

Steering System

GENERAL ST -2

POWER STEERING SYSTEM ST -13



GENERAL

SPECIFICATIONS EPMB0100

Items	Specifications
Steering wheel diameter (Outer)	386
Power steering gear box Steering gear type Steering gear ratio	Ball and nut, torsion (Integral type) 16.4-18.0
Oil pump Oil pump type	Vane type
Displacement	9.6 cc/rev

SERVICE SPECIFICATIONS

Items	Specifications
Steering wheel free play Steering gear angle Inner wheel (Tier size) Outer wheel (Tier size)	mm 30 34° (P235/75 R15) 33° (P255/65 R16) 31.50° (P235/75 R15) 30.50° (P255/65 R16)
Stationary steering effort	kg (lbs) 3.3 (7.3)
Drive belt tension 3.5 Gasoline 2.5 Diesel	mm 8-11 8-11
Oil pump pressure Gauge hose valve closed Gauge hose valve opened	kg/cm ² (psi) 75-82 (1,067-1.166) 10 (142) or less
Cross-shaft axial play Power steering	0.05
Main shaft total starting torque Power steering	kg-cm (in-lbs) 4.5-12.5 (4-8)
Backlash between ball groove of rack piston and balls Ball joint starting torque Idler arm turning torque Spring balance reading	mm 0.05-0.10 kg-cm (in-lbs) 10-30 (8.9-26) kg-cm (in-lbs) 30-90 (26-78) kg (lbs) 2.5-7.5 (5.5-16.5)

Items		Specifications
Limit		
Steering wheel free play	mm	
Power steering		50
Steering gear backlash	mm	0.5
Ball joint axial play	mm	1.5
Oil pump pressure	kg/cm ² (psi)	
Gauge hose valve closed		15 (218)
Backlash between ball groove of rack piston and balls	mm	0.2
Gap between vane and rotor groove	mm	0.06
Clearance between oil pump drive shaft and pump body	mm	0.1

TORQUE SPECIFICATIONS EPMB0200

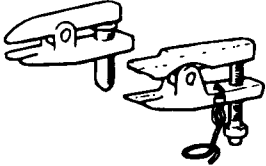

Items	kgf-m	ft-lbs
Steering column and shaft		
Steering wheel to steering shaft	4.0-5.0	29-36
Steering shaft B to joint assembly	1.3-1.8	9.4-13
Joint assembly to steering gear box	2.2-2.7	13-20
Power steering gear box		
Gear box to frame	5.5-6.5	40-47
Gear box to joint assembly	2.2-2.7	13-20
pitman arm to relay rod	4.5	33
Gear box to pressure hose	1.2-1.8	9-13
Gear box to pressure hose	1.2-1.8	9-13
Side cover to gear box housing	3.0-4.5	22-33
Adjusting bolt lock nut	3.0-4.5	22-33
Breather plug to side cover	0.5-0.8	4-6
pitman arm to cross-shaft	15-17	108-122
Valve housing to gear box housing	4.5-5.5	33-40
Valve housing lock nut	18-23	130-166
Oil pump		
<3.5 Gasoline>		
Oil pump bracket to engine	3.5-4.5	25-33
Oil pump to oil pump bracket	3.5-4.5	25-33
Oil pump to pressure hose	5.5-6.5	40-47
Oil pump to pressure switch	1.7-2.3	12.2-16.6
Oil pump		
<2.5 Gasoline>		
Oil pump bracket to engine	1.7-2.6	12.2-18
Oil pump to pressure hose	5.5-6.5	40-47
Oil pump to oil pump bracket	2.5-3.3	18-24
Steering hoses		
Pressure hose to oil pump	5.5-6.5	40-47
Pressure hose to gear box	1.2-1.8	9-13
Return hose (or return tube) to gear box	1.2-1.8	9-13
Pressure hose to clip to bracket	0.8-1.2	6-9
Return hose clip to radiator	0.8-1.2	6-9

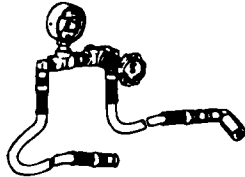
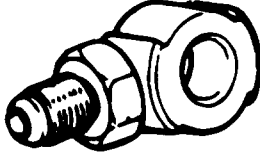
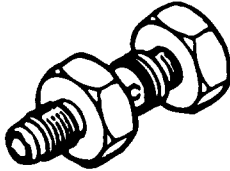
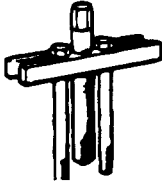
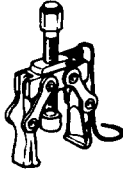
Items	kgf-m	ft-lbs
Steering linkage		
Tie rod end to knuckle	4.5	33
Tie rod end to relay rod	4.5	33
Tie rod end to pipe	6.5-8.0	47-58
Relay rod to pitman arm	4.5	33
Relay rod to idler arm	4.5	33
Idler arm to idler arm support	4.0-6.0	29-43
Idler arm support frame	5.5-6.5	40-47

LUBRICANTS EPMB0300

Items	Specified Lubricant	Quantity
Power steering gear box		
Bearing	PSF-3	As required
O-ring	PSF-3	As required
Oil seal	PSF-3	As required
Oil pump		
Power steering fluid	PSF-3	1.06 lit
Flow control valve		
Friction surface of rotor, vane, cam ring and pump cover	PSF-3	As required
O-ring	PSF-3	As required

LUBRICANTS EPMB0400

Tool (Number and name)	Illustration	Use
Steering linkage puller (09568-34000)	 KPMB040A	Disconnection of the steering linkage
Steering linkage joint gauge (HSG3043)	 KPMB040B	Measurement of the ball joint axial play

Tool (Number and name)	Illustration	Use
Oil pressure gauge (09572-21000)	 <p style="text-align: right;">KPMB040C</p>	Measurement of the oil pump pressure
Power steering oil pressure gauge adapter (Pump side) (09572-33100)	 <p style="text-align: right;">KPMB040D</p>	
Power steering oil pressure gauge adapter (Hose side) (09572-21200)	 <p style="text-align: right;">KPMB040E</p>	
Steering wheel puller (09561-11002)	 <p style="text-align: right;">KPMB040F</p>	Removal of the steering wheel
Pittman arm puller (HSG3046)	 <p style="text-align: right;">KPMB040H</p>	Removal of the Pittman arm

SERVICE ADJUSTMENT PROCEDURES

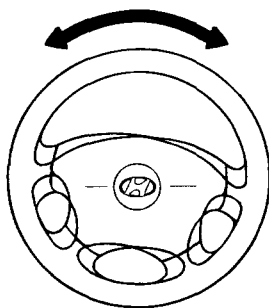
EPMB0500

STEERING WHEEL FREE PLAY CHECK

1. With the engine stationary and the steering wheel in the straight-ahead position, apply a force of 0.5 kg (1.1 lbs.) to the steering wheel in the peripheral direction.

 Standard value : 25 mm or less

 Limit : 50 mm



KPMB050A

2. If the measured value exceeds the repair limit, check the steering gear backlash and ball joint axial play.

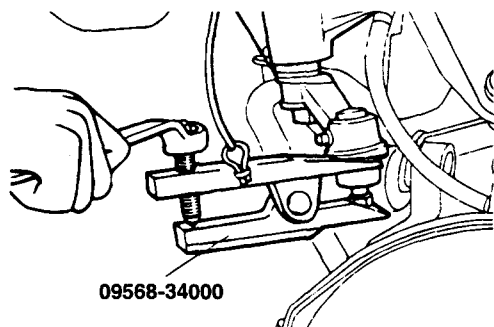
STEERING GEAR BACKLASH CHECK

1. Jack up to the vehicle front and hold the steering wheel in the straight ahead position.
2. Apart the pitman arm and the relay rod.

! CAUTION

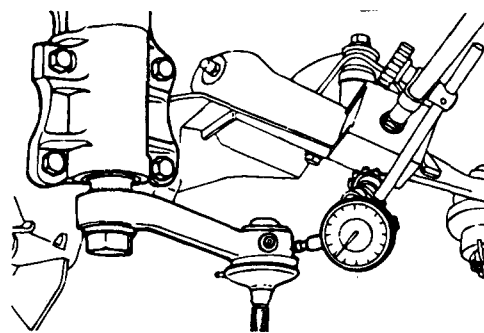
- Use cord to bind the special tool closely so it will not become separated.
- The nut should be loosened only, not removed.

 Limit : 0.5 mm



09568-34000

KPMB050B

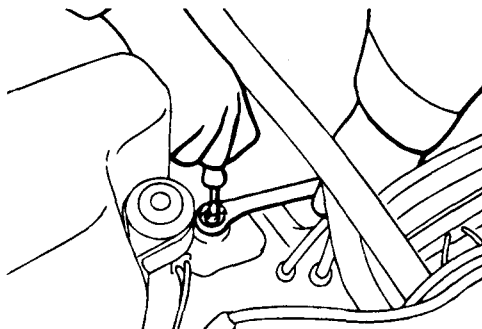


KPMB050C

3. If the measured value exceeds the limit, screw in the steering gear box adjusting bolt until steering wheel free play is within the range of standard value.

! CAUTION

- Be sure to make the adjustment with the steering wheel in the straight-ahead position.
- If the adjusting bolt is over tightened, more steering effort will be required, and return of the wheel will be adversely affected.

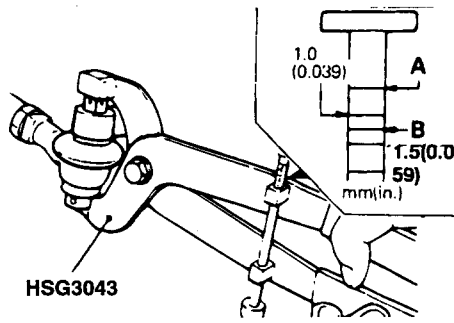


KPMB050D

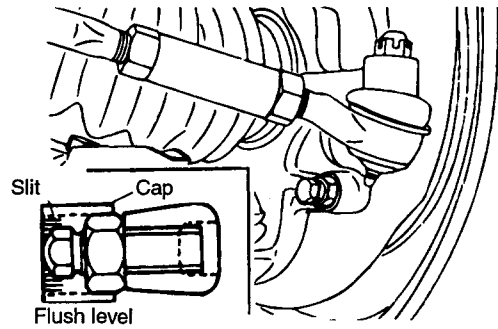
BALL JOINT AXIAL PLAY CHECK

1. Hold the ball joint by using the special tool.
2. Set the scale of special tool to the upper limit (A), compress the ball stud, and measure the axial play. The measured displacement should be between the upper limit (A) and the Centre graduation (B).

