STEERING
11

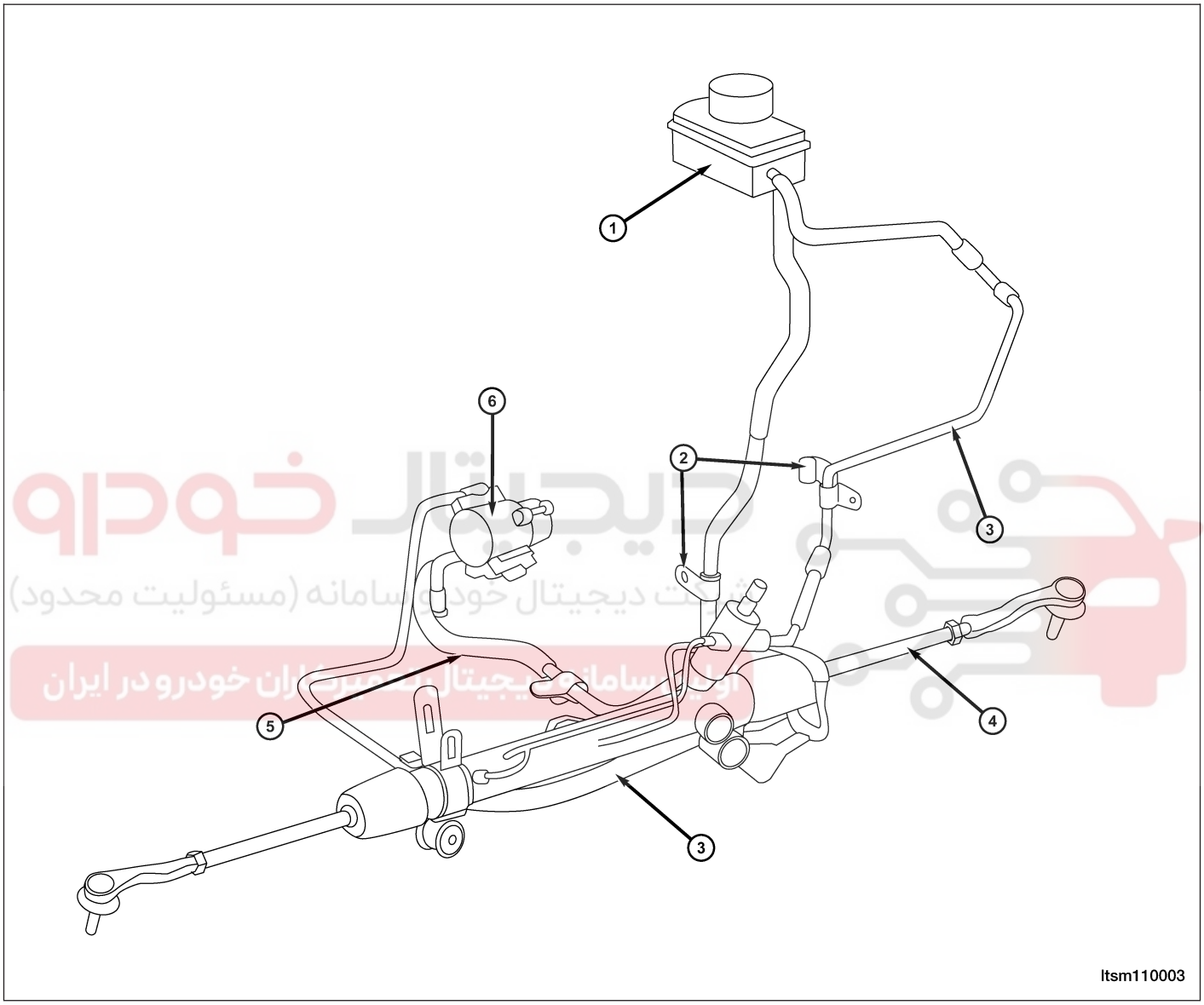
CONTENTS

STEERING SYSTEM

GENERAL INFORMATION

Description

The power steering pump is a constant flow rate and displacement vane type pump. The pump reservoir supplies fluid to the pump body. The pump is connected to the steering by the pressure and return hoses. The steering gear used is a rack and pinion type gear.



1 - Power Steering Fluid Reservoir	4 - Power Steering Gear Assembly
2 - Power Steering Fluid Pressure Hose Bracket	5 - Power Steering Fluid Return Hose
3 - Power Steering Fluid Pressure Hose	6 - Power Steering Pump

Operation

Turning of the steering wheel is converted into linear travel through the meshing of the helical pinion teeth with the rack teeth within the steering gear. The lateral travel pushes and pulls the tie rods to change the direction of the vehicle's front wheels.

Power assist steering is provided by a belt driven rotary type pump. It directs fluid through power steering fluid hoses to the power steering gear where it is used to assist the driver's turning effort.

Manual steering control of the vehicle can be maintained if power steering assist is lost. However, under this condition, steering effort is significantly increased.

WARNING!

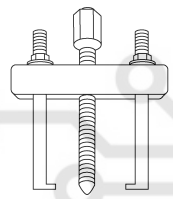
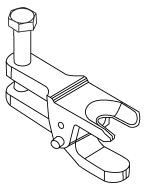
Power steering fluid, engine parts and exhaust system may be extremely hot if engine has been running. Do not start engine with any loose or disconnected hoses. Do not allow hoses to touch hot exhaust manifold or catalyst. Fluid level should be checked with the engine off to prevent personal injury from moving parts.

Specifications

Fluid Specifications

DESCRIPTION	CAPACITY (L)
Power Steering Fluid (ATF III)	1.1

Special Tools

Steering Wheel Puller	 besm110015
Ball Joint Separator CH-10002	 besm020086

DIAGNOSIS & TESTING

Power Steering Troubleshooting Chart

Review this troubleshooting chart any time a power steering system problem is present. This chart will help determine if the power steering pump or power steering gear is functioning properly.

CONDITION	POSSIBLE CAUSES	CORRECTION
Steering Wheel Is Loose	· Steering wheel retaining bolt loose. · Loose steering column to instrument panel fasteners.	· Check steering wheel retaining bolt torque and tighten to specifications if necessary. · Check steering column to instrument panel fastener torque and tighten to specifications if necessary.
Steering Catches, Surges Or Sticks In Certain Positions Or Is Difficult To Turn	· Low power steering fluid level. · Tire(s) not properly inflated. · Loose or slipping power steering/ accessory drive belt. · Lack of lubrication in steering gear outer tie rod end(s).	· Check fluid level and fill to proper level if necessary. Check for leaks. Make sure all air is bled from system. · Check and inflate tires to the specified pressure. · Verify belt tension. Replace belt auto-tensioner and belt if necessary. · Check the outer tie rod ends.
Steering Wheel Does Not Return To Center Position	· Tire(s) not properly inflated. · Improper front wheel alignment.	· Check and inflate tires to the specified pressure. · Check and adjust wheel alignment if necessary.
Excessive Steering Wheel Kickback From Road Inputs	· Air in power steering fluid. · Power steering gear loose on cradle/sub-frame. · Steering column, coupling or intermediate shaft worn or loose. · Power steering pump flow is too low.	· Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace if necessary. Bleed air from fluid. · Inspect gear mounting bolts. Replace if necessary and tighten to specifications. · Rotate steering wheel back-and-forth while inspecting intermediate shaft going into steering gear. Look for excessive free-play. Retighten if loose bolt is found. Replace steering column, coupling or intermediate shaft if necessary. · Perform power steering flow and pressure test. Look for low or erratic flow or pressure. Replace power steering pump if necessary.

Power Steering Fluid Troubleshooting Chart

NOTE :
Extremely cold temperatures may cause power steering fluid aeration. The air should work its way out of the system as the fluid warms.

CONDITION	POSSIBLE CAUSES	CORRECTION
Low Fluid Level With Visible Leak	· Loose power steering hose fittings or connections. · Damaged or missing O-ring at power steering hose tube nuts. · Power steering line or hose failure. · Power steering component leaking (reservoir, pump, gear).	· Check torque on all tube nuts (at gear and pump). Inspect clamps at all rubber hose connections for correct position, damage and tension. Tighten tube nuts to specifications as required. Reposition or replace clamps at hose connections. Clean joints and reinspect for leaks. · Remove tube nut and inspect O-ring. If damaged or missing, replace O-ring. Clean joints and reinspect for leaks. · Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace hoses if necessary. · Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace power steering component if necessary.
Aerated Fluid	· Low power steering fluid level. · Air leak at power steering supply hose, reservoir or pump.	· Check fluid level and fill to proper level if necessary. Check for leaks. Make sure all air is bled from system. · Inspect components. Place a hand vacuum pump with reservoir and verify that system can sustain vacuum. System should not lose more than 1 psi in 2 minutes (make sure vacuum pump is sealed well to the reservoir). Replace steering component if necessary.

ON-VEHICLE SERVICE

Power Steering Filling and Flushing

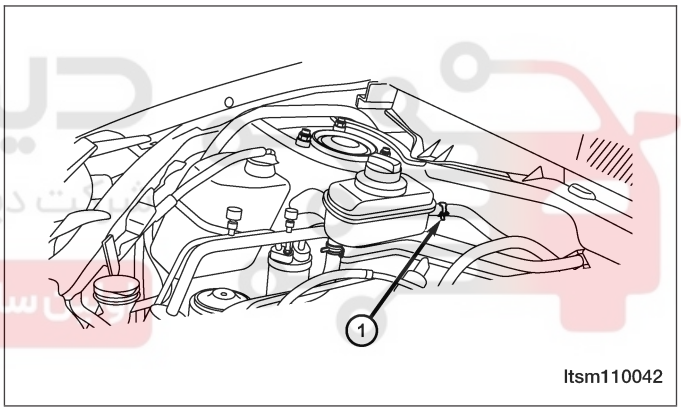
Filling

1. Fill the power steering fluid reservoir to the proper level and let the fluid settle for at least two minutes.
2. Start the engine and let run for a few seconds, then turn the engine off.
3. Add fluid if necessary.
4. Repeat the above procedure until the fluid level remains constant after running the engine.
5. When the steering fluid temperature is relatively high, the steering fluid level will approach to the “MAX” level.
6. When the steering fluid cools down, the steering fluid level may approach to the “MIN” level.

NOTE :
If the steering fluid is extremely foamy or milky looking, allow the vehicle to stand a few minutes and repeat the procedure.

Flushing

1. Raise and support the vehicle.
2. Remove the steering fluid reservoir release cap.
3. Siphon out the contaminated power steering fluid from the power steering liquid reservoir.
4. Remove the return hose clamp (1) from the power steering return hose.
5. Install a plug to the return hose fitting on the fluid reservoir.



6. Insert the power steering fluid return hose into a container for the discharged power steering fluid.
7. Fill the power steering fluid reservoir.
8. Start the engine and idle.
9. Let the engine idle until the return hose discharges clean power steering fluid.
10. Stop the engine and remove the plug from the power steering reservoir.
11. Reinstall the power steering return hose to the power steering reservoir.
12. Fill the power steering system (See Filling Procedure in Power Steering Filling and Flushing in Section 11 Steering).

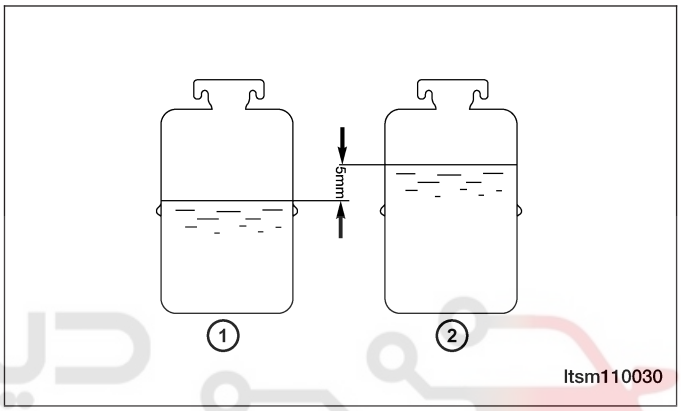
NOTE :
Approximately 1.0L of power steering fluid should be needed to fully flush the power steering reservoir. DO NOT mix other fluids in the power steering fluid.

