

Front Suspension

Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Front Brake Dust Shield	9 N•m	80 lb in
Front Lower Control Arm Ball Joint Nut		
First Pass	30 N•m	22 lb ft
Second Pass	loosen 120 degrees	
Third Pass	30 N•m	22 lb ft
Final Pass	plus 35 degrees	
Front Lower Control Arm Front Bolt		
First Pass	115 N•m	85 lb ft
Final Pass	plus 65 degrees	
Front Lower Control Arm Rear Nut		
First Pass	160 N•m	118 lb ft
Final Pass	plus 35 degrees	
Front Suspension Stabilizer Shaft Clamp Bolts	22 N•m	16 lb ft
Front Suspension Stabilizer Shaft Link Nuts	65 N•m	48 lb ft
Front Suspension Strut to Steering Knuckle Nuts	110 N•m	82 lb ft
Front Suspension Strut Upper Mount Nut	65 N•m	48 lb ft
Front Suspension Strut Lower Mount Nut	65 N•m	48 lb ft
Steering Knuckle Lower Ball Stud Nuts		
First Pass	20 N•m	15 lb ft
Final Pass	plus 45 degrees	

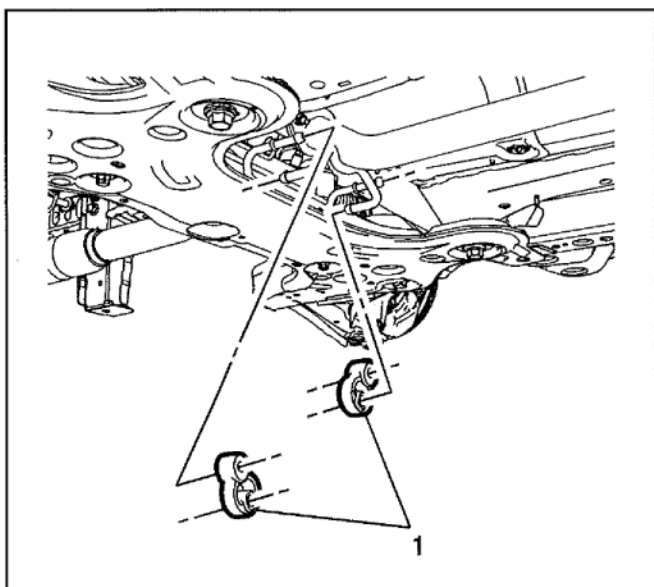
Repair Instructions

Stabilizer Shaft Replacement

Removal Procedure

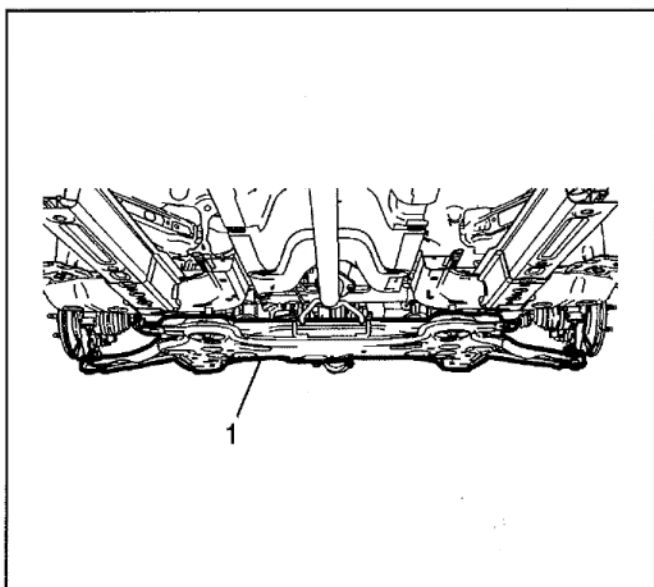
1. Remove the intermediate steering shaft lower bolt. Refer to *Intermediate Steering Shaft Replacement* on page 15-27.
2. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* on page 1-31.
3. Remove the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
4. Remove the front wheelhouse inner liner front extension. Refer to *Front Wheelhouse Liner Inner Front Extension Replacement (Left Side)* on page 3-147 or *Front Wheelhouse Liner Inner Front Extension Replacement (Right Side, LUV)* on page 3-148 or *Front Wheelhouse Liner Inner Front Extension Replacement (Right Side, LWE, LUW)* on page 3-149.
5. Remove the front bumper impact bar lower bracket. Refer to *Front Bumper Impact Bar Lower Bracket Replacement* on page 3-54.
6. Remove the stabilizer shaft links from the stabilizer shaft. Refer to *Stabilizer Shaft Link Replacement* on page 16-8.
7. Remove the lower control arm ball joint bolt and nut from the steering knuckle. Refer to *Lower Control Arm Replacement* on page 16-12.
8. Disconnect the steering linkage tie rod end from the steering knuckle. Refer to *Steering Linkage Outer Tie Rod Replacement* on page 15-17.
9. Remove the transmission rear mount to bracket retaining bolt. Refer to *Transmission Mount Bracket Replacement - Rear* on page 17-215.

16-4 Front Suspension



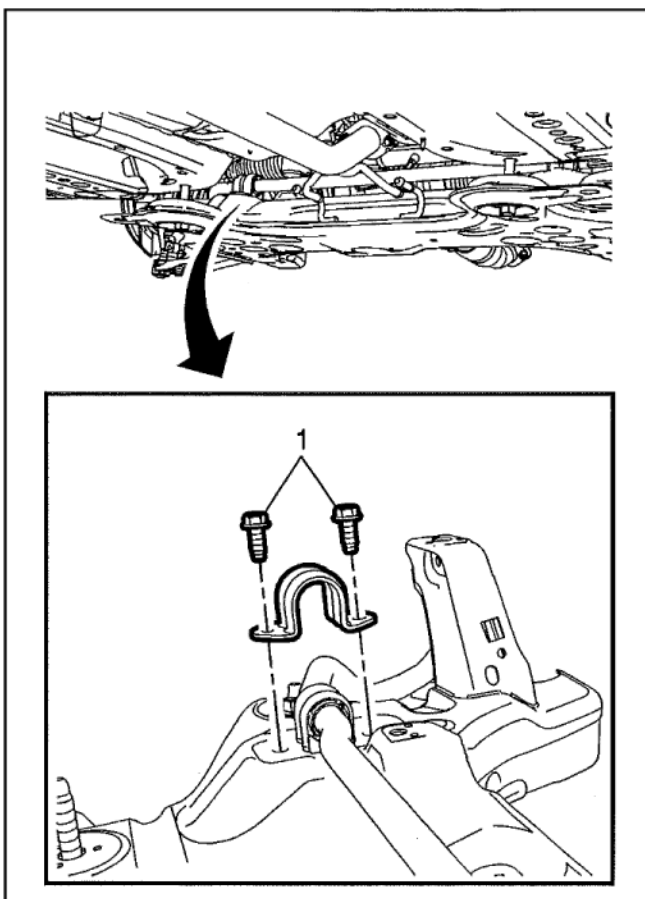
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10. Remove the exhaust pipe insulators (1).



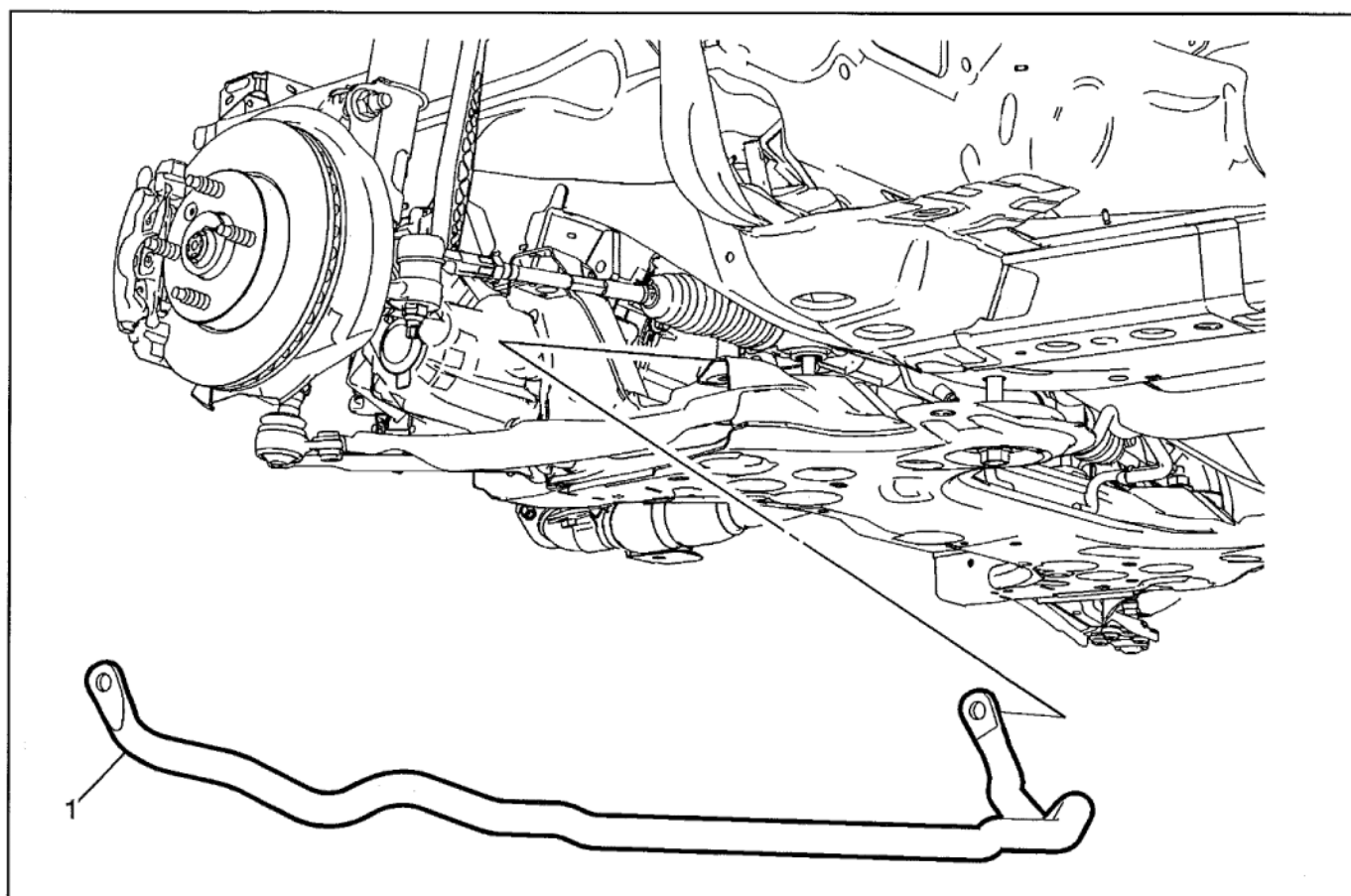
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11. Release the front suspension frame front bolts about 10 mm.
 12. Using a suitable support, support the crossmember area of the cradle.
- Note:** It is not necessary to remove the front bumper fascia in this procedure.
13. Using a suitable support, lower the front suspension frame (1) about 500 mm enough to gain access to the stabilizer shaft insulator bolts and to remove the stabilizer shaft. Refer to *Drivetrain and Front Suspension Frame Replacement* on page 3-144



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14. Remove the stabilizer shaft insulator bolts (1).

