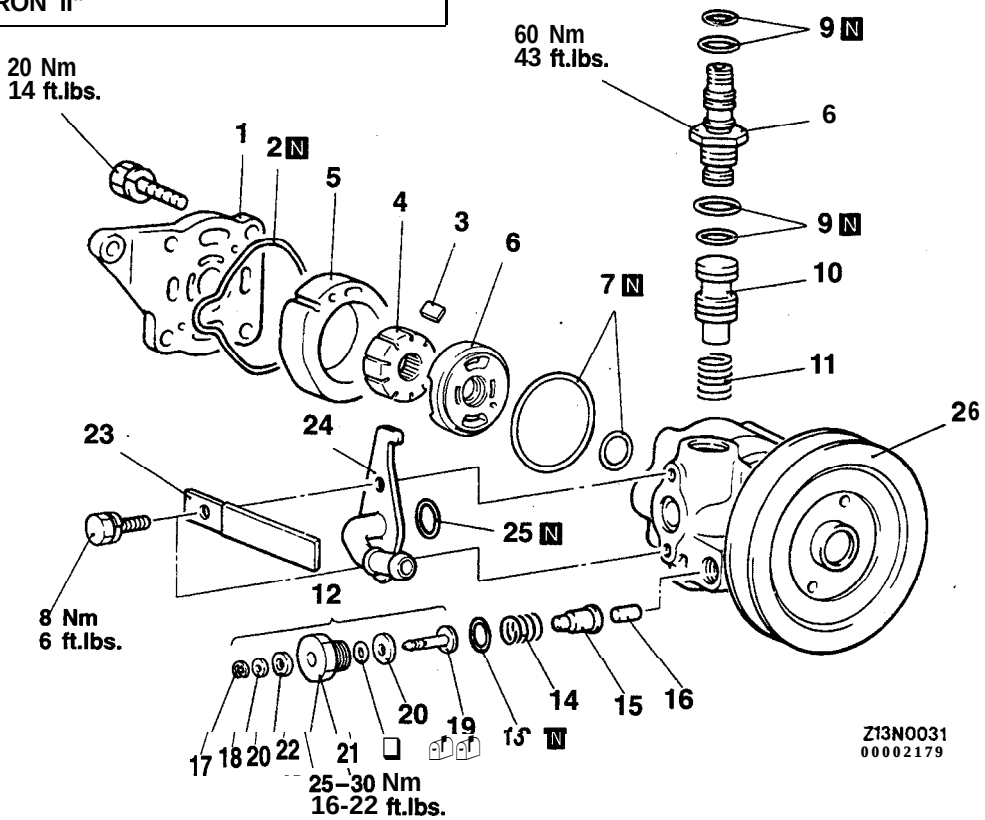
DISASSEMBLY AND REASSEMBLY



Fluid:
Automatic transmission fluid "DEXRON II"



Oil pump seal kit | **Oil pump cartridge k/t**



Disassembly steps

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

Caution
Do not disassemble the flow control valve.

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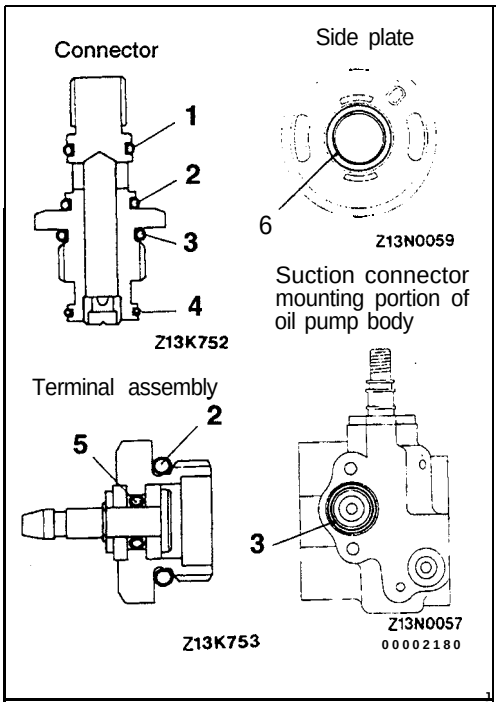
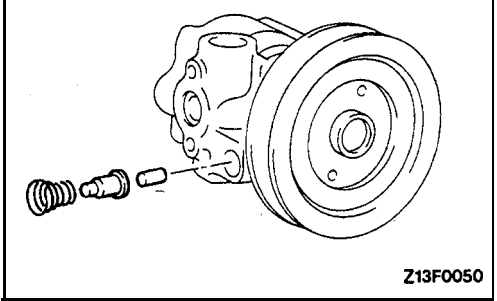


REASSEMBLY SERVICE POINTS

▶A◀ O-RINGS INSTALLATION

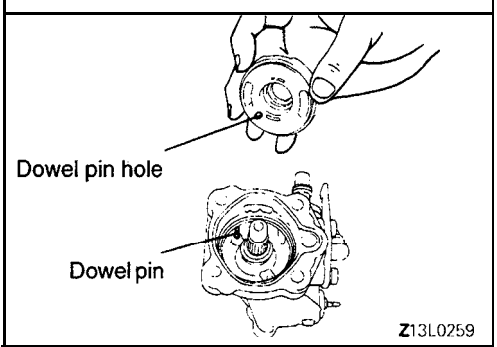
Apply specified fluid on O-rings to install.

No.	I.D. x Width mm (in.)	
1	11 x 1.9	(.433 x .075)
2	13x 1.9	(.512x .075)
3	17.8 x 2.4	(.701 x .094)
4	13.5 x 1.5	(.531 x .059)
5	3.8 x 1.9	(.150 x .075)
6	16.8 x 2.4	(.661 x .094)



