Steering System

Specifications

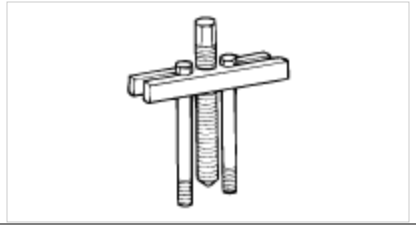
Item		Specification
Steering gear	Type	Rack & Pinion
	Rack stroke	129mm (5.0787 in)
Oil pump	Type	Vane
	Relief pressure	100 ~ 105kgf/cm²
Steering angle	Inner	38.01°±1°30’
	Outer	31.6°
Power steering oil		PENTOSIN CHF202

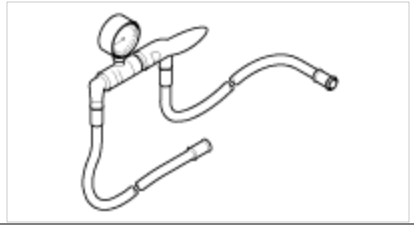
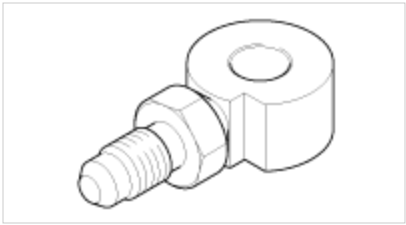
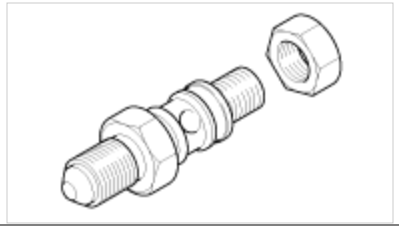
Tightening Torques

Item	Tightening torque		
	N.m	kgf.m	lb-ft
Wheel nuts	88.3 ~ 107.9	9.0 ~ 11.0	65.1 ~ 79.6
Steering column assembly and universal joint	29.4 ~ 34.3	3.0 ~ 3.5	21.7 ~ 25.3
Steering column assembly mounting bolt & nuts	12.7 ~ 17.7	1.3 ~ 1.8	9.4 ~ 13.0
Tie rod end & front axle	58.8 ~ 78.5	6.0 ~ 8.0	43.4 ~ 57.9
Steering gear box & sub frame	78.5 ~ 98.1	8.0 ~ 10.0	57.9 ~ 72.3
Steering gear box & bracket	19.6 ~ 29.4	2.0 ~ 3.0	14.5 ~ 21.7
Pressure tube wrench bolt & power steering pump	53.9 ~ 63.7	5.5 ~ 6.5	39.8 ~ 47.0
Steering gear box & universal joint	17.7 ~ 24.5	1.8 ~ 2.5	13.0 ~ 18.1
Dust cover & dash	12.7 ~ 17.7	1.3 ~ 1.8	9.4 ~ 13.0
Dust cover clamp	6.9 ~ 11.8	0.7 ~ 1.2	5.1 ~ 8.7

Steering System

Special Service Tools

Tool (Number and Name)	Illustration	Use
09561-11001 Steering wheel puller		Removal of steering wheel

09572-21000 Oil pressure gauge		Measurement of oil pressure (Use with 09572-22100, 09572-21200)
09572-22100 Oil pressure gauge adaptor		Measurement of oil pressure (Use with 09572-21000, 09572-21200)
09572-21200 Oil pressure gauge adaptor		Measurement of oil pressure (Use with 09572-22100, 09572-22100)
09568-2J100 Ball joint puller		Separation of tie-rod end ball joint

Troubleshooting

Symptom	Probable cause	Remedy
Excessive play in steering	Loose yoke plug	Retighten
	Loose steering gear mounting bolts	Retighten
	Loose or worn tie rod end	Retighten or replace as necessary
Steering wheel operation is not smooth (Insufficient power assist)	V-belt slippage	Readjust
	Damaged V-belt	Replace
	Low fluid level	Replenish