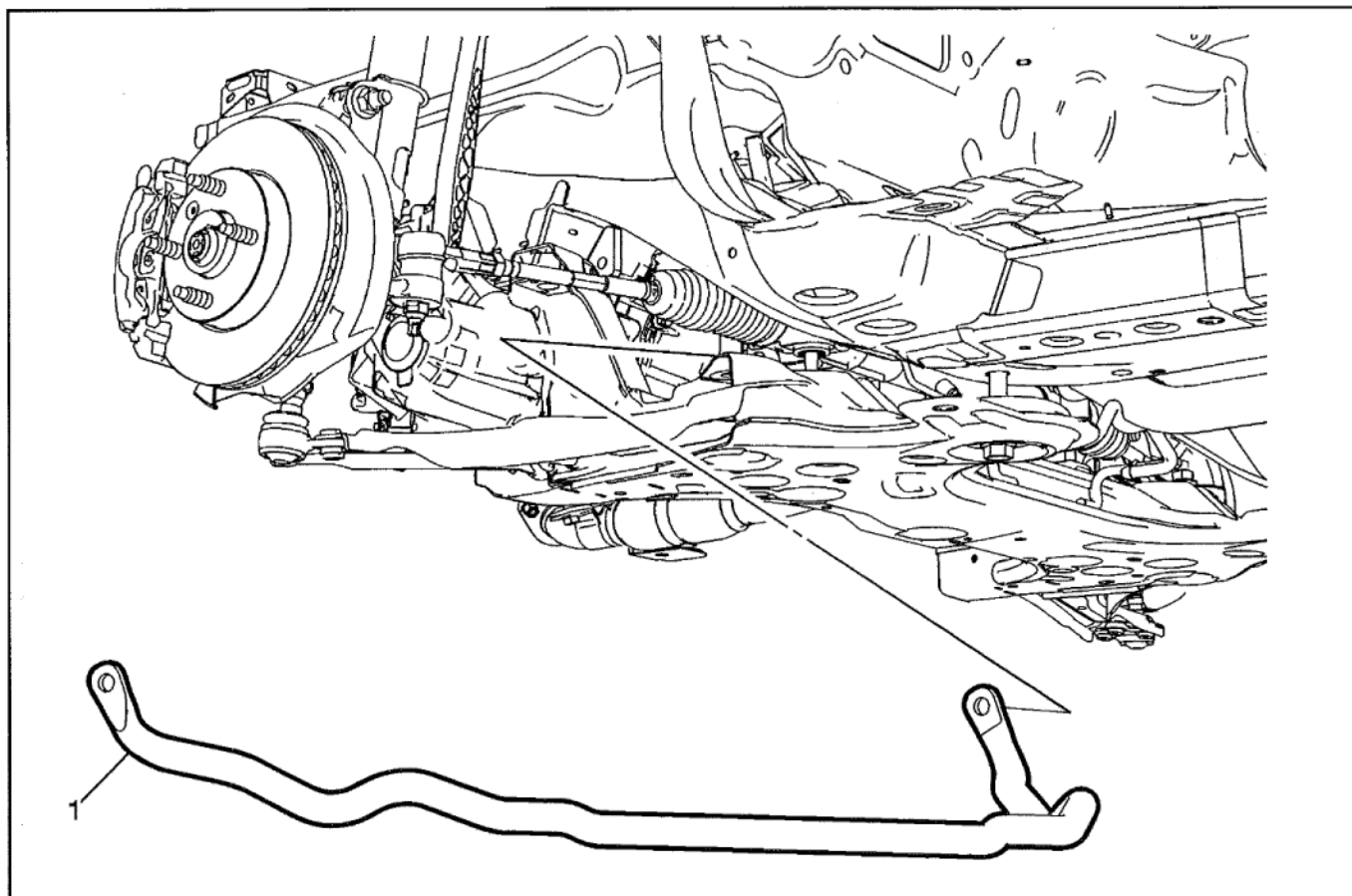


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Note: It may be necessary to maneuver the front stabilizer shaft in such a way as to remove it from the front suspension frame.

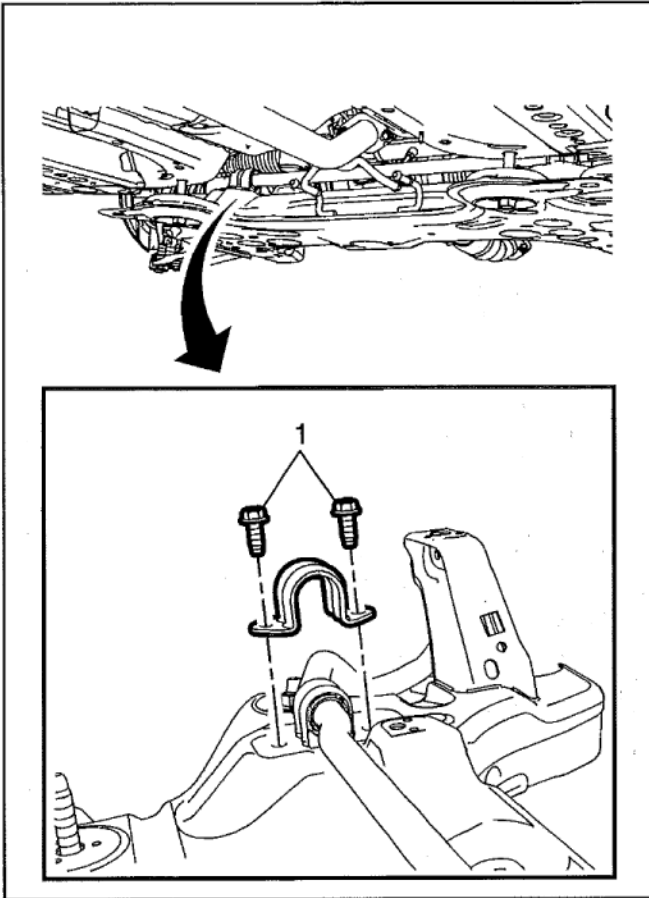
15. Remove the front stabilizer shaft (1) from the front suspension frame.

Installation Procedure



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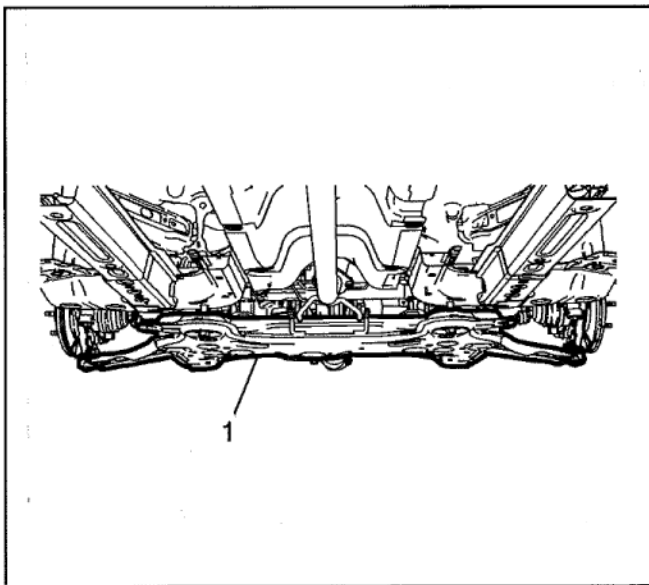
1. Position the front stabilizer shaft (1) in the front suspension frame.



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Caution: Refer to *Fastener Caution* on page 0-8.

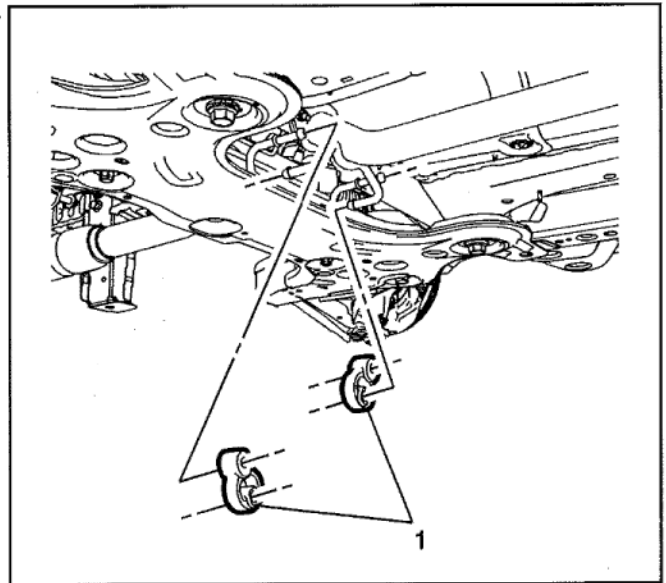
2. Install the front stabilizer shaft insulator bolts (1) and tighten to **22 N·m (16 lb ft)**.



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3. Lift the front suspension frame (1) into the proper position and tighten the front suspension frame bolts. Refer to *Drivetrain and Front Suspension Frame Replacement* on page 3-144.

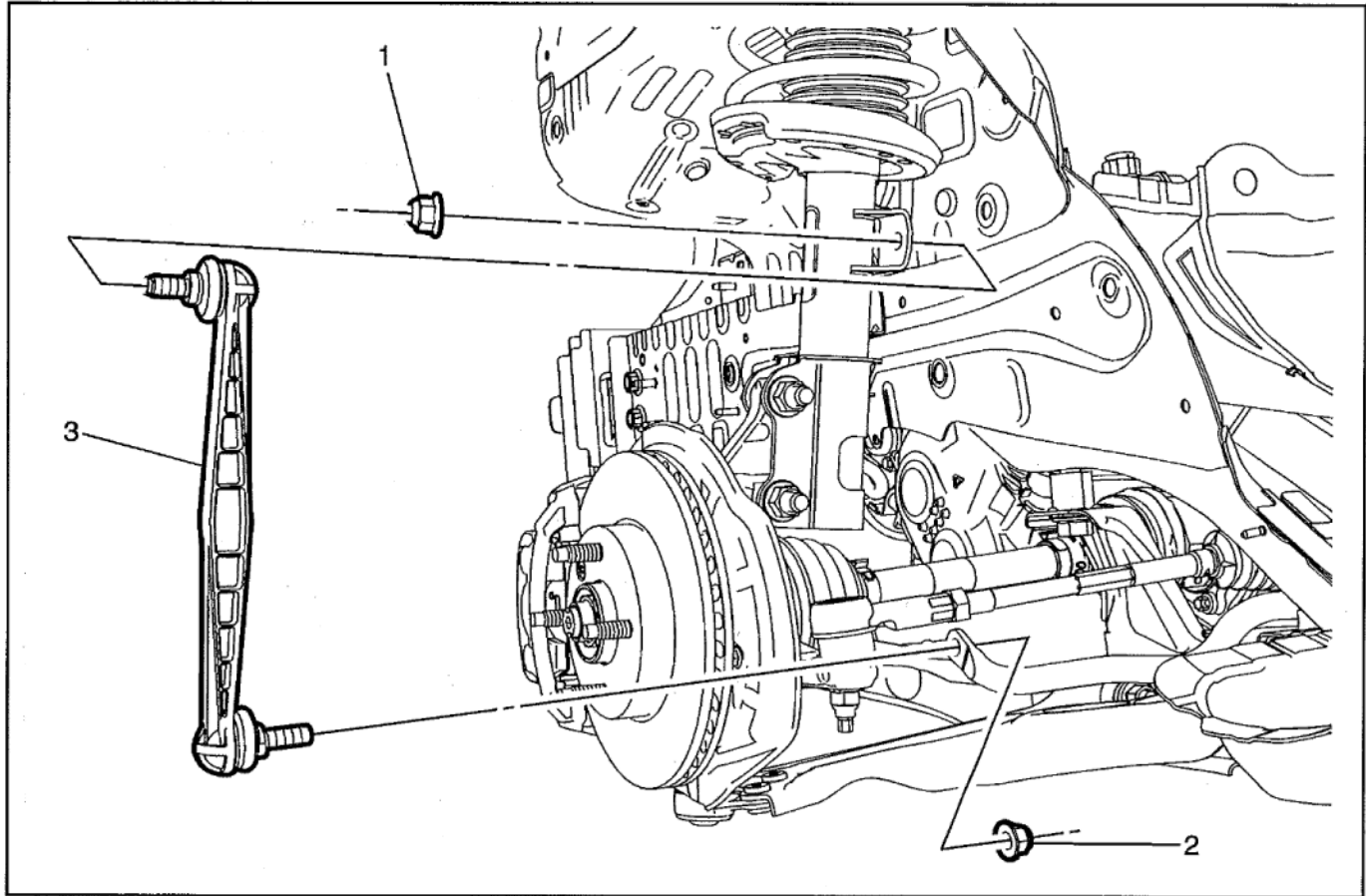
4. Install the transmission rear mount to bracket retaining bolt. Refer to *Transmission Mount Bracket Replacement - Rear* on page 17-215
5. Connect the steering linkage tie rod end from the steering knuckle. Refer to *Steering Linkage Outer Tie Rod Replacement* on page 15-17
6. Install the lower control arm ball joint to steering knuckle bolts. Refer to *Lower Control Arm Replacement* on page 16-12.
7. Install the stabilizer shaft link to the stabilizer shaft. Refer to *Stabilizer Shaft Link Replacement* on page 16-8.



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8. Install the exhaust pipe insulators (1).
9. Install the front bumper impact bar lower bracket. Refer to *Front Bumper Impact Bar Lower Bracket Replacement* on page 3-54.
10. Install the front wheelhouse inner liner front extension. Refer to *Front Wheelhouse Liner Inner Front Extension Replacement (Left Side)* on page 3-147 or *Front Wheelhouse Liner Inner Front Extension Replacement (Right Side, LUV)* on page 3-148 or *Front Wheelhouse Liner Inner Front Extension Replacement (Right Side, LWE, LUW)* on page 3-149.
11. Install the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
12. Remove the support and lower the vehicle.
13. Install the intermediate steering shaft lower bolt. Refer to *Intermediate Steering Shaft Replacement* on page 15-27.

