

Steering System

GENERAL

STEERING COLUMN AND SHAFT

STEERING COLUMN / SHAFT

MECHANICAL POWER STEERING SYSTEM

POWER STEERING GEAR BOX

POWER STEERING HOSES

POWER STEERING OIL PUMP

GENERAL

SPECIFICATIONS

E8600541

Items	Specifications
Shaft and joint type Steering gear type Rack stroke Power steering pump type Oil pump displacement 2.0(I4), 2.0(D-ENG) 2.7(V6)	Cross joint, tilt column with pop-up weight Rack and pinion 140 ± 1 mm (lock to lock : 3.06 turns) Vane type 9.6cc/rev. MAX. (0.59 in ³ /rev. MAX.) 10.5cc/rev. MAX. (0.64 in ³ /rev. MAX.)

SERVICE STANDARD

Items	Specifications
Steering wheel free play Steering angle Inner wheel Outer wheel Difference between LH and RH Stationary steering effort Belt deflection [under 98N (10kg, 22lb) force] New belt Use belt Oil pump relief pressure 2.0 (I4), 2.7 (V6) 2.0 (D-ENG) Total pinion preload Tie rod swing resistance	0~30mm (0~1.1 in.) 38°1' ± 1°30' 32°5' 2° or less 29N (3.0kg, 6.5lbs) or less 8.8~11.0mm 12.5~14.3mm 8.6~9.1 MPa (88~93 kg/cm ² , 1251~1322 psi) 9.1~9.6 MPa (93~98 kg/cm ² , 1322~1393 psi) 0.6~1.3 Nm (6~13 kg.cm, 5.2~11.3 lb.in.) 2~5 Nm (20~50 kg.cm, 1.4~3.6 lb.ft)

TIGHTENING TORQUE

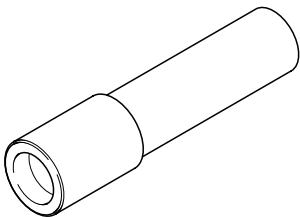
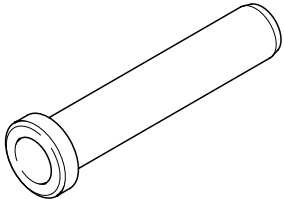
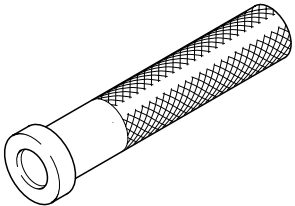
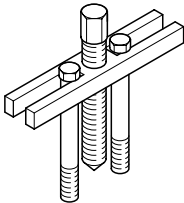
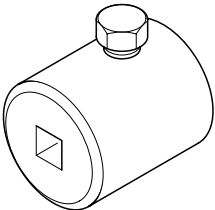
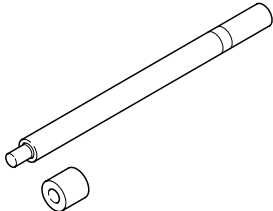
Item	Nm	kg-cm	lb-ft
Power steering column and shaft			
Steering column and shaft mounting bolt	13 ~ 18	130 ~ 180	9.6 ~ 13.3
Power steering wheel lock nut	40 ~ 50	400 ~ 500	28.9 ~ 37
Pinion gear and joint assembly	15 ~ 20	150 ~ 200	10.8 ~ 14.8
Steering column shaft and universal joint assembly	15 ~ 20	150 ~ 200	10.8 ~ 14.8
Dust cover mounting bolt	4 ~ 6	40 ~ 60	3.0 ~ 4.0
Power steering gear box			
Gear box mounting bolt	60 ~ 80	600 ~ 800	44 ~ 59
Tie rod end ball joint and knuckle arm mounting nut	45 ~ 60	450 ~ 600	32.5 ~ 43.4
Feed tube to gear box	10 ~ 16	100 ~ 160	7.4 ~ 11.8
Gear box to valve body	20 ~ 30	200 ~ 300	14.8 ~ 21.7
Yoke plug lock nut	50 ~ 70	500 ~ 700	37 ~ 50

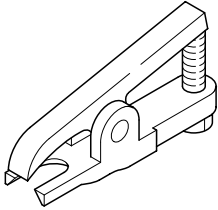
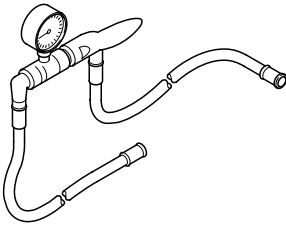
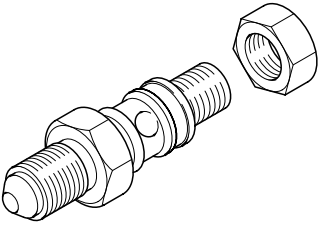
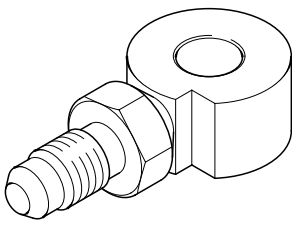
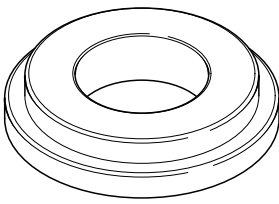
Item	Nm	kg-cm	lb-ft
Power steering oil pump			
Pressure hose to oil pump	65 ~ 75	650 ~ 750	47.9 ~ 54.2
Oil pump adjusting bolt	35 ~ 50	350 ~ 500	25.3 ~ 37
Oil pump mounting bolt			
2.0 (D-ENG)	17 ~ 26	170 ~ 260	12.3 ~ 18.8
2.0 (I4), 2.7 (V6)	35 ~ 50	350 ~ 500	25.8 ~ 37
Oil pump bracket mounting bolt	35 ~ 50	350 ~ 500	25.8 ~ 37
Power steering hose			
Power steering reservoir mounting bolt	17 ~ 26	170 ~ 260	12.3 ~ 18.8
Power steering hose mounting bolt	4 ~ 6	40 ~ 60	3.0 ~ 4.0
Power steering tube mounting bolt	4 ~ 6	40 ~ 60	3.0 ~ 4.0

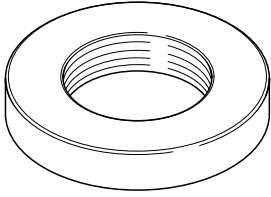
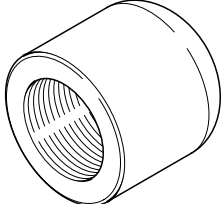
LUBRICANTS EAAE2CD4

Item	Recommended lubricant	Quantity
Horn contact ring of steering wheel	CENTOPLX278 (KLUBER KOREA)	As required
Bearing of steering shaft	ALVANIA #2 OR #3 (KEUK DONG SHELL, KOREA)	As required
Ball joint of tie rod end	SHOWA SUNLIGHT MB-2 OR equivalent	As required
Steering gear housing	ONE-LUBER RP GREASE (KYODOYUSHI, JAPAN)	As required
Inner ball joint of gear box	LONG TIME PD2 (OPTIMOL, GERMAN)	As required
Contact area of gear box bellows & tie rod	SILICON GREASE (SPEC NO : MS511-41)	As required
Power steering fluid	PSF-3	0.75~0.8 liter (0.79~0.84 qts.)

SPECIAL TOOLS E5C0D1D3

Tool (Number and name)	Illustration	Use
09222-32100 Valve stem oil seal installer	 HCT5602	Installing the pinion gear bearing
09432-21600 Bearing installer	 EPA9005D	Installing the pinion gear bearing
09434-14200 Counter shaft bearing installer	 EPKB040A	Installing the gear box oil seal.
09561-11002 Steering wheel puller	 HCT5607	Removing the steering wheel.
09565-11100 Preload socket	 EPA9005G	Measuring the mainshaft preload.
09555-21000 Bar	 EPKB040B	Removing & installing the oil seal.

Tool (Number and name)	Illustration	Use
09568-34000 Ball joint puller	 <p>EPA9005J</p>	Separating the tie rod end ball joint.
09572-21000 Oil pressure gauge	 <p>EPA9005K</p>	Measuring the power steering oil pressure (use with 09572-21200, 09572-22100)
09572-21200 Oil pressure gauge adapter	 <p>EPA9005L</p>	Measuring the power steering oil pressure (use with 09572-21000, 09572-22100)
09572-22100 Oil pressure gauge adapter	 <p>EPA9005M</p>	Measuring the power steering oil pressure (use with 09572-21000, 09572-21200)
09573-21000 Oil seal installer gauge	 <p>EPKB040C</p>	Installing the back-up washer and oil seal. (use with 09573-21100, 09573-21200, 09517-11000, 09555-21000)

Tool (Number and name)	Illustration	Use
09573-21100 Oil seal installer	 EPKB040D	Installing the back-up washer and oil seal. (use with 09573-21000, 09573-21200, 09555-21000)
09573-21200 Oil seal guide	 EPKB040E	1. Removing the gear box oil seal and back washer (use with 09573-21000) 2. Installing the gear box oil seal and back washer (use with 09555-21000, 09573-21000)

TROUBLESHOOTING

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Symptom	Probable cause	Remedy (see page)
Excessive play in steering	Loose yoke plug Loose steering gear mounting bolts Loose or worn tie rod end	Retighten Retighten Retighten or replace as necessary (See page ST-8)
Steering wheel operation is not smooth (Insufficient power assist)	V-belt slippage Damaged V-belt Low fluid level Air in the fluid Twisted or damaged hoses Insufficient oil pump pressure Sticky flow control valve Excessive internal oil pump leakage Excessive oil leaks from rack and pinion in gear box Distorted or damaged gear box or valve body seals	Readjust (See page ST-10) Replace (See page ST-10) Replenish (See page ST-11) Bleed air (See page ST-11) Correct the routing or replace Repair or replace the oil pump (See page ST-12) Replace Replace the damaged parts Replace the damaged parts Replace
Steering wheel does not return properly	Excessive turning resistance of tierod end Yoke plug excessively tight Tie rod and/or ball joint cannot turn smoothly Loose mounting of gear box mounting bracket Worn steering shaft joint and/or body grommet Distorted rack Damaged pinion bearing Twisted or damaged hoses Damaged oil pressure control valve Damaged oil pump input shaft bearing	Replace Adjust Replace (See page ST-8) Retighten Correct or replace Replace Replace Reposition or replace Replace Replace
Noise	Hissing Noise in Steering Gear There is some noise with all power steering systems. One of the most common is a hissing sound when the steering wheel is turned and the car is not moving. This noise will be most evident when turning the wheel while the brakes are being applied. There is no relationship between this noise and steering performance. Do not replace the valve unless the "hissing" noise becomes extreme. A replaced valve will also make a slight noise, and is not always a solution for the condition	
Rattling or chucking noise in the rack and pinion	Interference with hoses from vehicle body Loose gear box bracket Loose tie rod end and/or ball joint Worn tie rod and/or ball joint	Reposition Retighten Retighten Replace (See page ST-8)
Noise in the oil pump	Low fluid level Air in the fluid Loose pump mounting bolts	Replenish (See page ST-11) Bleed air (See page ST-11) Retighten

GENERAL

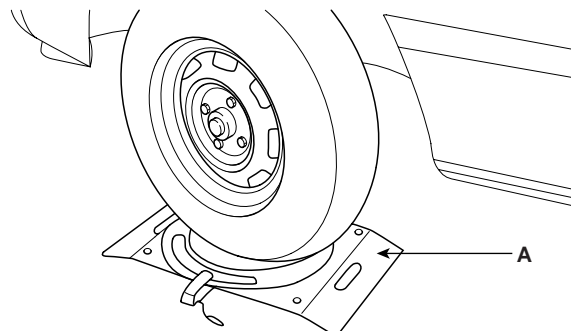
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CHECKING STEERING WHEEL FREE PLAY

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.

Standard value

Steering wheel free play : 0~30 mm (0~1.1 in)

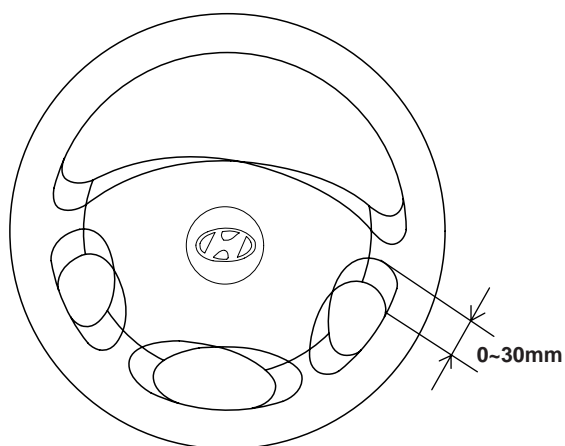


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2. If the measured value is not within the standard value, adjust the linkage.

CHECKING THE TIE ROD END BALL JOINT STARTING TORQUE

1. Disconnect the tie rod(A) and knuckle(B) by using the special tool (09568-34000).



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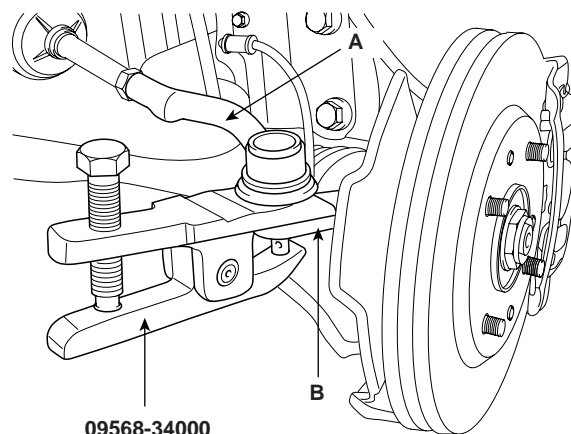
3. If the play exceeds the standard value, inspect the connection between the steering shaft and tie rod ends.

CHECKING STEERING ANGLE

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

Standard value

Wheel angle

Inner wheel : $38^{\circ}1' \pm 1^{\circ}30'$ Outer wheel : $32^{\circ}5'$ 

09568-34000

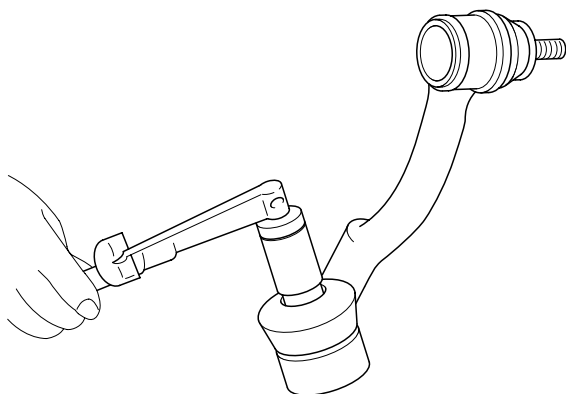
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2. Shake the ball joint stud several times to check for looseness.

3. Mount the nuts on the ball joint, and then measure the ball joint starting torque.

Standard value

0.5~2.5 Nm (5~25 kg·cm, 0.36~1.78 lb·ft)



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4. If the starting torque exceeds the upper limit of the standard value, replace the tie rod end.
5. Even if the starting torque is below the lower limit of the standard value, check the play of the ball joint and replace if necessary.

CHECKING STATIONARY STEERING EFFORT

1. Place the vehicle on a level surface and place the steering wheel in the straight ahead position.
2. Increase the engine speed to 1000 ± 100 rpm.

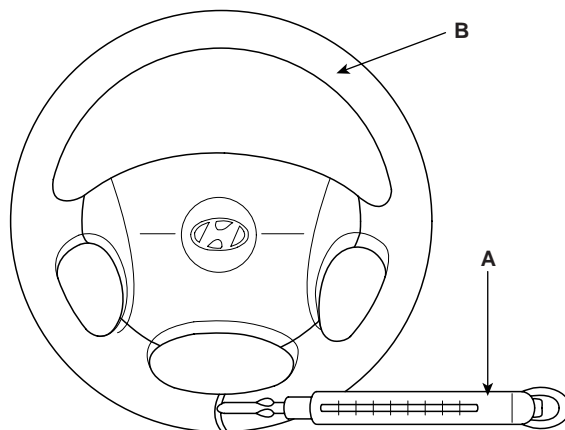
NOTE

After checking, reset the engine speed to the standard value (idling speed).