 Limit : 1.5 mm



EPMB050E



EPMB050G

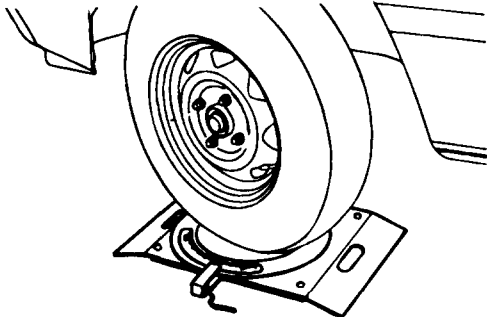
- If the measured displacement exceeds the Centre graduations (B), replace the ball joint.

STEERING ANGLE CHECK

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

STANDARD VALUE

Inner wheel	P235/75 R15	34°
	P255/65 R16	33°
Outer wheel	P235/75 R15	31.50°
	P255/65 R16	30.50°



KPMB050F

- Adjust the steering angle of each wheel by turning the stop bolt of the knuckle arm.

NOTE

After adjusting the steering angle, mount the cap onto the jam bolt so that the edge of the slit side of the cap and the head of the stop bolt are flush and face in the same direction, and then pack the head of the stop bolt with multipurpose grease.

CAUTION

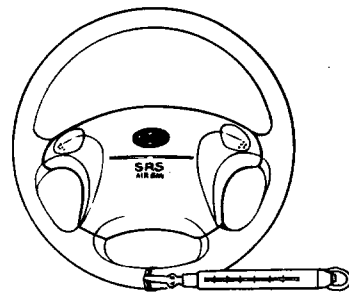
Be sure that the toe-in is properly adjusted before adjusting the steering angle.

STATIONARY STEERING EFFORT CHECK (POWER STEERING)

- Place the vehicle on a level surface and place the steering wheel in the straight-ahead position.
- Set the engine speed to 1,000 r/min.
- Measure the tangential force with a spring balance by turning the steering wheel clockwise and counter-clockwise one and a half turns.

Standard value : 3.7 kg (8.21 lbs) or less

- If the stationary steering effort exceeds the standard value, check for belt slackness, damage, insufficient oil, air mixed into oil, collapsed or twisted hoses, etc., and repair if found.



KPMB050H

CHECKING OF THE STEERING WHEEL RETURN TO CENTRE (POWER STEERING)

To check for the return of steering wheel to Centre, carry out drive test and check the following points.

- Make gentle and sharp turns and check to get a feel for that there is no appreciable difference in steering effort and return to Centre between right and left turns.

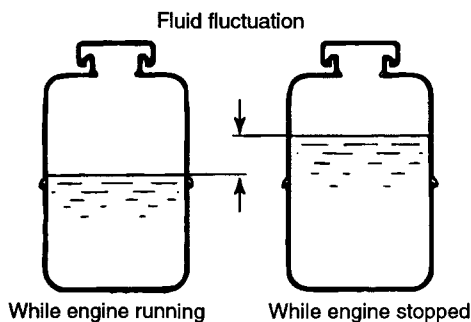
2. Drive at a speed of about 35 km/h turn the steering wheel 90 clockwise or counterclockwise, and release the wheel a second or two later, if the wheel returns more than 70 , the return may be considered good.

NOTE

When the steering wheel is turned abruptly, momentary hard steering might result, but this does not mean any problem. It is caused by low oil pump delivery during idling.

FLUID LEVEL CHECK (POWER STEERING)

1. Park the vehicle on a flat, level surface, start the engine, and then turn the steering wheel several times to raise the temperature of the fluid to approximately 50° - 60° C.
2. With the engine running, turn the wheel all the way to the left and right several times.
3. Check the fluid in the oil reservoir for foaming or milkiness.
4. Check the difference of the fluid level when the engine is stopped, and while it is running. If the fluid level changes considerably, air bleeding should be done.



EPMB0501

FLUID REPLACEMENT (POWER STEERING)

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. On vehicles with a patrol engine, disconnect the high tension cable. On vehicles with a diesel engine, remove the fuel cut valve connector attached to the injection pump.
While operating the starting wheel all the way to tently, turn the steering wheel all the way to the left and right several times to drain all of the fluid.

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 : PSF-3

BLEEDING EPMB0600

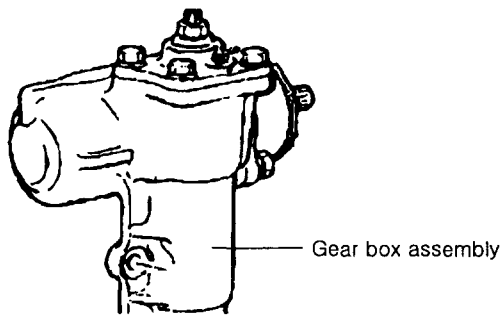
1. Jack up the front wheels and support them by using a rigid rack.
2. Manually turn the oil pump pulley a few times.
3. Turn the steering wheel all the way to the left and to the right five or six times.
4. On vehicles with a patrol engine, disconnect the high tension cable. On vehicles with a diesel engine, remove the fuel cut valve connector attached to the injection pump.
While operating the starting motor intermittently, turn the steering wheel all the way to the left and right five or six times (for 15 to 20 seconds).

CAUTION

- During air bleeding, replenish the fluid supply so that the level never falls below the lower position of the filter.
 - 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. On vehicles with a patrol engine, connect the ignition cable. On vehicles with a diesel engine, connect the fuel cut valve connector attached to the injection pump. Start the engine (idling).
 6. Turn the steering wheel to the right and test a air bleeding with air bleeder of the steering gear box loosened, then turn it to the left and test. The same work is repeated 3-4 times.

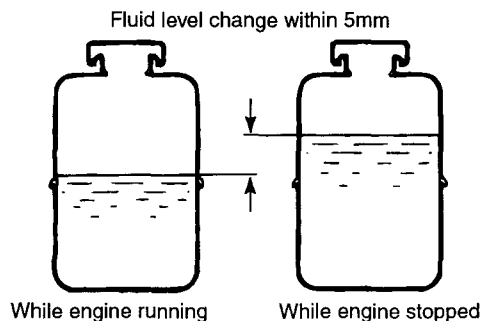
CAUTION

- During air bleeding, replenish the fluid supply so that the level never falls below the lower position of the filter.
- After air bleeding, clean the position which is polluted with power steering oil with water.



EPMB060B

7. Turn the steering wheel to the left and right until there are no air bubbles in the oil reservoir.
8. Confirm that the fluid is not milky, and that the level is up to the specified position on the level gauge.
9. Confirm that there is very little change in the fluid level when the steering wheel is turned left and right.
10. Check whether or not the change in the fluid level is within 5 mm (0.20 in.) when the engine is stopped and when it is running.



EPMB060A

! CAUTION

- If the change of the fluid level is 5 mm (0.20 in.) or more, the air has not been completely bled from the system, and thus must be bled completely.
- If the fluid level rises suddenly after the engine is stopped, the air has not been completely bled.
- 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.

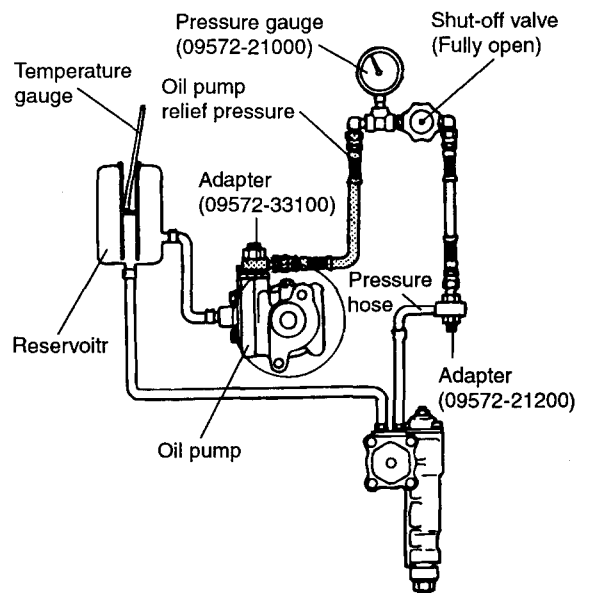
OIL PUMP PRESSURE TEST CHECKING THE OIL PUMP RELIEF PRESSURE

EPMB0700

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 : 75-82 kg/cm² (1,067-1, 166 psi)



EPMB070A

! 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.

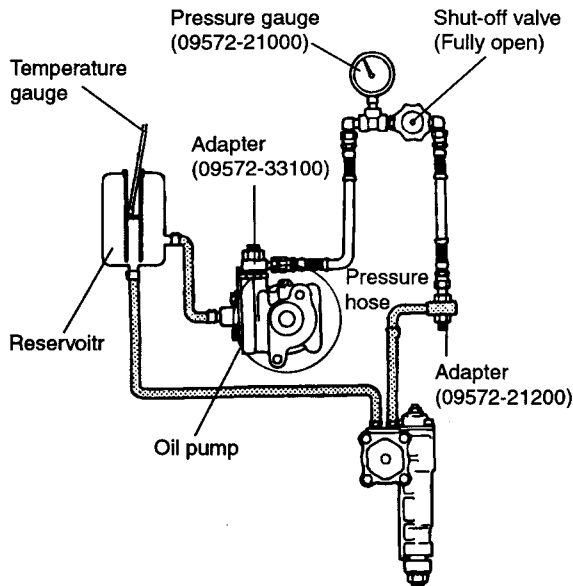
CHECKING THE PRESSURE UNDER NO-LOAD CONDITIONS

1. Disconnect the pressure hose from the oil pump, and then connect the special 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 raise to approximately 50-60° C (122-140° F).

3. Start the engine and idle it at $1,000 \pm 100$ 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 : 8-10 kg/cm² (114-142 psi)

Limit : 15 kg/cm² (213 psi)



EPMB070B

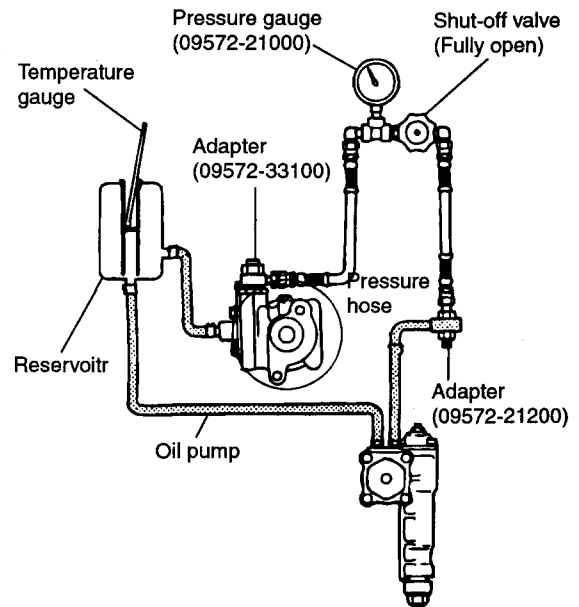
5. If it is not within the standard value, the probable cause is a malfunction of the oil line or steering gear box, so check these parts and repair as necessary.
6. Remove the special tools, and then tighten the pressure hose to the specified torque.
7. Bleed the system.

