

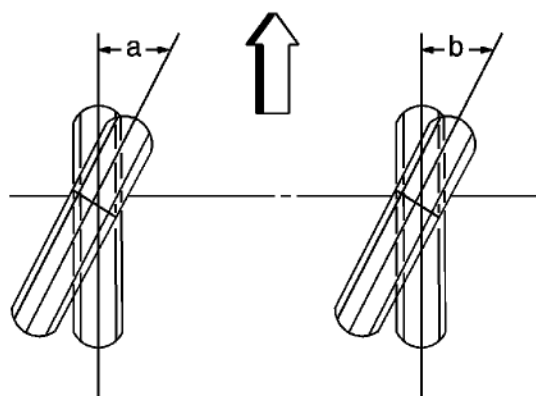
Fastener Tightening Specifications

Application	Specification	
	Metric	English
Adjuster Plug	12 N·m	106 lb in
Adjuster Plug Locknut (Tighten)	70 N·m	52 lb ft
Adjuster Plug Locknut (Loosen)	10 N·m	88 lb in
Air Cleaner Housing Bolts	12 N·m	106 lb in
Alternator Adjusting Bolts	20 N·m	15 lb ft
Ball Joint Hex Nut	45 N·m	33 lb ft
Crossmember to Underbody Nut	150 N·m	111 lb ft
Outer Tie Rod Nuts	54 N·m	40 lb ft
Outer Tie Rod Hex Nut	45 N·m	33 lb ft
Pinion Locknut	30 N·m	22 lb ft
Pinion Preload	0.9-1.7 N·m	8-15 lb in
Power Steering Fluid Reservoir Attaching Bolts	7 N·m	62 lb in
Power Steering Line Fittings-Cylinder End	28 N·m	21 lb ft
Power Steering Line Fittings-Valve End	18 N·m	13 lb ft
Power Steering Pump Pressure Line Union Nut	28 N·m	21 lb ft
Power Steering Pump Pulley Bolts	25 N·m	18 lb ft
Power Steering Pump Retaining Bolts	25 N·m	18 lb ft
Stabilizer Shaft to Knuckle Bolts	45 N·m	33 lb ft
Steering Gear Inlet and Outlet Fitting Nuts	28 N·m	21 lb ft
Steering Gear Inlet Pipe Fittings	28 N·m	21 lb ft
Steering Gear Outlet Pipe Fittings	22 N·m	16 lb ft
Steering Gear Retaining Bracket Nuts	50 N·m	37 lb ft
Steering Gear Yoke Plug	5 N·m - 45°	44 lb in - 45°
Steering Gear Yoke Plug Lock Nut	44 N·m	32 lb ft
Tie Rod	100 N·m	75 lb ft

Straight Ahead Inspection

Inspection Procedure

1. After completing all the necessary procedures on the steering gear, inspect the position of the front wheels and the steering wheel.
2. With the vehicle on the floor, place the steering wheel in the straight-ahead position.
3. Mark the centerline of the front tires on the floor.
4. Turn the steering wheel all the way to the right.
5. Mark the new centerline of the front tires on the floor.
6. Measure the turning angle of each tire.



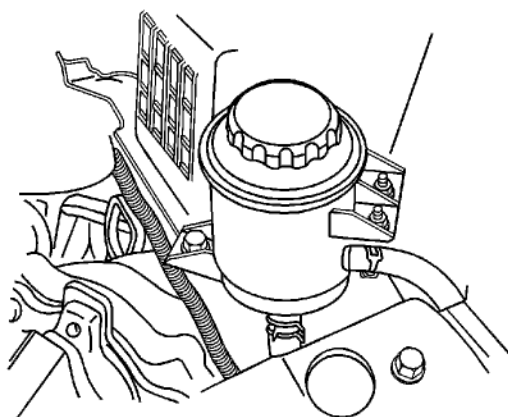
7. Compare the measurements to the specifications.

Specifications

- The outside angle (a) is 34 degrees $\pm$ 1 degree 30 minutes.
- The inside angle (b) is 39 degrees 5 minutes $\pm$ 1 degree 30 minutes.

Power Steering System Bleeding

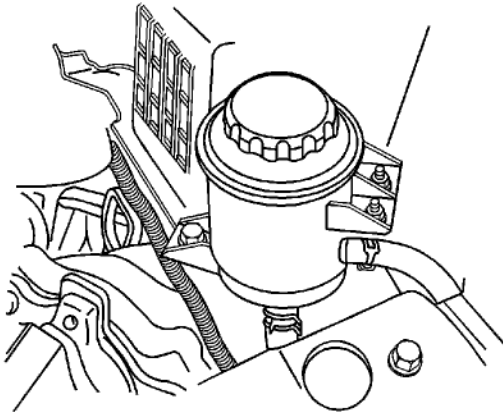
Notice: Refer to [Air in the Power Steering System Notice](#) in the Preface section.



Notice: When adding fluid or making a complete fluid change, always use a power steering fluid meeting GM Spec. No. 9985010 or equivalent. Fluid for cold climates is also available through GM Dealerships; refer to Specifications for further information. Failure to use the proper power steering fluid can cause power steering hose and seal damage, fluid leaks and pump failure.

1. Turn the wheels all the way to the left and add the power steering fluid to the MIN mark on the fluid level indicator.
2. Start the engine. With the engine running at fast idle, recheck the fluid level. If necessary, add fluid to bring the level up to the MIN mark.
3. Bleed the system by turning the wheels from side to side without reaching the stop at either end. Keep the fluid level at the MIN mark. The air must be eliminated from the fluid before normal steering action can be obtained.
4. Return the wheels to the center position. Continue running the engine for 2-3 minutes.
5. Road test the car to be sure the steering functions normally and is free from noise.
6. Recheck the fluid level. Ensure the fluid level is at the MAX mark after the system has stabilized at its normal operating temperature. Add fluid if necessary.

Checking and Adding Power Steering Fluid

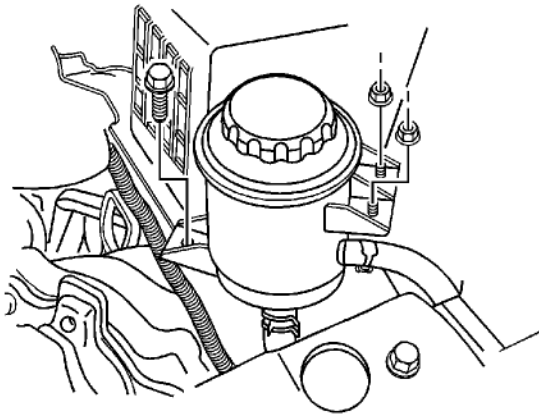


Notice: When adding fluid or making a complete fluid change, always use a power steering fluid meeting GM Spec. No. 9985010 or equivalent. Fluid for cold climates is also available through GM Dealerships; refer to Specifications for further information. Failure to use the proper power steering fluid can cause power steering hose and seal damage, fluid leaks and pump failure.