Stabilizer Shaft Link Replacement



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Stabilizer Shaft Link Replacement

Callout	Component Name
Preliminary Procedure 1. Raise and Support the vehicle. Refer to <i>Lifting and Jacking the Vehicle</i> on page 1-31. 2. Remove the tire and wheel assembly. Refer to <i>Tire and Wheel Removal and Installation</i> on page 16-60.	
1	Front Stabilizer Shaft Link Upper Nut Caution: Refer to <i>Fastener Caution</i> on page 0-8. Procedure Use the proper size Allen wrench to hold the stabilizer shaft link stud when loosening or tightening the stabilizer shaft link nut. Tighten 65 N•m (48 lb ft)
2	Front Stabilizer Shaft Link Lower Nut Procedure Use the proper size Allen wrench to hold the stabilizer shaft link stud when loosening or tightening the stabilizer shaft link nut. Tip: When removing the stabilizer shaft link lower nut, remove both of the upper nuts first and the lift up the stabilizer ends in order to get the tool access to the lower nut. Tighten 65 N•m (48 lb ft)
3	Front Stabilizer Shaft Link

Front Wheel Bearing and Hub Replacement

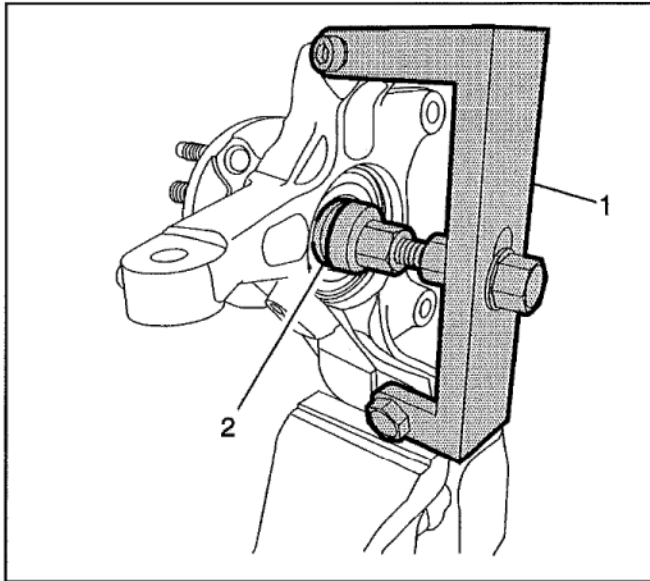
Special Tools

CH-50559 Wheel Hub/Bearing Remover Kit

For equivalent regional tools, refer to *Special Tools* on page 16-23.

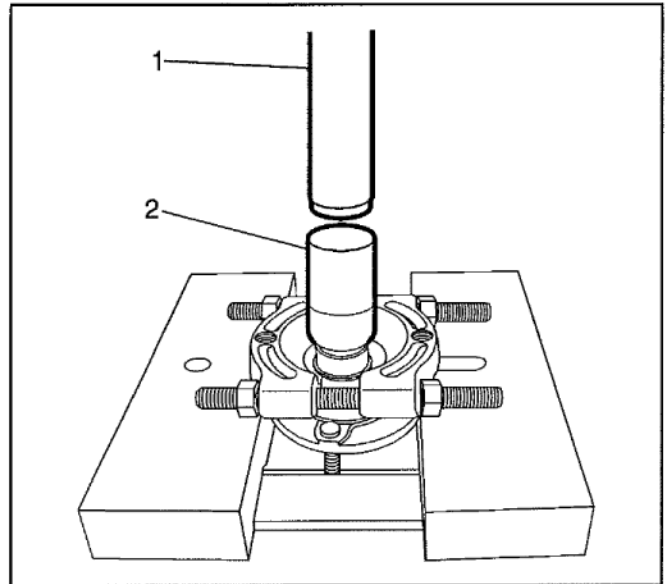
Removal Procedure

1. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* on page 1-31.
2. Remove the steering knuckle assembly from the vehicle. Refer to *Steering Knuckle Replacement* on page 16-11.



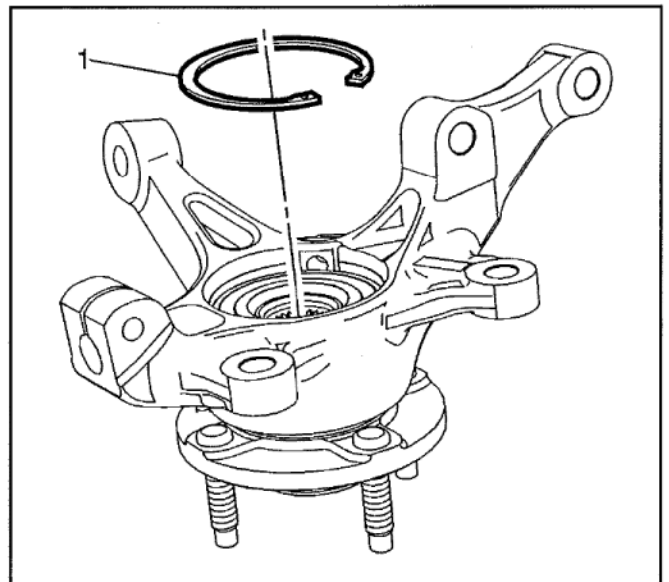
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3. Position the steering knuckle assembly (1) in a suitable vise.
4. Position the CH-50559-1 wheel hub/bearing removal/installation bridge assembly (1) and the CH-50559-2 wheel hub/bearing removal/installation adapter (2) on the wheel bearing inner hub.
5. Using the CH-50559-1 and the CH-50559-2, remove the wheel hub from the wheel bearing.



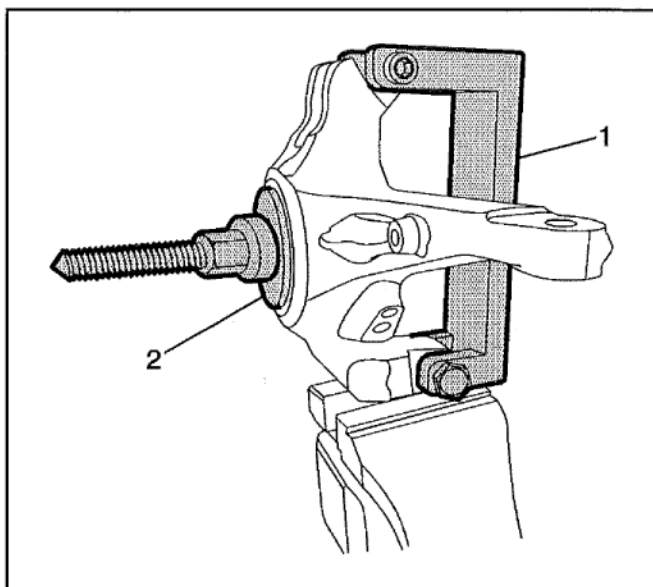
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6. If the inner race of the bearing is pulled out with the hub, remove the inner race from the using the appropriate tools (1, 2).



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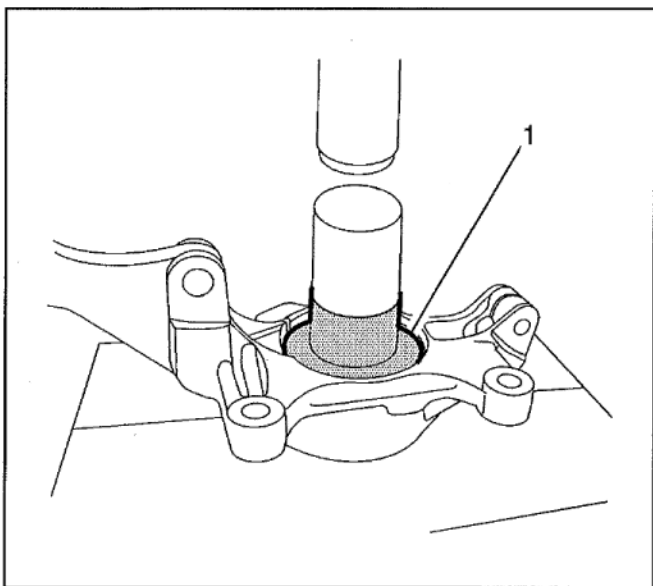
7. Using the appropriate tool, remove the retaining ring (1) from the steering knuckle.



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8. Position the CH-50559-1 wheel hub/bearing removal/installation bridge assembly (1) and the CH-50559-3 wheel bearing removal adapter (2) on the steering knuckle.
9. Remove the wheel bearing from the steering knuckle and discard it. Inspect the bore of the of the steering knuckle for pitting, scoring wear, or corrosion. If damage cannot be easily cleaned up with light sanding, replace the steering knuckle.

Installation Procedure

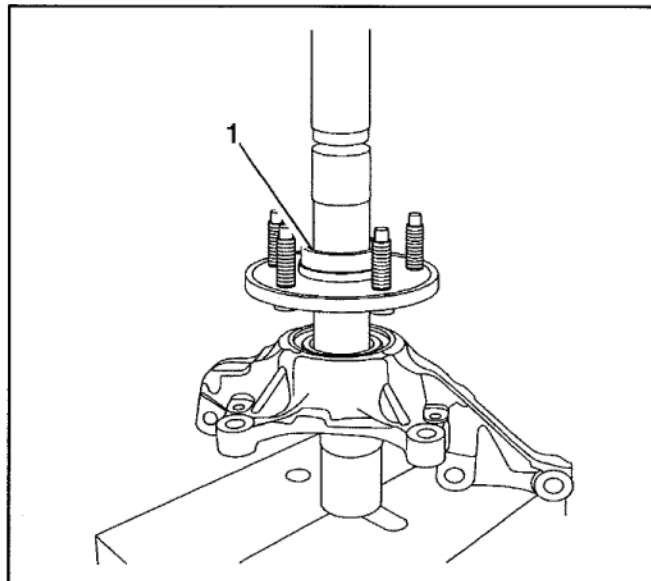


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Note:

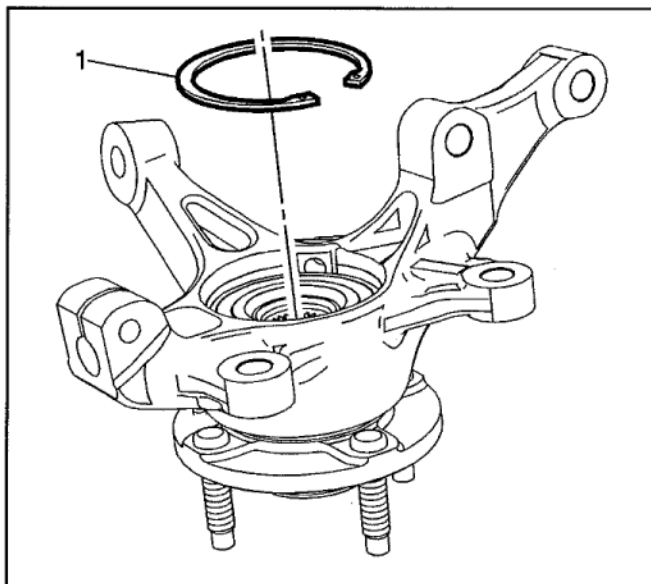
- The bearing must be installed with the rubber seal facing inboard.
- Ensure that the wheel bearing is evenly seated in the steering knuckle.

1. Using the CH-50559-4 wheel hub/bearing installation adapter (1) and the appropriate extension and press, install the new bearing into the steering knuckle until it is correctly seated.



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2. Position the CH-50559-4 (1) wheel hub/bearing installation adapter and the appropriate extension to the inside of the bearing and position the CH-50559-2 wheel hub removal/installation adapter and the appropriate extension on the wheel hub.
3. Press in the hub until it is correctly seated.



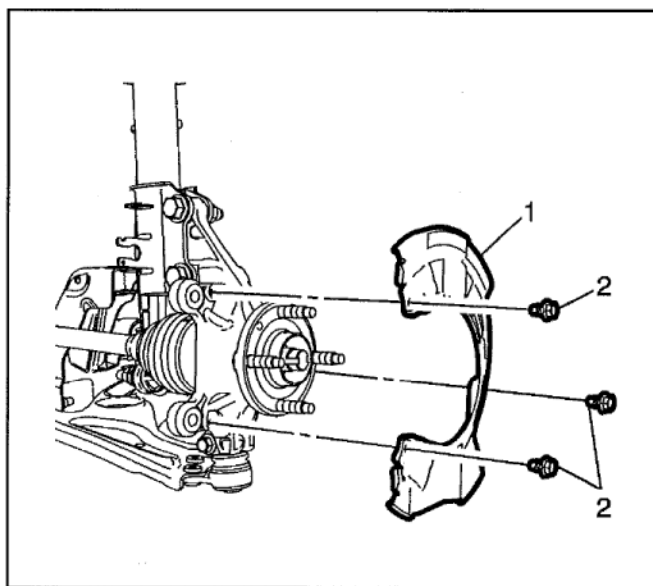
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4. Using the appropriate tool, install the retaining ring (1).
5. Verify the hub rotates smoothly.
6. Install the steering knuckle assembly in the vehicle. Refer to *Steering Knuckle Replacement* on page 16-11.
7. Lower the vehicle.

