

STEERING SYSTEM

Return To Main Table of Contents

GENERAL	2
STEERING COLUMN AND SHAFT	13
POWER STEERING GEAR BOX (TRW)	18
POWER STEERING GEAR BOX (MANDO)	24
POWER STEERING OIL PUMP	37
POWER STEERING HOSES	43

GENERAL SPECIFICATIONS

Shaft and joint type	Collapsible and tilt column, double universal joint type
Gear box	
Steering gear type	Power rack and pinion
Steering gear ratio (TRW)	45.53
Steering gear ratio (MANDO)	45.74
Pinion gear number of teeth	8
Rack stroke (TRW)	141.5 mm
Rack stroke (MANDO)	140 mm
Oil pump	
Type	Vane type
Displacement	9.6 cm ³ /rev. (0.586 cu.in./rev.)
Relief pressure	7.85 MPa (80 kg/cm ² , 1138 psi)
Tilt angle	
Tilt up	3.85°
Tilt down	11.55°

SERVICE STANDARD

Wheel angle	
Inside wheel	37°7' ± 2°
Outside wheel	30°12'
Steering wheel free play	30 mm (1.18 in.) or less
Steering effort [Standard]	27.5 N
[Minimum]	30.4 N

TIGHTENING TORQUE

	N.m	Kg.cm	lb.ft
Steering column and shaft			
Steering column member mounting bolt	8-12	80-120	5.8-8.7
Steering column to column member mounting (upper)	13-18	130-180	9.4-13
Steering column to column member mounting (lower)	8-12	80-120	5.8-8.7
Steering column member to cowl panel	9-14	90-140	6.5-10
Steering wheel lock nut	40-50	400-500	29-36
Joint assembly	15-20	150-200	11-14
Steering gear box			
Pressure hose to box	12-18	120-180	8.7-13
Return tube to box	12-18	120-180	8.7-13
Tie rod to rack (TRW)	69-90	690-900	50-65
Tie rod to rack (MANDO)	80-100	800-1000	58-72
Tie rod end lock nut	50-55	500-550	36-40
Rack support cover lock nut (TRW)	61-91	610-910	44-66
Rack support cover lock nut (MANDO)	50-70	500-700	36-51

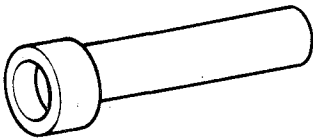
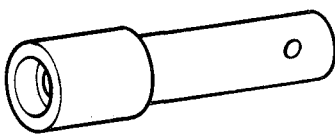


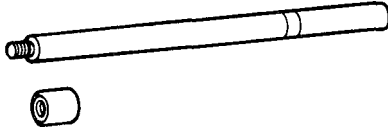
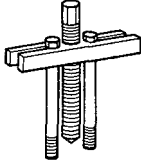
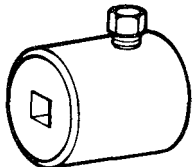
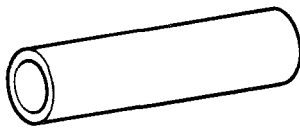
GENERAL

	N.m	kg.cm	lb.ft
Steering gear box			
Self locking nut (TRW)	25-35	250-350	18-25
Self locking nut (MANDO)	20-30	200-300	14-22
End plug (TRW)	48-76	480-760	35-55
End plug (MANDO)	50-70	500-700	36-51
Feed tubes (left and right)	12-18	120-180	8.7-13
Tie rod end to knuckle	24-34	240-340	17-25
Mounting bracket to crossmember	60-80	600-800	43-58
Oil pump			
Pressure hose to oil pump (jam nut)	16-24	160-240	12-17
Oil pump mounting bolt	17-26	170-260	12-19
Oil pump bracket mounting bolt	17-26	170-260	12-19
Pump cover to pump body	18-22	180-220	13-16
Suction connector to pump body	6-10	60-100	4.3-7.2
Flow control valve connector, to pump body	70-80	700-800	51-58
Guide bracket nut	30-40	300-400	22-49
Steering hoses and oil reservoir			
Oil reservoir installation bolt	8-12	80-120	5.8-8.7
Oil reservoir bracket mounting bolt	8-12	80-120	5.8-8.7
Cooler tube clamp mounting bolt (TRW)	8-12	80-120	5.8-8.7
Cooler tube clamp mounting bolt (MANDO)	4-6	40-60	2.9-4.3
Tube clip and tube bracket	8-12	80-120	5.8-8.7
Pressure hose bracket mounting bolt	8-12	80-120	5.8-8.7
Hose clamp	3-5	30-50	2.2-3.6

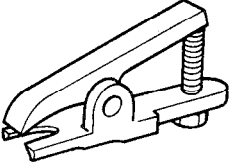
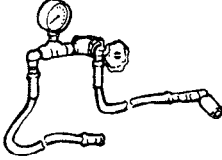
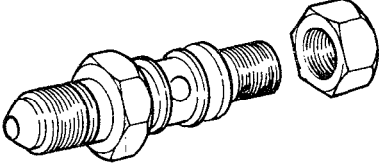
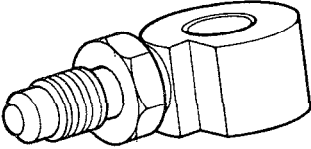
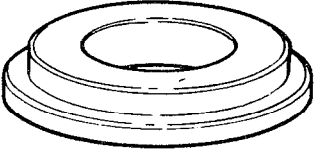
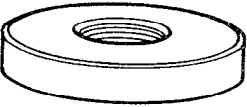
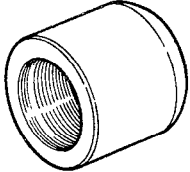
LUBRICANTS

Items	Specified lubricant	Quantity
Steering column bearing	Multipurpose grease SAE J310, NLGI No.2	As required
Steering gear box rack, pinion gear part	Multipurpose grease SAE J310, NLGI No.2	As required
Bellows	Silicone grease	As required
Oil pump	ATF DEXRON®II type	As required
Power steering fluid	ATF DEXRON®II type	0.9 lit (0.95 qts.)

SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09222-21100 Valve stem oil seal installer		Installation of the pinion gear bearing
09222-32100 Valve stem oil seal installer		Installation of the oil pump oil seal
09432-21601 Bearing installer		Installation of the pinion gear bearing
09517-21400 Drift		1) Removal of pinion gear bearing 2) Removal of pinion bearing outer race
09555-21000 Bar		Removal and installation of the oil seal (use with 09573—33000, 09573—33100, 09573—21000)
09561-11001 Steering wheel puller		Removal of the steering wheel
09565-11100 Pre-load socket		Measurement of the main shaft pre-load
09565-21000 Pinion bearing remover and installer		Removal and installation of pinion gear

GENERAL

Tool (Number and name)	Illustration	Use
09568—31000 Tie rod end puller		Separation of the tie rod end ball joint
09572—21000 Oil pressure gauge		Measurement of the oil pressure (use with 09572—33100, 09572—21200)
09572—21200 Oil pressure gauge adapter		Measurement of the oil pressure (use with 09572—21000, 09572—33100)
09572—33100 Oil pressure gauge adapter		Measurement of the oil pressure (use with 09572—21000, 09572—21200)
09573—21000 Oil seal installer guide		Installation of the back up washer and oil seal (use with 09573—33000, 09573—33100, 09555—21000)
09573—33000 Oil seal installer		Installation of the back up washer and oil seal (use with 09573—21000, 09573—33100, 09555—21000)
09573—33100 Oil seal guide		Removal and installation of the oil seal (use with 09573—21000, 09573—33000, 09555—21000)

GENERAL

TROUBLESHOOTING

Symptom	Probable cause	Remedy
Steering wheel return malfunction	Incorrect tire pressure	Adjust the tire pressure
Steering operation is "hard"	Incorrect tire pressure Loose belt Damaged belt Low fluid level Air in fluid line Twisted hose Incorrect mounting of the steering gear box on the crossmember Fluid leakage Incorrect wheel alignment (especially caster) Malfunction of gear box Malfunction of oil pump	Adjust the tire pressure Adjust the belt tension Replace the belt Refill fluid Bleed the system Correct the hose routing or replace the hoses Retighten Check the fluid leakage and retighten or replace Adjust the wheel alignment Check and replace the gear box if necessary Check the oil pump pressure and repair oil pump
Steering wheel pulls to one side	Excessive steering wheel play Insufficient tire inflation pressure Unevenly worn or deformed tire Dragging brake Deteriorated or broken front spring Deformed knuckle arm Poor wheel alignment Damaged wheel bearing Deformed or loose lower arm Loose linkage joints Malfunction of ball joints (Too small ball joint starting torque) Deteriorated or broken lower arm bushing Incorrect installation or internal damage in gear Malfunction of shock absorber	Adjust the steering wheel play Adjust the tire pressure Rotate the wheel or replace the tire Adjust Replace Replace Adjust the wheel alignment Replace Retighten or replace Retighten Replace Replace Correct or replace Replace

GENERAL

Symptom	Probable cause	Remedy
Steering wheel vibrates	Insufficient tire inflation pressure Unevenly worn or deformed tire(s) Loose hub nut Excessive runout, or unbalance of tire and wheel Poor wheel alignment Damaged wheel bearing Deformed or loose lower arm Deformed linkage Loose linkage joints Malfunction of ball joints (Too small ball joint starting torque) Malfunction of front suspension Incorrect installation or internal damage in gear box Malfunctioning of shock absorber	Adjust the tire pressure Rotate the wheels or replace the tire(s) Retighten Adjust the wheel balance or replace Adjust the wheel alignment Replace Retighten or replace Repair or replace Retighten Replace Check and adjust; replace the parts if necessary Correct or replace Replace
Road 'shock is felt in steering wheel	Insufficient steering wheel play Insufficient tire inflation pressure Unevenly worn or deformed tire(s) Malfunction of shock absorber	Adjust the steering wheel play Adjust the tire pressure Rotate the wheels or replace the tire(s) Replace
Poor recovery of steering wheel to straight ahead position	Insufficient tire inflation pressure Stuck or damaged ball joint Improper wheel alignment angles	Adjust the tire pressure Replace Adjust the wheel alignment
Rattling noise	Loose installation of oil pump or gear box Steering linkage looseness or play Loose oil pump pulley nut Interference around column or between pressure hose and other parts Abnormal noise inside the gear box and oil pump	Retighten the oil pump and gear box Retighten or replace the steering linkage Retighten the oil pump pulley nut Correct or replace the pressure hose and the parts around the column Replace the gear box or oil pump
Strident noise	Air sucked into oil pump Seizure inside oil pump	Check the oil level and hose clips; bleed the system or replace the oil pump Replace the oil pump
Squealing noise 1)	Loose belt Seizure inside oil pump	Adjust the belt tension Replace the oil pump

GENERAL

Symptom	Probable cause	Remedy
Hissing noise	Air sucked into oil pump Damage to the gear box port section Malfunction of return hose	Check the oil level and hose clips; bleed the system Replace the gear box Replace the hose
Whistling noise	Malfunction of gear box port section	Replace the gear box
Droning noise	Loose mounting bolt on oil pump or oil pump bracket Poor condition of oil pump body ²⁾	Retighten the pump bracket and pump installing bolt Replace the oil pump
Squeaking noise	Malfunction of steering stopper contact Interference of wheel with vehicle body Interference of steering shaft and joint assembly with other parts Malfunction of gear box	Check and adjust the steering stopper Adjust the steering angle Re position the interfering parts Replace the gear box
Shuddering vibration ³⁾	Air suction Malfunction of gear box	Bleed the system Replace the gear box
Oil leakage from hose connection	Improperly tightened flare nut Incorrectly inserted hose Improperly clamped hose	Check, repair or replace
Oil leakage from hose assembly	Damaged or clogged hose Hose connector malfunction	Replace
Oil leakage from oil reservoir	Leaking reservoir Overflow	Replace Bleed the system or adjust the oil level
Oil leakage from oil pump	Malfunction of oil *pump housing Malfunction of o-ring and/or oil seal	Replace the oil pump Replace the o-ring and oil seal
Oil leakage from gear box	Malfunction of gear box housing (including leakage from air hole) Malfunction of o-ring and/or oil seal	Replace the gear box Replace the o-ring and oil seal

NOTE

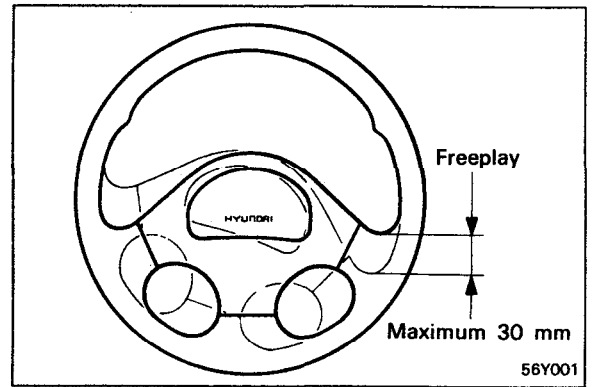
- 1) A squealing noise may be heard just after very cold engine start (-20°C or less), caused by fluid characteristics at extreme low temperatures. This is not a malfunction.
- 2) A slight “beat noise” is produced by the oil pump; this is not a malfunction. (This noise occurs particularly when a stationary steering effort is made.)
- 3) A slight vibration may be felt when a stationary steering effort is made due to the condition of the road surface. To check whether the vibration actually exists or not, test-drive the vehicle on a dry concrete or asphalt surface. A very slight amount of vibration is not a malfunction.

SERVICE ADJUSTMENT PROCEDURE

Checking Steering Wheel Free Play

1. Start the engine with the steering wheel in the straight ahead position. Apply a force of 5 N (1.1 lb) to the steering wheel in the peripheral direction.
2. Measure the play at the circumference of the steering wheel.

Steering wheel free play [Standard value]
 0-30 mm (0-1.1 in.)

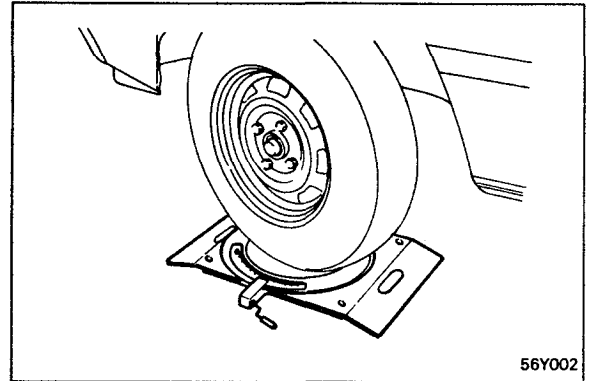


3. If the play exceeds the standard value, inspect the contact of the steering shaft and tie rod ball joints.

Checking Steering Angle

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

Wheel angle [Standard value]
 Inside wheel $37^{\circ}7' \pm 2^{\circ}$
 Outside wheel $30^{\circ}12'$



2. If the measured value is not within the standard value. Adjust the linkage.

Checking Steering Wheel Return

Check the steering wheel return and confirm the following points:

1. The force required to turn the steering wheel and the wheel return should be the same for left and right for both moderate turns and sharp turns.
2. When the steering wheel is turned 90° and held for a couple of seconds while the vehicle is being driven at 35 km/h (22 mph), the steering wheel should return at least 70% when it is released.

NOTE

If the steering wheel is turned very quickly, the steering wheel operation may be momentarily difficult. This is not a malfunction.

