

2017 SUSPENSION
Front Suspension - Encore, Trax

SPECIFICATIONS

FASTENER SPECIFICATIONS

Single Use Threaded Fastener/Component Tightening Specifications

NOTE: <i>All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.</i>	
Application	Specification
	Metric (English)
Front Lower Control Arm Front Bolt	
• First Pass:	115 N.m (85 lb ft)
• Second Pass:	Loosen 720 degrees
• Third Pass:	80 N.m (59 lb ft)
• Final Pass:	90-105 degrees
Front Lower Control Arm Rear Bolt	
• First Pass:	80 N.m (59 lb ft)
• Final Pass:	60-75 degrees

Reusable Threaded Fastener Tightening Specifications

NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Application	Specification
	Metric (English)
Front Lower Control Arm Ball Stud Nut (At Knuckle)	
• First Pass:	42 N.m (31 lb ft)
• Second Pass:	Loosen 120 degrees
• Third Pass:	35 N.m (26 lb ft)
• Final Pass:	30-45 degrees
Front Lower Control Arm Ball Stud Nut	35 N.m (26 lb ft)
Front Stabilizer Shaft Insulator Clamp Nut	22 N.m (16 lb ft)

NOTE:

All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Front Stabilizer Shaft Link Nut	65 N.m (48 lb ft)
Front Strut Rod Mount Nut	65 N.m (48 lb ft)
Front Suspension Strut Nut	110 N.m (81 lb ft)
Front Suspension Strut Upper Mounting Nut	65 N.m (48 lb ft)

REPAIR INSTRUCTIONS

FRONT SUSPENSION SUPPORT VIBRATION DAMPENER REPLACEMENT

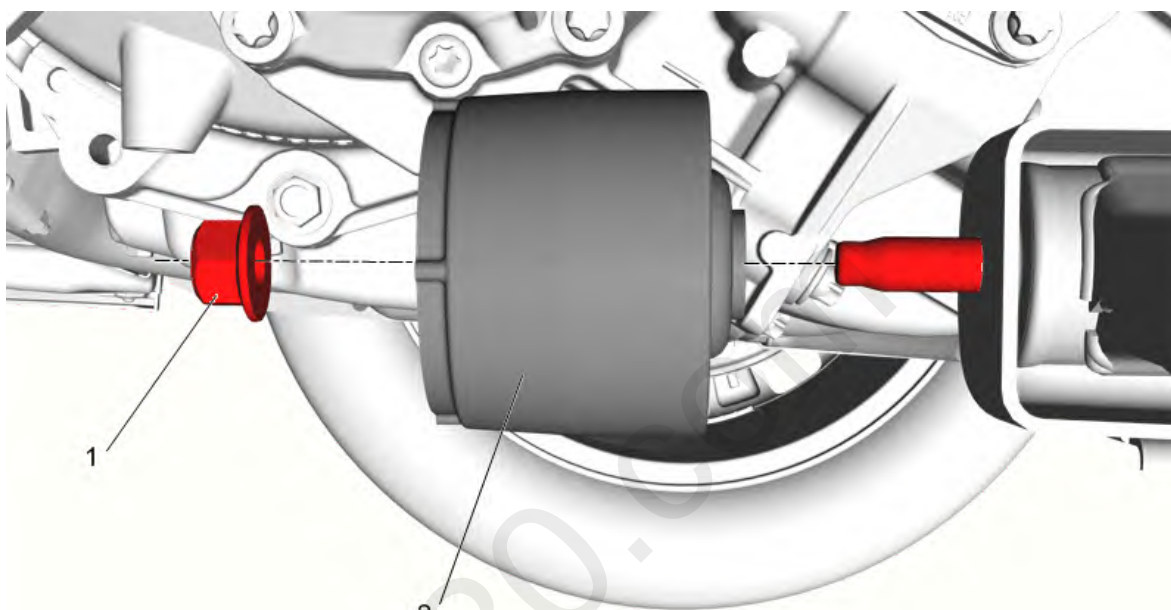


Fig. 1: Front Suspension Support Vibration Dampener

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Front Lower Control Arm Front Nut CAUTION: Refer to Fastener Caution . Tighten Lower Control Arm Replacement
2	Front Suspension Support Vibration Dampener

STABILIZER SHAFT REPLACEMENT

Removal Procedure

1. Remove the intermediate steering shaft lower universal joint. Refer to **Intermediate Steering Shaft Replacement (N40)** **Intermediate Steering Shaft Replacement (NJ1)**
2. Remove the front tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation**
3. Remove Drivetrain and Front Suspension Frame Transmission Protector. Refer to **Drivetrain and Front Suspension Frame Transmission Protector Replacement**

4. Remove Front Wheelhouse Liner-Left Side. Refer to [Front Wheelhouse Liner Replacement \(Chevrolet\)](#), [Front Wheelhouse Liner Replacement \(Buick\)](#).
5. Separate Steering Linkage Outer Tie Rod (Qty: 2) @ Steering Knuckle. Refer to [Steering Linkage Outer Tie Rod Replacement](#).
6. Separate Front Stabilizer Shaft Link (Qty: 2) @ Front Stabilizer Shaft. Refer to [Stabilizer Shaft Link Replacement](#).
7. Separate Front Lower Control Arm (Qty: 2) @ Steering Knuckle. Refer to [Lower Control Arm Replacement](#).
8. Separate Exhaust Isolator (Qty: 2) @ Drivetrain and Front Suspension Frame. Refer to [Exhaust Front Pipe Replacement \(LUV\)](#), [Exhaust Front Pipe Replacement \(2H0\)](#), [Exhaust Front Pipe Replacement \(LE2\)](#).
9. Remove Rear Transmission Mount Through Bolt. Refer to [Transmission Mount Bracket Replacement - Rear \(All Wheel Drive\)](#), [Transmission Mount Bracket Replacement - Rear \(Front Wheel Drive\)](#).
10. Position adjustable stands underneath the left and right sides of the rear of the drivetrain and front suspension frame.
11. Loosen, but do NOT remove, the drivetrain and front suspension frame front bolts. Refer to [Drivetrain and Front Suspension Frame Replacement \(Long Cradle\)](#), [Drivetrain and Front Suspension Frame Replacement \(Short Cradle\)](#), [Drivetrain and Front Suspension Frame Replacement \(Long Cradle - V50\)](#).
12. Remove the drivetrain and front suspension frame upper and rear bolts. Refer to [Drivetrain and Front Suspension Frame Replacement \(Long Cradle\)](#), [Drivetrain and Front Suspension Frame Replacement \(Short Cradle\)](#), [Drivetrain and Front Suspension Frame Replacement \(Long Cradle - V50\)](#).

NOTE: It is NOT necessary to remove the front bumper fascia in this procedure.

13. Partially lower the rear of the drivetrain and front suspension frame to gain clearance for the front stabilizer shaft.

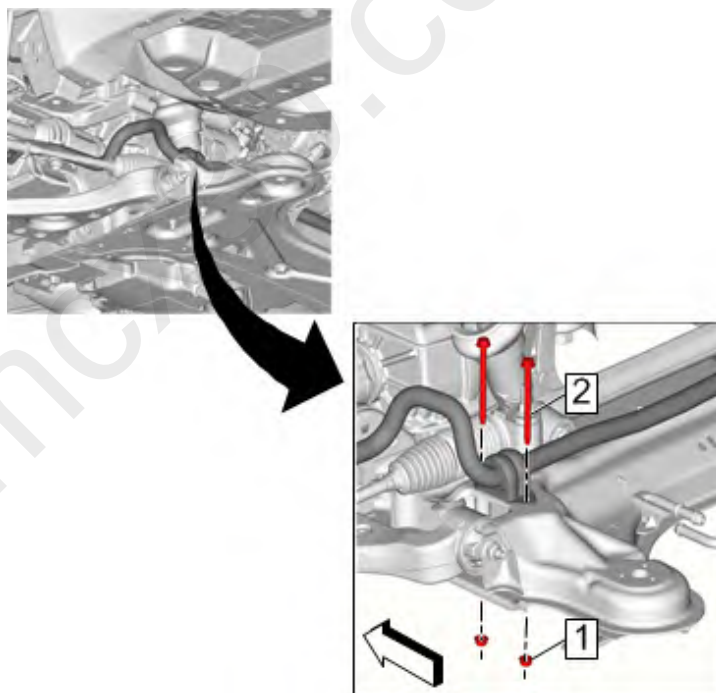


Fig. 2: Front Stabilizer Shaft Insulator Clamp Bolt/Nut
Courtesy of GENERAL MOTORS COMPANY

14. Remove Front Stabilizer Shaft Insulator Clamp Nuts (1) (Qty: 2)
15. Remove Front Stabilizer Shaft Insulator Clamp Bolts (1) (Qty: 2)

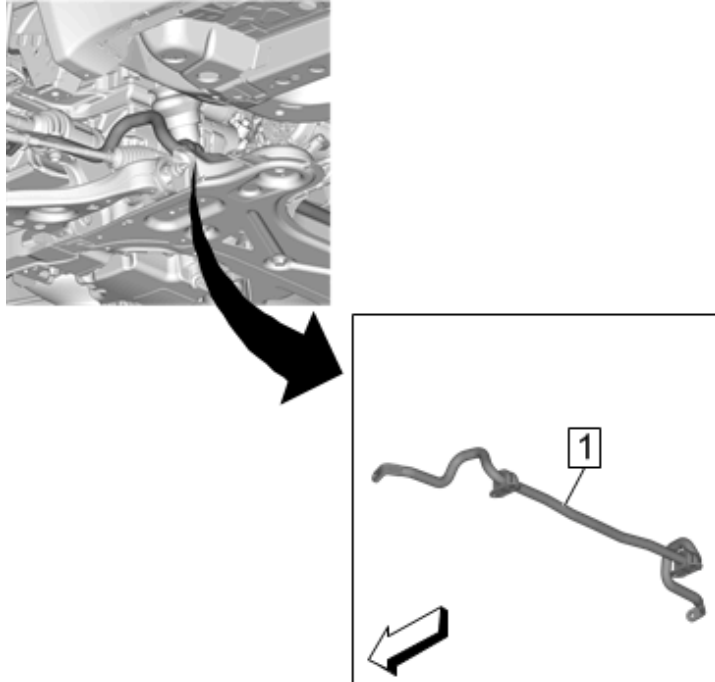


Fig. 3: Front Stabilizer Shaft

Courtesy of GENERAL MOTORS COMPANY

16. Remove the front stabilizer shaft (1) from the drivetrain and front suspension frame.

Installation Procedure

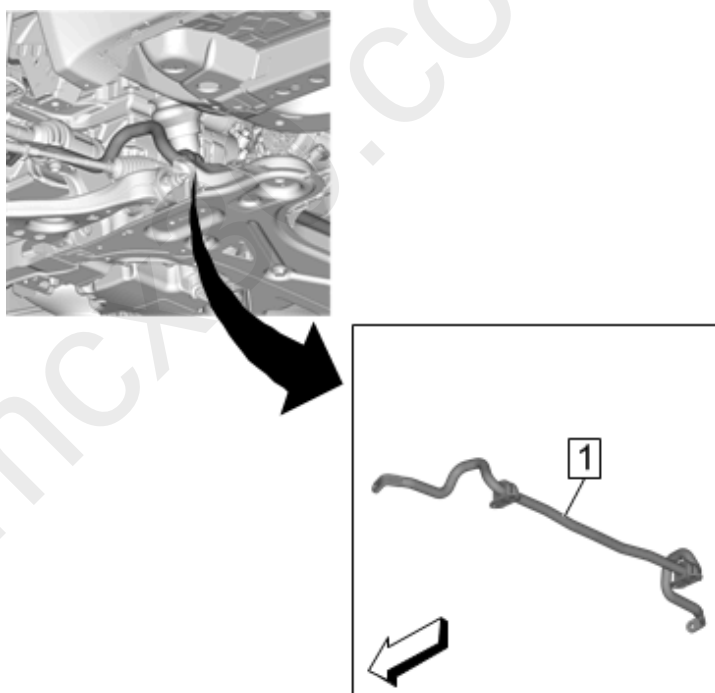


Fig. 4: Front Stabilizer Shaft

Courtesy of GENERAL MOTORS COMPANY

1. Position the stabilizer shaft (1) on the drivetrain and front suspension frame.

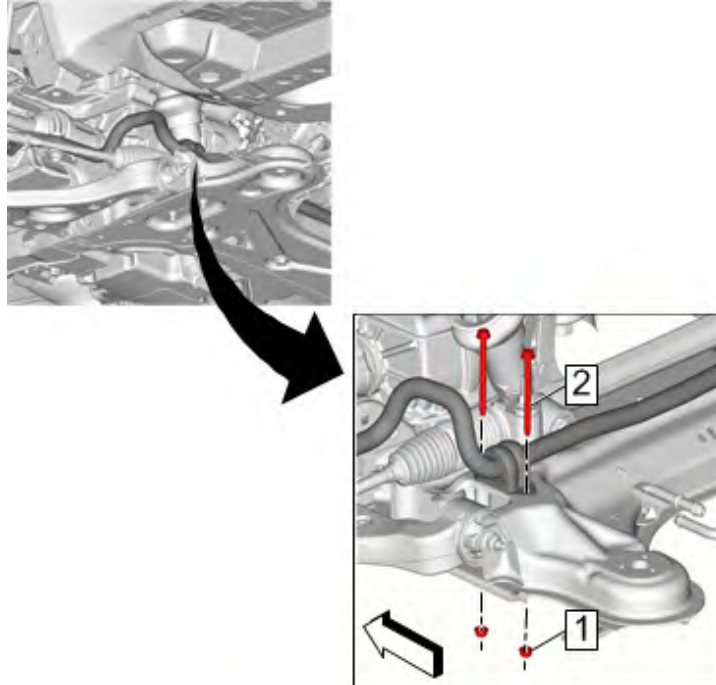


Fig. 5: Front Stabilizer Shaft Insulator Clamp Bolt/Nut
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Start ALL fasteners by hand before tightening.

2. Install Front Stabilizer Shaft Insulator Clamp Bolts (2) (Qty: 2)

CAUTION: Refer to Fastener Caution .

3. Install and tighten Front Stabilizer Shaft Insulator Clamp Nuts (1) (Qty: 2) to 22 N.m (16 lb ft)
4. Raise the rear of the drivetrain and front suspension frame.
5. Install ALL drivetrain and front suspension frame bolts. Refer to Drivetrain and Front Suspension Frame Replacement (Long Cradle) Drivetrain and Front Suspension Frame Replacement (Short Cradle) Drivetrain and Front Suspension Frame Replacement (Long Cradle - V50).
6. Remove the adjustable stands from underneath the vehicle.
7. Install Rear Transmission Mount Through Bolt. Refer to Transmission Mount Bracket Replacement - Rear (FWD) Transmission Mount Bracket Replacement - Rear (AWD).
8. Install Exhaust Isolator (Qty: 2) @ Drivetrain and Front Suspension Frame. Refer to Exhaust Front Pipe Replacement (LUV) Exhaust Front Pipe Replacement (2H0) Exhaust Front Pipe Replacement (LE2).
9. Install Front Lower Control Arm (Qty: 2) @ Steering Knuckle. Refer to Lower Control Arm Replacement.
10. Install Front Stabilizer Shaft Link (Qty: 2) @ Front Stabilizer Shaft. Refer to Stabilizer Shaft Link Replacement.
11. Install Steering Linkage Outer Tie Rod (Qty: 2) @ Steering Knuckle. Refer to Steering Linkage Outer Tie Rod Replacement.
12. Install Front Wheelhouse Liner-Left Side. Refer to Front Wheelhouse Liner Replacement (Chevrolet) Front Wheelhouse Liner Replacement (Buick).
13. Install Drivetrain and Front Suspension Frame Transmission Protector. Refer to Drivetrain and Front Suspension Frame Transmission Protector Replacement.
14. Install the front tire and wheel assemblies. Refer to Tire and Wheel Removal and Installation.
15. Install the intermediate steering shaft lower universal joint. Refer to Intermediate Steering Shaft Replacement (N40) Intermediate Steering Shaft Replacement (NJ1).
16. Measure and adjust the wheel alignment. Refer to Wheel Alignment Measurement.