3. Measure the turning force with a spring scale(A) by turning the steering wheel(B) clockwise and counter-clockwise one and a quarter turns.

Standard value

Stationary steering effort :
29 N (3.0 kg, 6.5lbs) or less



EPKE003A

4. Check that there is no sudden change of force while turning the steering wheel.
5. If the stationary steering effort is excessive, check and adjust the following points.
 - 1) Damage or cracks on the dust cover of the lower arm ball joint and tie rod end.
 - 2) Pinion preload of the steering gear box and starting torque of the tie rod end ball joint.
 - 3) Starting torque of the ball joint.

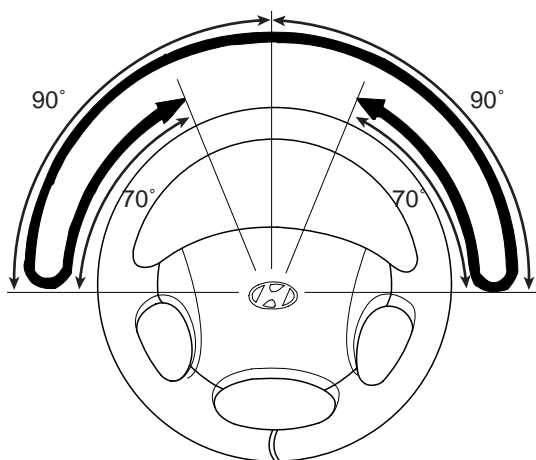
CHECKING STEERING WHEEL RETURN

Check the steering wheel return and confirm the following points :

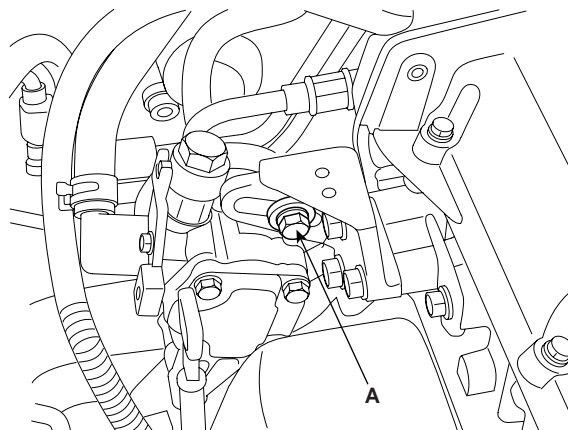
1. The force required to turn the steering wheel and the wheel return should be the same for both left and right in case of moderate or sharp turns.
2. When the steering wheel is turned 90° and held for a couple of seconds while the vehicle is being driven at 35kph, the steering wheel should return 70° or more.

NOTE

If the steering wheel is turned very quickly, steering may be momentarily difficult. This is not a malfunction because the oil pump output will be somewhat-decreased.



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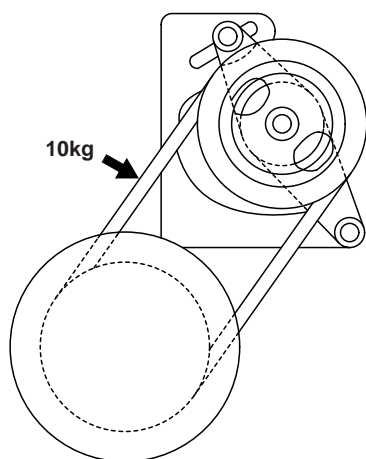
CHECKING POWER STEERING BELT TENSION

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

Standard value

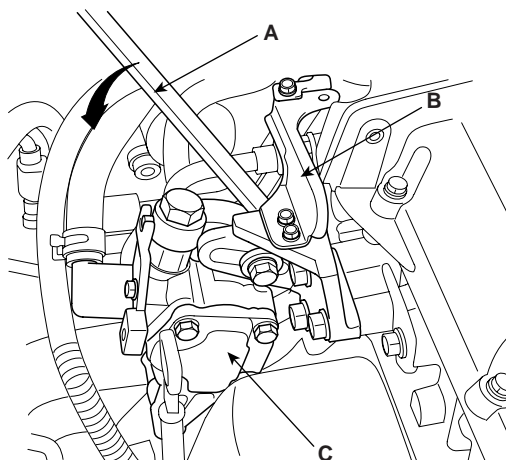
New belt : 8.8 ~ 11.0 mm

Used belt : 12.5 ~ 14.3 mm



EPKE085A

- 2) Put a bar(A) or equivalent, between the bracket(B) and the oil pump(C) and adjust the tension so that the belt deflection is within the standard value.



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2. If the belt deflection is beyond the standard value, adjust the belt tension as follows.
 - 1) Loosen the bolt adjusting(A) the power steering "V" belt tension.

- 3) Tighten the bolt adjusting the power steering "V" belt tension.
- 4) Check the belt deflection and adjust it again if necessary.



CAUTION

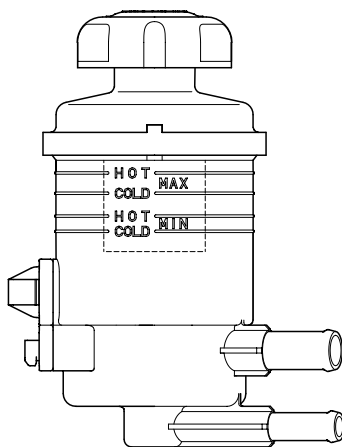
After turning the V belt in the normal rotation direction more than once, recheck the belt deflection.

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 to 50 - 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 there is no foaming or cloudiness in the reservoir fluid.
5. Stop the engine to check for any difference in fluid level between a stationary 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, further bleeding is required.
3. Incomplete bleeding will produce a chattering sound in the pump and noise in the flow control valve, and lead to decreased durability of the pump.



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REPLACING POWER STEERING FLUID

1. Jack up the front wheels of the car and support them with jackstands.
2. Disconnect the return hose from the oil reservoir and plug the oil reservoir.
3. Connect a hose to the disconnected return hose, and drain the oil into a container.

4. Disconnect the high-tension cables and ignition coils. 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 hose and fix it with a clip.
6. Fill the power steering fluid reservoir with the specified fluid.

 PSF-3 : 0.75~0.8 lit.

7. Start the engine. Check for fluid leaks from the hose, then stop the engine.
8. Pour the fluid into the bottom of the oil filter in the power steering fluid reservoir.
9. Bleed the air.

AIR BLEEDING

1. Fill the power steering fluid reservoir up to the "MAX" position with specified fluid.
2. Jack up the front wheels.
3. Disconnect the ignition coil high tension cable, and then, while operating the starter motor intermittently (for 15 to 20 seconds), turn the steering wheel all the way to the left and then to the right five or six times.

NOTE

1. When bleeding fluid, replenish with the fluid so that the level does not fall below the bottom 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.
4. Connect the high tension cable, and then start the engine (idling).
5. Turn the steering wheel to the left and then to the right, until there are no air bubbles in the oil reservoir.

NOTE

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

6. Confirm that the fluid is not milky and that the level is between "MAX" and "MIN" mark on the reservoir.
7. Check that there is a little change in the fluid level when the steering wheel is turned left and right.

NOTE

1. If the fluid level varies 5mm (0.2 in.) or more, bleed the system again.
2. If the fluid level suddenly rises after stopping the engine, further bleeding is required.
3. Incomplete bleeding will produce a chattering sound in the pump and noise in the flow control valve, and lead to decreased durability of the pump.

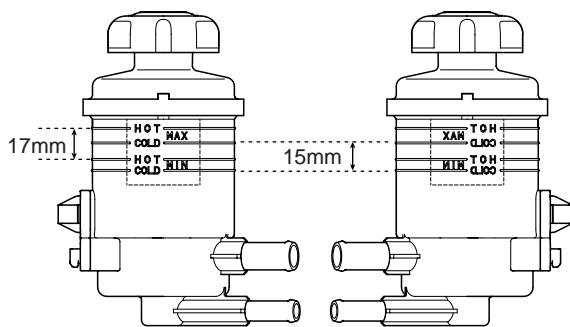
CAUTION

Do not keep the shut-off valve on the pressure gauge closed for more than ten seconds.

5. Remove the special tools, and tighten the pressure hose(B) against the oil pump (A) using the specified torque.

Tightening torque

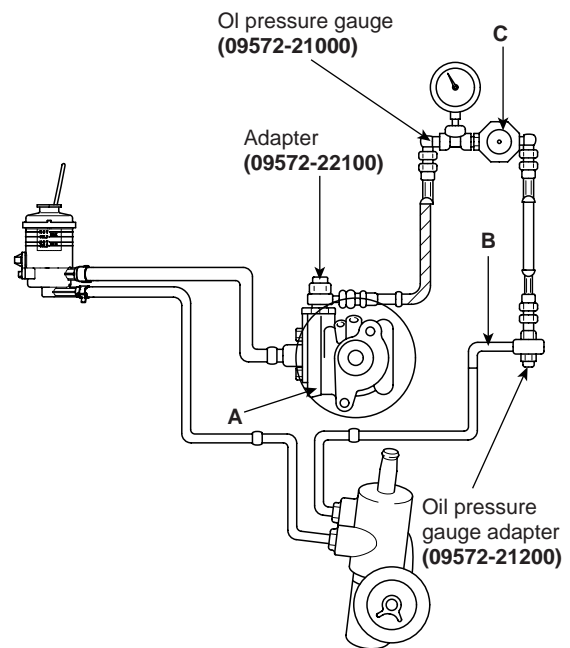
65~75 Nm (650~750 kg.cm, 47.9~54.2 lb.ft)



KPQE220A

OIL PUMP PRESSURE TEST

1. Disconnect the pressure hose(B) from the pump(A). Connect the special tool between the pump and the pressure hose as illustrated.
2. Bleed the air, and then start the engine and turn the steering wheel several times, measure the fluid temperature by Temperature gauge so that the fluid temperature can rise to approximately 50°C (122°F).
3. Increase the engine speed to 1,000 rpm.
4. Close the shut-off valve of the special tool and measure the fluid pressure to confirm that it is within the standard value range.



EPQF230A

6. Air bleed the system. (see page ST-11)

Standard value

Oil pump pressure

Relief pressure :

2.0(I4), 2.7(V6) :

8.6~9.1 MPa (88~93 kg.cm², 1251~1322 psi)

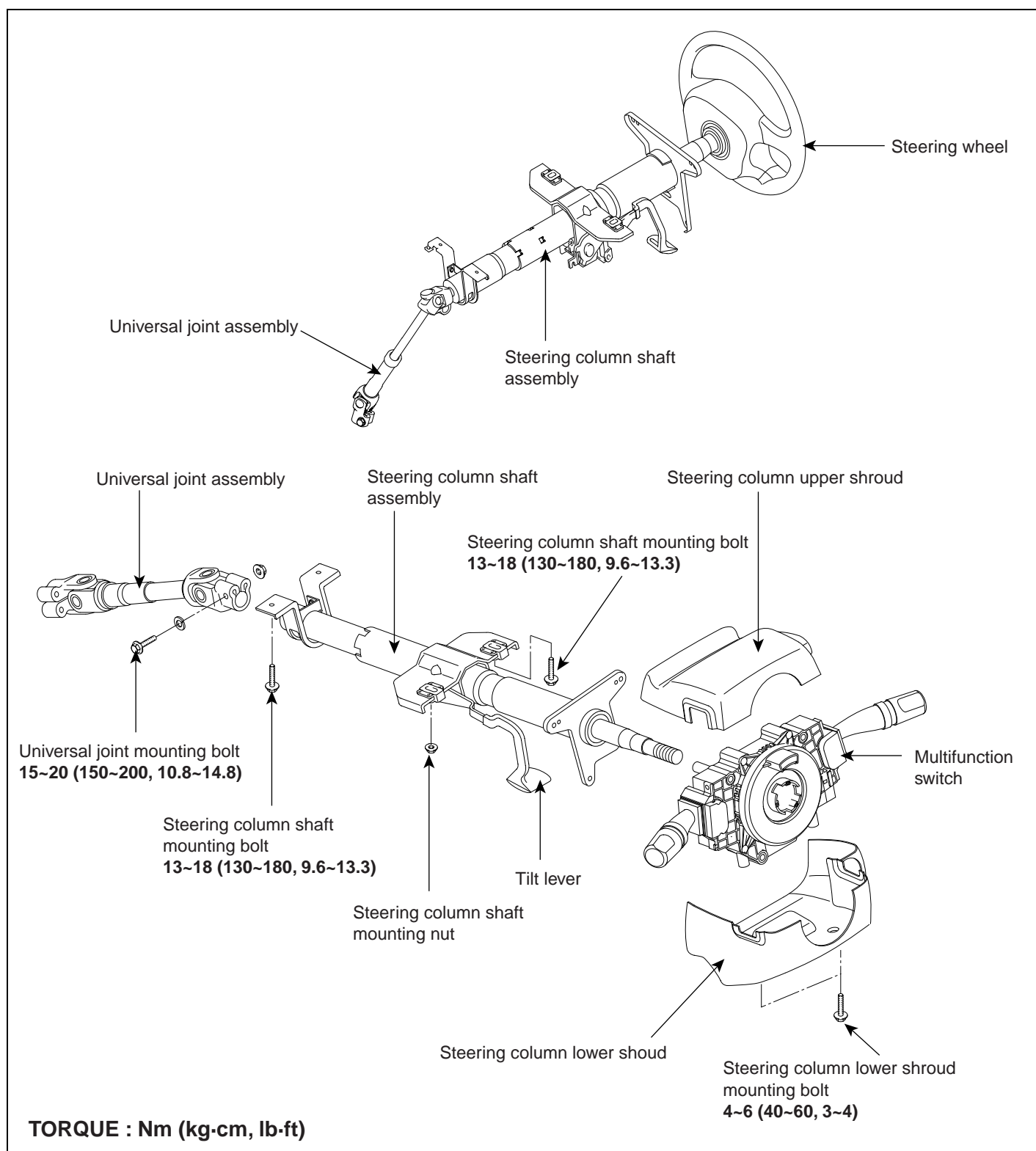
2.0(D-ENG) :

9.1~9.6 MPa (93~98 kg.cm², 1322~1393 psi)

STEERING COLUMN AND SHAFT

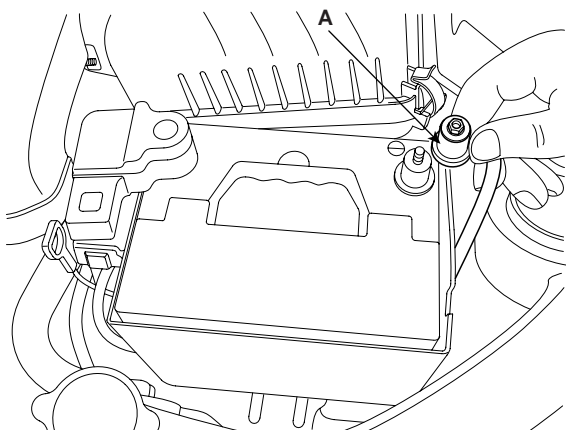
STEERING COLUMN / SHAFT

COMPONENTS ECD7C10D



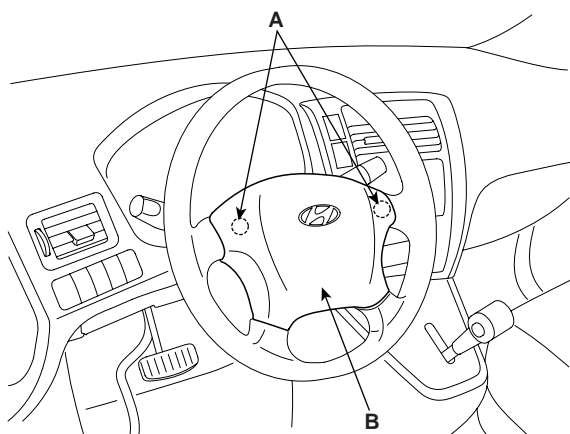
REMOVAL EFDE98AA

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



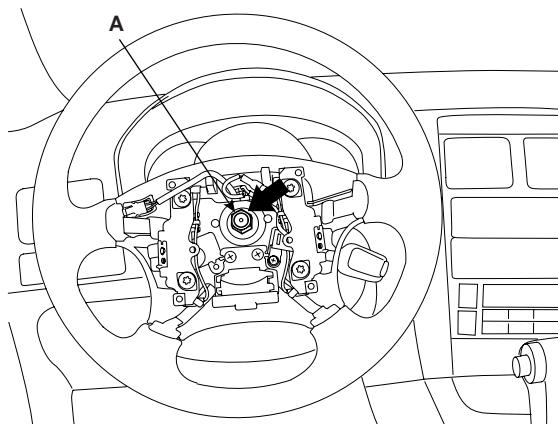
KPQE040A

2. Take away the bolts (A) in the illustration, and then remove the driver's airbag module(B).



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3. Remove the steering wheel lock nut(A).