Inspection

1. If the power steering fluid level is low, inspect the entire power steering system for potential leaks.

CAUTION:
DO NOT operate the vehicle with foamy steering fluid for an extended period. This may cause pump damage.

2. Perform the following to inspect the power steering fluid reservoir level:
   - Park the vehicle on a level surface.
   - Start the engine.
   - Turn the steering wheel several times to heat the power steering fluid to 50°- 60°C.
   - With the engine running, turn the steering wheel left and right to the wheel stops and repeat this several times.
   - Check the power steering fluid reservoir to see whether there is foam or milky fluid present. Check the fluid level difference between engine off (2) and engine running (1). If the fluid level variation exceeds 5 mm, air is in the system and the air should be bled from the power steering system.

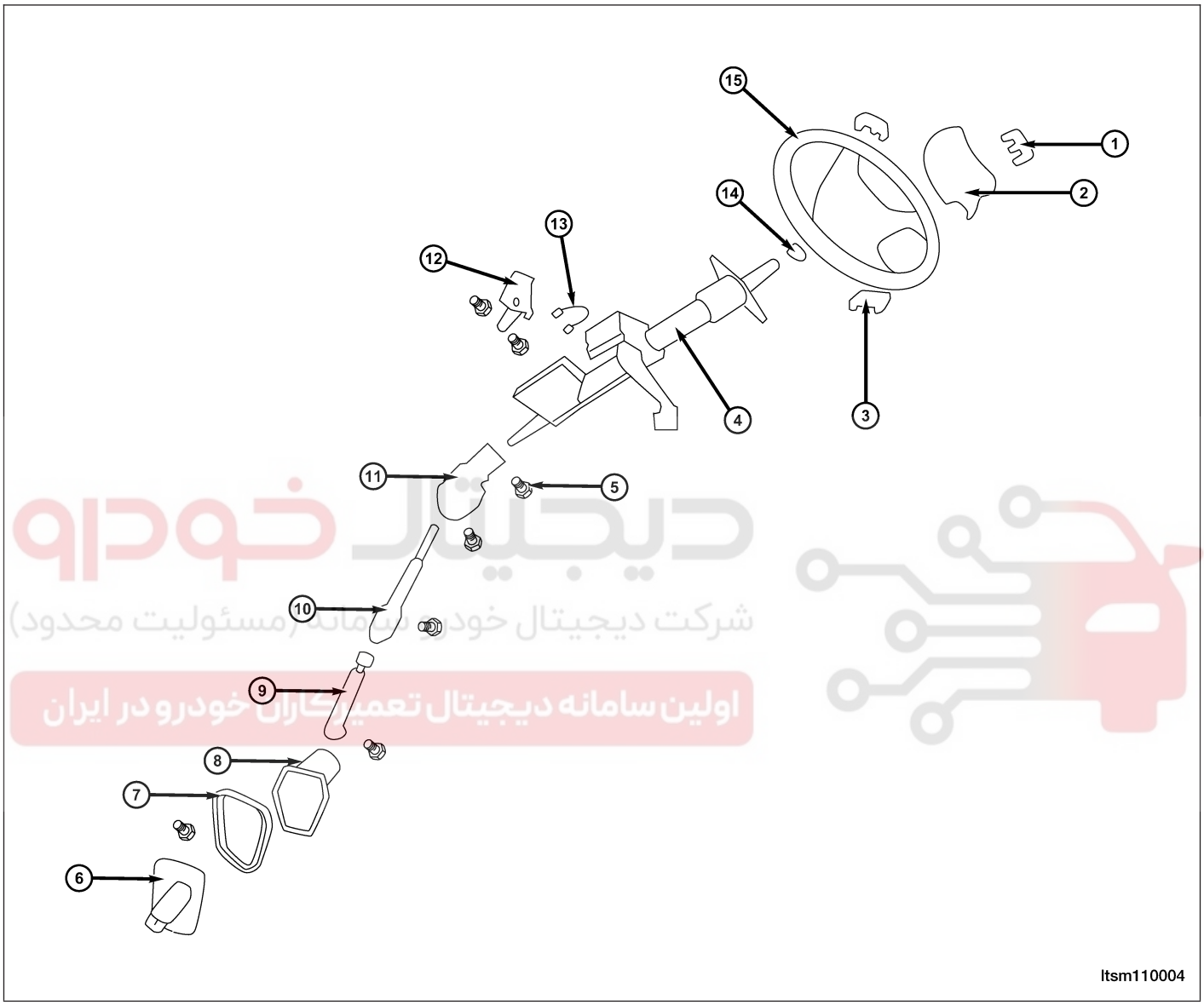


STEERING COLUMN

GENERAL INFORMATION

Description

The steering column has been designed so that the wiring, switches, shrouds and steering wheel can be serviced without removing the steering column from the vehicle.



1 - Horn Hood Assembly	9 - Intermediate Shaft
2 - Airbag	10 - Lower Universal Joint
3 - Spoke Trim Cover	11 - Upper Universal Joint
4 - Adjustable Steering Column	12 - Installed Bracket
5 - Bolt	13 - Adjusting Spring
6 - Steering Lower Shield	14 - Steering Wheel Nut
7 - Jacket Mounting Bracket	15 - Steering Wheel
8 - Steering Upper Shield	

Operation

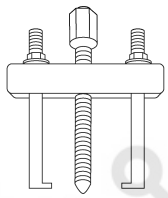
The steering column is the mechanical linkage between the steering wheel and the steering gear. The steering column shaft then connects the steering column to the steering gear. The tilt function of the steering column is controlled by a mechanical lever on the underside of the steering column, which uses a cam to lock and unlock the steering column.

Specifications

Torque Specifications

DESCRIPTION	TORQUE (N·m)
Steering Wheel Lock Nut	25 - 30

Special Tool

Steering Wheel Puller	 besm110015

DIAGNOSIS & TESTING

Vehicle Inspection

There is some noise in all power steering systems. One of the most common is a hissing sound. Hiss is a high frequency noise similar to that of a water tap being closed slowly. The noise is present in all valves that have a high velocity steering fluid passing through an orifice. There is no relationship between this noise and steering performance. The hissing sound is commonly heard during the following operations:

- Evident at a standstill
- At park with the engine running
- When the steering wheel is at the end of its travel

Loose Steering / Vehicle Leads / Drifts Troubleshooting Chart

CONDITION	POSSIBLE CAUSES	CORRECTION
Excessive Play In Steering Wheel	· Worn or loose suspension or steering components. · Worn or loose wheel bearings. · Steering gear mounting. · Gear out of adjustment. · Worn or loose steering coupler.	· Repair if necessary. · Repair if necessary. · Tighten gear mounting bolts to specification. · Adjust gear to specification. · Repair if necessary.
Vehicle Pulls To One Side During Braking	· Tire pressure. · Air in brake hydraulics system. · Worn brake components.	· Adjust tire pressure. · Bleed brake system. · Repair if necessary.
Vehicle Leads Or Drifts From Straight Ahead Direction On Uncrowned Road	· Tire pressure. · Radial tire lead. · Brakes dragging. · Wheel alignment. · Weak or broken strut. · Loose or worn steering/suspension components.	· Adjust tire pressure. · Cross front tires. · Repair if necessary. · Align vehicle. · Replace strut. · Repair if necessary.

ON-VEHICLE SERVICE

Steering Wheel

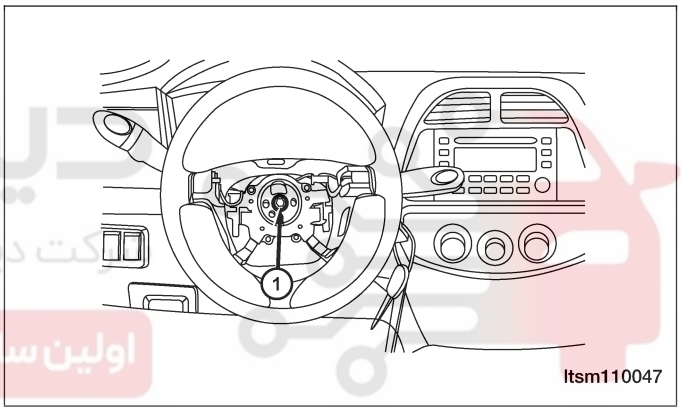
Removal & Installation

WARNING!

Before servicing the steering column, the airbag system must be disarmed. Failure to do so may result in accidental deployment of the airbag and possible personal injury (See Airbag System Disarming Procedure in Section 14 Restraints).

NOTE :
To help maintain alignment of the spiral cable connector during reassembly, apply a small piece of tape to the spiral cable and the steering column to keep them in alignment.

1. Set the front wheels to the straight-ahead position.
2. Disconnect the negative battery cable.
3. Remove the driver airbag (See Driver Airbag Removal & Installation in Section 14 Restraints).
4. Disconnect the spiral cable electrical connector.
5. Remove the steering wheel lock nut (1).
   (Tighten: Steering wheel lock nut to 25 - 30 N·m)
6. Using the steering wheel puller, remove the steering wheel.



7. Installation is in the reverse order of removal.

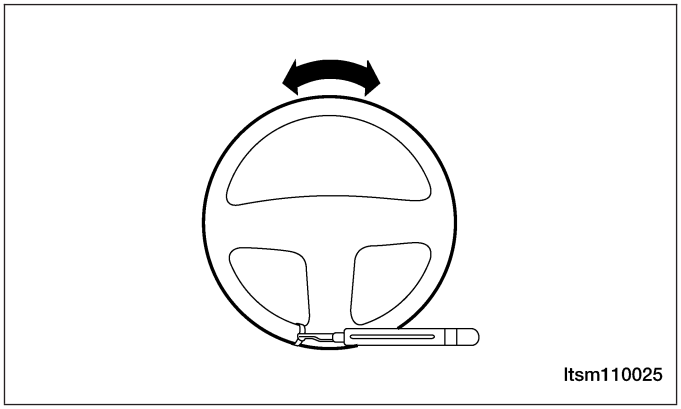
Installation Notes:

- The spiral cable could be damaged if installed in an improper position.
- Do not rotate the spiral cable quickly or beyond the limit of turns (this can cause the cable to snap).
- Verify the airbag system is operating properly after the repair is complete.

Inspection - Steering System

Steering Wheel Free-Play Inspection

- Set the front wheels to the straight-ahead position with the engine idling (hydraulic system is working).
- Slightly turn steering wheel to the right and left, and before the wheels begin turning, measure the free play of steering wheel.
  - Maximum limit: 40 mm.



- If the free play exceeds the limit value, inspect the gap between the steering shaft joint and the steering linkage. Repair or replace the related parts as necessary. If the free play still exceeds the limit value, turn the steering wheel to the right position with the engine off. Apply 5 N·m of load to the steering wheel and inspect the free-play again.
  - Standard value: Less than 15 mm (steering wheel free play with the engine off)
- If free play exceeds standard value, remove steering gear housing and inspect the gross torque of pinion gear.

Static Steering Force Inspection

- Park the vehicle on a level surface, and turn the steering wheel to the straight-ahead position. Start the engine, adjust engine speed to 1000 ± 100 RPM.

CAUTION:

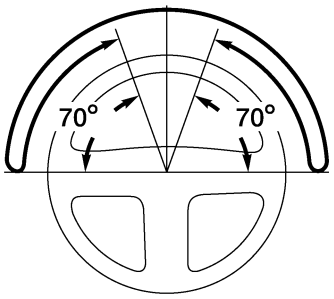
After adjusting the engine speed, return it back to standard idle speed.

- Connect a spring scale to the outer circle of steering wheel. Measure the steering force required when turning the steering wheel leftward and rightward (within 1.5 circles) at the straight-ahead position. If obvious steering force fluctuation exists, inspect the steering force as necessary.
  - Standard steering force: Less than 34 N·m
  - Fluctuation tolerance: Less than 5.9 N·m
- If the measured force exceeds the standard value, see the trouble shooting section for inspection and adjustment.

Steering Wheel Return to Center Inspection

NOTE :
This test should be performed during a road test.

- Make smooth turns and sharp turns. Check the driving ″sense″ to ensure there is no difference between the left and right turns in terms of steering force and the steering wheel returning to center.
- When the vehicle speed is between 20 to 30 km/h, turn the steering wheel 90° for 1 or 2 seconds and release the steering wheel. If the steering wheel returns over 70°, the steering wheel return function can be considered good.