STABILIZER SHAFT LINK REPLACEMENT

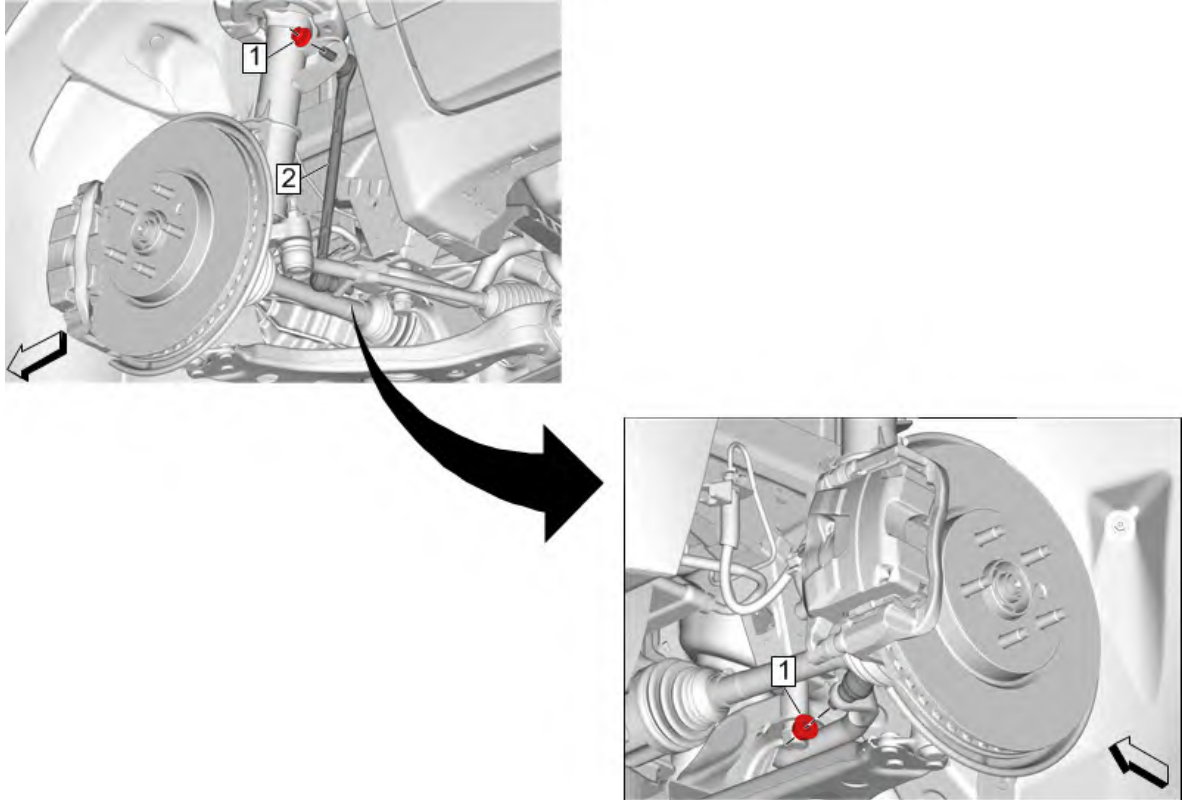


Fig. 6: Stabilizer Shaft Link

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front tire and wheel assembly. Refer to Tire and Wheel Removal and Installation	
1	Front Stabilizer Shaft Link Nut (Qty: 2) CAUTION: Refer to Fastener Caution . Procedure Use the proper tool to hold the front stabilizer shaft link stud from rotating while loosening the front stabilizer shaft link nut. Tighten 65 N.m (48 lb ft)
2	Front Stabilizer Shaft Link

FRONT WHEEL BEARING AND HUB REPLACEMENT

Special Tools

CH-50559 Wheel Hub/Bearing Remover Kit

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Remove Steering Knuckle. Refer to [Steering Knuckle Replacement](#)
2. Position the steering knuckle in a suitable vise.

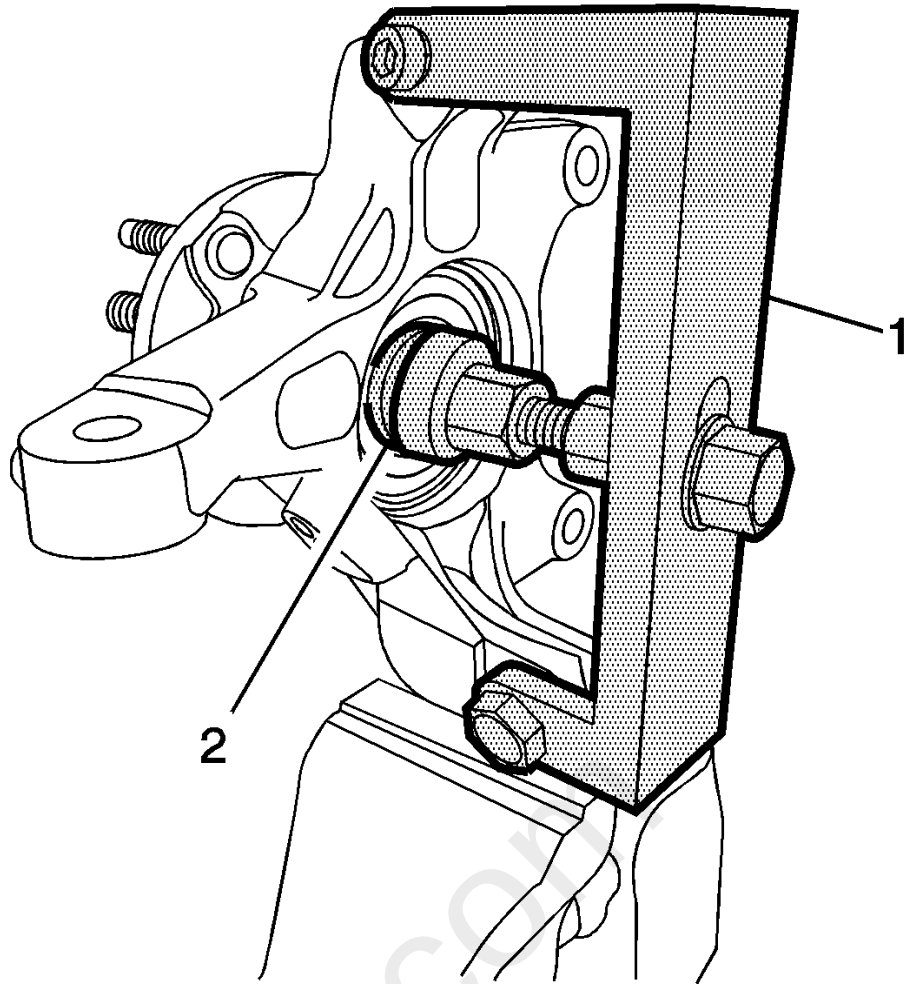


Fig. 7: Steering Knuckle Assembly & Wheel Hub/Bearing Remover Kit
Courtesy of GENERAL MOTORS COMPANY

3. Position the **CH-50559-1** bridge assembly (1) and the **CH-50559-2** removal/installation adapter (2) on the steering knuckle.
4. Use the **CH-50559-1** bridge assembly (1) and the **CH-50559-2** removal/installation adapter (2) to separate the front wheel bearing from the hub assembly.

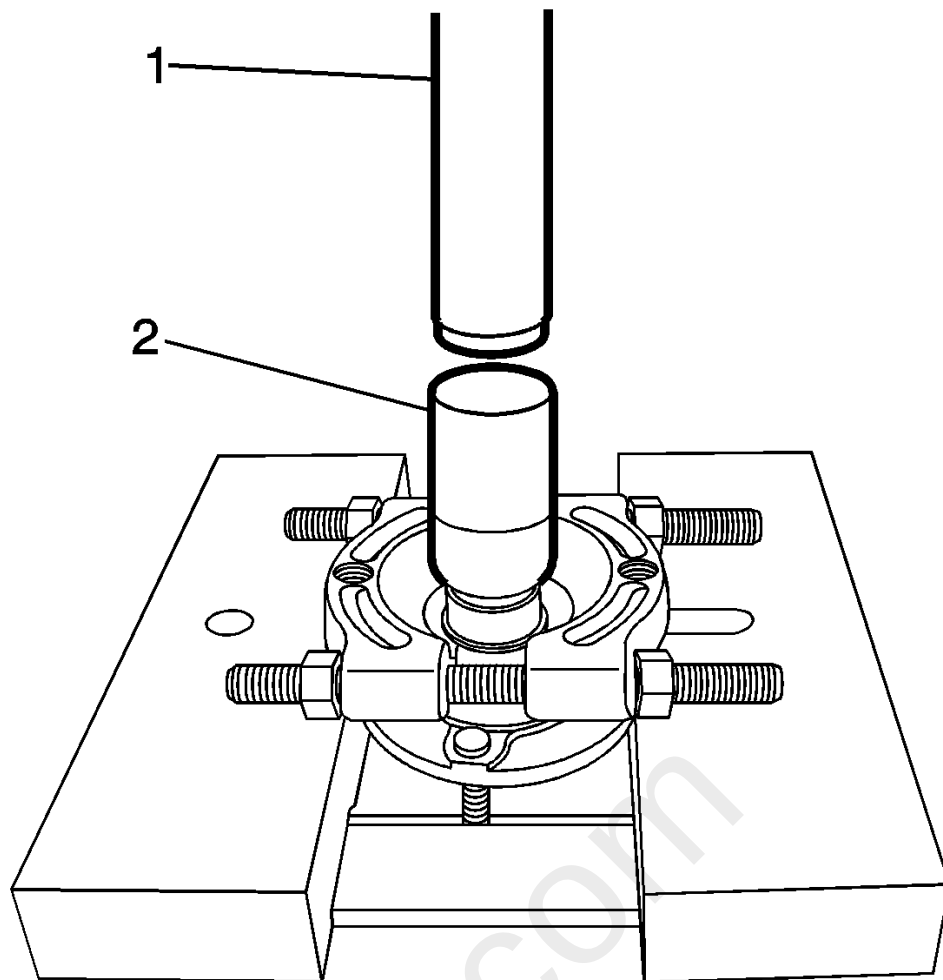


Fig. 8: Wheel Hub/Bearing Removal/Installation Bridge Assembly And Adapter
Courtesy of GENERAL MOTORS COMPANY

5. If the front wheel bearing inner race is removed with the front wheel hub, use a hydraulic press (1) and appropriate adaptor (2) to remove the inner race from the wheel hub.

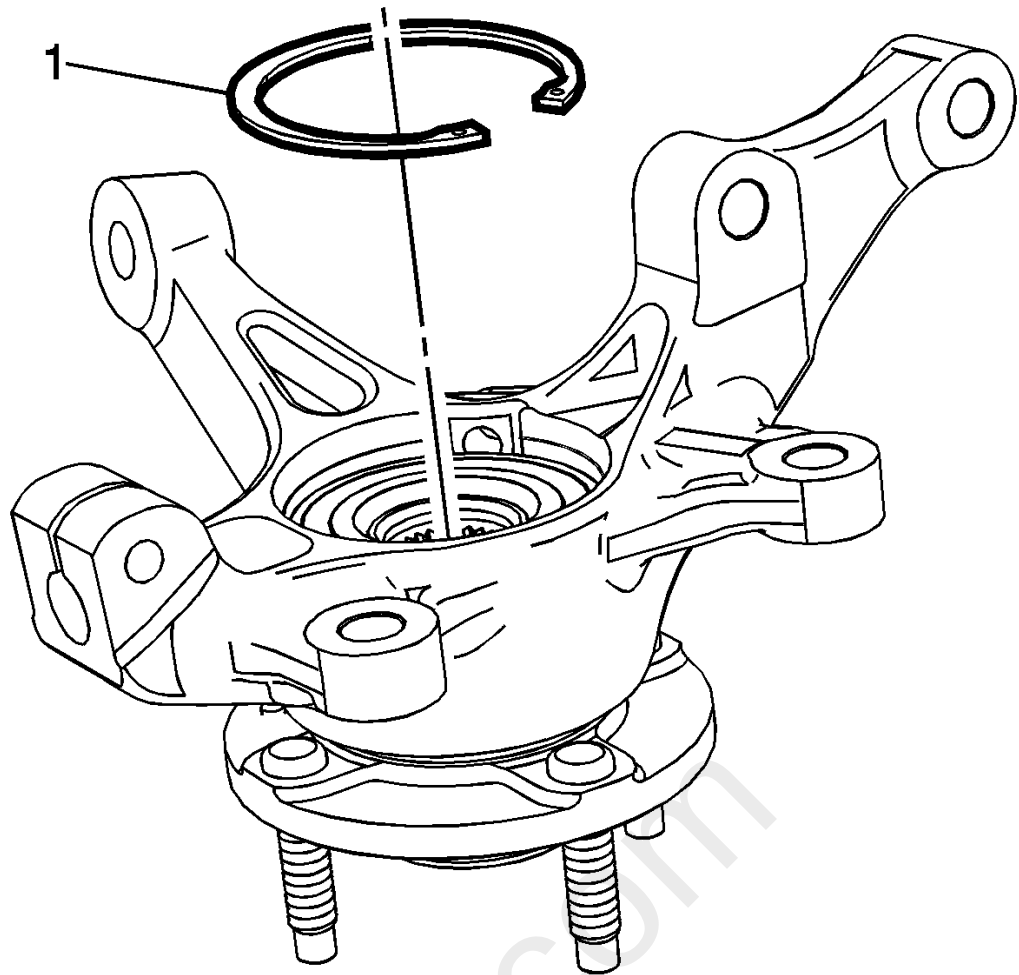


Fig. 9: Steering Knuckle Retaining Ring
Courtesy of GENERAL MOTORS COMPANY

6. Remove the front wheel bearing retaining ring (1) from the steering knuckle.

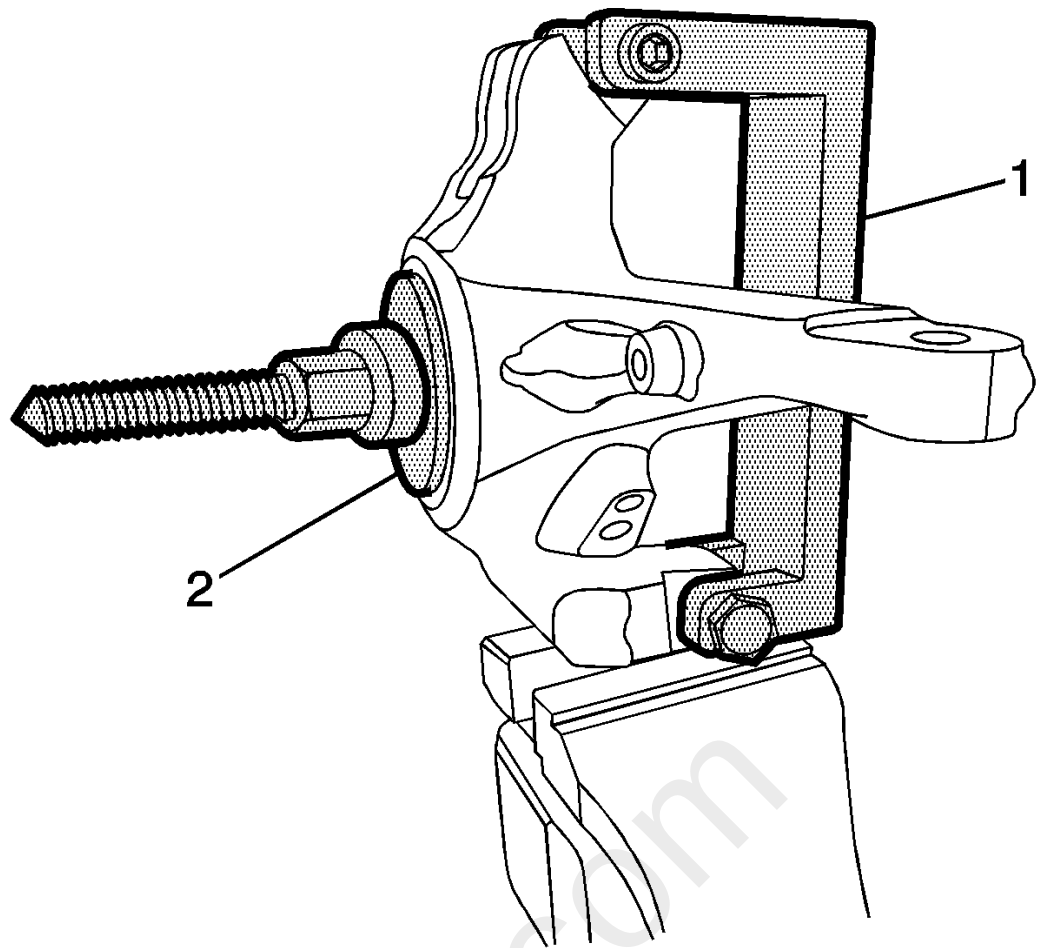


Fig. 10: Wheel Hub/Bearing Removal/Installation Bridge Assembly & Adapter
Courtesy of GENERAL MOTORS COMPANY

7. Position the **CH-50559-1** bridge assembly (1) and the **CH-50559-3** removal adapter (2) on the steering knuckle.

NOTE:

- Inspect the bore of the steering knuckle for pitting, scoring wear, or corrosion.
- Replace the steering knuckle if the damage cannot be easily cleaned up with light sanding.

8. Remove the front wheel bearing from the steering knuckle.

DISCARD the wheel bearing.