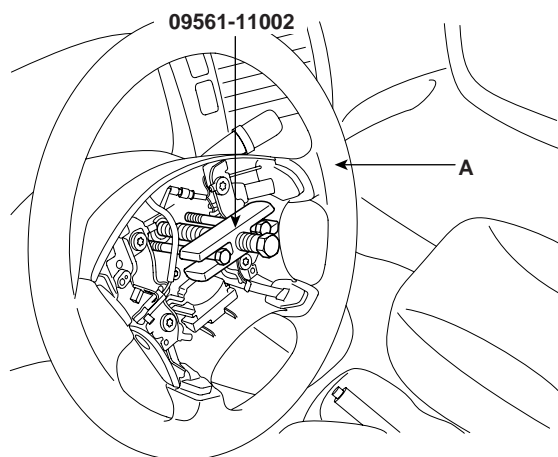


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4. After aligning the marks on the steering shaft and wheel(A), remove the steering wheel using the special tool (09561-11002).

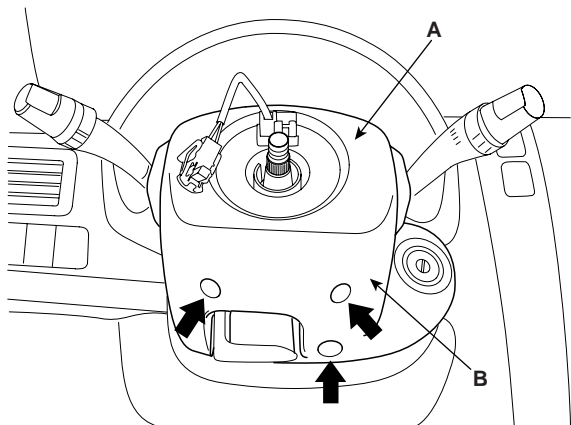
**NOTE**

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



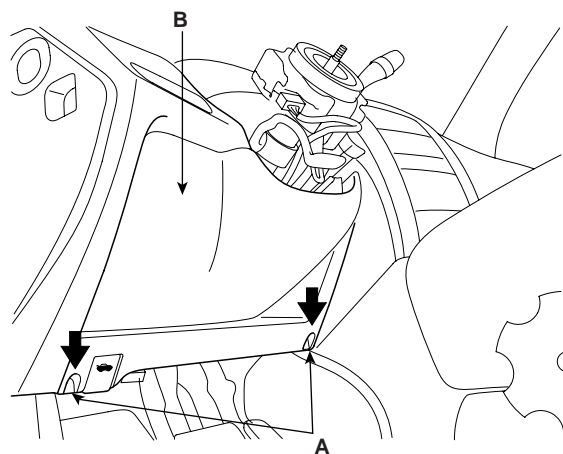
KPQE150A

5. Remove the steering column upper(A) and lower shrouds(B).



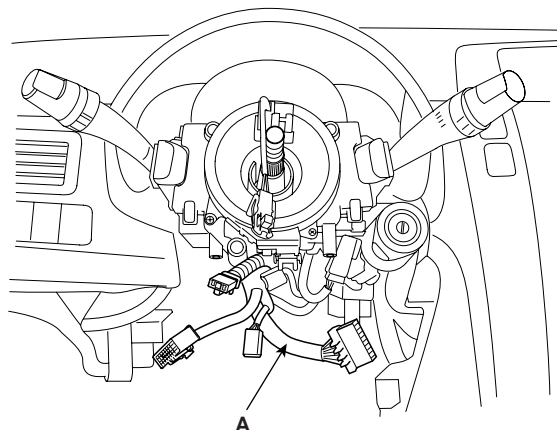
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6. Disconnect two tightening bolt(A) and remove the lower crash pad(B).



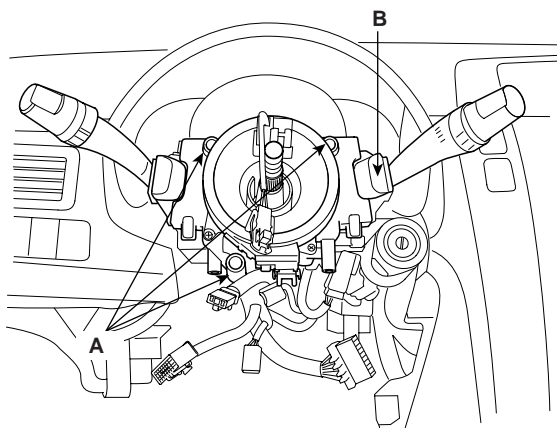
KPQE170A

7. Remove the connectors of the multifunction switch(A).



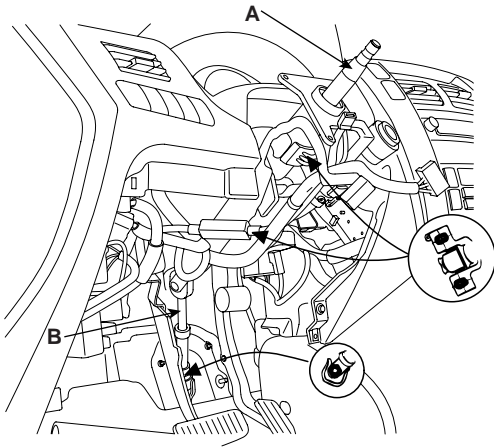
KPQE180B

8. After removing three bolts(A) in the illustration, remove the multifunction switch assembly(B).



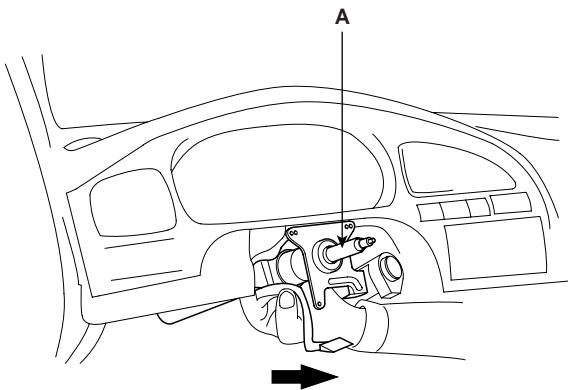
KPQE190A

9. Remove the bolts connecting the steering column shaft(A) and the universal joint(B) as shown in the illustration.



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10. After removing the mounting bolts and nuts on the steering column and shaft assembly, remove the steering column and shaft assembly(A).



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INSPECTION

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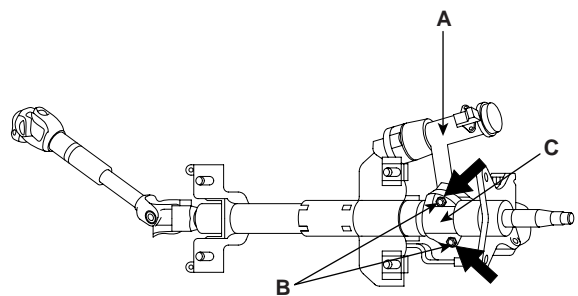
1. Check the steering column shaft for damage and deformation.
2. Check connections for play, damage and smooth operation.
3. Check the ball joint bearing for wear and damage.

DISASSEMBLY AND REASSEMBLY

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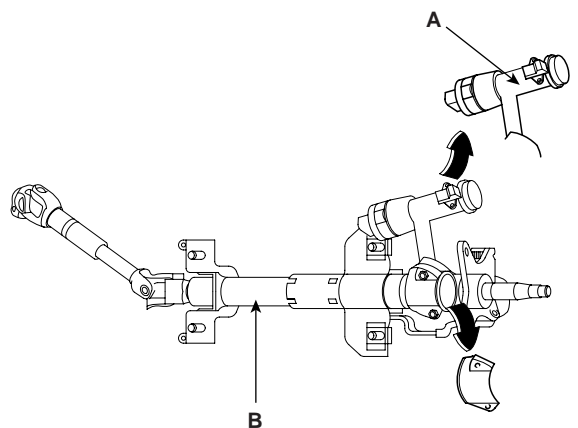
KEY LOCK ASSEMBLY

1. If it is necessary to remove the key lock assembly(A), use a punch to make a groove on the head of the special bolt(B), and then use a screwdriver to remove the key lock assembly mounting bracket(C).



EPKE021A

2. Disassemble the key lock assembly(A) from the steering column and shaft assembly(B).

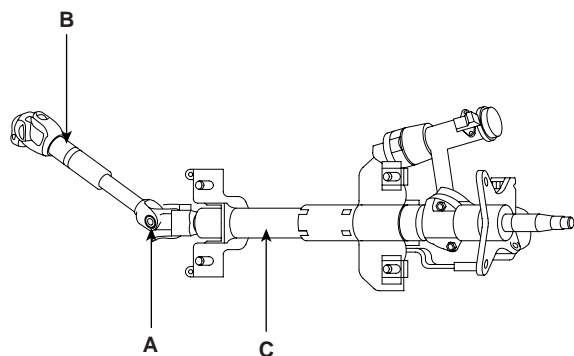


EPKE022A

3. Reassembly is the reverse of disassembly.

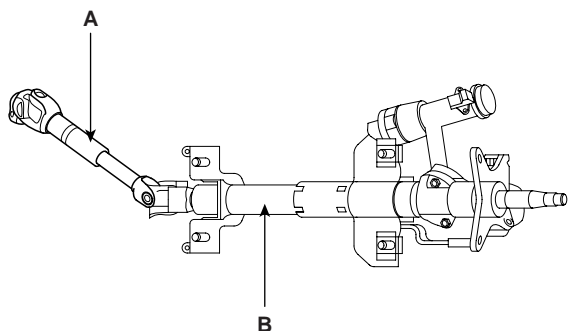
UNIVERSAL JOINT ASSEMBLY

1. Remove the bolt(A) connecting the universal joint assembly(B) and the steering column and shaft assembly(C).



EPKE023A

2. Remove the universal joint assembly(A) from the steering column and shaft assembly(B).



EPKE024A

3. Reassembly is the reverse of disassembly.

INSTALLATION

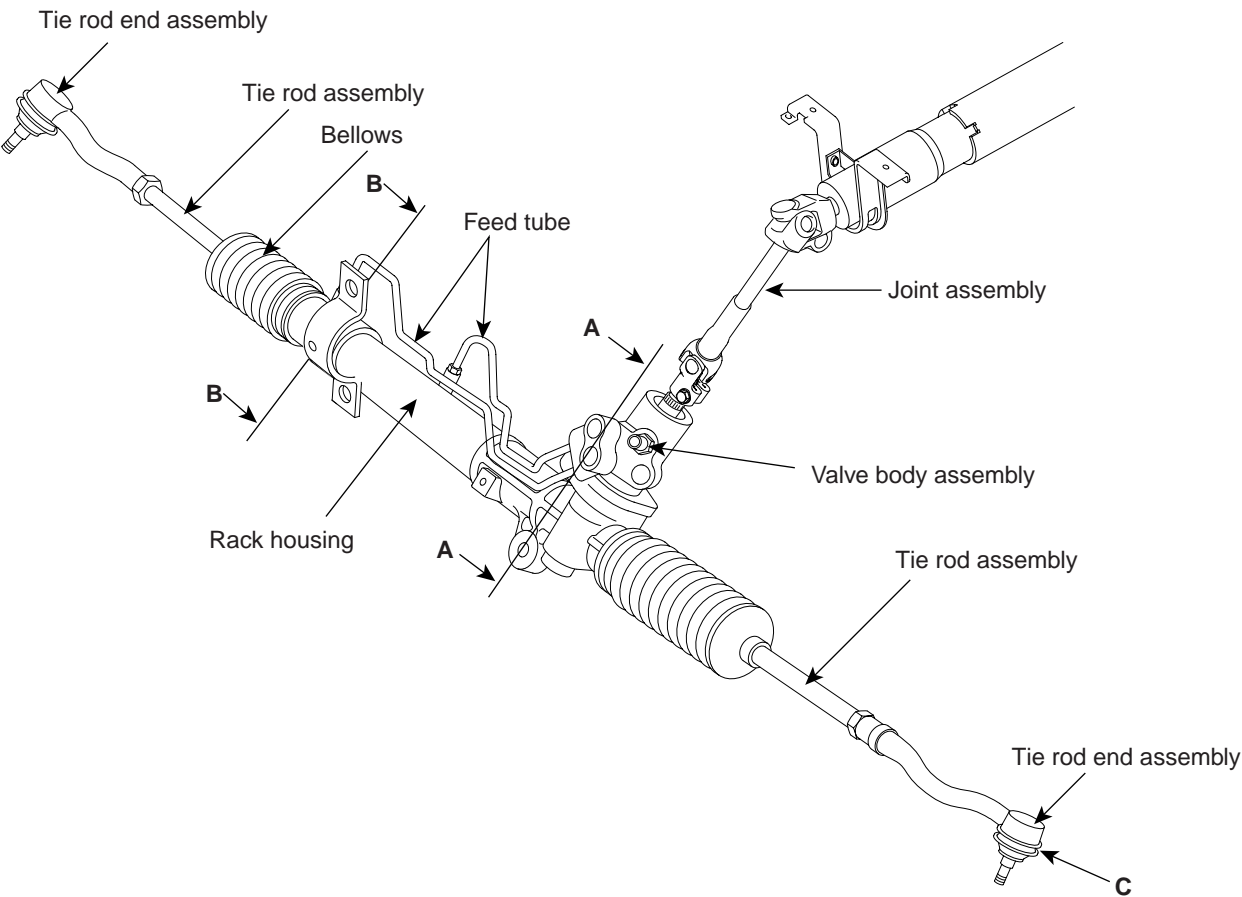
EDD4EDB1

Assembly is the reverse of removal.