1. The power steering fluid level is indicated either by marks on a see-through fluid reservoir or by marks on a fluid level indicator on the fluid reservoir cap.
2. If the fluid is warmed up to 66°C (150°F), the fluid level should be between the MAX and MIN marks. Add fluid if necessary.
3. If the fluid is cool, 21°C (70°F), the fluid level should be at the MIN mark. Add fluid if necessary.

Power Steering Fluid Reservoir Replacement

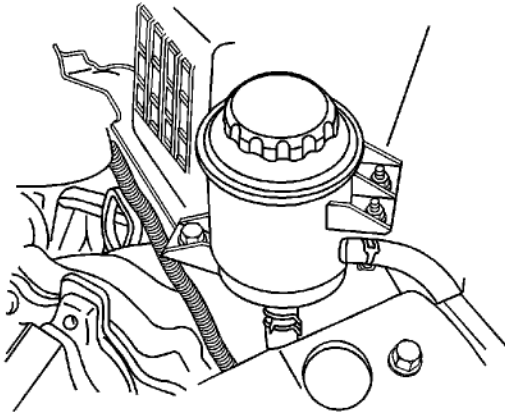
Removal Procedure



1. Siphon the power steering fluid from the fluid reservoir.
2. Loosen the hose clamps and remove both hoses.
3. Plug the hoses in order to prevent contaminants from entering the power steering system.
4. Remove the fluid reservoir attaching bolts and remove the fluid reservoir.

Installation Procedure

Notice: Refer to [Fastener Notice](#) in the Preface section.



1. Attach the fluid reservoir with the power steering fluid reservoir attaching bolts.

Tighten

Tighten the power steering fluid reservoir attaching bolts to 7 N·m (62 lb in).

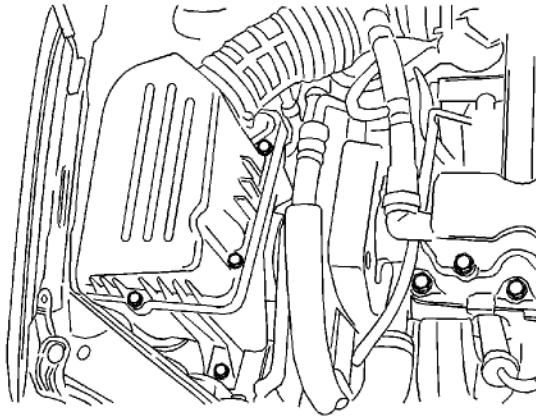
2. Connect both hoses and secure the hose clamps.

Notice: When adding fluid or making a complete fluid change, always use a power steering fluid meeting GM Spec. No. 9985010 or equivalent. Fluid for cold climates is also available through GM Dealerships; refer to Specifications for further information. Failure to use the proper power steering fluid can cause power steering hose and seal damage, fluid leaks and pump failure.

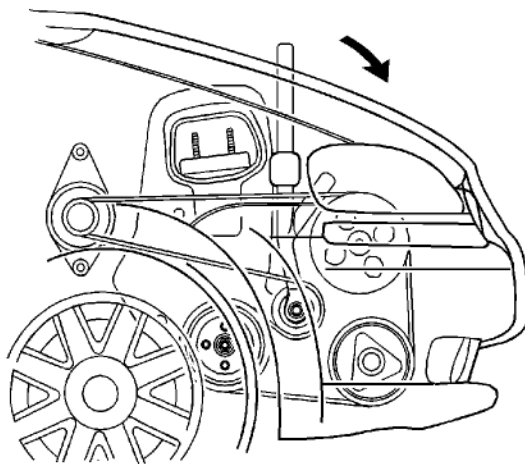
3. Fill the fluid reservoir with power steering fluid.
4. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to [Power Steering System Bleeding](#) .

Power Steering Pump Replacement (1.4L Engine)

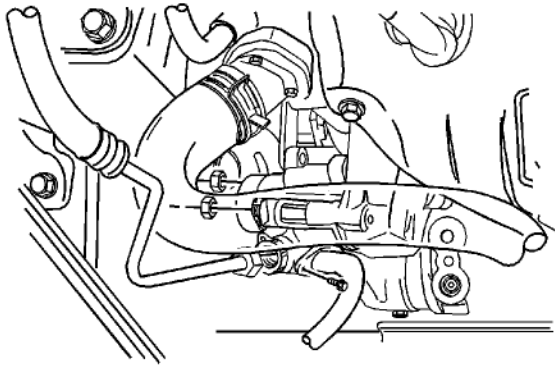
Removal Procedure



1. Remove the air cleaner housing by removing the housing bolts and loosening the clamp.



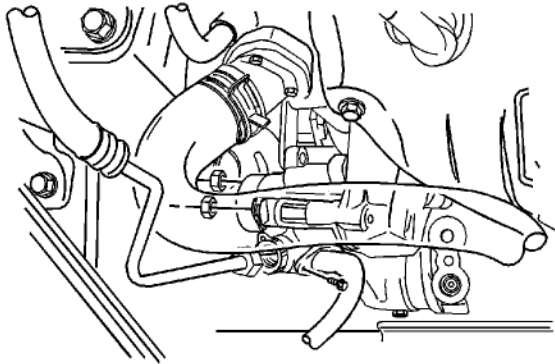
2. Remove the pump drive belt from the pulley by moving the autotensioner.



3. Drain the power steering fluid by disconnecting the pressure and supply lines from the pump.
4. Remove the pump assembly by removing the steering pump retaining nuts.

Installation Procedure

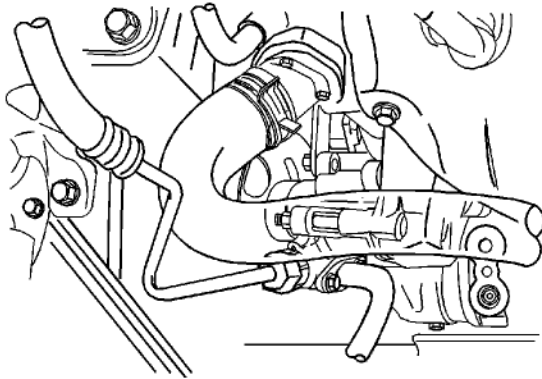
Notice: Refer to [Fastener Notice](#) in the Preface section.