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NOTE :
When rapidly turning the steering wheel, there will be a sense of “heavy”, however, this does not indicate a problem with the steering system. This is due to insufficient steering fluid supplied to the steering fluid pump during idle speed.

Steering Column Shroud

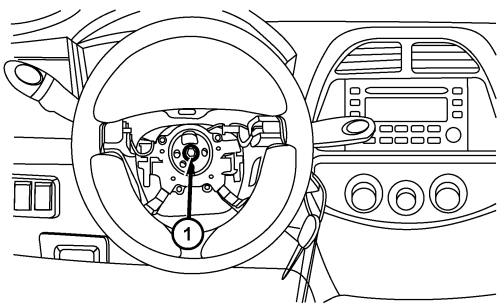
Removal & Installation

WARNING!

Before servicing the steering column, the airbag system must be disarmed. Failure to do so may result in accidental deployment of the airbag and possible personal injury (See Airbag System Disarming Procedure in Section 14 Restraints).

NOTE :
To help maintain alignment of the spiral cable connector during reassembly, apply a small piece of tape to the spiral cable and the steering column to keep them in alignment.

1. Disconnect the negative battery cable.
2. Remove the driver airbag (See Driver Airbag Removal & Installation in Section 14 Restraints).
3. Remove the steering wheel lock nut (1).
   (Tighten: Steering wheel lock nut to 25 - 30 N·m)



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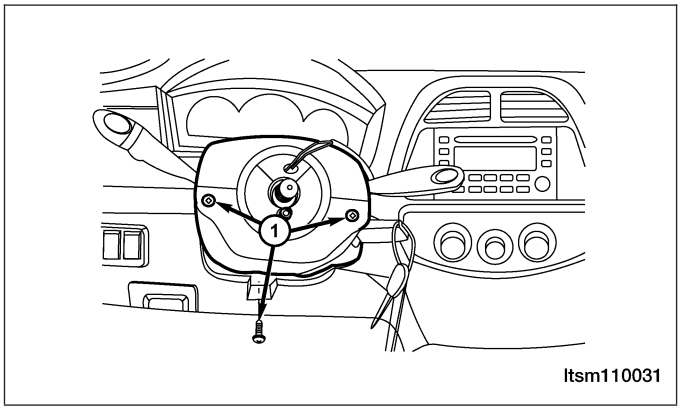
4. Remove the three steering shroud retaining bolts (1).
   (Tighten: Steering shroud bolts to 8 N·m)



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5. Remove the shroud.
6. Installation is in the reverse order of removal.

Installation Notes:

- The spiral cable could be damaged if installed in an improper position.
- Do not rotate the spiral cable quickly or beyond the limit of turns (this can cause the cable to break).
- Verify the airbag system is operating properly after the repair is complete.

Steering Column Shaft

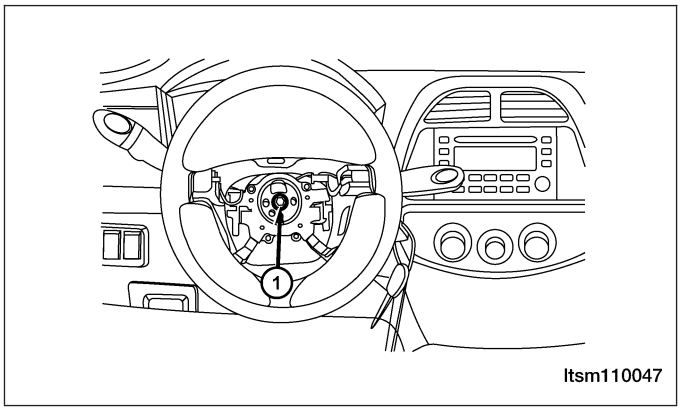
Removal & Installation

WARNING!

Before servicing the steering column, the airbag system must be disarmed. Failure to do so may result in accidental deployment of the airbag and possible personal injury (See Airbag System Disarming Procedure in Section 14 Restraints).

NOTE :
To help maintain alignment of the spiral cable connector during reassembly, apply a small piece of tape to the spiral cable and the steering column to keep them in alignment.

1. Disconnect the negative battery cable.
2. Set the front wheels to the straight-ahead position.
3. Disconnect the negative battery cable.
4. Remove the driver airbag (See Driver Airbag Removal & Installation in Section 14 Restraints).
5. Disconnect the spiral cable electrical connector.
6. Remove the steering wheel lock nut (1).
   (Tighten: Steering wheel lock nut to 25 - 30 N·m)



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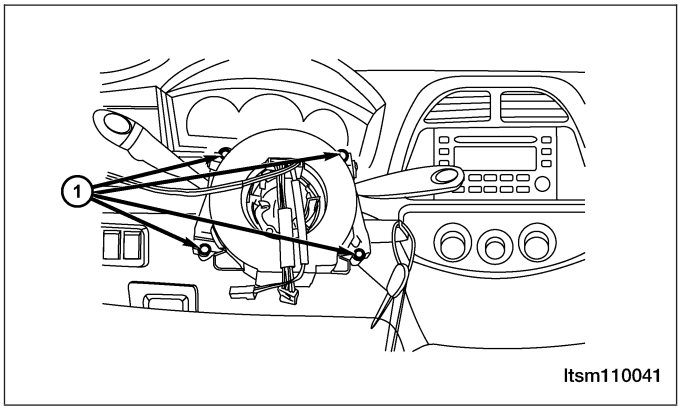
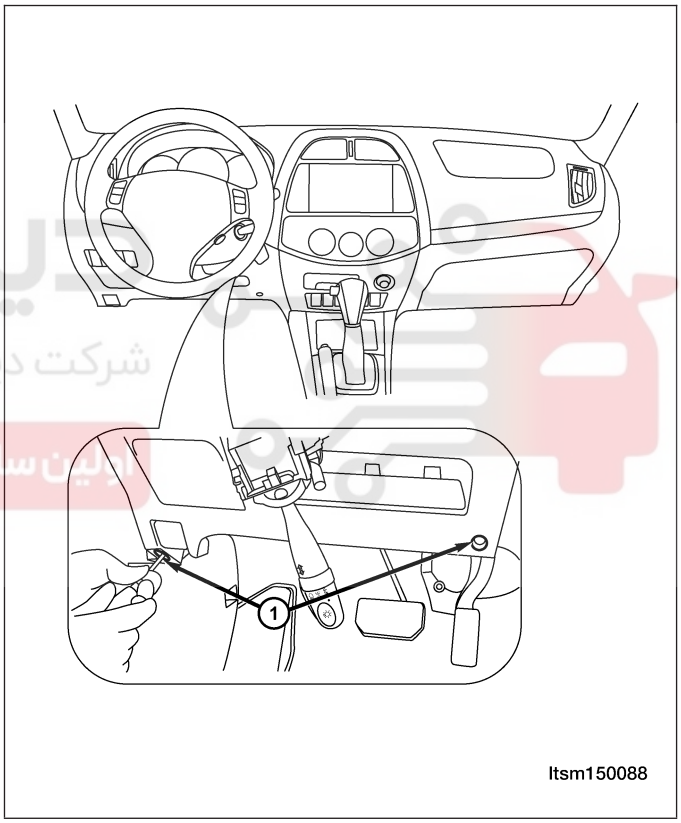
7. Using the steering wheel puller, remove the steering wheel.
8. Remove the steering column shroud (See Steering Column Shroud Removal & Installation in Section 11 Steering).

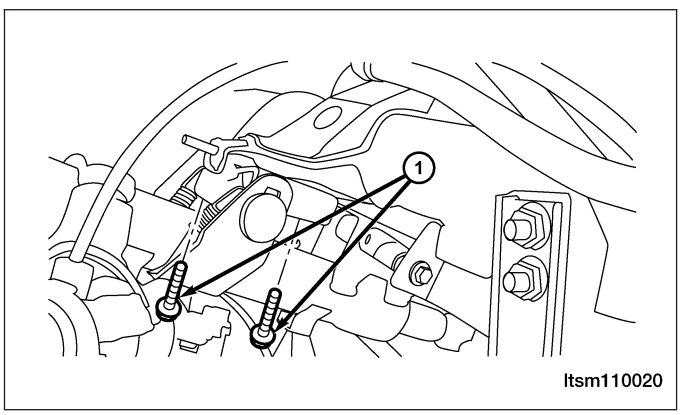
9. Disconnect the multi-function switch electrical connector and remove the multi-function switch.
10. Disconnect the wiper and washer switch electrical connector and remove the wiper and washer switch.
11. Remove the spiral cable retaining bolts (1).
    (Tighten: Spiral cable bolts to 8 N·m)



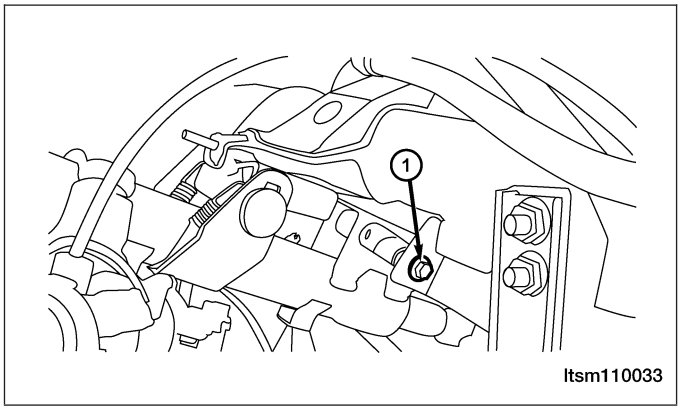
12. Remove the instrument panel lower shroud bolts (1).



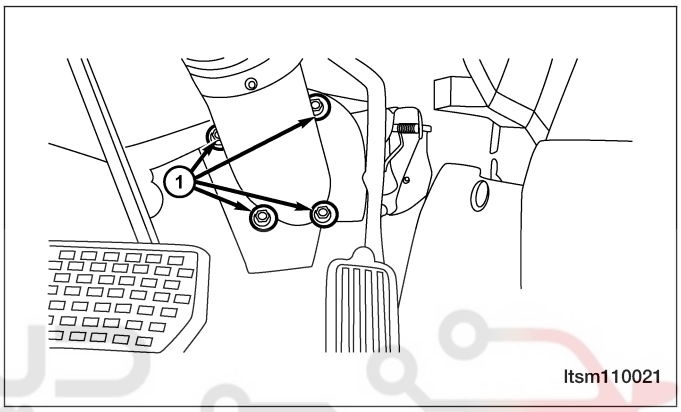
13. Remove the upper mounting bolts (1) from the steering column.
    (Tighten: Steering column upper mounting bolts to 25 - 30 N·m)



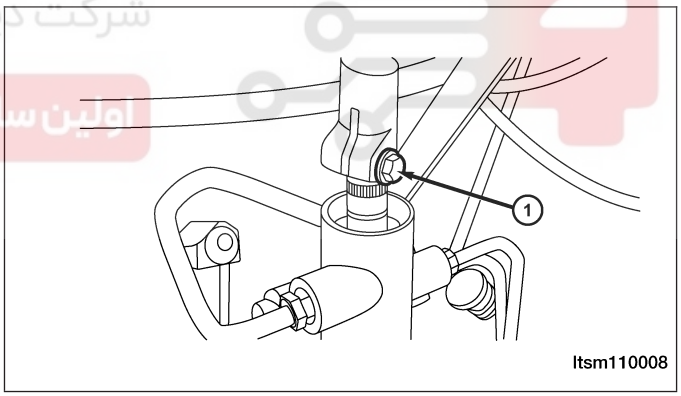
14. Remove the lower mounting bolt (1) from the steering column.
(Tighten: Steering column lower mounting bolt to 25 - 30 N·m)



15. Remove the steering column floor bolts (1).
(Tighten: Steering column floor bolts to 25 - 30 N·m)



16. Remove the intermediate shaft lock bolt (1) that connects to the steering gear.
(Tighten: Intermediate shaft lock bolt to 25 - 30 N·m)



17. Remove the steering column assembly.
18. Installation is in the reverse order of removal.

Installation Notes:

- Check the steering shaft and universal joint for damage or wear. Check the clearance of universal joint and replace if necessary.
- Check the steering column seal cover. The distance to the groove button should be less than 1.00 mm, replace if necessary.
- Verify the airbag system is operating properly after the repair is complete.
- When installing the spiral cable, slowly wind the spiral cable to the end of its travel and then unwind the spiral cable two and a half turns.