Checking Power Steering Fluid Level

1. Position the vehicle on a level surface.
2. Start the engine. With the vehicle kept stationary, turn the steering wheel several times continuously to raise the fluid temperature from 50 to 60°C (122 to 140°F).
3. With the engine at idle, turn the steering wheel fully clockwise and counterclockwise several times.
4. Make sure that there is no foaming or cloudiness in the reservoir fluid.
5. Stop the engine and check for any difference in fluid level between a stopped and a running engine.

NOTE

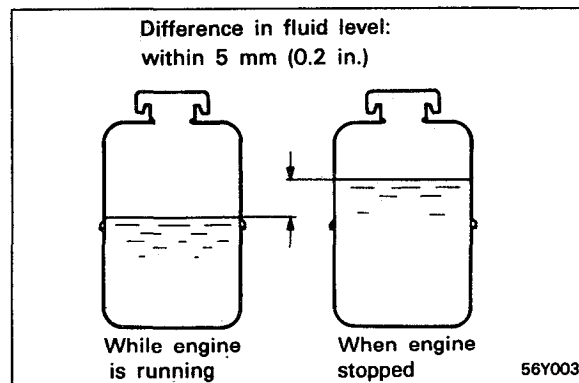
- 1) If the fluid level varies 5 mm (0.2 in.) or more, bleed the system again.
- 2) If the fluid level suddenly rises after stopping the engine, it shows that bleeding is not satisfactory.
- 3) Incomplete bleeding will produce a chattering sound in the pump and a noise in the flow control valve, decreasing durability of the pump, etc.

Replacing Power Steering Fluid

1. Jack up the -front wheels and support with rigid racks.
2. Disconnect the return hose from the oil reservoir and install a plug on the oil reservoir.
3. Connect a vinyl hose to the disconnected return hose, and drain the oil into a container.
4. Disconnect the high-tension cable at the ignition coil side. While operating the starter motor intermittently, turn the steering wheel all the way to the left and then to the right several times to drain the fluid.
5. Connect the return hoses securely, and then fill the oil reservoir with the specified fluid.
6. Bleed the system.

Automatic transmission fluid DEXRON®II type:

Total quantity : Approx. 0.9 liter



Air Bleeding

1. Disconnect the high tension cable, and while operating the starting motor intermittently (for 15 to 20 seconds), turn the steering wheel all the way to the left and to the right five or six times.

NOTE

- 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 the vehicle is idling, the air will be broken up and absorbed into the fluid; be sure to do the bleeding only while cranking.
2. Connect the high tension cable, and then start the engine (idling).
 3. Turn the steering wheel to the left and then to the right until there are no air bubbles in the oil reservoir.

CAUTION

Do not hold the steering wheel turned all the way to either side for longer than ten seconds.

4. Confirm that the fluid is not milky, and that the level is up to the specified position on the level gauge.
5. Confirm that there is little change in the surface of the fluid when the steering wheel is turned left and right.

CAUTION

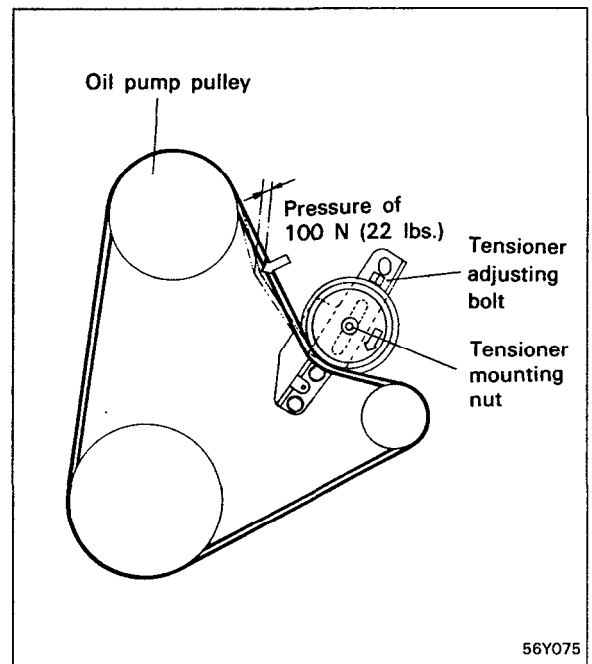
- 1) If the surface of the fluid changes considerably, air bleeding should be done again.
- 2) If the fluid level rises suddenly when the engine is stopped, it indicates that there is still air in the system.
- 3) If there is air in the system, a jingling noise may be heard from the pump and the control valve may also produce unusual noises. Air in the system will shorten the useful life of the pump and other parts.

Checking Power Steering Belt Tension

1. Press the ribbed V-belt by applying a pressure of 98 N (10 kg, 22 lb) at the specified point, and measure the deflection to confirm that it is within the standard value range.

V-belt deflection [Standard value]

On vehicle check.....	6-9 mm (0.24-0.35 in.)
When installed: New belt.. . .	4-5 mm (0.16-0.20 in.)
Used belt	7 mm (0.276 in.)

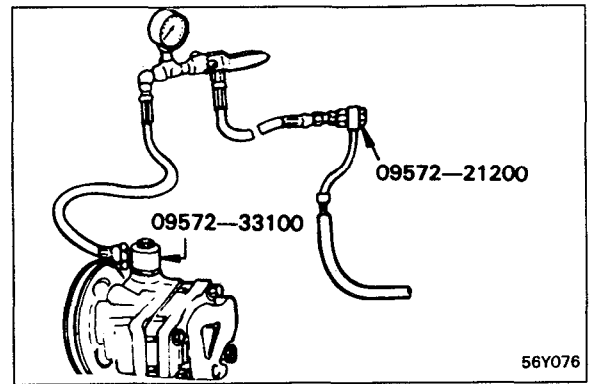


56Y075

2. To adjust the belt tension, loosen the tensioner mounting nut and move the tensioner to obtain the standard value.

Oil Pump Pressure Test

1. Disconnect the pressure hose from the oil pump, and then connect the special tool between the oil pump and pressure hose as illustrated.
2. Bleed the air. Start the engine and turn the steering wheel several times so that the fluid temperature rises to approximately 50°C (122°F) operating temperature.
3. Set the engine speed to 1,000 rpm.
4. Fully close and then fully open the shut-off valve of the special tool and measure the fluid pressure to confirm that it is within the standard value range.



Oil pump pressure [Standard value]

Gauge hose valve closed
7.85 MPa (80 kg/cm², 1138 psi) or less

CAUTION

Be sure not to keep the shut-off valve on the pressure gauge closed for longer than ten seconds.

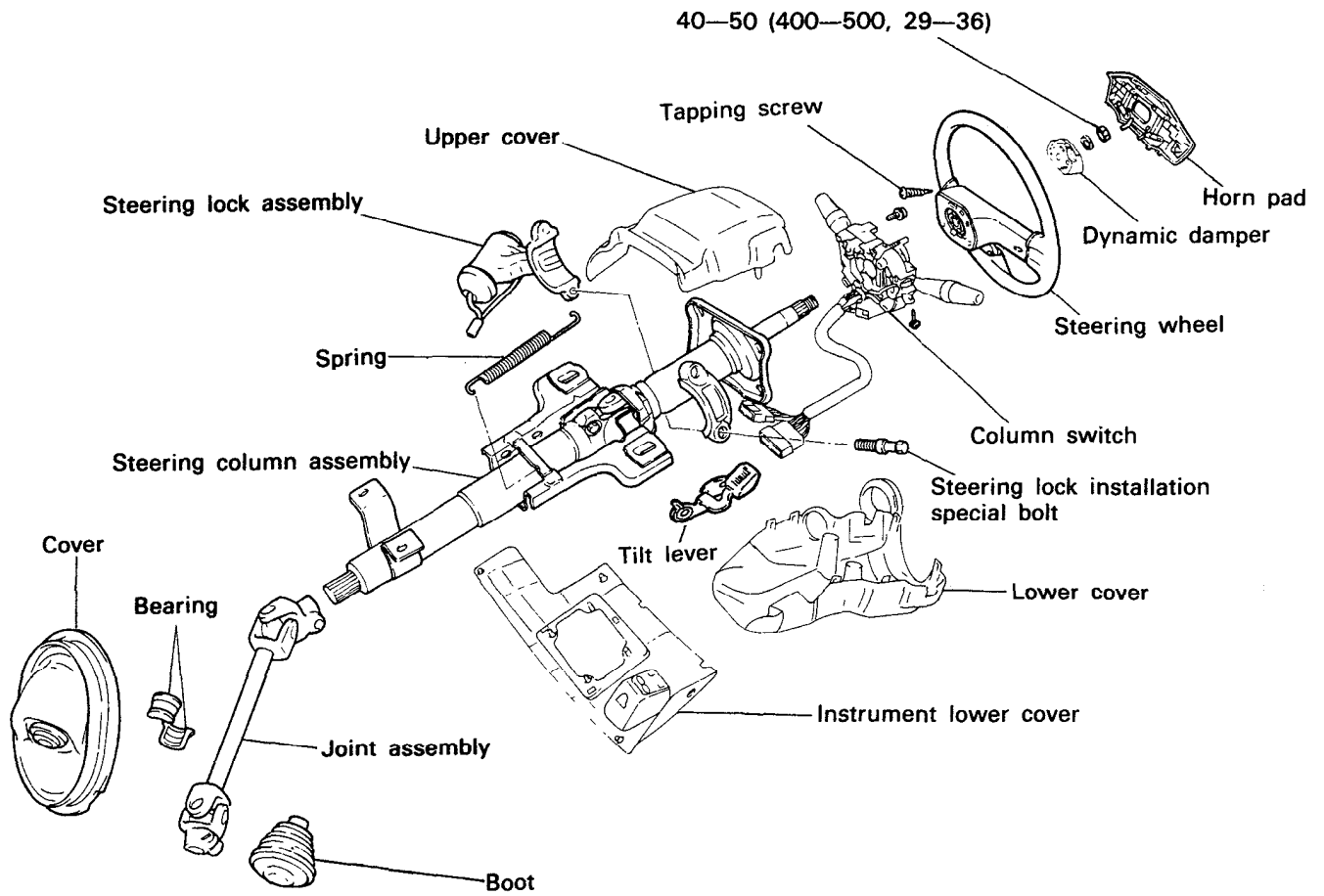
5. Remove the special tools and then tighten the pressure hose to the specified torque.

Tightening torque.....
16-24 Nm (160-240 kg.cm, 12-17 lb.ft)

6. Bleed the system.

STEERING COLUMN AND SHAFT

COMPONENTS

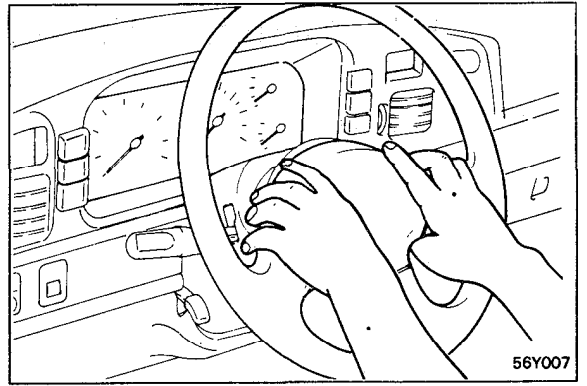


TORQUE : Nm (kg.cm, lb.ft)

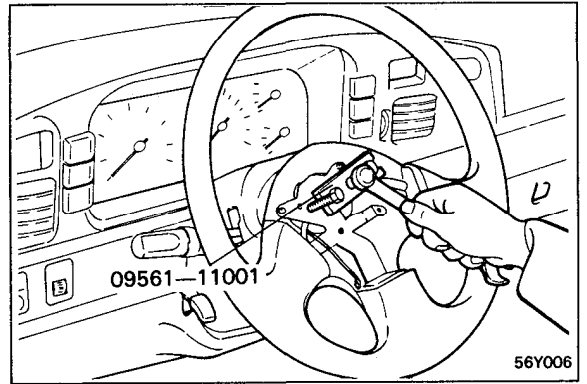
STEERING COLUMN AND SHAFT

REMOVAL

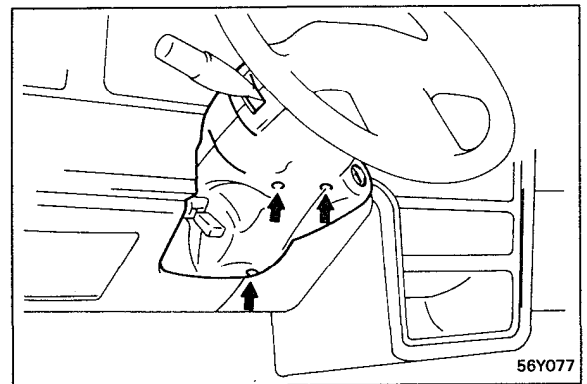
1. Loosen the tapping screws and lift up the horn pad and remove it.
2. Remove the lock nut and the washer.



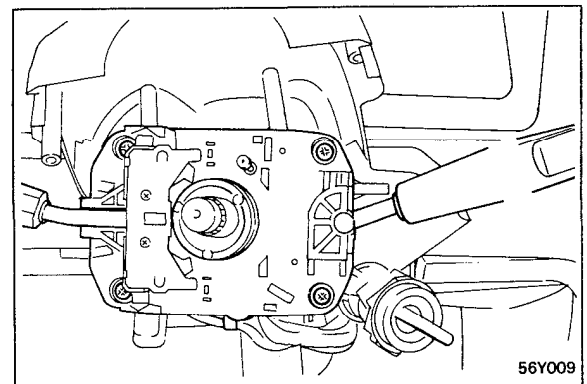
3. Install the special tool (09561-11001) and remove the steering wheel.



4. Remove the steering column lower and upper shrouds.
5. Remove the lower cover.

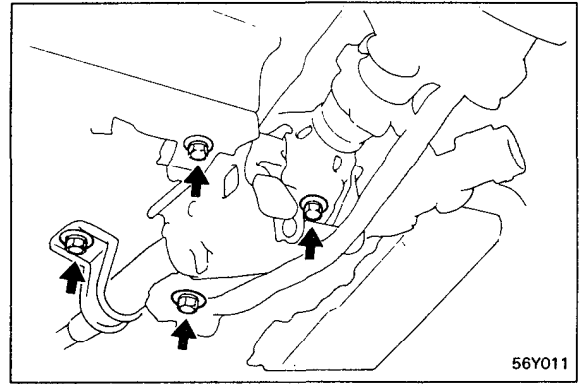


6. Disconnect the connectors and remove the multifunction switch.

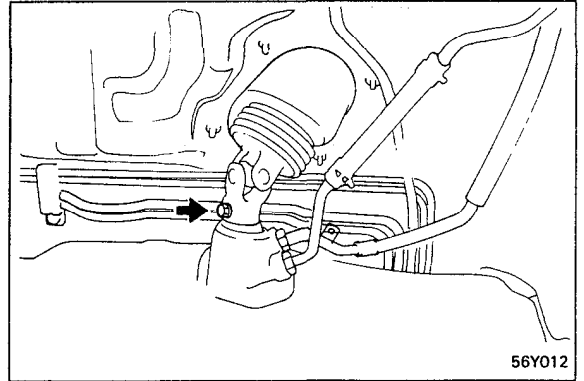


STEERING COLUMN AND SHAFT

7. Remove the steering column mounting bolts (4 bolts).

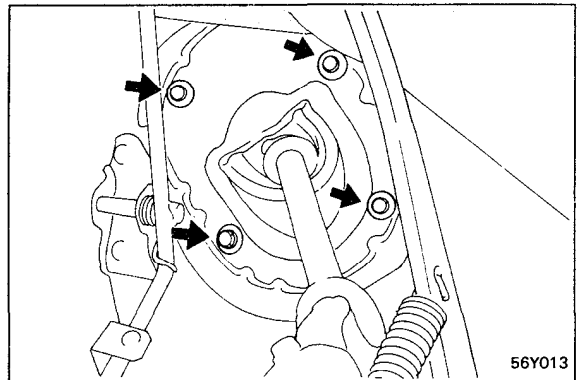


8. Remove the bolts securing the coupling and universal joint. Pull out the coupling and universal joint from the gear box.