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.
3. Start the engine and idle it at $1,000 \pm 100$ rpm.
4. Fully close and 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 : 75-82 kg/cm² (1,067-1,166 psi)



EPMB070C

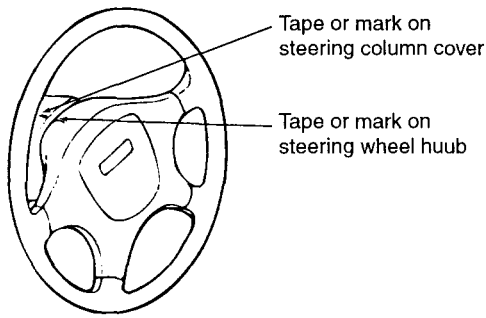
6. When not within the standard value, overhaul the steering gear box.
7. Remove the special tools, and then tighten the pressure hose to the specified torque.
8. Bleed the system.

STEERING WHEEL CENTERING SIMPLIFIED STEERING WHEEL CENTERING

EPMB0800

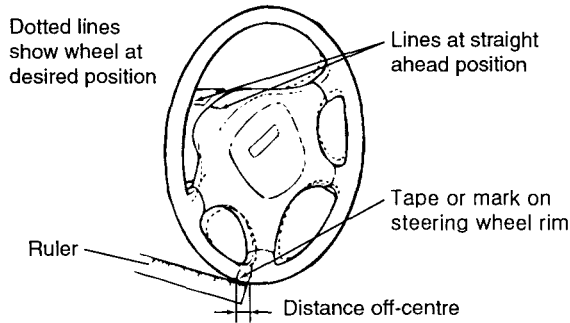
DETERMINING STEERING WHEEL'S OFF CENTRE

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.



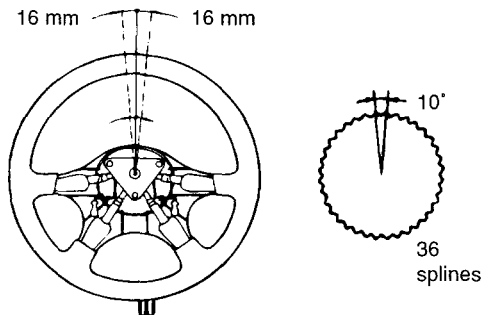
EPMB080A

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.



EPMB080B

7. Record the distance the strip or mark on the rim has moved. This is how far the steering wheel is off Centre. If it is more than 16 mm (0.63 in.) off Centre, it can be centered by indexing it ten degrees towards the Centre.



EPMB080C

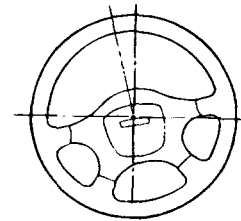
INDEXING STEERING WHEEL TO CENTRE IT

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

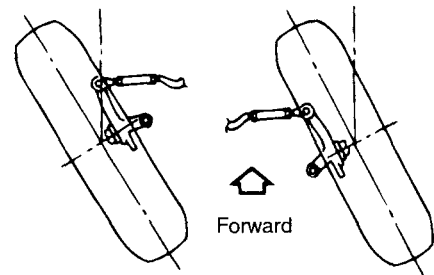
1. Remove the steering wheel.
2. Without disturbing the position of the steering wheel shaft, re-install the wheel as near on-Centre as possible.

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 Centre. If the steering wheel is off Centre to the left, Centre it by adjusting the tie rods to make the front wheels steer toward the left, and vice versa.



Steering wheel off-centre left



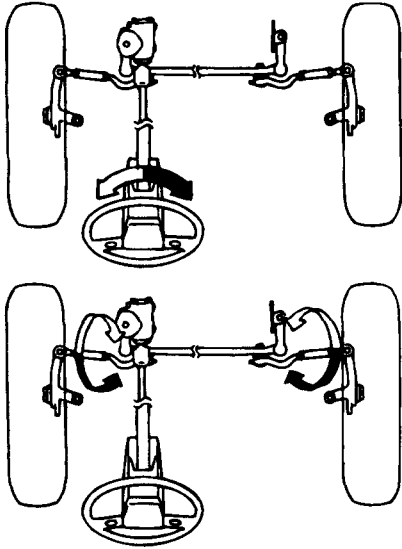
Adjust tie to steer left

EPMB080D

1. Hold the tie rods with a wrench while loosening the locking nuts at lest 1/4 turn.
2. Hold the tie rod end with a wrench and turn the tie rod the desired number of turns. Adjust both tie rods equally in same direction to Centre the steering wheel.

NOTE

By turning the tie rods 1/6 of a turn, an adjustment of 2 (at the steering wheel Centre) or 6 mm (0.24 in.) (at the steering wheel rim) can be made.



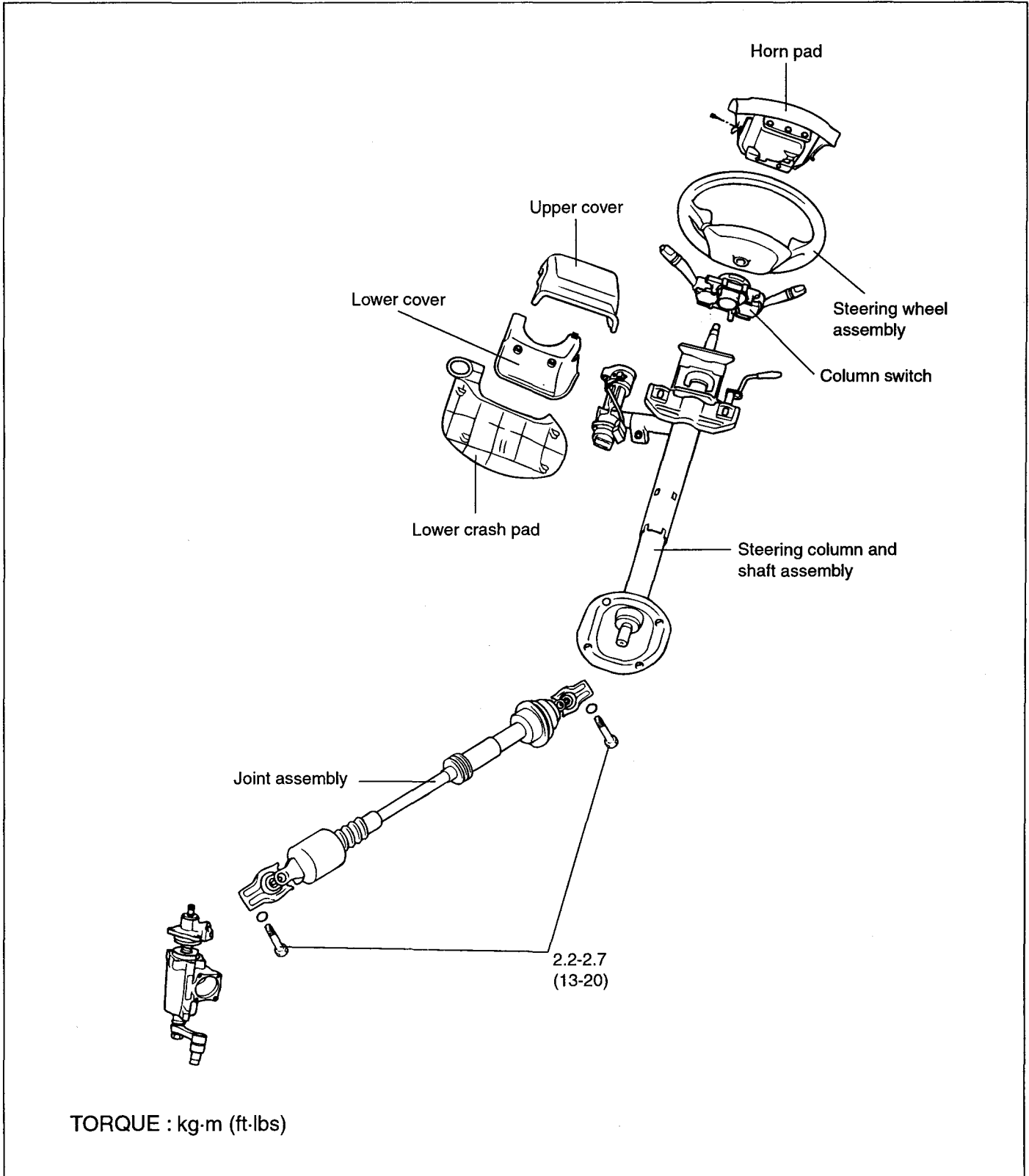
- ◊ Off-centre to left
- ◆ Off-centre to right

EPMB080E

POWER STEERING SYSTEM

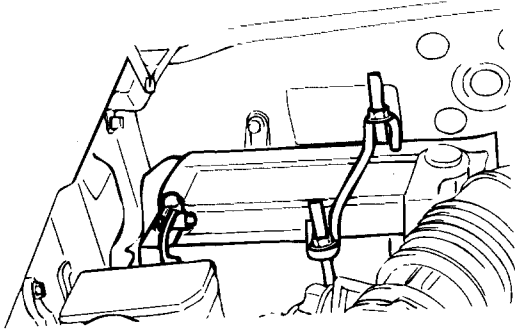
STEERING COLUMN/SHAFT

COMPONENTS EPMB0900



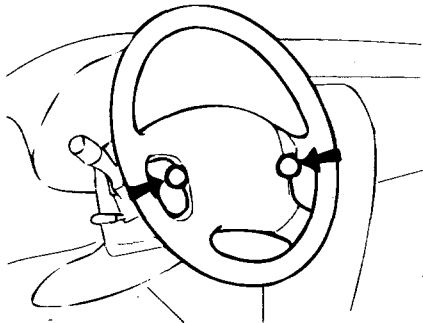
REMOVAL EPMB1000

1. Disconnect the negative (-) terminal from the battery.



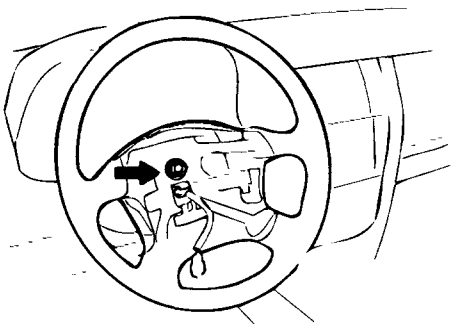
KPMB100A

2. After removing the two screws in the illustration, remove the driver's airbag module.



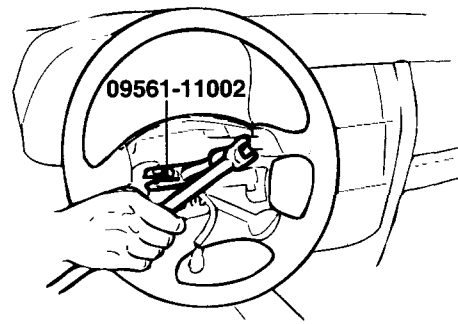
KPMB100B

3. Remove the steering wheel lock nut.



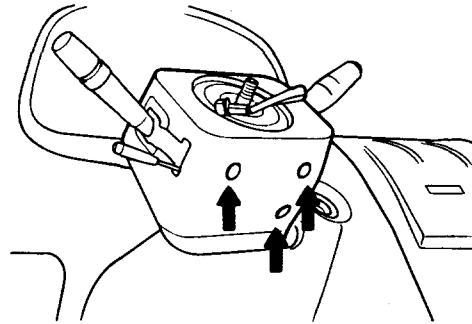
KPMB100C

4. After aligning the marks on the steering shaft and wheel, remove the steering wheel using the special tool (09561-11002).



