

2017 SUSPENSION

Front Suspension - CT6

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 Front Link Bolt	
• First Pass:	240 N.m (177 lb ft)
• Final Pass:	45-60 degrees
Front Lower Control Rear Link Bolt	
• First Pass:	160 N.m (118 lb ft)
• Final Pass:	45-60 degrees
Front Shock Absorber Yoke Bolt	
Front Stabilizer Shaft Insulator Clamp Bolt	
• First Pass:	58 N.m (43 lb ft)
• Final Pass:	15-30 degrees
Front Suspension Strut Bolt	
Front Upper Control Arm Bolt	
• First Pass:	58 N.m (43 lb ft)
• Final Pass:	90-105 degrees
Wheel Stud	

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	

NOTE:

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

Application	Specification
	Metric (English)
• First Pass:	40 N.m (30 lb ft)
• Final Pass:	120-135 degrees
Front Shock Absorber Nut	50 N.m (37 lb ft)
Front Shock Absorber Yoke Nut	100 N.m (74 lb ft)
Front Stabilizer Shaft Link Nut	100 N.m (74 lb ft)
Front Suspension Mount Upper Bolt	22 N.m (16 lb ft)
Front Suspension Strut Nut	
• First Pass:	240 N.m (177 lb ft)
• Final Pass:	45-60 degrees
Front Upper Control Arm Ball Stud Nut	100 N.m (74 lb ft)
Front Wheel Bearing and Hub Assembly Bolt	125 N.m (92 lb ft)
Steering Knuckle Nut	
• First Pass:	40 N.m (30 lb ft)
• Final Pass:	120-135 degrees

ADHESIVES, FLUIDS, LUBRICANTS AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Front Wheel Bearing and Hub Assembly Bolt	Thread Locking Adhesive	89021297	10953488
Steering Knuckle Bearing Pilot Bore	Grease	12345996	10953501

REPAIR INSTRUCTIONS

STABILIZER SHAFT REPLACEMENT (RWD)

Removal Procedure

1. Remove the front tire and wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#)
2. Underbody Front Air Deflector (1)» Remove - [Underbody Front Air Deflector Replacement](#)