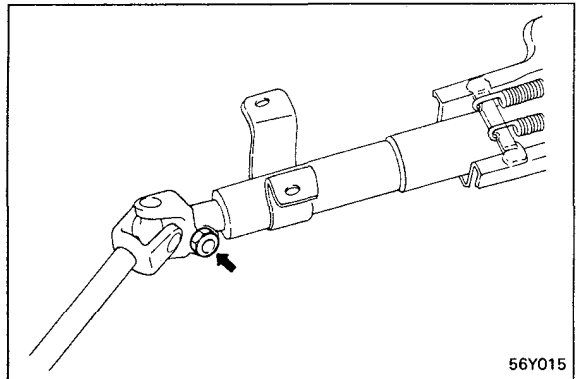
9. Remove the dust cover mounting bolts.

10. Remove the steering column and shaft together with the universal joint and dust cover.



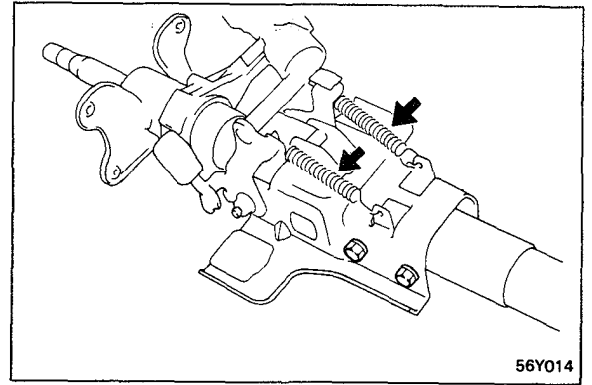
DISASSEMBLY

1. Remove the coupling and universal joint from the steering column and shaft assembly.

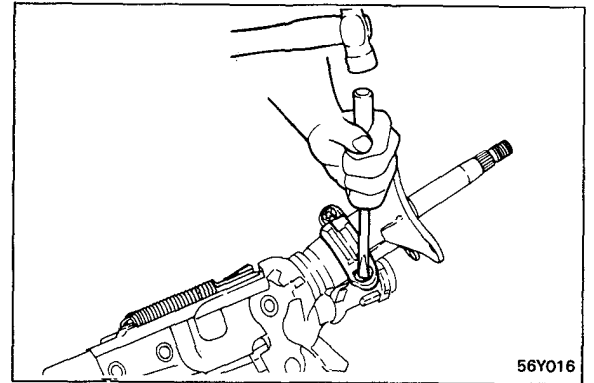


STEERING COLUMN AND SHAFT

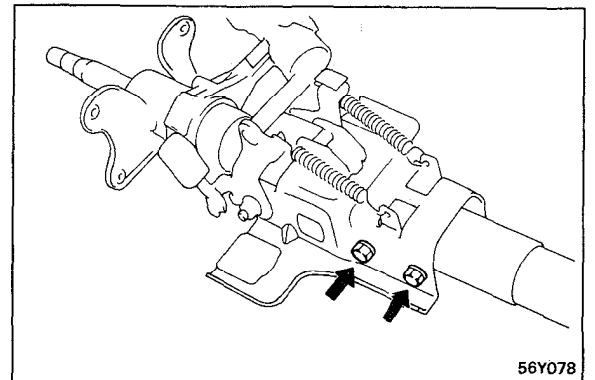
2. Remove the springs.



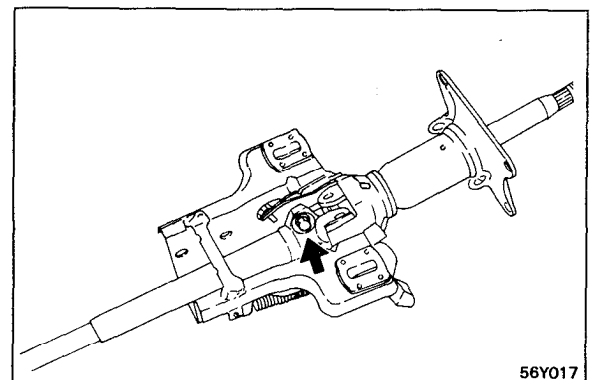
3. If it is necessary to remove the steering lock, detach it using a screw driver and hammer as illustrated.



4. Remove the steering column assembly by loosening 4 bolts.



5. Remove the bolt and separate the lower steering shaft from the tilting joint.



INSPECTION

1. Check the steering shaft for damage.
2. Check the upper and lower bearings for wear or damage.
3. Check the joints for excessive play, damage or rough movement.
4. Check the tilt bracket for cracks or damage.
5. Check the cover or boot for damage.
6. Check that the steering lock mechanism operates properly.
If necessary, replace.

ASSEMBLY

1. Assembly is reverse of the removal procedure.
2. When installing the steering lock assembly, match up the groove on the shaft with the hook on the steering lock in the steering column.

INSTALLATION

1. Before installation, apply multipurpose grease to the groove on the inside of the bearing and mating surfaces of the boot and cover assembly.
2. Connect the steering lower shaft and joint assembly.

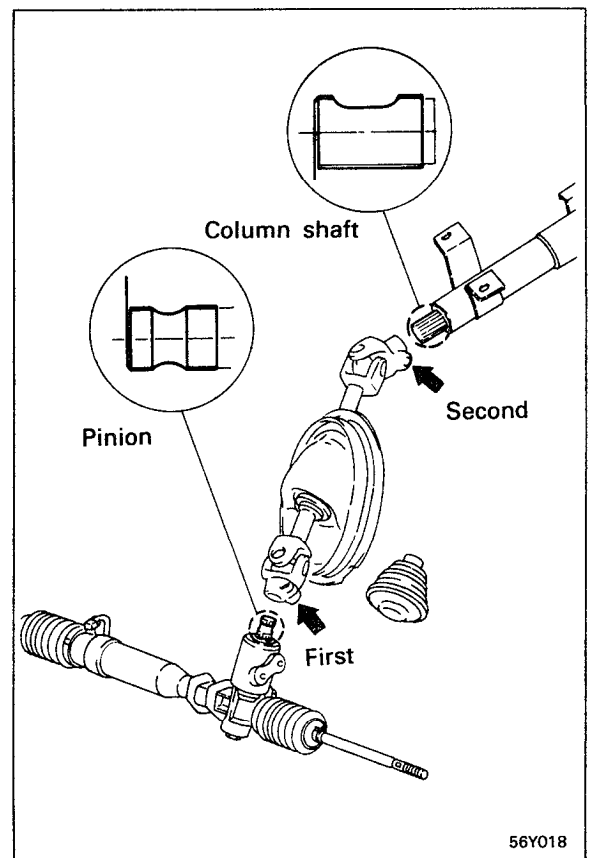
NOTE

When installing, secure the U-joint to the gear box first, then to the steering column shaft.

3. Install the dust cover with column shaft assembly.
4. Install the steering column assembly to the column member assembly (4 bolts).
5. Install the malfunction switch and connect the connectors.
6. Install the lower cover and upper and lower shroud.
7. Install the steering wheel and the dynamic damper.

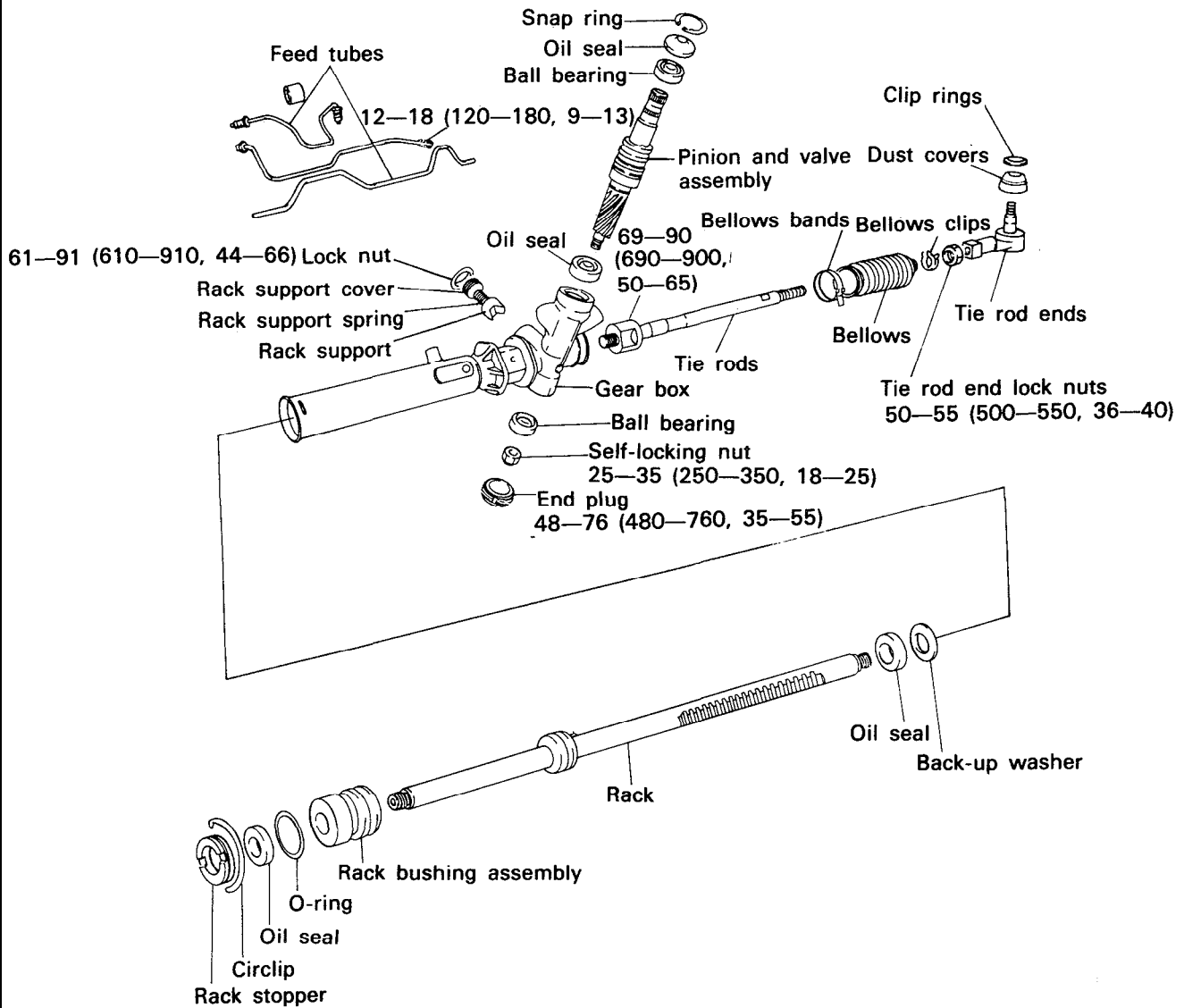
NOTE

When installing, do not use a hammer as the collapsible column shaft could be damaged.



POWER STEERING GEAR BOX (FOR U.S.A., CANADA)

COMPONENTS

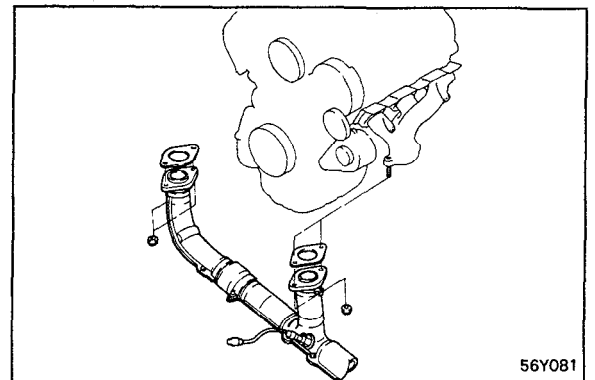
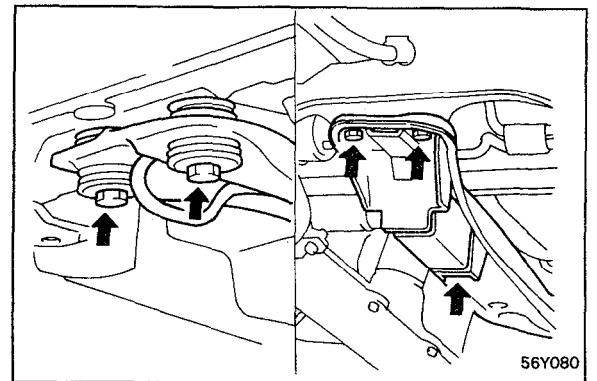
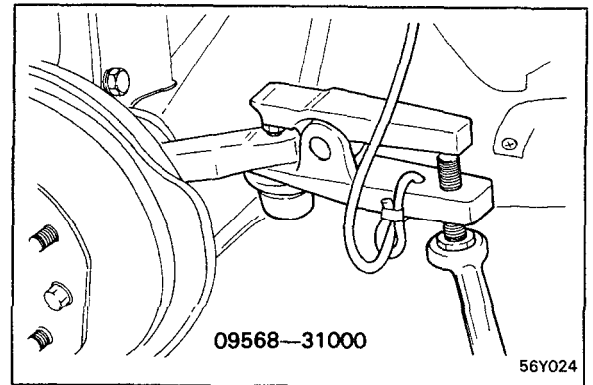
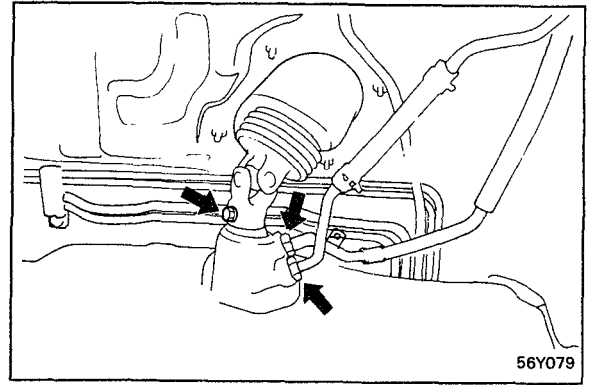


TORQUE : Nm (kg.cm, lb.ft)

POWER STEERING GEAR BOX (TRW)

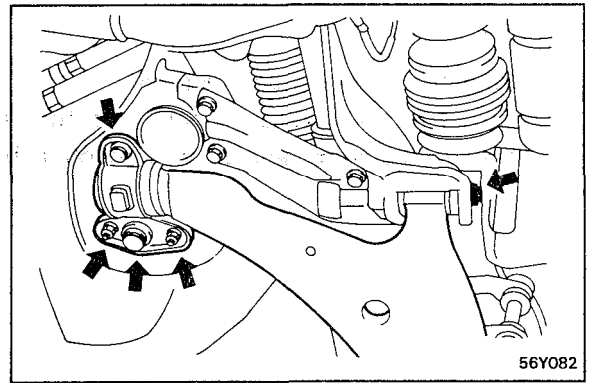
REMOVAL

1. Drain the power steering fluid.
2. Disconnect the pressure hose and the return tube.
3. Remove the joint assembly connecting bolt.
4. Using the special tool (09568-31000), disconnect the tie rod end from the knuckle arm.
5. Remove the center member assembly with front roll stopper.
6. Disconnect the front muffler temporarily.