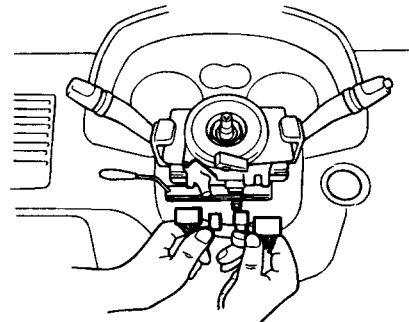
KPMB100D

5. After removing the three screws in the illustration, remove the steering column upper and lower shrouds.



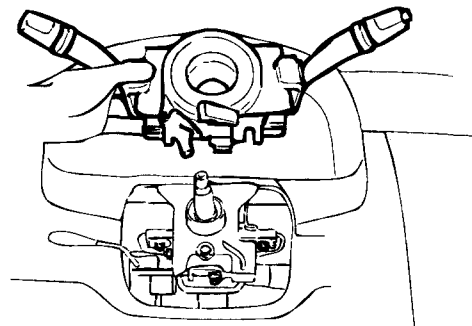
KPMB100E

6. Remove the connectors from the multifunction switch.



KPMB100F

7. After removing the three bolts in the illustration, remove the multifunction switch assembly.

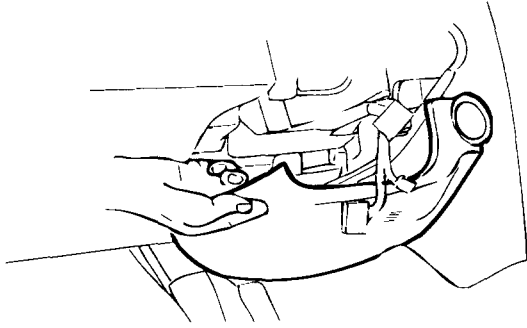


KPMB100G

⚠ CAUTION

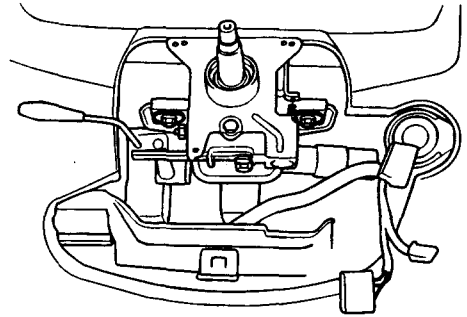
Do not hammer on the steering wheel to remove it; it may damage the steering column.

8. Remove the lower crash pad.



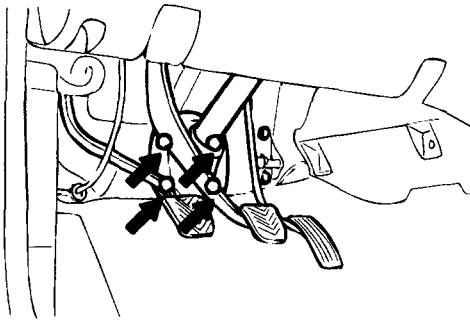
KPMB100H

11. After removing the two mounting bolts, remove the steering column shaft assembly.



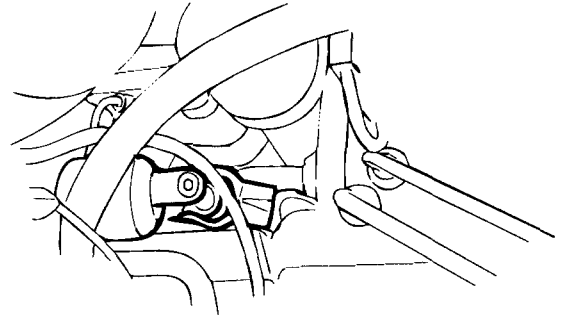
KPMB100K

9. Remove the four mounting bolts in the dust cover assembly.



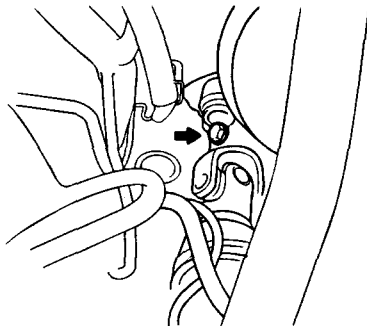
KPMB100I

12. After removing the bolt connecting the steering gear box with the universal joint, separate the universal joint from the gear box.



KPMB100L

10. Remove the bolt connecting the steering column shaft assembly with the universal joint assembly, and then separate them apart.



KPMB100J

INSPECTION EPMB1100

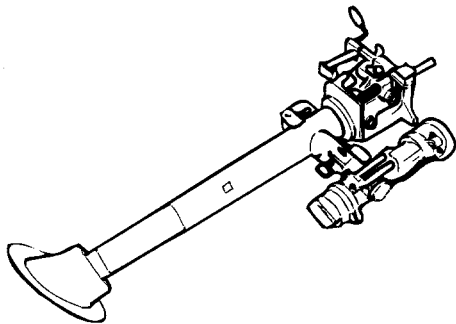
1. Check the steering column shaft for damage and deformation.
2. Check the connections for play, damage and smooth operation.
3. Check the ball joint bearing for wear and damage.

ASSEMBLY EPMB1200

Assembly is the reverse of removal.

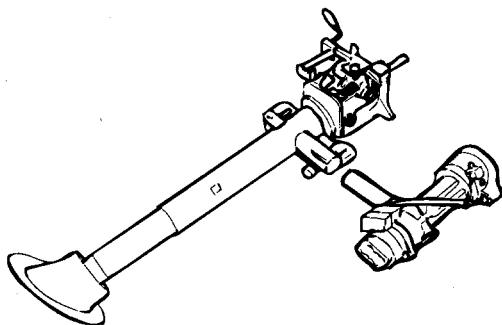
DISASSEMBLY AND REASSEMBLY

1. If it is necessary to remove the key lock assembly, use a pinch to make a groove on the head of the special bolt, and then use a screwdriver to remove the key lock assembly mounting bracket.



KPMB120A

2. Disassemble the key lock assembly from the steering column shaft.



KPMB120B

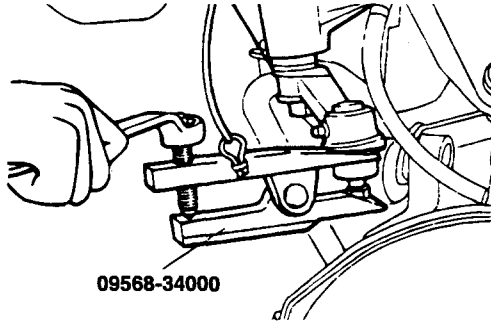
3. Reassembly is the reverse of disassembly.

REMOVAL EPMB3000

1. Remove the tie rod ends from the left and right knuckles.

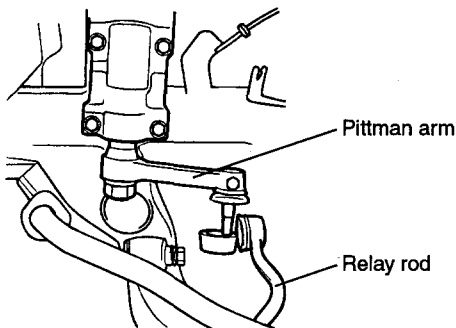
NOTE

- When removing the tie rod ends, be sure to tighten the special tool not to be separated.
- Only loosen the nut, do not remove it.



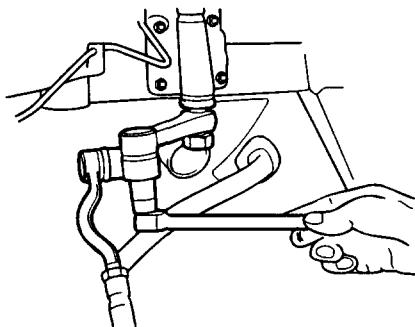
KPMB050B

2. Remove the relay rod from the pitman arm.



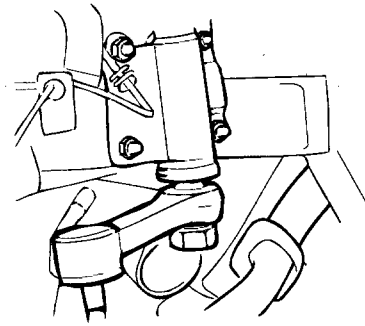
EPMB140B

3. Remove the relay rod from the idler arm.



KPMB300A

4. Remove the idler arm from the idler arm support.



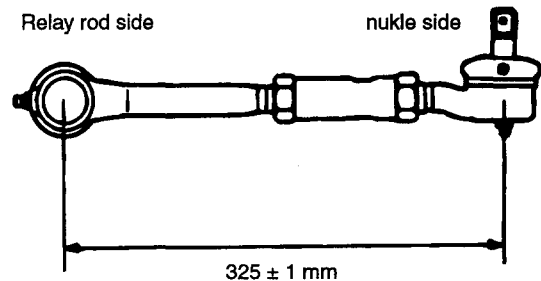
KPMB290A

INSTALLATION EPMB3100

Installation is the reverse of removal.