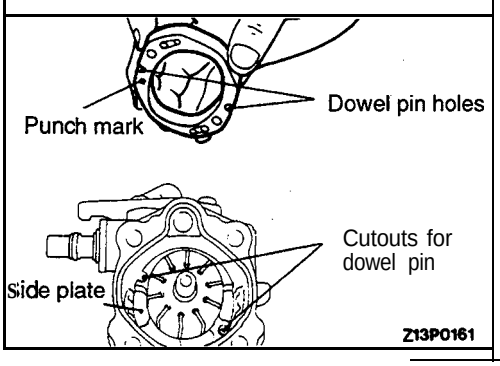
▶B◀ SPRING INSTALLATION

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



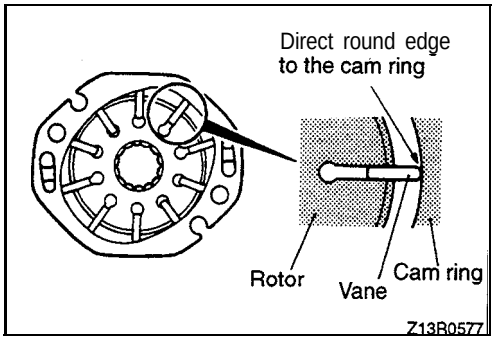
▶C◀ SIDE PLATE INSTALLATION

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



▶D◀ CAM RING INSTALLATION

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

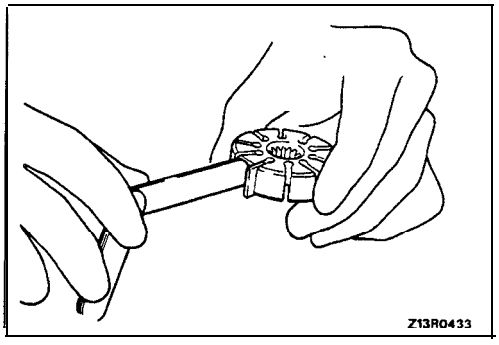


▶E◀ VANES INSTALLATION

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

INSPECTION

- Check the flow control spring for wear.
- Check the shaft of the pulley for play and round movement.
- Check the groove of rotor vane for “stepped” wear.
- Check the contact surface of cam ring and vanes for “stepped” wear.
- Check the vanes for breakage.



CHECK OF GAP BETWEEN VANE AND ROTOR GROOVE

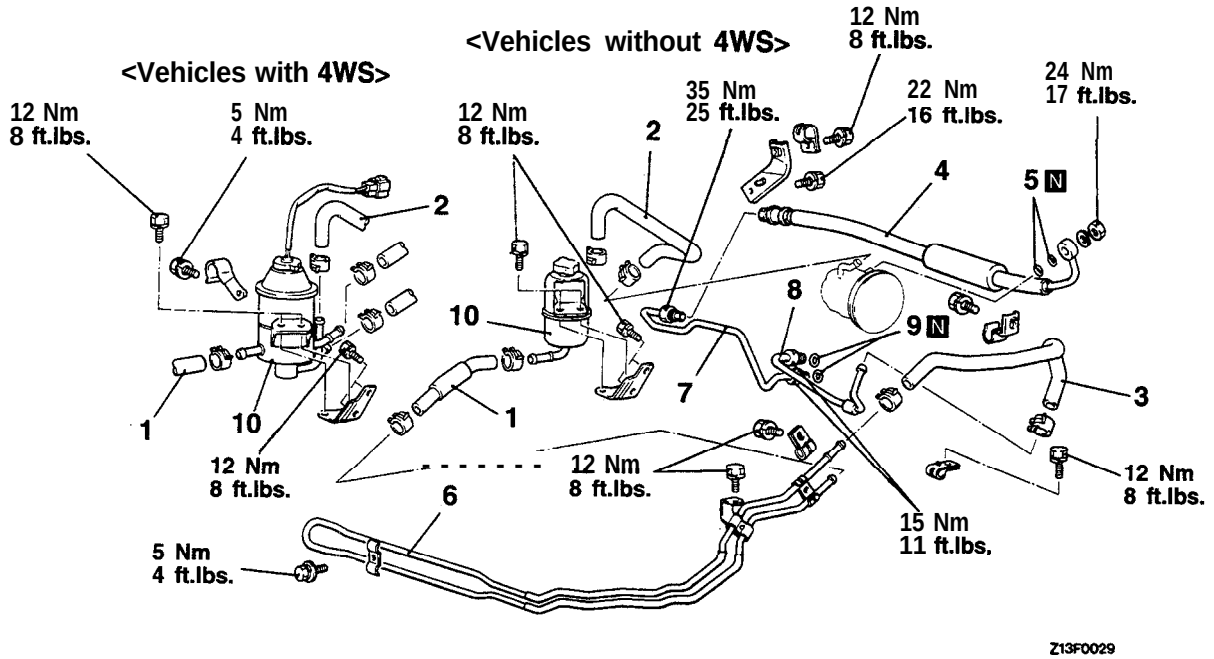
Install vane to rotor groove as illustrated. Measure the gap between vane and rotor groove with thickness gauge.

Limit: 0.06 mm (.0024 in.)

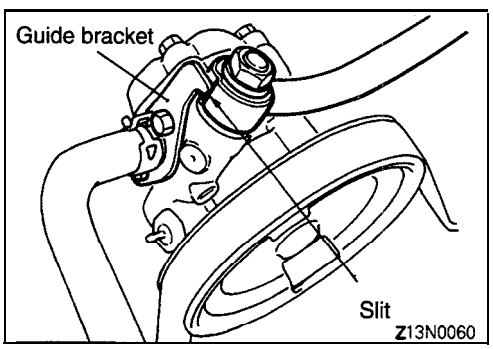
POWER STEERING HOSES

REMOVAL AND INSTALLATION

Pm-removal and Post-installation Operation
- Power Steering Fluid Draining, Supplying, and Bleeding (Refer to P.37A-10,11.)



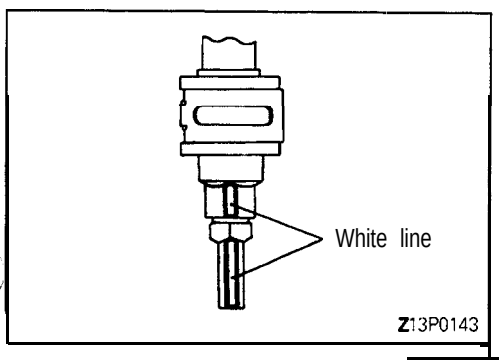
Removal steps
1. Return hose
2. Suction hose
3. Return hose
4. Pressure hose
5. O-ring
6. Cooler tube
7. Pressure tube
8. Return tube
9. O-ring
10. Oil reservoir



INSTALLATION SERVICE POINT

▶A◀ PRESSURE HOSE INSTALLATION

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



(2) 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.