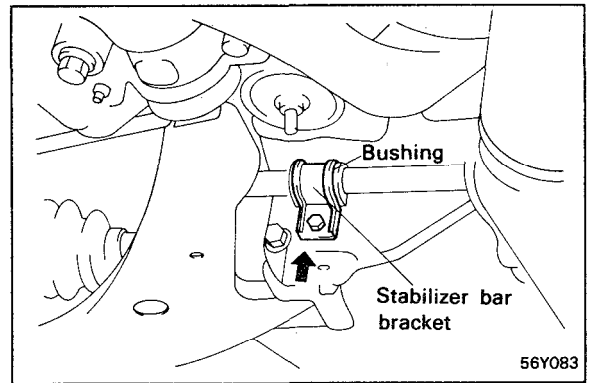


POWER STEERING GEAR BOX (TRW)

7. Remove the stay and disconnect the left lower arm.



8. Remove the stabilizer bar.



9. Remove the steering gear box mounting brackets and remove the steering gear box assembly together with mounting rubber.

NOTE

Move the rack completely to the right and then remove the gear box to the left from the crossmember.

CAUTION

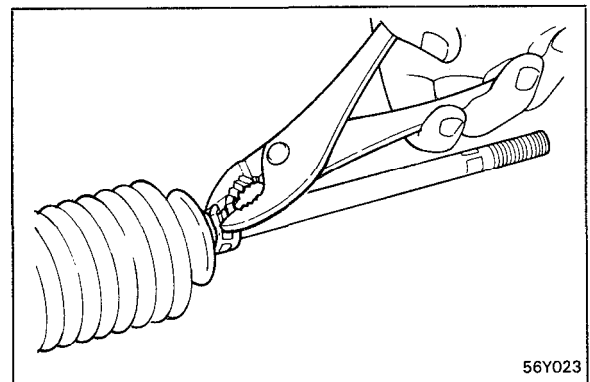
When removing the gear box, pull it out carefully and slowly to avoid damaging the boots.

DISASSEMBLY

1. Remove the bellows band and bellows clip.
2. Pull the bellows out toward the tie rod.

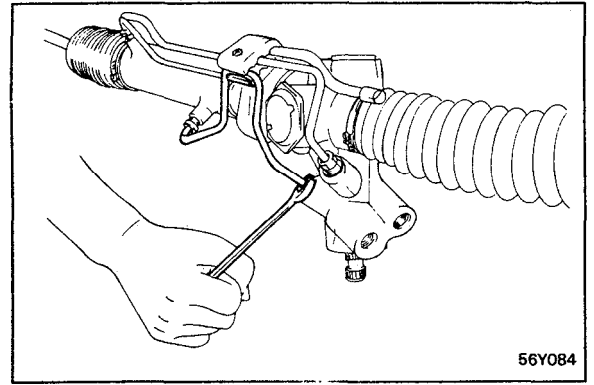
NOTE

Check for rust on the rack when the bellows are replaced.



POWER STEERING GEAR BOX (TRW)

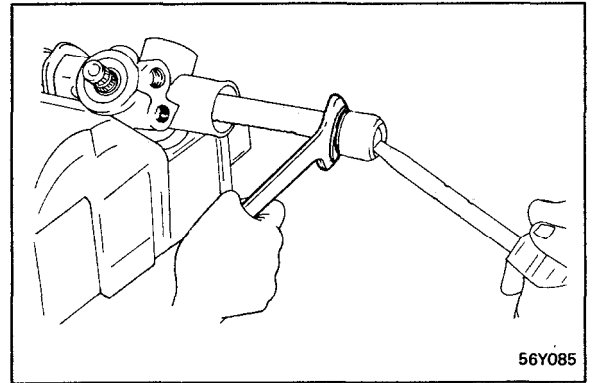
3. Remove the feed tubes from the gear housing.
4. While moving the rack slowly, drain the fluid from the gear housing.



5. Remove the tie rod from the rack.

NOTE

When removing the tie rod from the rack, be careful not to twist the rack.



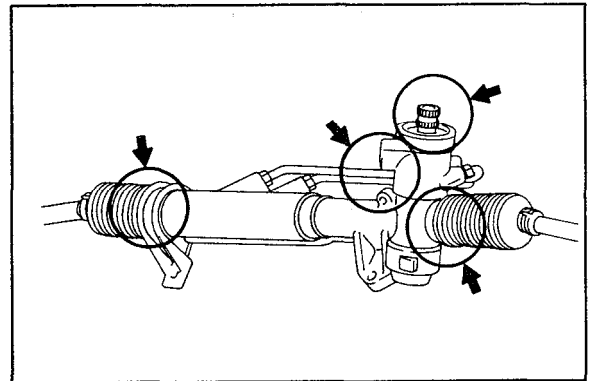
INSPECTION

1. Boot damage, cracking or ageing.
2. Individual leakage breakdown as illustrated.

CAUTION

According to the TRW'S A/S supply policy, components inside of the TRW power steering gear box should not be repaired or replaced.

If necessary, they will supply a complete gear box assembly for you.



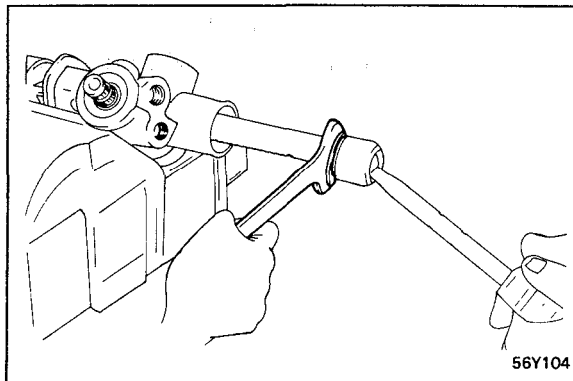
ASSEMBLY

1. Install the tie rod to the rack.

CAUTION

Be careful not to twist the rack.

2. Tighten the feed tube to the specified torque together with mounting strap and install the pressure line clip using the pine three clip.



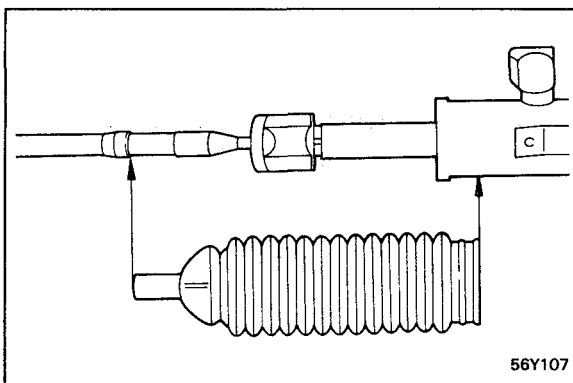
3. Apply the specified grease to the bellows position (fitting groove) of the tie rod.

Recommended grease
 Multipurpose grease SAE J310a. NLGI No.2

4. Install the bellows, taking care not to twist them.

NOTE

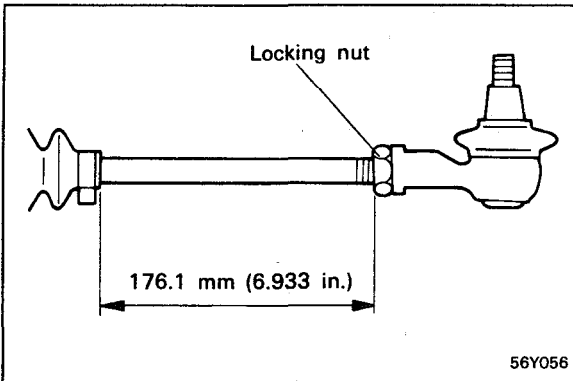
Whenever the bellows are installed, a new band must be used.



5. Install the tie rods so that the length of the left and right tie rods will be equal to the standard value.

Tie rod free length [Standard value].
 176.1 mm (6.933 in.)

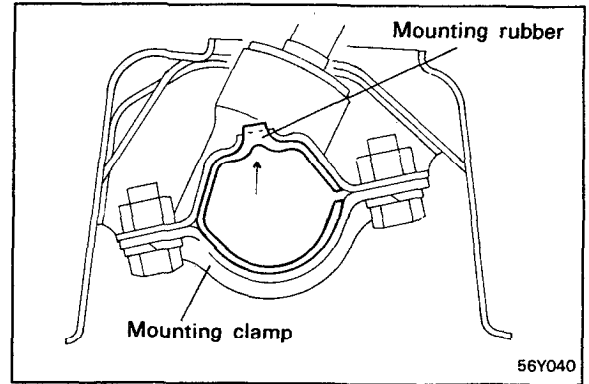
6. Check the total pinion preload.



POWER STEERING GEAR BOX (TRW)

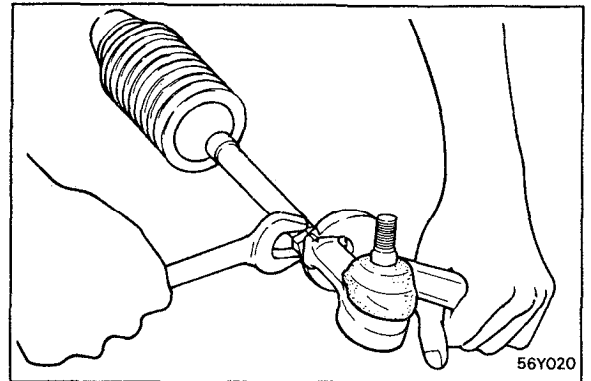
INSTALLATION

1. When installing the mounting rubber, align the projection of the mounting rubber with the indentation in the cross-member to install the gear box.
2. Confirm that there is no oil leak.
3. Confirm that the steering wheel rotates smoothly when it is turned.
4. Adjust the toe-in.
5. Install the parts by reference to torque specifications.

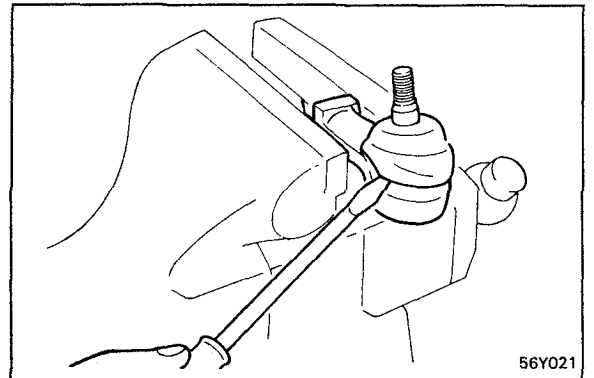


TIE ROD OVERHAUL

1. Remove the tie rod end from the tie rod.

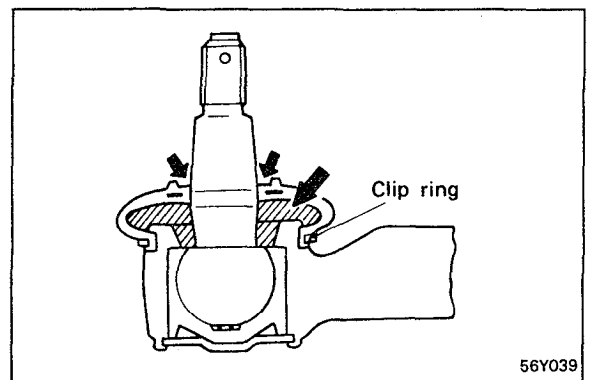


2. Remove the dust cover from the ball joint.



3. Fill the dust cover inner side and lip with the specified multipurpose grease, and fix the dust cover in position with the clip ring attached in the groove of the tie rod end.

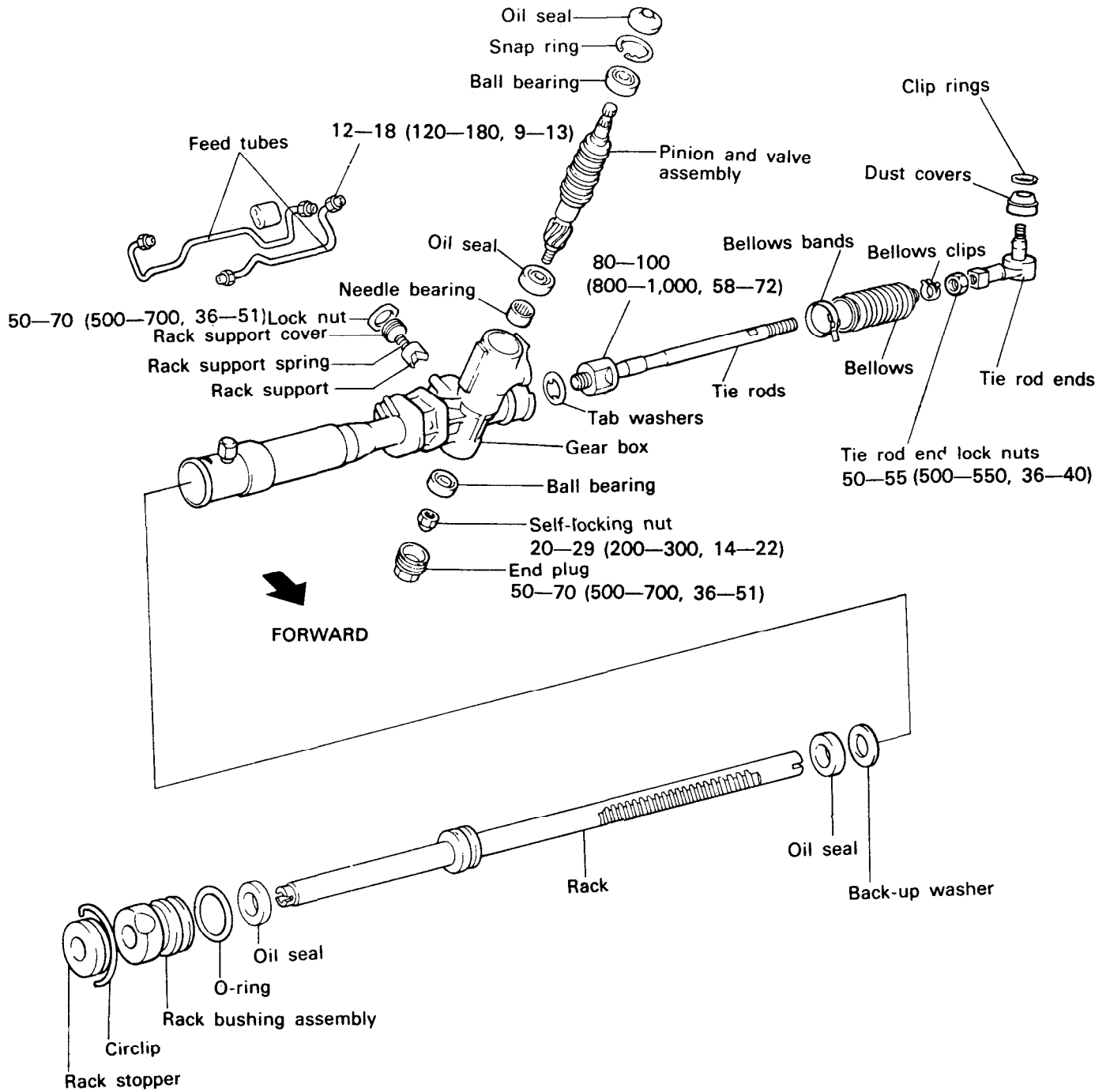
Recommended grease
Multipurpose grease SAE J310a, NLGI No.2



POWER STEERING GEAR BOX (MANDO)