1. Install the pump to the A/C compressor bracket and tighten the steering pump retaining nuts.

Tighten

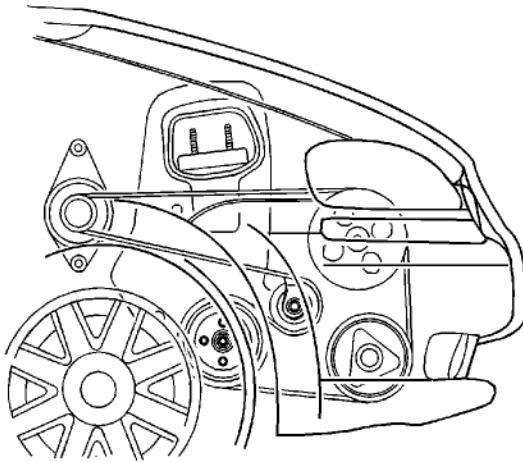
Tighten the steering pump retaining nuts to 25 N·m (18 lb ft).



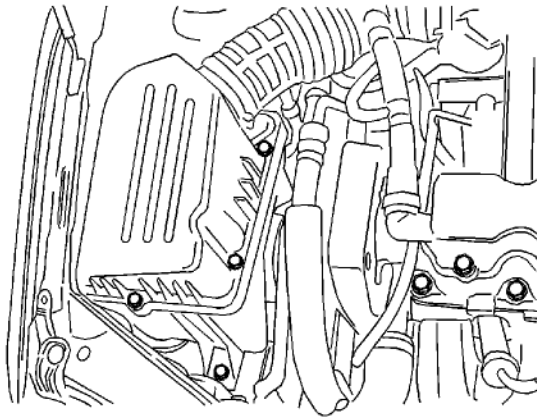
2. Connect the pressure and supply lines to the power steering pump.

Tighten

Tighten the pressure line union nut to 28 N·m (21 lb ft).



3. Install the pump drive belt onto the pulley by moving the autotensioner.



4. Install the air cleaner housing with the housing bolts and the clamp.

Tighten

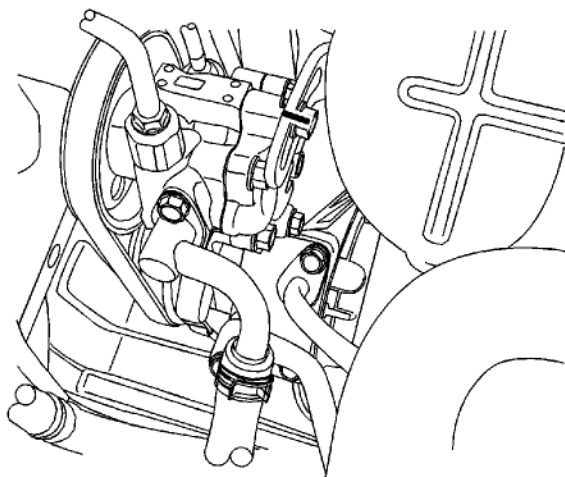
Tighten the air cleaner housing bolts to 12 N·m (106 lb in).

Notice: Refer to [Using Proper Power Steering Fluid Notice](#) in the Preface section.

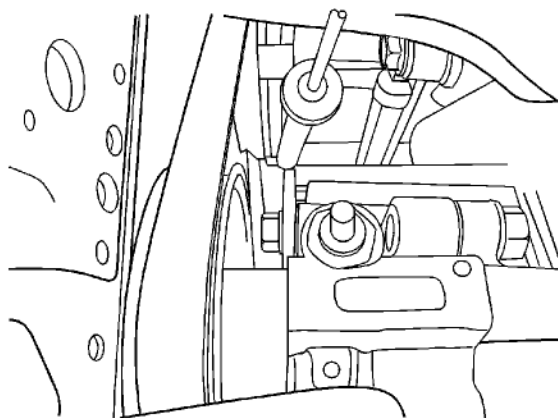
5. Refill the pump with new fluid and bleed the air from the system. Refer to [Power Steering System Bleeding](#)
6. Inspect for leaks. If leaks are found, correct the cause of the leak and bleed the system.

Power Steering Pump Replacement (1.2L Engine)

Removal Procedure



1. Use paint in order to place match marks on the pump and on the rear shackle.
2. Drain the power steering fluid by disconnecting the pressure and supply lines from the pump.
3. Remove the rear shackle bolt.
4. Remove the pump retaining bolt.
5. Disconnect the pressure switch connector.



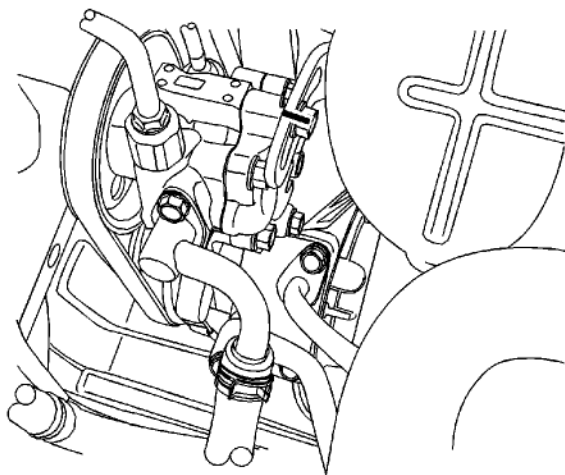
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6. Remove the front shackle bolt.
7. Remove the pump assembly.

Installation Procedure

1. Position the pump assembly in the vehicle.

Notice: Refer to [Fastener Notice](#) in the Preface section.



2. Loosely install the rear shackle bolt.
3. Loosely install the pump retaining bolt.
4. Position the belt on the pump pulley.
5. Align the match marks and adjust the tension on the belt.
6. Tighten the rear shackle bolt.

Tighten

Tighten the rear shackle bolt to 22 N·m (16 lb ft).

7. Tighten the pump retaining bolt.

Tighten

Tighten the pump retaining bolt to 22 N·m (16 lb ft).

8. Install the front shackle bolt.

Tighten

Tighten the front shackle bolt to 20 N·m (15 lb ft).

9. Connect the pressure and supply lines to the pump.

Tighten

Tighten the pressure line union nut to 28 N·m (21 lb ft).

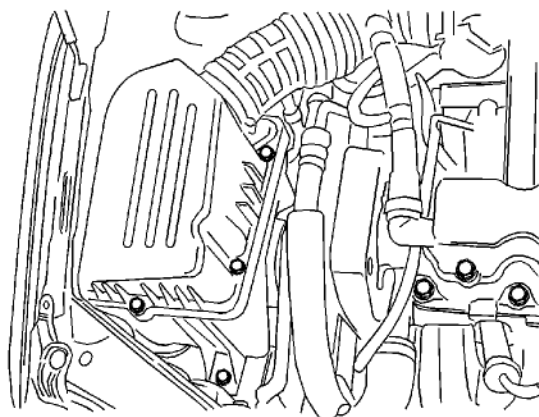
10. Connect the pressure switch connector.