STEERING GEAR

GENERAL INFORMATION

Description

The steering gear used is the rack-and-pinion type with power assist. It is mounted on the front suspension sub-frame. The outer ends of the outer tie rods attach to the front knuckles.

NOTE :
The power steering gear should not be serviced or adjusted. If a malfunction or steering fluid leak occurs with the steering gear, the complete steering gear needs to be replaced.

Operation

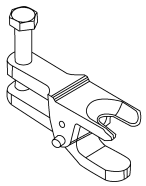
The steering wheel turns the pinion. The rack is a long flat bar with geared teeth on one side. The rack teeth mesh with the teeth on the pinion gear. Rotation of the pinion moves the rack from left to right and right to left. The tie rod then causes the wheels to turn to the left or right.

Specifications

Torque Specifications

DESCRIPTION	TORQUE (N·m)
Inlet / Outlet Pipe Nut	25 - 30
Intermediate Shaft Bolt	25 - 30
Steering Gear to Sub-Frame Bolts	70 - 80
Sub-Frame Assembly Bolts	180 ± 15
Tie Rod End Nut	32 - 38
Tie Rod Jam Nut	15
Wheel Mounting Nuts	110

Special Tool

Ball Joint Separator CH-10002	 besm020086

DIAGNOSIS & TESTING

Binding and Sticking Troubleshooting Chart

CONDITION	POSSIBLE CAUSES	CORRECTION
Difficult To Turn Wheel Sticks Or Binds	· Low fluid level. · Tire pressure. · Steering component. · Loose belt. · Low pump pressure. · Column shaft coupler binding. · Steering gear worn or out of adjustment. · Ball joints binding. · Belt routing.	· Fill to proper level. · Adjust tire pressure. · Inspect and lubricate. · Adjust or replace. · Pressure test and replace if necessary. · Replace coupler. · Repair or replace gear. · Inspect and repair if necessary. · Verify belt routing is correct.

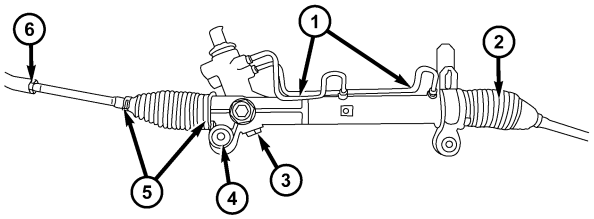
Insufficient Assist / Poor Return To Center Troubleshooting Chart

CONDITION	POSSIBLE CAUSES	CORRECTION
Hard Turning Or Momentary Increase In Turning Effort	· Tire pressure. · Low fluid level. · Loose belt. · Lack of lubrication. · Low pump pressure or flow. · Internal gear leak. · Belt routing.	· Adjust tire pressure. · Fill to proper level. · Adjust or replace. · Inspect and lubricate steering and suspension components. · Pressure and flow test and repair if necessary. · Pressure and flow test, and repair if necessary. · Verify belt routing is correct.
Steering Wheel Does Not Want To Return To Center Position	· Tire pressure. · Wheel alignment. · Lack of lubrication. · High friction in steering gear. · Ball joints binding.	· Adjust tire pressure. · Align front wheels. · Inspect and lubricate steering and suspension components. · Test and adjust if necessary. · Inspect and repair if necessary.

ON-VEHICLE SERVICE

Steering Gear - LHD

Removal & Installation



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1 - Steering Gear Inlet/Outlet Pipe	4 - Steering Gear Retaining Hole
2 - Dust Boot	5 - Clamp
3 - Steering Gear Lock Nut	6 - Tie Rod Lock Nut

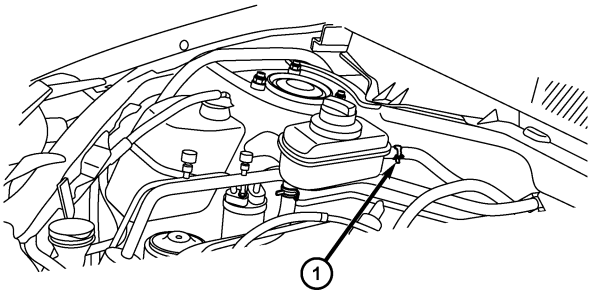
NOTE :
The following special tools are required to perform the repair procedure:
- CH-10002 - Ball Joint Separator

1. Siphon out as much power steering fluid as possible from the reservoir.

WARNING!

Prolonged and repeated contact with power steering fluid will damage skin. If steering fluid is spilled on your skin, wash it off immediately with water.

2. Remove the wheel mounting nuts and wheel assemblies from both sides of the vehicle. (Tighten: Wheel mounting nuts to 110 N·m)
3. Remove the return hose clamp (1) from the steering liquid reservoir and insert the end of the hose into a container.



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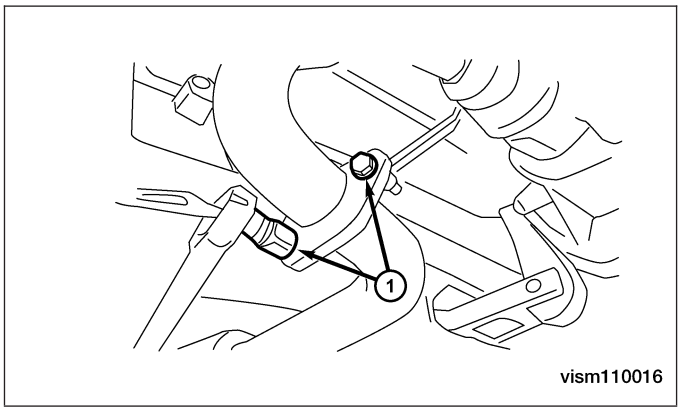
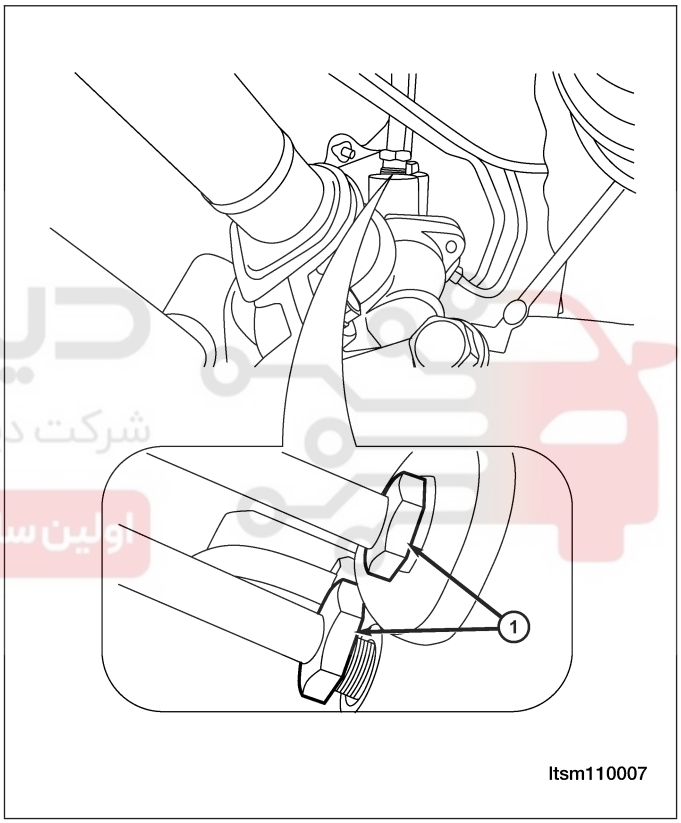
4. Start the engine and turn the steering wheel from lock-to-lock until all power steering fluid has been drained from the system.
5. Stop the engine.
6. Raise and support the vehicle.

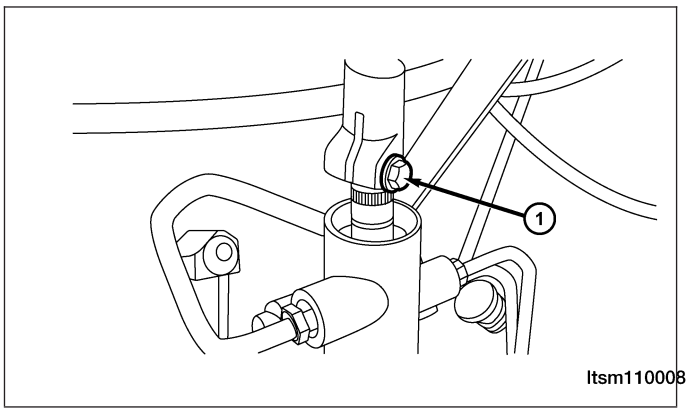
7. Remove the exhaust pipe assembly mounting bolts (1).
   (Tighten: Exhaust pipe assembly mounting bolts to 25 ± 3 N·m)



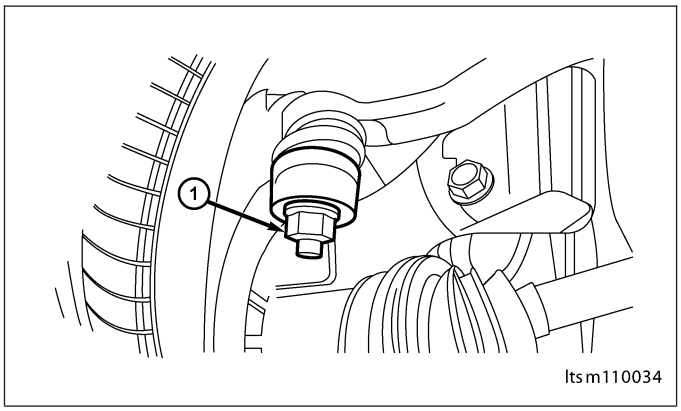
8. Remove the exhaust pipe assembly (See Exhaust Pipe Assembly Removal & Installation in Section 07 Exhaust).
9. Remove the high pressure and low pressure lines (1) from the steering gear.
   (Tighten: High pressure line to steering gear 27 - 33 N·m)
   (Tighten: Low pressure line to steering gear 27 - 33 N·m)



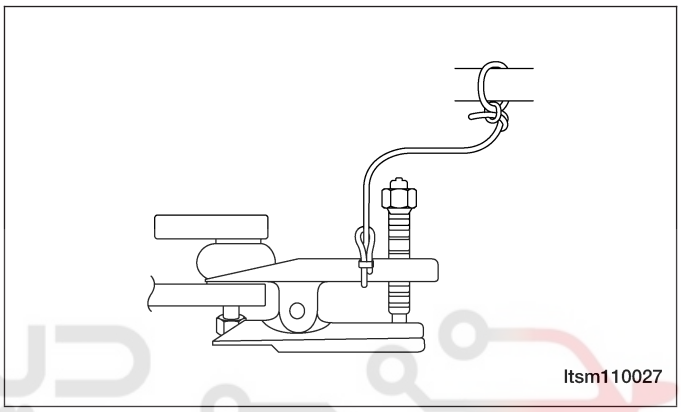
10. Remove the intermediate shaft coupling bolt (1) at the steering gear.
    (Tighten: Intermediate shaft coupling bolt to 25 - 30 N·m)



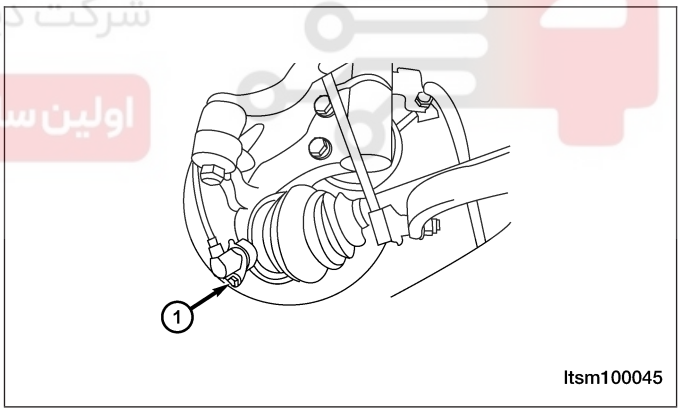
11. On each side of the steering gear, remove the nut (1) attaching the outer tie rod end to the steering knuckle.
(Tighten: Outer tie rod end nut to 32 - 38 N·m)