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NOTES

4-WHEEL STEERING SYSTEM (4WS)

CONTENTS

SPECIFICATIONS

GENERAL SPECIFICATIONS

Items		Specifications
Power steering gear box	Type	Rack and pinion
Oil pump	Type	Vane type
	Displacement cm^3/rev. (cu.in./rev.)	9.6 (0.59)
	Relief set pressure MPa (psi)	8 (1,138)
Rear oil pump	Type	Vane type
	Displacement cm^3/rev. (cu.in./rev.)	3.3 (0.20)
	Relief set pressure MPa (psi)	4 (569)
Power cylinder	Type	Hydraulic double action type
	Stroke mm (in.)	20.2 (.8) [one side 10.1 (.39)]

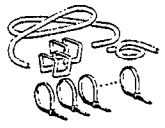
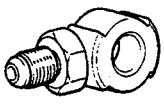
SERVICE SPECIFICATIONS

Items	Standard value
Rear oil pump displacement [at speedometer reading of 31 mph (50 km/h) for 30 seconds] dm^3 (qts.)	Approx. 1 .0 (1.06)
Power cylinder ball joint rotation starting torque Nm (in.lbs.)	**0.5 (4)** or less
Power cylinder tie rod swing torque N (lbs.) [Nm (in.lbs.)]	9–55 **(2-12)** [0.5–3.0 (4–26)]
Power cylinder slide resistance N (lbs.)	**67** (15) or less

LUBRICANTS

Items	Specified lubricant	Quantity
Power steering fluid	Automatic Transmission fluid "DEXRON II"	1.45 dm^3 (1.53 qts.)
Dust cover	Silicone grease	As required

SPECIAL TOOLS

Tool	Tool number and name	Supersession	Application
	MB991230 Air bleeder set		Air bleed
	MB990993 Power steering oil pressure gauge adapter	MB990993-01	Measurement of fluid flow volume

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TROUBLESHOOTING

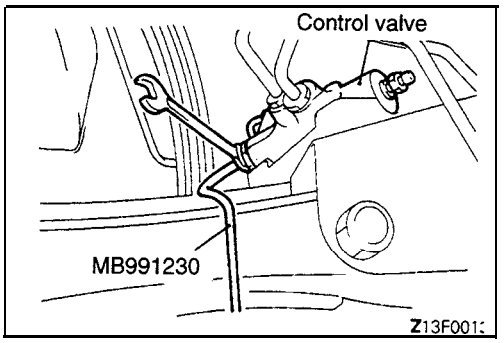
Before inspecting, check the following items:
- Ensure that the suspension has not been modified
- 'Tire and wheel size, specifications, air pressure, balance and amount of wear
- Steering wheel type
- Wheel alignment
- Oil pump drive belt tension
- Power steering fluid level, and air in the system
- Engine idle speed and even idle
- Oil leakage

Malfunction symptom	Malfunctioning system	Inspection item
4WS does not operate	Power cylinder	Tie rod swing torque
		Power cylinder slide resistance
	Rear oil pump	Flow volume check
	Control valve	
Poor steering feeling Feeling of friction in steering Poor steering return	Steering gears and linkage	Rack cracks or deformation
Steering wheel efforts excessive	Control valve	Oil leakage from control valve joint
	Power cylinder	Oil leakage from piston rod
	Oil line	Pressure hose breakage
	Oil reservoir	Oil reservoir deformation or oil leakage
Rear wheels cannot be steered Poor rear wheels return Hydraulic pressure for rear wheel is constantly high	Control valve	Stuck control valve spool
	Power cylinder	Stuck power cylinder
	Rear oil pump	Relief valve remains open
Long rear wheel steering delay Poor steering response Poor steering return	Power cylinder	Excessive power or cylinder friction
		Looseness in power cylinder tie rod ball joint
		Ball joint dust cover cracks
Poor rear wheel steering response Poor rear wheel steering range	Control valve	Oil leakage from control valve spool
	Power cylinder	Oil leakage from power cylinder
	Rear oil pump	Extreme oil pump internal wear
Poorsteerability (extreme tire wear)	Power cylinder	Tie rod length improperly adjusted after toe-in adjustment

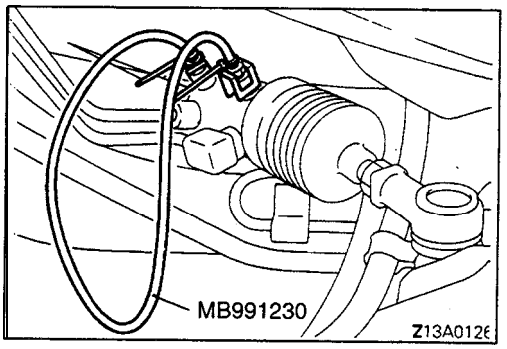
ON-VEHICLE SERVICE

BLEEDING

(1) Bleed air from power steering system. (Refer to GROUP 37A – On-vehicle Service.)
(2) Lift up the vehicle.
(3) Start the engine and let it idle.



(4) Loosen the bleeder screw on the left side of the control valve and set the special tool to the bleeder screw.
(5) Turn the steering wheel all the way to the left, immediately returning it half way back.
At this time confirm that air is discharged with the fluid.
(6) Repeat step (5) two or three times to make sure that there is no more air in the system. Tighten the bleeder screw and remove the special tool.
(7) Repeat steps (4) through (6) for the right side bleeder screw, turning the steering wheel to the right this time.



(8) Loosen the power cylinder bleeder screw and set the special tool to the bleeder screw.

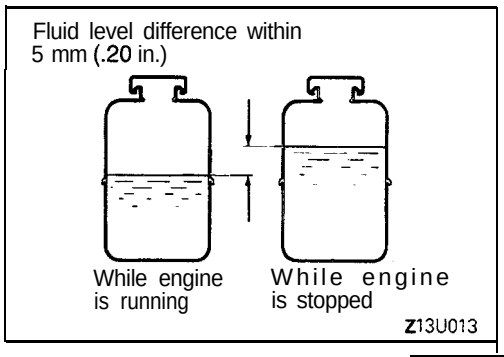
Caution
Loosen the bleeder screw about 30 to 45 degrees, and secure it with the special tool (rotation prevention metal fixtures) so as not to be loosened more.

(9) Start the engine and keep the front wheels in a straight ahead position. Increase the engine speed once to a speedometer reading of 70-80 km/h (43-50 mph) to operate the oil pump for the rear wheels.

Caution
Pay particular attention to all four wheels that rotate.