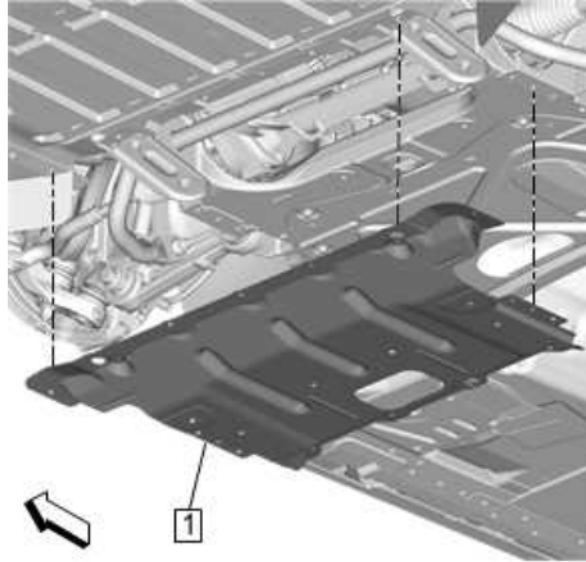


Fig. 1: Underbody Front Air Deflector

Courtesy of GENERAL MOTORS COMPANY

3. Front Stabilizer Shaft Link (1) @ Front Stabilizer Shaft» Separate [2x] - **Stabilizer Shaft Link Replacement (RWD)**

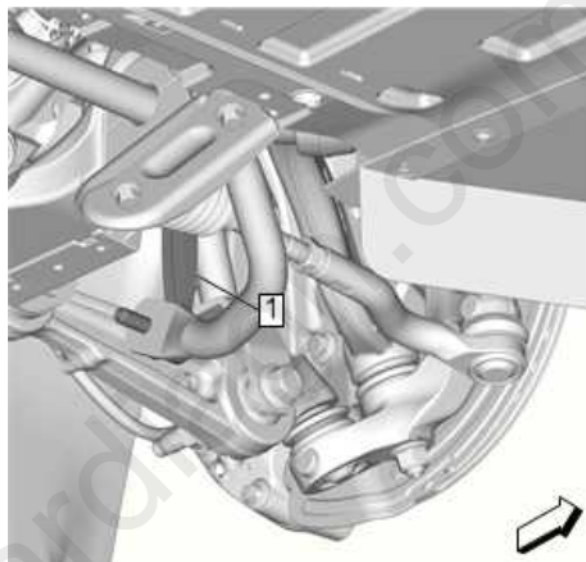


Fig. 2: Front Stabilizer Shaft Link

Courtesy of GENERAL MOTORS COMPANY

4. Support the front stabilizer shaft.
5. Front Stabilizer Shaft Insulator Clamp Bolt (1)» Remove [4x]

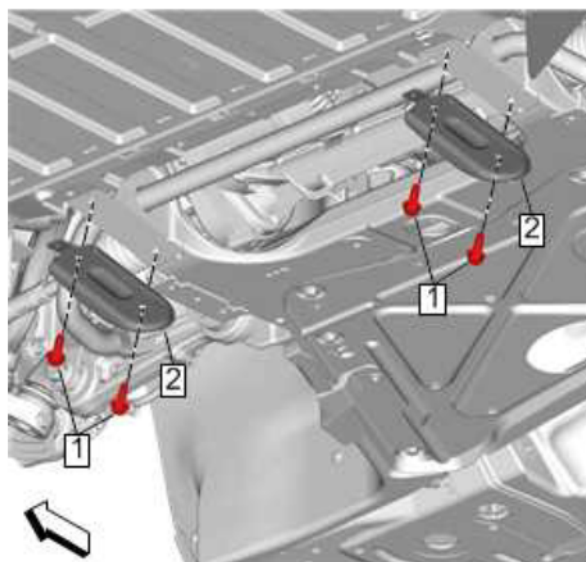


Fig. 3: Front Stabilizer Shaft Insulator Clamp Bolt
Courtesy of GENERAL MOTORS COMPANY

DISCARD the bolts.

6. Front Stabilizer Shaft Insulator Retainer (2)» Remove [2x]
7. Remove the front stabilizer shaft (1) from the vehicle.

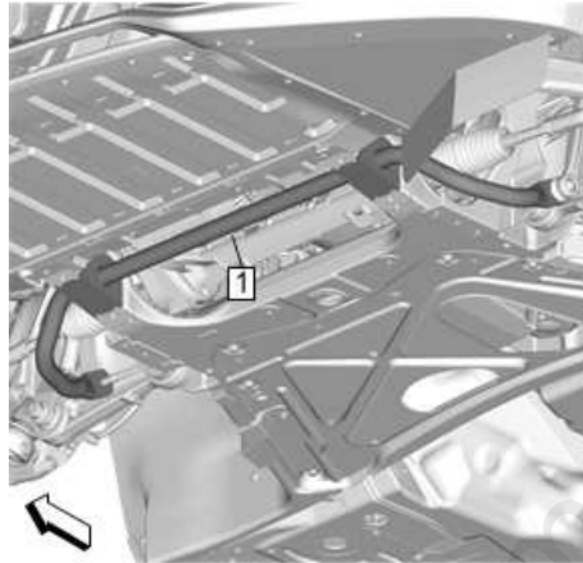


Fig. 4: Front Stabilizer Shaft
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front stabilizer shaft (1) on the vehicle.