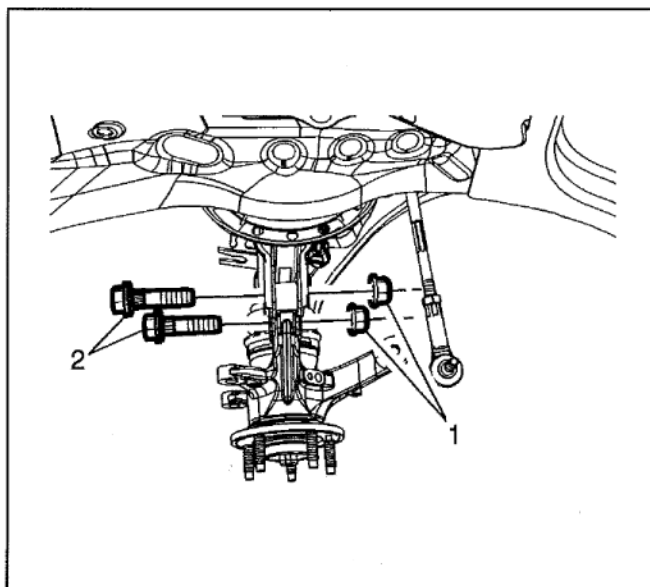
Steering Knuckle Replacement

Removal Procedure

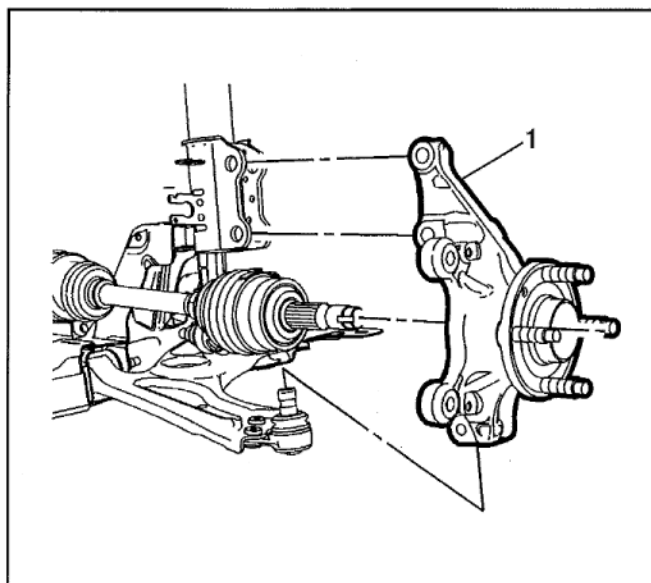
1. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* on page 1-31.
2. Remove the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
3. Remove the wheel speed sensor from the steering knuckle. Refer to *Front Wheel Speed Sensor Replacement* on page 5-44.
4. Separate the wheel drive shaft from the steering knuckle. Refer to *Front Wheel Drive Shaft Replacement* on page 7-5.
5. Remove the brake rotor from the steering knuckle. Refer to *Front Brake Rotor Replacement* on page 5-77.



6. Remove the front brake dust shield bolts (2) and the shield (1).
7. Remove the lower ball joint bolt and nut from the steering knuckle. Refer to *Lower Control Arm Replacement* on page 16-12.



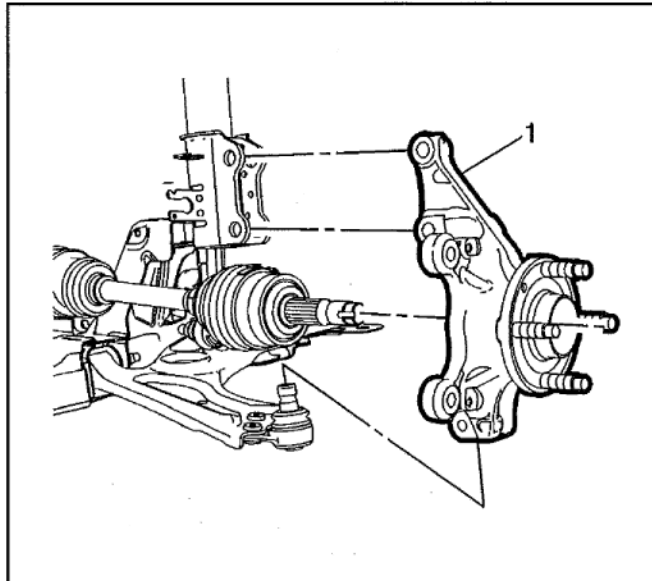
8. Remove the bolts (2) and the nuts (1) from the front strut to the steering knuckle. Refer to *Strut Assembly Removal and Installation* on page 16-17.



9. Remove the steering knuckle assembly (1) from the vehicle.
10. Remove the wheel bearing and hub assembly from the steering knuckle. Refer to *Front Wheel Bearing and Hub Replacement* on page 16-9.

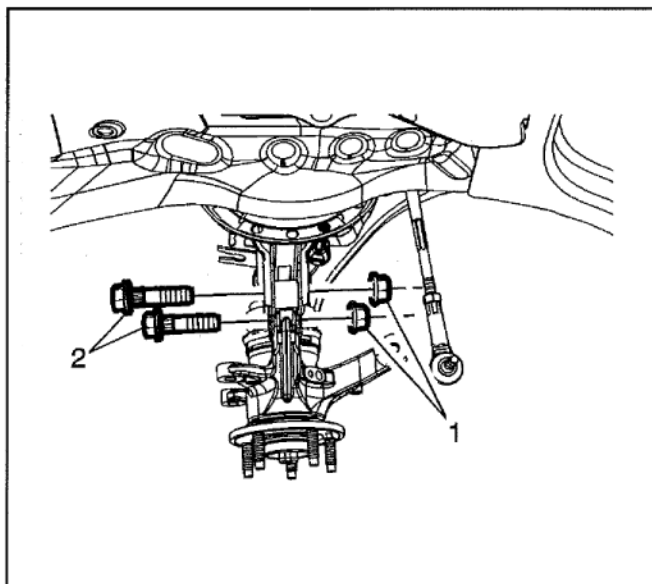
Installation Procedure

1. Install the wheel bearing and hub assembly in the steering knuckle. Refer to *Front Wheel Bearing and Hub Replacement* on page 16-9.



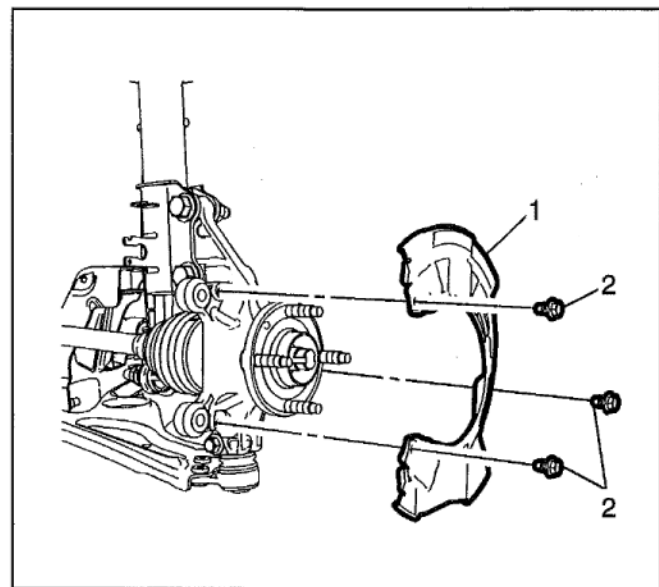
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2. Position the steering knuckle (1) in the front strut and lower ball joint.



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3. Install the bolts (2) and the nuts (1) from the front strut assembly to the steering knuckle. Refer to *Strut Assembly Removal and Installation* on page 16-17.
4. Install the lower ball joint bolt and nut to the steering knuckle. Refer to *Lower Control Arm Replacement* on page 16-12.



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Caution: Refer to *Fastener Caution* on page 0-8.

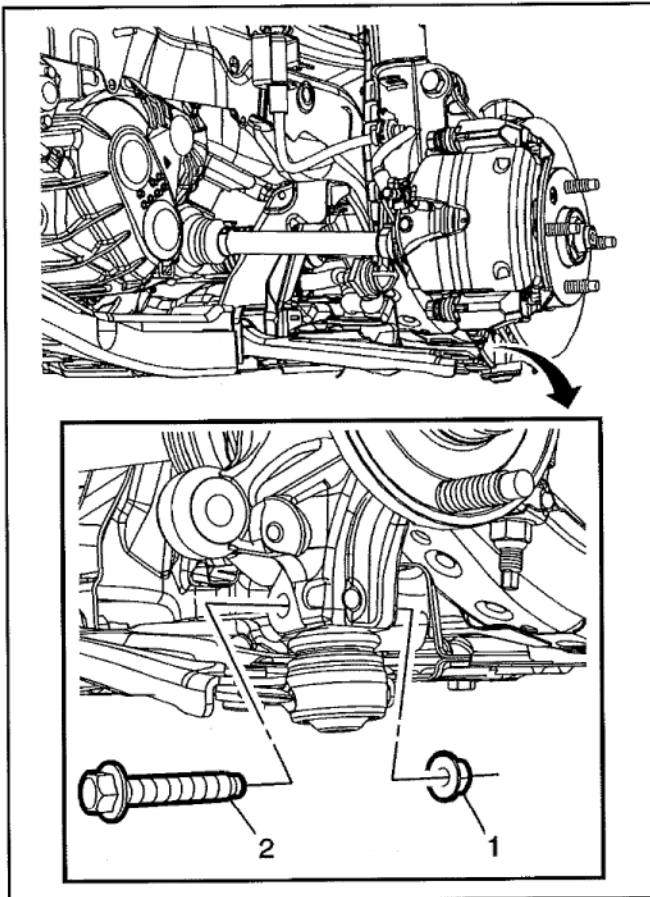
5. Install the front brake dust shield (1) bolts (2) and the bolts to 9 N·m (80 lb in).
6. Install the brake rotor on the steering knuckle. Refer to *Front Brake Rotor Replacement* on page 5-77.
7. Install the NEW wheel drive shaft nut. Refer to *Front Wheel Drive Shaft Replacement* on page 7-5.
8. Install the wheel speed sensor in the steering knuckle. Refer to *Front Wheel Speed Sensor Replacement* on page 5-44.
9. Install the tire and wheel assembly the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
10. Remove the supports and lower the vehicle.
11. Check the front wheel alignment measurements, if the vehicle had a camber adjustment repair. Refer to *Wheel Alignment Specifications* on page 16-69.

Lower Control Arm Replacement

Removal Procedure

1. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* on page 1-31.
2. Remove the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
3. Remove the front wheelhouse rear liner. Refer to *Front Wheelhouse Liner Replacement (Rear)* on page 3-151 or *Front Wheelhouse Liner Replacement (Front)* on page 3-150.
4. Remove the front wheelhouse liner inner front extension. Refer to *Front Wheelhouse Liner Inner Front Extension Replacement (Left Side)* on page 3-147 or *Front Wheelhouse Liner Inner Front Extension Replacement (Right Side, LUV)* on page 3-148 or *Front Wheelhouse Liner Inner Front Extension Replacement (Right Side, LWE, LUW)* on page 3-149.

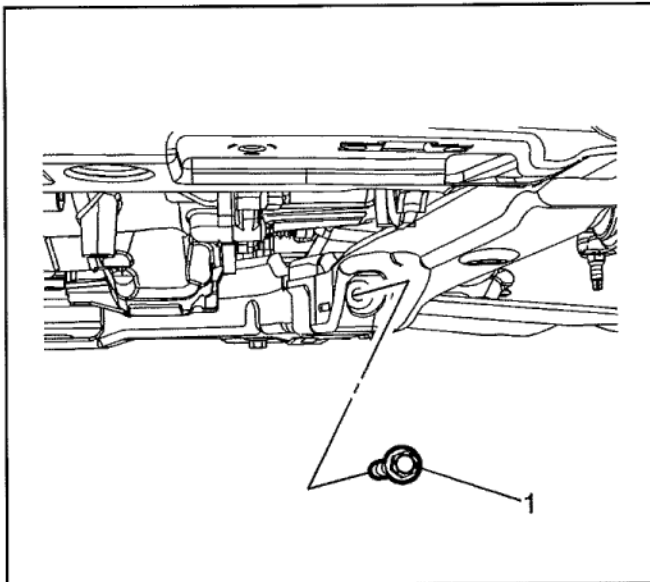
5. Disconnect the steering linkage tie rod end from the steering knuckle. Refer to *Steering Linkage Outer Tie Rod Replacement* on page 15-17.