Installation Procedure

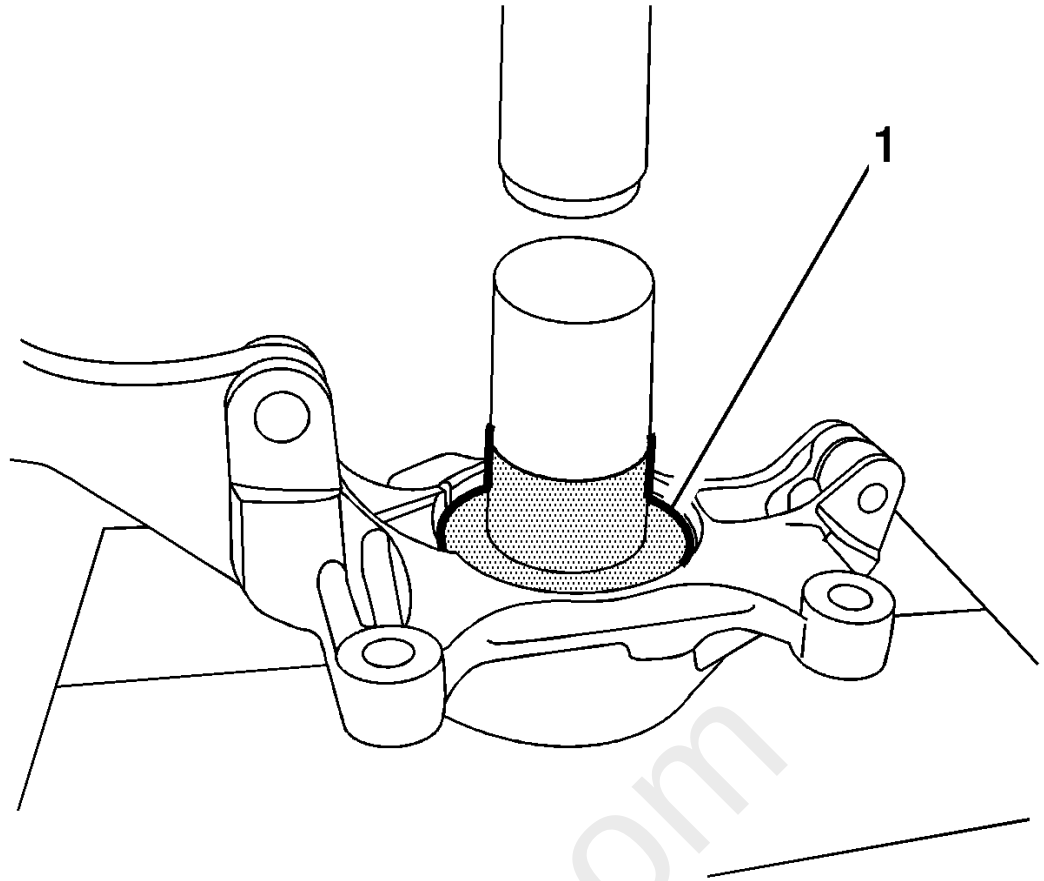


Fig. 11: Wheel Hub/Bearing Remover/Installer Adapter

Courtesy of GENERAL MOTORS COMPANY

NOTE:

- The front wheel bearing **MUST** be installed so that the reluctor ring with the brown band is facing toward the wheel speed sensor.
- Ensure the front wheel bearing is seated evenly in the steering knuckle.

1. Use the **CH-50559-4** installation adapter (1), appropriate extension, and hydraulic press to install the NEW front wheel bearing into the steering knuckle. Ensure the reluctor ring with the brown band is facing toward the wheel speed sensor.

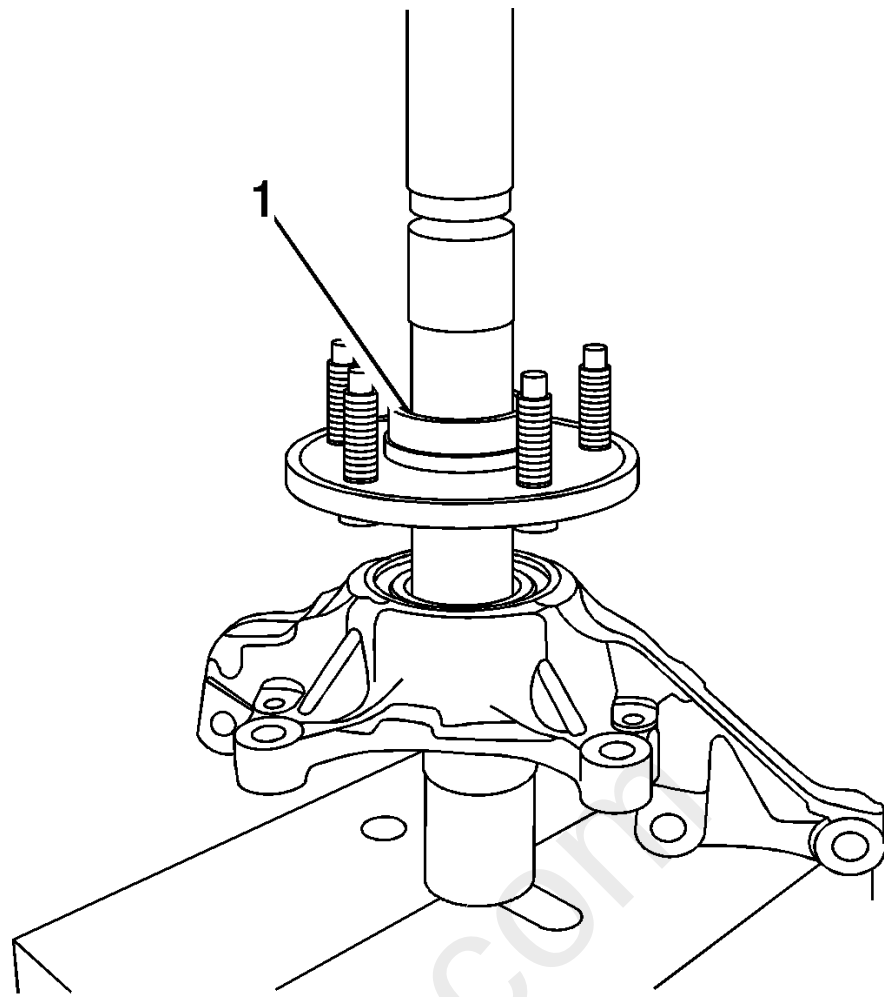


Fig. 12: Wheel Hub/Bearing Remover/Installer Kit
Courtesy of GENERAL MOTORS COMPANY

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

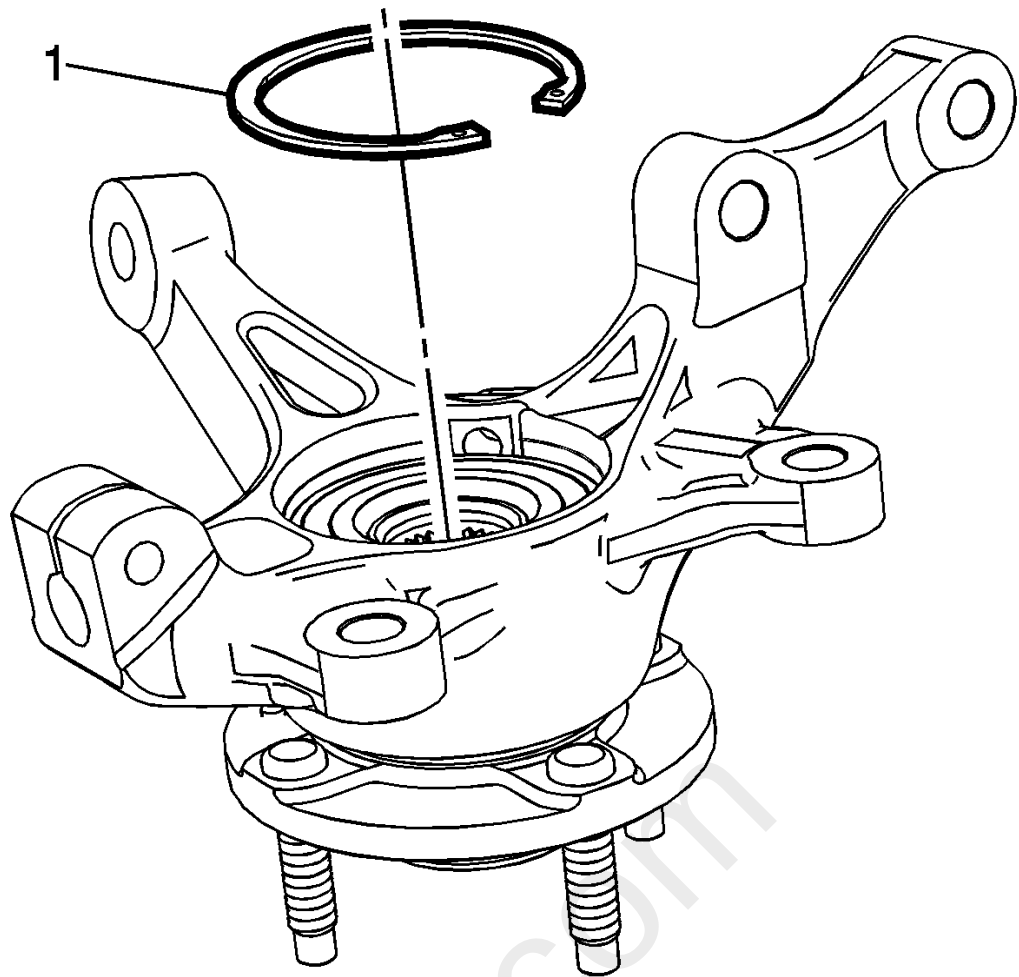


Fig. 13: Steering Knuckle Retaining Ring
Courtesy of GENERAL MOTORS COMPANY

5. Install the front wheel bearing retaining ring (1) in the steering knuckle.
6. Verify the front wheel bearing and hub assembly rotates smoothly.
7. Install Steering Knuckle. Refer to [Steering Knuckle Replacement](#)

STEERING KNUCKLE REPLACEMENT

Removal Procedure

1. Remove Front Wheel Speed Sensor @ Steering Knuckle. Refer to [Front Wheel Speed Sensor Replacement](#)
2. Separate Front Wheel Drive Shaft @ Steering Knuckle. Refer to [Front Wheel Drive Shaft Replacement - Left Side](#) , or [Front Wheel Drive Shaft Replacement - Right Side](#)
3. Remove Front Brake Shield. Refer to [Front Brake Shield Replacement](#)
4. Separate Steering Linkage Outer Tie Rod @ Steering Knuckle. Refer to [Steering Linkage Outer Tie Rod Replacement](#)
5. Separate Front Lower Control Arm @ Steering Knuckle. Refer to [Lower Control Arm Replacement](#)
6. Separate Strut Assembly @ Steering Knuckle. Refer to [Strut Assembly Removal and Installation](#)

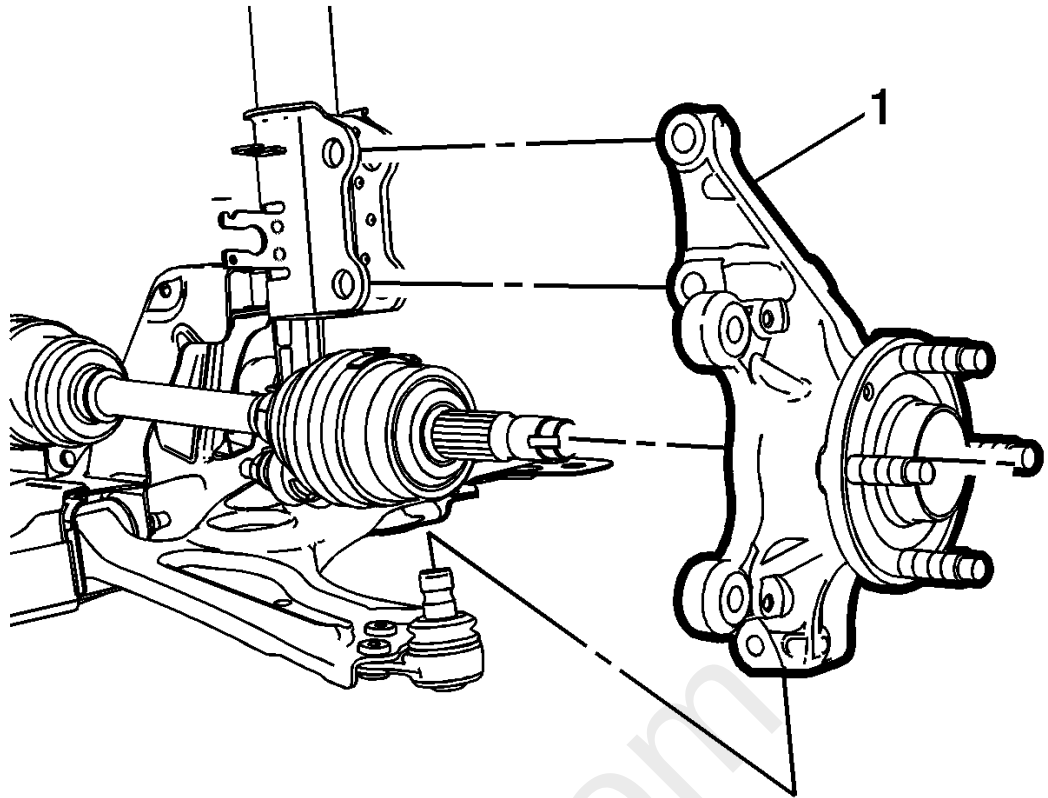


Fig. 14: Steering Knuckle Assembly

Courtesy of GENERAL MOTORS COMPANY

7. Remove the steering knuckle (1) from the vehicle.
8. Transfer components as necessary.

Installation Procedure

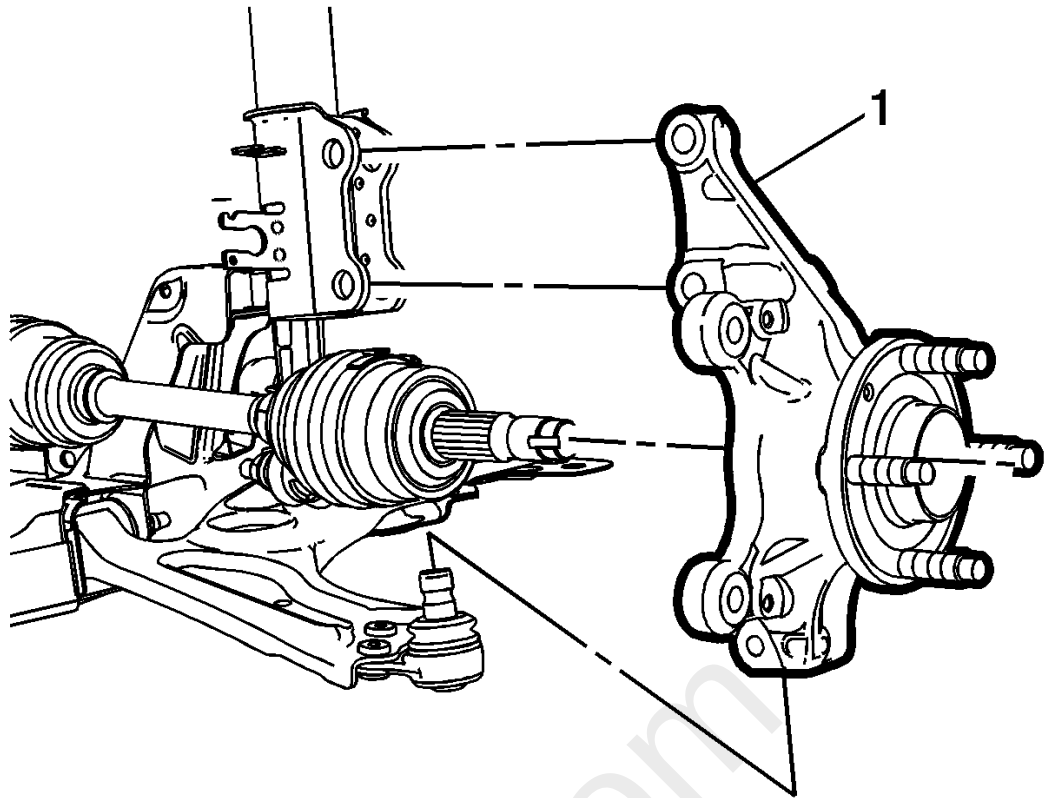


Fig. 15: Steering Knuckle Assembly

Courtesy of GENERAL MOTORS COMPANY

1. Position the steering knuckle (1) on the vehicle.
2. Install Strut Assembly @ Steering Knuckle. Refer to [Strut Assembly Removal and Installation](#)
3. Install Front Lower Control Arm @ Steering Knuckle. Refer to [Lower Control Arm Replacement](#)
4. Install Steering Linkage Outer Tie Rod @ Steering Knuckle. Refer to [Steering Linkage Outer Tie Rod Replacement](#)
5. Install Front Brake Shield. Refer to [Front Brake Shield Replacement](#)
6. Install Front Wheel Drive Shaft @ Steering Knuckle. Refer to [Front Wheel Drive Shaft Replacement - Left Side](#) , or [Front Wheel Drive Shaft Replacement - Right Side](#)
7. Install Front Wheel Speed Sensor @ Steering Knuckle. Refer to [Front Wheel Speed Sensor Replacement](#)
8. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

LOWER CONTROL ARM REPLACEMENT

Removal Procedure

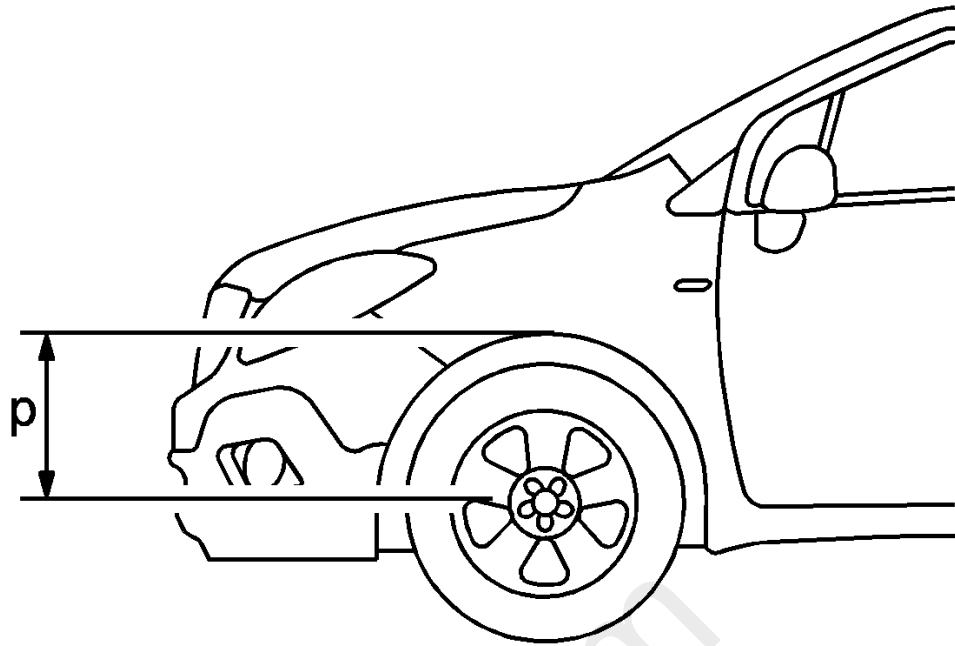


Fig. 16: Front Suspension Measurement

Courtesy of GENERAL MOTORS COMPANY

1. Record the front suspension measurement (p) at curb weight.

Measurement (p) is the distance from the center of the wheel to the bottom of the front fender.