CAUTION

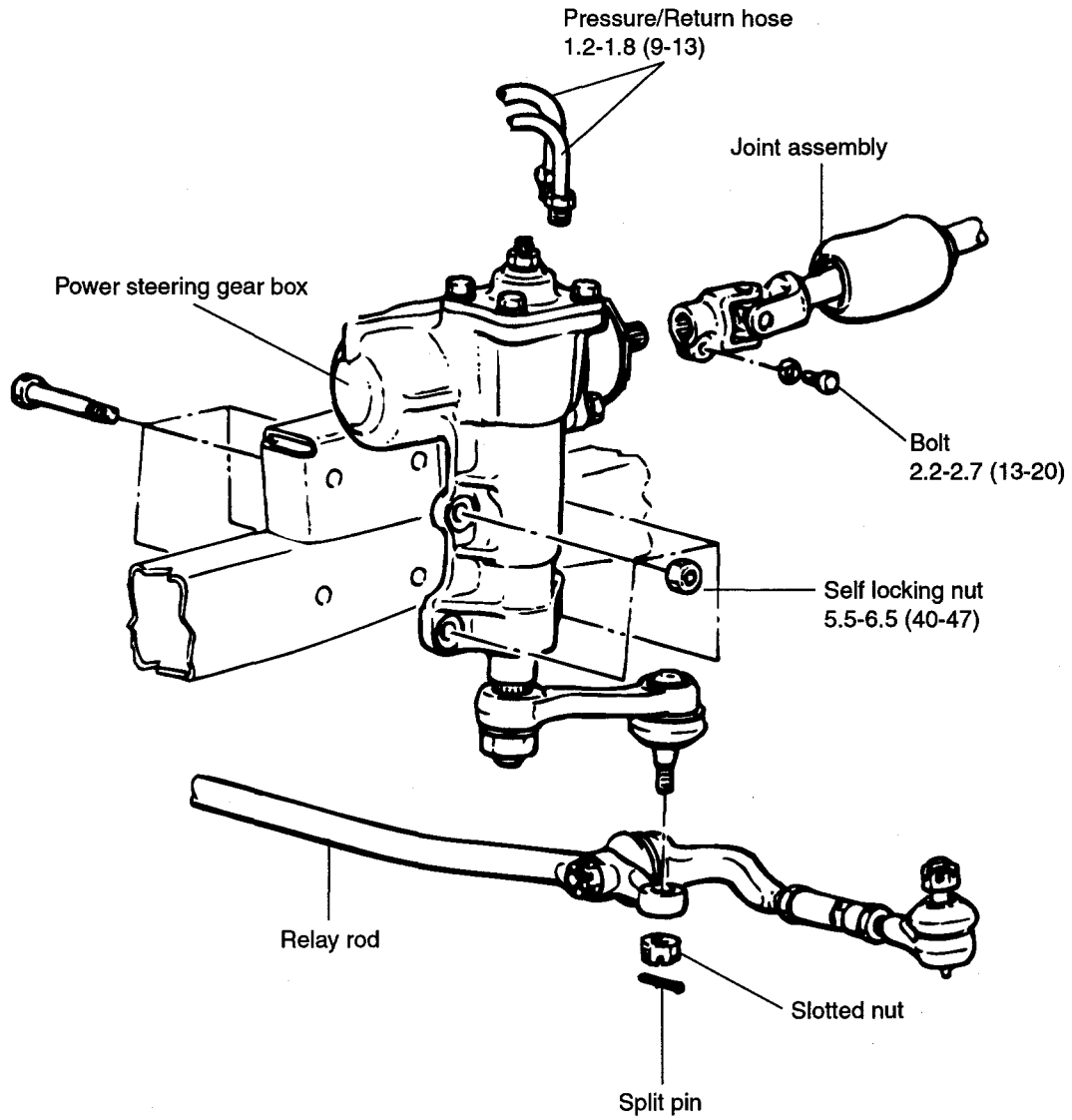
- Apply the specified anti-corrosion agent to the threaded portion of the tie rod end.
- Tighten the tie rod so that the distance between tie rods becomes the value shown in the illustration.
- At this time, tie rod end tightness of left and right is uniformed.



EPMB310A

POWER STEERING GEAR BOX

COMPONENTS EPMB1300



TORQUE : kg·m (ft·lbs)

REMOVAL EPMB1400**INSPECTION AND ADJUSTMENT BEFORE DISASSEMBLY**

- Before disassembly of steering gear box, clean the steering gear box surface and dry it out. Then check the fluid leakage by turning the steering wheel left and right.
 - Check the input shaft oil seal part for leakage.
 - Check the gear box and valve housing assembly for leakage.
 - Check the gear box and side cover assembly for leakage.
 - Check the ball coking part of gear box for leakage.
 - Check the pressure/return hose assembly for leakage.
 - Check the other part for abnormality.
- Before removal of steering gear box, check the tire pressure, wheel balance, etc. Turn the steering wheel smoothly to the left and right to check the turning for abnormality and unbalance at the steering pump operation and non-operation conditions. If it is an abnormal, re-check the vehicle after lifting it.
- After inspection and adjustment of above 1.2, if abnormality is found, replace the parts according to the removal and disassembly procedures.

1. Drain the power steering fluid.

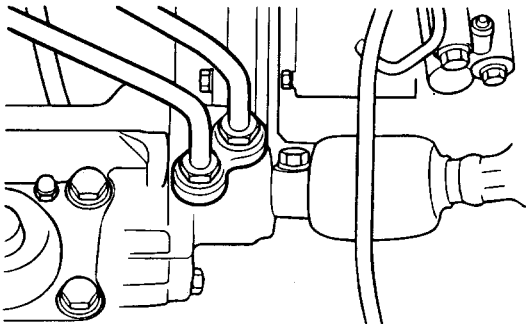
NOTE

Drain the power steering fluid through the return hose side. With the vehicle kept stationary, turn the steering wheel fully clockwise and counterclockwise several times during the drain.

2. Remove the power steering pressure/return hoses.

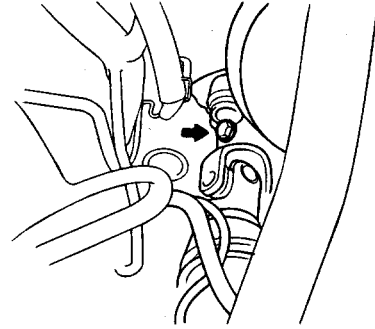
NOTE

Clog the each hose ends with waste cloth to prevent the oil leakage or the entry of foreign material.



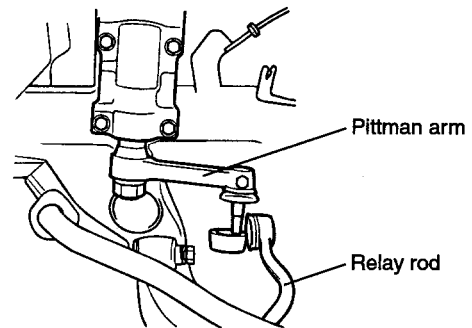
KPMB140A

3. Remove the universal joint assembly from the steering gear box.



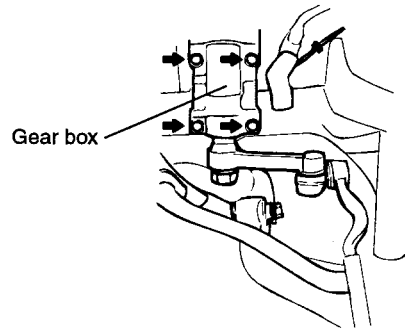
KPMB100J

4. Remove the pitman arm from the relay rod.



EPMB140B

5. After removing the 4 mounting bolts, remove the power steering gear box.

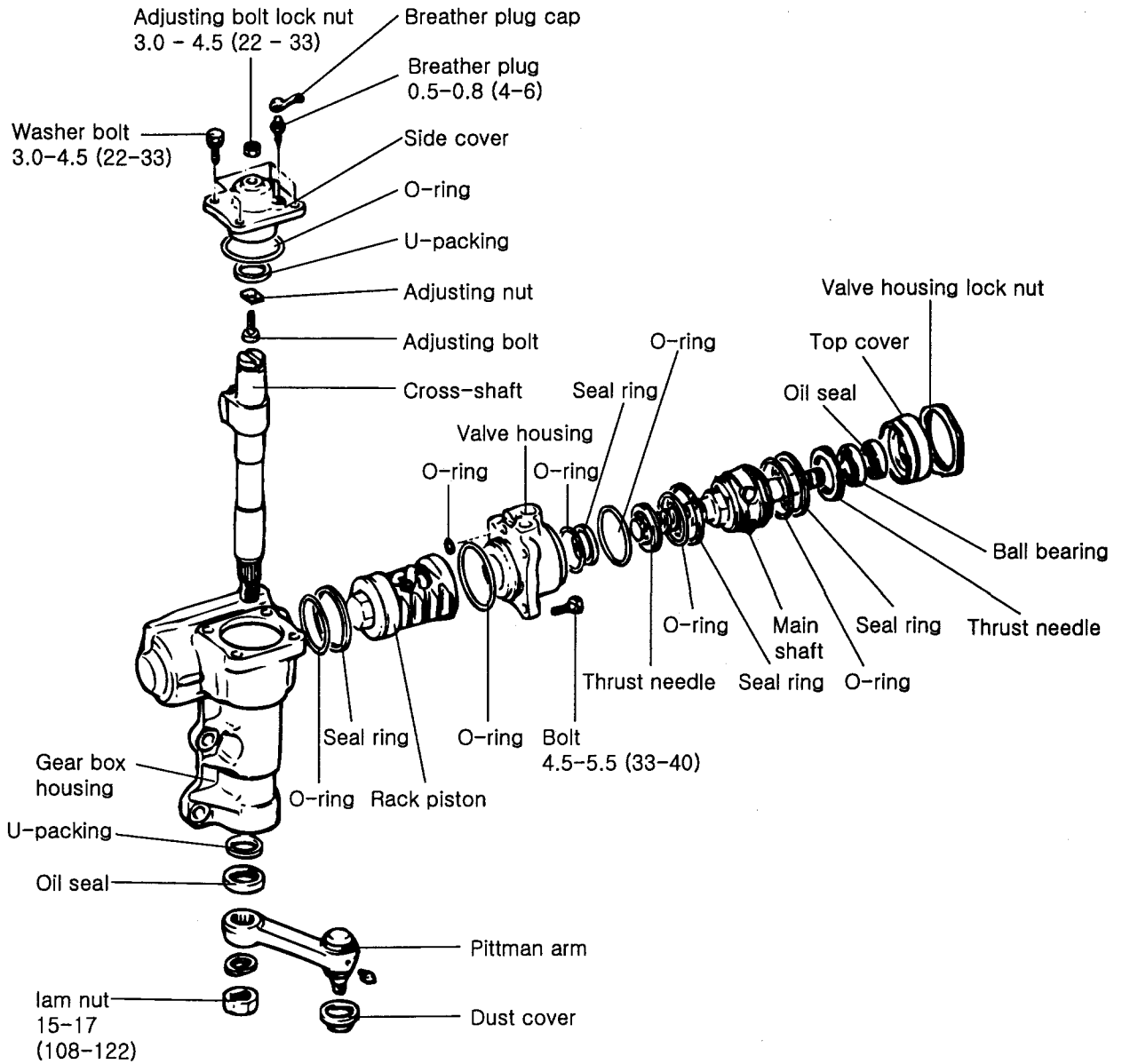


EPMB140C

INSTALLATION EPMB1500

Installation is the reverse of removal.