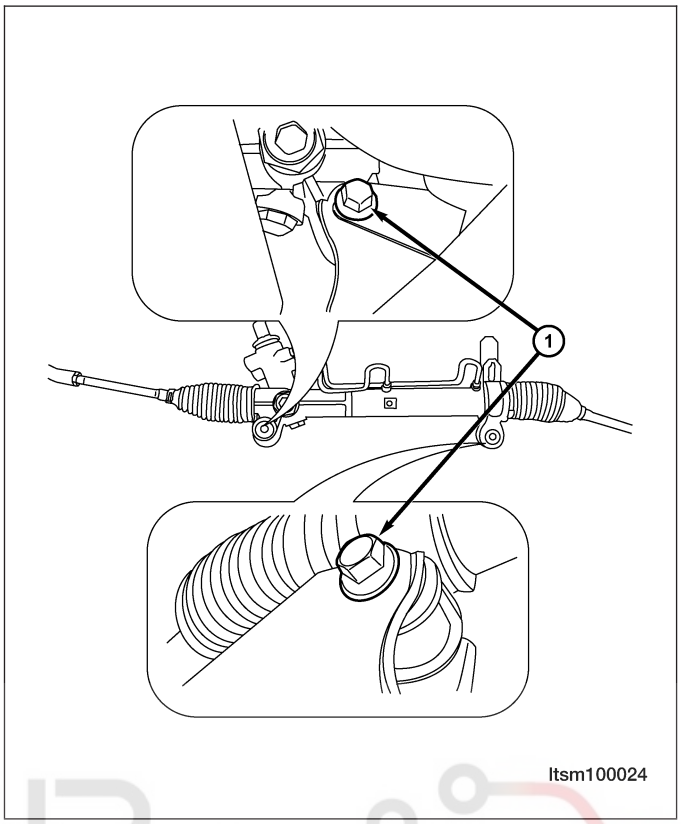
12. Using special tool CH-10002, separate the outer tie rod ends from both steering knuckles.



13. Remove the wheel speed sensor mounting bolt (1).
(Tighten: Wheel speed sensor mounting bolt to 10 ± 1 N·m)
14. Remove the wheel speed sensor and set it aside.



15. Remove the bolts (1) between the steering gear and the sub-frame.
(Tighten: Steering gear and sub-frame bolt to 70 - 80 N·m)



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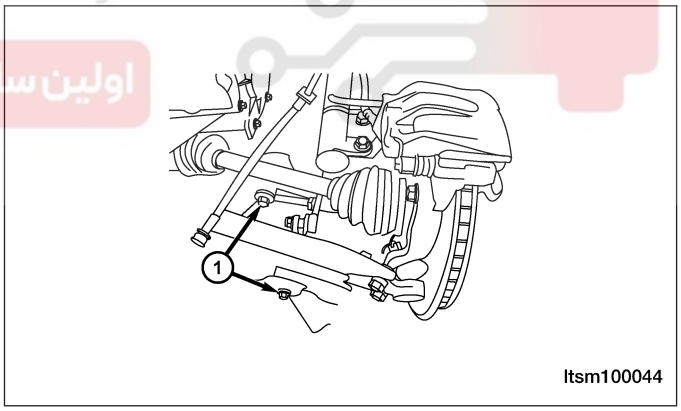
16. Support the engine using a suitable tool.
17. Remove the engine front and rear mounts (See Engine Mounts Removal & Installation in Section 02 Engine).
18. Remove the sub-frame mounting bolts (1) (4 total) between the sub-frame assembly and the vehicle body.
(Tighten: Sub-frame mounting bolts to 180 ± 15 N·m)



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NOTE :
Before removing the front suspension sub-frame from the vehicle, the location of the sub-frame must be marked on the body of the vehicle. Do this so the sub-frame can be relocated, upon reinstallation, against the body of vehicle in the same location as before removal. If the front suspension sub-frame is not reinstalled in exactly the same location as before removal, the preset front wheel alignment settings (caster and camber) may be lost.

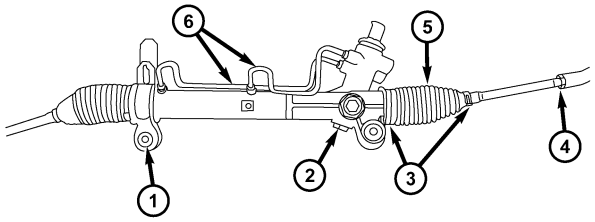
19. Using a jack, slowly lower the sub-frame enough to access the intermediate shaft coupling at the steering gear pinion shaft.
20. Remove the steering gear assembly.
21. Installation is in the reverse order of removal.

Installation Notes:

- After installing the new steering gear, perform a front end alignment procedure to reset the toe-in (See Front Wheel Alignment in Section 10 Suspension).

Steering Gear - RHD

Removal & Installation



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1 - Steering Gear Inlet/Outlet Pipe	4 - Steering Gear Retaining Hole
2 - Dust Boot	5 - Clamp
3 - Steering Gear Lock Nut	6 - Tie Rod Lock Nut

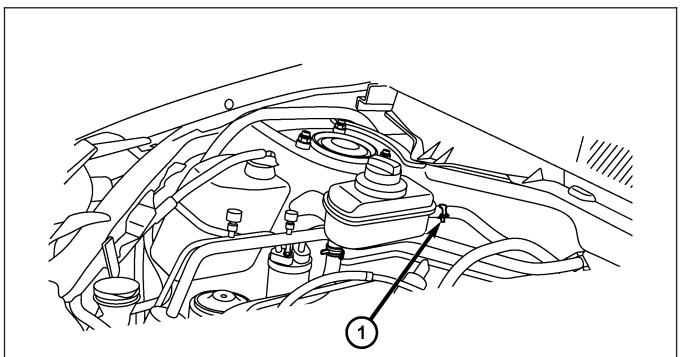
NOTE :
The following special tool is required to perform the repair procedure:
- CH-10002 - Ball Joint Separator

1. Siphon out as much power steering fluid as possible from the reservoir.

WARNING!

Prolonged and repeated contact with power steering fluid will damage skin. If steering fluid is spilled on your skin, wash it off immediately with water.

2. Remove the wheel mounting nuts and the wheel assemblies from both sides of the vehicle. (Tighten: Wheel mounting nuts to 110 N·m)
3. Remove the return hose clamp (1) from the steering liquid reservoir and insert the end of the hose into a container.



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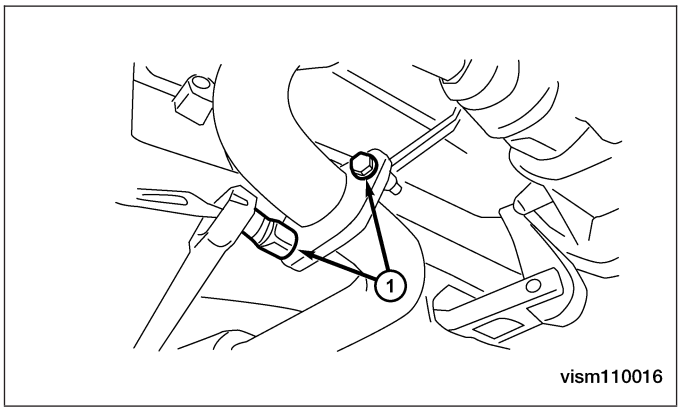
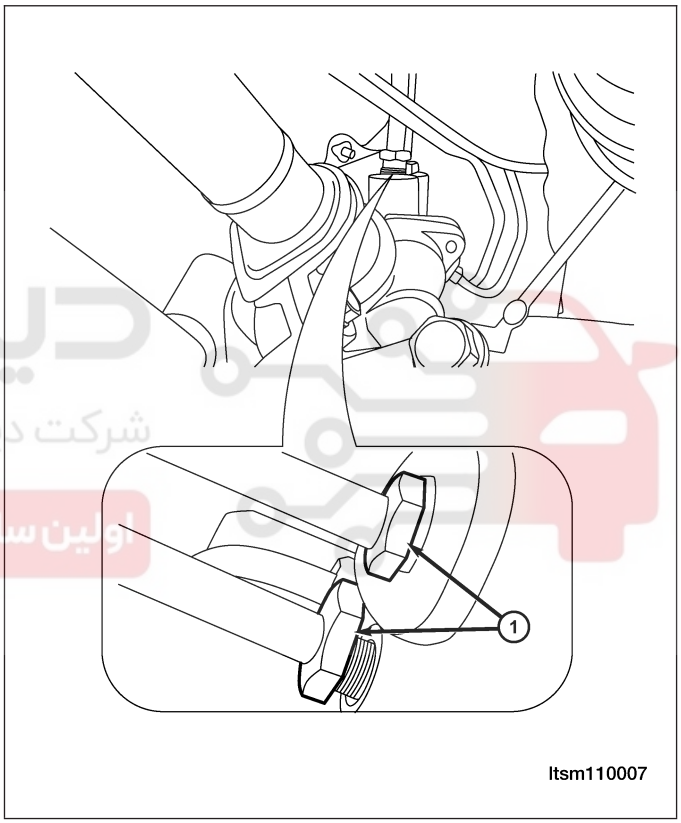
4. Start the engine and turn the steering wheel from lock-to-lock until all power steering fluid has been drained from the system.
5. Stop the engine.
6. Raise and support the vehicle.

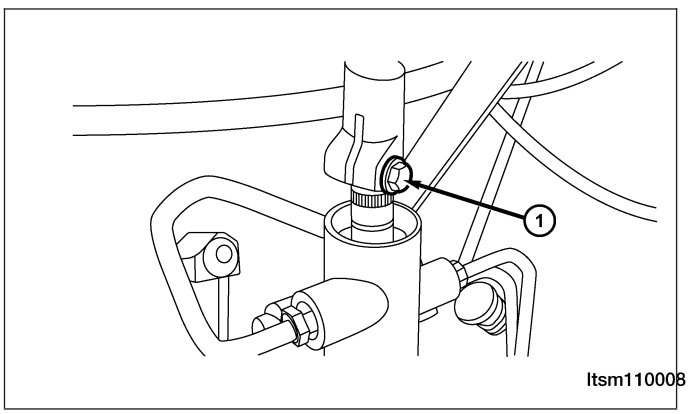
7. Remove the exhaust pipe assembly mounting bolts (1).
   (Tighten: Exhaust pipe assembly mounting bolts to 25 ± 3 N·m)



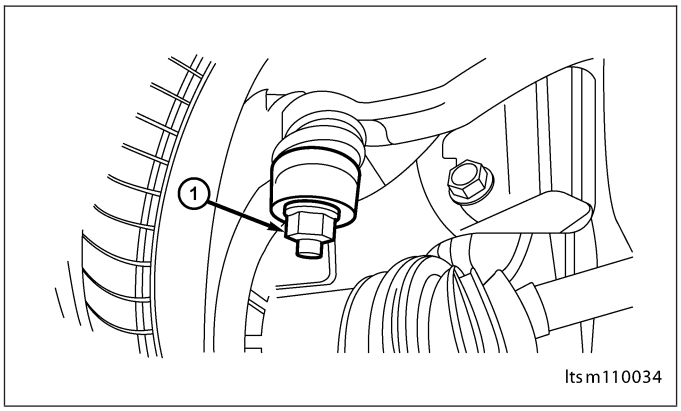
8. Remove the exhaust pipe assembly (See Exhaust Pipe Assembly Removal & Installation in Section 07 Exhaust).
9. Remove the high pressure and low pressure lines (1) from the steering gear.
   (Tighten: High pressure line to steering gear 27 - 33 N·m)
   (Tighten: Low pressure line to steering gear 27 - 33 N·m)