Notice: Refer to [Using Proper Power Steering Fluid Notice](#) in the Preface section.

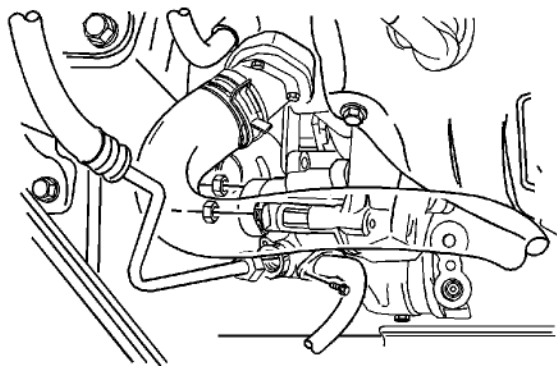
11. Refill the pump with new fluid and bleed the air from the system. Refer to [Power Steering System Bleeding](#).
12. Inspect for leaks. If leaks are found, correct the cause of the leaks and bleed the system.

Power Steering Pump Replacement (1.6L Engine)

Removal Procedure



1. Remove the air cleaner housing by removing the housing bolts and loosening the clamp.



2. Drain the power steering fluid by disconnecting the pressure and supply lines from the pump.
3. Remove the air conditioning A/C compressor. Refer to [Air Conditioning Compressor Replacement](#)
4. Remove the right front wheel. [Tire and Wheel Removal and Installation](#)

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5. Remove the right side engine under cover. [Engine Shield Replacement](#)
6. Remove the A/C compressor mounting bracket.
7. Remove the pump assembly from the A/C compressor mounting bracket by removing the steering pump retaining nuts.

Installation Procedure

Notice: Refer to [Fastener Notice](#) in the Preface section.

1. Install the pump to the A/C compressor bracket and tighten the steering pump retaining nuts.

Tighten

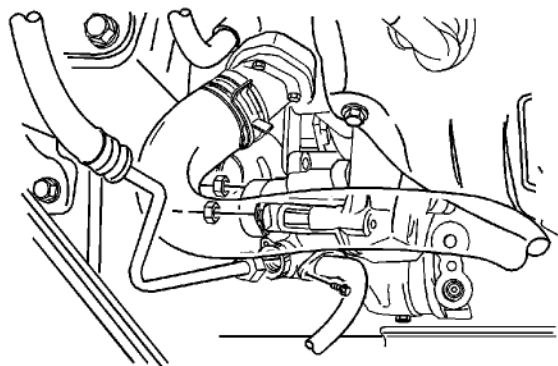
Tighten the steering pump retaining nuts to 25 N·m (18 lb ft).

2. Install the A/C compressor mounting bracket and tighten the bolts to.

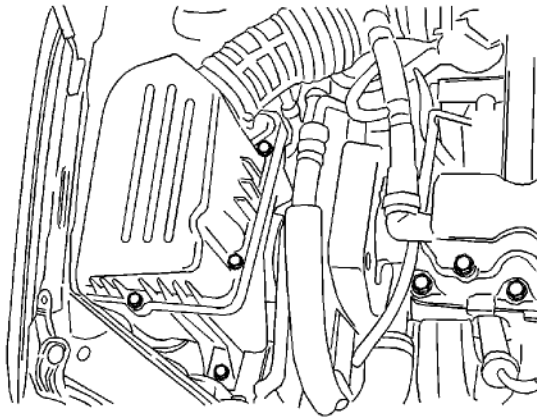
Tighten

Tighten the A/C compressor mounting bracket bolts to 50 N·m (37 lb ft).

3. Install the A/C compressor to the bracket. [Air Conditioning Compressor Replacement](#)
4. Install the right side engine under cover. [Engine Shield Replacement](#)
5. Install the right front tire. [Tire and Wheel Removal and Installation](#)
6. Lower the vehicle.



7. Connect the pressure and supply lines to the power steering pump.



8. Install the air cleaner housing with the housing bolts and the clamp.

Tighten

Tighten the air cleaner housing bolts to 12 N·m (106 lb in).

Notice: Refer to [Using Proper Power Steering Fluid Notice](#) in the Preface section.

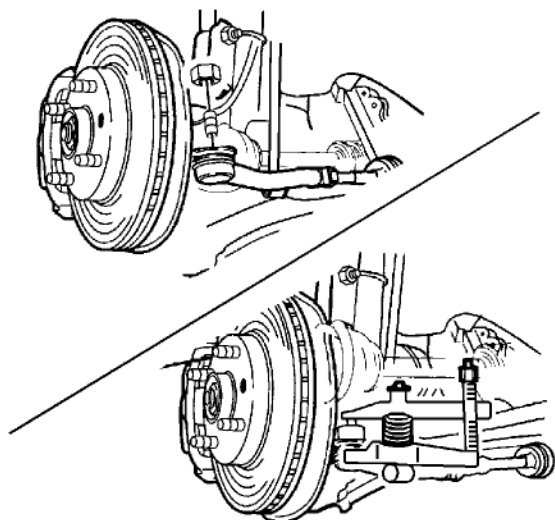
9. Refill the pump with new fluid and bleed the air from the system. Refer to [Power Steering System Bleeding](#)
10. Inspect for leaks. If leaks are found, correct the cause of the leak and bleed the system.

Steering Linkage Outer Tie Rod Replacement

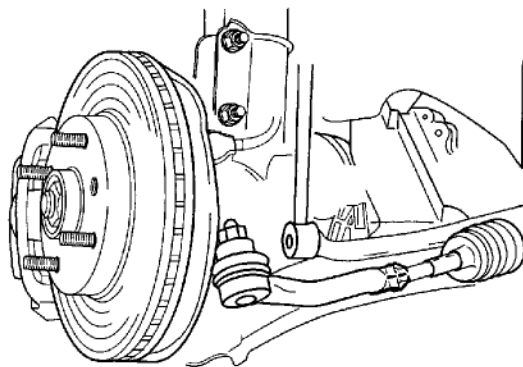
Tools Required

[KM-507-C](#) Ball Joint Remover

Removal Procedure



1. Remove the outer tie rod hex nut and disconnect the outer tie rod from the steering knuckle using the [KM-507-C](#).



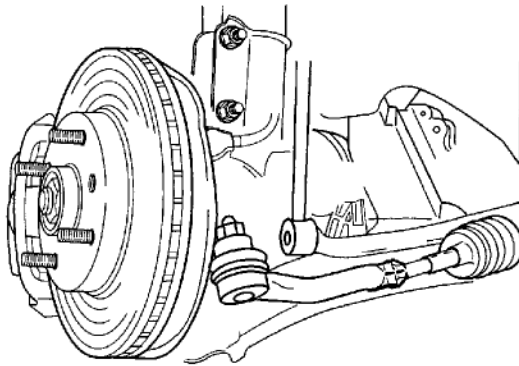


Important: Before loosening the tie rod lock nut, mark the position of the lock nut for easy alignment after the installation procedure.