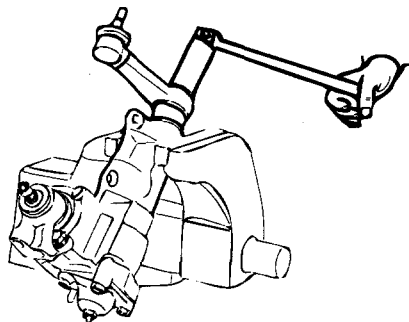
DISASSEMBLY AND ASSEMBLY EPMB1600



TORQUE : kg·m (ft·lbs)

DISASSEMBLY EPMB1700

1. After mounting the steering gear box in a vise remove the nut (32 mm) and the spring washer.

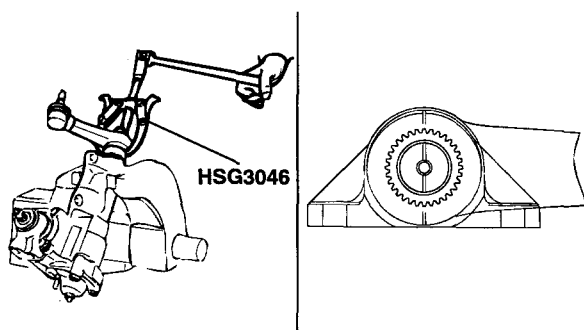


KPMB170A

2. Remove the pitman arm using the special tool (HSG3046).

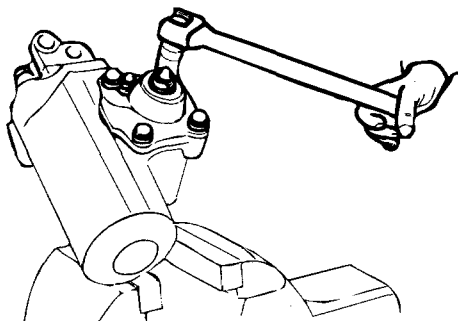
⚠ CAUTION

- Be careful not to damage the pitman arm and nut connections.
- When removing the pitman arm, make identification marks to avoid making any mistake when install it again as below.



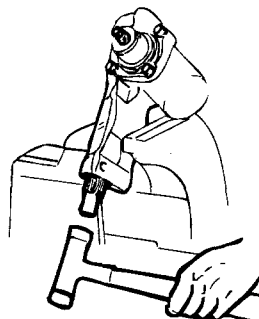
KPMB180D

3. Remove the four side cover mounting washer bolts (14 mm).



KPMB170D

4. After checking the gear box at neutral position, tap the sector shaft end lightly with a plastic hammer, and remove the gear box together with the side cover.

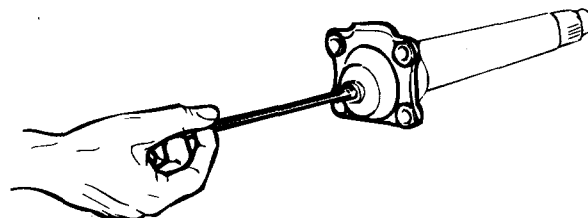


KPMB170E

5. Remove the nut (17 mm) from the side cover and separate side cover from the sector shaft by turning the adjusting screw (-) to the right.

⚠ CAUTION

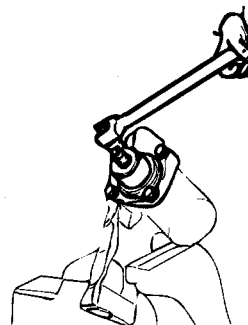
Do not disassemble the side cover if leakage is not found in the nut part.



KPMB170F

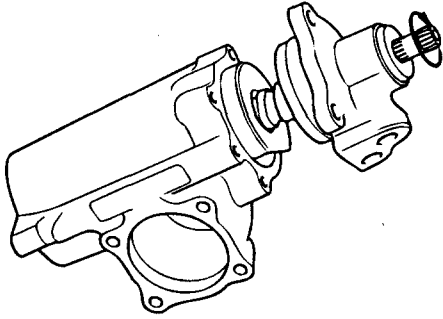
6. Remove the ball screw unit.

- 1) Remove the four mounting bolts (14mm).



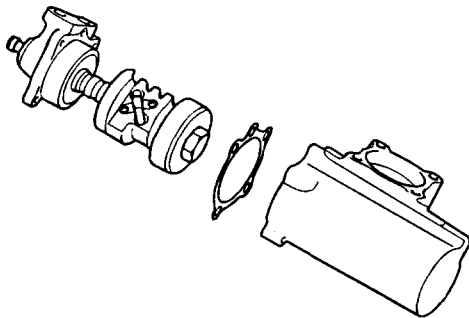
KPMB170G

- 2) Rotate the input shaft clockwise so as to move the ball screw unit forward.



KPMB170H

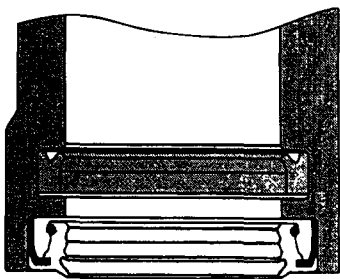
- 3) Holding the valve housing, remove the ball screw unit by pulling it.



KPMB170I

- 4) Hold the rack piston and the input shaft with each hand, and then turn them left and right to check for abnormality.

7. Remove the gear box oil seal and packing.

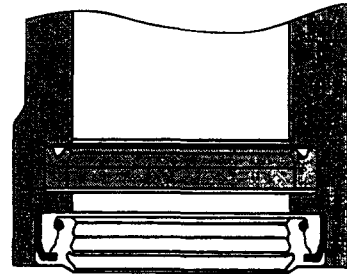


KPMB170J

- 1) Clean the gear box mounting part, packing and seal.
- 2) Apply oil to the packing and then install it in the direction shown in the illustration.
- 3) After installation, be sure to be installed properly.
- 4) Install the dust seal properly.

CAUTION

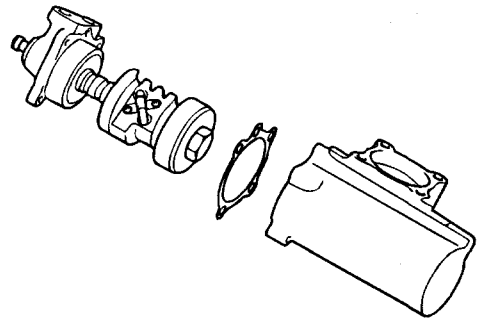
Be sure to press-fit the packing and oil seal in the proper direction.



KPMB170J

2. Ball screw unit reassembly.

- 1) Install the piston ring checking for damage.



KPMB170I

- 2) Insert the ball screw into the gear box slowly.

CAUTION

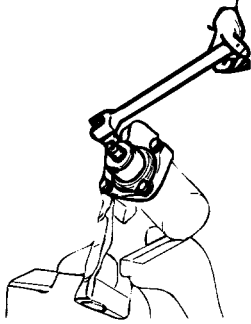
Be careful not to damage the piston ring by slanting partion of gear box.

REASSEMBLY EPMB1800

- Clean away foreign material, dirt, etc. from all parts for reassembly.
- Tighten bolts and nuts to the specified torque and Install O-ring while rechecking for mission, distortion, and damage.

1. Reassembly of gear box packing and oil seal.

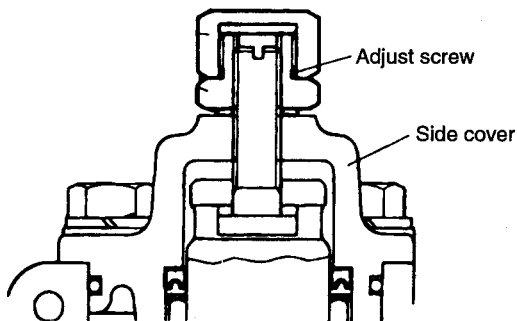
- 3) Tighten the four bolts to the specified torque.



KPMB170G

3. Side cover reassembly.

- 1) Install the packing in the proper direction.
- 2) Apply grease to the adjusting plate and the adjusting screw and then install them to the sector shaft.
- 3) Install the side cover by turning the adjusting screw counter-clockwise.



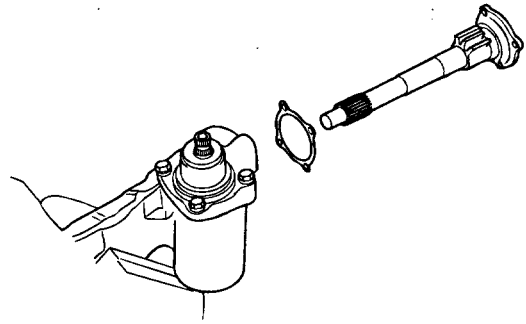
EPMB180B

4. Insertion of sector shaft.

- 1) Install the rack piston to the gear box body.
- 2) Install the sector shaft aligning the central tooth of sector shaft with the central groove of rack piston.

CAUTION

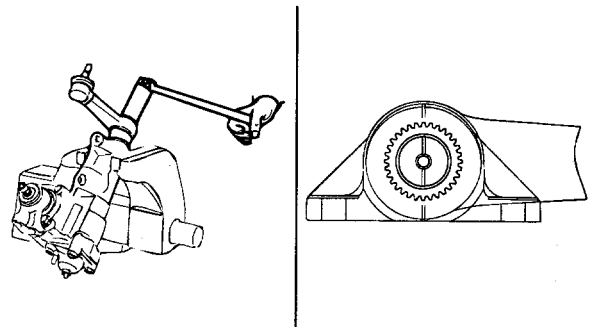
Check the tooth of sector shaft is properly seated in the correct position.



KPMB180C

5. Reassembly of pitman arm assembly.

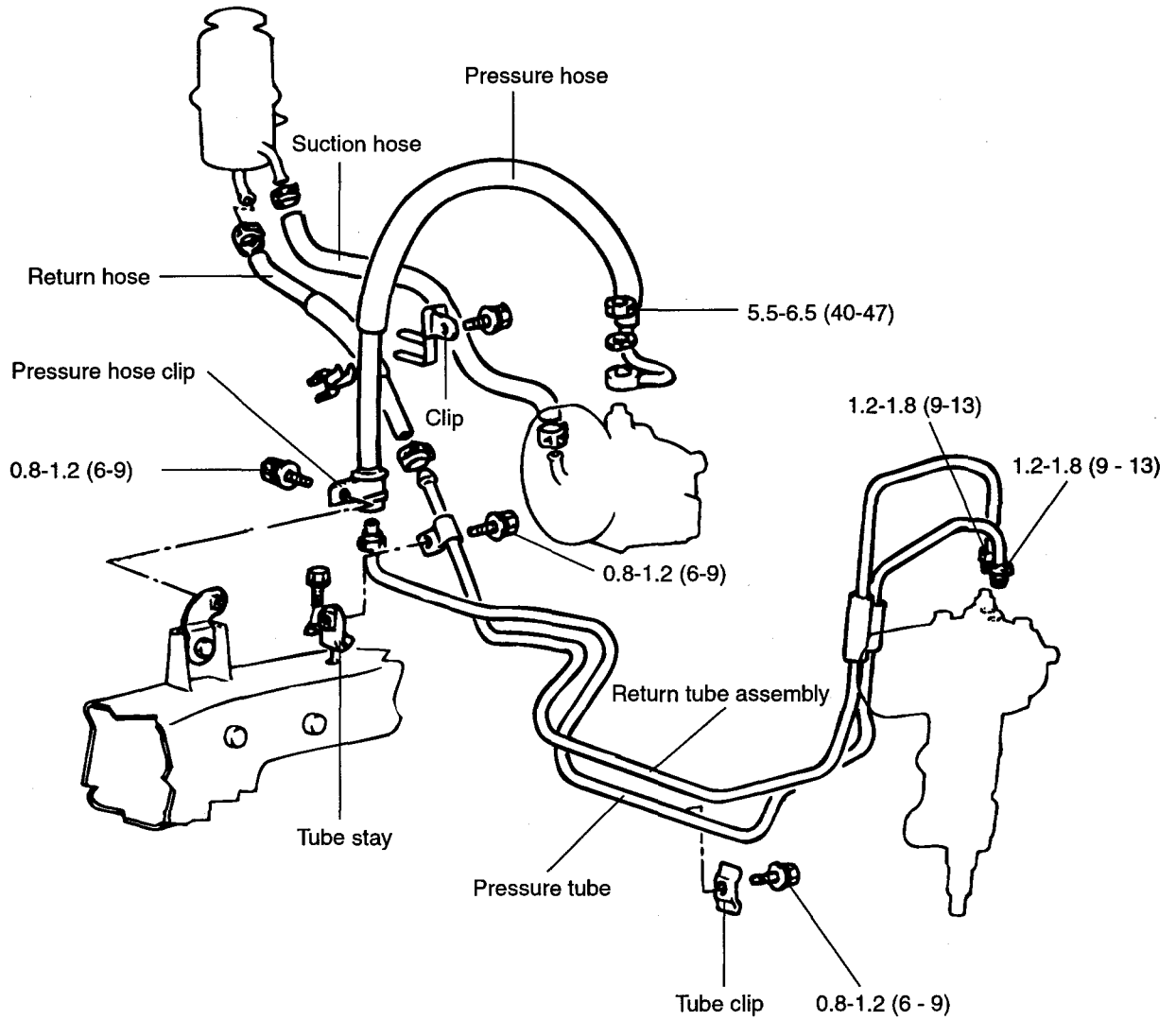
After installation of the rubber packing and the pitman arm to the identification marks on the sector shaft, install the spring washer and nuts to the specified torque.