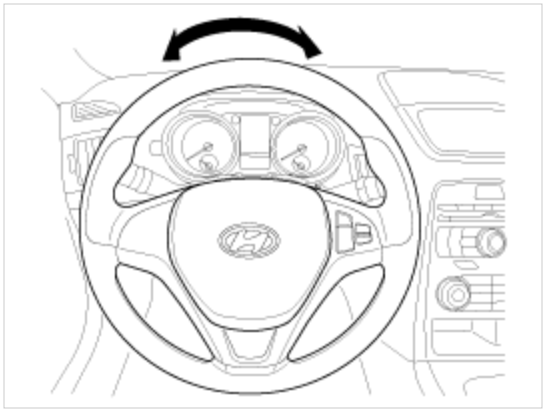
	Air in the fluid	Bleed air
	Twisted or damaged hoses	Correct the routing or replace
	Insufficient oil pump pressure	Repair or replace the oil pump
	Sticky flow control valve	Replace
	Excessive internal oil pump leakage	Replace the damaged parts
	Excessive oil leaks from rack and pinion in gear box	Replace the damaged parts
	Distorted or damaged gear box or valve body seals	Replace
Steering wheel does not return properly	Excessive turning resistance of tierod end	Replace
	Yoke plug excessively tight	Adjust
	Tie rod and/or ball joint cannot turn smoothly	Replace
	Loose mounting of gear box mounting bracket Worn steering shaft joint and/or	Retighten
	Worn steering shaft joint and/or body grommet	Correct or replace
	Distorted rack	Replace
	Damaged pinion bearing	Replace
	Twisted or damaged hoses	Reposition or replace
	Damaged oil pressure control valve	Replace
	Damaged oil pump input shaft bearing	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	Reposition
	Loose gear box bracket	Retighten
	Loose tie rod end and/or ball joint	Retighten
	Worn tie rod and/or ball joint	Replace
Noise in the oil pump	Low fluid level	Replenish
	Air in the fluid	Bleed air
	Loose pump mounting bolts	Retighten

Adjustment

Steering Wheel Play Inspection

1. Turn the steering wheel so that the front wheels can face straight ahead.
2. Measure the distance the steering wheel can be turned without moving the front wheels.

Standard value:30mm (1.1811in.) or less

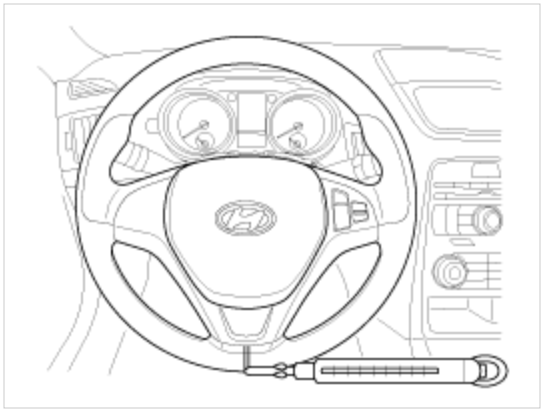


3. If the play exceeds standard value, inspect the steering column, shaft, and linkages.

Checking stationary steering effort

1. Position the vehicle on a level surface and place the steering wheel in the straight ahead position.
2. Start the engine and turn the steering wheel from lock to lock several times to warm up the power steering fluid.
3. Attach a spring scale to the steering wheel. With the engine speed 900 ~ 1100rpm, pull the scale and read it as soon as the tires begin to turn.

Standard value:3.5kgf or less



4. If the measured value exceeds standard value, inspect the power steering gear box and pump.

Power steering fluid replacement

⚠ CAUTION

Always use genuine power steering fluid. Using other type of power steering fluid or ATF can cause increased wear and poor steering in cold weather.

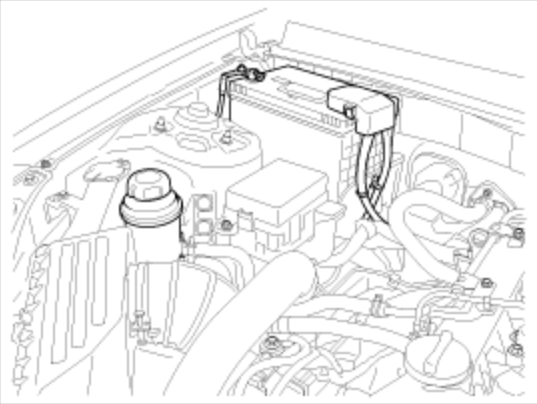
1. Raise the reservoir and then disconnect the return hose to drain the reservoir. Take care not to spill the fluid on the body and parts. Wipe off any spilled fluid at once.
2. Connect a tube of suitable diameter to the disconnected return hose, and put the hose end in a suitable container.
3. Jack up the front wheels and turn the steering wheel from the lock to lock until fluid stops running out of the tube.
4. Reconnect the return hose to reservoir
5. Fill the reservoir with the power steering fluid and then bleed the power steering system.