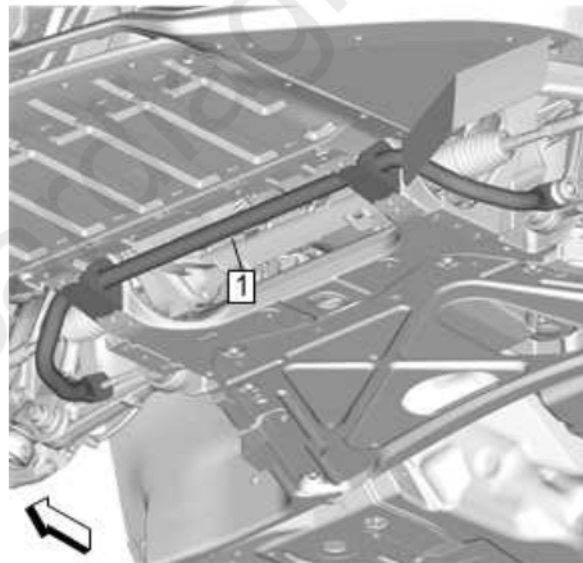


Fig. 5: Front Stabilizer Shaft
Courtesy of GENERAL MOTORS COMPANY

2. Front Stabilizer Shaft Insulator Retainer (2)» Install [2x]

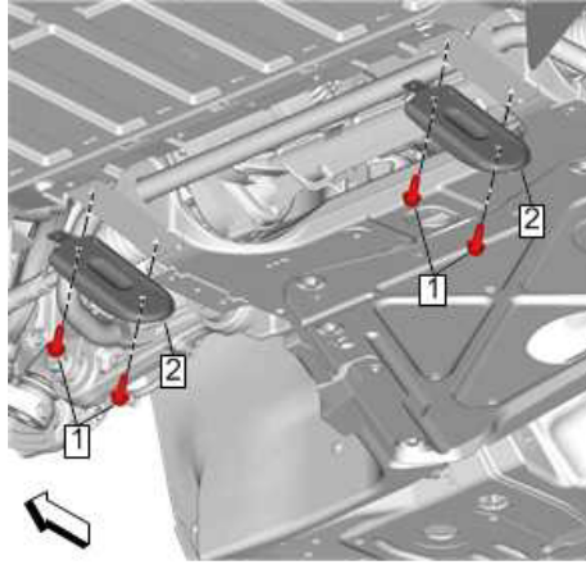


Fig. 6: Front Stabilizer Shaft Insulator Clamp Bolt
Courtesy of GENERAL MOTORS COMPANY

3. Front Stabilizer Shaft Insulator Clamp Bolt (1)» Install and tighten [4x]

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

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.

Install NEW bolts.

Tighten

1. First Pass: 58 N.m (43 lb ft)
2. Final Pass: (15-30 degrees)

4. Front Stabilizer Shaft Link (1) @ Front Stabilizer Shaft» Install [2x] - [Stabilizer Shaft Link Replacement \(RWD\)](#)