KPMB180E

POWER STEERING HOSES

COMPONENT KPMB2500

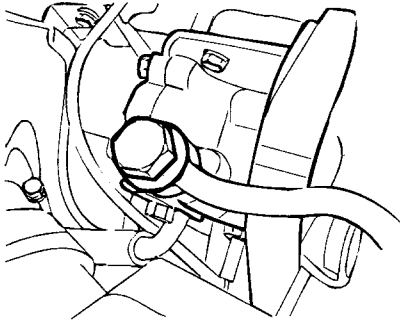


TORQUE : kg·m (ft·lbs)

REMOVAL EPMB2600

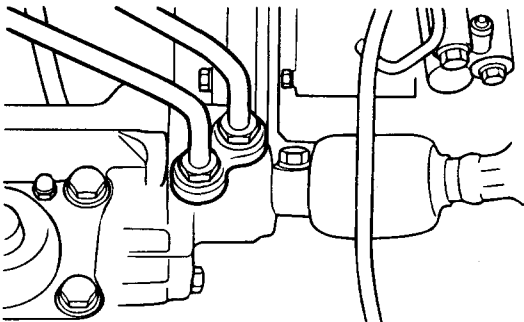
Before removal of steering hose, drain the power steering oil.

1. Removal of pressure hose and tube.
 - 1) Disconnect the pressure hose from the steering oil pump.



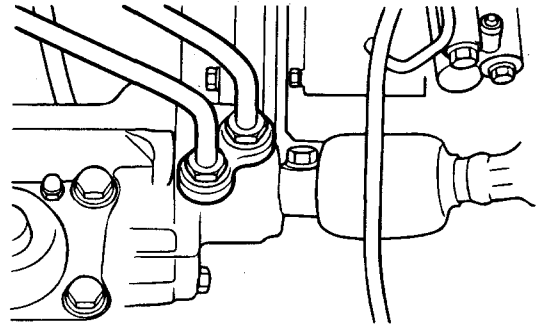
KPMB200A

- 2) Loosen the bolt of pressure hose mounting clamp.
- 3) Remove the pressure/return tube clip mounting bolt.
- 4) Disconnect the pressure tube from the steering gear box, and then disconnect the pressure hose and the tube.



KPMB140A

2. Removal of RETURN HOSE AND TUBE.
 - 1) Disconnect the return hose from the oil reservoir.
 - 2) Loosen the return tube clip mounting bolt.
 - 3) Remove the return/pressure tube clip mounting bolt.
 - 4) Disconnect the return tube from the steering gear box, and then disconnect the return hose and the tube.



KPMB140A

3. Removal of suction hose.
 - 1) Disconnect the suction hose from the steering oil reservoir.
 - 2) Loosen the two bolts of steering oil pump and disconnect the suction hose.

INSTALLATION EPMB2700

Installation is the reverse of removal

CAUTION

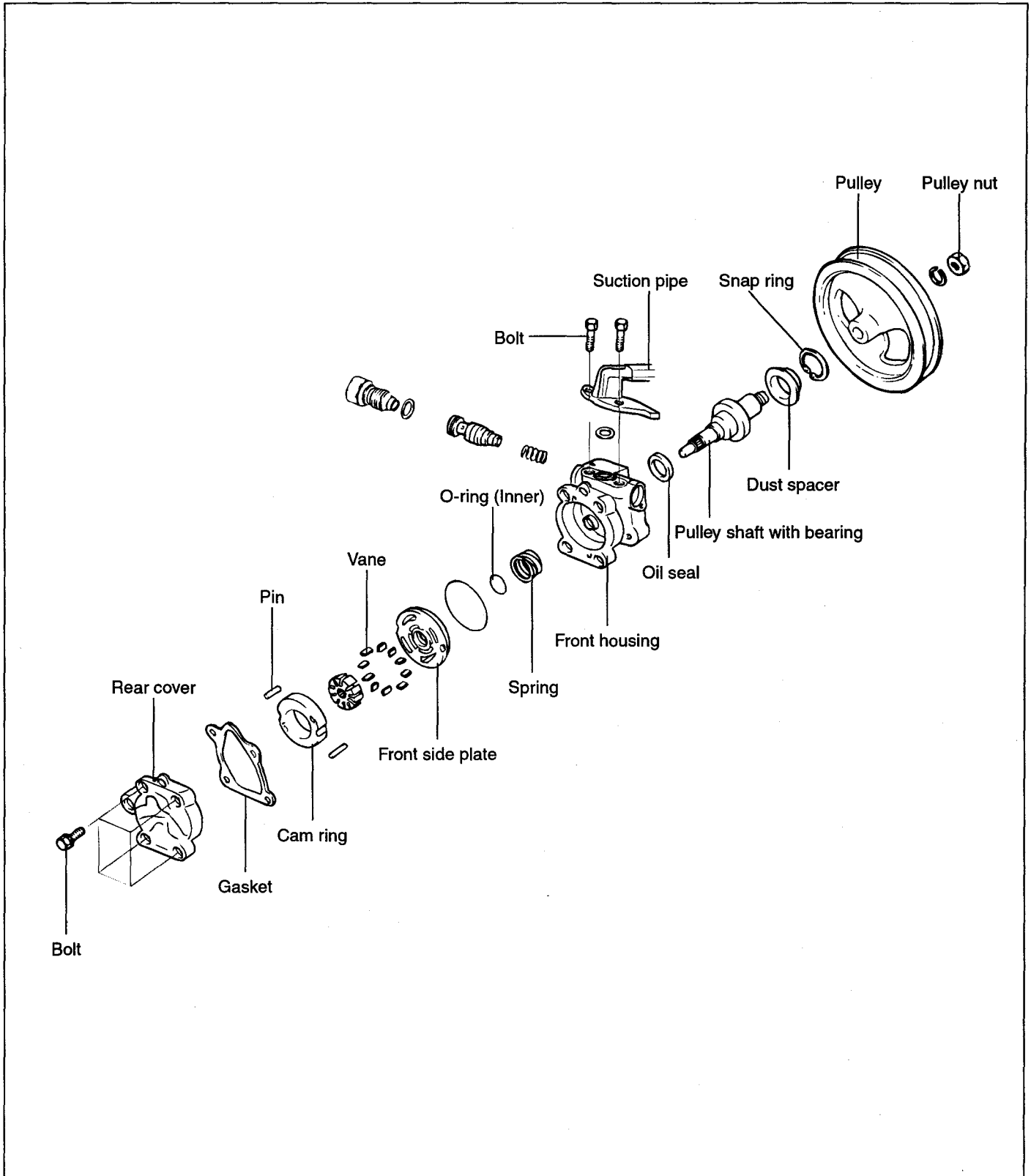
- *Install the hose lest they should be twisted and come in contact with any other parts.*
- *After installation, bleed the air.*

INSPECTION EPMB2800

1. Inspect the hose for cracks by twisting it by hand.
2. Check for interference between hose and the other parts.

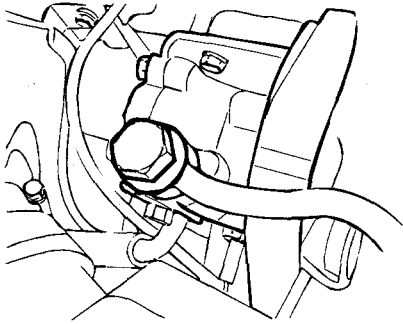
POWER STEERING OIL PUMP

COMPONENTS EPMB1900



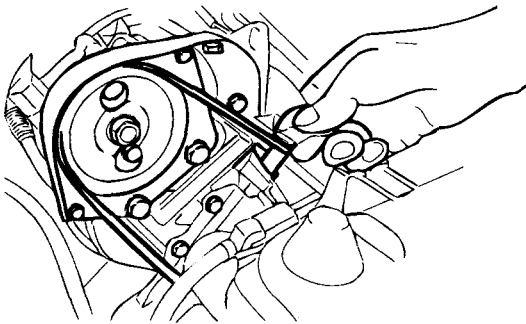
REMOVAL EPMB2000

1. Disconnect the pressure hose from the oil pump, disconnect the suction hose from the suction pipe, and drain the oil.



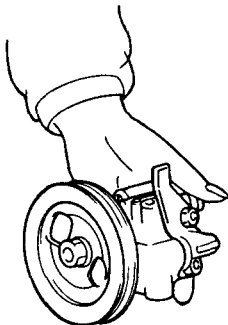
KPMB200A

2. Loosen the power steering tension adjusting bolt.
3. Separate the "V" belt from the power steering oil pump pulley.



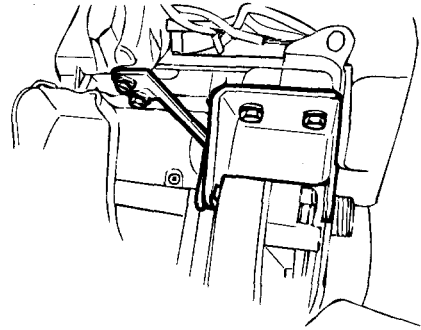
KPMB200B

4. Loosen the power steering oil pump mounting bolt, and then remove the power steering oil pump assembly.



KPKA048A

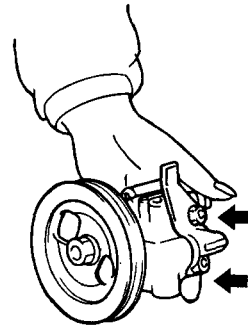
5. Remove the power steering oil pump mounting bracket.