Air bleeding

⚠ CAUTION

Always use genuine power steering fluid. Using other type of power steering fluid or ATF can cause increased wear and poor steering in cold weather.

1. Fill the reservoir with the power steering fluid up to the level of 'COLD MAX' marked on the reservoir.



NOTICE

While conducting the following operations, keep replenishing the reservoir so that the fluid level can be always between the 'COLD MAX' and the 'COLD MIN' marked on the reservoir.

2. Jack up the front wheels.
3. Crank the engine 1 ~ 2times by turning the ignition key very quickly from the 'On' position to the 'Start' position, but do not start the engine.

⚠ CAUTION

Be careful not to start the engine. If starting the engine before performing the steps 3 through 4, it may cause an abnormal noise during power steering pump operation.

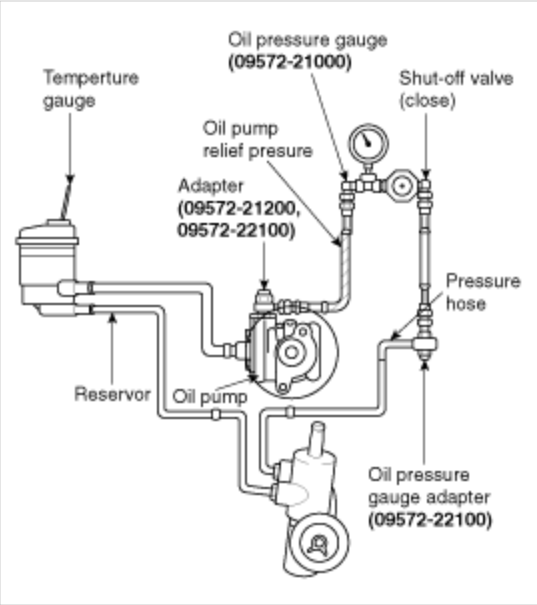
4. Turn the steering wheel from lock to lock 5 ~ 6 times for 15 ~ 20 seconds.
5. Start the engine and keep turning the steering wheel from lock to lock until air bubbles stop appearing in the reservoir with the engine idle.
6. Check the color and level of the power steering fluid in the reservoir and then replenish the reservoir up to the 'COLD MAX' level as required.

NOTICE

If the fluid level moves up and down when turning the steering wheel, the fluid overflows out of the reservoir when the turning off the engine or the fluid has white color, it indicates that air bubbles have not been removed sufficiently from the power steering system. Therefore, repeat the steps 5 through 6 as required.

Oil pump relief pressure test

1. Disconnect the pressure tube from the power steering pump and then install the special tools between the pump and the pressure tube as illustration below.



2. Start the engine and turn the steering wheel several times so that the fluid temperature can rise to approx. 50 ~ 60 C (122 F).
3. Set the engine speed to approx. 1000rpm.
4. Close the shut-off valve of the special tools and measure the fluid pressure.