2. Loosen the tie rod lock nuts and remove the outer tie rod.

Installation Procedure

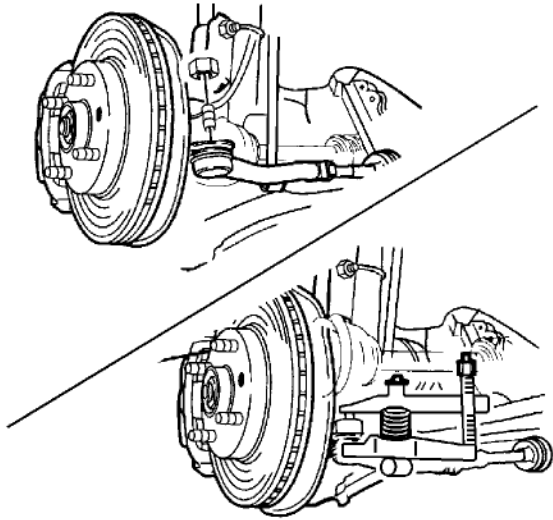
Notice: Refer to [Fastener Notice](#) in the Preface section.



1. Install the outer tie rod with the lock nuts.

Tighten

Tighten the lock nuts to 54 N·m (40 lb ft).



2. Install the outer tie rod with the hex nut.

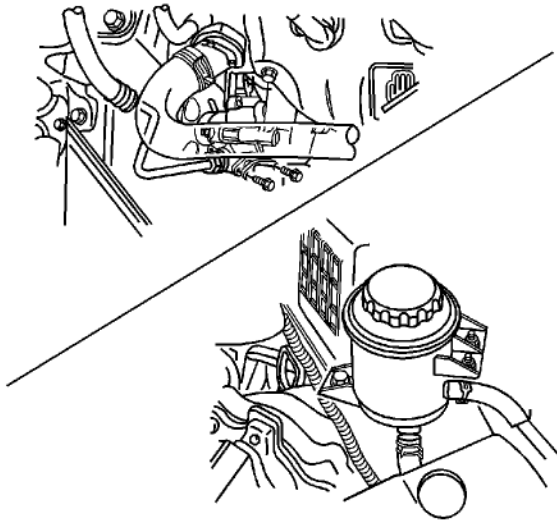
Tighten

Tighten the hex nut to 45 N·m (33 lb ft).

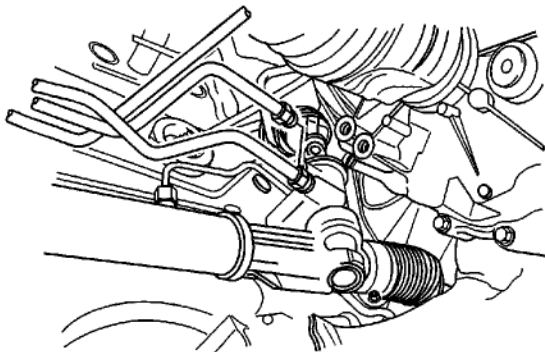
3. Inspect the vehicle. Refer to [Preliminary Alignment Inspection](#) and [Straight Ahead Inspection](#) .
4. Measure the wheel alignment.
5. If necessary, adjust the front toe. Refer to [Front Toe Adjustment](#) .

Power Steering Pump Hoses and Pipes Replacement

Removal Procedure



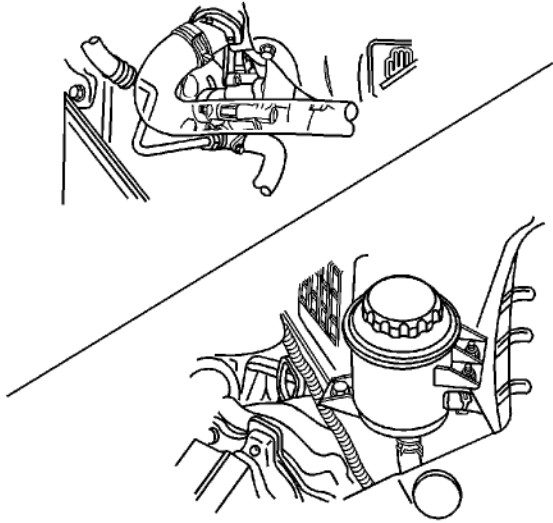
1. Siphon the power steering fluid from the fluid reservoir.
2. Disconnect the pressure line pipe and the supply line hose from the inlet and outlet connections on the power steering pump.
3. Remove the air cleaner housing, if needed.



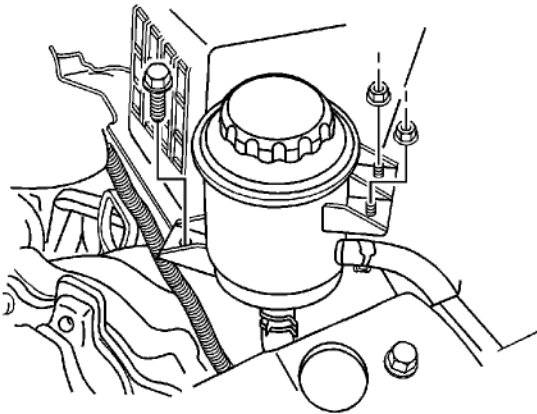
4. Disconnect the pressure line and return line hoses from the retaining clips at the bottom and

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the side of the radiator.

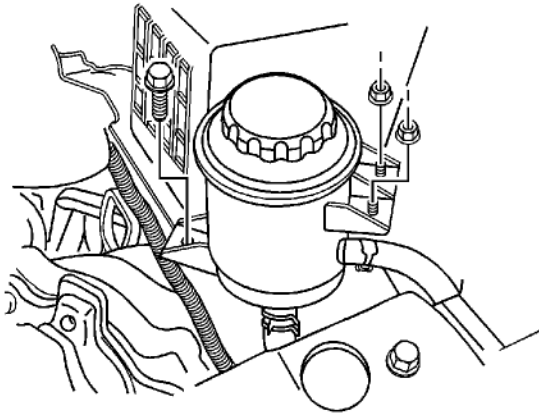


5. Disconnect the pressure line inlet pipe from the steering gear.



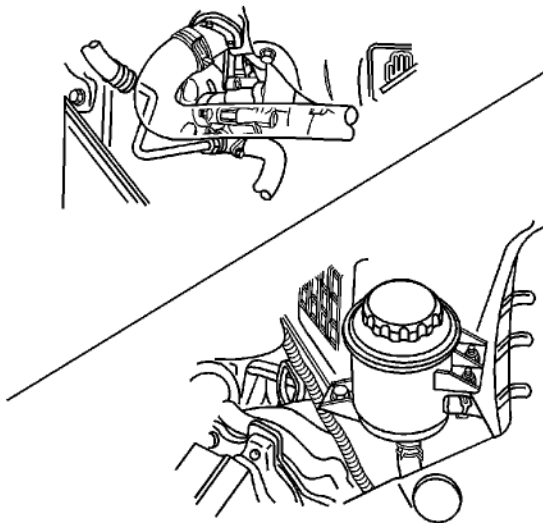
6. Disconnect the supply line hose from the power steering fluid reservoir.
7. Remove the power steering pump pressure line and return line.