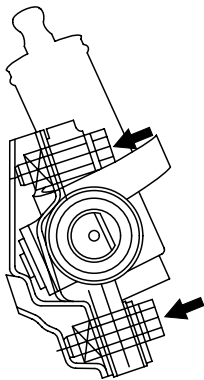
MECHANICAL POWER
STEERING SYSTEM

POWER STEERING GEAR BOX

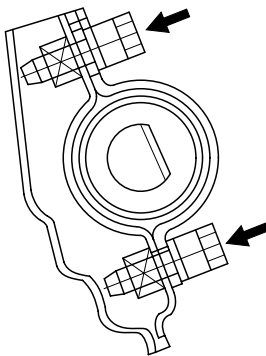
COMPONENTS ED4EE5EF



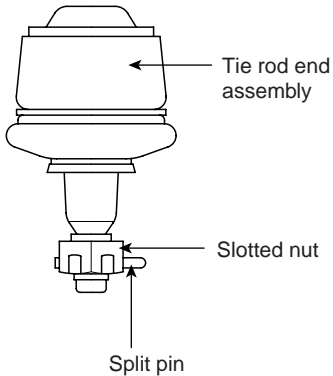
[VIEW A]

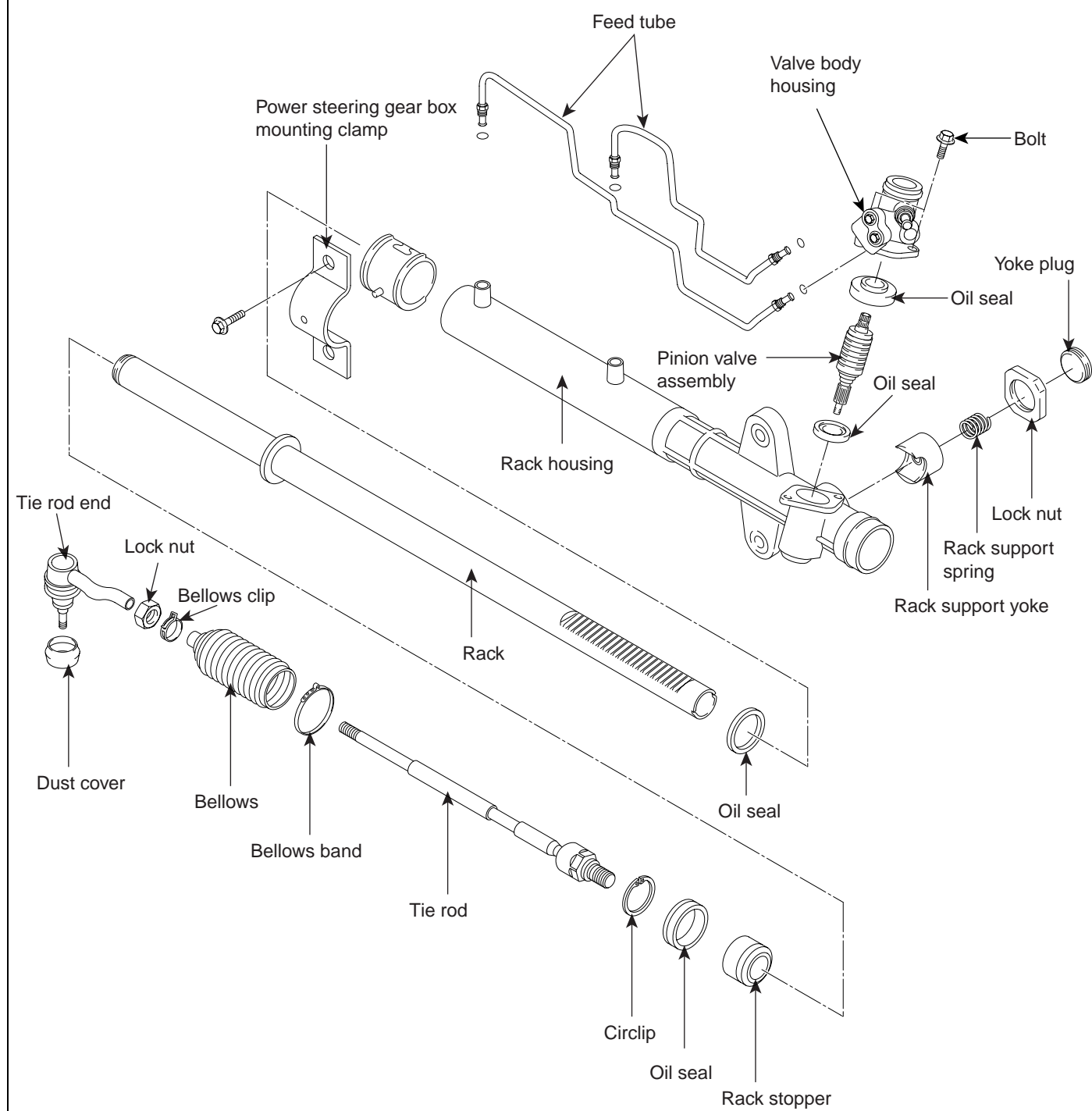


[VIEW B]



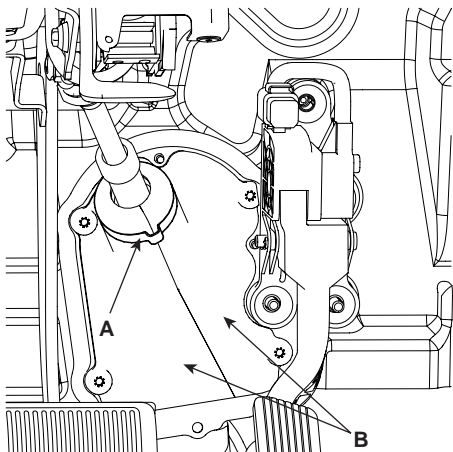
[VIEW C]





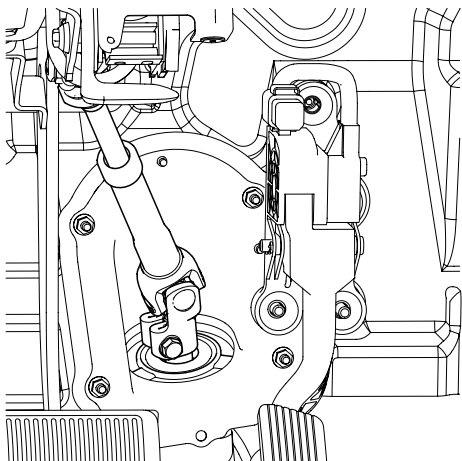
REMOVAL EFF4F37B

1. Disconnect the cover fixing clip(A) on the universal joint indoor driver isde, loosen the noise covers(B).



KPQE750A

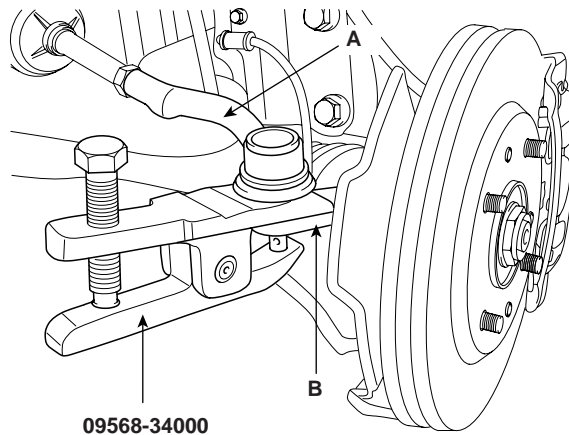
2. Loosen the iniversal joint and the gear box mounting bolt and disconnect the universal joint from the gear box.



KPQE710A

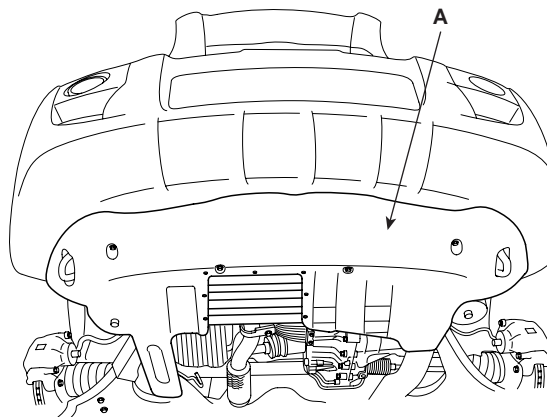
3. Lift up the vehicle.
4. Remove the front tires (RH/LH).

5. After removing the split pin, disconnect the tie rod(A) from the knuckle(B) by using the special tool (09568-34000).



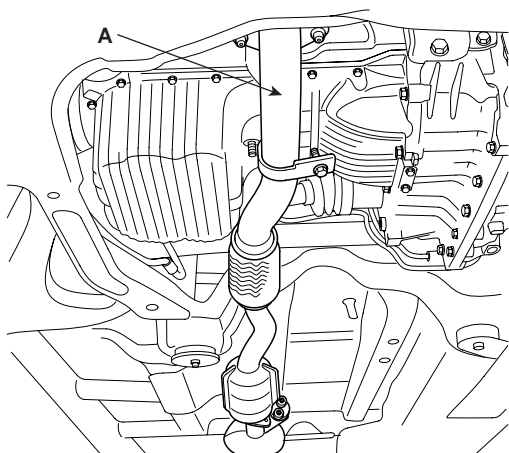
KPQE130A

6. Drain the power steering fluid. (see page ST-11)
7. Remove the engine under cover(A).



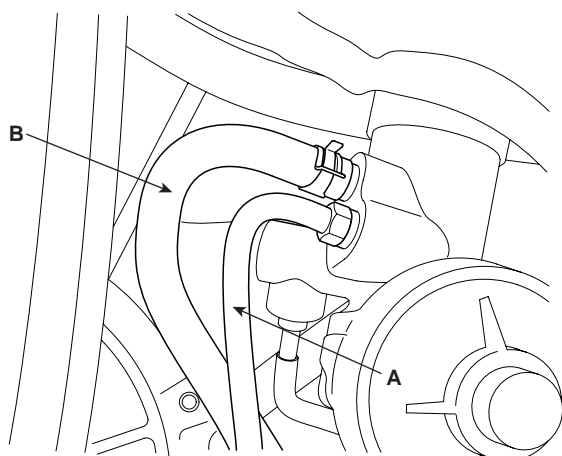
KPQE300A

8. Remove the front muffler assembly(A).



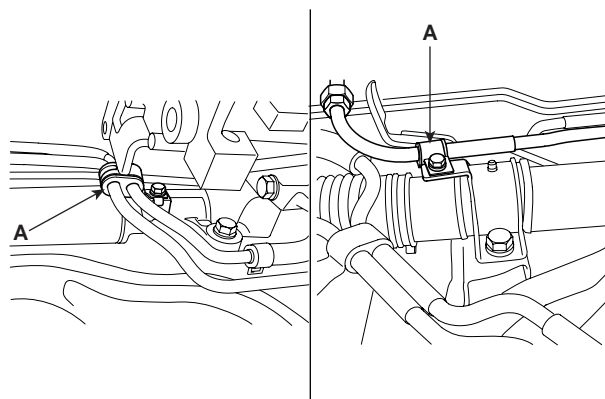
KPQE310A

9. Disconnect the end tube of the pressure hose(A) and the end hose of the return hose(B) from the gear box.



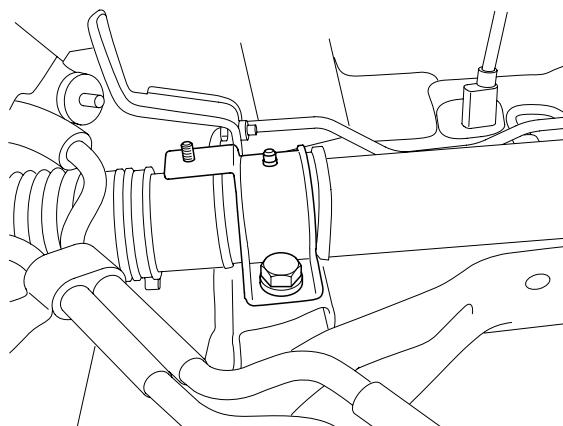
KPQE320A

10. Remove the bracket(A) holding the end tubes of the pressure tube and the return tube.



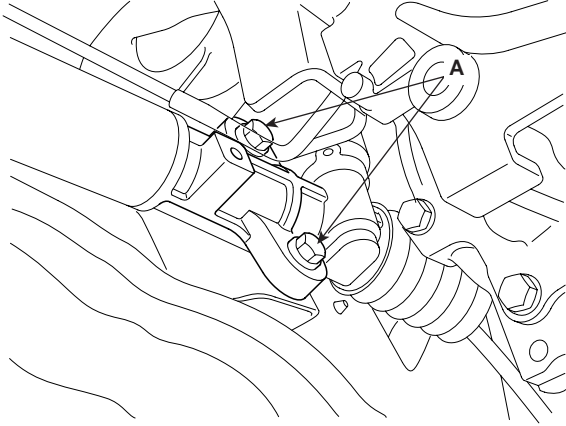
KPQE322A

11. Remove the mounting clamp of power steering gear box, and also remove the clamp holding the pressure tube and the return tube.



KPQE340A

12. Remove the mounting bolt(A) from the power steering gear box.

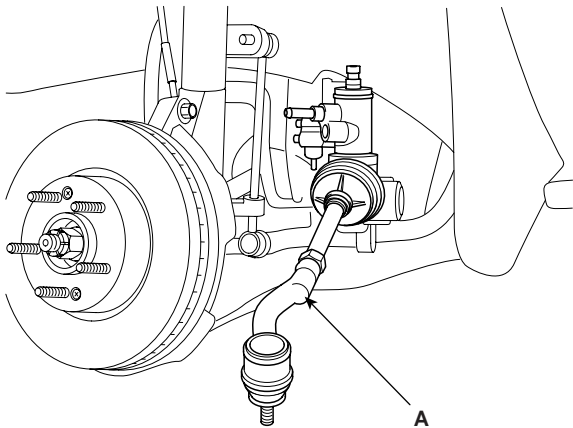


KPQE330A

13. Pull the power steering gear box assembly(A) toward the right side of the vehicle.

**NOTE**

When removing the gear box, pull it out carefully and slowly so as not to cause damage to the Bellows(B).



KPQE350A

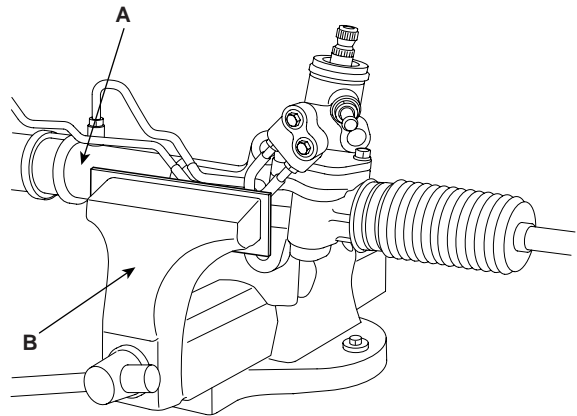
INSPECTION AND ADJUSTMENT BEFORE DISASSEMBLY

E10ABCAB

Fix a brass plate or aluminum plate for protection to the jaws of a vise and mount the gear box(A) in a vise(B).

**CAUTION**

When mounting the gear box in a vise, let the installation section of it be fixed to the jaws. If other section is fixed the gear box may be damaged.



KPQE360A

TOTAL PINION PRELOAD

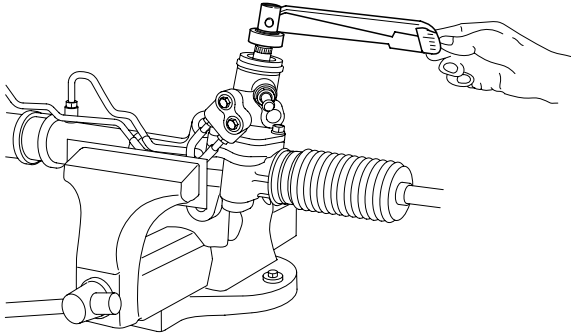
1. Rotate the pinion gear for approximately 4 to 6 seconds for one rotation to measure the total pinion preload.

Standard value

Total pinion preload :
0.6~1.3 Nm (6~13 kg.cm, 0.4~1.0 lb.ft)

**NOTE**

Measure the pinion preload through the entire stroke of the rack.



KPQE370A

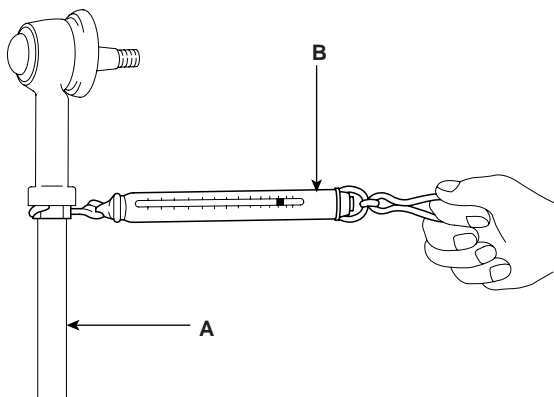
2. If the measured value is out of specifications, first adjust the yoke plug, then recheck the total pinion preload.
3. If you adjust the yoke plug but do not obtain the total pinion preload, check or replace the yoke plug components

TIE ROD SWING RESISTANCE

1. Rotate the tie rod severely ten times.
2. Measure the tie rod(A) swing resistance with a spring scale(B).

Standard value

Total rod swing resistance :
 8~22 N (1.9~4.6 lb) [2~5 Nm (20~50 kg.cm,
 17~43 lb.in)]



EPQF380A

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

CAUTION

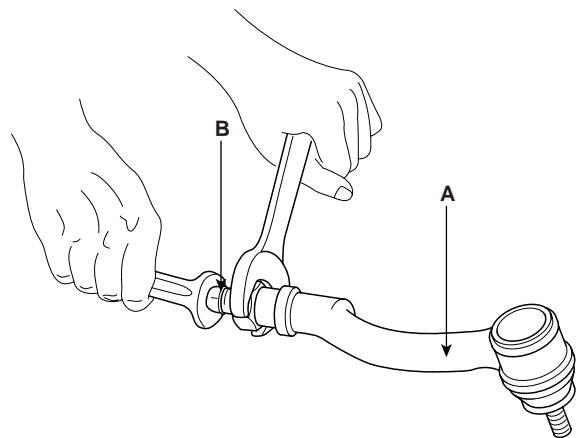
Even if the measured value is below the standard value, the tie rod that swings smoothly without excessive play may be used. If the measured value is below 4.3 N (0.9 lb) [100 Ncm (8.7 lb.in.)], replace the tie rod.