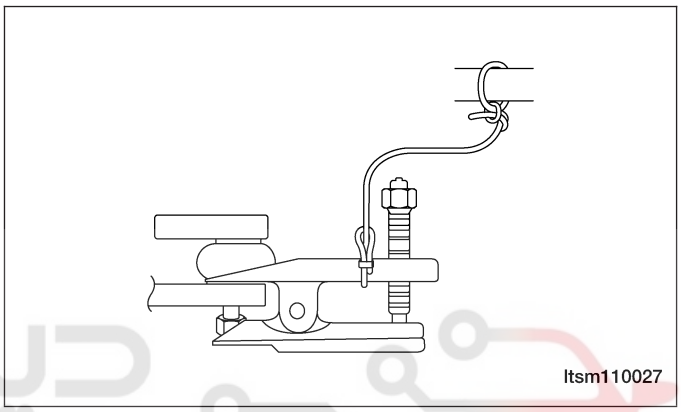
10. Remove the intermediate shaft coupling bolt (1) at the steering gear.
    (Tighten: Intermediate shaft coupling bolt to 25 - 30 N·m)



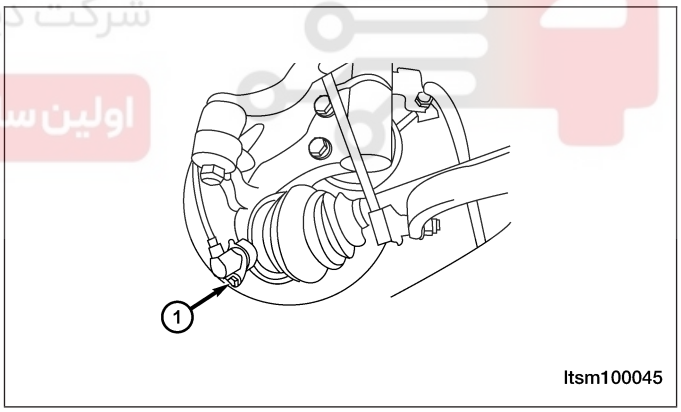
11. On each side of the steering gear, remove the nut (1) attaching the outer tie rod end to the steering knuckle.
(Tighten: Outer tie rod end nut to 32 - 38 N·m)



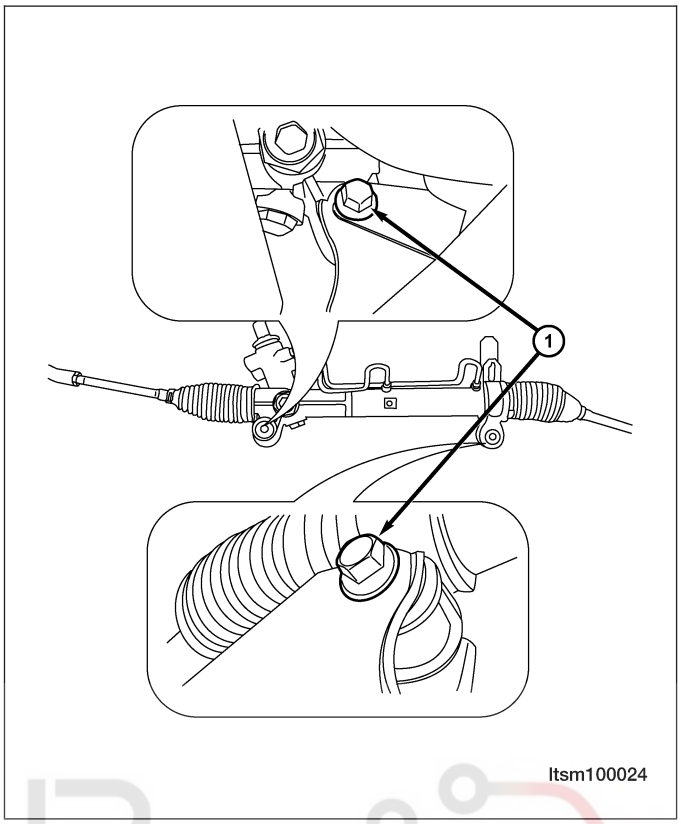
12. Using special tool CH-10002, separate the outer tie rod ends from both steering knuckles.



13. Remove the wheel speed sensor mounting bolt (1).
(Tighten: Wheel speed sensor mounting bolt to 10 ± 1 N·m)
14. Remove the wheel speed sensor and set it aside.



15. Remove the bolts (1) between the steering gear and the sub-frame.
(Tighten: Steering gear and sub-frame bolt to 70 - 80 N·m)



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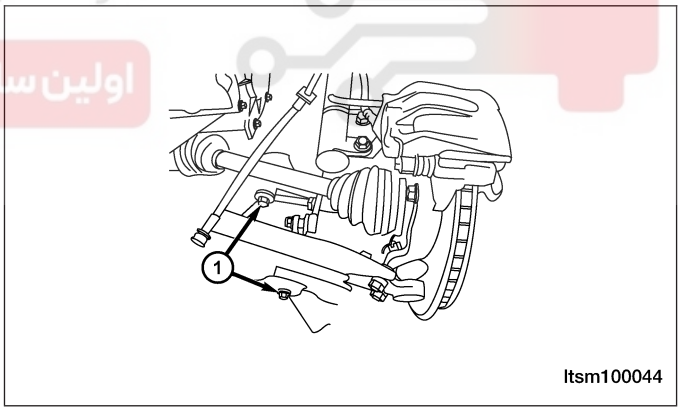
16. Support the engine using a suitable tool.
17. Remove the engine front and rear mounts (See Engine Mounts Removal & Installation in Section 02 Engine).
18. Remove the sub-frame mounting bolts (1) (4 total) between the sub-frame assembly and the vehicle body.
(Tighten: Sub-frame mounting bolts to 180 ± 15 N·m)



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NOTE :
Before removing the front suspension sub-frame from the vehicle, the location of the sub-frame must be marked on the body of the vehicle. Do this so the sub-frame can be relocated, upon reinstallation, against the body of vehicle in the same location as before removal. If the front suspension sub-frame is not reinstalled in exactly the same location as before removal, the preset front wheel alignment settings (caster and camber) may be lost.

19. Using a jack, slowly lower the sub-frame enough to access the intermediate shaft coupling at the steering gear pinion shaft.
20. Remove the steering gear assembly.
21. Installation is in the reverse order of removal.

Installation Notes:

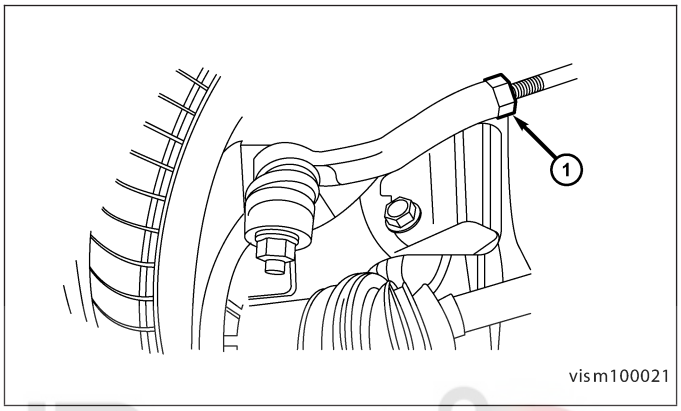
- After installing the new steering gear, perform a front end alignment procedure to reset the toe-in (See Front Wheel Alignment in Section 10 Suspension).

Tie Rod

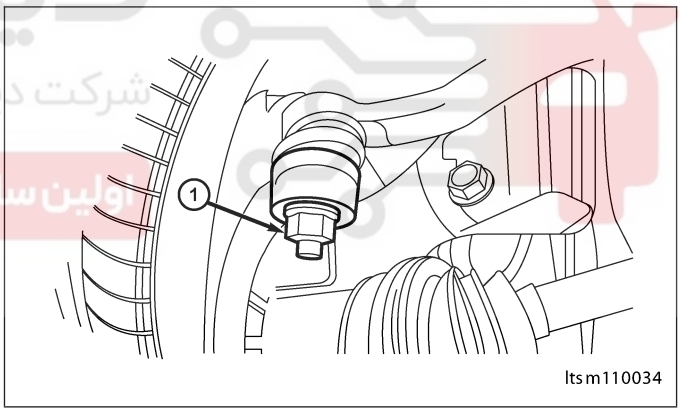
Removal & Installation

NOTE :
The following special tool is required to perform the repair procedure:
- CH-10002 - Ball Joint Separator

1. Raise and support the vehicle.
2. Remove the wheel mounting nuts and the wheel assembly.
   (Tighten: Wheel mounting nuts to 110 N·m)
3. Loosen the tie rod jam nut (1).
   (Tighten: Tie rod jam nut to 15 N·m)



4. Remove the nut (1) attaching the outer tie rod end to the steering knuckle.
   (Tighten: Outer tie rod end nut to 32 - 38 N·m)



5. Using special tool CH-10002, separate the outer tie rod end from the steering knuckle.
6. Remove the outer tie rod end from the steering rack.

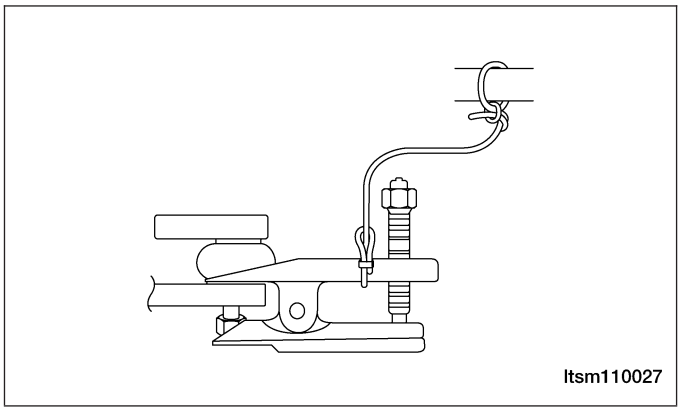
NOTE :
When removing the outer tie rod end, count the number of revolutions when removing. This will aid in installation, getting the toe setting close to where it needs to be when setting the final toe-in wheel alignment.

7. Installation is in the reverse order of removal.

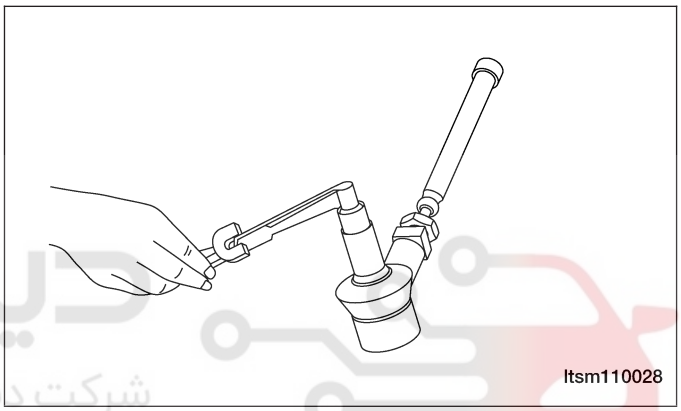
Installation Notes:
- After installing the new tie rod end, perform a front end alignment procedure to reset the toe-in (See Front Wheel Alignment in Section 10 Suspension).

Inspection

1. Use special tool CH-10002 to disconnect the steering tie rod from the knuckle.



2. When the starting torque exceeds the standard value, replace the steering tie rod end.
   - Standard value: 0.98 - 3.92 N·m
3. When the starting torque is less than the standard value, inspect the ball joint for excessive play or wear problem. If there is no problem found, the ball joint can be used.



POWER STEERING PUMP

GENERAL INFORMATION

Description

The power steering pump is a constant flow rate and displacement vane type pump. The pump reservoir is detached from the pump body. The pump is connected to the steering gear by the pressure and return lines.

Operation

The power steering pump is mounted to the engine and driven by the engine accessory drive belt. Power steering fluid enters the pump from the reservoir. The power steering fluid is then trapped between the pump vanes and moved to the high-pressure side of the pump creating a flow of steering fluid. The restriction of this flow by the steering gear creates the pressure that provides the steering assist.