Installation Procedure



1. Install the power steering pump pressure line and return line.
2. Connect the supply line hose to the power steering fluid reservoir.

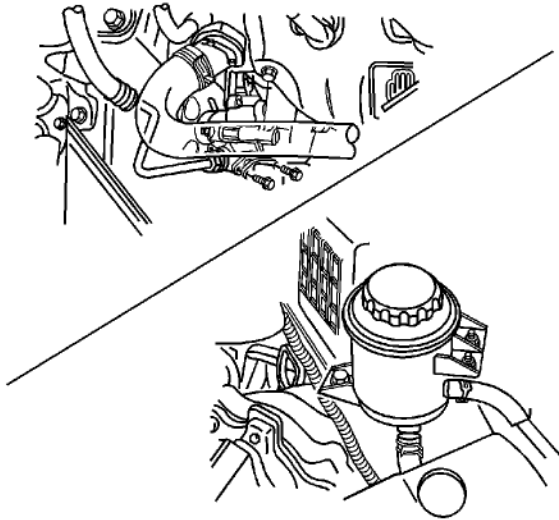
Notice: Refer to [Fastener Notice](#) in the Preface section.



3. Connect the pressure line inlet pipe to the steering gear.

Tighten

Tighten the steering gear inlet pipe fitting to 28 N·m (21 lb ft).



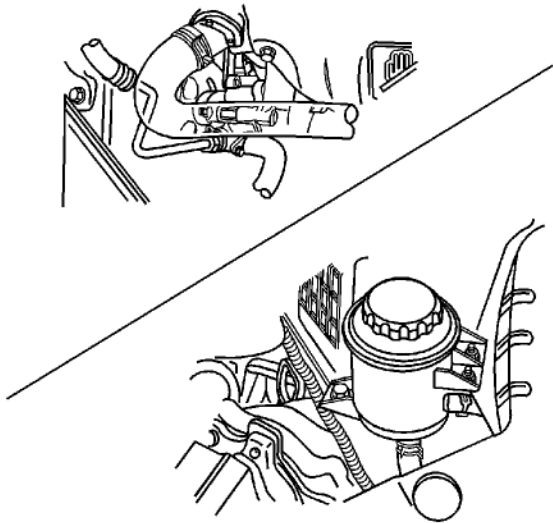
4. Connect the pressure line and return line hoses to the retaining clips at the bottom and the side of the radiator.
5. Connect the pressure line pipe and the supply line hose to the inlet and outlet connections on the power steering pump.
6. On dual overhead cam (DOHC) engines, install the air cleaner housing, if removed.

Tighten

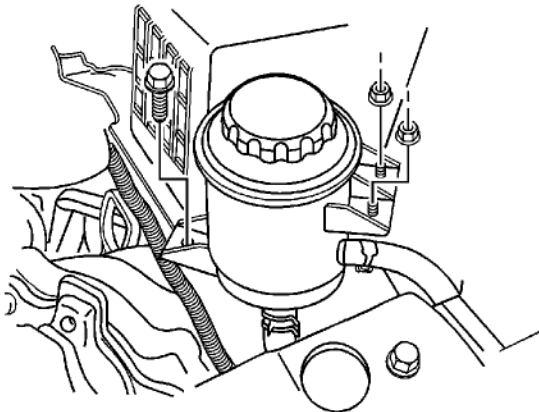
- Tighten the air cleaner housing bolts to 12 N·m (106 lb in).
 - Tighten the power steering pump pressure line union nut to 28 N·m (21 lb ft).
7. Fill the fluid reservoir with power steering fluid.
 8. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to [Power Steering System Bleeding](#).

Power Steering Return Hose Replacement

Removal Procedure



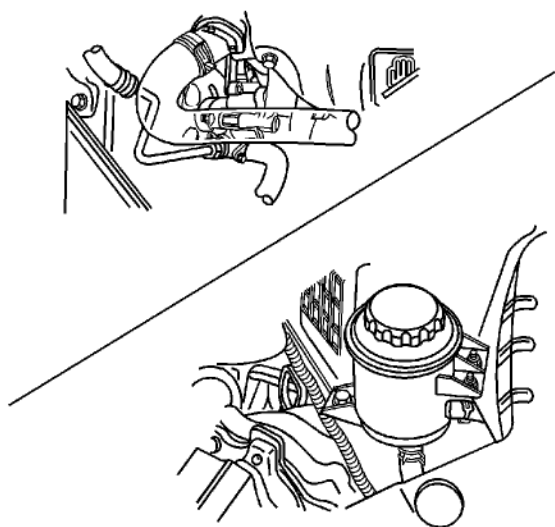
1. Siphon the power steering fluid from the fluid reservoir.
2. Disconnect the return line pipe from the outlet connection at the steering gear.



3. Disconnect the fluid reservoir hose from the fluid reservoir.
4. Remove the fluid reservoir hose.

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Installation Procedure



1. Connect the fluid reservoir hose at the fluid reservoir.

Notice: Refer to [Fastener Notice](#) in the Preface section.

2. Connect the fluid reservoir pipe to the outlet connection at the steering gear.

Tighten

Tighten the steering gear outlet pipe fittings to 28 N·m (21 lb ft).

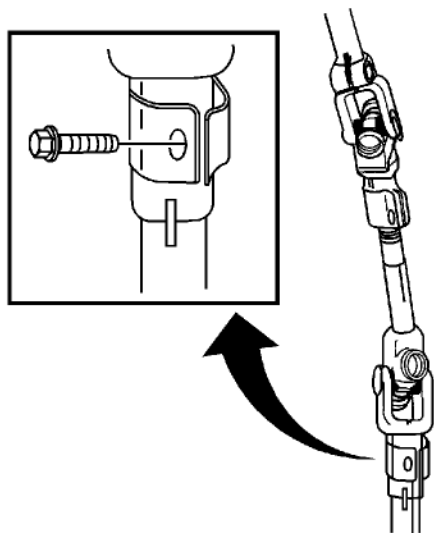
Notice: When adding fluid or making a complete fluid change, always use a power steering fluid meeting GM Spec. No. 9985010 or equivalent. Fluid for cold climates is also available through GM Dealerships; refer to Specifications for further information. Failure to use the proper power steering fluid can cause power steering hose and seal damage, fluid leaks and pump failure.