2. Remove the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)

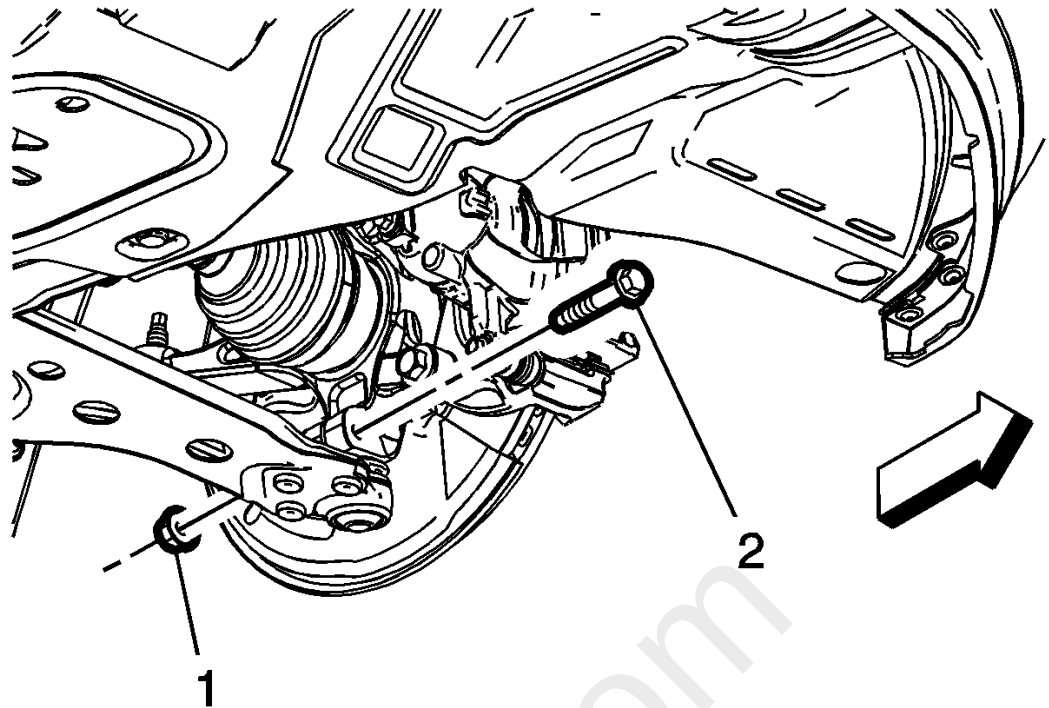


Fig. 17: Front Lower Control Arm Ball Stud Nut And Bolt
 Courtesy of GENERAL MOTORS COMPANY

3. Remove Front Lower Control Arm Ball Stud Nut (1)
4. Remove Front Lower Control Arm Ball Stud Bolt (2)

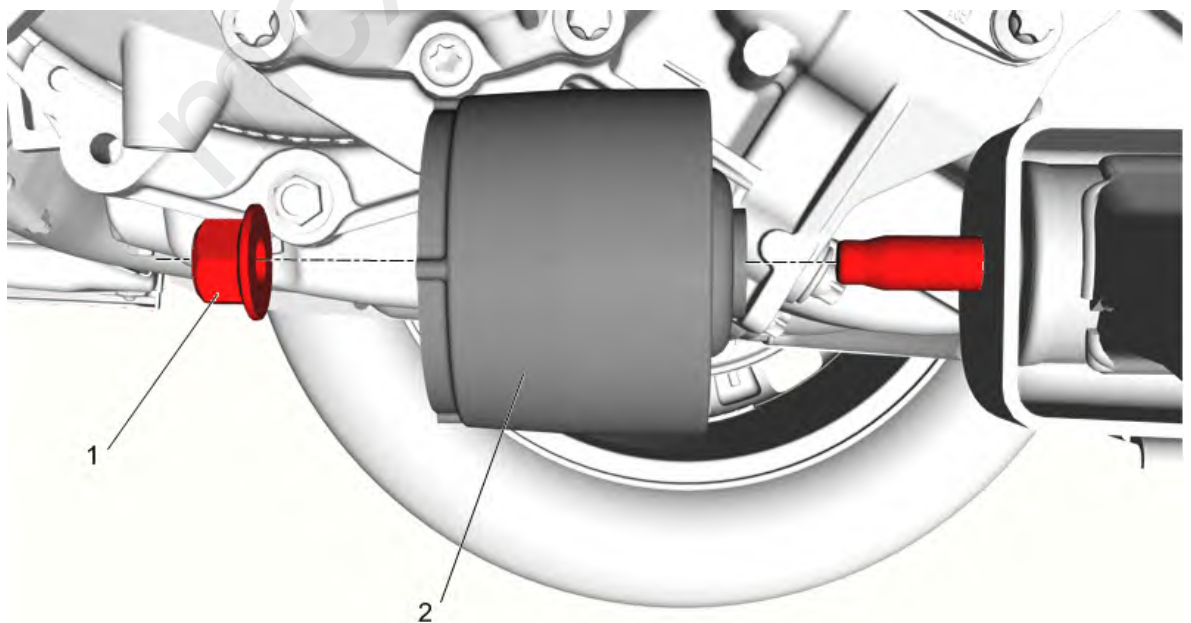


Fig. 18: Front Suspension Support Vibration Dampener
 Courtesy of GENERAL MOTORS COMPANY

5. {If equipped} Remove Front Suspension Support Vibration Dampener (2). Refer to [Front Suspension Support Vibration Dampener Replacement](#)

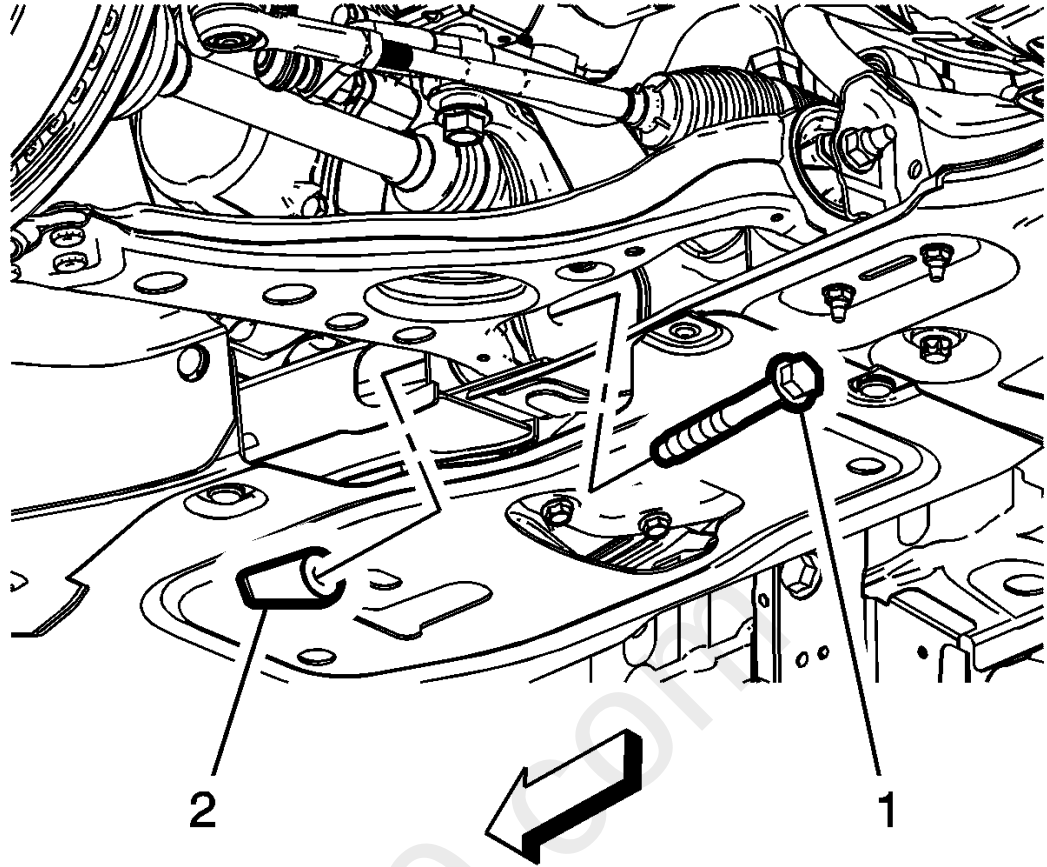


Fig. 19: Front Lower Control Arm Front Bolt And Nut
Courtesy of GENERAL MOTORS COMPANY

6. Remove Front Lower Control Arm Front Nut (2)
7. Remove Front Lower Control Arm Front Bolt (1)

DISCARD the bolt.

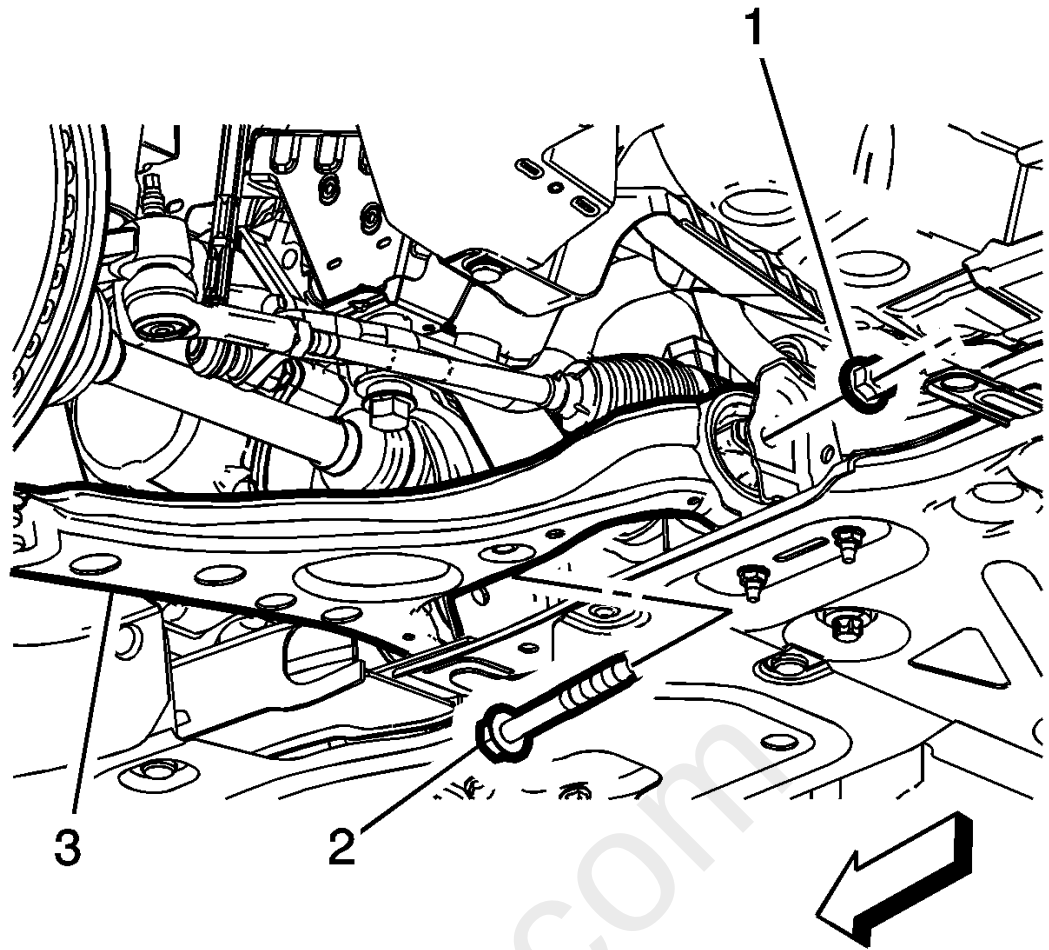


Fig. 20: Front Lower Control Arm, Rear Nut And Bolt
Courtesy of GENERAL MOTORS COMPANY

8. Remove Front Lower Control Arm Rear Nut (1)
9. Remove Front Lower Control Arm Rear Bolt (2)

DISCARD the bolt.

10. Remove the front lower control arm (3).

Installation Procedure

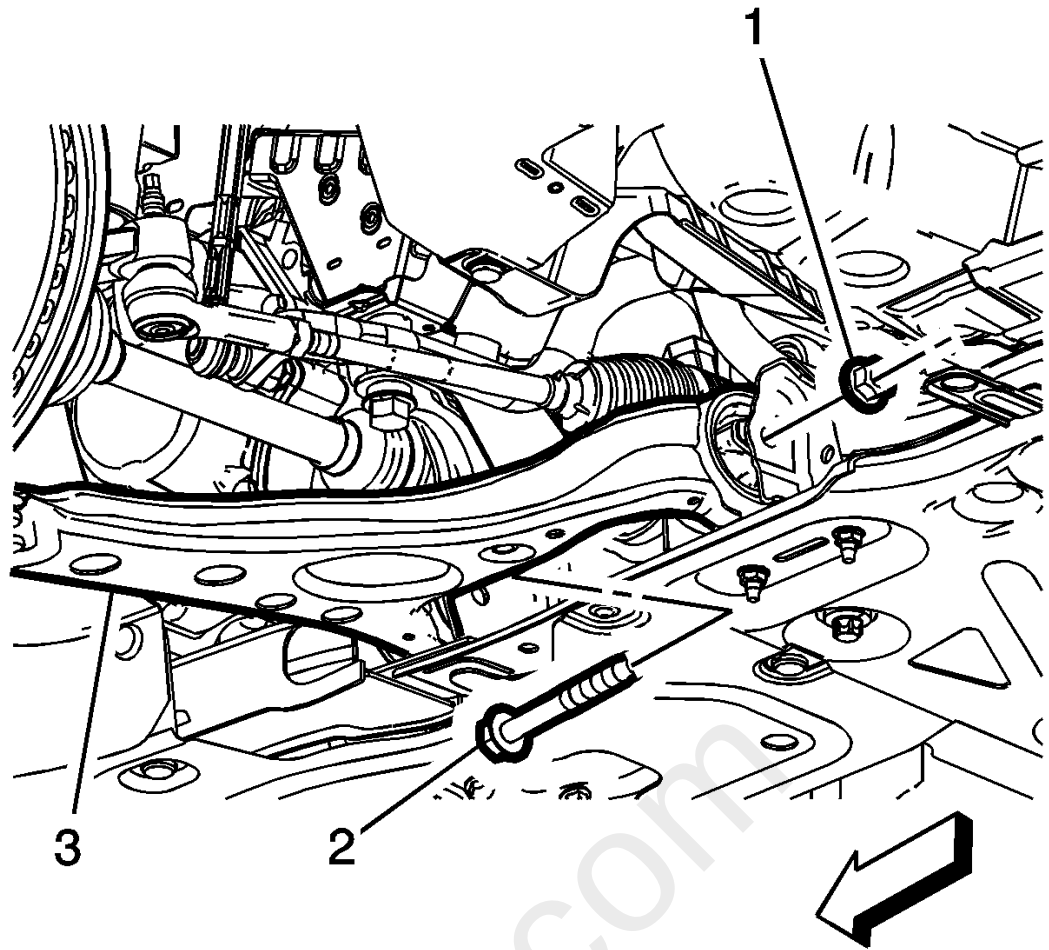


Fig. 21: Front Lower Control Arm, Rear Nut And Bolt
Courtesy of GENERAL MOTORS COMPANY

1. Position the front lower control arm (3) on the vehicle.

CAUTION: This vehicle is equipped with torque-to-yield or single use fasteners. Install a **NEW** torque-to-yield or single use fastener when installing this component. Failure to replace the torque-to-yield or single use fastener could cause damage to the vehicle or component.

2. Install Front Lower Control Arm Rear Bolt (2)

Install a NEW bolt.