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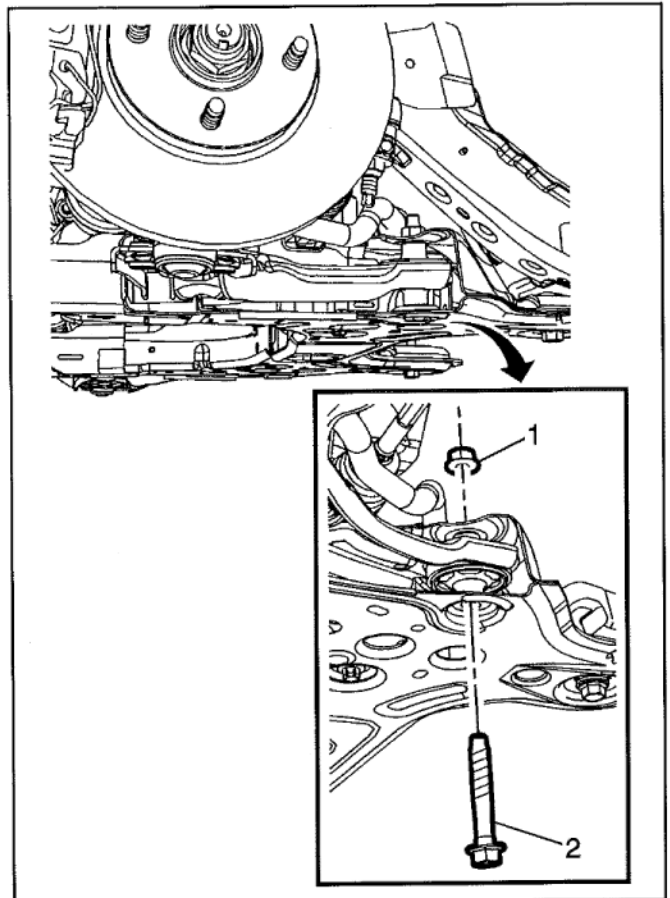
Note: DO NOT reuse the ball joint nut. The nut is NOT reusable.

6. Remove the lower ball joint nut (1) and bolt (2).



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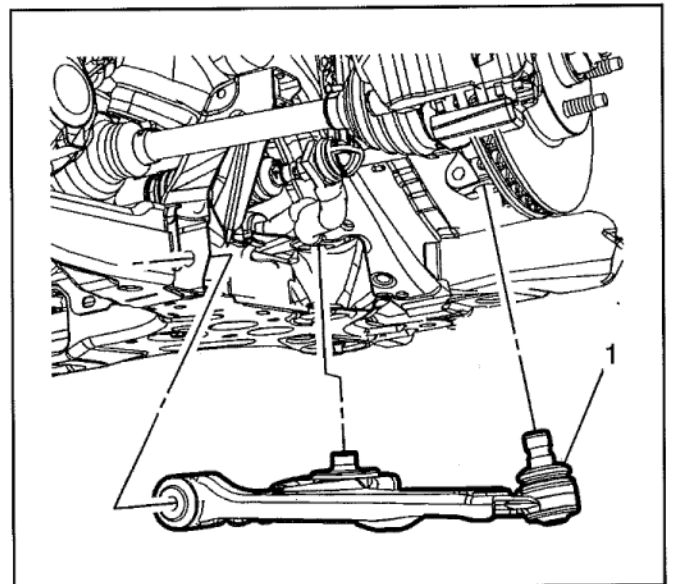
7. Remove and discard the front lower control bolt (1). Replace with NEW only.



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Note: DO NOT reuse the rear lower control arm nut. The nut is NOT reusable.

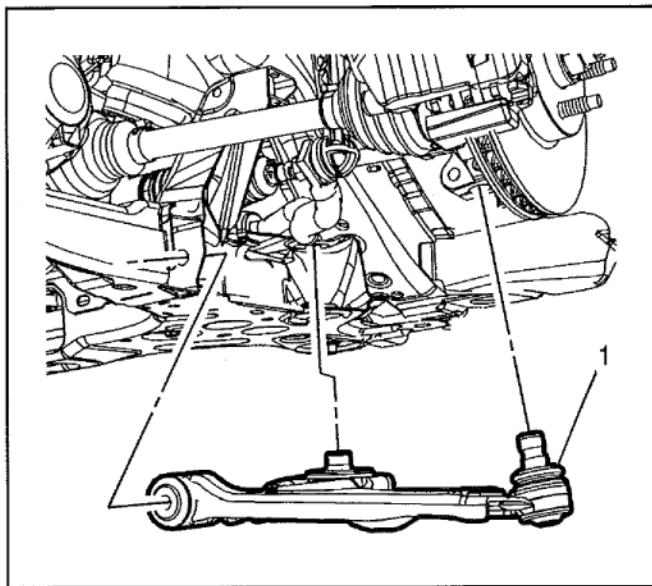
8. Remove the front lower control arm rear nut (1) and bolt (2).



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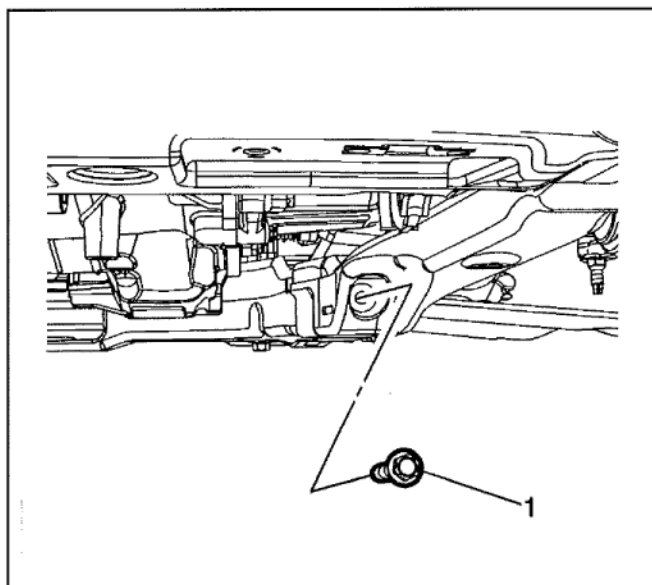
9. Push the front brake corner forward and then remove the front lower control arm (1).

Installation Procedure



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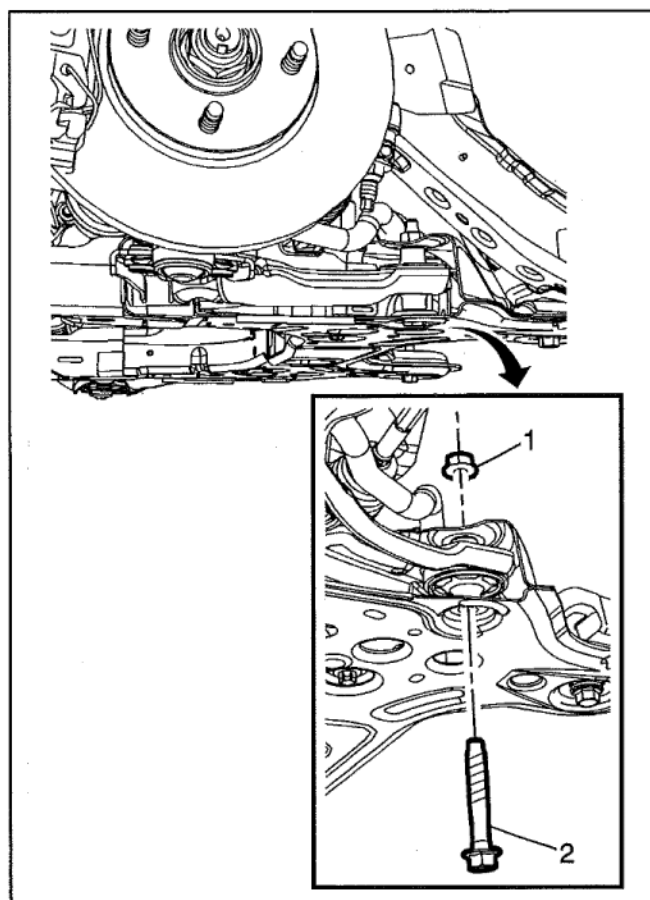
1. Push the front brake corner forward and then position the lower control arm (1) in the vehicle.



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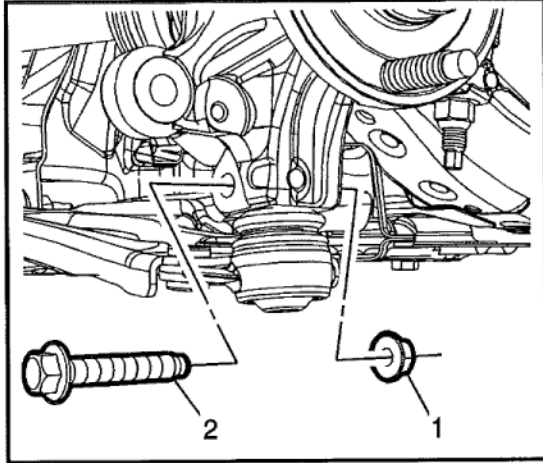
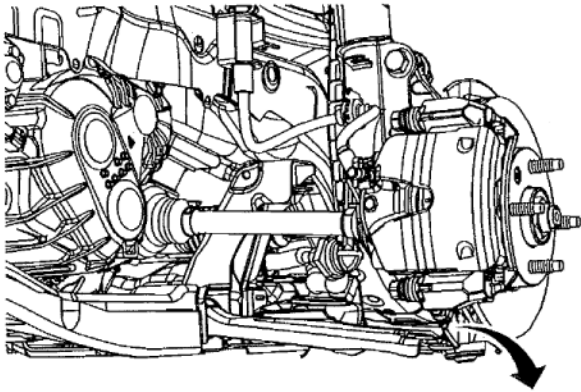
Note: Install the front lower control arm rear bolt and nut hand tight to hold the lower control arm in place while tightening the front lower control arm bolt.

2. Install the NEW front lower control arm front bolt (1) and tighten to.
 - First Pass: **115 N•m (85 lb ft)**
 - Final Pass: **plus 65 degrees**



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3. Tighten the NEW front lower control arm rear nut (1) to:
 - First Pass: **160 N•m (118 lb ft)**
 - Final Pass: **plus 35 degrees**



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4. Install the NEW lower ball joint bolt (2) and nut (1) and tighten the to nut (1):
 - First Pass: **30 N•m (22 lb ft)**
 - Second Pass: **release 120 degrees**
 - Third Pass: **30 N•m (22 lb ft)**
 - Final Pass: **plus 35 degrees**
5. Install the steering linkage tie rod end on the steering knuckle. Refer to *Steering Linkage Outer Tie Rod Replacement* on page 15-17.
6. Install the front wheelhouse liner inner front extension. Refer to *Front Wheelhouse Liner Inner Front Extension Replacement (Left Side)* on page 3-147 or *Front Wheelhouse Liner Inner Front Extension Replacement (Right Side, LUV)* on page 3-148 or *Front Wheelhouse Liner Inner Front Extension Replacement (Right Side, LWE, LUW)* on page 3-149.
7. Install the front wheelhouse rear liner. Refer to *Front Wheelhouse Liner Replacement (Rear)* on page 3-151 or *Front Wheelhouse Liner Replacement (Front)* on page 3-150.
8. Install the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
9. Lower the vehicle.

Wheel Stud Replacement

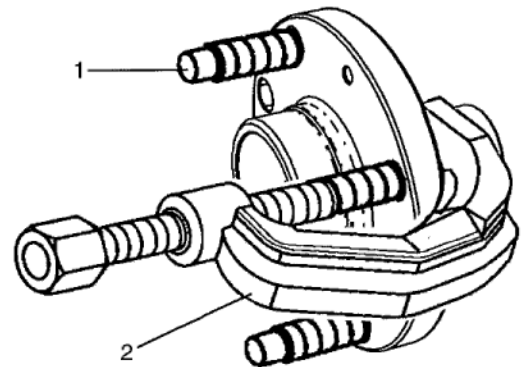
Special Tools

CH 43631 Ball Joint Separator

For equivalent regional tools, refer to *Special Tools* on page 16-23.

Removal Procedure

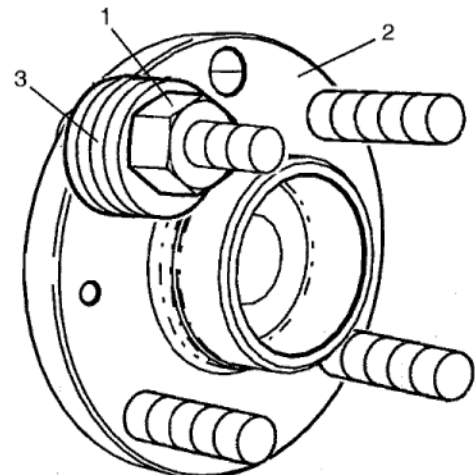
1. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* on page 1-31.
2. Remove the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
3. Without disconnecting the hydraulic brake flex hose, remove and support the brake caliper and bracket as an assembly. Refer to *Front Brake Rotor Replacement* on page 5-77.
4. Remove the front wheel hub. Refer to *Front Wheel Bearing and Hub Replacement* on page 16-9.