POWER STEERING GEAR BOX

COMPONENTS

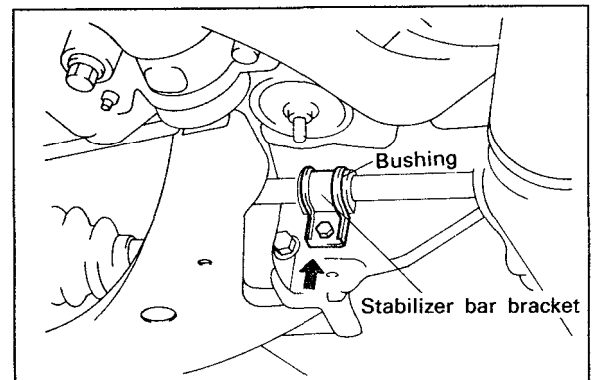
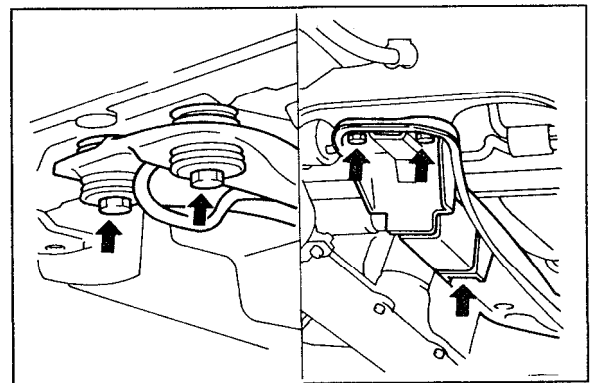
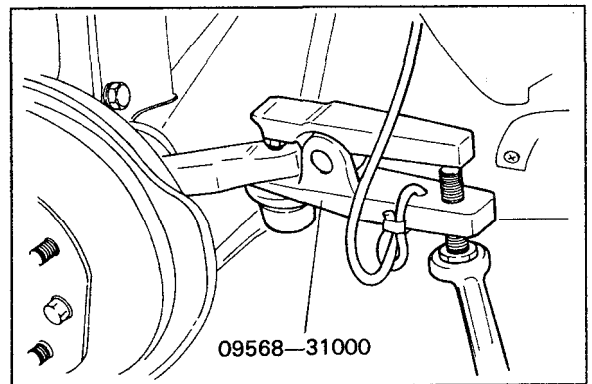
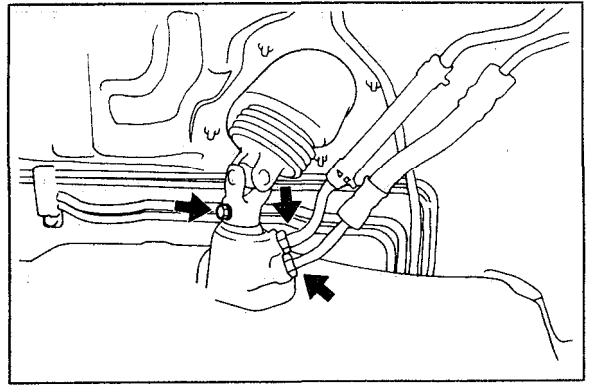


TORQUE : Nm (kg.cm, lb.ft)

POWER STEERING GEAR BOX (MANDO)

REMOVAL

1. Drain the power steering fluid.
2. Disconnect the pressure hose and the return tube.
3. Remove the joint assembly connecting bolt.
4. Using the special tool (09568-31000), disconnect the tie rod end from the knuckle arm.
5. Remove the center member assembly and retighten the front muffler assembly temporarily.
6. Remove the stabilizer bar.
7. Remove the steering gear box mounting brackets.



POWER STEERING GEAR BOX (MANDO)

8. Remove the steering gear box assembly together with mounting rubber.

NOTE

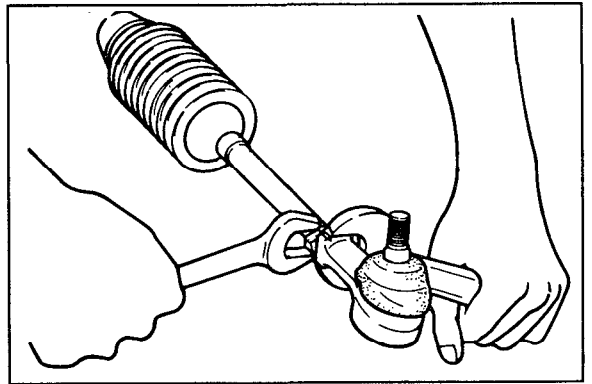
Move the rack completely to the right and then remove the gear box to the left from the crossmember.

CAUTION

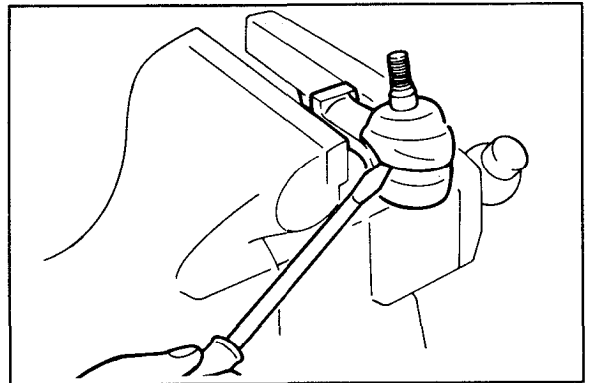
When removing, the gear box, pull it out carefully and slowly to avoid damaging the boots.

DISASSEMBLY

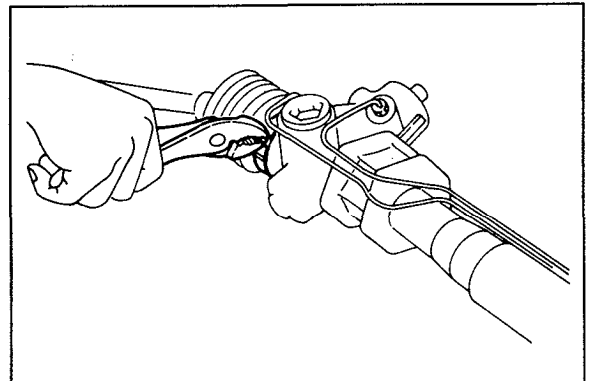
1. Remove the tie rod end from the tie rod.



2. Remove the dust cover from the ball joint.



3. Remove the bellows band.



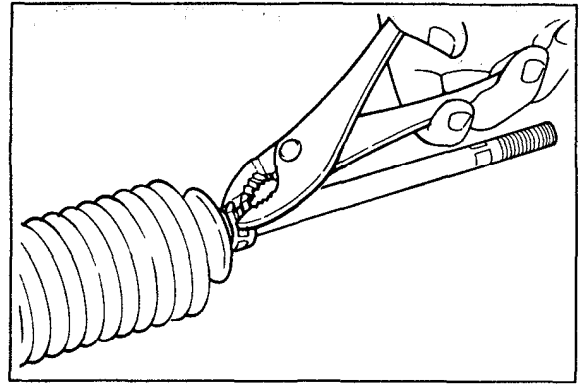
POWER STEERING GEAR BOX (MANDO)

4. Remove the bellows clip.
5. Pull the bellows out toward the tie rod.

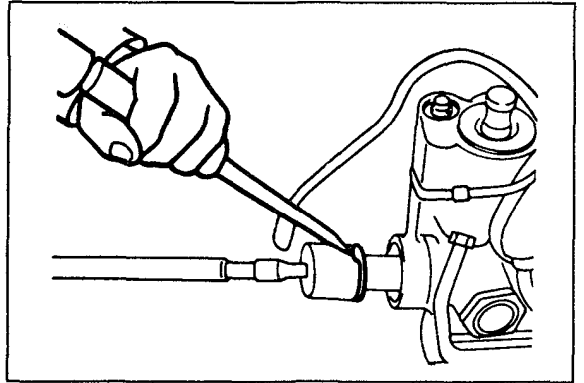
NOTE

Check for rust on the rack when the bellows are replaced,

6. Remove the feed tube from the gear housing.
7. While moving the rack slowly, drain the fluid from the gear housing.



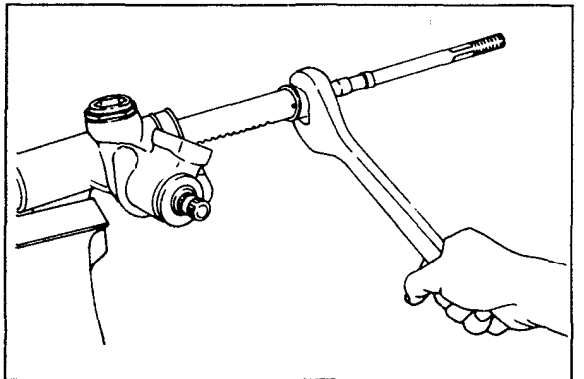
8. Unstake the tab washer which fixes the tie rod and rack with a chisel.



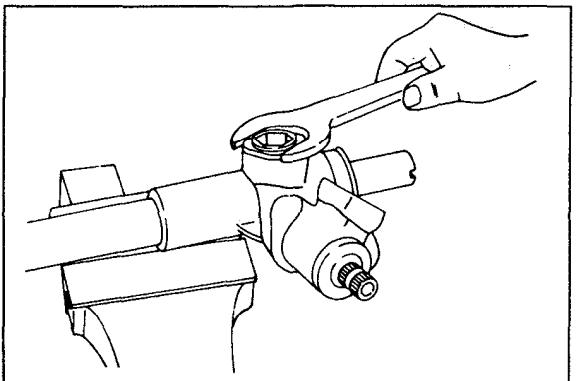
9. Remove the tie rod from the rack.

CAUTION

Remove the tie rod from the rack, taking care not to twist the rack.

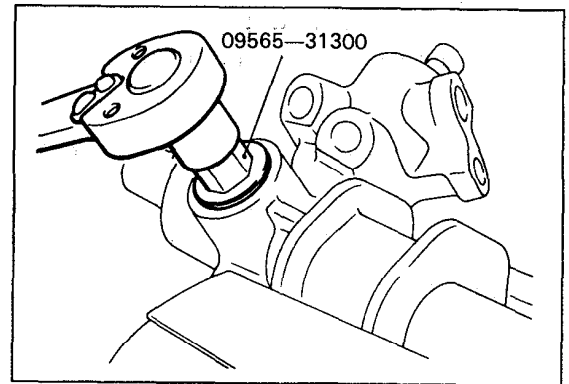


10. Remove the rack support cover locking nut.

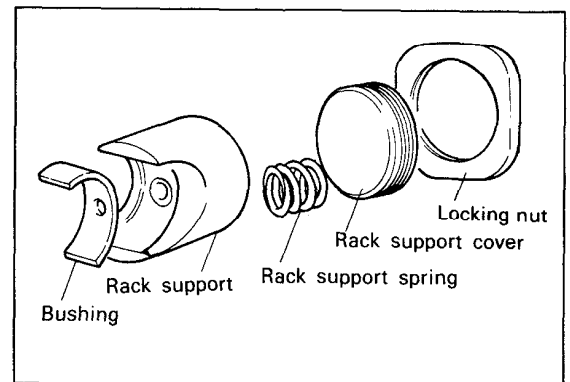


POWER STEERING GEAR BOX (MANDO).

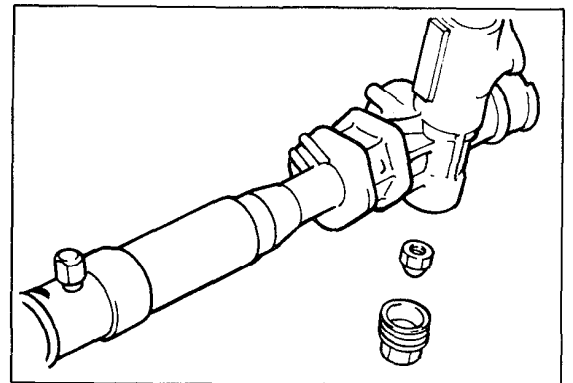
11. Using the special tool (09565-31300), remove the rack support cover.



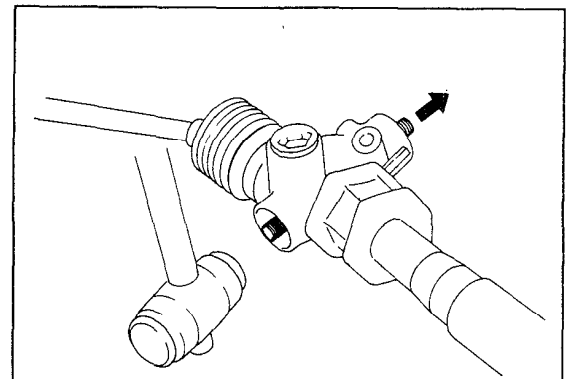
12. Remove the rack support spring, rack support and bushing from the gear box.



13. Remove the end plug and self-locking nut.
14. Remove the snap ring with a snap ring plier.

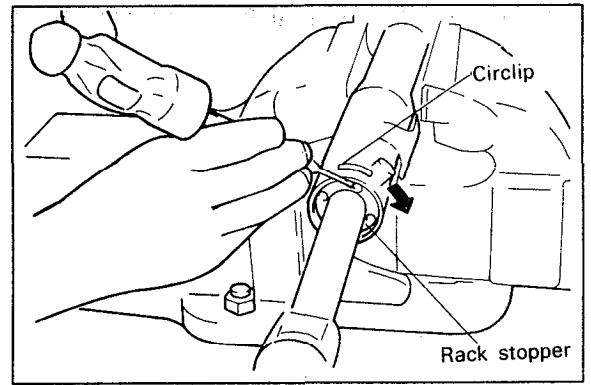


15. Remove the pinion and valve assembly together with the oil seal (upper) using a soft hammer.



POWER STEERING GEAR BOX (MANDO)

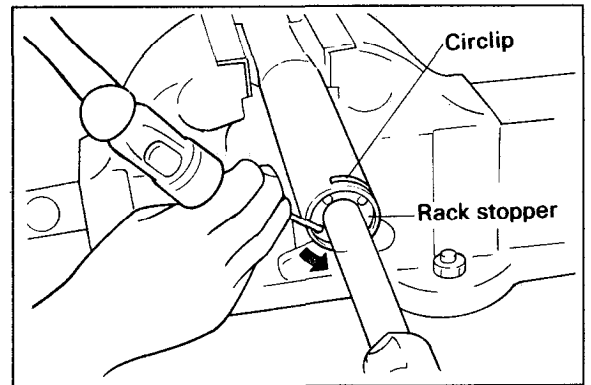
16. Turn the rack stopper clockwise until the end of the circlip comes out of the slot in the gear housing.



17. When the end of the circlip comes out from the notched hole of the housing rack cylinder, turn the rack stopper counter-clockwise and remove the circlip.

CAUTION

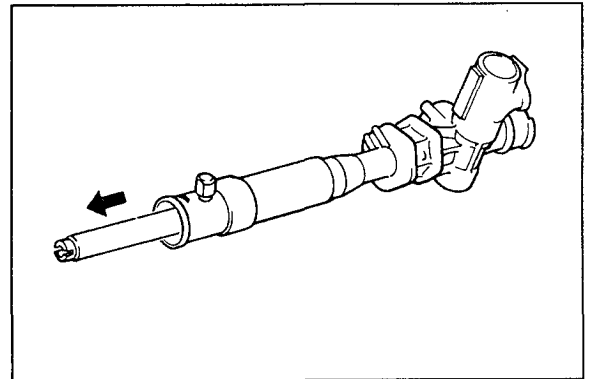
Do not damage the rack.