3. Install and hand tighten Front Lower Control Arm Rear Nut (1)

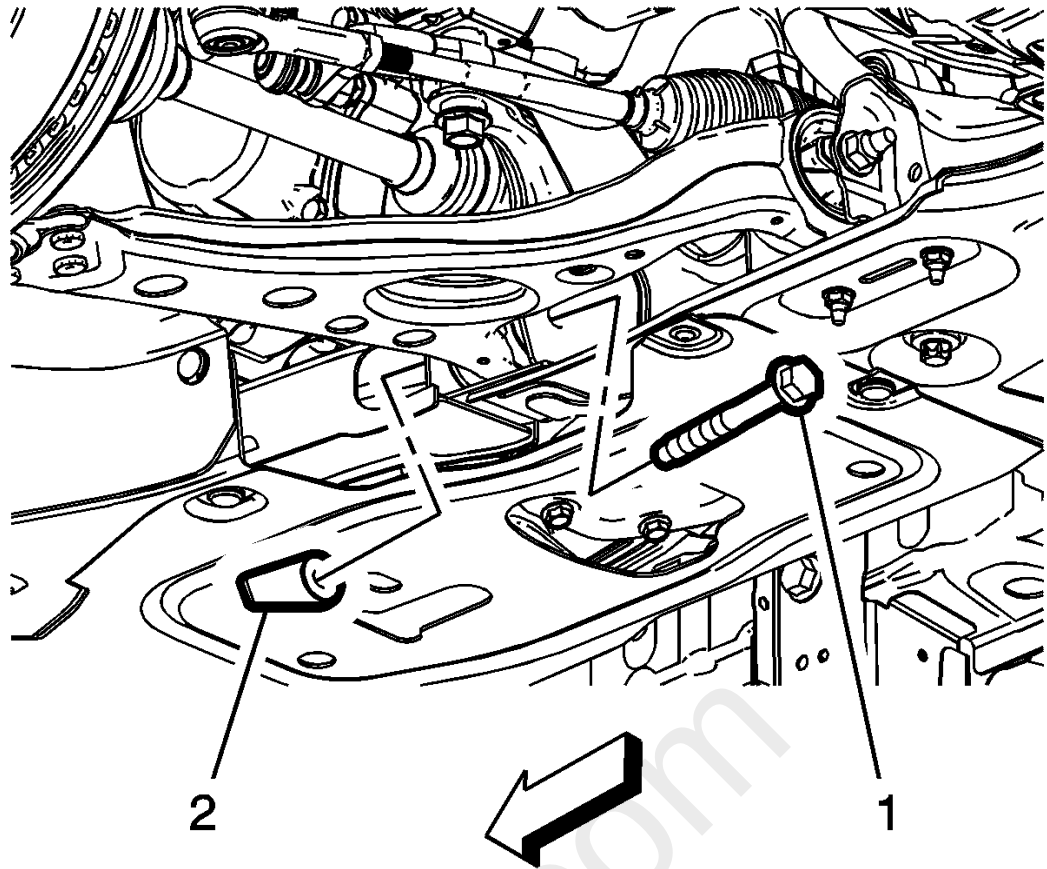
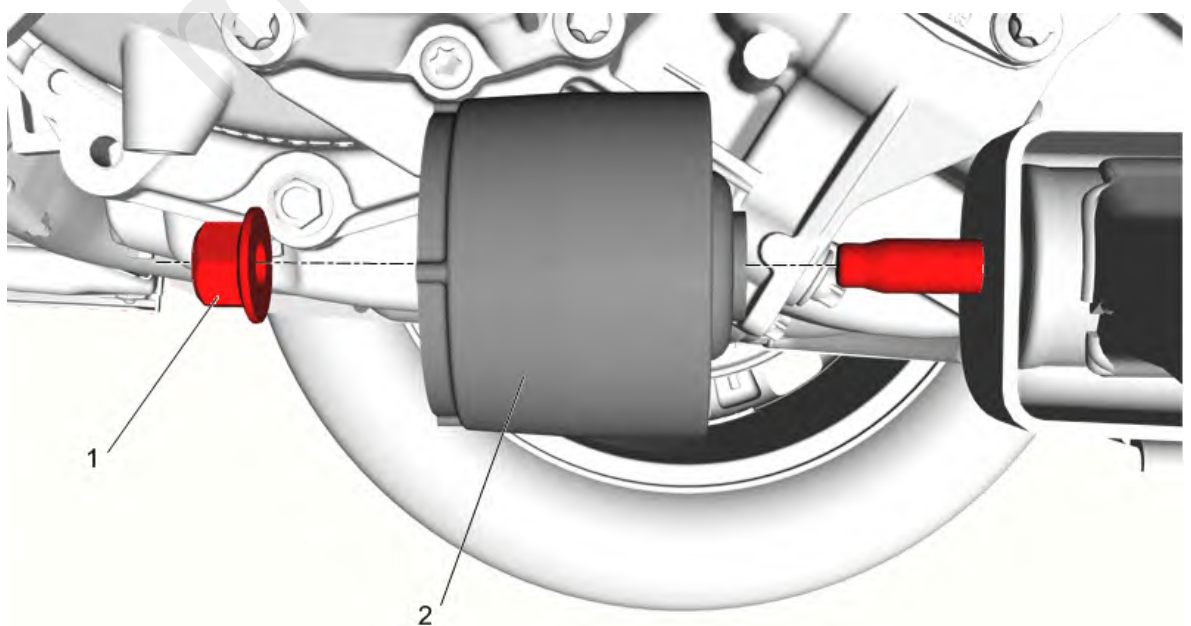


Fig. 22: Front Lower Control Arm Front Bolt And Nut
 Courtesy of GENERAL MOTORS COMPANY

4. Install and hand tighten Front Lower Control Arm Front Bolt (1)
 Install a NEW bolt.
5. Install Front Lower Control Arm Front Nut (2)



6. {If equipped} Install Front Suspension Support Vibration Dampener (2). Refer to [Front Suspension Support Vibration Dampener Replacement](#)

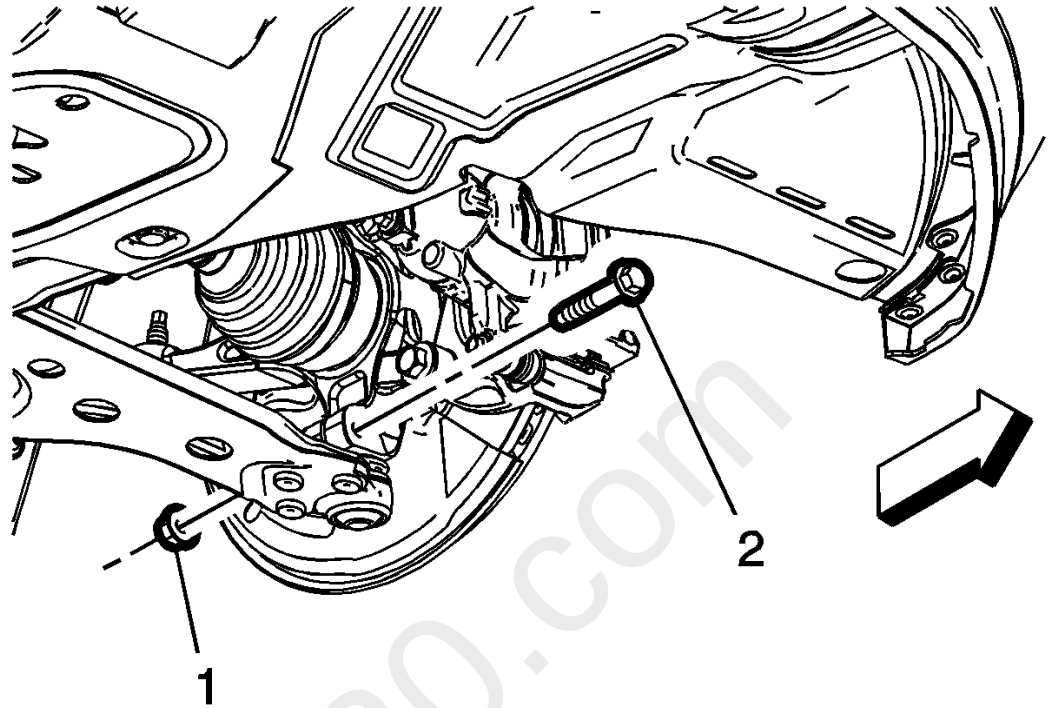


Fig. 24: Front Lower Control Arm Ball Stud Nut And Bolt
Courtesy of GENERAL MOTORS COMPANY

WARNING: Ensure that the lower control arm ball joint stud is correctly seated in the steering knuckle. Visually check that the notch in the lower control arm ball joint stud is lined up with the bolt hole in the steering knuckle. Failure to correctly align these components may cause the lower control arm to detach from the knuckle which will result in severe personal injury and damage to the vehicle.

7. Install Front Lower Control Arm Ball Stud Bolt (2)

CAUTION: Refer to [Fastener Caution](#) .

8. Install and tighten Front Lower Control Arm Ball Stud Nut (1)

Tighten

1. First Pass: 42 N.m (31 lb ft)
2. Second Pass: Loosen 120 degrees
3. Third Pass: 35 N.m (26 lb ft)
4. Final Pass: (30-45 degrees)

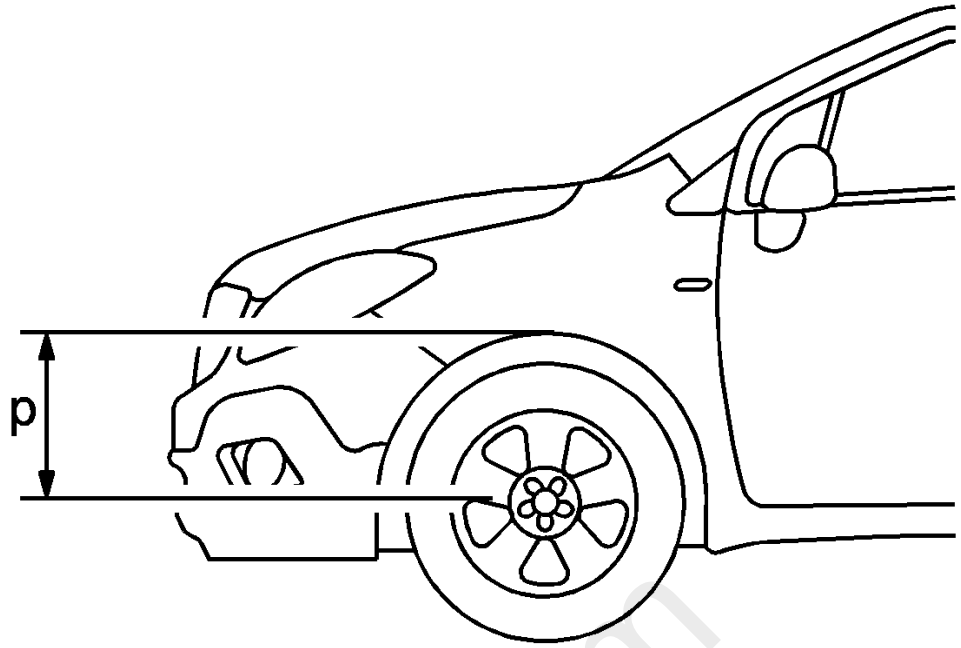


Fig. 25: Front Suspension Measurement

Courtesy of GENERAL MOTORS COMPANY

9. Support the front lower control arm with a hydraulic jack and lift the control arm until the previously recorded measurement (p) is achieved.

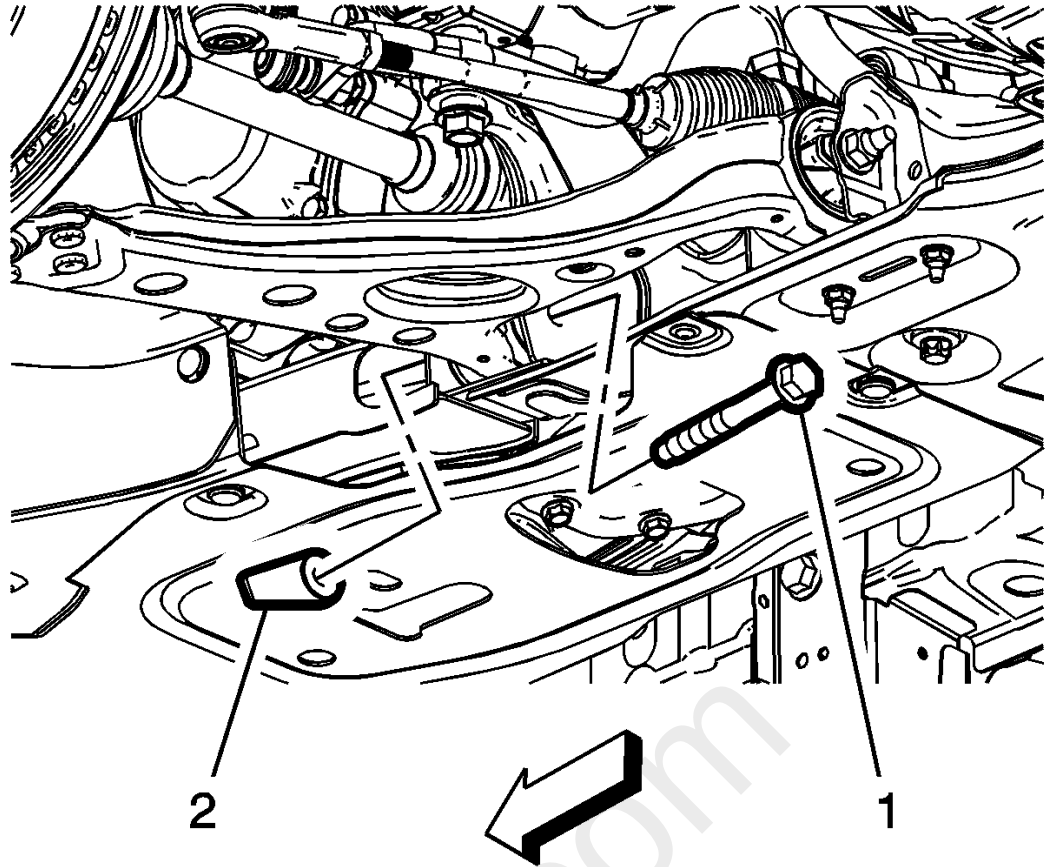


Fig. 26: Front Lower Control Arm Front Bolt And Nut
Courtesy of GENERAL MOTORS COMPANY

10. Tighten Front Lower Control Arm Front Bolt (1)

Tighten

1. First Pass: 115 N.m (85 lb ft)
2. Second Pass: Loosen 720 degrees
3. Third Pass: 80 N.m (59 lb ft)
4. Final Pass: (90-105 degrees)

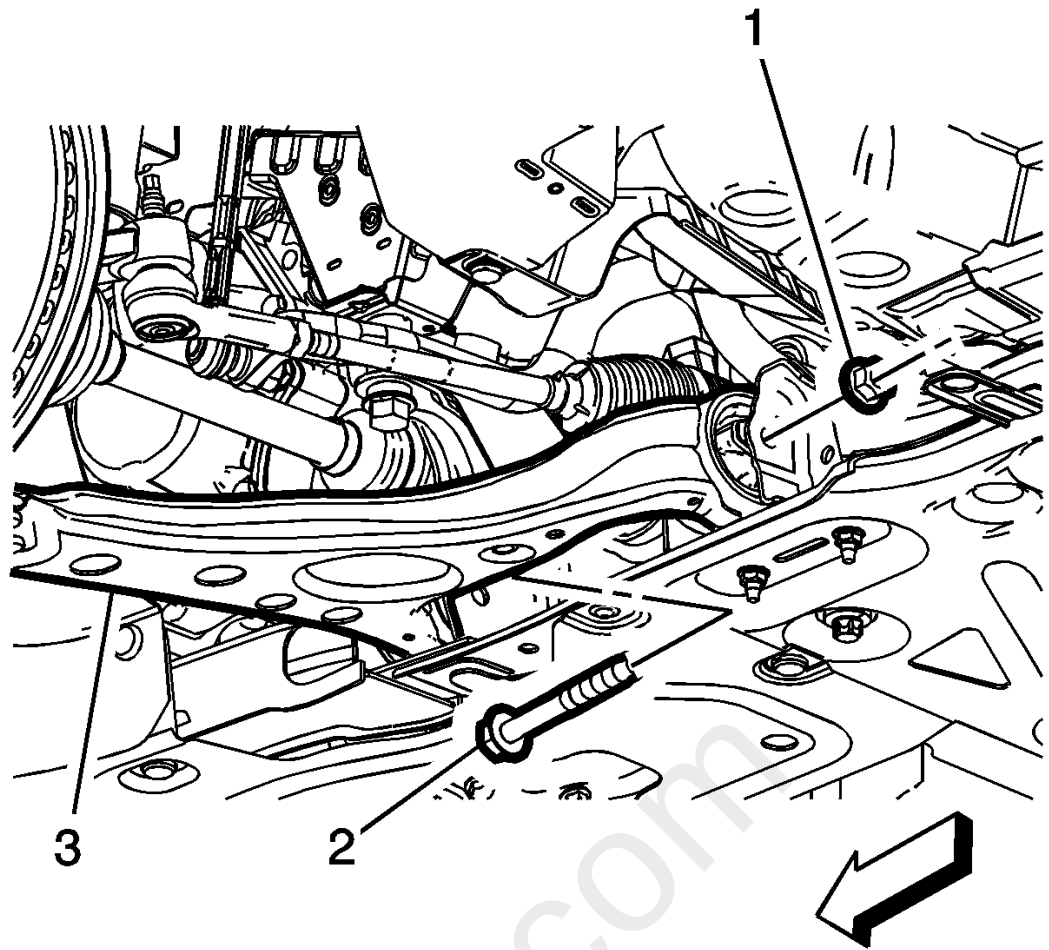


Fig. 27: Front Lower Control Arm, Rear Nut And Bolt
Courtesy of GENERAL MOTORS COMPANY