BELLOWS INSPECTION

1. Inspect the bellows for damage or deterioration.
2. Make sure the bellows are secured in the correct position.
3. If the bellows are defective, replace them with new ones.

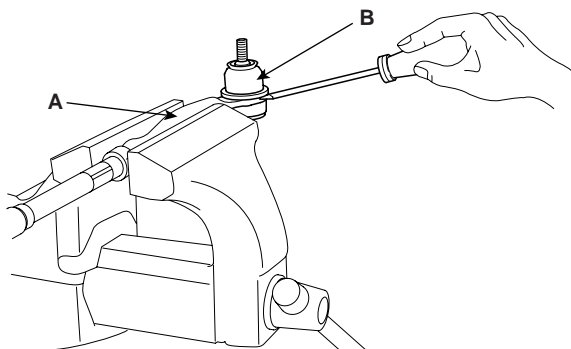
DISASSEMBLY EBD6CEFF

1. Remove the tie rod end(A) from the tie rod(B).



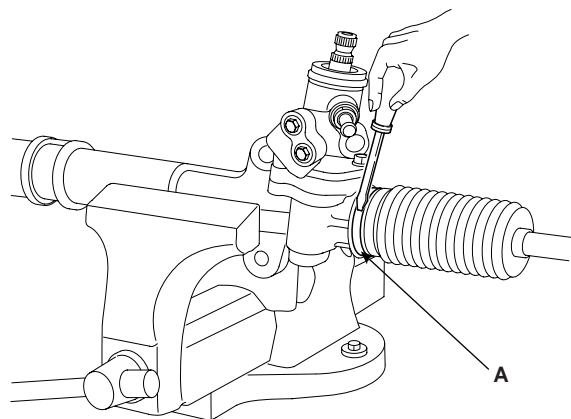
EPQF390A

2. After mounting the tie rod end(A) in a vise, remove the dust cover(B) from the ball joint.



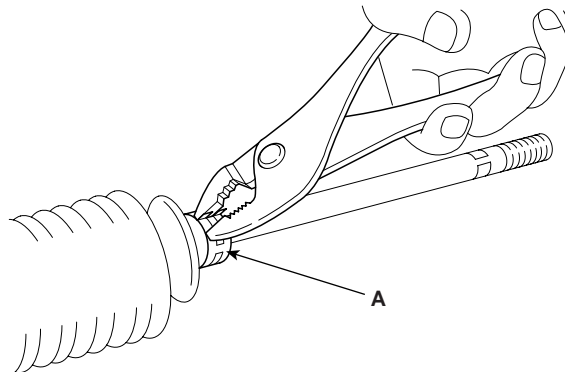
KPQE400A

3. Remove the bellows band(A).



KPQE410A

4. Remove the bellows clip(A).



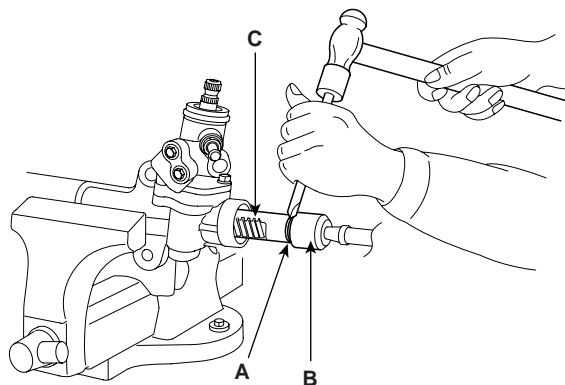
EPKE013I

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 rack housing.
7. While moving the rack slowly, drain the fluid from the rack housing.
8. Unstake the tab washer(A) which fixes the tie rod(B) and rack(C) with a chisel.



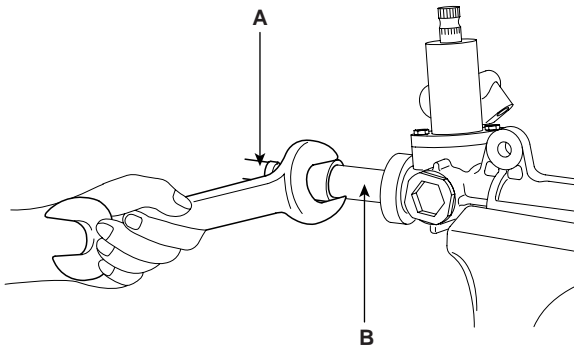
EPQF420A

9. Remove the tie rod(A) from the rack(B).



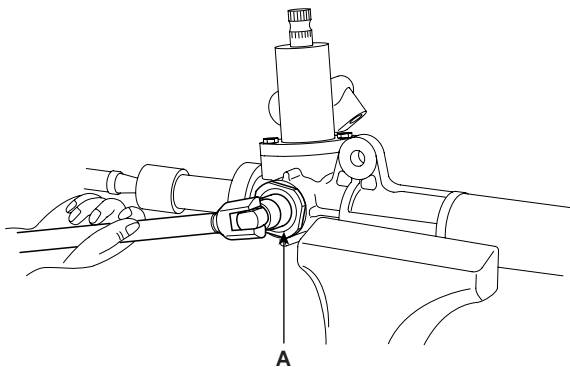
CAUTION

Remove the tie rod(A) from the rack(B), taking care not to twist the rack.



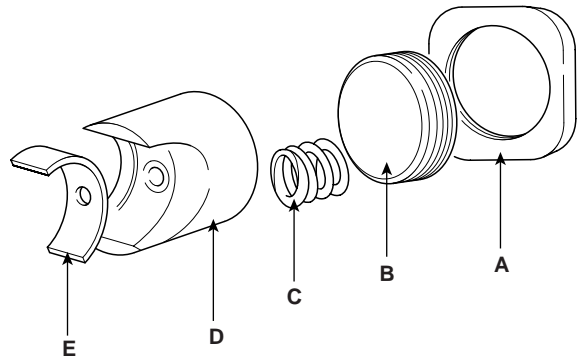
EPQF430A

10. Remove the yoke plug locking nut(A), and then remove the yoke plug.



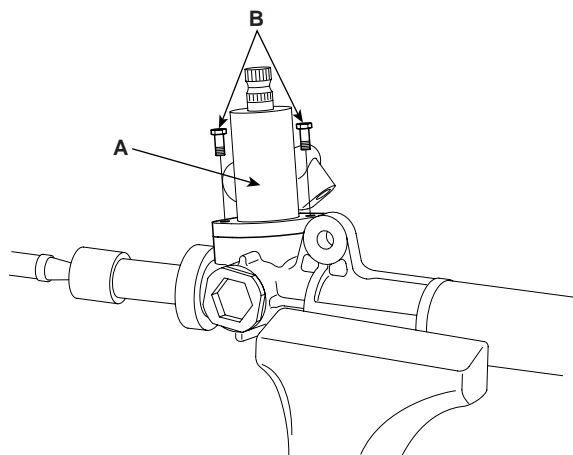
KPQE440A

11. Remove the lock nut(A), yoke plug(B), rack support spring(C), rack support yoke(D) and bushing(E) from the gear box.



EPKE013N

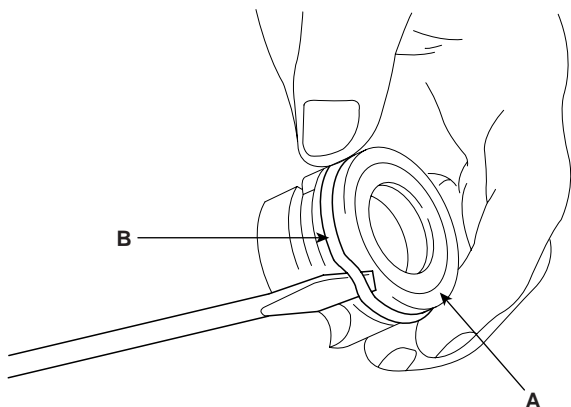
12. Remove the valve body housing(A) by loosening the two bolts(B).



EPQF450A

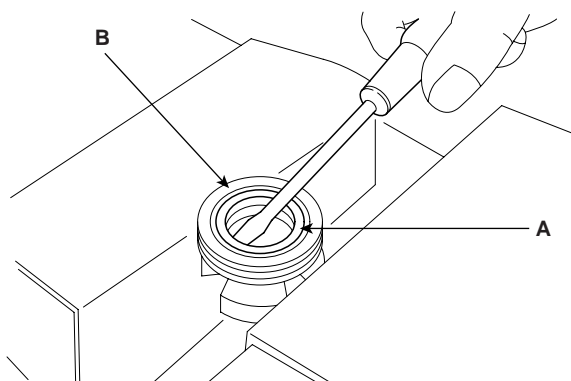
13. Remove the rack bushing and the rack from the rack housing.

14. Remove the O-ring(A) from the rack bushing(B).



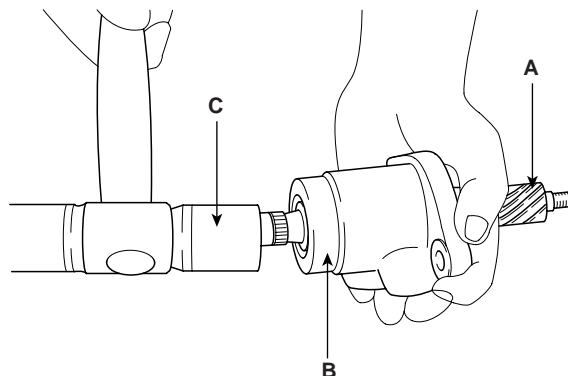
KPQE903A

15. Remove the oil seal(A) from the rack bushing(B).



EPQF904A

16. Remove the pinion valve assembly(A) from the valve body housing(B) with a soft hammer(C).



EPQF905A

17. Using the special tool, remove the oil seal and ball bearing from the valve body housing.

18. Remove the oil seal and O-ring from the rack housing.

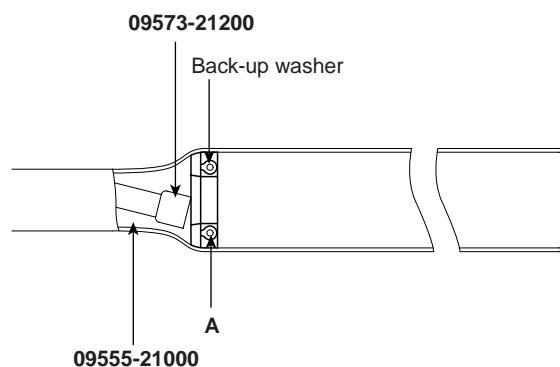
**CAUTION**

Be careful not to damage the pinion valve cylinder inside of the rack housing.

19. Using the special tool(06573-21200, 09555-21000), remove the oil seal(A) from the rack housing.

**CAUTION**

Be careful not to damage the rack cylinder inside of the rack housing.



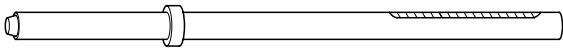
EPKE210B

INSPECTION

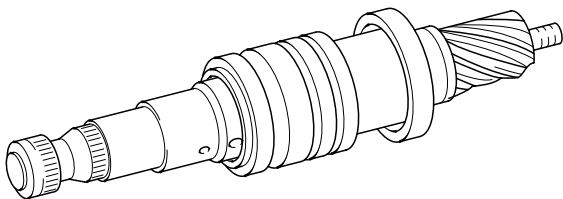
E5CC6AAB

1. Rack

- Check for rack tooth face damage or wear
- Check for oil seal contact surface damage
- Check for rack bending or twisting
- Check for oil seal ring damage or wear
- Check for oil seal damage or wear

**2. Pinion valve**

- Check for pinion gear tooth face damage or wear
- Check for oil seal contact surface damage
- Check for seal ring damage or wear
- Check for oil seal damage or wear



EPA9013Y

3. Bearing

- Check for seizure or abnormal noise during rotating a bearing
- Check for excessive play
- Check for missing needle bearing rollers

4. Others

- Check for damage of the rack housing cylinder bore
- Check for boot damage, cracking or aging

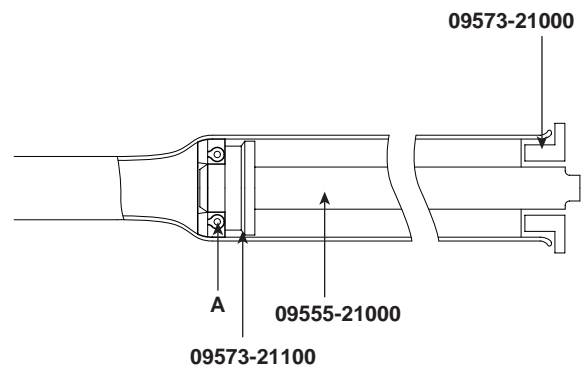
REASSEMBLY

ECB64D96

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

 Recommended fluid : PSF-3

2. Install the oil seal(A) to the specified position in the rack housing.



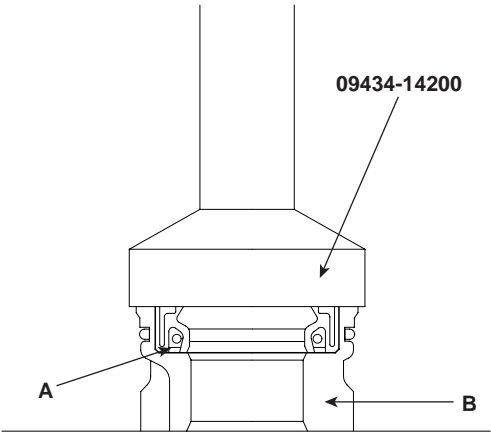
EPQF231A

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

 Recommended fluid : PSF-3

EPA9013Z

4. Install the oil seal(A) in the rack bushing(B).



EPQF231B

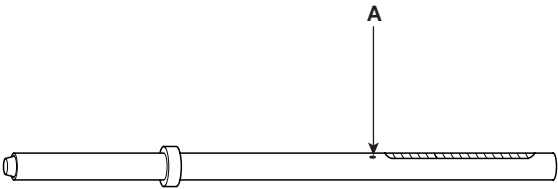
5. Apply the specified fluid to the entire surface of the O-ring and install it in the rack bushing.
6. Apply the specified grease to the rack teeth.

Recommended grease
Multipurpose grease SAE J310, NLGI No.2



NOTE

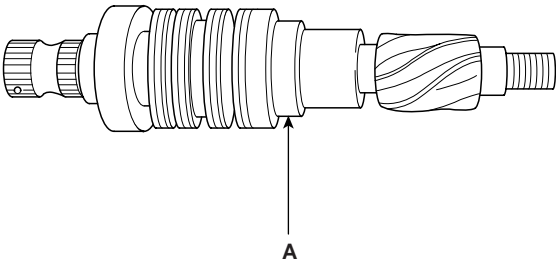
Do not plug the vent hole(A) in the rack with grease.



EPKE014E

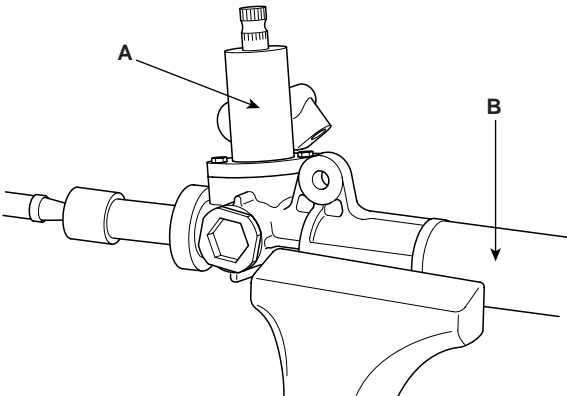
7. Insert the rack into the rack housing and install the rack bushing and rack stopper.