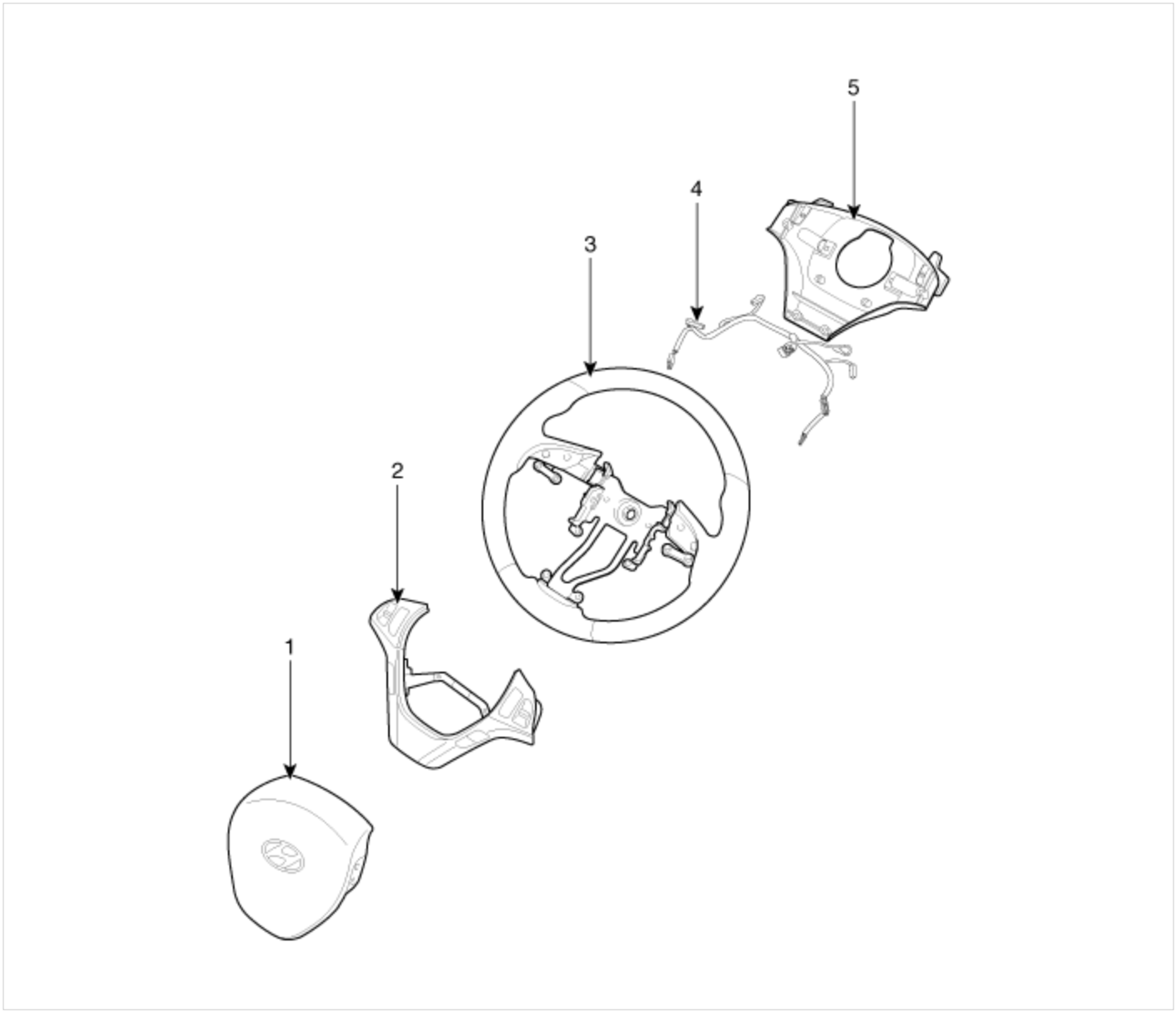
Relief pressure:
100 ~ 105kgf/cm² (1422 ~ 1493psi, 9.7 ~ 10.2Mpa)

⚠ CAUTION
Do not keep the shut-off valve on the pressure gauge closed for longer than 10 seconds.

5. Remove the special tools, and than connect the pressure tube to the pump by tightening the eye bolt.
6. Bleed the power steering system.