NOTE
When the engine speed is increased, the fluid circulates through the oil pump but it does not circulate through the tube (special tool).

(IO)With a 30-40 km/h (19-25 mph) speedometer reading maintained, turn the steering wheel all the way clockwise and counterclockwise to ensure that pressure rises, causing air to circulates through the tube (special tool) and to be discharged from the reserve tank.
(11) Repeat step (10) several times to make sure that there is no more air in the system. Tighten the bleeder screw and remove the special tool.



(12)Ensure that the difference in the fluid levels when the engine is running and when it is stopped are within 5 mm (.20 in.).
If the difference exceeds 5 mm (.20 in.), there is still air in the system and it must be bled again.

Caution
If air has not been completely bled from the system, the pump will make a humming sound or an unusual noise will come from the flow control valve; this also contributes to shortened pump life.

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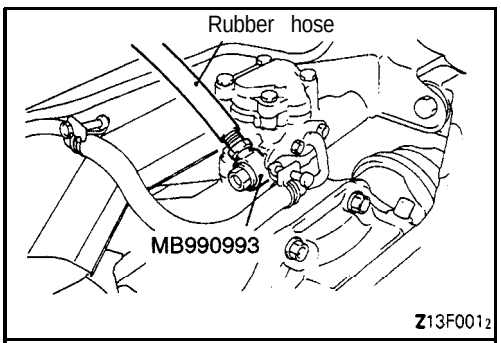
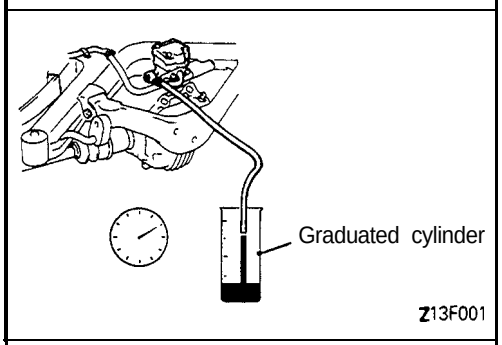
FUNCTION CHECK

(1) Raise the vehicle so that all four wheels may turn freely.
(2) Start the engine, running the vehicle at an indicated speed of about 80 km/h (50 mph).
(3) Turn the steering wheel all the way to left and right and turn it swiftly, checking to ensure that the rear wheels steer to the same directions as the front wheels.



REAR OIL PUMP DISCHARGE FLOW VOLUME CHECK

(1) Disconnect the pressure hose from the rear oil pump and install the special tool with a rubber hose.
(2) Place the other end of the rubber hose in a container which permits measurement of flow rate (2-dm^3 graduated cylinder).

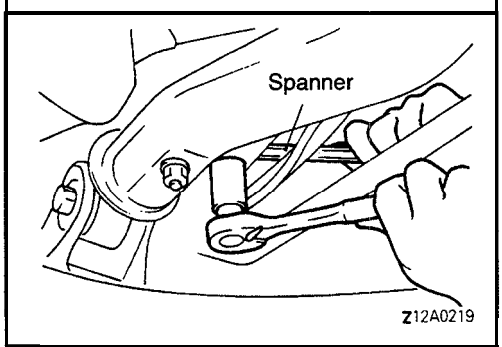


(3) Start the engine. Increase speed slowly, then hold the indicated speed of 50 km/h (31 mph), measuring discharge flow volume for 30 seconds.

Caution
While performing this work, continuously add fluid into the oil reservoir.

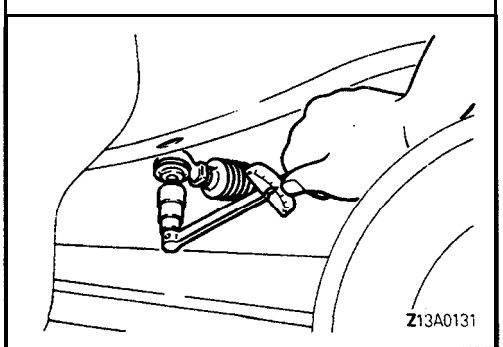
Standard value: Approximately 1.0 dm^3 (1.06 qts.)

(4) If the discharge flow volume is extremely high or low, the rear oil pump should be replaced.



BALL JOINT ROTATION STARTING TORQUE CHECK

(1) Holding the power cylinder tie rod with a spanner, disconnect the tie rod and trailing arm.



(2) After swinging the ball joint stud several times, install the stud nut, then measure the ball joint rotation starting torque with the special tool.