8. Install the oil seal and the ball bearing in the valve body.
9. After applying the specified fluid and grease to the pinion valve assembly(A), install it in the rack housing assembly.



EPKE230E

10. After applying the specified fluid to the oil seal, install it in the rack housing, and fix the valve body assembly(A) and O-ring in the gear box(B).

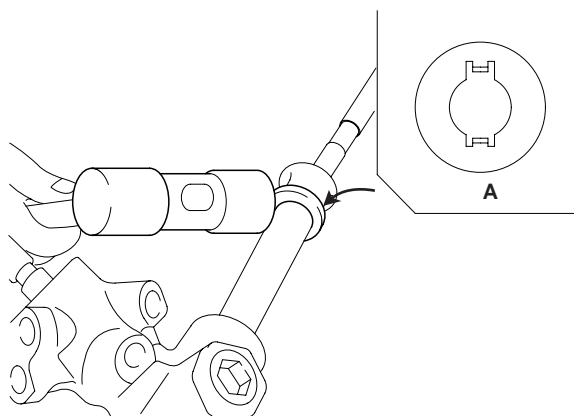


EPQF460A

11. Install the tab washer and the tie rod and stake the tab washer(A) end at two points over the tie rod.

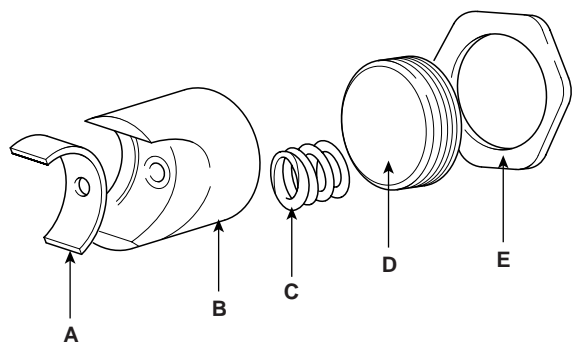
**NOTE**

1. Align the tab washer pawls with the rack grooves.
2. Always use a new tab washer.



EPKE230F

12. Install the bushing(A), rack support yoke(B), rack support spring(C), lock nut(E) and yoke plug(D) in the order shown in the illustration. Apply semi-drying sealant to the threaded section of the yoke plug before installation.

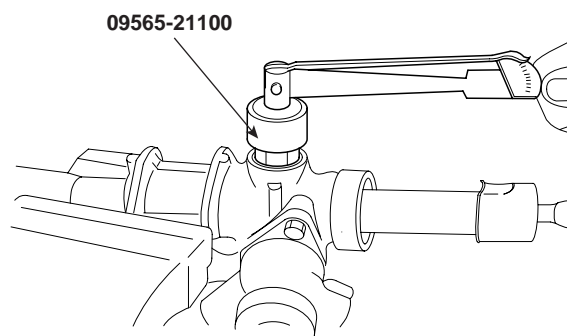


EPKE230K

13. With the rack placed in the center position, attach the yoke plug to the rack housing. Tighten the yoke plug to 15 Nm (150 kg.cm, 11 lb.ft). Loosen the yoke plug approximately from 30° to 60° and tighten the locking nut to the specified torque.

Tightening torque

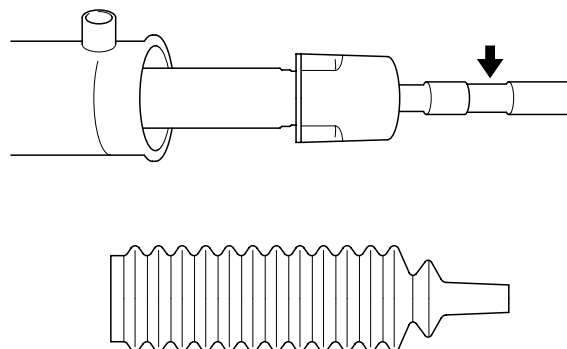
50~70 Nm (500~700 kg.cm, 37~52 lb.ft)



EPKB230G

14. Tighten the feed tube to the specified torque and install the mounting rubber using adhesive.
15. Apply the specified grease to the bellows mounting position (fitting groove) of the tie rod.

Recommended grease : Silicone grease



EPKB230H

16. Install the new attaching band to the bellows.

**NOTE**

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

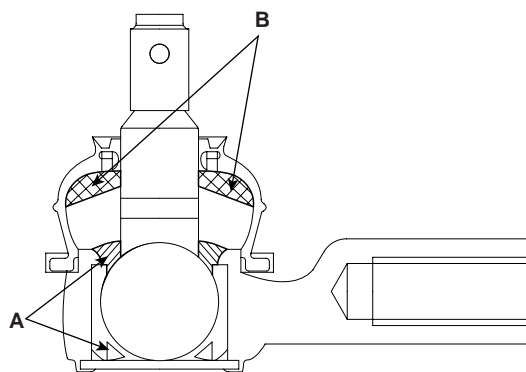
17. Install the bellows in position, taking care not to twist it.
18. Fill the dust cover inner side and lip with the specified grease, and fix the dust cover in position with the clip ring attached in the groove of the tie rod end.

Recommended greas

A : POLY LUB GLY 801K or equivalent

B : SHOWA SUNLIGHT MB2 or equivalent

Dust cover inner side and lip : THREE BOND

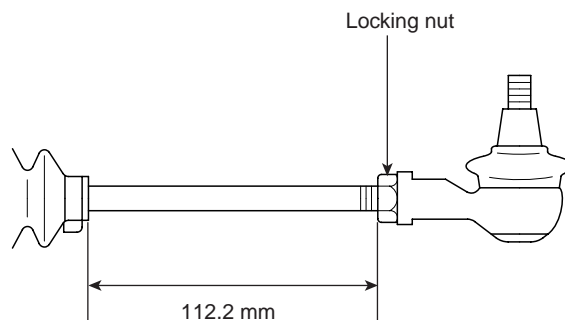


EPKE043A

19. Install the tie rods so that the length of the left and right tie rods equals the standard value.

Standard value

Tie rod free length : 112.2mm

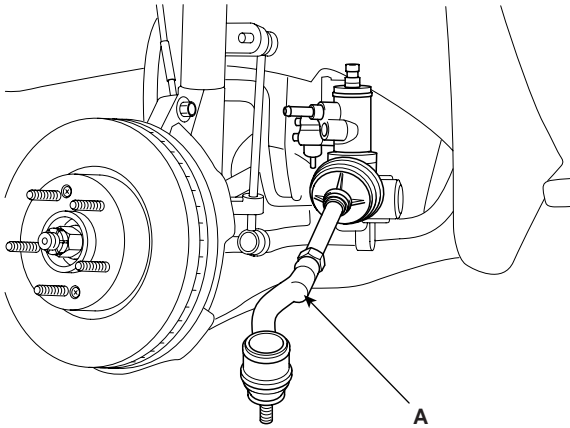


EPQF115A

20. Check for total pinion preload.

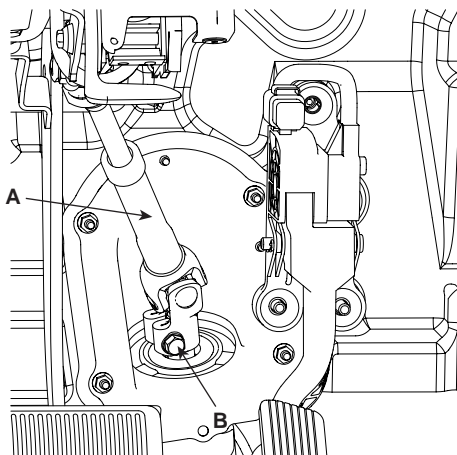
INSTALLATION EE55FA84

1. Push in the power steering gear box assembly(A) on the right side of the vehicle.



KPQE350A

2. Install the dust cover mounting plate.
3. Connect the dust cover to its mounting plate with a new strap.
4. Connect the steering gear box assembly to the universal joint assembly(A) by using the bolt(B).

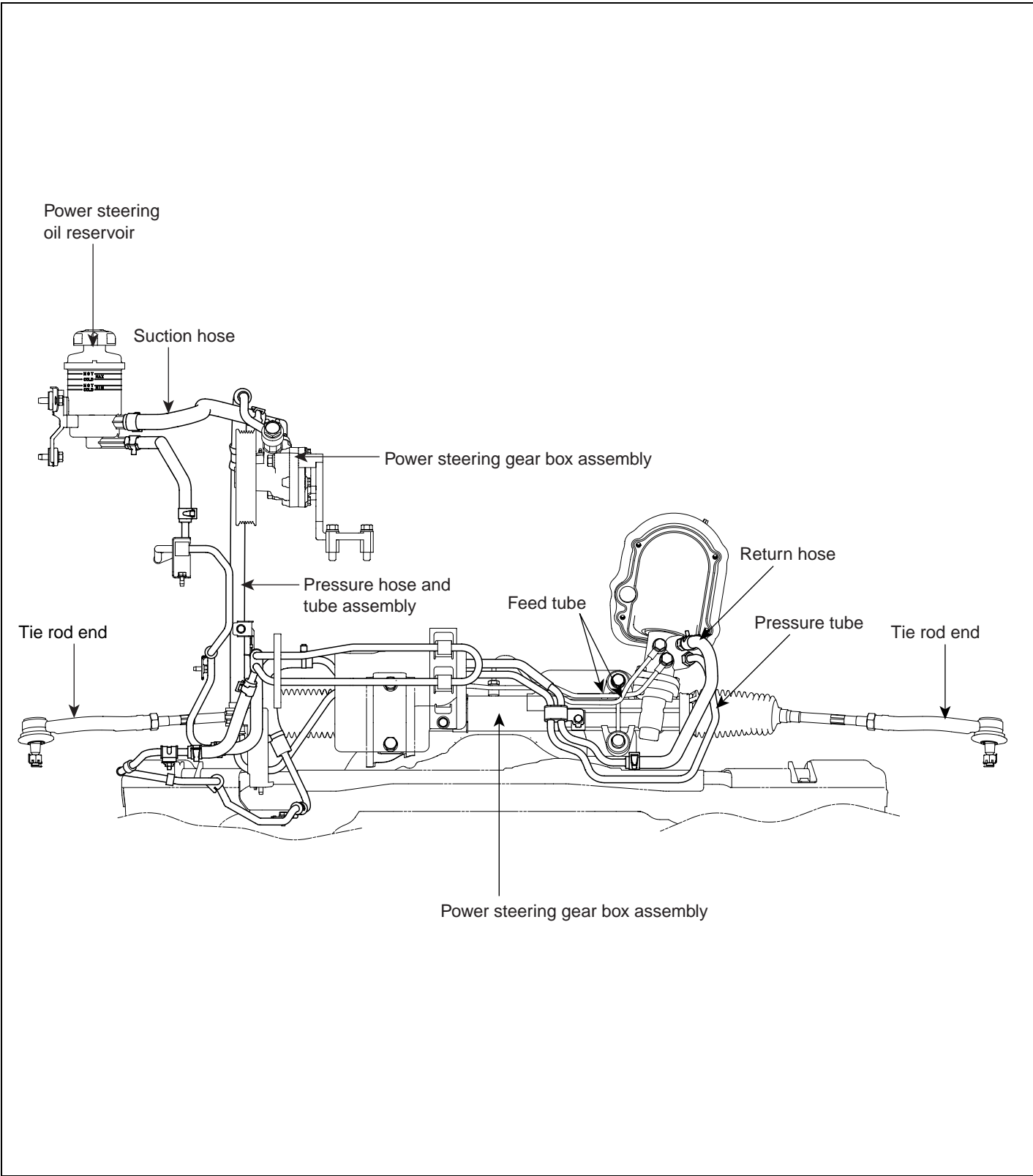


KPQE290A

5. Installation is the reverse of removal.
6. After installation, air bleed the system.
(see page ST-11)

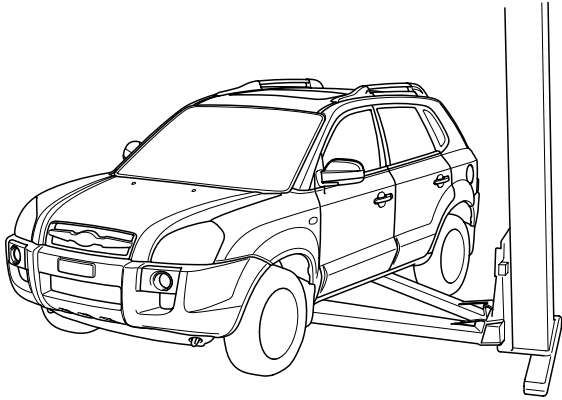
POWER STEERING HOSES

COMPONENTS EA4CBF16



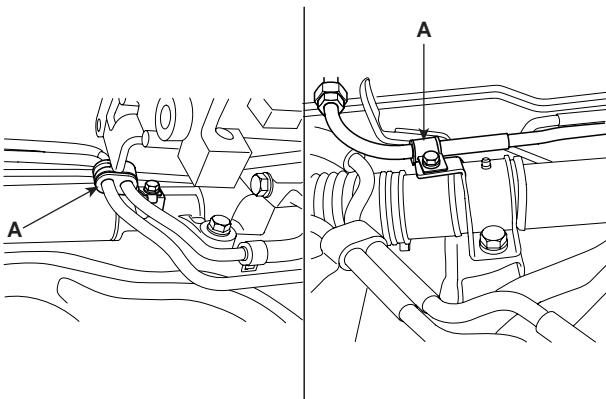
REMOVAL E3A3C1E5

1. Support the specified point of the vehicle with a lift.



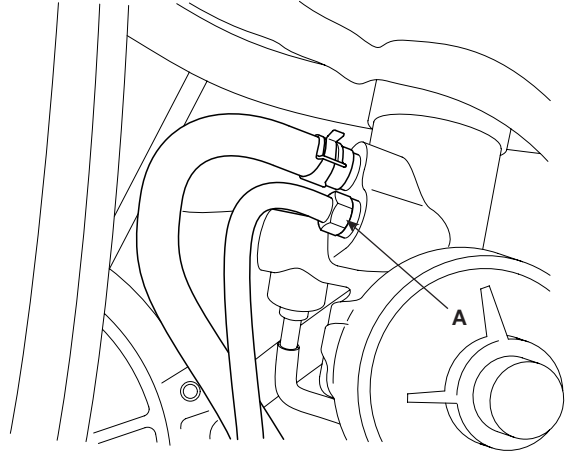
KPQE801A

2. Drain the power steering fluid. (see page ST-11)
3. Lift up the vehicle and remove the mounting clamp which is holding both the pressure tube and the return tube(A).