11. Tighten Front Lower Control Arm Rear Bolt (2)

Tighten

1. First Pass: 80 N.m (59 lb ft)
 2. Final Pass: (60-75 degrees)
12. Remove the hydraulic jack from under the front lower control arm.
 13. Install the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
 14. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

FRONT LOWER CONTROL ARM BALL STUD REPLACEMENT

Removal Procedure

1. Remove Lower Control Arm. Refer to [Lower Control Arm Replacement](#)

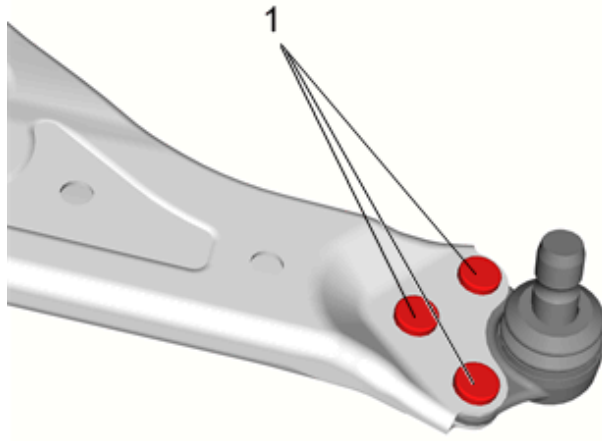


Fig. 28: Ball Stud Rivets

Courtesy of GENERAL MOTORS COMPANY

2. Vertically drill a hole through the rivet (1) using a 5 mm (0.197 in) diameter drill bit.

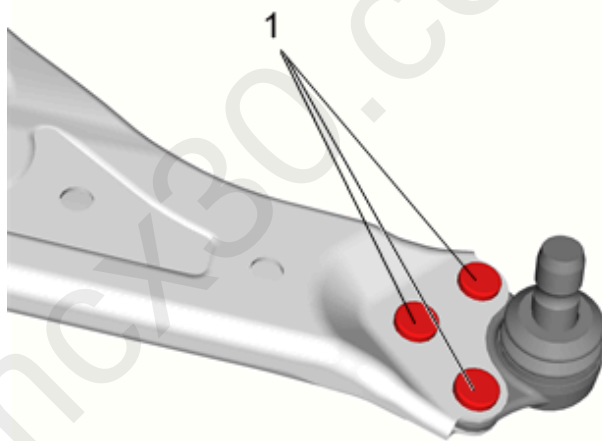


Fig. 29: Ball Stud Rivets

Courtesy of GENERAL MOTORS COMPANY

3. Enlarge the pre-drilled hole (1) using a 8 mm (0.315 in) drill bit.
4. Remove the rivet head of each rivet using a flat chisel.
5. Remove the remaining piece of each rivet using a punch.

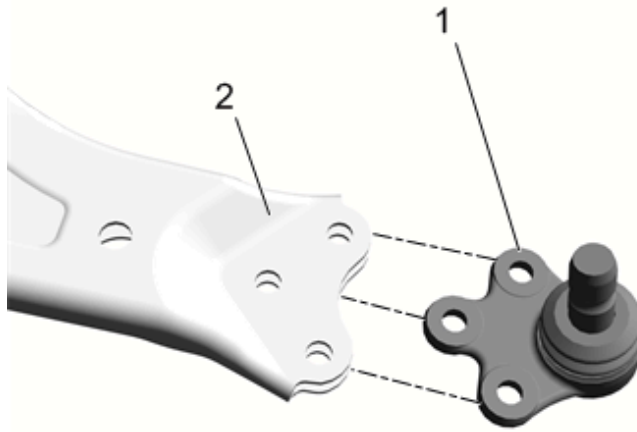


Fig. 30: Front Lower Control Arm And Ball Stud
Courtesy of GENERAL MOTORS COMPANY

6. Remove Front Lower Control Arm Ball Stud (1) @ Front Lower Control Arm (2)

Installation Procedure

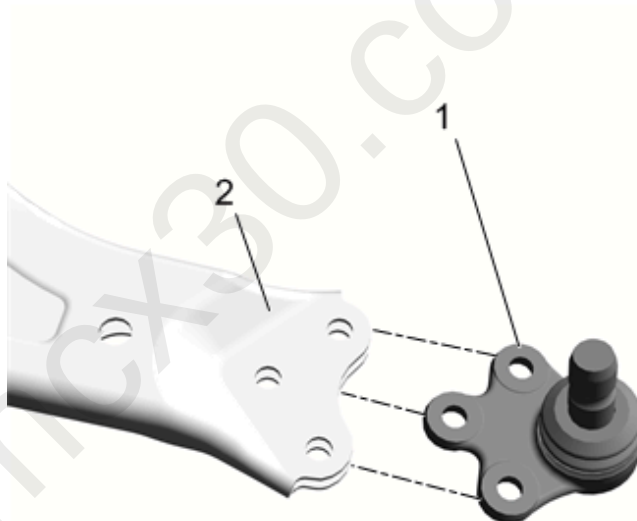


Fig. 31: Front Lower Control Arm And Ball Stud
Courtesy of GENERAL MOTORS COMPANY

1. Install Front Lower Control Arm Ball Stud (1) @ Front Lower Control Arm (2)

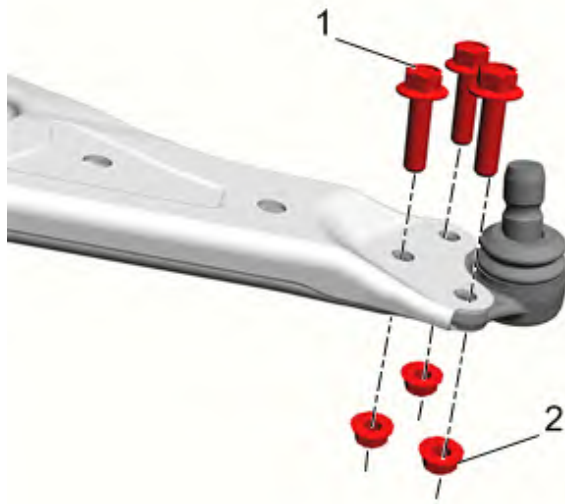


Fig. 32: Front Lower Control Arm Ball Stud Bolts And Nuts
 Courtesy of GENERAL MOTORS COMPANY

2. Install Front Lower Control Arm Ball Stud Bolts (1) (Qty: 3)

CAUTION: Refer to [Fastener Caution](#) .

3. Install and tighten Front Lower Control Arm Ball Stud Nuts (2) (Qty: 3) to 35 N.m (26 lb ft)
4. Install Lower Control Arm. Refer to [Lower Control Arm Replacement](#)

WHEEL STUD REPLACEMENT

Special Tools

CH-43631 Ball Joint Separator

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Remove Front Wheel Bearing and Hub Assembly. Refer to [Front Wheel Bearing and Hub Replacement](#)

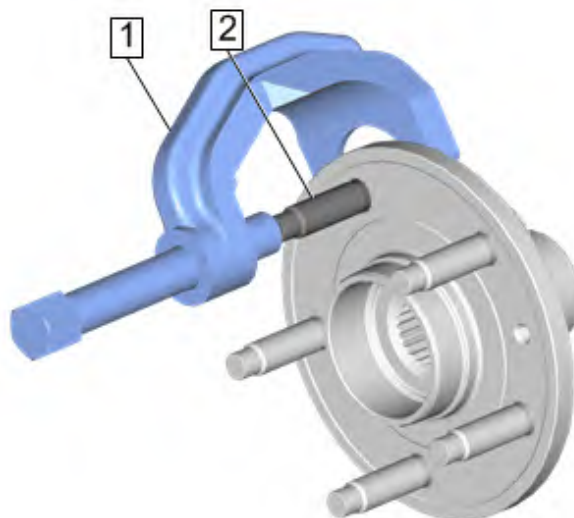


Fig. 33: Removing Wheel Stud

Courtesy of GENERAL MOTORS COMPANY

2. Use the **CH-43631** separator (1) to remove the wheel stud (2) from the flange on the hub assembly.

DISCARD the stud.

Installation Procedure

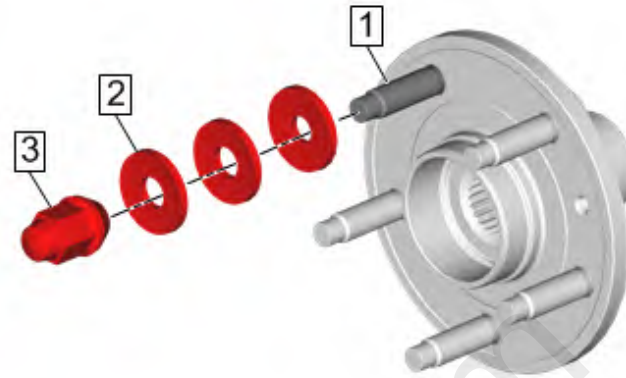


Fig. 34: Nut, Stud And Washers

Courtesy of GENERAL MOTORS COMPANY

1. Position the NEW wheel stud (1) in the flange on the hub assembly.
2. Install flat washers (2) and an OLD wheel nut (3) on the wheel stud.
3. Use a suitable tool to prevent the flange on the hub assembly from rotating.
4. Tighten the wheel nut until the wheel stud is firmly seated.
5. Remove the wheel nut and flat washers.
6. Install Front Wheel Bearing and Hub Assembly. Refer to **Front Wheel Bearing and Hub Replacement**

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.

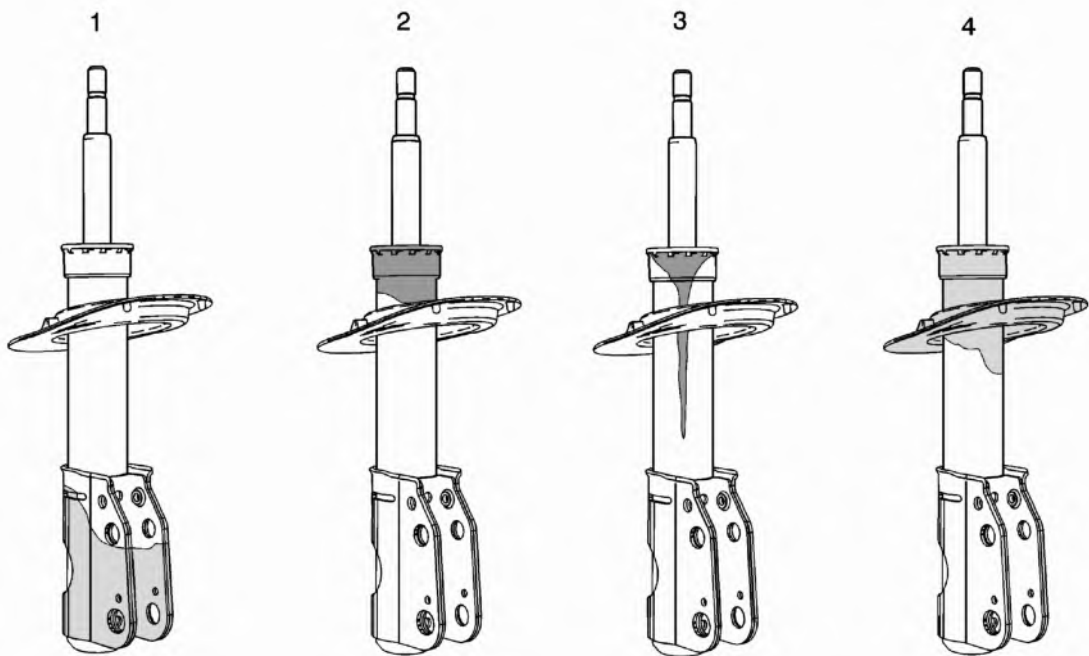


Fig. 35: Strut and Shock Absorber Inspection
Courtesy of GENERAL MOTORS COMPANY

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](#).
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 Spring Wrench

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Remove Air Inlet Grille Panel. Refer to [Air Inlet Grille Panel Replacement \(Chevrolet\)](#) [Air Inlet Grille Panel Replacement \(Buick\)](#)

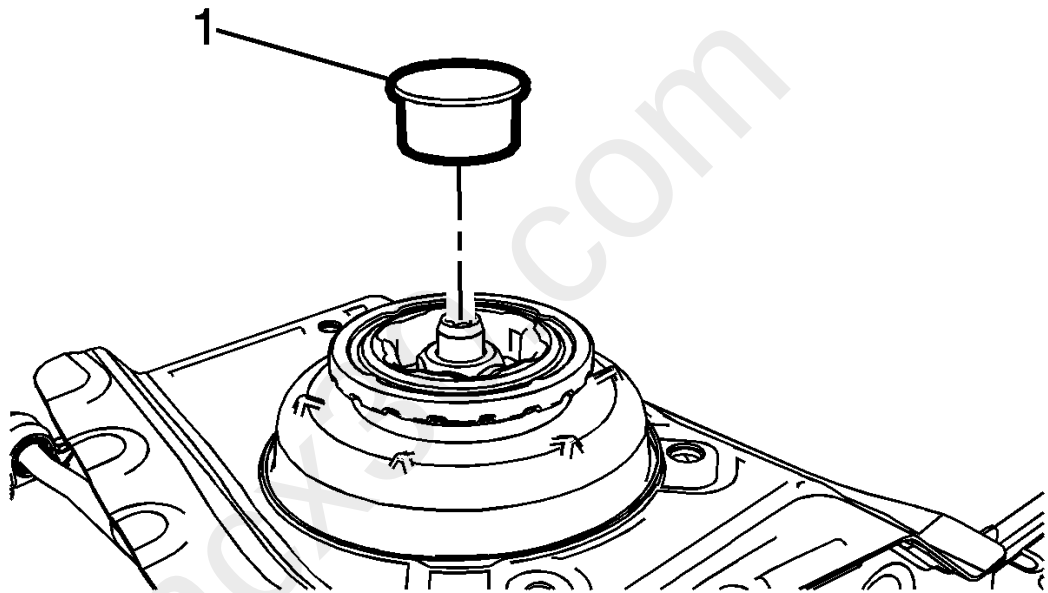


Fig. 36: Front Suspension Strut Cartridge Upper Cover
Courtesy of GENERAL MOTORS COMPANY

2. Remove the front suspension strut cartridge upper cover (1).

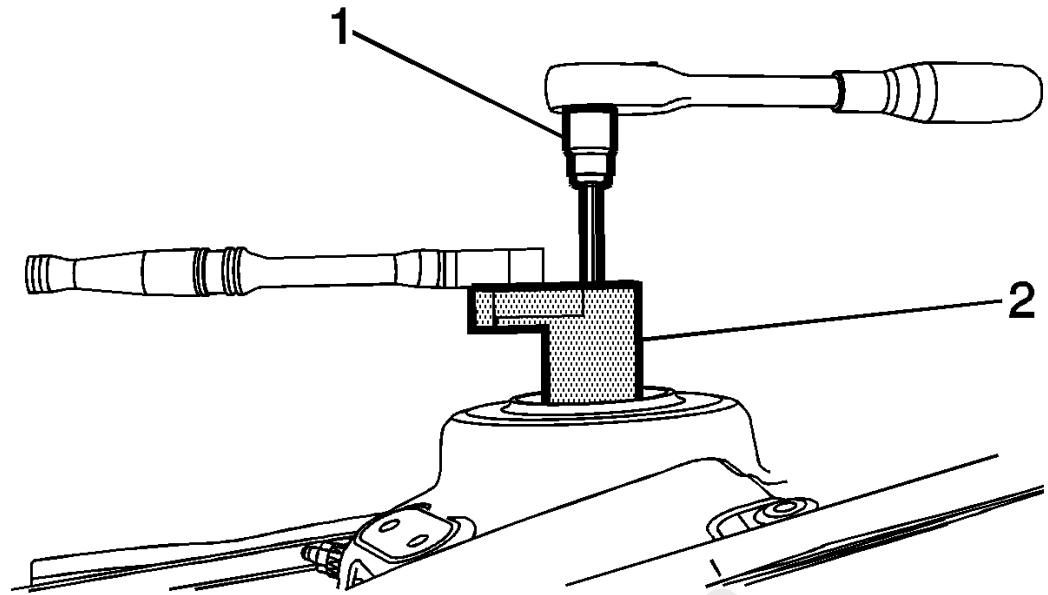


Fig. 37: Special Tool And Torx Bit

Courtesy of GENERAL MOTORS COMPANY

3. Use the **CH-49375** wrench (2) and the appropriate hand tools to loosen the front strut rod mount nut.

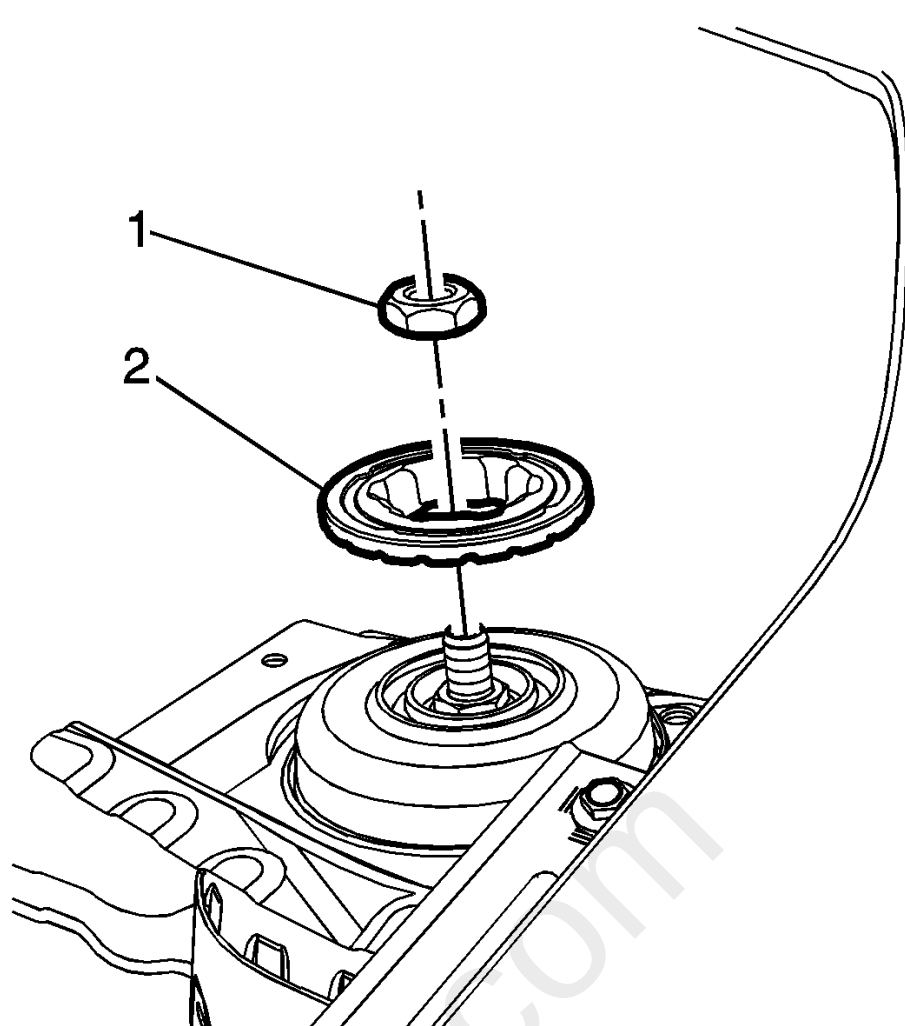


Fig. 38: Front Strut Nut And Front Suspension Mount Upper Cup
Courtesy of GENERAL MOTORS COMPANY