Standard value: 0.5 Nm (4 in.lbs.) or less

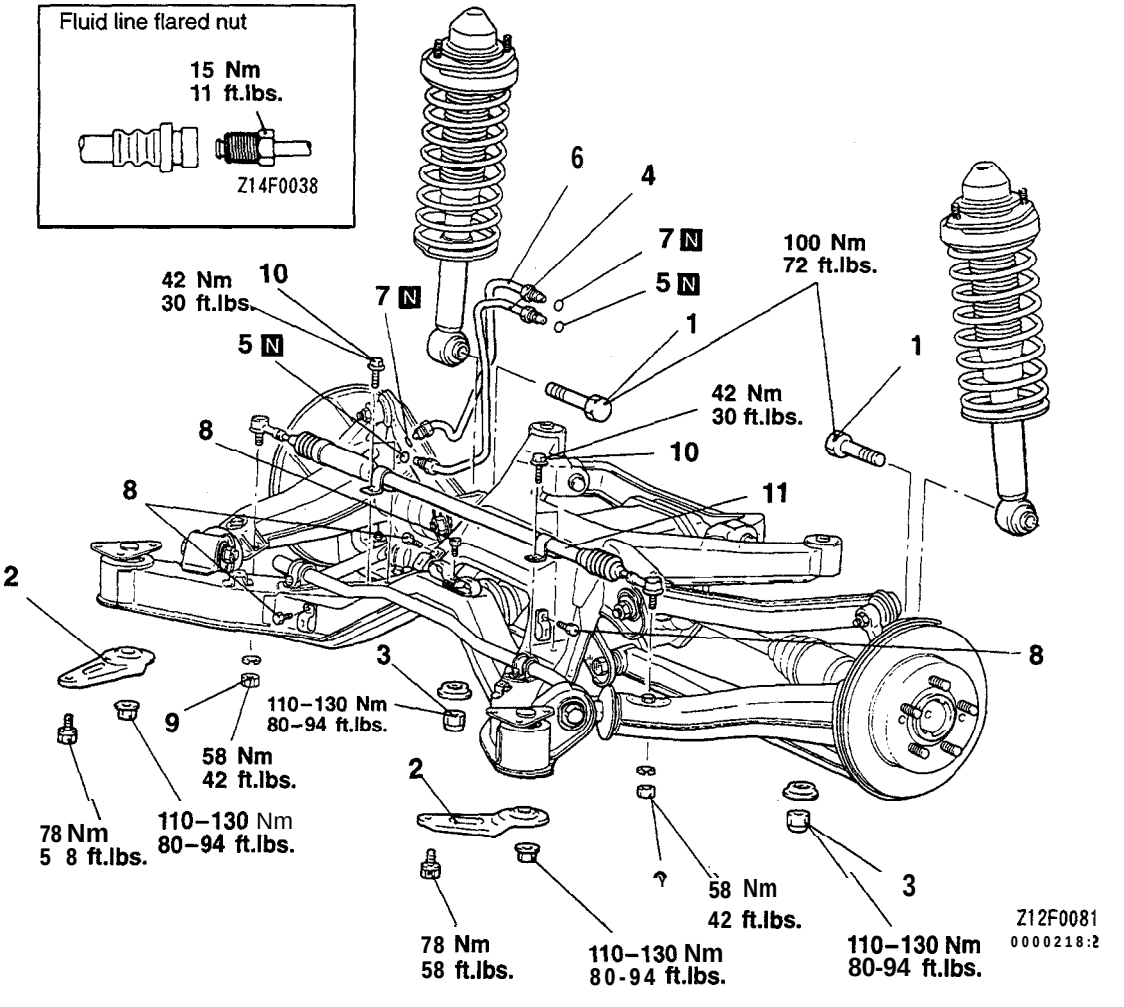
(3) If the rotation starting torque exceeds the standard value, replace the tie rod end.
(4) If the rotation starting torque is less than the standard value, check that the ball joint is not loose and operates smoothly. If not, it may be reused.

POWER CYLINDER

REMOVAL AND INSTALLATION

Pre-removal Operation
- Cleaning of Pipings with Steam
- Power Steering Fluid Draining (Refer to GROUP 37A – On-vehicle Service.)
- Main Muffler Assembly Removal (Refer to GROUP 15 – Exhaust Pipe and Muffler.)

Post-installation Operation
- Main Muffler Assembly Installation (Refer to GROUP 15 – Exhaust Pipe and Muffler.)
- Power Steering System Refilling and Bleeding (Refer to GROUP 37A – On-vehicle Service.)
- 4WS System Bleeding (Refer to P.37B-4.)
- 4WS System Operation Checking (Refer to P.37B-5.)
- Wheel Alignment Checking (Refer to GROUP 34 – On-vehicle Service.)



Removal steps

1. Rear shock absorber lower mounting bolt
2. Crossmember bracket
3. Crossmember mounting nut (on differential side)

◀A▶

4. Pressure tube (RL)
5. O-ring
6. Pressure tube (RR)
7. O-ring
8. Oil line clamp bolt

◀B▶

9. Tie rod end nut

▶A◀ 10. Power cylinder installation bolt

▶A◀ 11. Power cylinder

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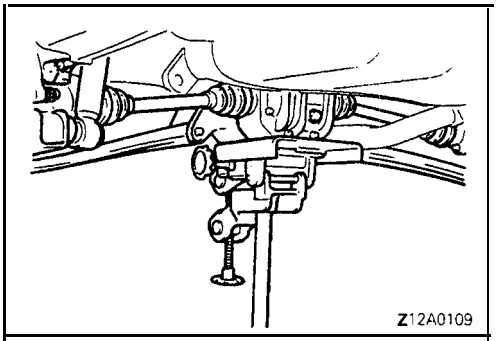
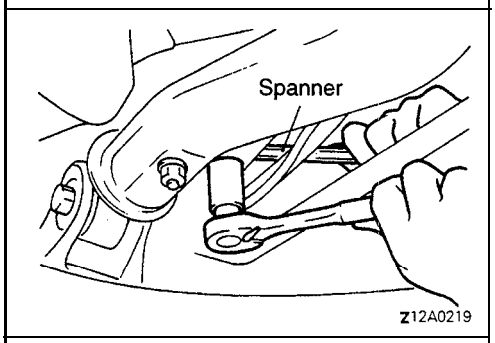

Z12A0109

REMOVAL SERVICE POINTS

(A, CROSSMEMBER MOUNTING NUT REMOVAL

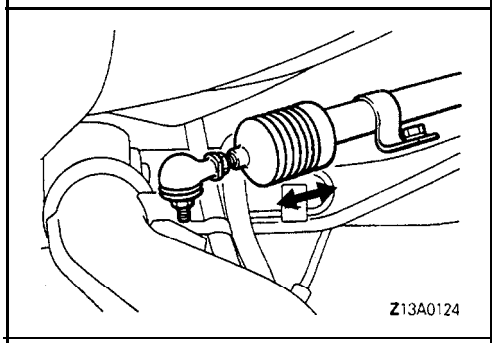
(1) Before removing the self-locking nuts, support the differential case with a transaxle jack.
(2) Remove the self-locking nuts.



Z12A0219

◀B▶ TIE ROD END NUT REMOVAL

Secure the power cylinder on the tie rod side with a spanner and remove the power cylinder mounting nut.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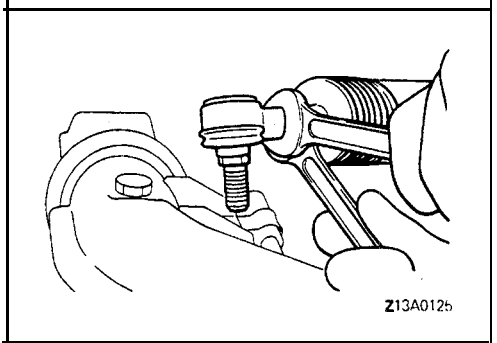
INSTALLATION SERVICE POINTS

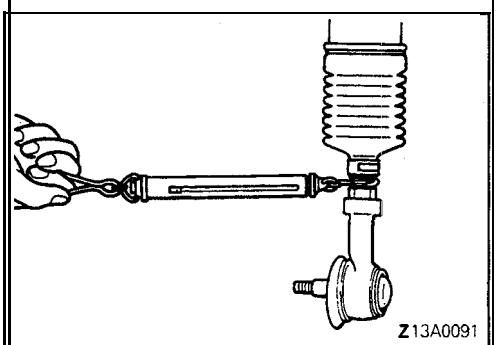
▶A◀ POWER CYLINDER / POWER CYLINDER INSTALLATION BOLTS INSTALLATION

(1) Secure the power cylinder to the crossmember.
(2) Move the power cylinder piston rod over its full stroke to determine its neutral position.
(3) Align tie rod ends and the installation holes at trailing arm.