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5. Using the CH 43631 separator (2), remove the wheel stud (1) from the wheel bearing and hub.

Installation Procedure



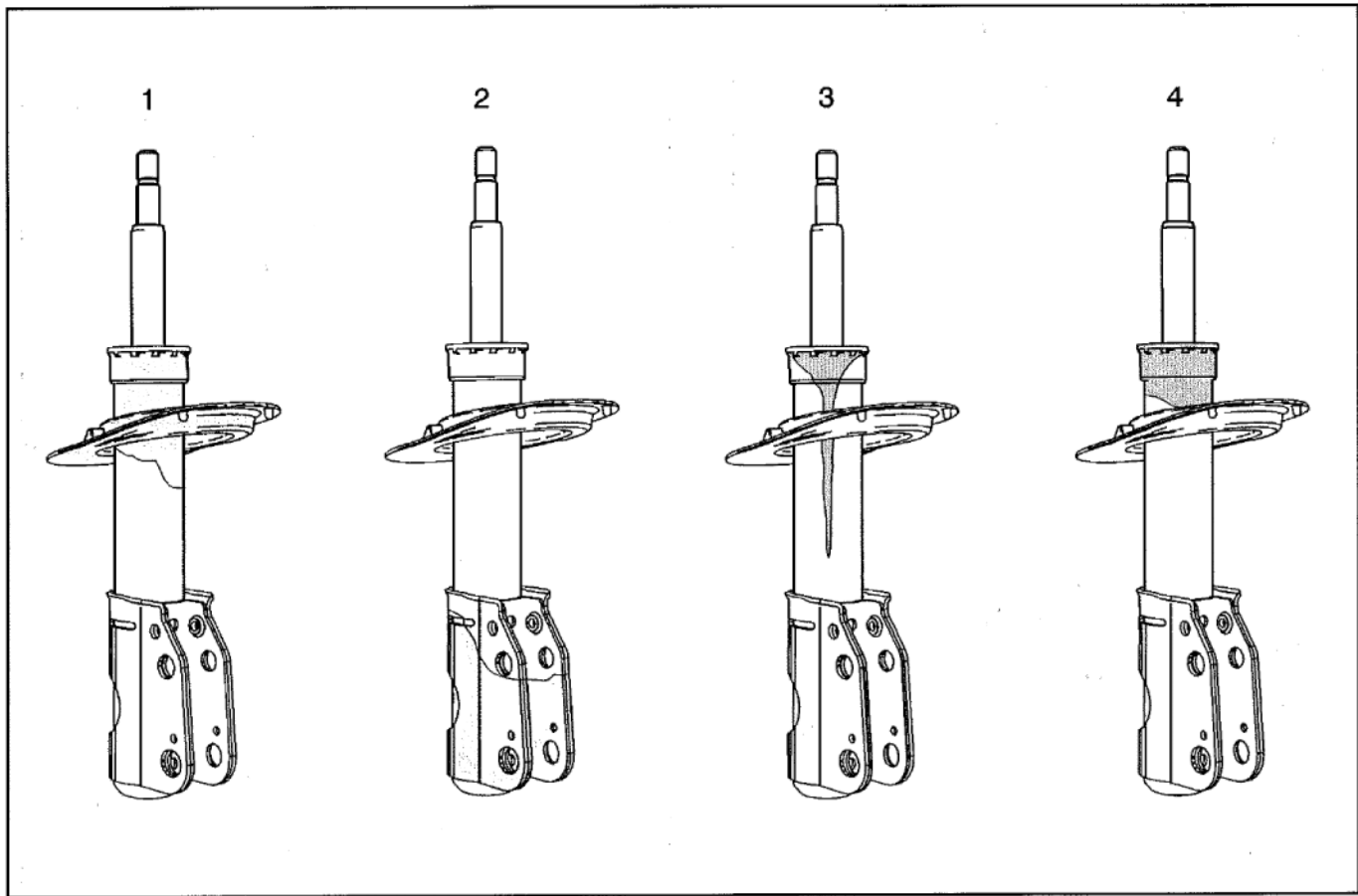
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1. Install a NEW wheel stud to the wheel hub flange (2).
2. Position three washers (3) and an old lug nut (1) on the stud to be replaced.
3. Position the pry bar to hold the wheel bearing flange while tightening the wheel lug nut.
4. Tighten the old lug nut (1) until the wheel stud is firmly seated in the wheel hub flange.
5. Remove the washers (3) and the old lug nut (1) and the pry bar.
6. Install the front wheel hub. Refer to *Front Wheel Bearing and Hub Replacement* on page 16-9.
7. Install the front brake rotor. Refer to *Front Brake Rotor Replacement* on page 5-77.
8. Install the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
9. Lower the vehicle.

Strut and Shock Absorber Inspection

Note: The strut assembly DOES NOT have to be removed from the vehicle to perform the following inspection procedure.

Note: A light film of oil on the top portion of the strut is normal. DO NOT replace the strut for this condition.



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Condition 1

Oil or fluid residue only on the bottom of the strut tube or on other strut components and not originating from the shaft seal, is not a strut related problem. DO NOT replace the strut, look for other external leaks.

Condition 2

Light film/residue on the strut tube, but not on the spring seat and originating from the shaft seal, is a NORMAL condition. DO NOT replace the strut.

Condition 3

Oil drip or trail down the strut tube and originating from the shaft seal, is an ABNORMAL condition. Replace the strut.

Condition 4

Extreme wet film of oil covering the strut tube and pooling in the spring seat and originating from the shaft seal, is an ABNORMAL condition. Replace the strut.

Inspection

1. Verify the customer's concern is present. If the concern is present, continue to the next step. If the concern is not present, then the vehicle is operating normally.

Note: The strut assembly DOES NOT have to be removed from the vehicle to perform the following inspection procedure.

2. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* on page 1-31.
3. Visually inspect each of the shock absorbers or struts for external fluid leaks. Refer to the following conditions 1, 2, 3, and 4 for visual inspection.
 - If conditions 1 or 2 are found, continue to step 4.
 - If conditions 3 or 4 are found, replace strut. Refer to *Strut Replacement*.
4. If equipped with electronic suspension control system, ensure that the system is working properly. Refer to *Diagnostic Starting Point-Electronic Suspension Control*.
5. Use your hands in order to lift up and push down on each corner of the vehicle 3 times. Remove your hands from the vehicle. If the corner motion exceeds 2 cycles, replace the strut. If the strut does not exceed 2 cycles, NO repair is necessary.

Strut Assembly Removal and Installation

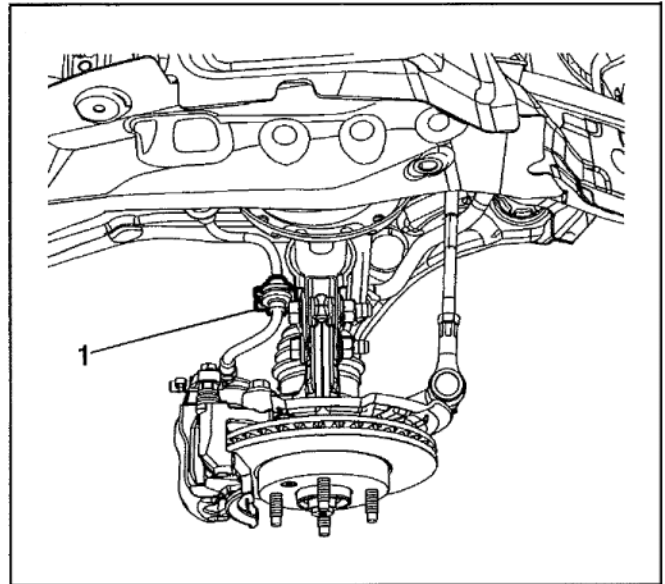
Special Tools

CH 49375 Strut Rod Nut Socket

For equivalent regional tools, refer to *Special Tools* on page 16-23

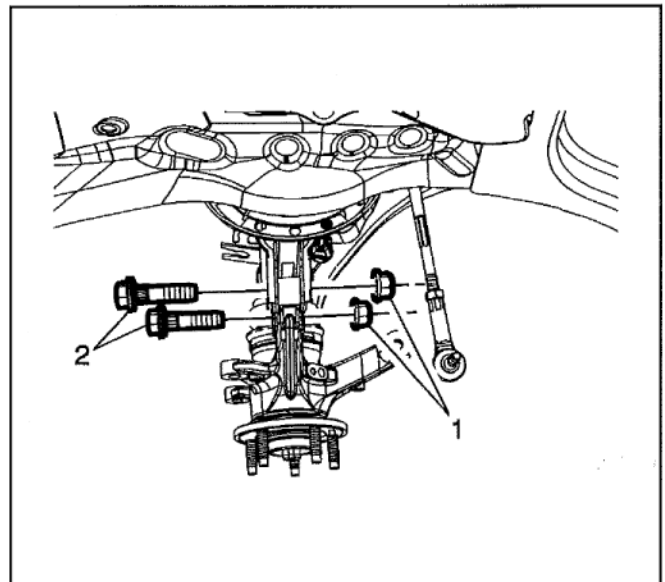
Removal Procedure

1. Remove the air inlet grille panel. Refer to *Air Inlet Grille Panel Replacement* on page 4-374.
2. Raise and support the vehicle. Refer to *Lifting and Jacking the Vehicle* on page 1-31.
3. Remove the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
4. Remove the stabilizer shaft link from the front strut assembly. Refer to *Stabilizer Shaft Link Replacement* on page 16-8.



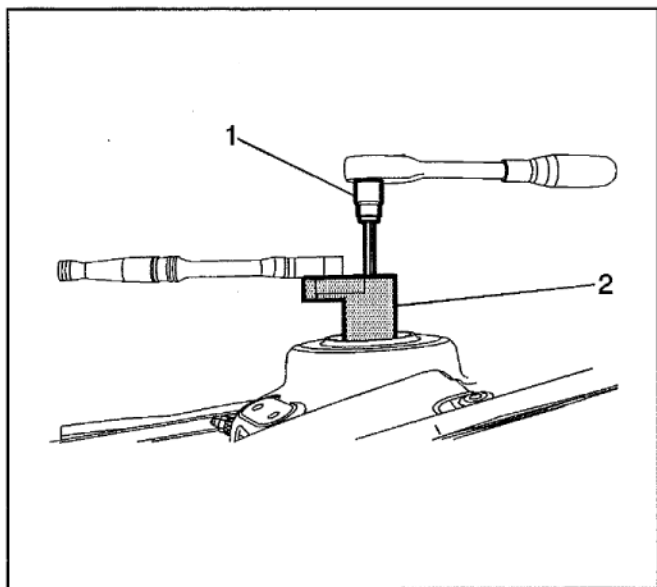
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5. Remove the front brake hose (1) from the front strut assembly.
6. Remove the speed sensor wiring harness from the front strut assembly, if needed.
7. Remove the outer tie rod end from the steering knuckle. Refer to *Steering Linkage Outer Tie Rod Replacement* on page 15-17.
8. Support the lower control arm with a jack stand.



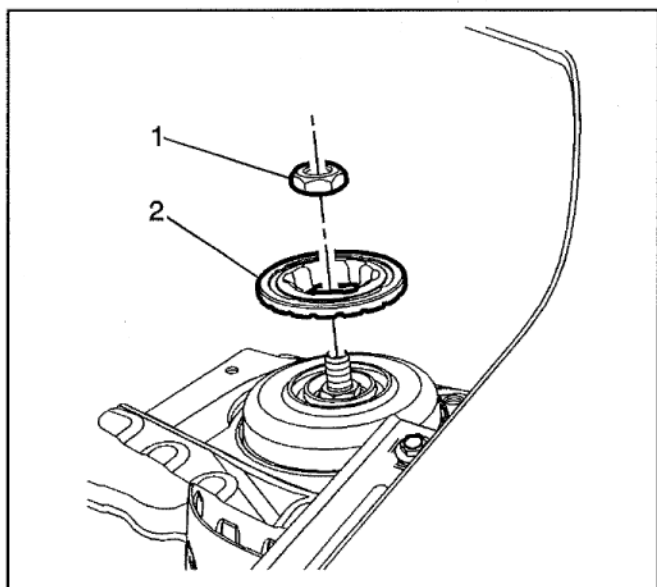
2497931

9. Remove the front strut nut (1) and the bolt (2) from the front strut.



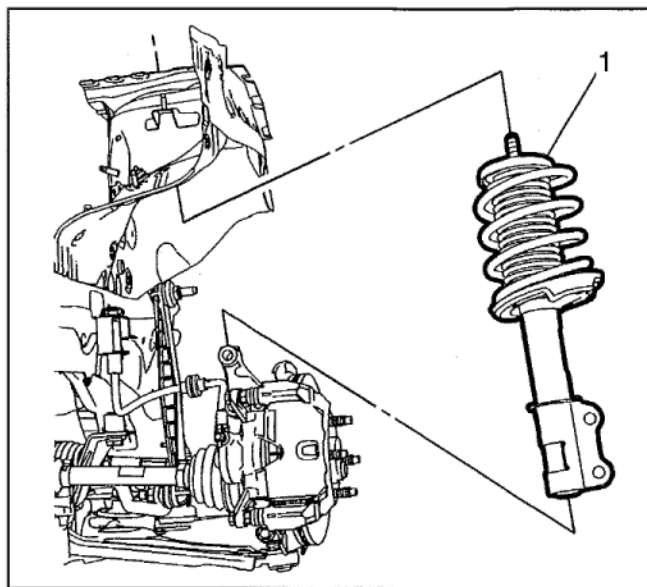
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10. Using the CH 49375 socket (2) and the proper size Torx® wrench, loosen the front strut nut.