KPMB200C

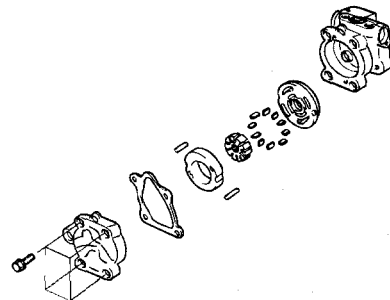
DISASSEMBLY EPMB2100

1. Remove the two bolts (12 mm) from oil pump body, and then remove the suction pipe and O-ring.



KPKA050A

2. Remove the four bolts (14 mm), and then remove the oil pump cover assembly.
3. Remove the cap ring.
4. Remove the rotor and the vane.
5. Remove the oil pump side plate.

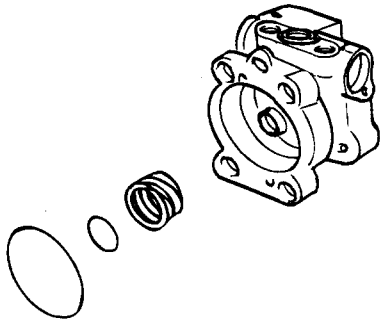


KPKA046A

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

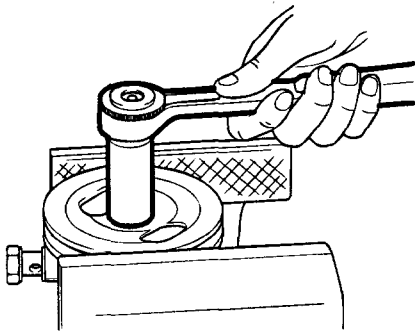
 **NOTE**

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



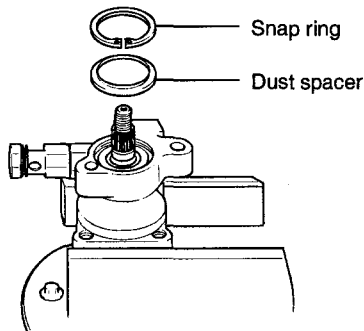
KPKA055A

8. Mount the pulley in a vise and remove the pulley nut and the spring washer.



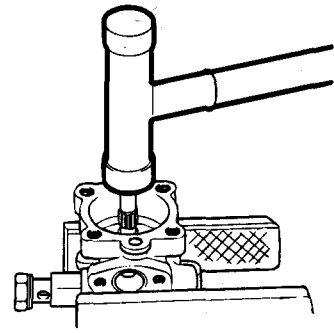
KPKA056A

9. Pull the pulley out.
10. After removing the snap ring of the shaft with snap ring pliers, remove the dust spacer.



KPKA057A

11. Tap the rotor side of the shaft slightly with a plastic hammer to remove the shaft.

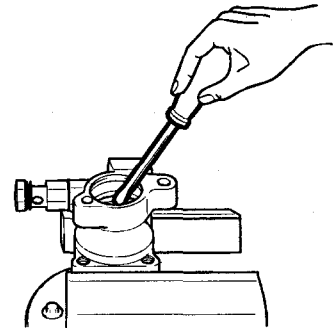


KPKA058A

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

 **NOTE**

When assembling, use a new oil seal.

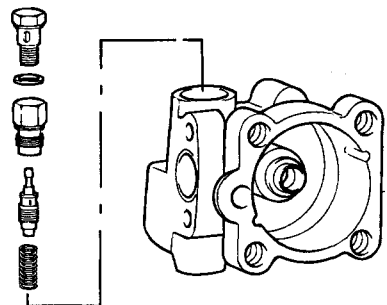


KPKA059A

13. Remove the connector from the oil pump body, and take out the flow control valve and the flow control spring.
14. Remove the O-ring from the connector.

 **CAUTION**

Do not disassemble the flow control valve.

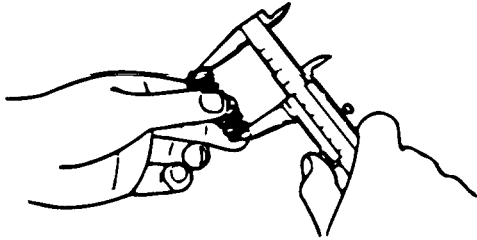


KPKA060A

INSPECTION EPMB2200

1. Check the free length of the flow control spring.

Free length of the flow control spring : 36.5 mm

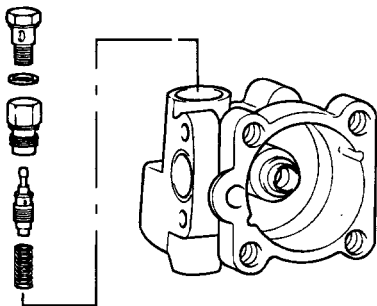


KPKA068A

2. Check that the flow control valve is not bent.
3. Check the shaft for wear and damage.
4. Check the V-belt for wear and deterioration.
5. Check the grooves of the rotor and vanes for stratified abrasion.
6. Check the contact surface of the cam ring and vanes for stratified abrasion.
7. Check vanes for damage.
8. Check that there is no striped wear in the side plate or contacting part between the shaft and the pump cover surface.

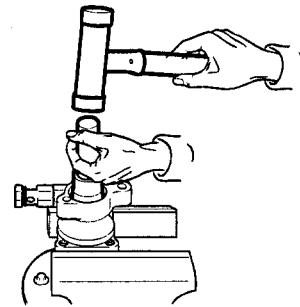
REASSEMBLY EPMB2300

1. Install the flow control spring the flow control valve and the connector in to the pump body.



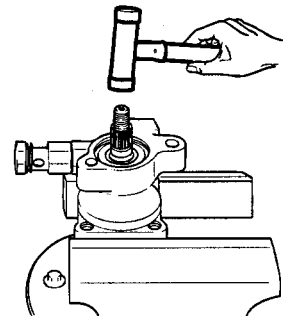
KPKA060A

2. Install the oil seal in the pump body by using the special tool.

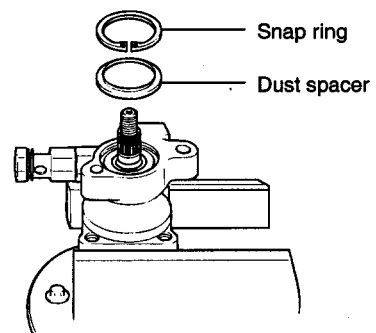


KPKA061A

3. After inserting the shaft assembly into the pump body, install the dust spacer and snap ring.

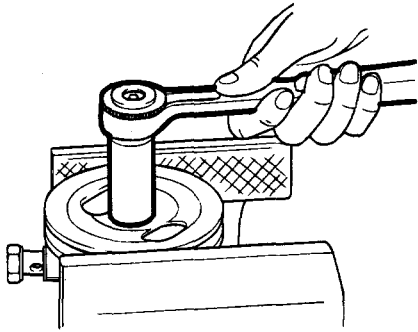


KPKA062A



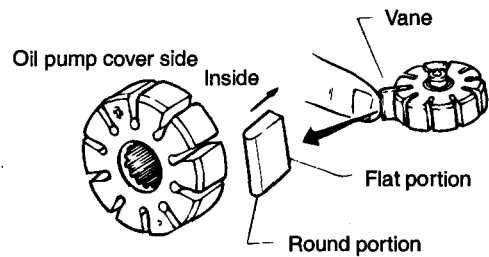
KPKA057A

4. Install the pump pulley.



KPKA056A

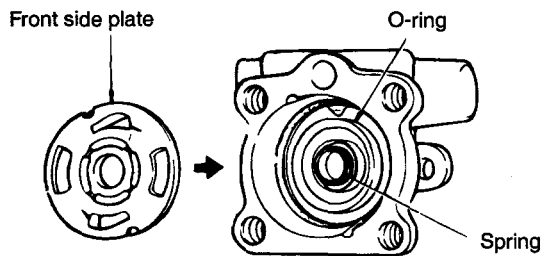
9. Install vanes so that the rounded edges face outward.



EPKB300C

5. Install the spring and inner O-ring.

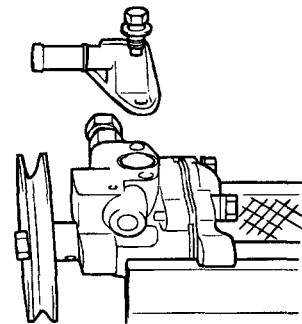
6. Insert the outer O-ring in the oil pump side plate then install it in the pump body.



EPKB300A

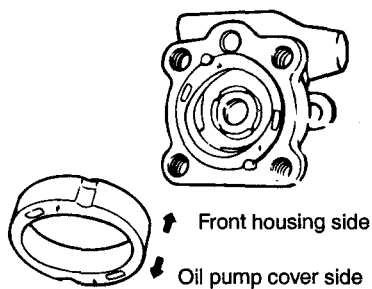
10. Install the gasket and oil pump cover assembly.

11. Install the suction pipe and O-ring.



KPKA063A

7. After inserting the lock pin into the groove of the front housing, install the cam ring attending to the direction.

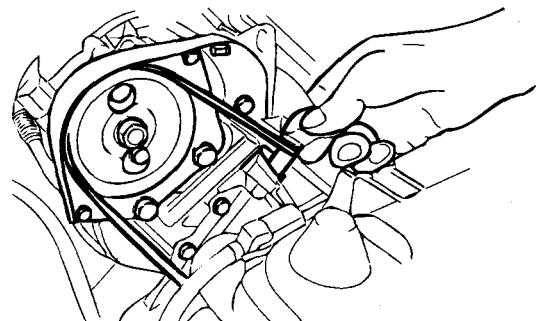


EPKB300B

8. Install the rotor.

INSTALLATION EPMB2400

1. After installing the oil pump to the oil pump bracket, install the "V" belt and tighten the bolt adjusting tension to the specified torque.



KPMB200B

2. Install the suction hose.



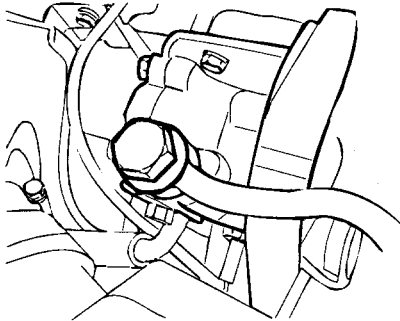
CAUTION

Install the pressure hose to the oil pump.

3. Install the pressure hose to the oil pump.

 **NOTE**

Install the pressure hose being careful so that it does not twist and come in contact with other components.



KPMB200A

4. Add power steering fluid (PSF-3).
5. Air bleed the system.
6. Check the oil pump pressure.