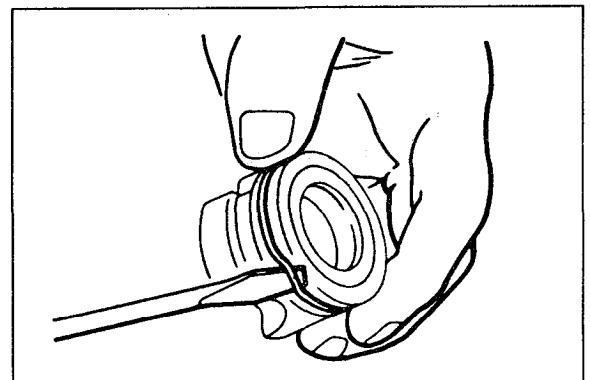
18. Remove the rack stopper, rack bushing and rack from the gear housing by moving it toward the piston side.

CAUTION

When the rack has been removed, be sure to replace the housing side oil seal with a new one.

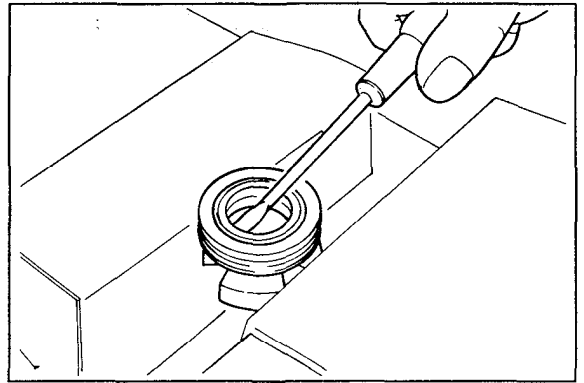


19. Remove the O-ring from the rack bushing.



POWER STEERING GEAR BOX (MANDO)

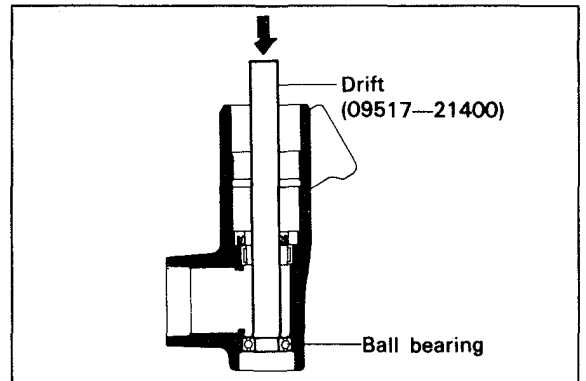
20. Remove the oil seal from the rack bushing.



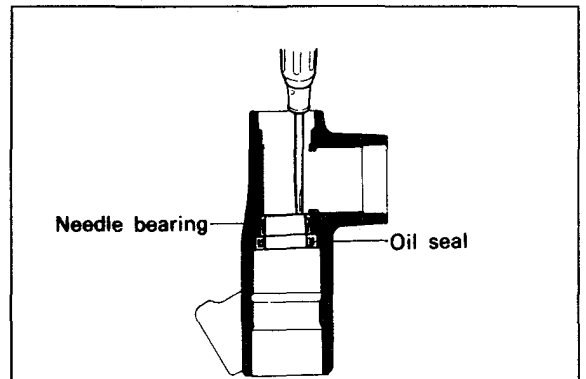
21. Drive out the ball bearing using special tool (09517-21400) and hammer.

CAUTION

Do not damage the pinion valve cylinder inside of the gear housing.



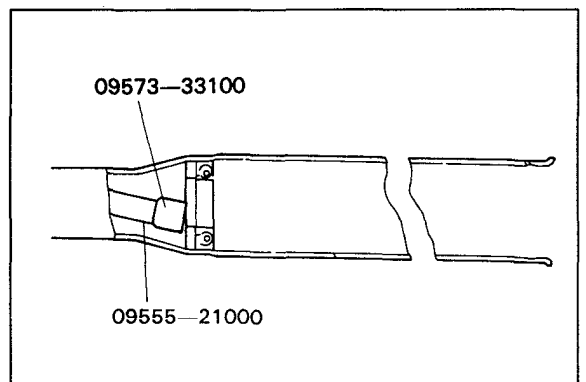
22. Drive out the needle bearing and oil seal.



23. Use the special tools (09555-21000, 09573-33100) to remove the back washer and oil seal from the gear housing.

CAUTION

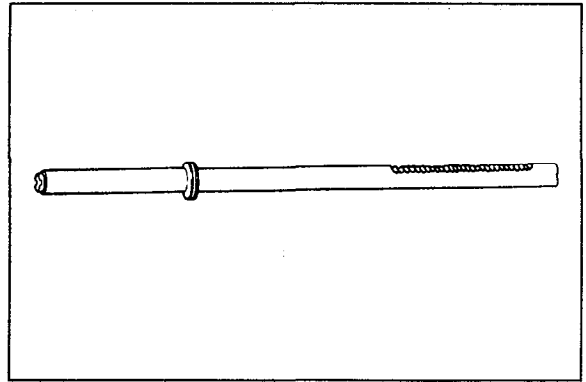
Do not damage the rack cylinder inside of the gear housing.



INSPECTION

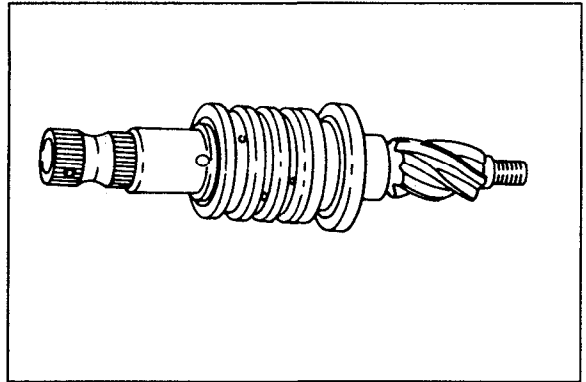
1. Rack

- 1) Rack tooth face damage or wear
- 2) Oil seal contact surface damage
- 3) Bending or twisting
- 4) Oil seal ring damage or wear
- 5) Oil seal damage or wear



2. Pinion valve

- 1) Pinion gear tooth face damage or wear
- 2) Oil seal contact surface damage
- 3) Seal ring damage or wear
- 4) Oil seal damage or wear



3. Bearing

- 1) Seizure or abnormal noise during bearing rotation
- 2) Excessive play
- 3) Missing needle bearing rollers

4. Others

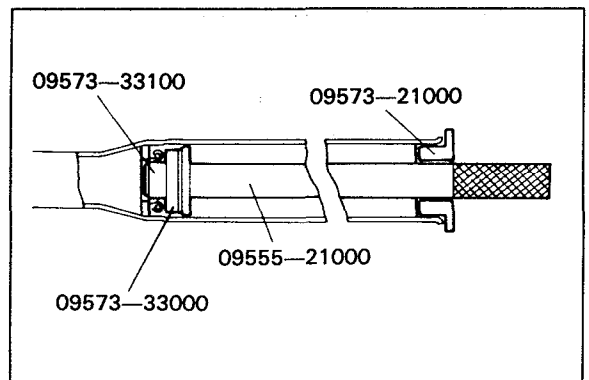
- 1) Damage of the gear housing cylinder bore
- 2) Boot damage, cracking or ageing

ASSEMBLY

- 1. Apply the specified fluid to the entire surface of the oil seal and gear housing.

Recommended fluid.....
 Automatic transmission fluid DEXRON®II type

- 2. Using the special tools (09555-21000, 09573-21000, 09573-33000, 09573-33100) install the backup washer and oil seal to the specified position in the gear housing.

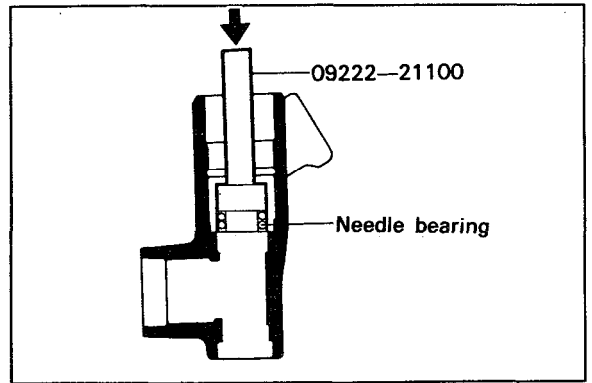


POWER STEERING GEAR BOX (MANDO)

3. Apply the specified grease to the entire surface of the needle bearing.

Recommended grease
Multipurpose grease SAE J310a, NLGI No.2

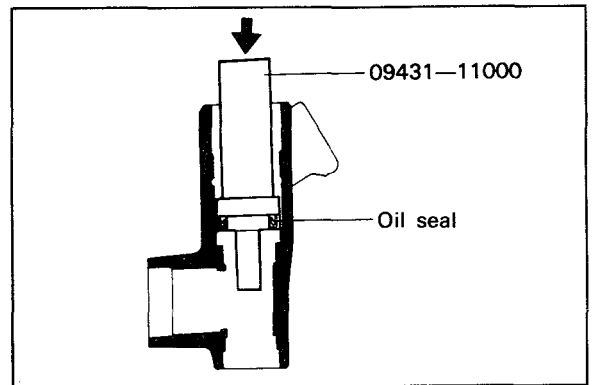
4. Install the needle bearing in the gear housing using special tool (09222-21100).



5. Set the scribed side of the oil seal (inner) in the special tool (09431-11000) and install in the gear housing.

CAUTION

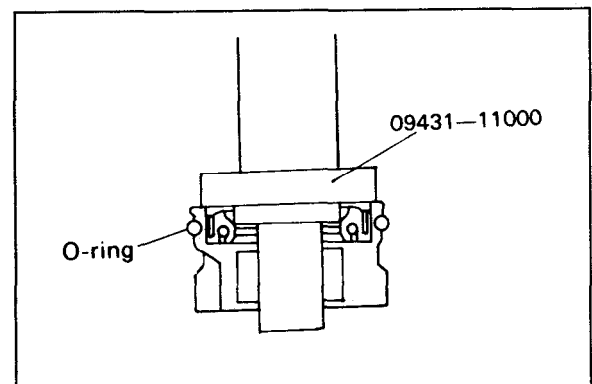
- 1) Note the direction of the oil seal.
- 2) Use a new oil seal.



6. Apply the specified fluid to the entire surface of the rack bushing oil seal.

Recommended fluid.....
Automatic transmission fluid DEXRON® II type

7. Install the oil seal on the rack bushing.
8. Apply the specified fluid to the entire surface of the O-ring and install to the rack bushing using the special tool (09431-11000).



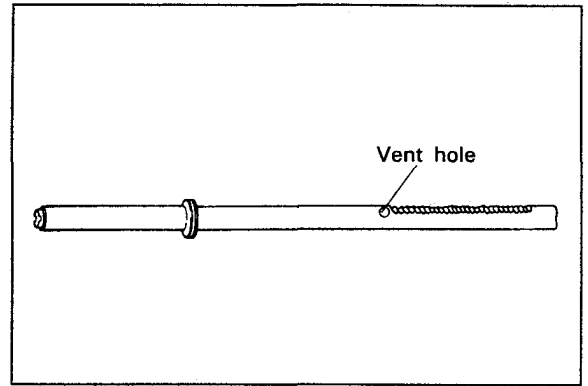
POWER STEERING GEAR BOX (MANDO)

9. Apply the specified grease to the rack teeth.

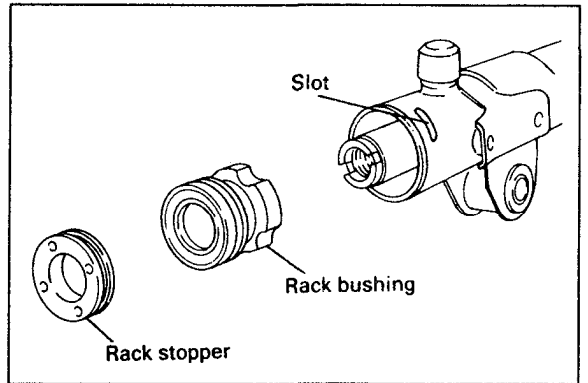
Recommended grease
Multipurpose grease SAE J310a, NLGI grade #2 EP

CAUTION

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



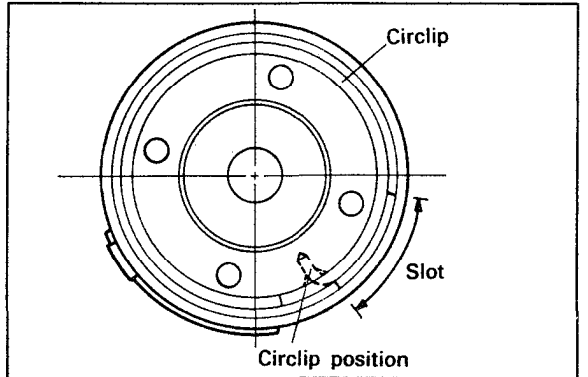
10. Insert the rack into the gear housing.
Install the rack bushing and rack stopper.



11. Push in the rack stopper until the circlip groove of the rack stopper is aligned with the notched hole of the rack housing and then install the circlip while turning the rack stopper.

CAUTION

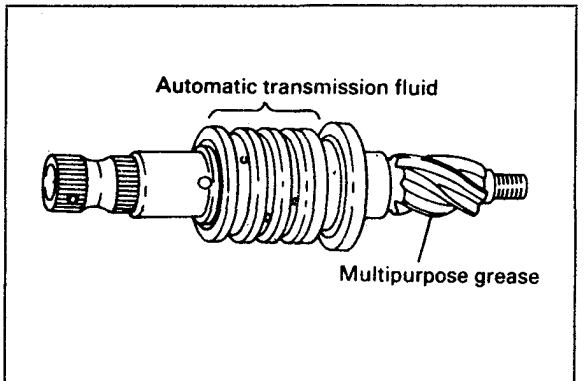
The circlip end should not be visible through the notched hole of the rack housing.



12. Apply the specified fluid and grease to the pinion valve assembly and install to the gear housing assembly.

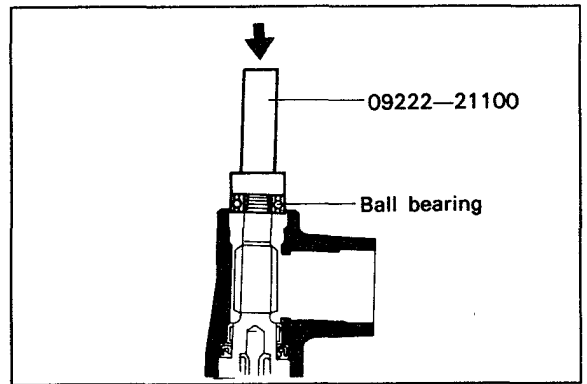
Recommended fluid.....
Automatic transmission fluid DEXRON®II type

Recommended grease
Multipurpose grease SAE J310a, NLGI Grade #2 EP

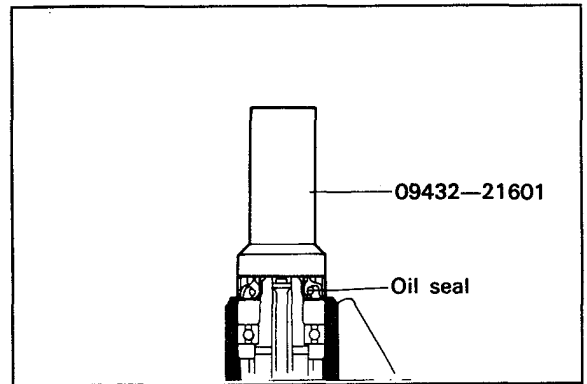


POWER STEERING GEAR BOX (MANDO)

13. Install the ball bearing using special tool (09222-21100).
14. Install the pinion and valve assembly to the valve housing.