Z13A0125

(4) When the tie rod ends and the installation holes at the trailing arm do not meet, loosen the tie rod end securing nut, then adjust the length. The dust cover fastener clip should be removed for this.
(5) The difference between the lengths of the left and right tie rods should be less than 1 mm (.039 in.).

NOTE
The threads of the tie rod ends may be used as a guide for this.


Z13A0091

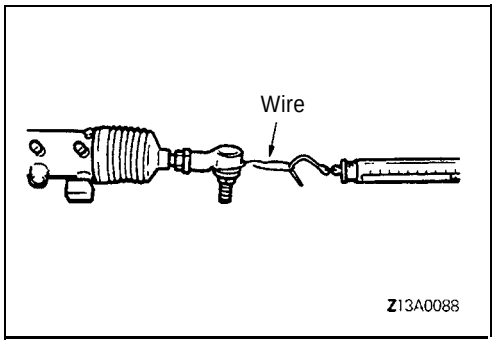
INSPECTION

TIE ROD SWING TORQUE INSPECTION

(1) Swing the tie rod ten times, hard.
(2) Point the tie rod end down, then attach a spring balance as shown in the illustration to measure swing resistance (swing torque).

Standard value: 9-55 N (2-12 lbs.)
[0.5–3 Nm (4-26 in.lbs.)]

(3) If the swing resistance exceeds the standard value, replace the tie rod.
(4) If the swing resistance is less than the standard value, the ball joint may be reused as long as it is not loose and operates smoothly.



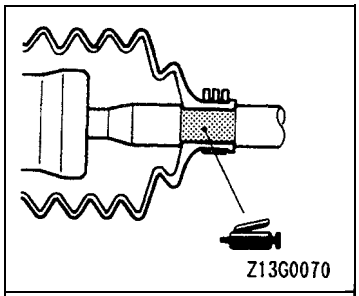
POWER CYLINDER SLIDE RESISTANCE CHECK

(1) Place the piston in a neutral position.
(2) Wrap a wire around the tie rod end, then measure slide resistance with a spring balance as shown in the illustration.

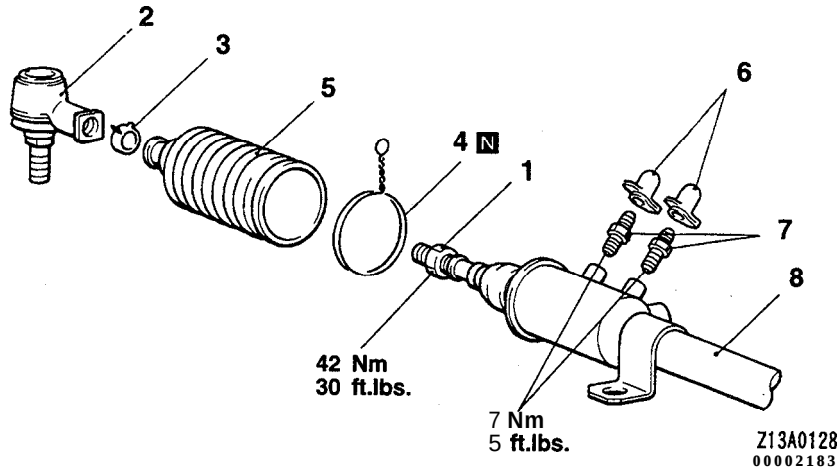
Standard value: 67 N (15 lbs.) or less

(3) If the slide resistance exceeds the standard value, replace the power cylinder.
(4) If the slide resistance is less than the standard value, the power cylinder may be reused as long as it is not loose and slides smoothly.

DISASSEMBLY AND REASSEMBLY

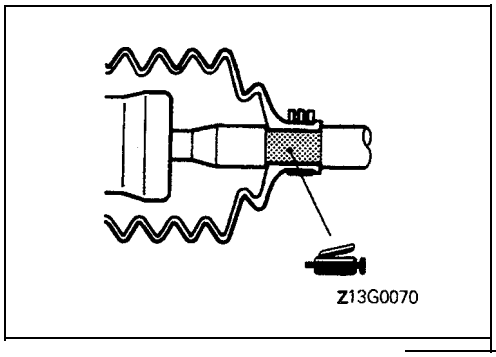


Grease: Silicone grease



Disassembly steps

1. Nut
▶B◀ 2. Tie rod end assembly
3. Clip
4. Wire
▶A◀ 5. Dust cover
6. Bleeder caps
7. Bleeder screws
8. Cylinder assembly

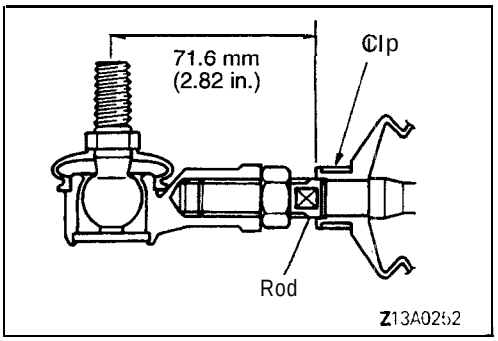


REASSEMBLY SERVICE POINTS

▶A◀ DUST COVER INSTALLATION

Apply the specified grease to the place indicated in the illustration, then install the dust cover to the cylinder assembly.

Specified grease: Silicone grease



▶B◀ TIE ROD END ASSEMBLY INSTALLATION

Temporarily attach the tie rod end assembly to the cylinder assembly at the place of dimension as illustrated.