CAUTION:

- **Operating the power steering with a low steering fluid level will damage the power steering system.**
- **Holding the steering wheel in the full lock position for more than 3 seconds will damage the power steering system.**

Specifications

Torque Specifications

DESCRIPTION	TORQUE (N·m)
Power Steering Pressure Line To Steering Gear	27 - 33
Power Steering Return Line To Steering Gear	27 - 33
Power Steering Pressure Line To Power Steering Pump	40 - 50
Power Steering Pump Mounting Bolts	20 - 30
Pressure/Return Hose Routing Clamp Screws To Cross Member	10 - 15

Fluid Specifications

DESCRIPTION	CAPACITY (L)
Power Steering Fluid (ATF III)	1.1

DIAGNOSIS & TESTING

Steering System Noise Troubleshooting Chart

CONDITION	POSSIBLE CAUSES	CORRECTION
Hiss Or Whistle Sound When Turning Steering Wheel	· Steering intermediate shaft to dash panel seal. · Noisy valve in power steering gear.	· Check and repair seal at dash panel. · Replace steering gear.
Rattle Or Clunk	· Gear mounting bolts loose. · Loose or damaged suspension components. · Loose or damaged steering linkage. · Internal gear noise. · Pressure hose in contact with other components.	· Tighten bolts to specification. · Inspect and repair suspension. · Inspect and repair steering linkage. · Replace gear. · Reposition hose.
Chirp Or Squeal	· Loose belt. · Belt routing.	· Adjust or replace. · Verify belt routing is correct.
Whine Or Growl	· Low fluid level. · Pressure hose in contact with other components. · Internal pump noise. · Air in the system.	· Fill to proper level. · Reposition hose. · Replace pump. · Perform pump initial operation.
Sucking Air Sound	· Loose return line clamp. · O-ring missing or damaged on hose fitting. · Low fluid level. · Air leak between pump and reservoir.	· Replace clamp. · Replace O-ring. · Fill to proper level. · Repair if necessary.
Scrubbing Or Knocking	· Wrong tire size. · Wrong gear.	· Verify tire size. · Verify gear.

Insufficient Assist / Poor Return To Center Troubleshooting Chart

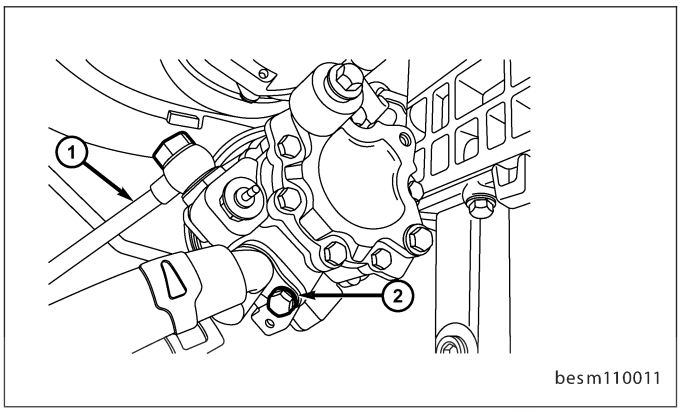
CONDITION	POSSIBLE CAUSES	CORRECTION
Hard Turning Or Momentary Increase In Turning Effort	· Tire pressure. · Low fluid level. · Loose belt. · Lack of lubrication. · Low pump pressure or flow. · Internal gear leak. · Belt routing.	· Adjust tire pressure. · Fill to proper level. · Adjust or replace. · Inspect and lubricate steering and suspension components. · Pressure and flow test and repair if necessary. · Pressure and flow test, and repair if necessary. · Verify belt routing is correct.
Steering Wheel Does Not Want To Return To Center Position	· Tire pressure. · Wheel alignment. · Lack of lubrication. · High friction in steering gear. · Ball joints binding.	· Adjust tire pressure. · Align front end. · Inspect and lubricate steering and suspension components. · Test and adjust if necessary. · Inspect and repair if necessary.

ON-VEHICLE SERVICE

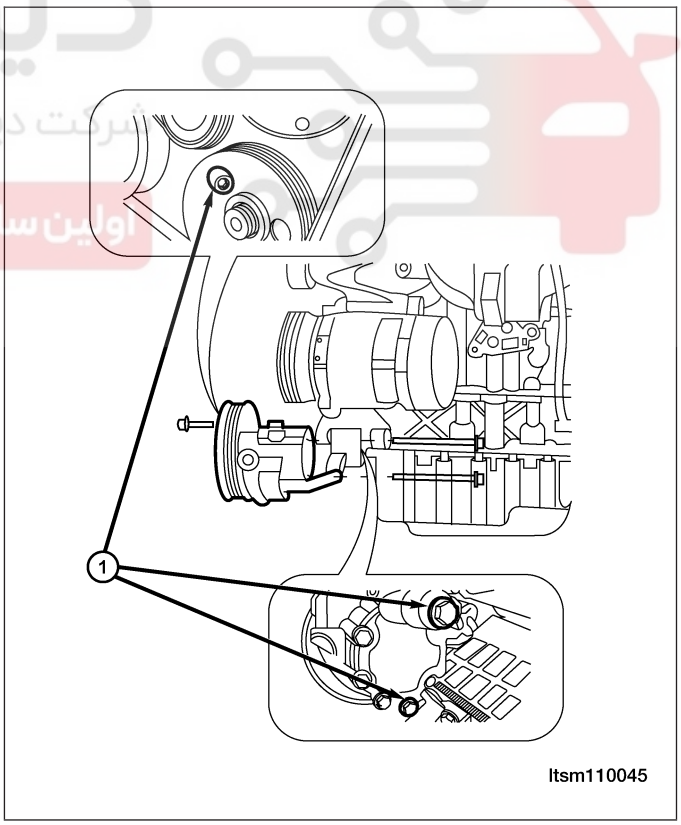
Power Steering Pump - 1.6L & 1.8L & 2.0L

Removal & Installation

1. Siphon as much steering fluid as possible from the power steering fluid reservoir.
2. Raise and support the vehicle.
3. Remove the engine cover.
4. Remove the drive belt (See Accessory Drive Belt Removal & Installation in Section 02 Engine).
5. Remove the high pressure (1) and low pressure lines (2) from the power steering pump (drain steering fluid from lines).
   (Tighten: High pressure line to power steering pump 40 - 50 N·m)
   (Tighten: Low pressure line to power steering pump 40 - 50 N·m)



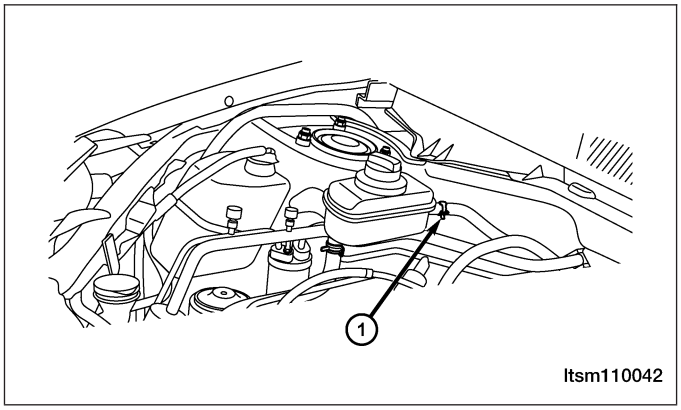
6. Remove the three power steering pump mounting bolts (1).
   (Tighten: Power steering pump bolts to 20 - 30 N·m)
7. Remove the power steering pump.
8. Installation is in the reverse order of removal.



Power Steering Pump - 2.4L

Removal & Installation

1. Siphon out as much power steering fluid as possible from the reservoir.
2. Raise and support the vehicle.
3. Remove the return hose clamp (1) from the steering liquid reservoir and insert the end of the hose into a container.



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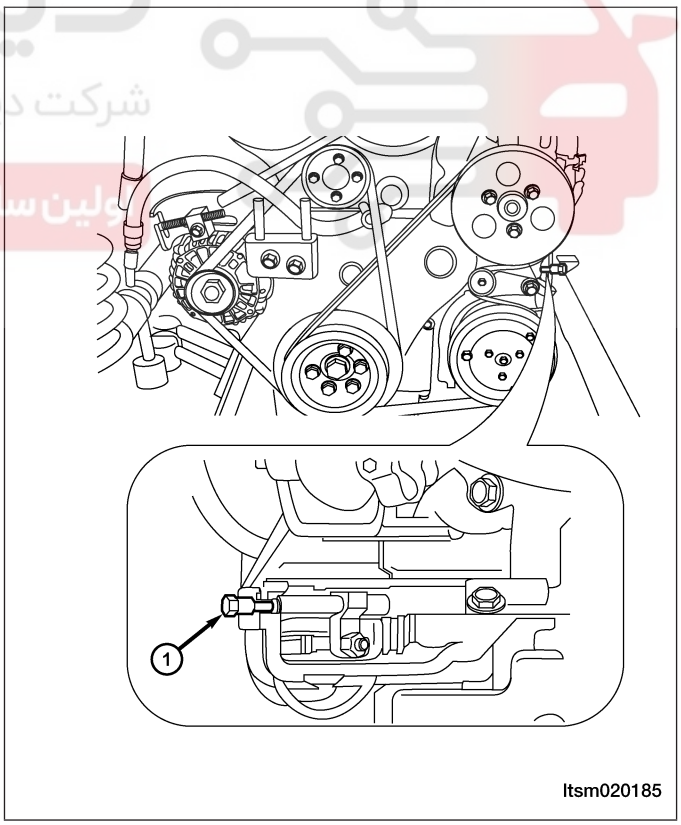
4. Start the engine and turn the steering wheel from lock-to-lock until all power steering fluid has been drained from the system.
5. Stop the engine.
6. Remove the engine lower shield.
7. Loosen the power steering pump belt adjustment bolt (1).



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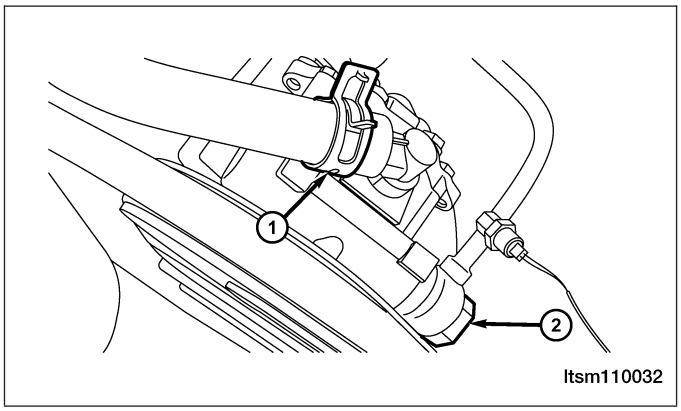
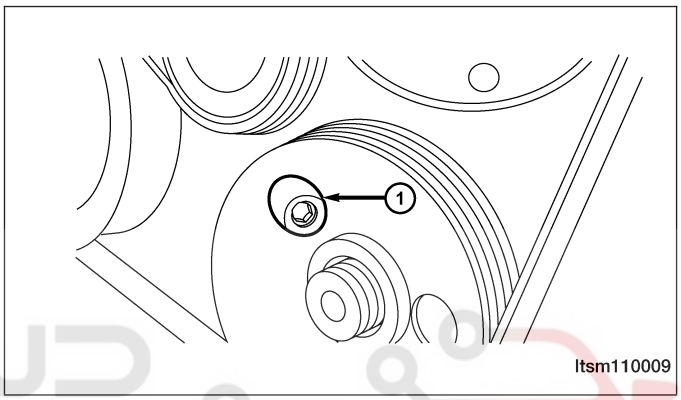
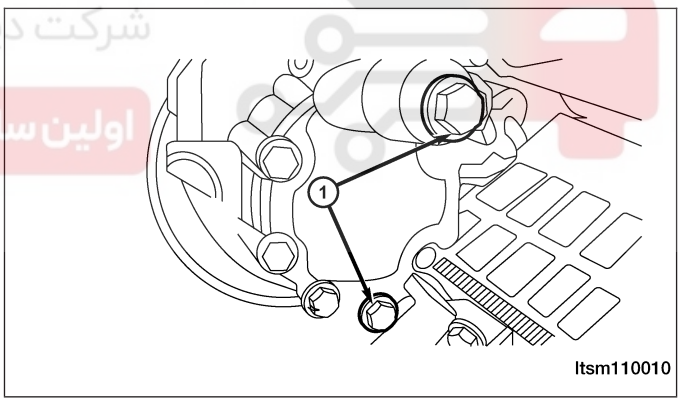
8. Remove the power steering pump inlet hose clamp (1), and then remove the pump inlet hose.
9. Remove the pump outlet pipe bolt (2).