Steering System

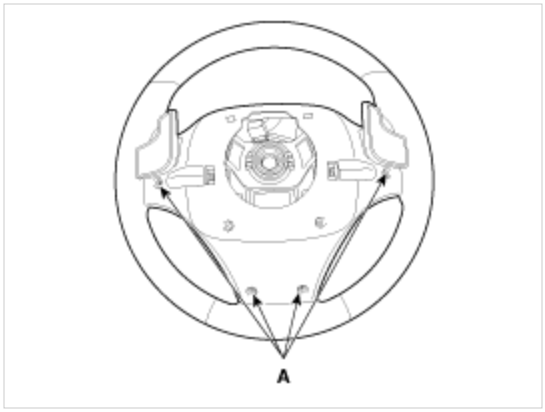
Components

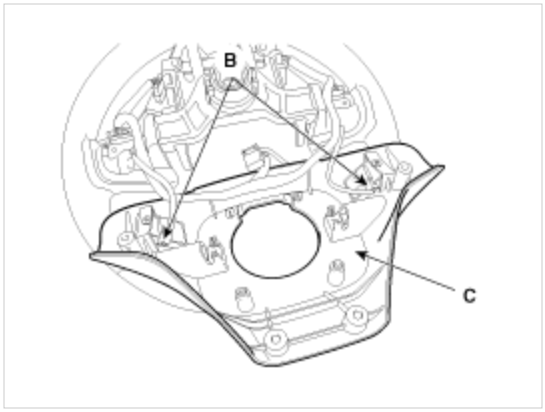


1. Driver airbah module (DAB) 2. Remote control assembly 3. Steering wheel	4. Wiring 5. Lower cover

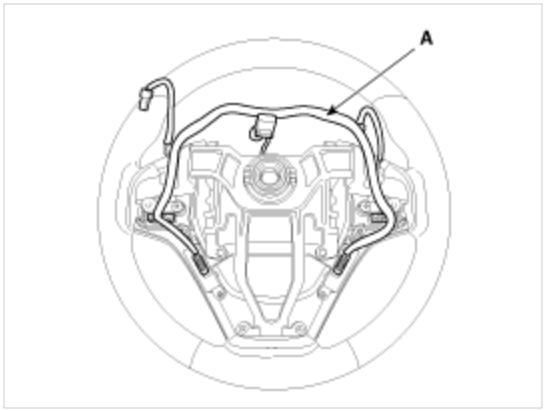
Disaseembly

1. Disconnect the screw (A-4ea) & paddle shift connector (B) and then remove the lower cover (C).

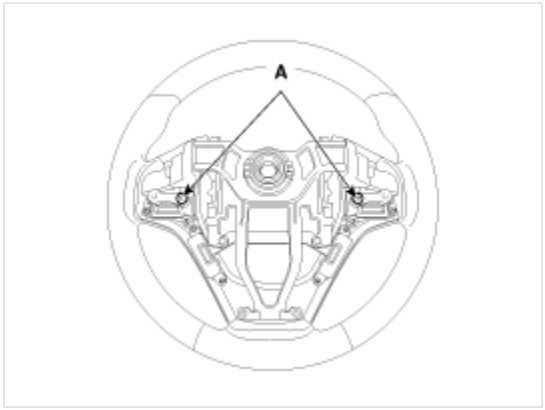


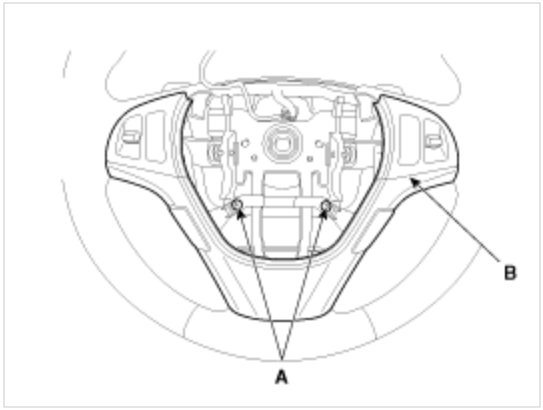


2. Disconnect the wiring (A)



3. Disconnect the screw (A-4ea) remove the remote control assembly (B).

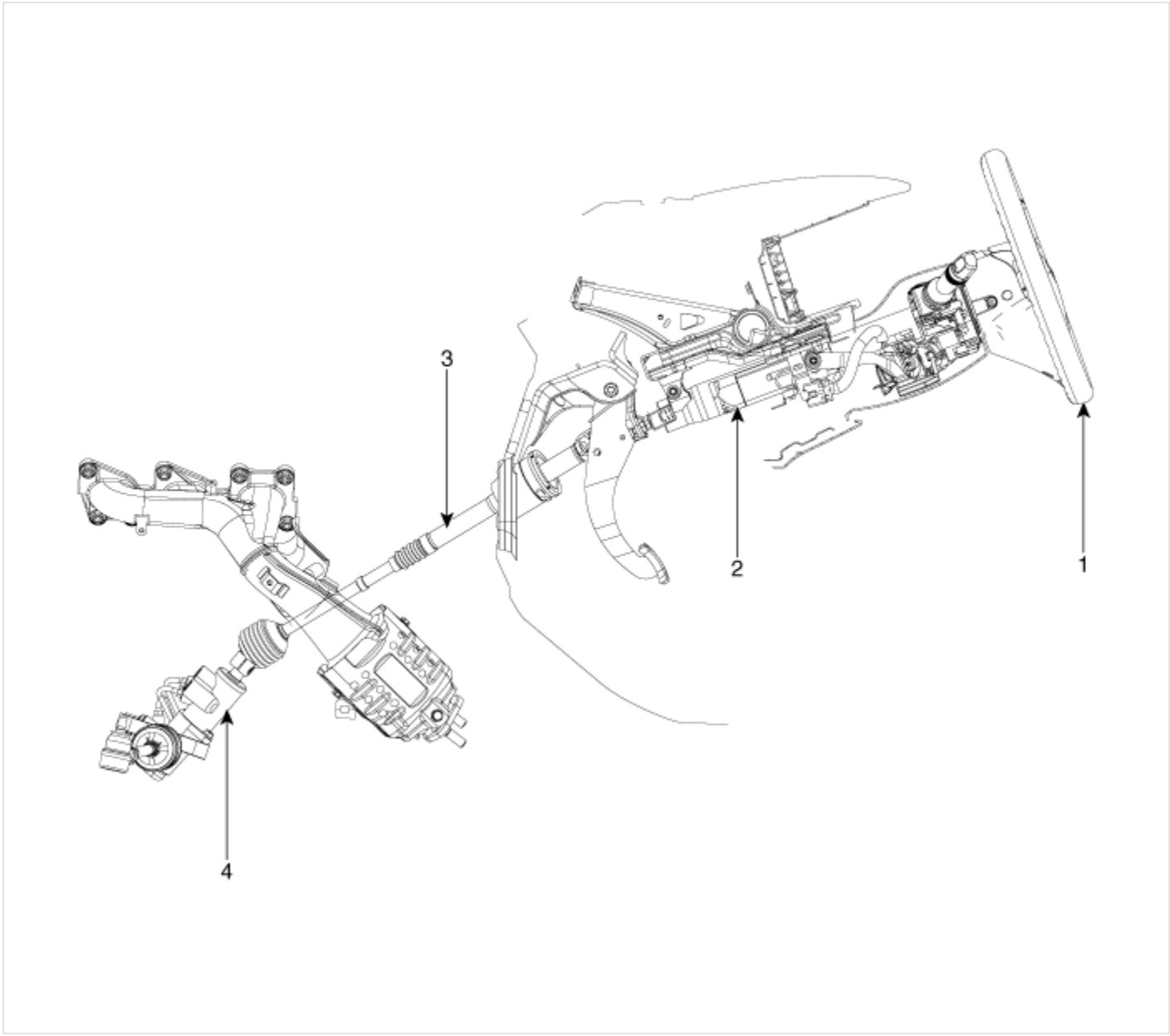




4. Reassembly is the reverse of the disaseembly.