2497571

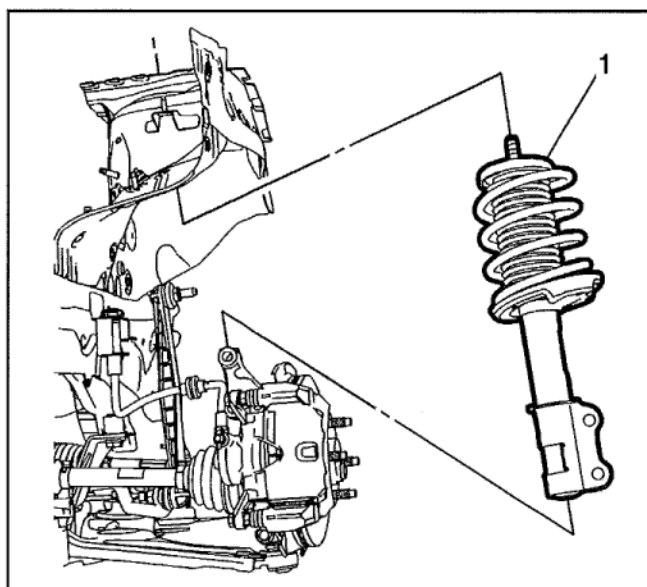
11. Remove the front strut nut (1) and the retaining plate (2).



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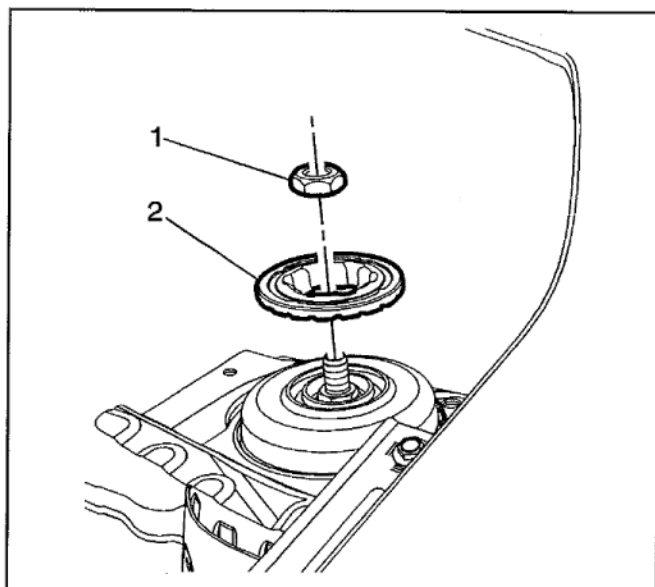
12. Remove the front strut assembly from the vehicle (1).
13. If removing the front strut assembly to service any of the front strut components, refer to *Strut, Strut Component, or Spring Replacement* on page 16-20.

Installation Procedure



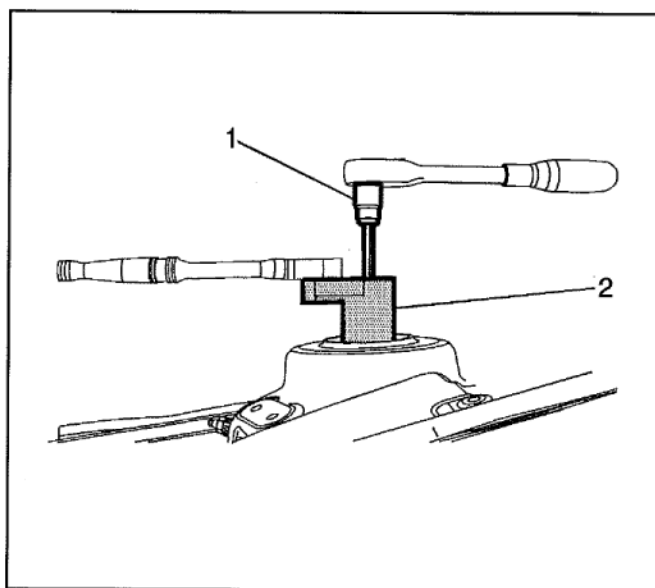
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1. Position the front strut assembly (1) in the vehicle.



2497571

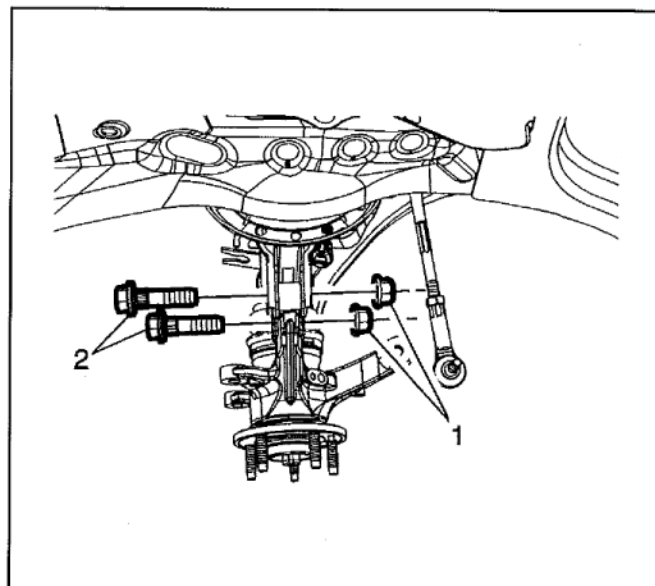
2. Install the front strut nut (1) and the retaining plate (2).



2424066

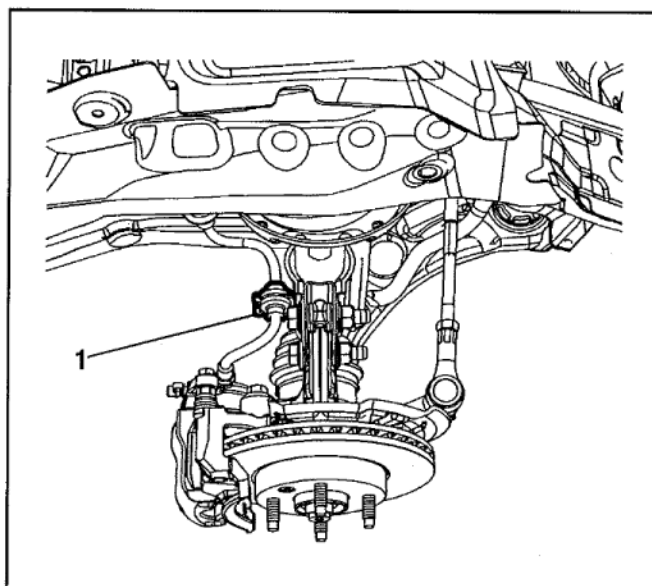
Caution: Refer to *Fastener Caution* on page 0-8.

3. Using the CH 49375 socket (2) and the proper size Torx® wrench to hold the strut shaft, tighten the nut to **65 N·m (48 lb ft)**.



2497931

4. Install the front strut nut (1) and the bolt (2) from the front strut and tighten the nut to **110 N·m (82 lb ft)**.
5. Install the stabilizer shaft link in the front strut assembly. Refer to *Stabilizer Shaft Link Replacement* on page 16-8.
6. Remove the jack stand from the lower control arm.
7. Install the outer tie rod end in the steering knuckle. Refer to *Steering Linkage Outer Tie Rod Replacement* on page 15-17.
8. Install the speed sensor wiring harness on the front strut assembly, if needed.



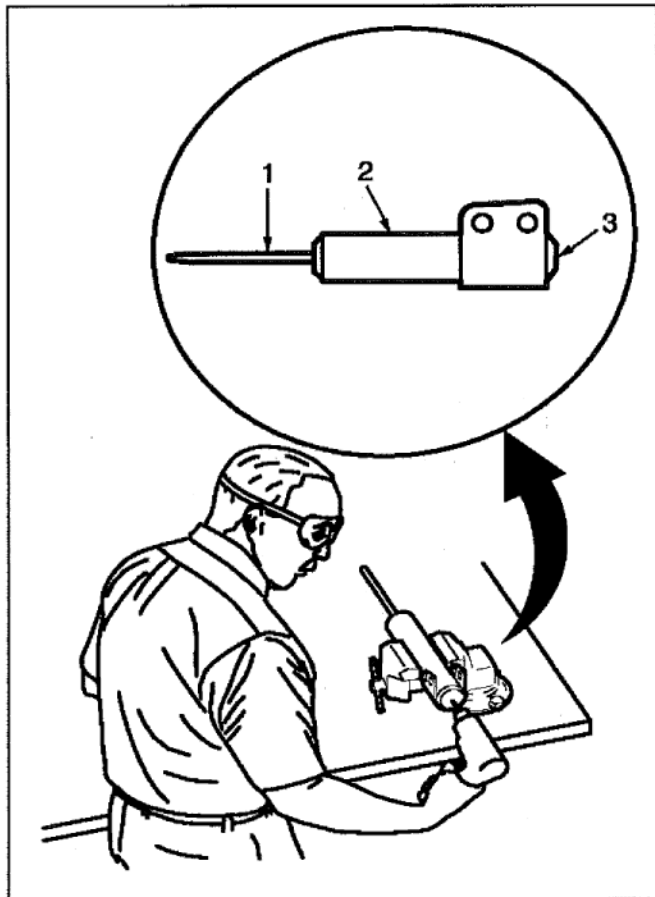
2497949

9. Install the front brake hose (1) on the front strut assembly.
10. Install the tire and wheel assembly. Refer to *Tire and Wheel Removal and Installation* on page 16-60.
11. Remove the support and lower the vehicle.

12. Install the air inlet grille panel. Refer to *Air Inlet Grille Panel Replacement* on page 4-374.

Shock Absorber Disposal

Warning: Use the proper eye protection when drilling to prevent metal chips from causing physical injury.



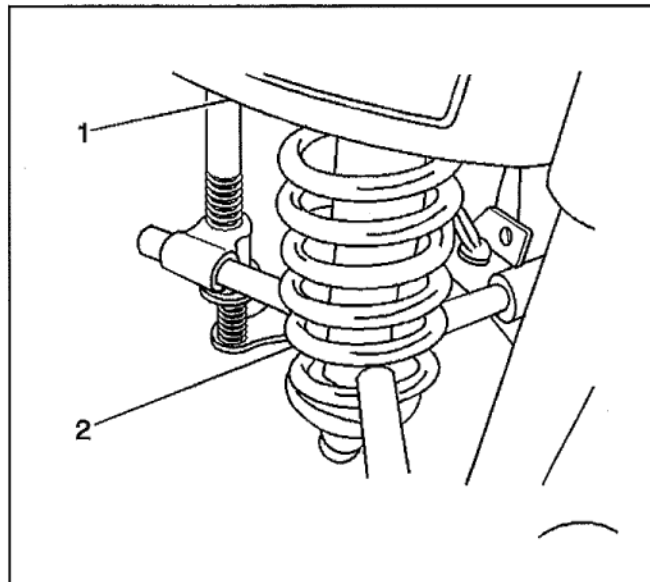
606886

1. Clamp the strut in a vise horizontally with the rod (1) completely extended.
2. Drill a hole in the strut at the center of the end cap (3) using a 5 mm (3/16 in) drill bit. Gas or a gas/oil mixture will exhaust when the drill bit penetrates the strut. Use shop towels in order to contain the escaping oil.
3. Remove the strut from the vise.
4. Hold the strut over a drain pan vertically with the hole down.
5. Move the rod (1) in and out of the tube (2) to completely drain the oil from the strut.