10. Rotate the steering pump pulley until the bolt (1) access hole lines up with the bolt.
11. Remove the power steering pump retaining bolt. (Tighten: Power steering pump bolt to 20 - 30 N·m)



12. Remove the two bolts (1) on the other side of the power steering pump. (Tighten: Power steering pump bolts to 20 - 30 N·m)



13. Remove the steering pump from the engine bracket.
14. Installation is in the reverse order of removal.

Installation Notes:

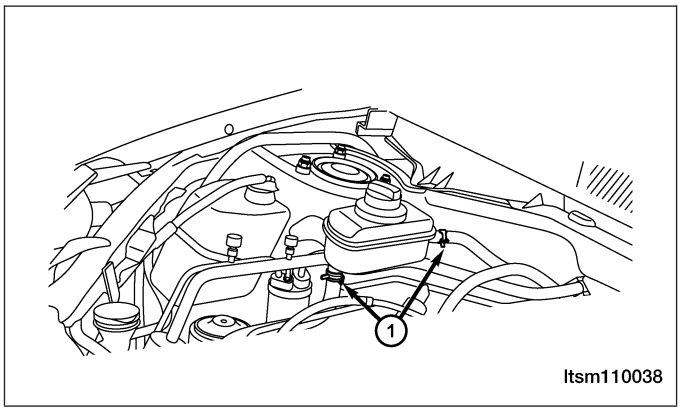
- Fill the power steering reservoir to the proper level.
- Check the system for leaks.

Power Steering Fluid Reservoir

Removal & Installation

1. Siphon as much steering fluid as possible from the power steering fluid reservoir.

2. Remove the hose clamps (1) securing the return hose and the supply hose to the steering fluid reservoir fitting.



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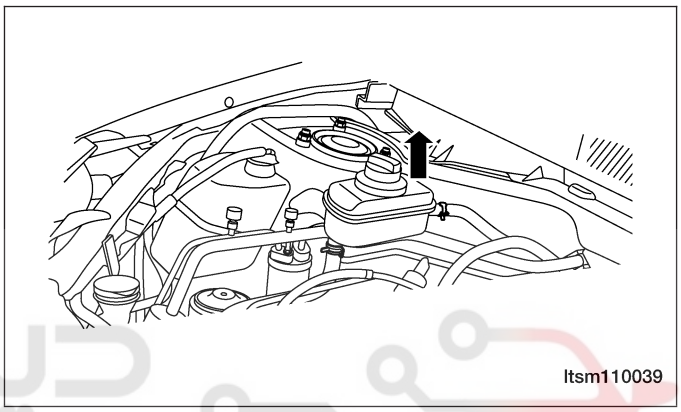
3. Slide the hose off the end of the reservoir fitting and remove the steering fluid reservoir.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4. Installation is in the reverse order of removal.

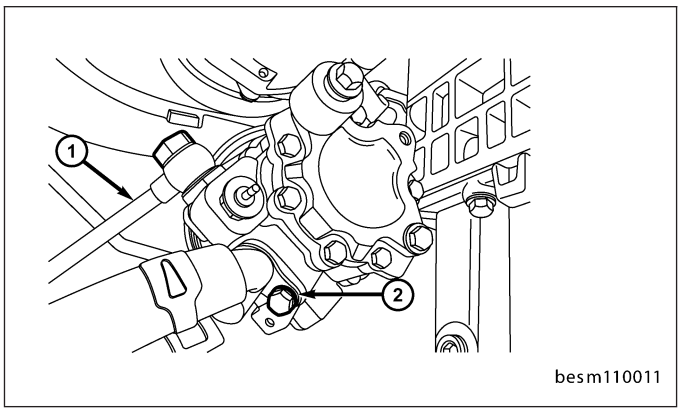
Installation Notes:

- Fill the power steering reservoir to the proper level.
- Check the system for leaks.

Power Steering Pressure and Return Lines - 1.6L & 1.8L & 2.0L

Removal & Installation

1. Siphon as much steering fluid as possible from the power steering fluid reservoir.
2. Remove the engine cover.
3. Remove the hose clamps securing the return hose and the supply hose to the steering fluid reservoir fitting.
4. Remove the high pressure (1) and low pressure lines (2) from the power steering pump (drain steering fluid from lines).
   (Tighten: High pressure line to power steering pump 40 - 50 N·m)
   (Tighten: Low pressure line to power steering pump 40 - 50 N·m)



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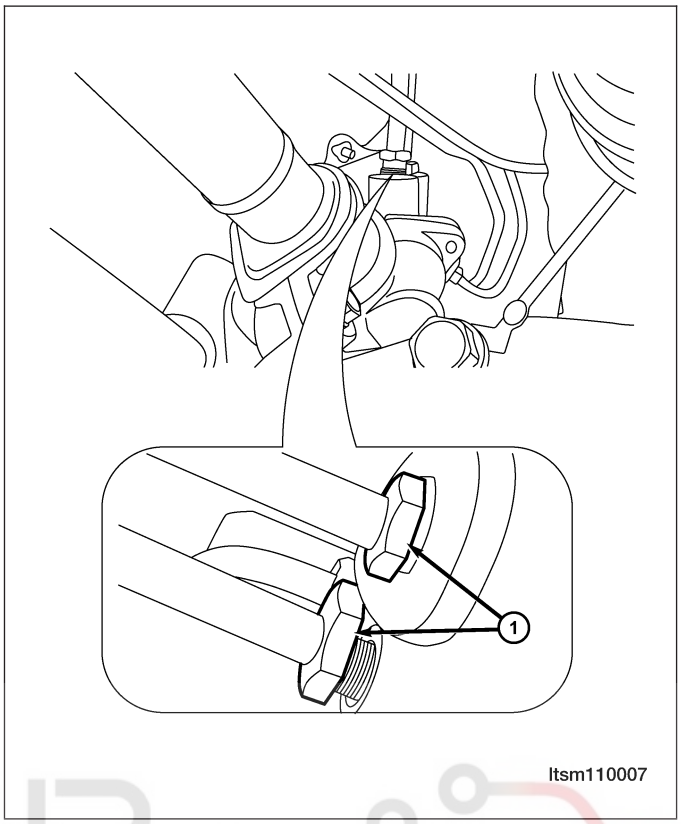
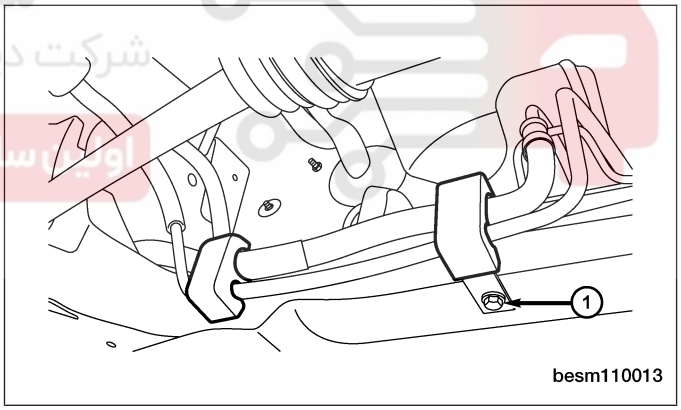
5. Remove the high pressure and low pressure lines (1) from the steering gear (drain steering fluid from lines).
   (Tighten: High pressure line to power steering pump 27 - 33 N·m)
   (Tighten: Low pressure line to power steering pump 27 - 33 N·m)



6. Remove the power steering line clamp bracket bolt (1) from the pressure and return lines.
   (Tighten: Power steering line clamp bracket bolt to 10 N·m)



7. Remove the pressure and return lines.
8. Installation is in the reverse order of removal.

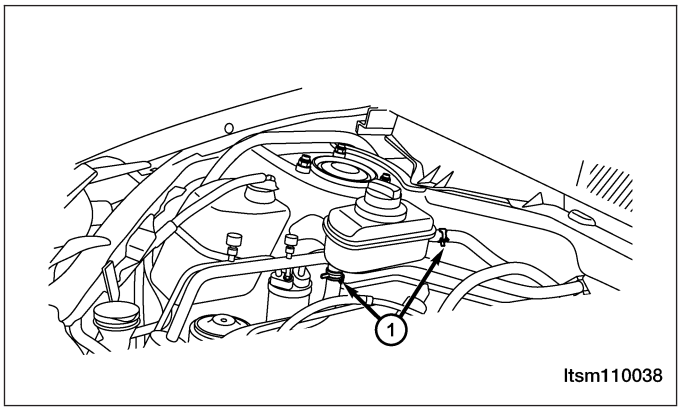
Installation Notes:

- Fill the power steering reservoir to the proper level.
- Check the system for leaks.

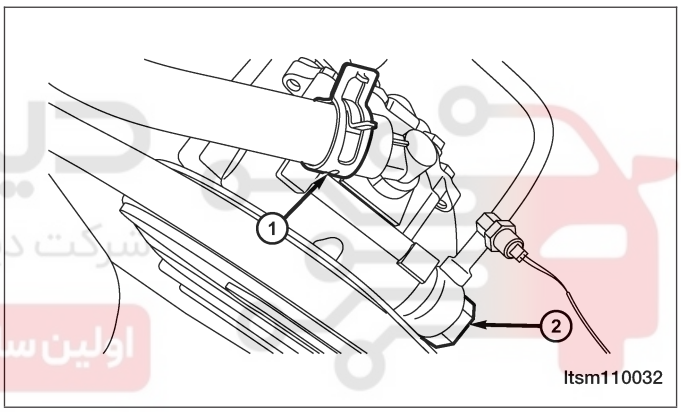
Power Steering Pressure and Return Lines - 2.4L

Removal & Installation

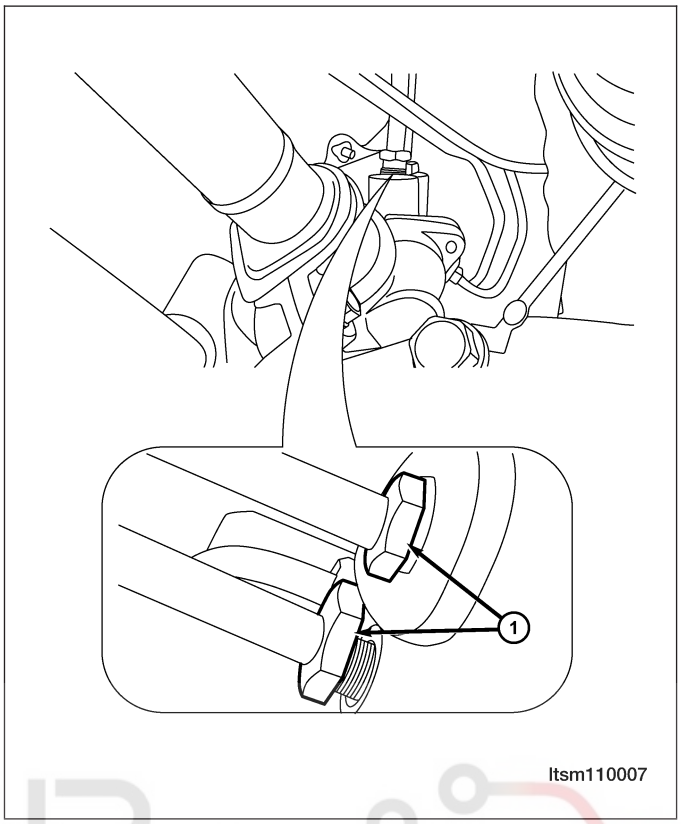
1. Siphon as much steering fluid as possible from the power steering fluid reservoir.
2. Remove the hose clamps (1) securing the return hose and the supply hose to the steering fluid reservoir fitting.



3. Remove the pressure and return hoses.
4. Disconnect the power steering switch electrical connector.
5. Remove the bolt (2) from the pressure line and remove the clamp (1) from the return hose.



6. Remove the high pressure and low pressure lines (1) from the steering gear.
   (Tighten: High pressure line to steering gear 27 - 33 N·m)
   (Tighten: Low pressure line to steering gear 27 - 33 N·m)



7. Installation is in the reverse order of removal.

Installation Notes:

- Fill the power steering reservoir to the proper level.
- Check the system for leaks.