Steering System

Components



1. Steering wheel	3. Wheel joint assembly
2. Steering column	4. Steering gear box

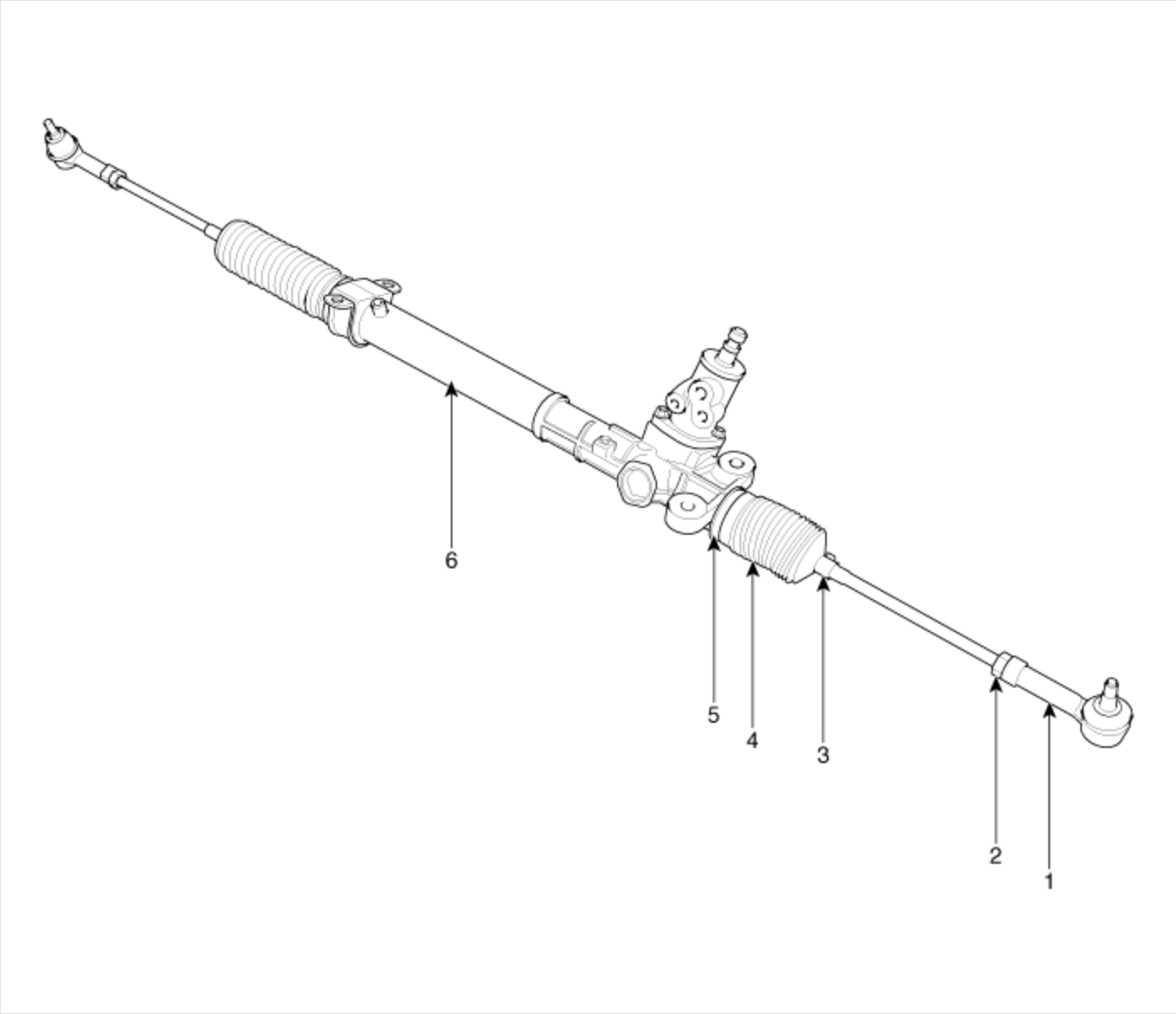
Steering System

Inspection

1. Check the steering column for damage and deformation.
2. Check the join bearing for damage and wear.
3. Check the tilt bracket for damage and cracks.
4. Check the key lock assembly for proper operation and replace it if necessary.

Steering System

Components



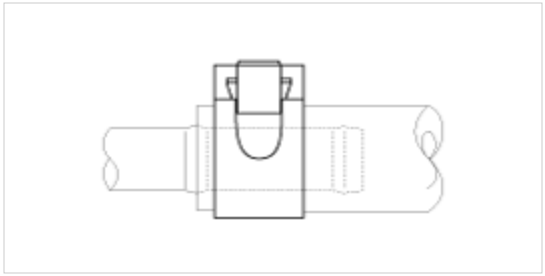
1. Tie rod end assembly	4. Bellows
2. Lock nut	5. Bellows band
3. Bellows clip	6. Rack housing assembly

Inspection

1. Rack
   A. Check for rack tooth face damage or wear.
   B. Check for oil seal contact surface damage.
   C. Check for rack bending or twisting.
   D. Check for oil seal ring damage or wear.
   E. Check for oil seal damage or wear.
2. Pinion valve
   A. Check for pinion gear tooth face damage or wear.
   B. Check for oil seal contact surface damage.
   C. Check for seal ring damage or wear.
   D. Check for oil seal damage or wear.
3. Bearing
   A. Check for seizure or abnormal noise during abearing rotation.
   B. Check for excessive play.
   C. Check for missing needle bearing rollers.
4. Others
   A. Check for damage of the rack housing cylinder bore.
   B. Check for boot damage, cracking or aging.