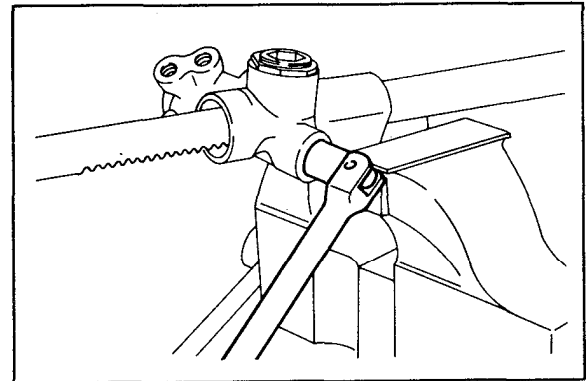
15. Install the oil seal using the special tool (09432-21601).
16. Install the snap ring with snap ring pliers.



17. With the pinion turned all the way clockwise, tighten the self-locking nut.

CAUTION

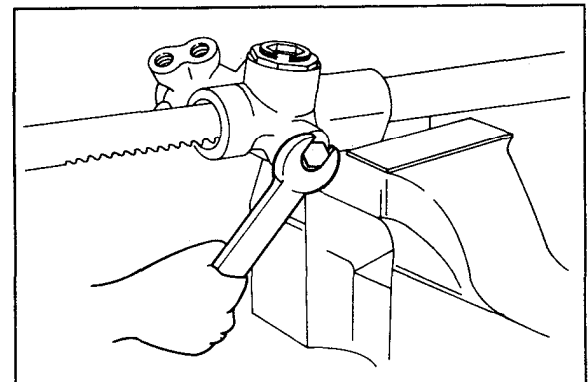
Always replace the self-locking nut with a new one.



18. Apply semi-drying sealant to the threaded section of the end plug and tighten to the specified torque.

Tightening torque.....
50-70 Nm (500-700 kg.cm, 36-51 lb.ft)

19. Stake the end plug at two points on its circumference with a punch.

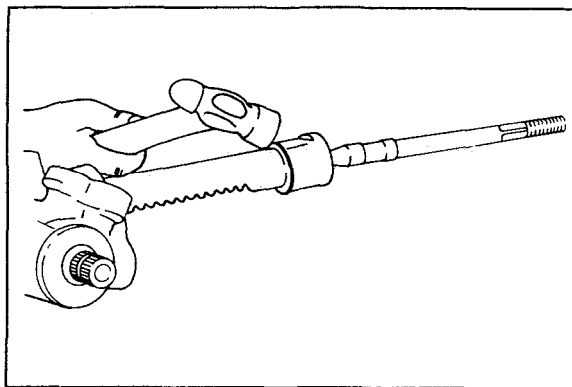


POWER STEERING GEAR BOX (MANDO)

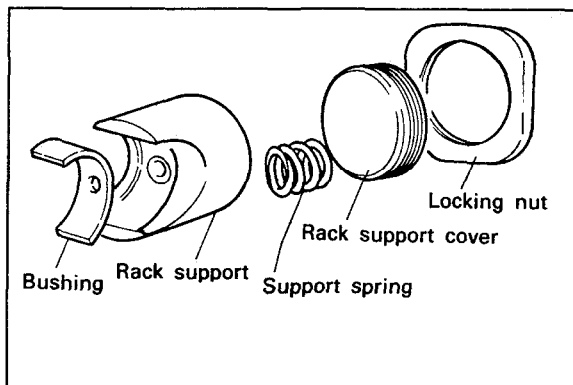
20. Install the tab washer and then the tie rod and peen the tab washer end at two points to the tie rod.

CAUTION

- 1) Align the tab washer pawls with the rack grooves.
- 2) Use a new tab washer.



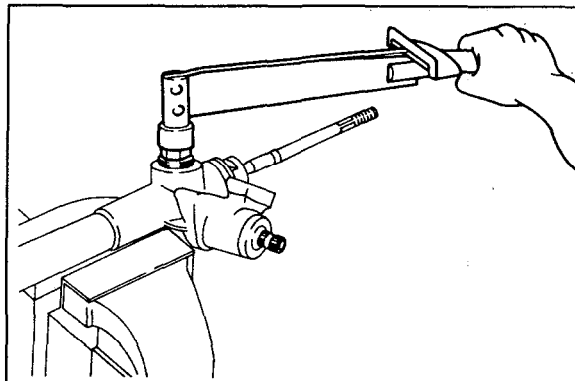
21. Install the bushing, rack support, rack support spring and rack support cover in the order shown. Apply thread sealant to the threaded section of the rack support cover before installation.



22. With the rack placed at the center position, attach the rack support cover to the gear housing. Tighten the rack support cover within the range of 11 Nm (112 kg.cm, 8 lb.ft), using the special tool. Loosen the rack support cover for approximately 30° to 60°, and tighten the locking nut to the specified torque.

Lockint nut . . . 50-70 Nm (500-700 kg.cm, 36-51 lb.ft)

23. Tighten the feed tube to the specified torque and install the mount rubber using adhesive.



24. Apply the specified grease to the bellows fitting position (fitting groove) of the tie rod.

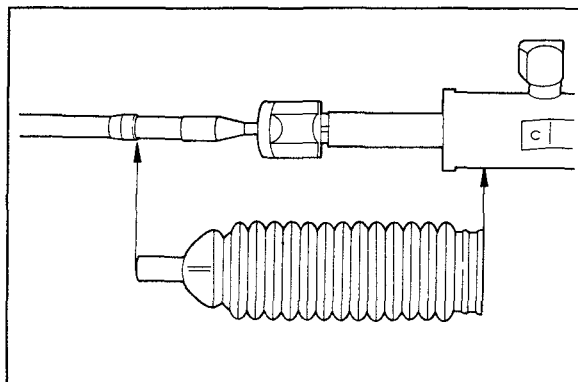
Recommended grease
Multipurpose grease SAE J310a, NLGI grade #2 EP

24. Install the new attaching band to the bellows.

CAUTION

Whenever the bellows are installed, a new band must be used.

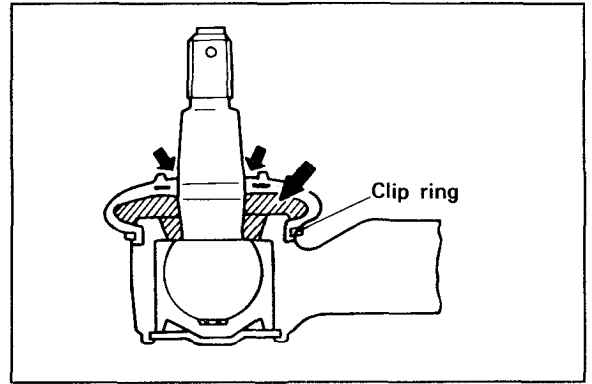
26. Install the bellows in, taking care not to twist it.



POWER STEERING GEAR BOX (MANDO)

27. Fill the dust cover inner side and lip with the specified multipurpose grease, and fix the dust cover in position with the clip ring attached in the groove of the tie rod end.

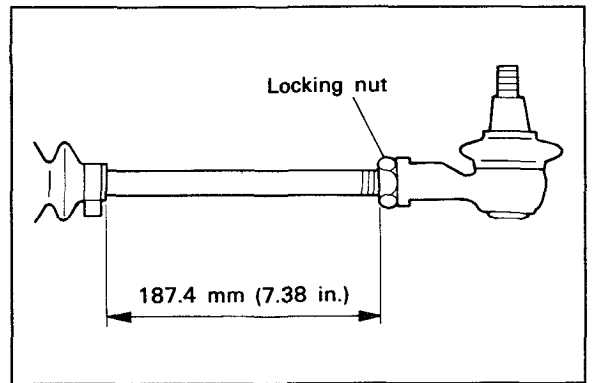
Recommended grease
Multipurpose grease SAE J310a, NLGI grade #2 EP



28. Install the tie rods so that the length of the left and right tie rods will be equal to the standard value.

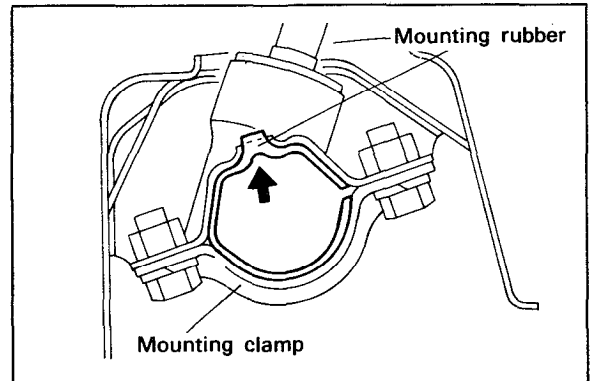
Tie rod free length [Standard value].
187.4 mm (7.38 in.)

29. Confirm the total pinion preload.



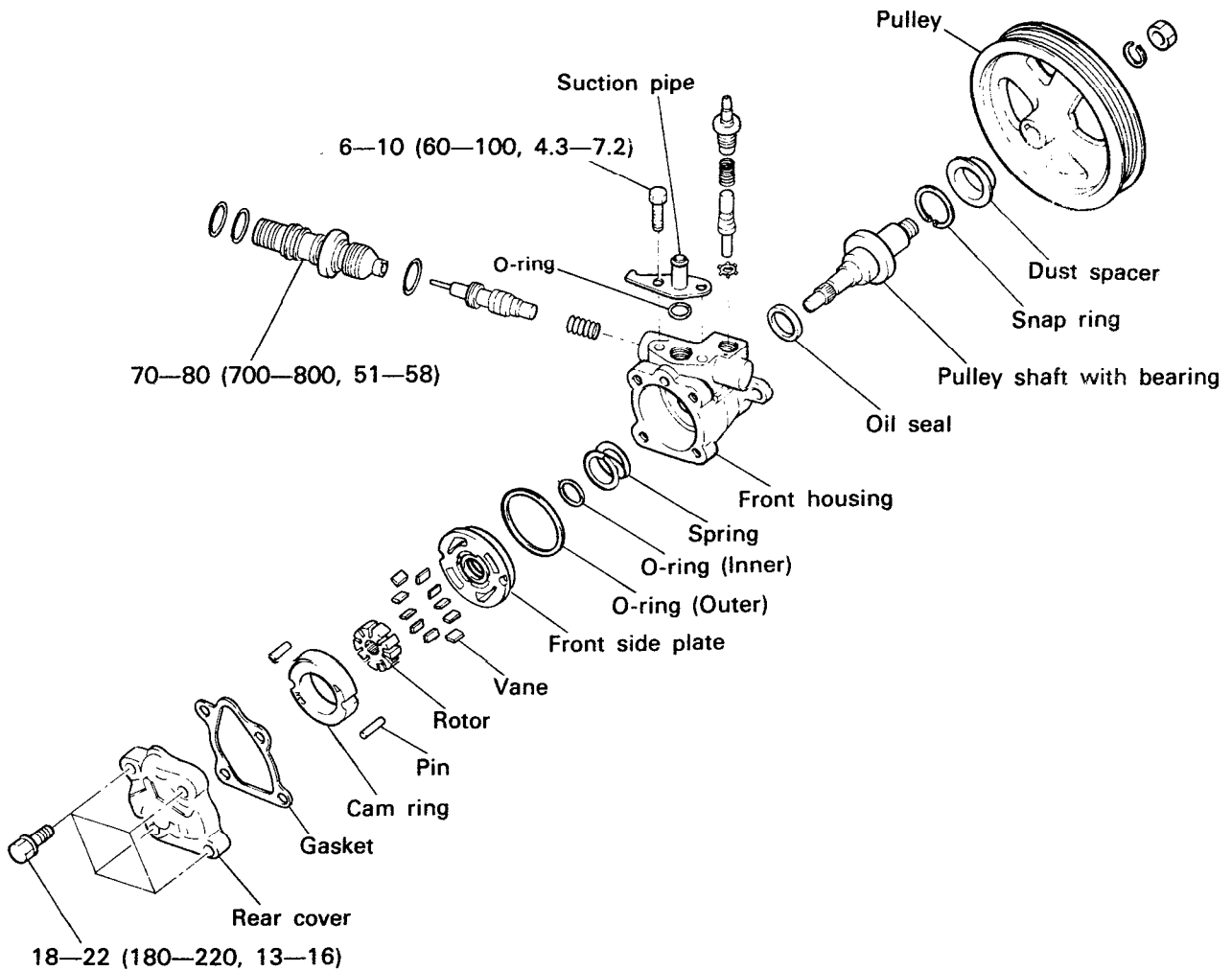
INSTALLATION

1. When installing the mounting rubber, align the projection of the mounting rubber with the indentation in the cross-member to install the gear box.
2. Confirm that there is no oil leak.
3. Confirm that the steering wheel rotates smoothly when it is turned.
4. Adjust the toe-in.
5. Install the parts by reference to torque specifications.



POWER STEERING OIL PUMP

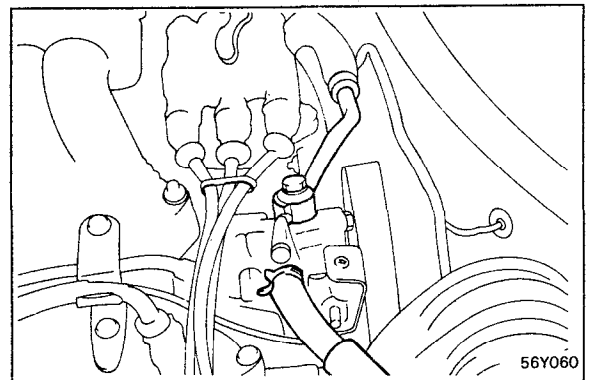
COMPONENTS



TORQUE : Nm (kg.cm, lb.ft)

REMOVAL

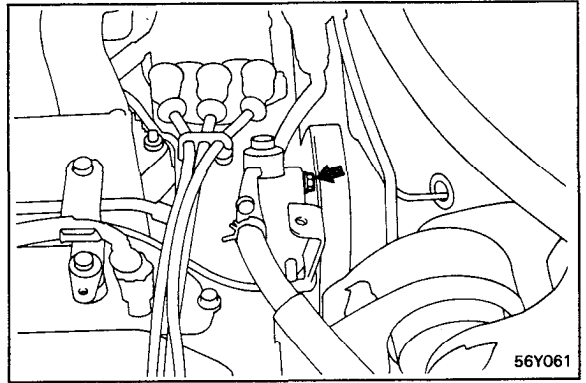
1. Remove the pressure hose from the oil pump.
2. Disconnect the suction hose from the suction connector and drain the fluid into a container.



56Y060

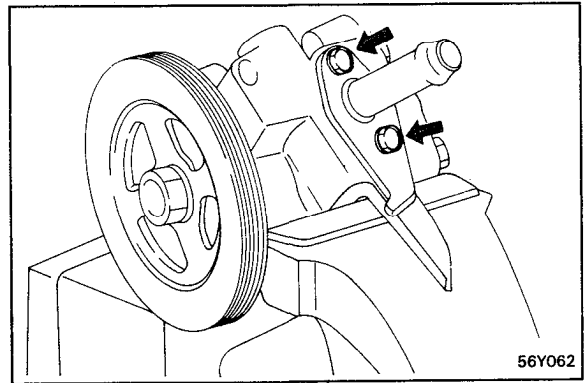
POWER STEERING OIL PUMP

3. Loosen the tensioner mounting nut and adjusting bolt, then remove the ribbed V-belt.
4. Remove the oil pump bracket mounting bolt and disconnect the pressure switch connector.