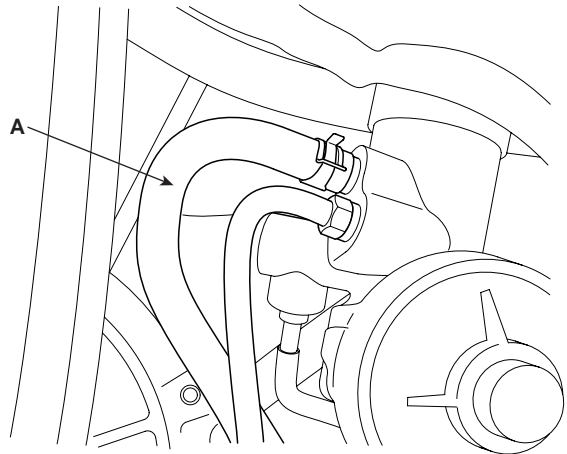
KPQE322A

4. Disconnect the pressure tube fitting(A) at the gear box side. (when removing the pressure tube)



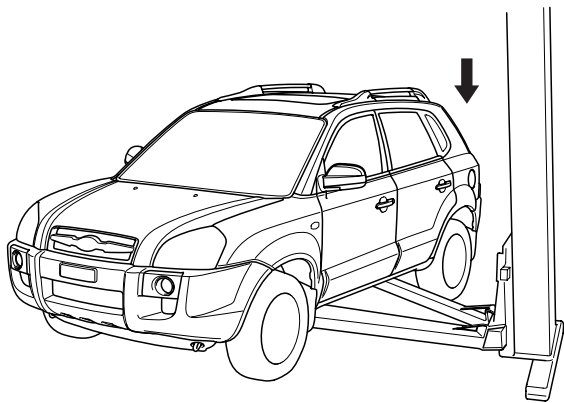
KPQE320B

5. Remove the return hose(A) in the gear box. (when removing return hose)



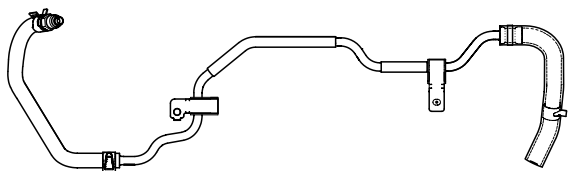
KPQE320C

6. Lower the vehicle.



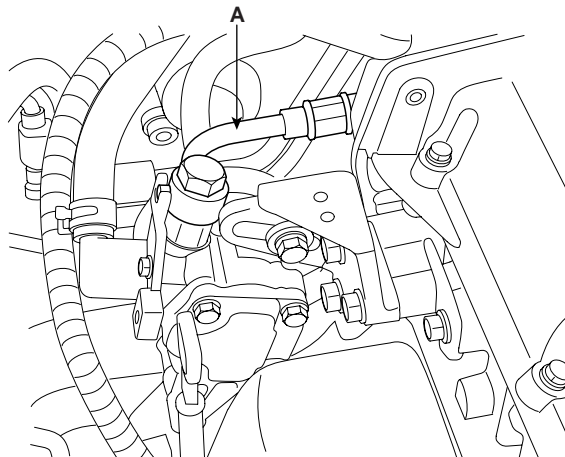
KPQE801B

7. Remove the clamp of the return tube and hose. (when removing return tube and hose)
8. Remove the return tube and hose. (when removing return hose)



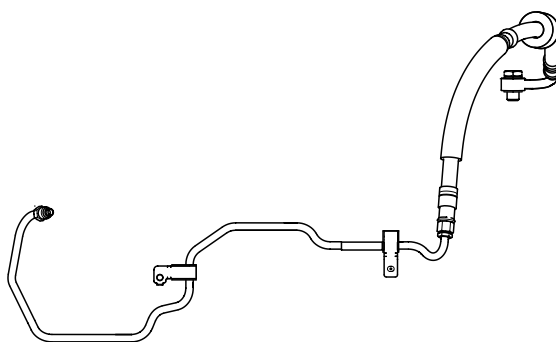
KPQE630A

9. Disconnect the pressure hose connector from the oil pump. (when removing the pressure hose)



KPQE120A

10. Disconnect the pressure hose assembly. (when removing the pressure hose)



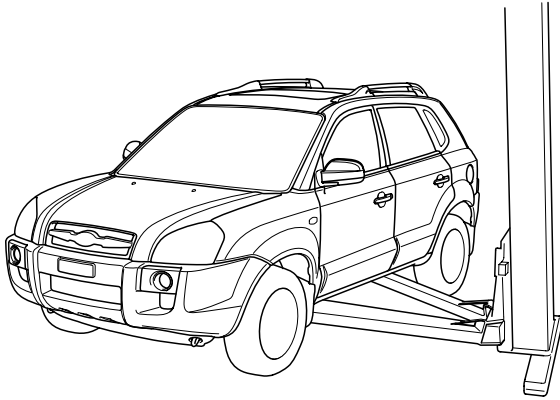
KPQE510A

11. Remove the color tube mounting clip bolt. (when removing the color tube)
12. Disconnect the remove the color tube from the power steering oil reservoir tank side hose. (when working on the color tube)

INSTALLATION

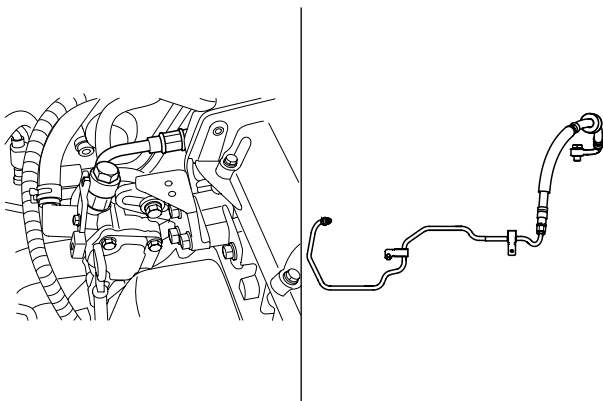
E803DBC5

1. Support the specified portion of the vehicle with a lift.



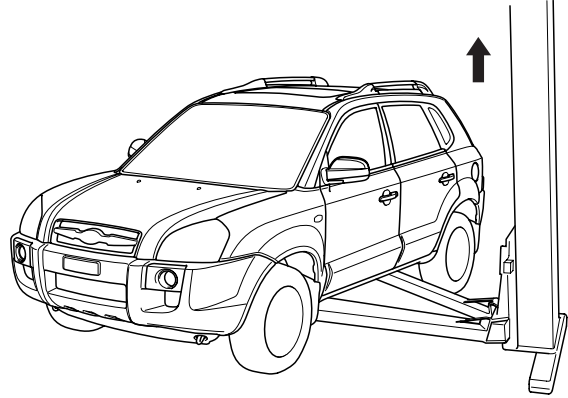
KPQE801A

2. Insert the color tube from the front pump upper part to the lower part and install mounting bolts. (when installing the color tube)
3. Connect the color tube to the power steering oil reservoir tank side hose, return tube and hose side and fix it with clips. (when installing the color tube)
4. Place the pressure hose and tube assembly in position and connect it to the oil pump. (when installing the pressure hose and tube)



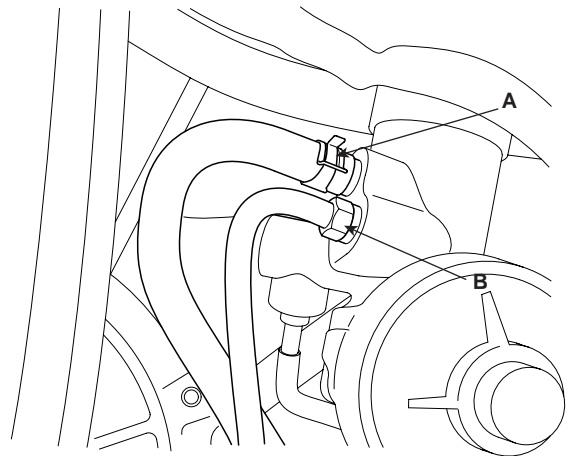
EPQF120A

5. Raise the vehicle with a lift.



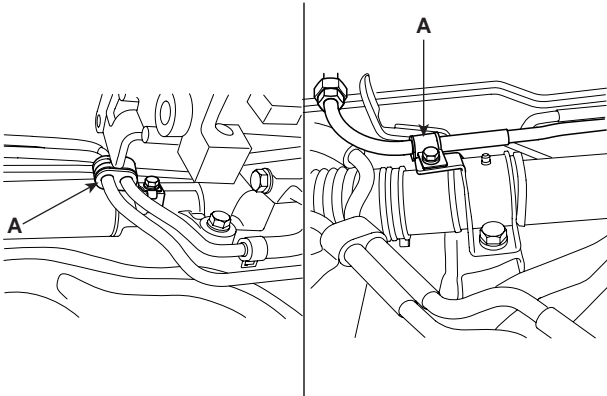
KPQE801C

6. Fix the return hose(A) and pressure tube(B) fitting to the power steering gear box.



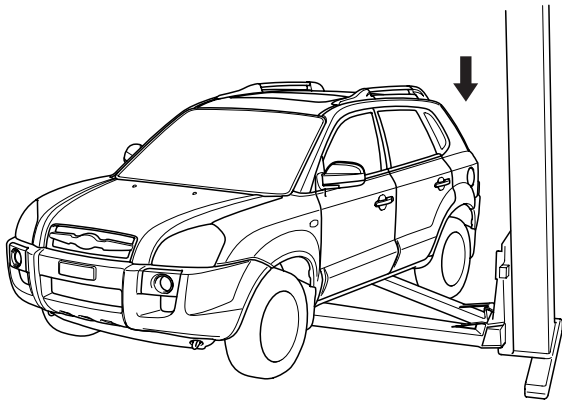
EPQF320B

7. Fix the power steering pressure tube and return tube mounting clamp(A) with a bolt.



KPQE322A

8. Lower the vehicle.



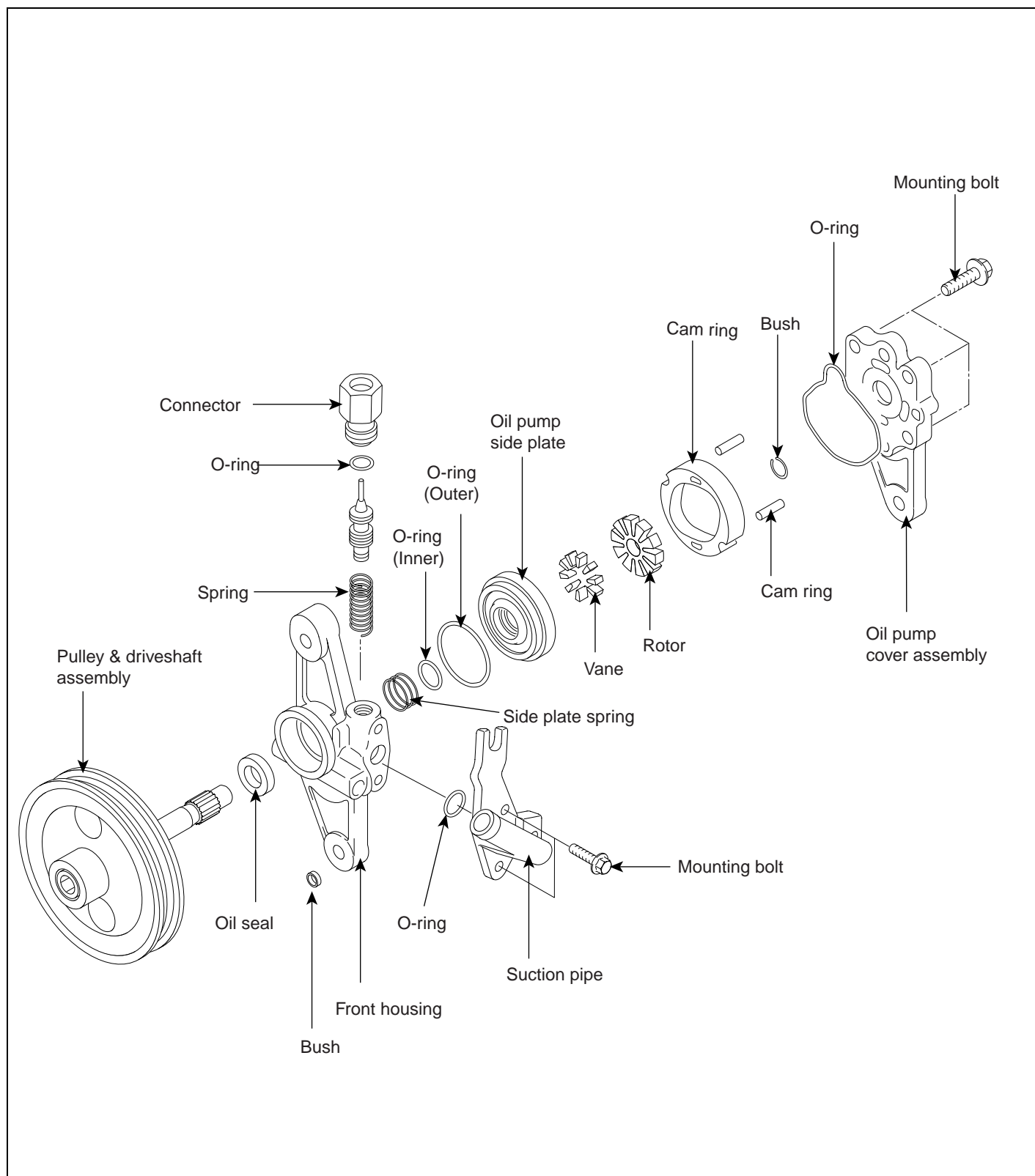
KPQE801B

9. Add power steering fluid(PSF-3).
(see page ST-11)
10. Air bleed the system. (see page ST-11)

POWER STEERING OIL PUMP

COMPONENTS

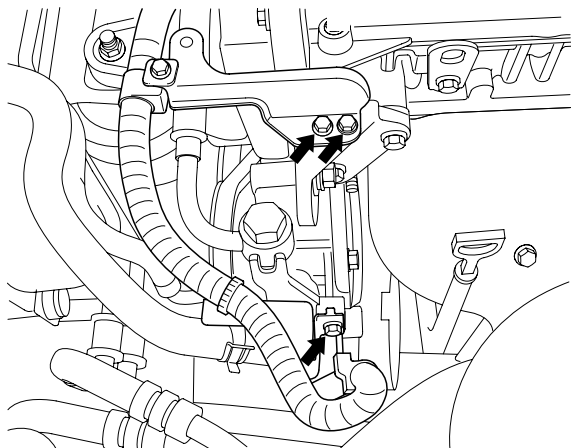
E8CFAAC2



REMOVAL

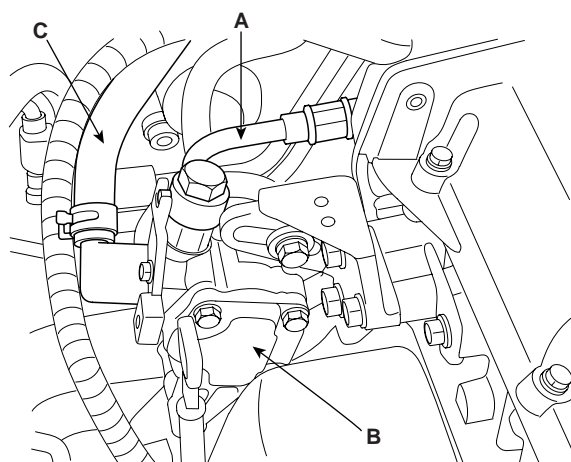
E3DFD8C7

1. Loosen the bolt fixing the wiring bracket, and then move the wiring sideward.



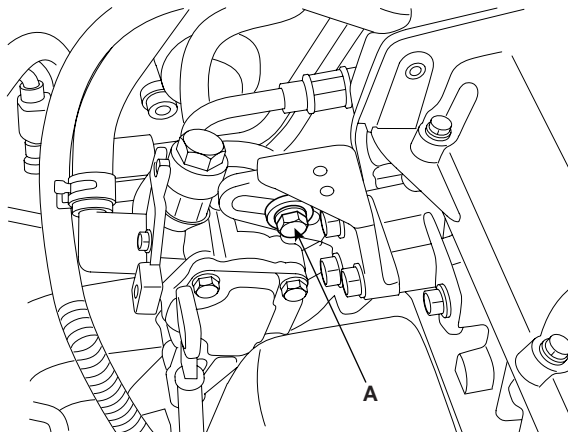
EPQF020A

2. Remove the pressure hose(A) from the oil pump(B), and then disconnect the suction hose(C) from the suction connector and drain the fluid into a container. (see page ST-11, Replacing power steering fluid)



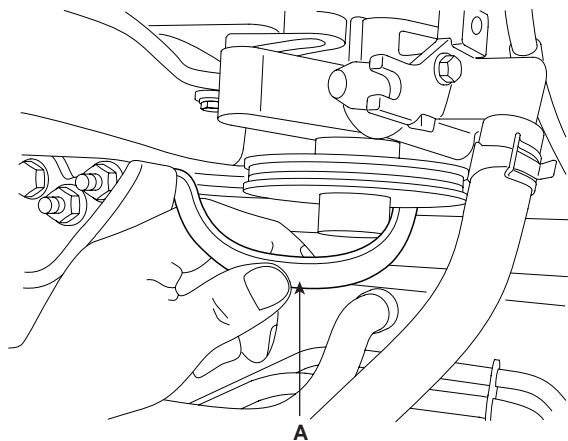
EPQF030A

3. Loosen the tension adjusting bolt(A) on the power steering "V" belt.



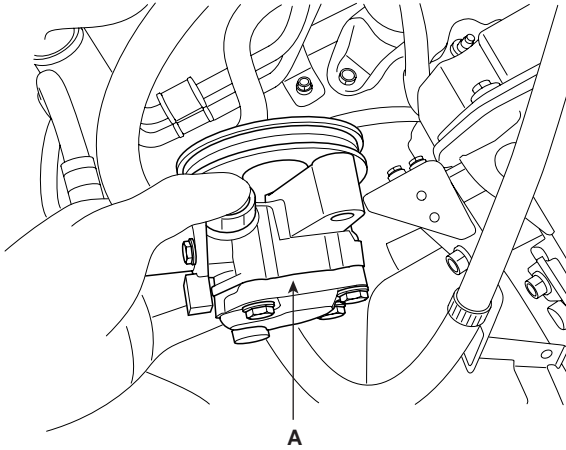
KPQE100A

4. Remove the "V" belt(A) from the power steering oil pump pulley.



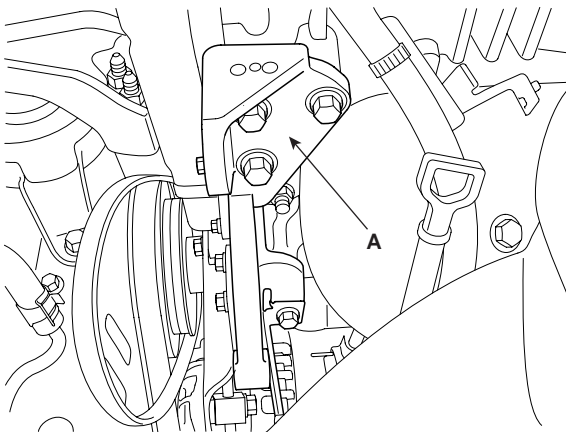
KPQE080A

5. Loosen the power steering oil pump mounting bolt and the tension adjusting bolt, and then remove the steering oil pump assembly(A).