Replacement

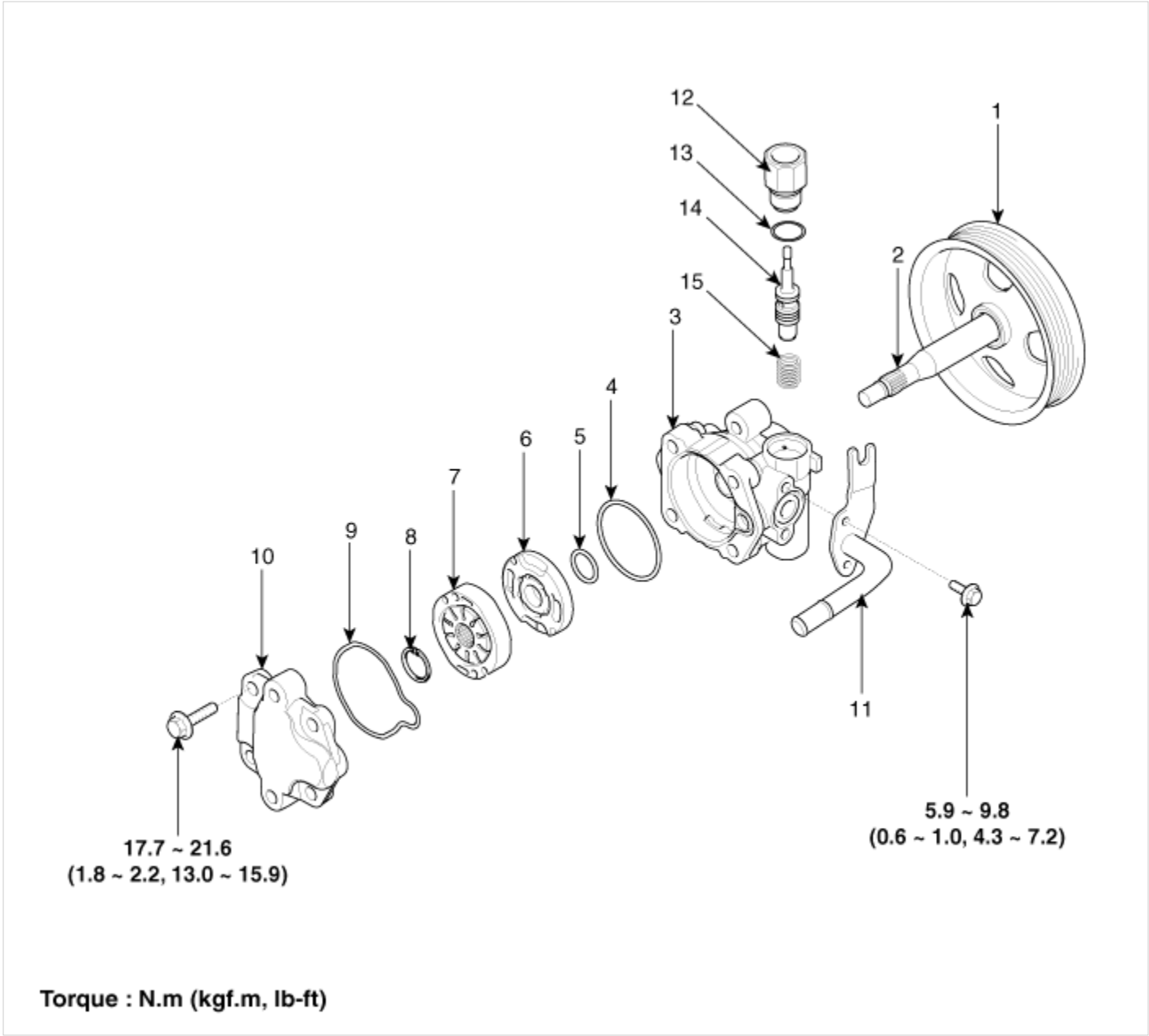
- Refer to the components illustration during removal or installation.
- When installing, be sure to connect between hose to tube using a clamp as shown in the illustration.



- Check all clamps for deterioration or deformation; replace with the clamps new one if necessary.

- Add the recommended power steering fluid and bleed the power steering system.

Components



Torque : N.m (kgf.m, lb-ft)

1. Pump pulley	6. Side plate	11. Suction pipe
2. Pump shaft	7. Rotor & vane	12. Connector assembly
3. Pump body	8. O - ring	13. O-ring
4. O - ring	9. O - ring	14. Flow control valve
5. O - ring	10. Pump cover	15. Spring

Inspection

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