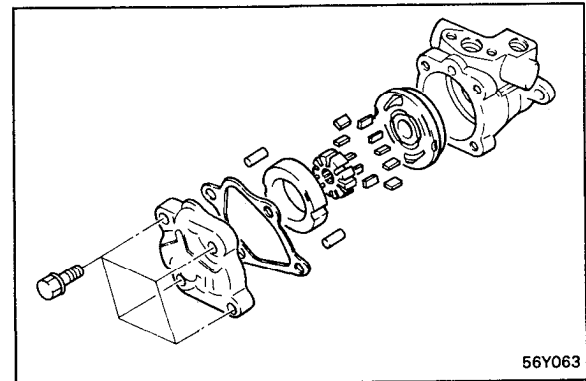


DISASSEMBLY

1. Remove the suction connector and the O-ring from the oil pump.



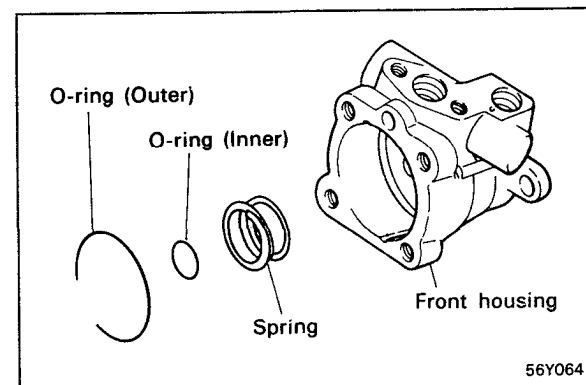
2. Remove the rear cover with the gasket and pins.
3. Remove the cam ring.
4. Remove the rotor and vanes.
5. Remove the front side plate.



6. Remove the inner and outer O-ring.
7. Remove the spring.

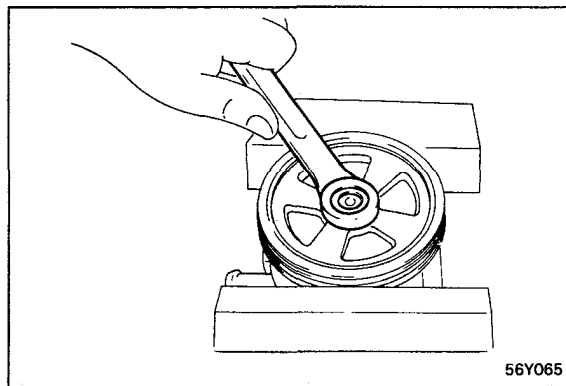
NOTE

When assembling, use a new gasket and O-ring.

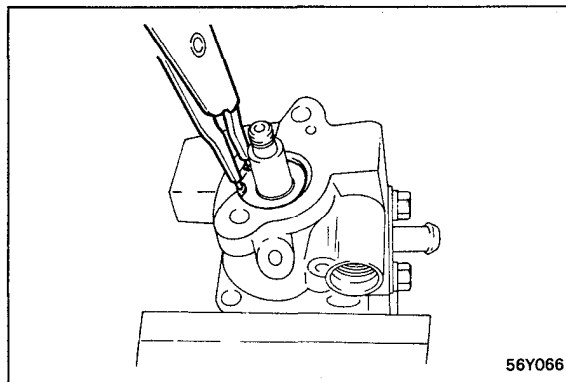


POWER STEERING OIL PUMP

8. Remove the pulley nut and the spring washer.
9. Pull off the pulley and the woodruff key.



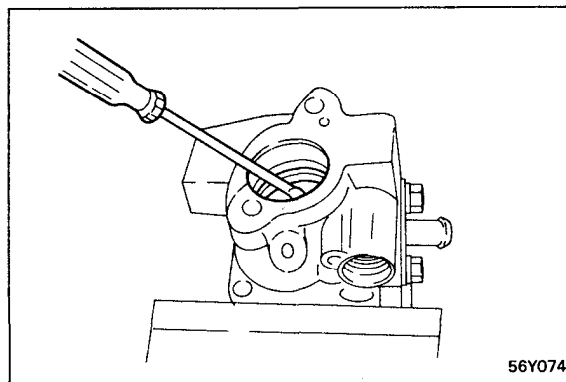
10. Remove the snap ring using the snap ring pliers.
11. Drive out the pulley shaft and bearing.
If necessary, use a plastic hammer.



12. Remove the oil seal from the oil pump body.

NOTE

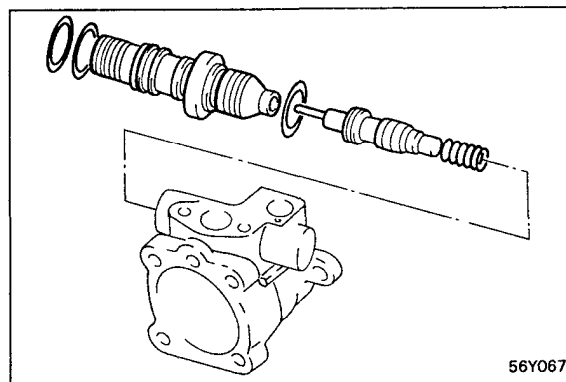
When assembling, use a new oil seal.



13. Remove the guide bracket and nut.
14. Remove the connector from the oil pump body, and then remove the flow control valve and flow control spring.
15. Remove the O-ring from the connector.

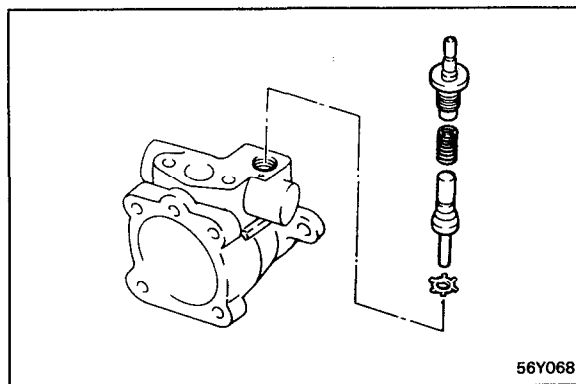
CAUTION

Do not disassemble the flow control valve.



POWER STEERING OIL PUMP

16. Remove the oil pump switch.
17. Take out the spring and the spool.
18. Remove the O-ring from the oil pump switch.



INSPECTION

1. Clean all disassembled parts with a suitable cleaning solvent.
2. If any inside parts of the oil pump have been damaged, replace the pump as an assembly.
3. If the pulley is cracked or deformed, replace it.
4. If oil leaks around the pulley shaft oil seal, replace the oil seal.
5. If the serrations of the pulley or pulley shaft are deformed or worn, replace them.

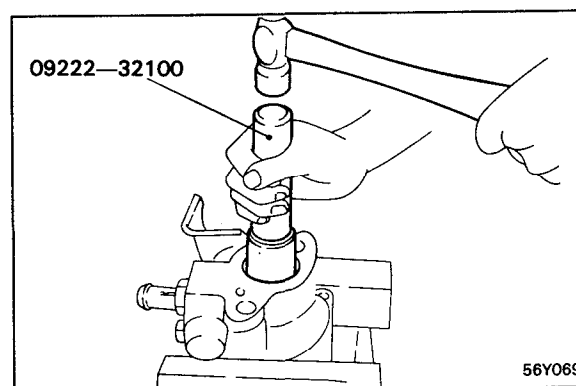
ASSEMBLY

1. Install the oil pump switch.
2. Install the flow control valve spring, valve and connector in the pump body.

NOTE

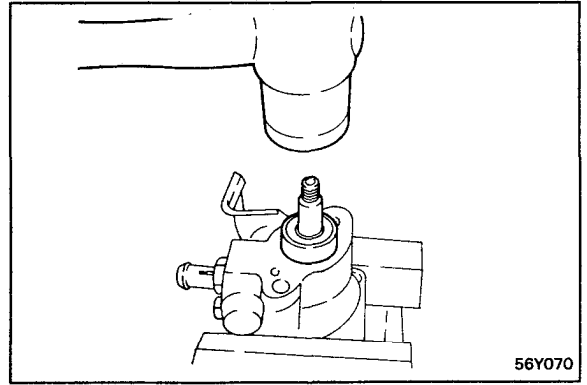
Apply a thin coat of ATF DEXRON®II type to all parts including the oil seal and O-ring.

3. Install the guide bracket and nut.
4. Using special tool (09222-32100), install the oil seal into the pump body.

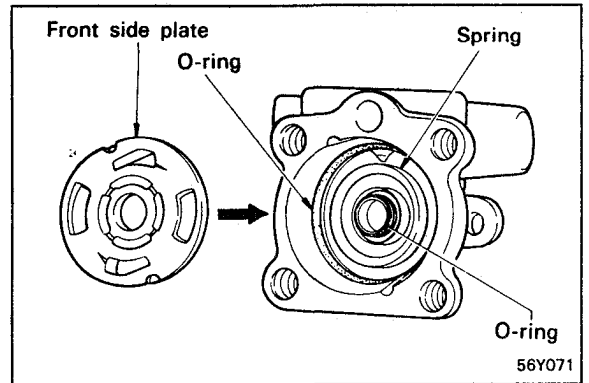


POWER STEERING OIL PUMP

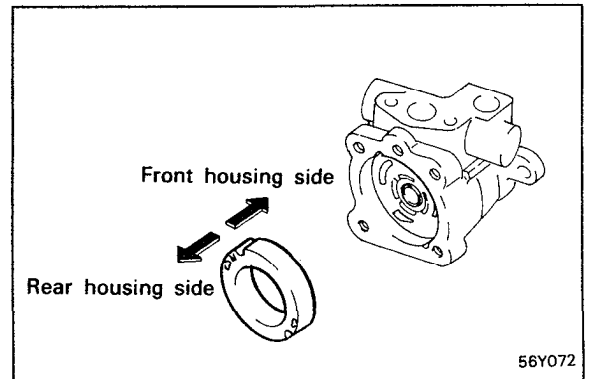
5. Gently insert the shaft assembly and install the snap ring.
6. Install the pump pulley with woodruff key in place.



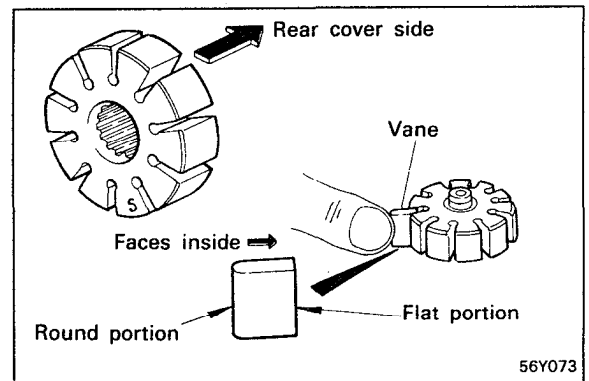
7. Install the spring and the inner and outer O-rings.
8. Install the front side plate.



9. Insert the pins into the pin grooves of the front housing, then install the cam ring, paying attention to its direction.



10. Install the rotor with its punch marked side facing towards the front side plate.
11. Install the vane plates with the round end facing outward.



12. Install the gasket and rear cover.
13. Tighten the suction connector.

INSTALLATION

1. Install the oil pump to the oil pump bracket.
2. Install the suction hose.
3. Install the ribbed V-belt and adjust the belt tension.
4. Connect the pressure hose to the oil pump, and the suction hose to the oil reservoir.

NOTE

Install the hoses so that they are not twisted and they do not come in contact with any other parts.

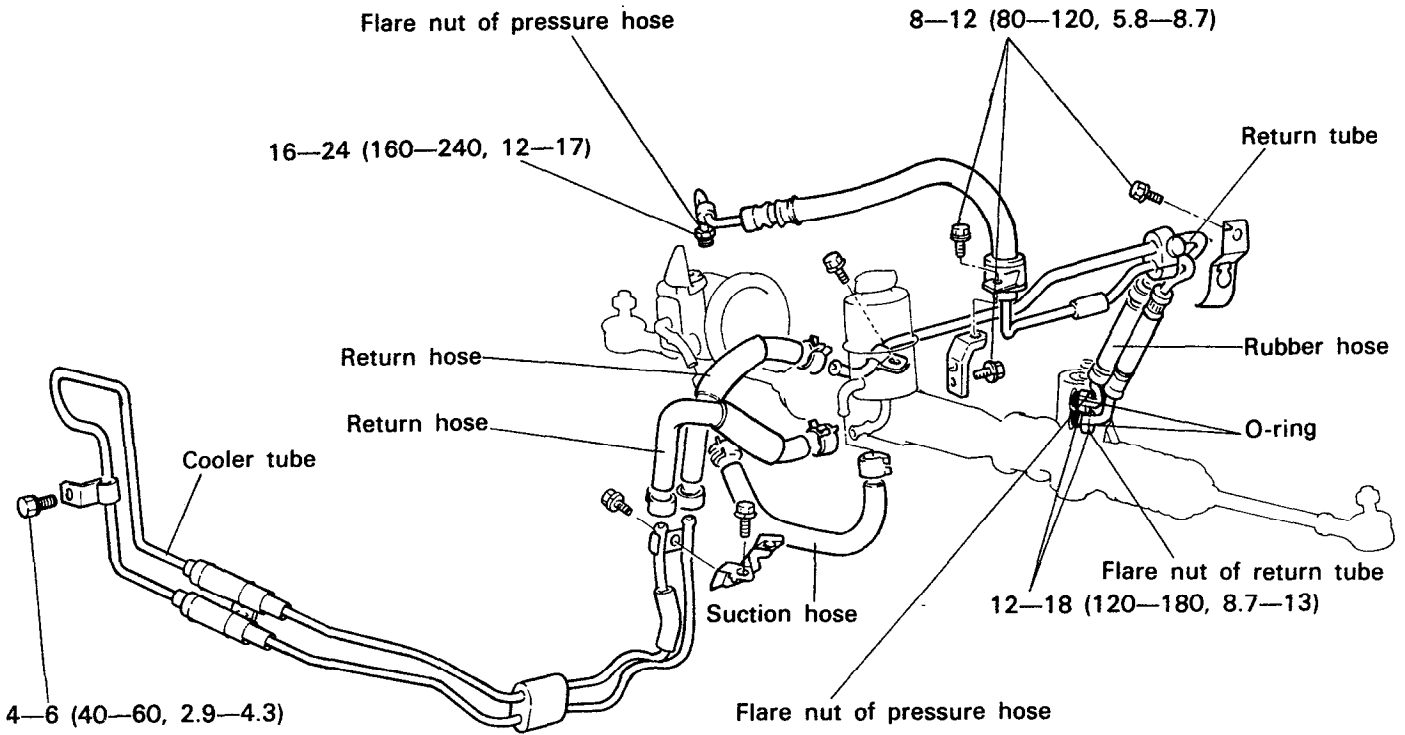
5. Replenish the reservoir.

Recommended fluid.. ATF DEXRON® II type

6. Bleed the system.
7. Check the oil pump pressure.
8. Install parts by reference to the torque specification.

POWER STEERING HOSES

COMPONENTS



TORQUE : Nm (kg,cm, lb.ft)

REMOVAL

1. Drain the power steering fluid.
2. Disconnect the return hose and the suction hose from the oil reservoir.
3. Remove the flare nut of pressure hose.
4. Remove the return tube and rubber hose together with the flare nut and O-ring.
5. Remove the cooler tube.