KPQE070A

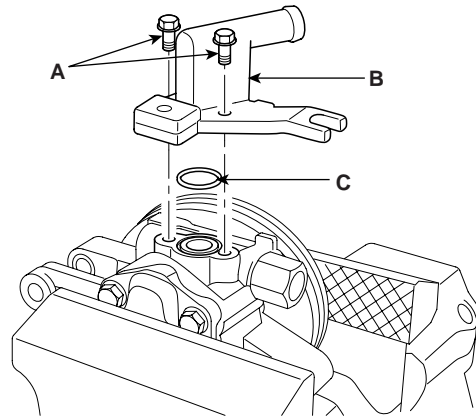
6. Remove the power steering oil pump mounting bracket(A).



KPQE060A

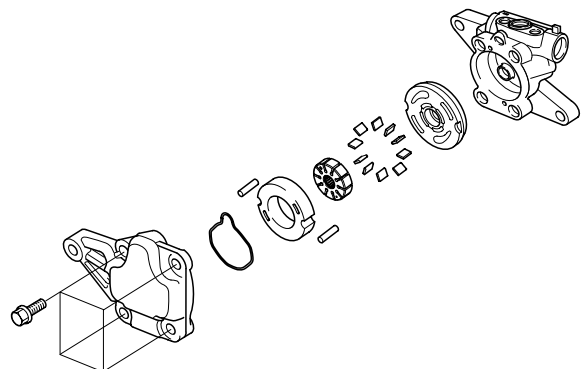
DISASSEMBLY E8B230EC

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



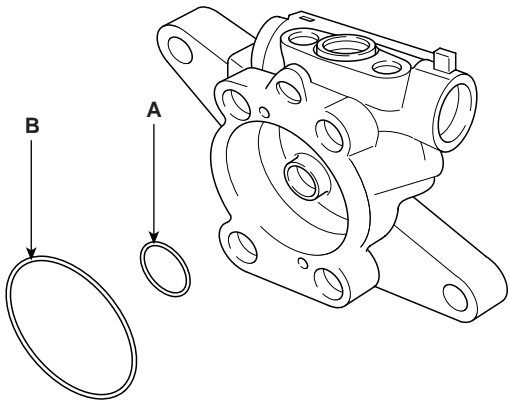
KPQE531A

2. Loosen the four bolts and remove the oil pump cover assembly.
3. Remove the cam ring.
4. Remove the rotor and vanes.
5. Remove the oil pump side plate.



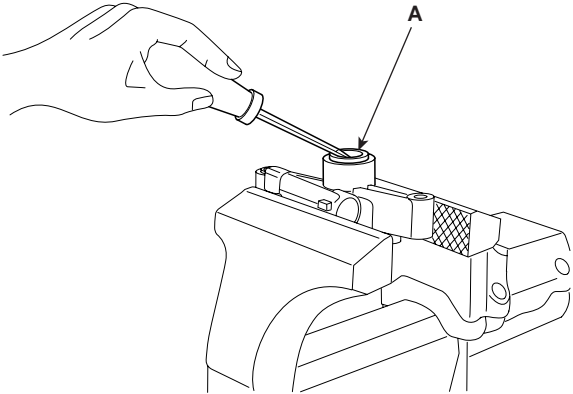
KPQE540A

6. Remove the inner O-ring(A) and outer O-ring(B).



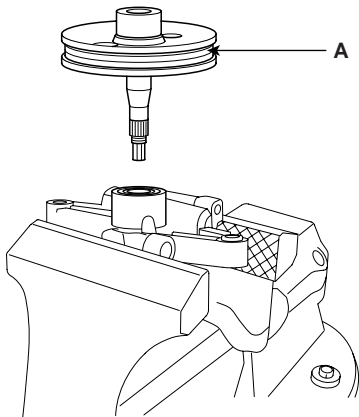
KPQE550A

8. Remove the oil seal(A) from the oil pump body.



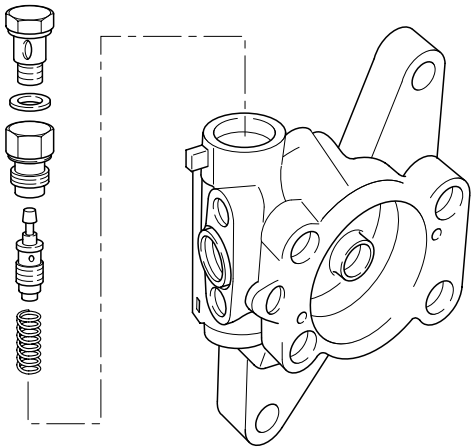
KPQE560A

7. Remove the snap ring and take out the pulley and the drive shaft assembly(A).



KPQE551B

9. Remove the connector from the oil pump body, and take out the flow control valve and the flow control spring.



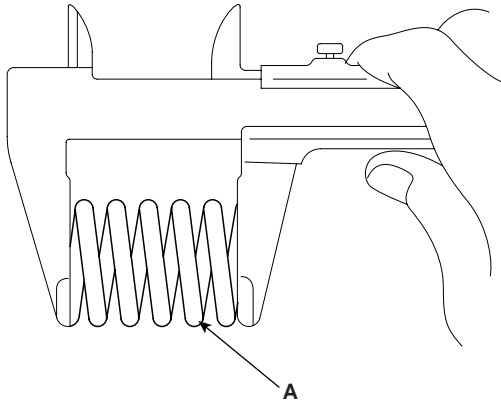
EPQF570B

INSPECTION

EBD6687B

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

Free length of the flow control spring : 36.5mm



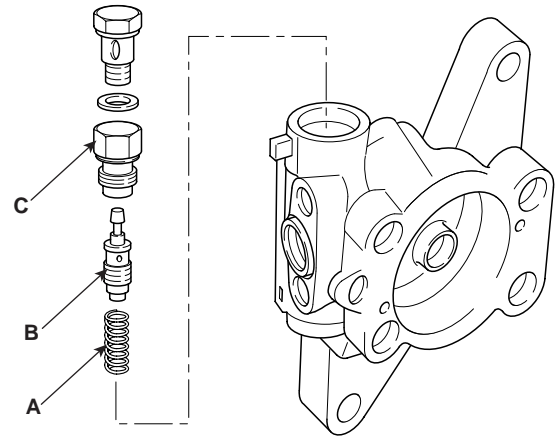
KPQE911A

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

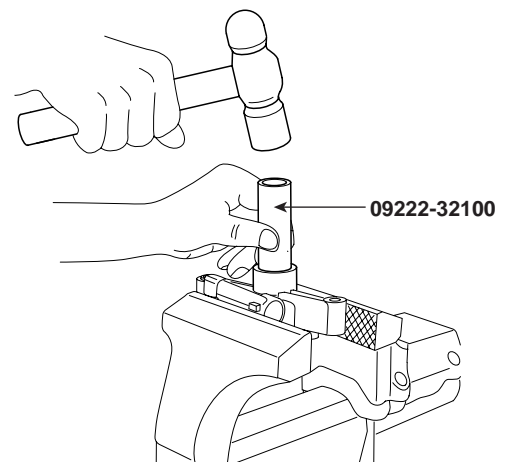
EEDE15E7

1. Install the flow control spring, the flow control valve and the connector into the pump body.



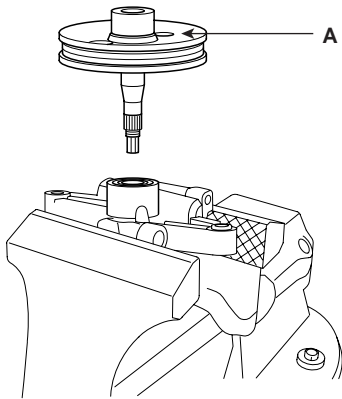
EPQF570A

2. Install the oil seal in the pump body by using the special tool(09222-32100).



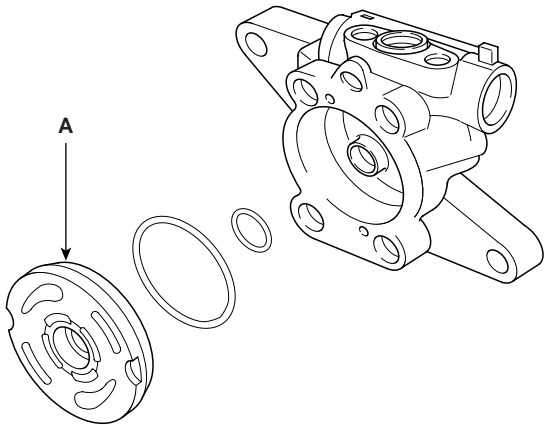
KPQE580A

3. Install the pump pulley(A).



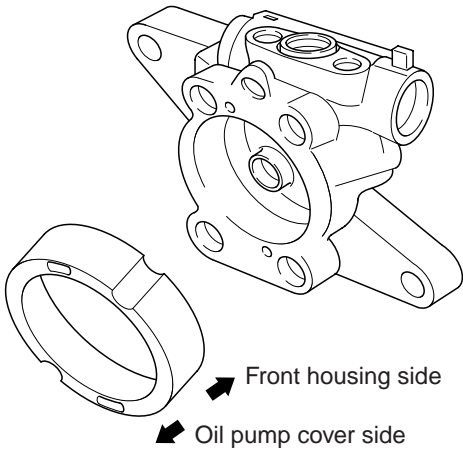
KPQE551A

4. Assenge the inner O-ring and the outer O-ring and install the site plate(A).



KPQE555A

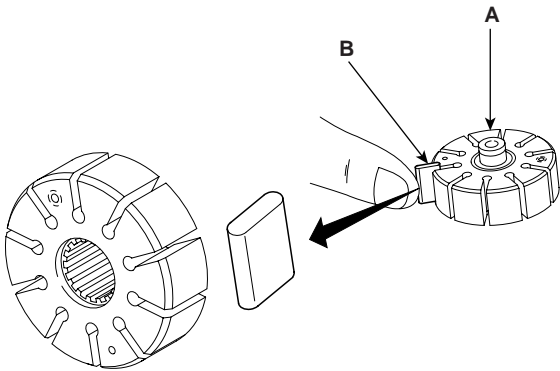
5. Install the cam ring attending to the groove and the direction of the front housing.



EPQF600A

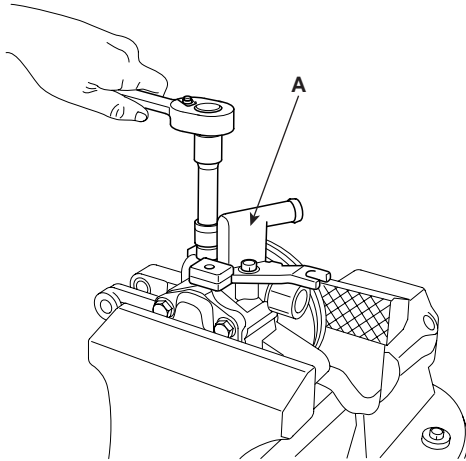
6. Install the rotor.

7. Install vanes(A) to the rotor(B).

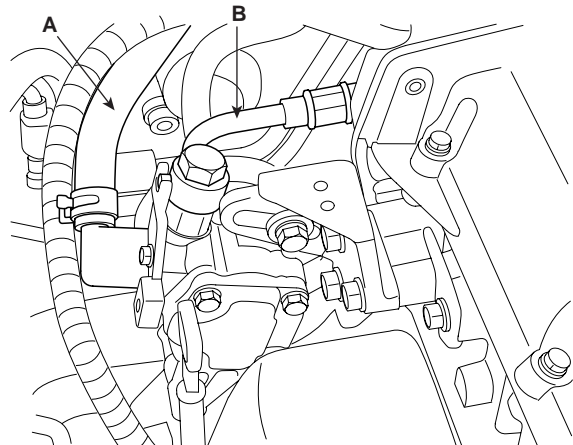


KPQE610A

8. Install the O-ring and the oil pump cover assembly.
9. Install the suction pipe(A) and O-ring.



KPQE530A



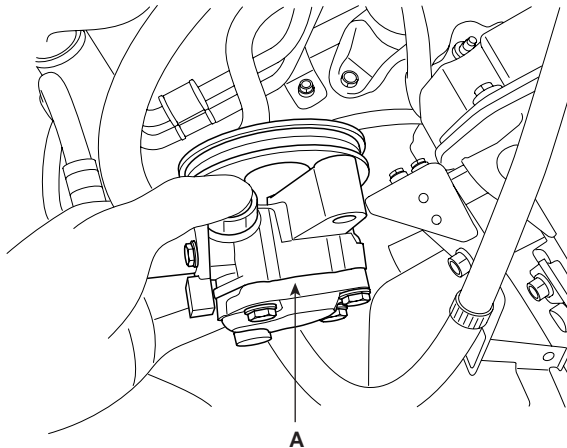
KPQE030B

3. Insert a stick(C) or similar thing between the bracket(A) and the oil pump(B) to produce tension and confirm that belt deflection is within the standard value.

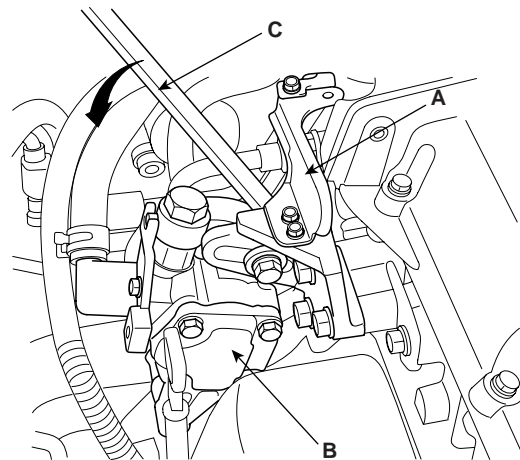
INSTALLATION

E5BF56CC

1. Install the oil pump(A) to the oil pump bracket.



KPQE070A



KPQE010A

2. Hang the "V" belt on the oil pump and connect the suction hose(A) and the pressure hose(B).

NOTE

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

4. Add power steering fluid. (see page to ST-11)
5. Air bleed the system. (see page to ST-11)
6. Check the oil pump pressure. (see page to ST-12)