Strut, Strut Component, or Spring Replacement

Disassembly Procedure

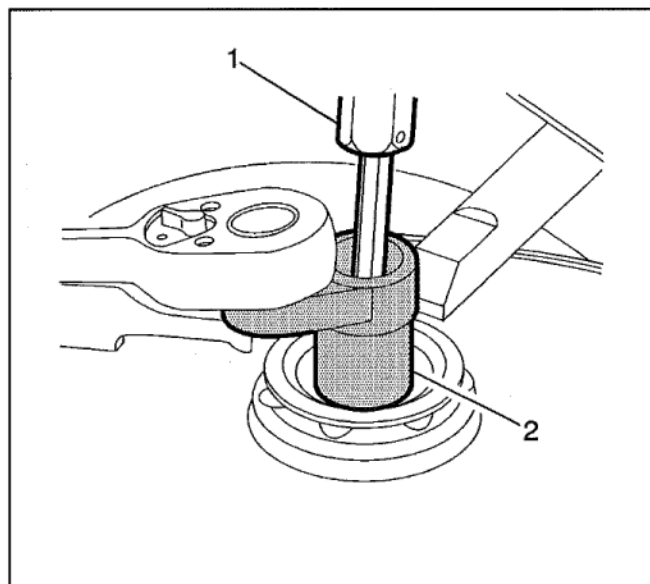
1. Remove the strut assembly from the vehicle. Refer to *Strut Assembly Removal and Installation* on page 16-17.



743246

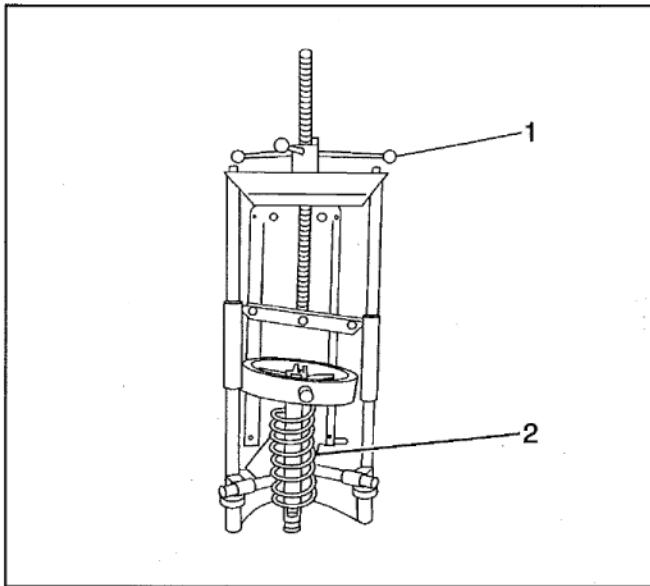
Note: The spring is compressed when the strut moves freely.

2. Install the strut assembly (2) in a suitable spring compressor (1) and compress the front spring.



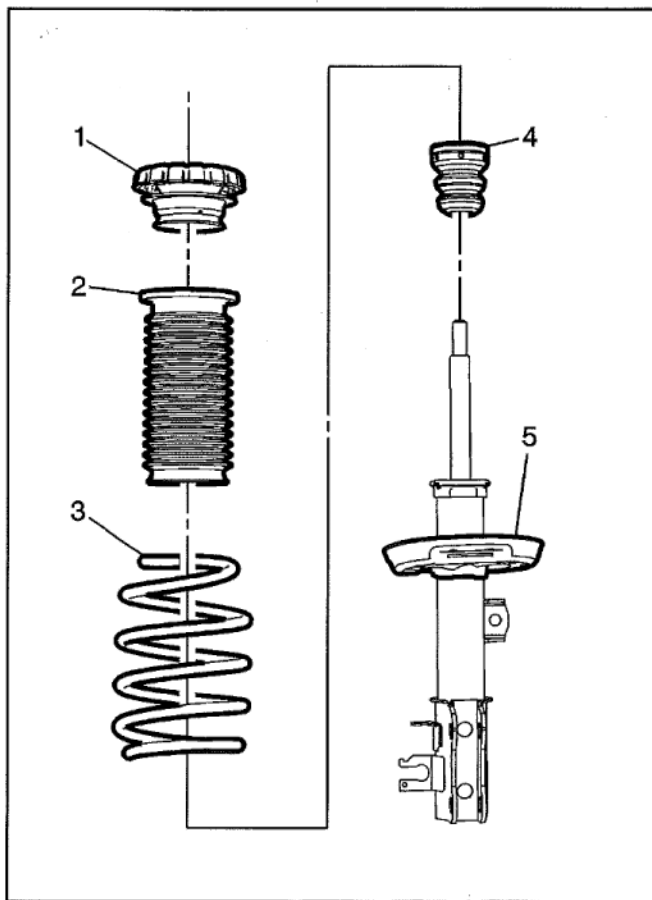
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3. Use a suitable bit (1) and socket (2) to loosen the front suspension strut mount nut.



743241

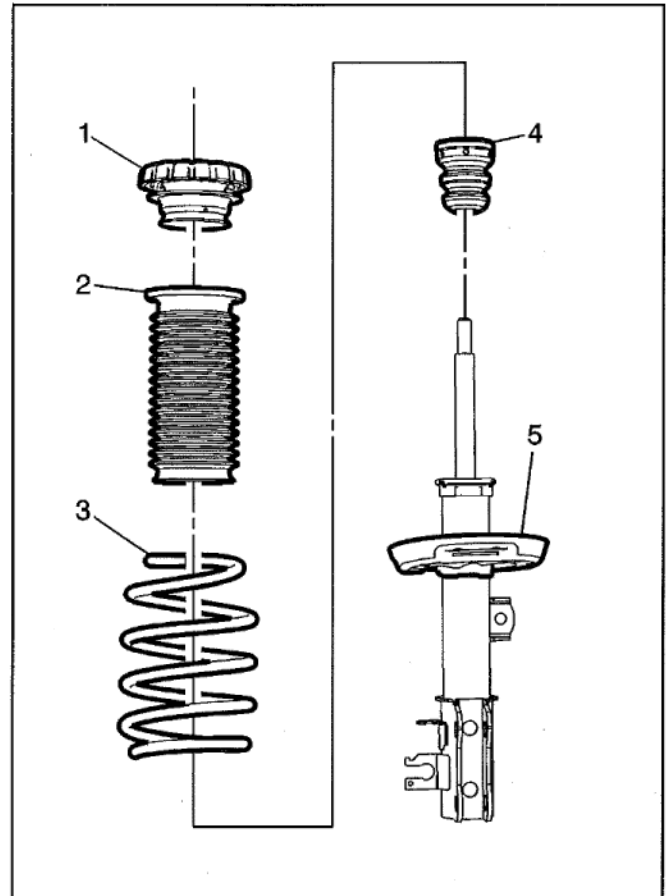
4. Slowly loosen the spring compressor (2) to remove the front suspension strut components to be serviced.



2511340

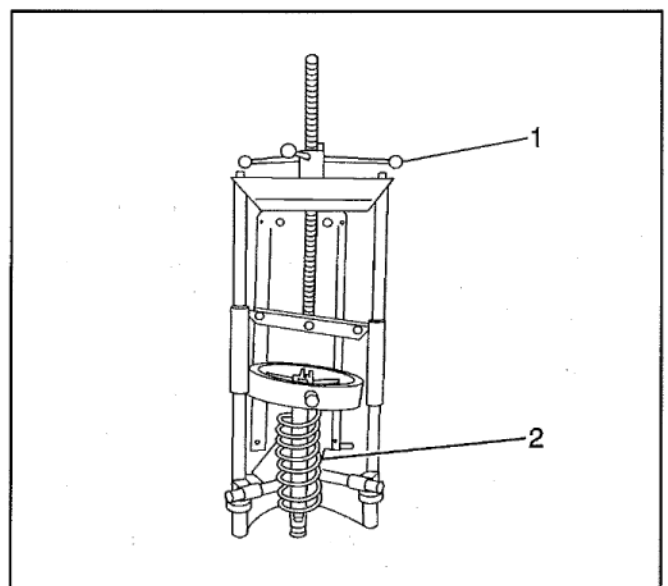
5. Remove the front suspension strut mount assembly (1), front spring insulator (2), front spring (3), front suspension strut bumper (4) and the front strut (5) from the spring compressor.

Assembly Procedure



2511340

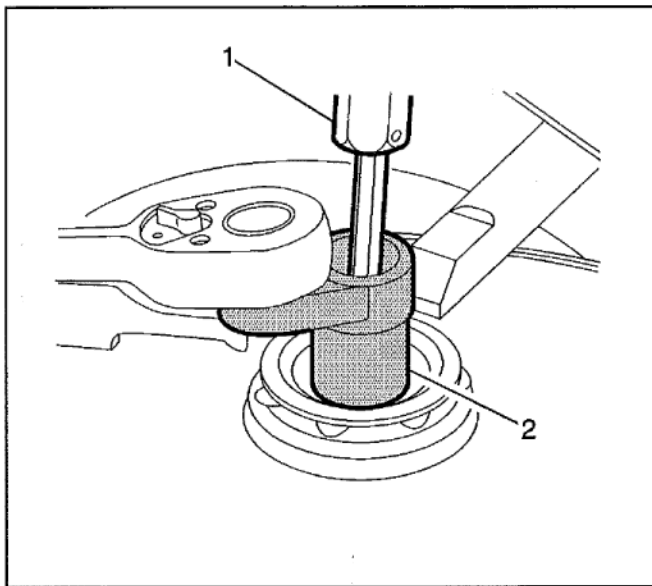
1. Install the front suspension strut (5), front suspension strut bumper (4), front spring (3), front spring insulator (2) and the front suspension strut mount assembly (1) in the spring compressor.



743241

2. Use the spring compressor (1) to compress the front spring (2).

3. Install the front suspension strut mount nut and tighten as much as possible by hand.



2452042

Caution: Refer to *Fastener Caution* on page 0-8.

4. Use a suitable bit (1) and socket (2) to tighten the front suspension strut mount nut to **65 N·m (48 lb ft)**.
5. Remove the strut assembly from the spring compressor.
6. Install the strut assembly. Refer to *Strut Assembly Removal and Installation* on page 16-17.

Description and Operation

Front Suspension Description and Operation

The front suspension has 2 primary purposes:

- Isolate the driver from irregularities in the road surface.
- Define the ride and handling characteristics of the vehicle.

The front suspension absorbs the impact of the tires travelling over irregular road surfaces and dissipates this energy throughout the suspension system. This process isolates the vehicle occupants from the road surface. The rate at which the suspension dissipates the energy and the amount of energy that is absorbed is how the suspension defines the vehicles ride characteristics. Ride characteristics are designed into the suspension system and are not adjustable. The ride characteristics are mentioned in this description in order to aid in the understanding of the functions of the suspension system. The suspension system must allow for the vertical movement of the tire and wheel assembly as the vehicle travels over irregular road surfaces while maintaining the tire's horizontal relationship to the road.

This requires that the steering knuckle be suspended between a lower control arm and a strut assembly. The lower control arm attaches from the steering knuckle at the outermost point of the control arm. The attachment is through a ball and socket type joint. The innermost end of the control arm attached at 2 points to the vehicle frame through semi-rigid bushings. The upper portion of the steering knuckle is attached to a strut assembly. The strut assembly then connects to the vehicle body by way of an upper bearing. The steering knuckle is allowed to travel up and down independent of the vehicle body structure and frame.

This up and down motion of the steering knuckle as the vehicle travels over bumps is absorbed predominantly by the coil spring. This spring is retained under tension over the strut assembly. A strut is used in conjunction with this system in order to dampen out the oscillations of the coil spring. A strut is a basic hydraulic cylinder. The strut is filled with oil and has a moveable shaft that connects to a piston inside the strut. Valves inside the shock absorber offer resistance to oil flow and consequently inhibit rapid movement of the piston and shaft. Each end of the shock absorber is connected in such a fashion to utilize this recoil action of a spring alone. Each end of the strut is designed as the connection point of the suspension system to the vehicle and acts as the coil spring seat. This allows the strut to utilize the dampening action to reduce the recoil of a spring alone. The lower control arm is allowed to pivot at the vehicle frame in a vertical fashion. The ball joint allows the steering knuckle to maintain the perpendicular relationship to the road surface.

Front suspensions systems utilize a stabilizer shaft. The stabilizer bar connects between the left and right lower control arm assemblies through the stabilizer link and stabilizer shaft insulators. This bar controls the amount of independent movement of the suspension when the vehicle turns. Limiting the independent movement defines the vehicles handling characteristics on turns.

Special Tools and Equipment

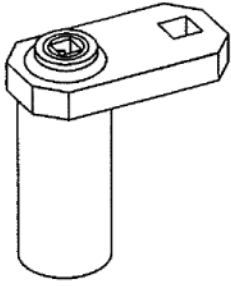
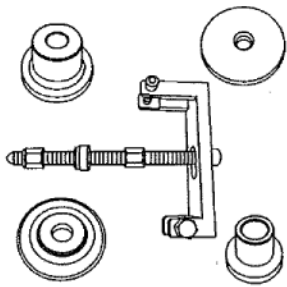
Illustration	Tool Number/ Description
 2330185	CH-49375 CH-8803109 K-8803109 Strut Rod Nut Socket

Illustration	Tool Number/ Description
 400167	CH-24319-B CH 43631 J-24319-B J-43631 Ball Joint Remover
 2548684	CH 50559 Wheel Hub/Bearing Remover/Installer Kit