4. Remove the front strut rod mount nut (1) and the front suspension mount upper cup (2).
5. Remove the front tire and wheel assembly. Refer to [**Tire and Wheel Removal and Installation**](#)
6. Remove any harnesses or hoses attached to the strut assembly.
7. Separate Front Stabilizer Shaft Link @ Strut Assembly. Refer to [**Stabilizer Shaft Link Replacement**](#)

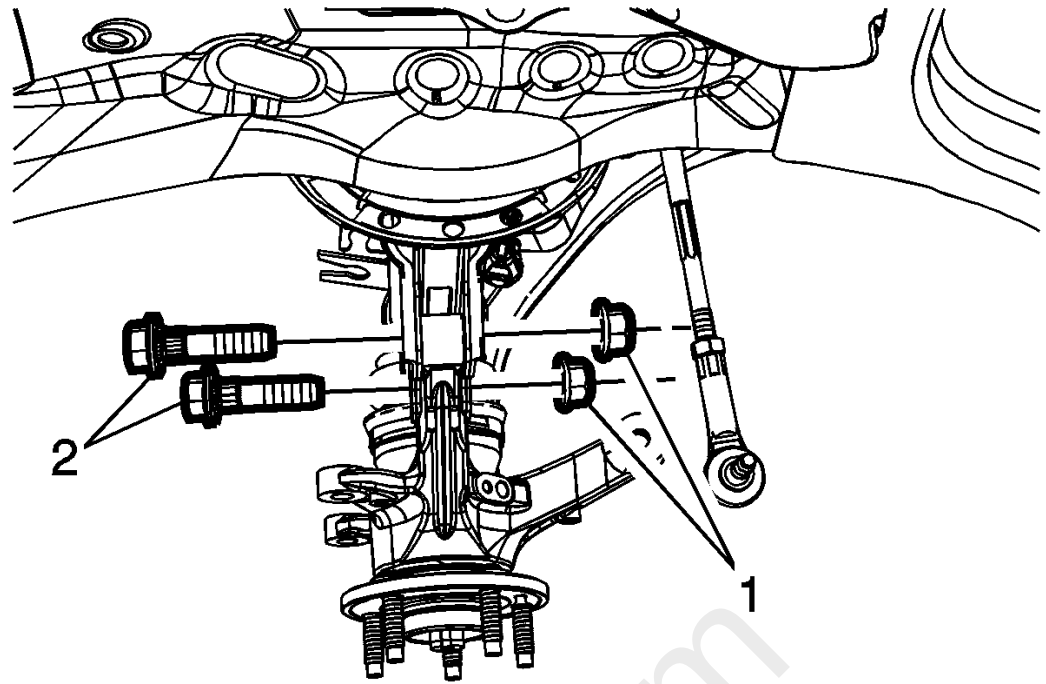


Fig. 39: Front Strut Nuts And Bolts

Courtesy of GENERAL MOTORS COMPANY

8. Remove Front Suspension Strut Nuts (1) (Qty: 2)
9. Remove Front Suspension Strut Bolts (1) (Qty: 2)

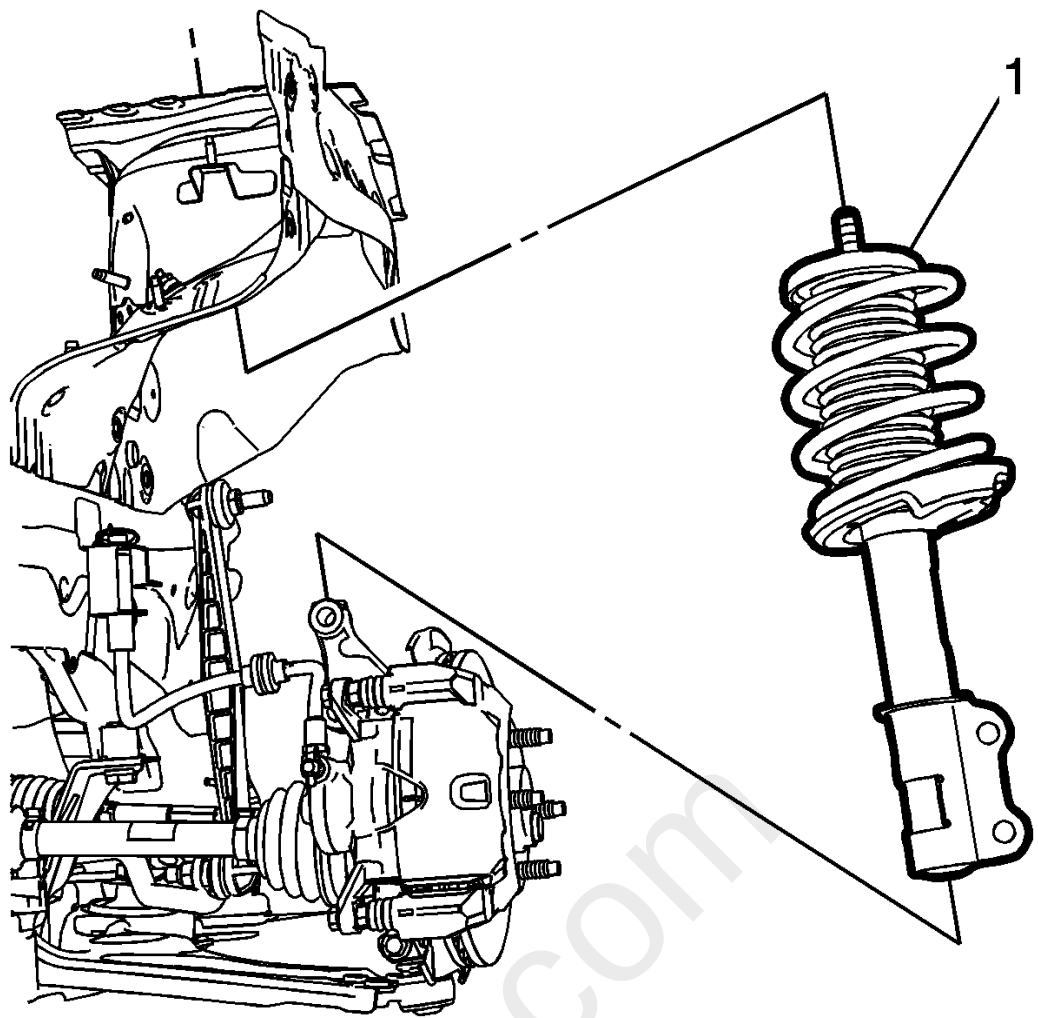


Fig. 40: Front Strut Assembly

Courtesy of GENERAL MOTORS COMPANY

10. Remove the front strut assembly (1) from the vehicle.
11. Transfer components as necessary.

Installation Procedure

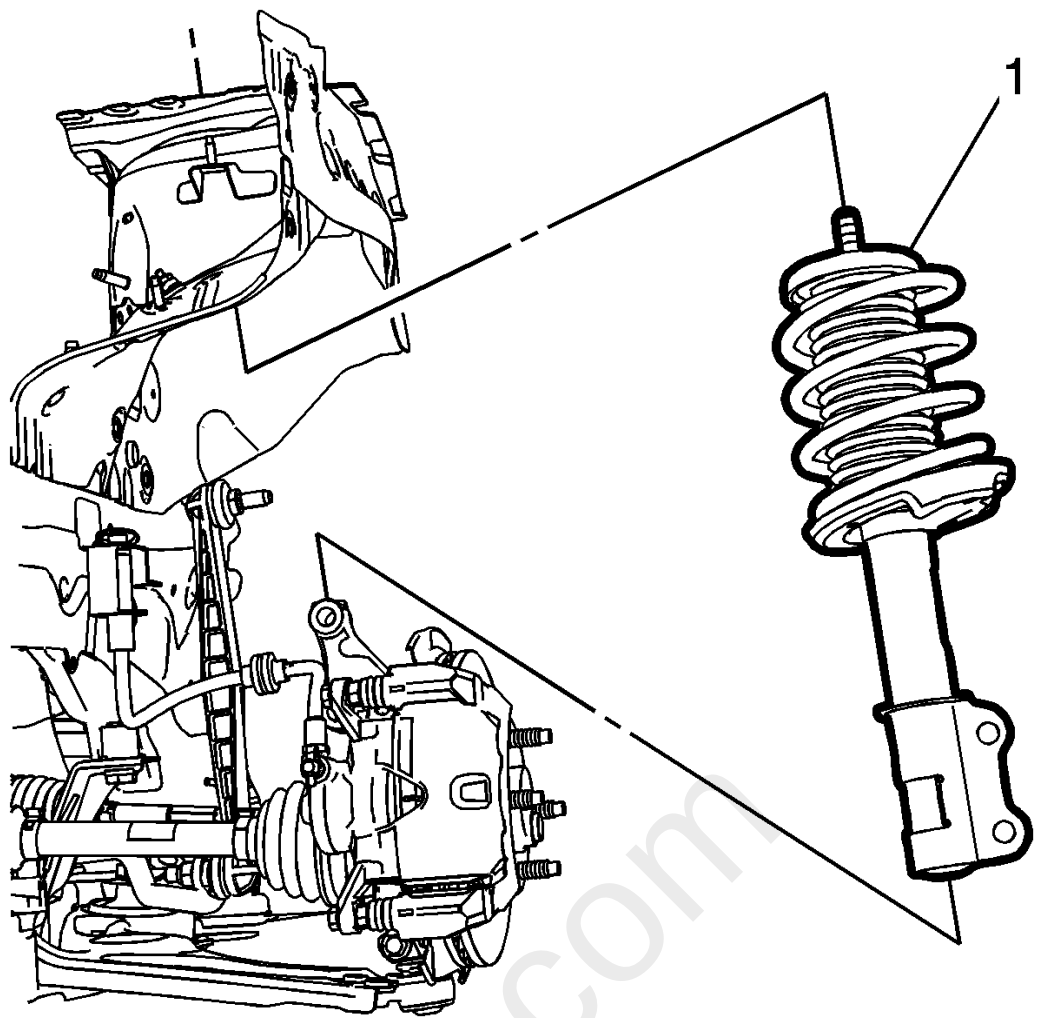


Fig. 41: Front Strut Assembly

Courtesy of GENERAL MOTORS COMPANY

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

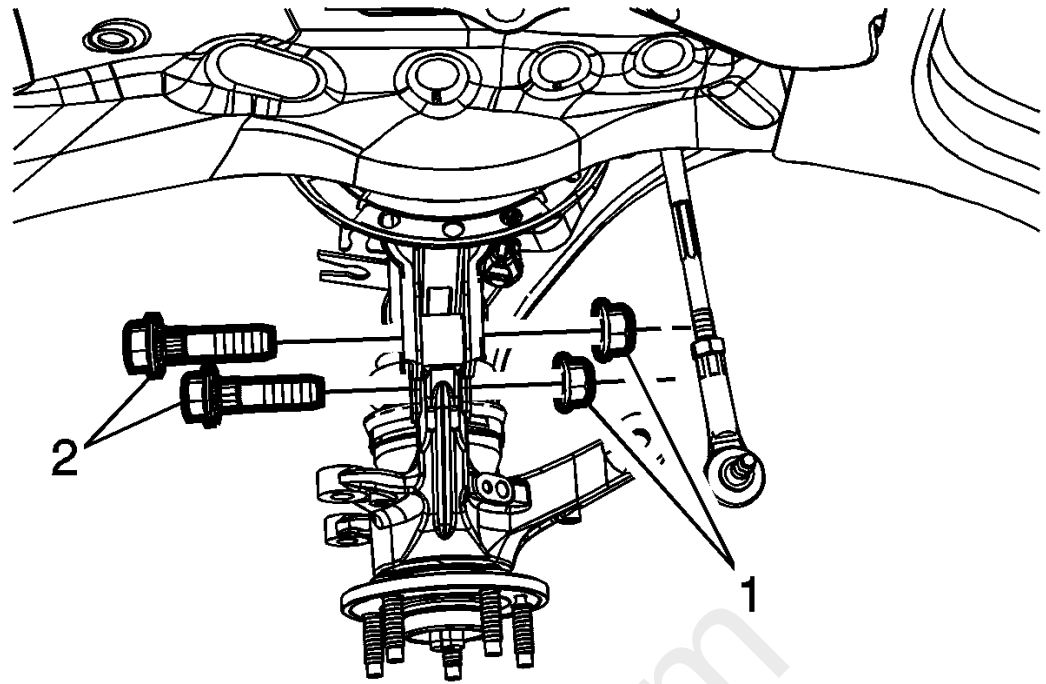


Fig. 42: Front Strut Nuts And Bolts

Courtesy of GENERAL MOTORS COMPANY

2. Install Front Suspension Strut Bolts (2) (Qty: 2)

CAUTION: Refer to [Fastener Caution](#) .