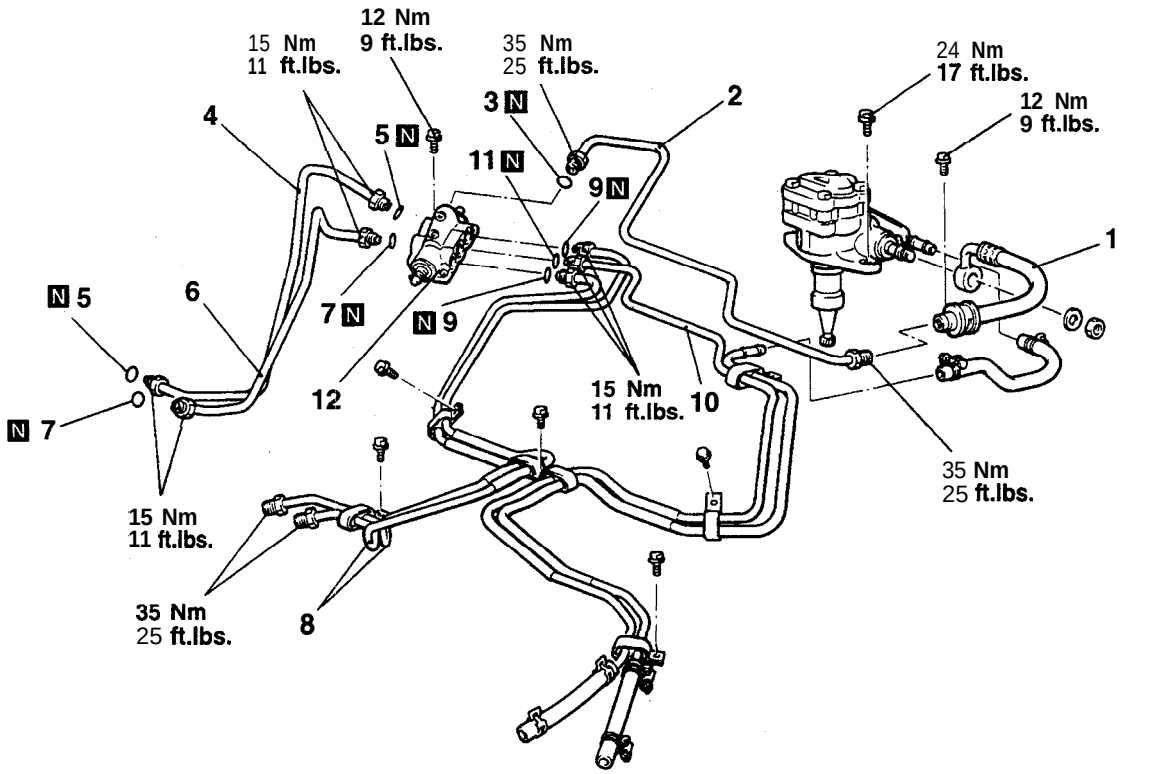
NOTE
To adjust the assembly dimensions of the tie rod end assembly, remove the dust cover clip and rotate the rod.

CONTROL VALVE

REMOVAL AND INSTALLATION

Pre-removal Operation
- Cleaning of Pipings with Steam
- Power Steering Fluid Draining (Refer to GROUP 37A – On-vehicle Service.)
- Rear Suspension Assembly Removal (Refer to GROUP 34 – Rear Suspension Assembly.)

Post-installation Operation
- Rear Suspension Assembly Installation (Refer to GROUP 34 – Rear Suspension Assembly.)
- Power Steering System Refilling and Bleeding (Refer to GROUP 37A – On-vehicle Service.)
- 4WS System Bleeding (Refer to P.37B-4.)
- 4WS System Operation Checking (Refer to P.37B-5.)



Removal steps
1. Pressure hose
2. Pressure tube
3. O-ring
4. Pressure tube (RR)
5. O-ring
6. Pressure tube (RL)
7. O-ring
8. Pressure tube (FL, FR)
9. O-ring
10. 11. O-ring Return pipe
12. Control valve

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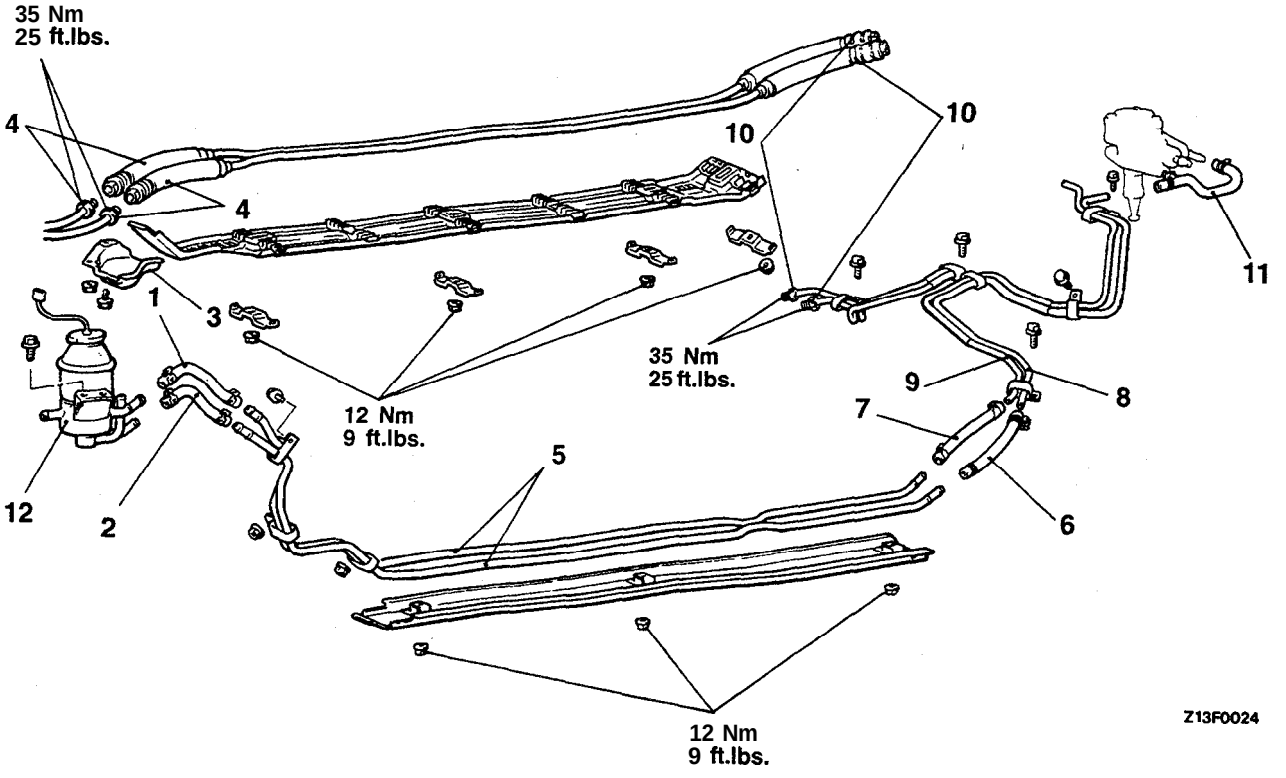
REAR OIL LINE

REMOVAL AND INSTALLATION

Pre-removal Operation
- Cleaning of Pipings with Steam
- Power Steering Fluid Draining (Refer to GROUP 37A – On-vehicle Service.)