3. Fill the fluid reservoir with power steering fluid.
4. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to [Power Steering System Bleeding](#).

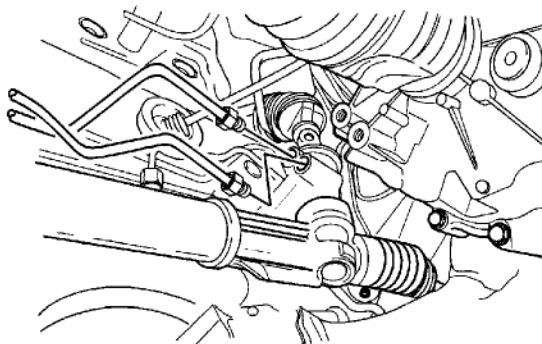
Steering Gear Replacement

Removal Procedure

1. Position the tires in the straight ahead position by turning the steering wheel.

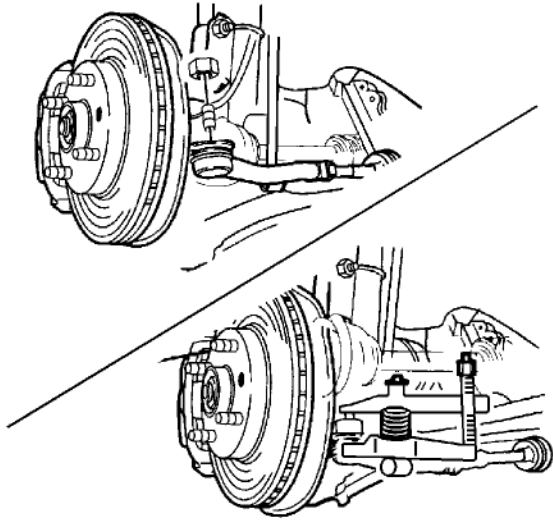


2. Remove the intermediate shaft.

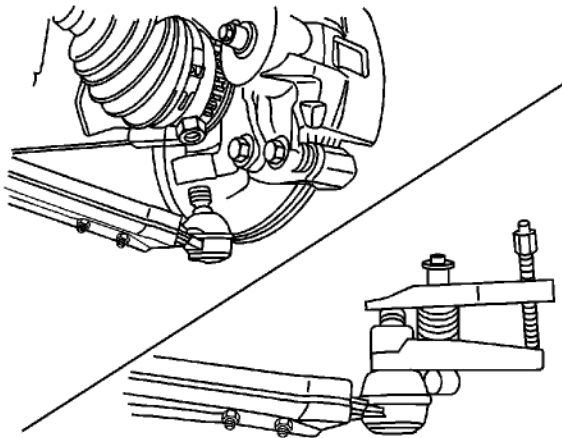


3. Remove the front tire and wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).
4. Drain the power steering fluid from the rack and pinion.
5. Disconnect the steering gear inlet and outlet pipe fittings.

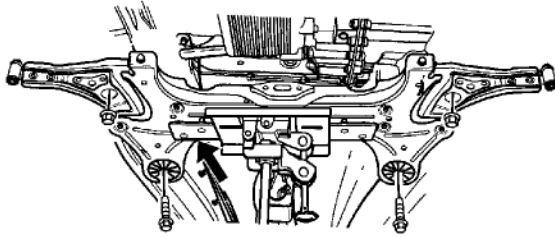
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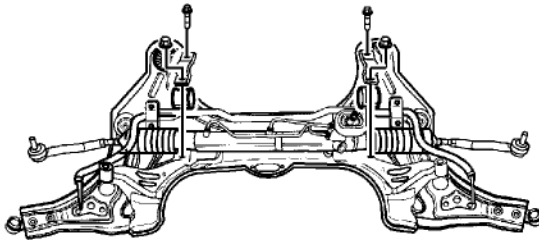
6. Remove the outer tie rod hex nuts. Refer to [Rack and Pinion Outer Tie Rod End Replacement](#) .



7. Remove the ball joint hex nuts and disconnect the stabilizer shaft from the knuckle by removing the stabilizer shaft link assembly. Refer to [Stabilizer Shaft Link Replacement](#) .



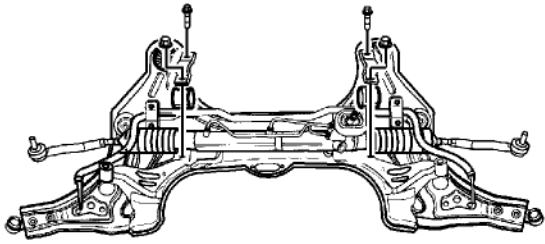
8. Remove the cross member by removing the nuts and bolts to the underbody.



9. Remove the rack and pinion assembly by disconnecting the steering gear retaining bracket nuts.

Installation Procedure

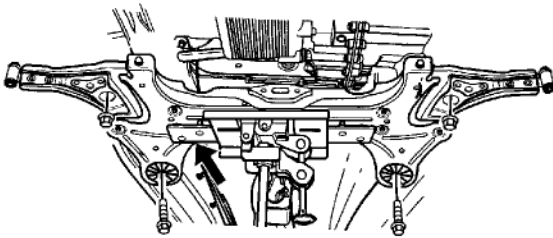
Notice: Refer to [Fastener Notice](#) in the Preface section.



1. Install the rack and pinion assembly by connecting the steering gear retaining bracket nuts.

Tighten

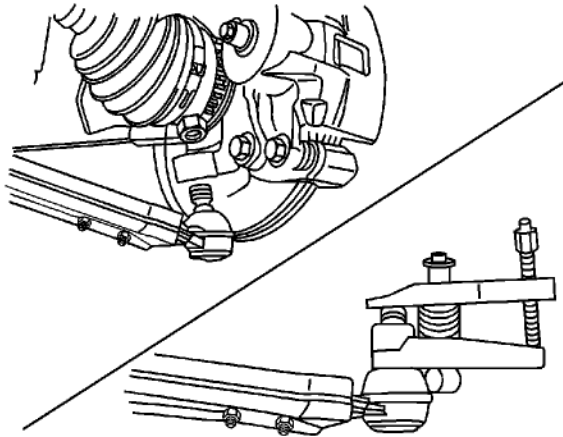
Tighten the steering gear retaining bracket nuts to 50 N·m (37 lb ft).