3. Install and tighten Front Suspension Strut Nuts (1) (Qty: 2) to 110 N.m (81 lb ft)
4. Install Front Stabilizer Shaft Link @ Strut Assembly. Refer to [Stabilizer Shaft Link Replacement](#)
5. Install any harnesses or hoses attached to the strut assembly.
6. Install the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)

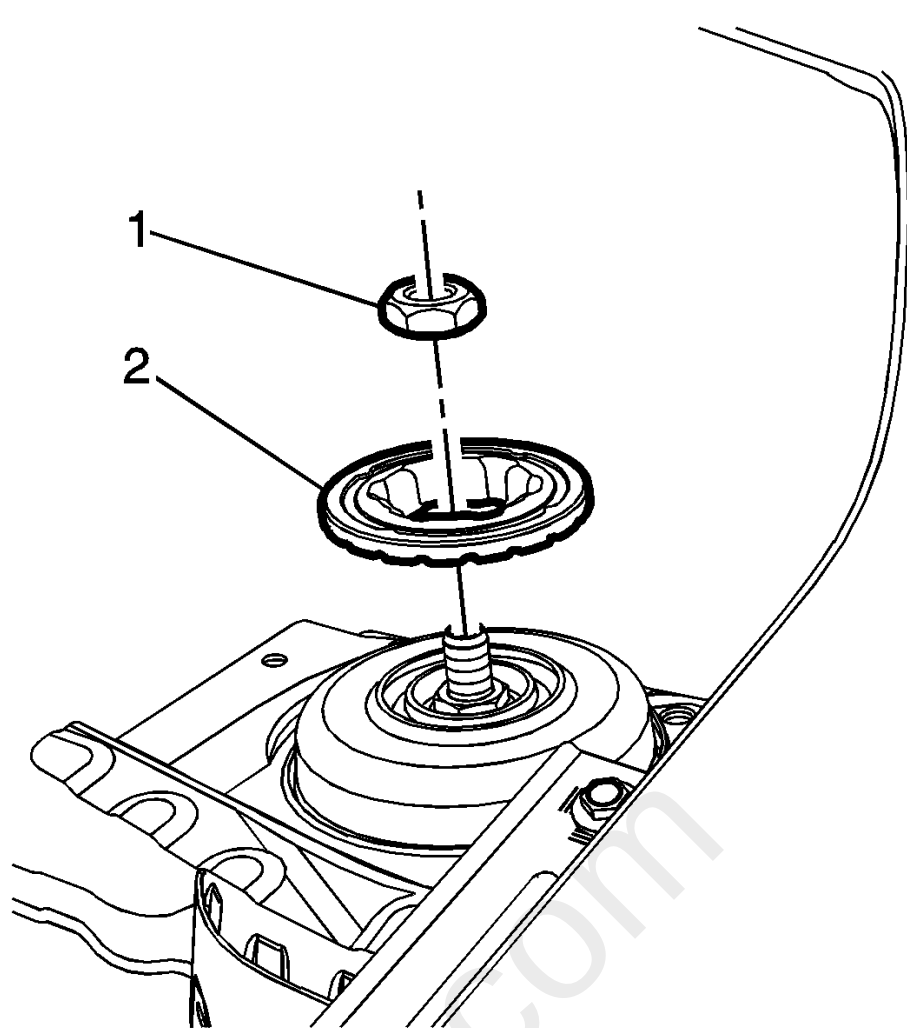


Fig. 43: Front Strut Nut And Front Suspension Mount Upper Cup
Courtesy of GENERAL MOTORS COMPANY

7. Install the front suspension mount upper cup (2) and the front strut rod mount nut (1).

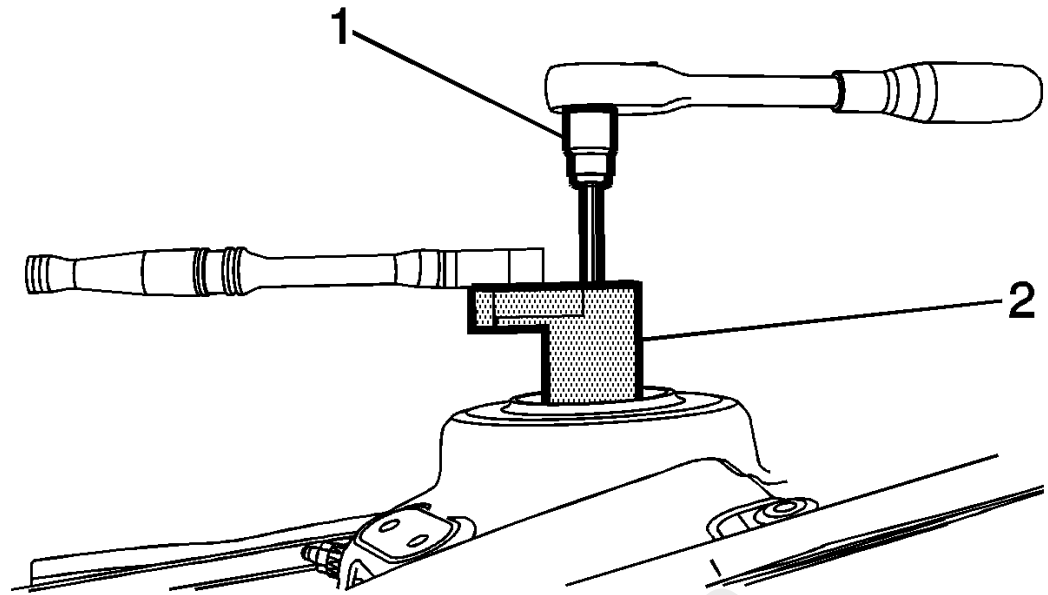


Fig. 44: Special Tool And Torx Bit

Courtesy of GENERAL MOTORS COMPANY

8. Use the **CH-49375** wrench (2) and the appropriate hand tools to tighten the front strut rod mount nut to 65 N.m (48 lb ft).

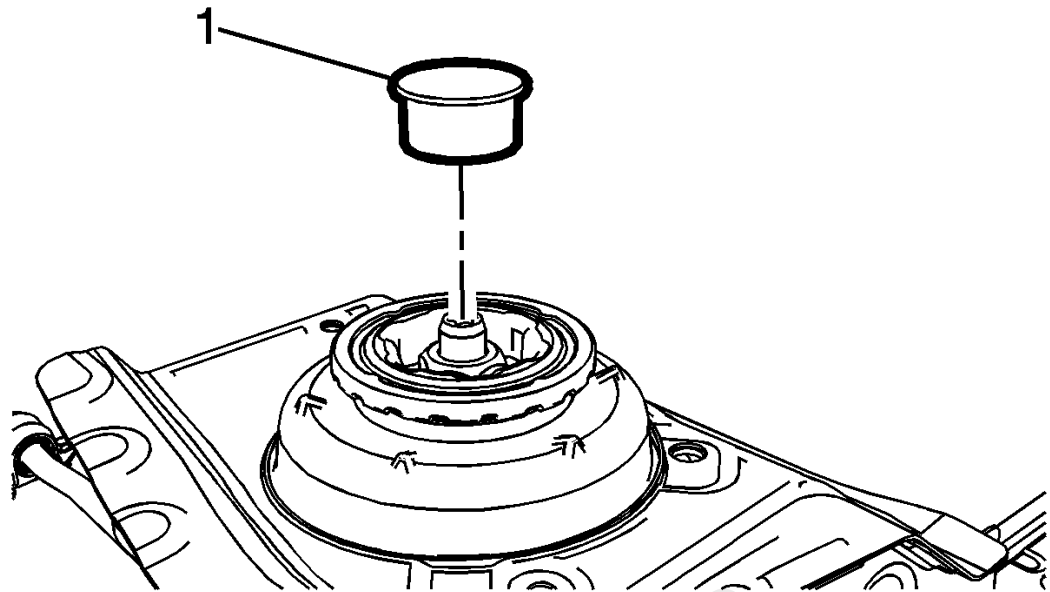
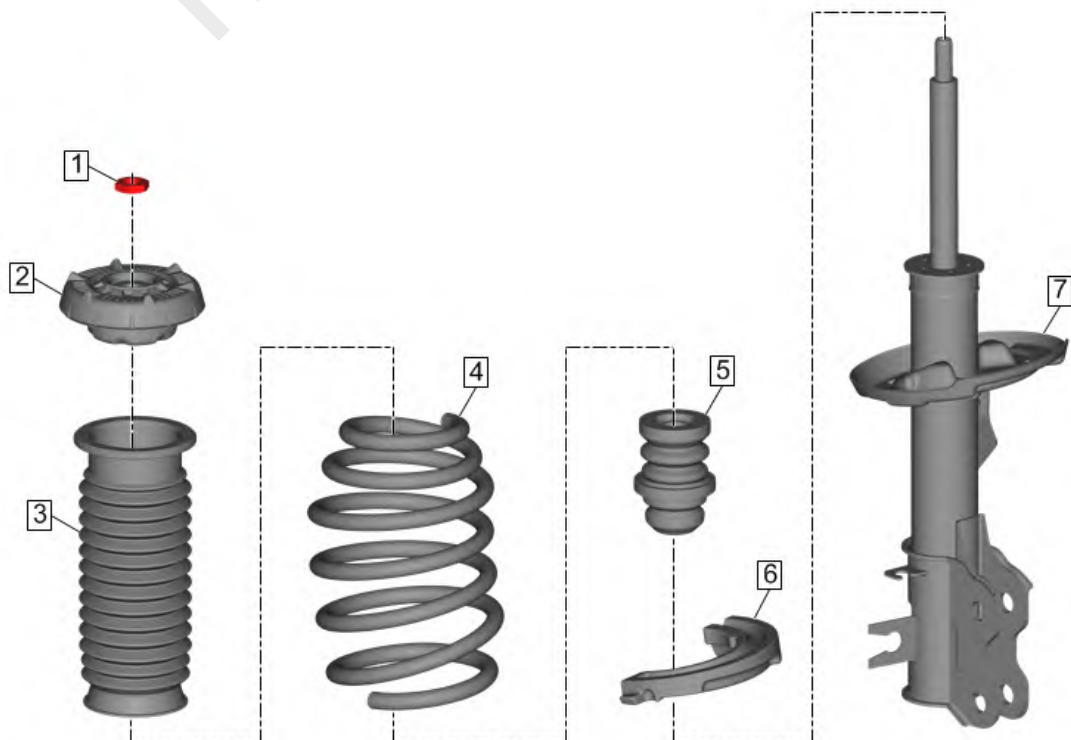


Fig. 45: Front Suspension Strut Cartridge Upper Cover
 Courtesy of GENERAL MOTORS COMPANY

9. Install the front suspension strut cartridge upper cover (1).
10. Install Air Inlet Grille Panel. Refer to [Air Inlet Grille Panel Replacement \(Chevrolet\)](#), [Air Inlet Grille Panel Replacement \(Buick\)](#).

STRUT, STRUT COMPONENT, OR SPRING REPLACEMENT



Callout	Component Name
WARNING: To prevent personal injury and/or component damage, use the proper tools to support and compress the coil spring prior to removal of the strut shaft nut when removing the coil spring. The coil spring is under extreme pressure and can become a projectile should the spring separate from the strut before all of the tension is relieved.	
Preliminary Procedure Remove Strut Assembly. Refer to Strut Assembly Removal and Installation	
1	Front Suspension Strut Upper Mounting Nut CAUTION: Refer to Fastener Caution . Procedure 1. Use a suitable strut spring compressor to compress the front coil spring. 2. Use the CH-49375 wrench to remove and install the front strut rod mount nut. Tighten 65 N.m (48 lb ft) Special Tools CH-49375 Strut Spring Wrench Equivalent regional tools: Special Tools
2	Front Strut Mount
3	Front Strut Boot
4	Front Coil Spring
5	Front Suspension Strut Bumper
6	Front Shock Absorber Lower Insulator
7	Front Suspension Strut

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

SPECIAL TOOLS

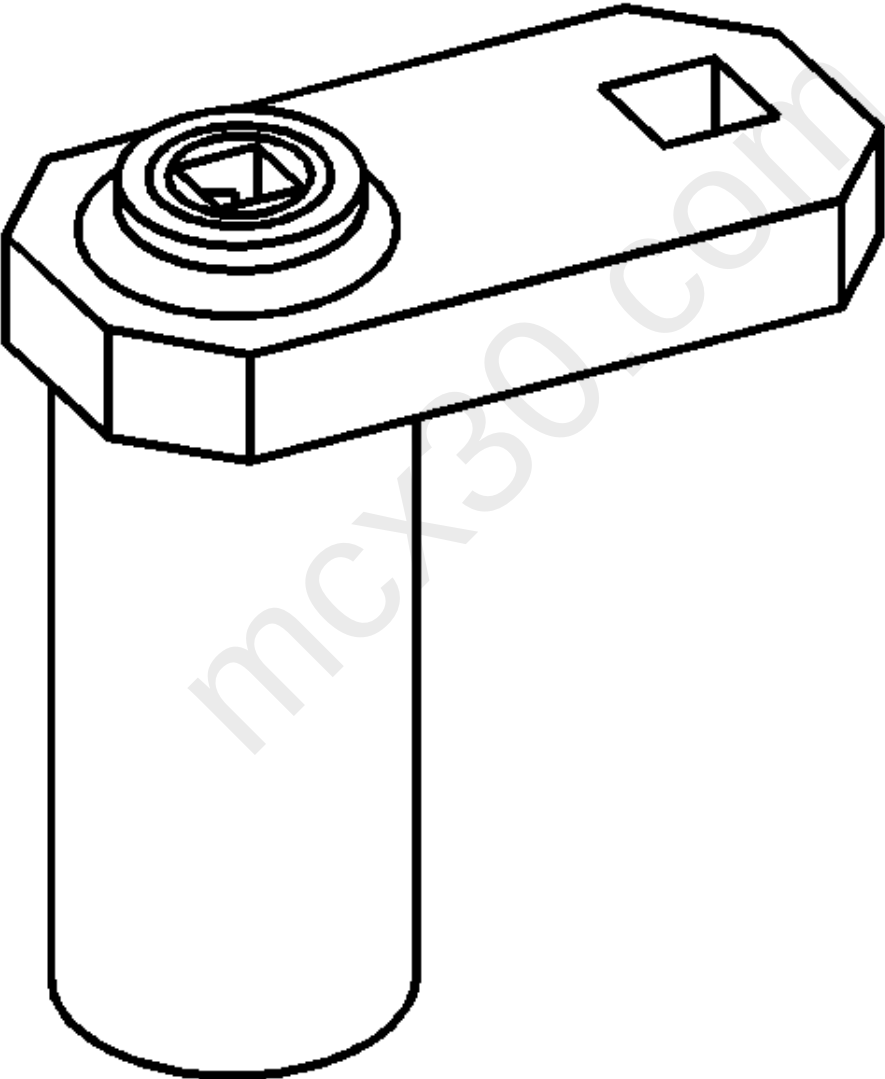
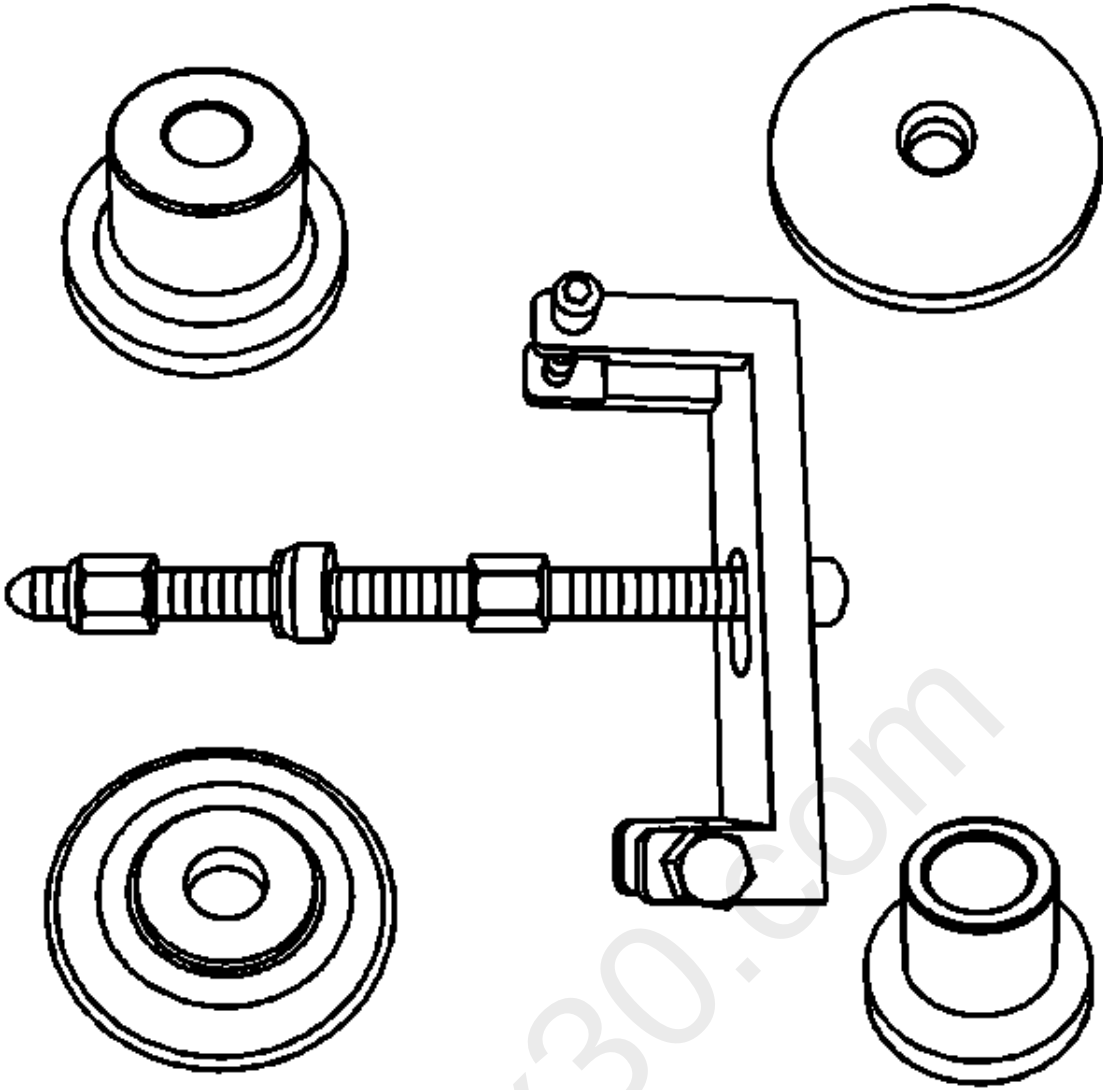
Illustration	Tool Number/Description
	CH-49375 Strut Spring Wrench

Illustration	Tool Number/Description
 A blue ball joint separator tool. It features a curved, hook-like end designed to grip a ball joint. The handle is long and cylindrical, with a square-shaped base at the end. A large, light gray watermark "mcx30.com" is diagonally across the image.	CH-43631 CH-49455 J-43631 Ball Joint Separator

Illustration	Tool Number/Description
 The illustration shows the components of the CH-50559 Wheel Hub/Bearing Remover/Installer Kit. It includes a central L-shaped metal tool with a threaded rod and a conical end. Surrounding the tool are five other parts: a large circular bearing, a smaller circular bearing, a cylindrical hub component, and two smaller cylindrical components. A watermark 'mcx30.com' is visible across the image.	CH-50559 Wheel Hub/Bearing Remover/Installer Kit