Post-installation Operation
- Power Steering System Refilling and Bleeding (Refer to GROUP 37A – On-vehicle Service.)
- 4WS System Bleeding (Refer to P.37B-4.)
- 4WS System Operation Checking (Refer to P.37B-5.)



Removal steps
1. Return hose
2. Suction hose
3. Protector
4. Pipe assembly to pressure tube connection
5. Pipe assembly
6. Suction hose
7. Rubber hose
8. Feed pipe assembly
9. Return pipe assembly
10. Pressure tube assembly to pipe assembly connection
11. Suction hose
12. Reserve tank

INSPECTION

- Check tubes and pipes for cracking, damage or corrosion.
- Check hoses for cracking, damage, leakage or fluid seepage.
- Check flare nuts for damage.

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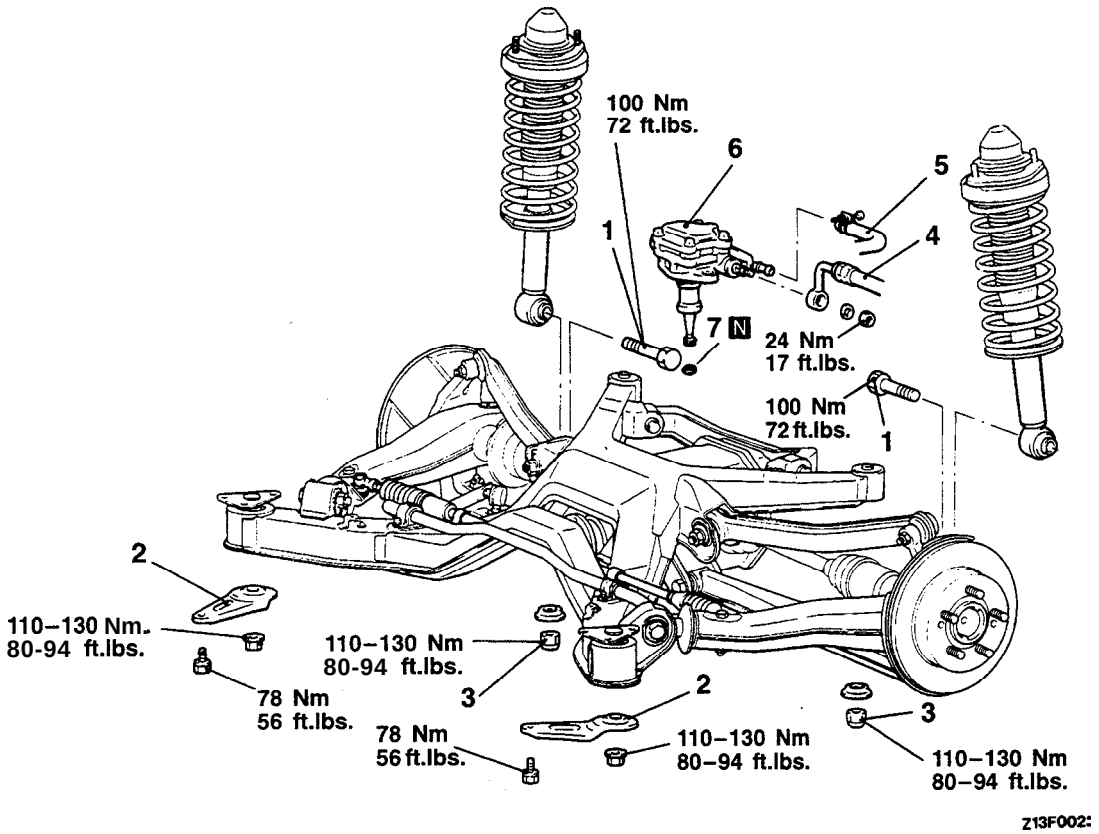
REAR OIL PUMP

REMOVAL AND INSTALLATION

Pre-removal Operation
- Power Steering Fluid Draining (Refer to GROUP 37A – On-vehicle Service.)
- Main Muffler Assembly Removal (Refer to GROUP 15 – Exhaust Pipe and Muffler.)

Post-installation Operation
- Main Muffler Assembly Installation (Refer to GROUP 15 – Exhaust Pipe and Muffler.)
- Power Steering System Refilling and Bleeding (Refer to GROUP 37A – On-vehicle Service.)
- 4WS System Bleeding (Refer to P.37B-4.)
- 4WS System Operation Checking (Refer to P.37B-5.)

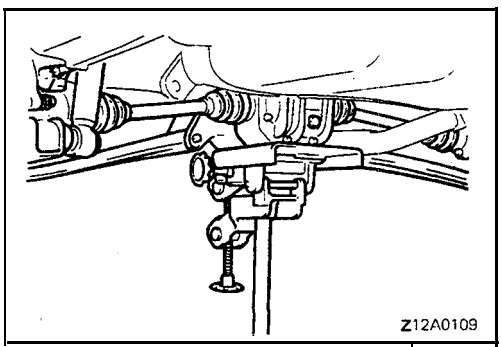


Removal steps

1. Rear shock absorber lower mounting bolt
2. Crossmember bracket
3. Crossmember mounting nut (on differential side)
4. Pressure hose
5. Suction hose
6. Rear-wheel oil pump
7. O-ring

◀A▶ ◀A▶

N O T E
Do not disassemble the rear-wheel oil pump.



REMOVAL SERVICE POINT

(A, CROSSMEMBER BRACKET / CROSSMEMBER MOUNTING NUT (ON DIFFERENTIAL SIDE) REMOVAL

(1) Support the differential case with the transmission jack, then remove the crossmember bracket and crossmember mounting nut (on the differential side).
(2) Slightly lower the crossmember.

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NOTES