2. Install the cross member by tightening the nuts and bolts to the underbody.

Tighten

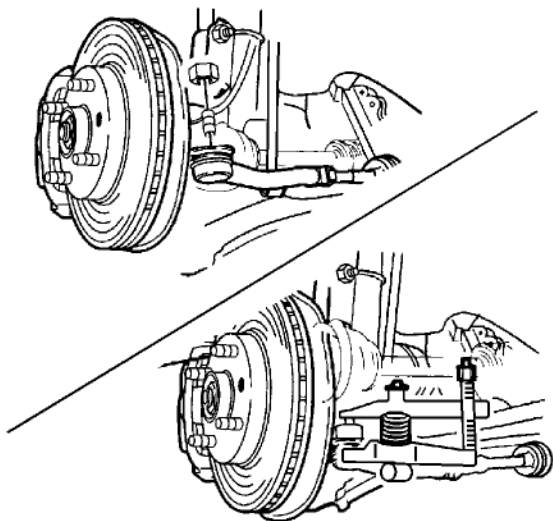
Tighten the cross member by tightening the nuts and bolts to the underbody to 150 N·m (111 lb ft).



3. Install the ball joint hex nuts and connect the stabilizer shaft to the knuckle by tightening the bolt with stabilizer shaft link assembly. Refer to [Stabilizer Shaft Link Replacement](#) .

Tighten

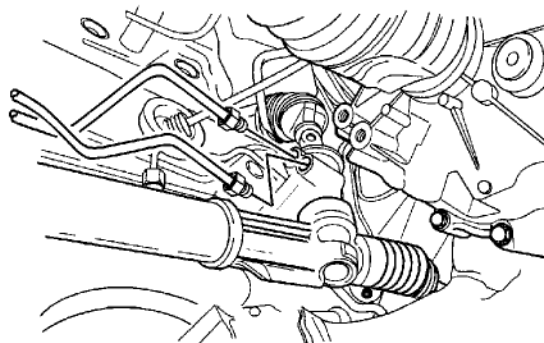
- Tighten the ball joint hex nuts to knuckle to 45 N·m (33 lb ft).
- Tighten the bolts of the stabilizer shaft to the knuckle to 45 N·m (33 lb ft).



4. Install the outer tie rod hex nuts. Refer to [Rack and Pinion Outer Tie Rod End Replacement](#) .

Tighten

Tighten the outer tie rod hex nuts to 45 N·m (33 lb ft).



5. Connect the steering gear inlet and outlet pipe fittings.

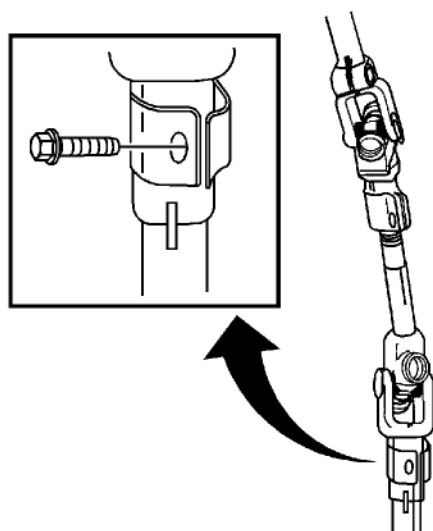
Tighten

Tighten the nuts of the steering gear inlet and outlet pipe fittings to 22 N·m (16 lb ft).

6. Install the front tire and wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).

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7. Refill the power steering fluid.





8. Install the intermediate shaft.
9. Inspect the vehicle. Refer to [Preliminary Alignment Inspection](#) and [Straight Ahead Inspection](#) .
10. Measure the wheel alignment.
11. If necessary, adjust the front toe. Refer to [Front Toe Adjustment](#) .

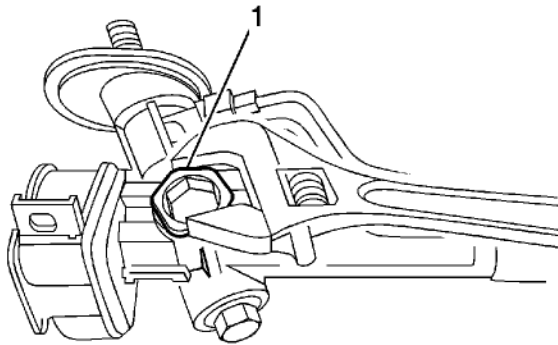
Steering Gear Yoke Adjustment

Tools Required

[GE-42910](#) Yoke Adjusting Tool

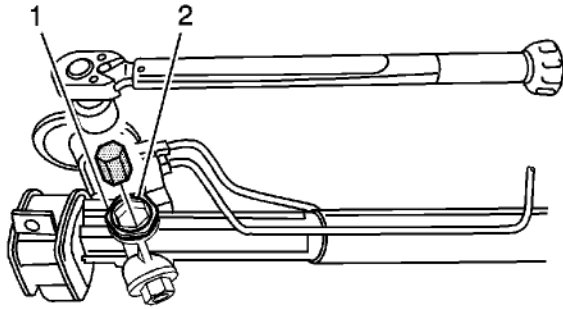
Adjustment Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Ensure the steering wheel and the front wheels are in the straight ahead position.
3. Remove the steering gear. Refer to [Steering Gear Replacement](#).



4. Loosen the locknut (1).

Notice: Refer to [Fastener Notice](#) in the Preface section.

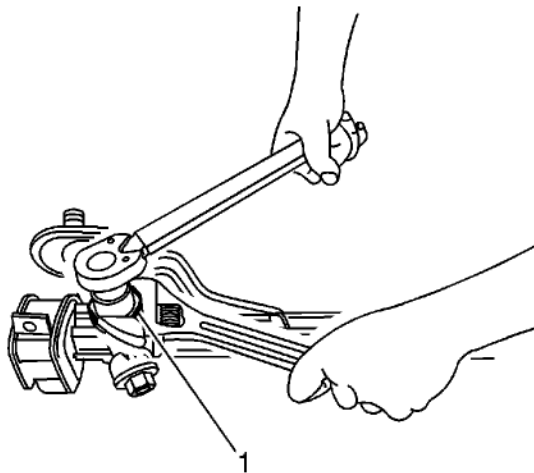


5. Use the [GE-42910](#) in order to tighten the yoke plug (2).

Tighten

Tighten the yoke plug to 5 N·m (44 lb in).

6. Loosen the yoke plug by 45 degrees.



7. Hold the yoke plug stationary and tighten the locknut (1).

Tighten

Tighten the locknut to 44 N·m (32 lb ft).

8. Install the steering gear. Refer to [Steering Gear Replacement](#).
9. Drive the vehicle and ensure the steering system returns to the straight ahead position.