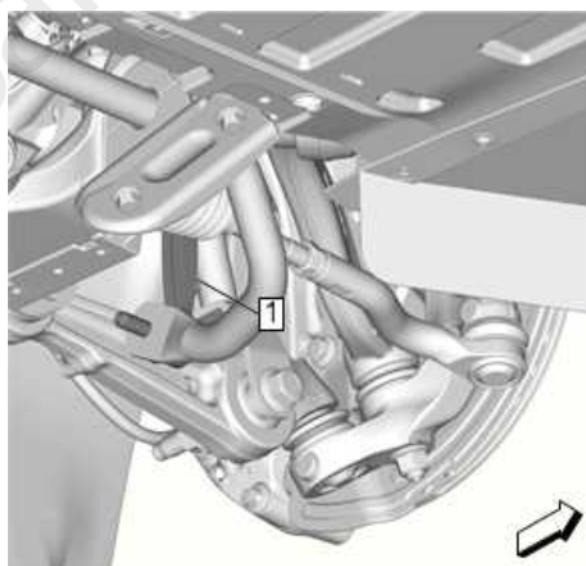


Fig. 7: Front Stabilizer Shaft Link
Courtesy of GENERAL MOTORS COMPANY

5. Underbody Front Air Deflector (1)» Install - [Underbody Front Air Deflector Replacement](#)

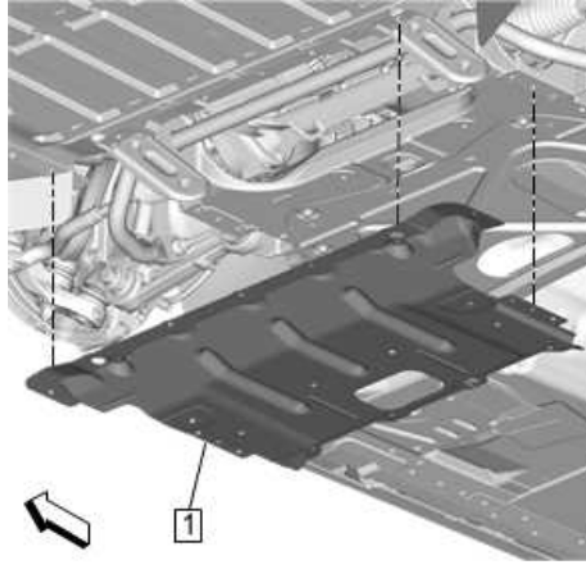


Fig. 8: Underbody Front Air Deflector

Courtesy of GENERAL MOTORS COMPANY

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

STABILIZER SHAFT REPLACEMENT (AWD)

Removal Procedure

1. Remove the front tire and wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#)
2. Underbody Front Air Deflector (1)» Remove - [Underbody Front Air Deflector Replacement](#)

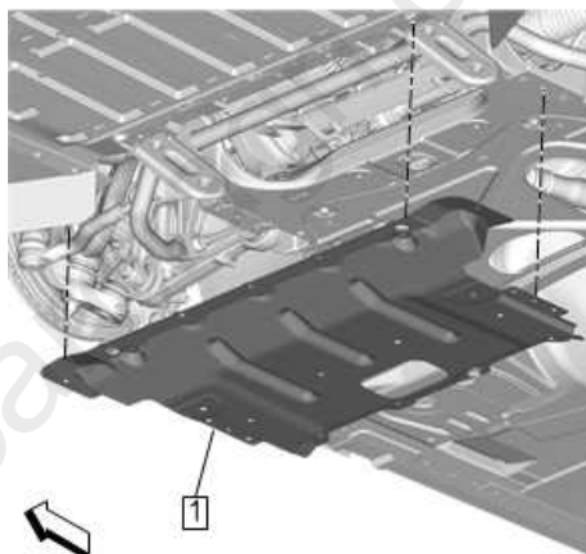


Fig. 9: Underbody Front Air Deflector

Courtesy of GENERAL MOTORS COMPANY

3. Front Stabilizer Shaft Link (1) @ Front Stabilizer Shaft» Separate [2x] - [Stabilizer Shaft Link Replacement \(AWD\)](#)

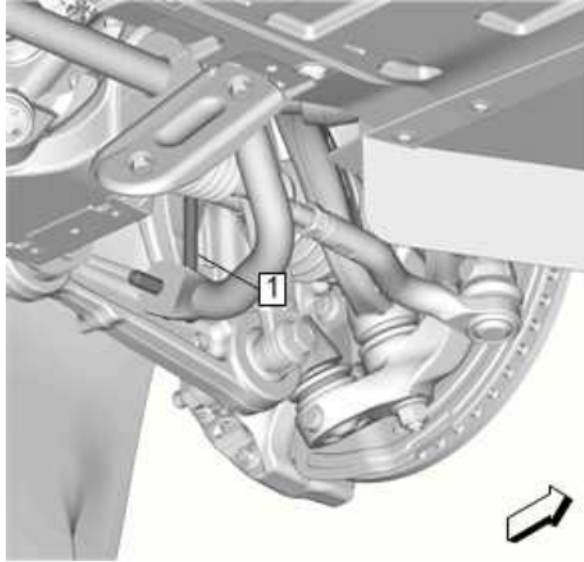


Fig. 10: Front Stabilizer Shaft Link

Courtesy of GENERAL MOTORS COMPANY

4. Support the front stabilizer shaft.
5. Front Stabilizer Shaft Insulator Clamp Bolt (1) » Remove [4x]

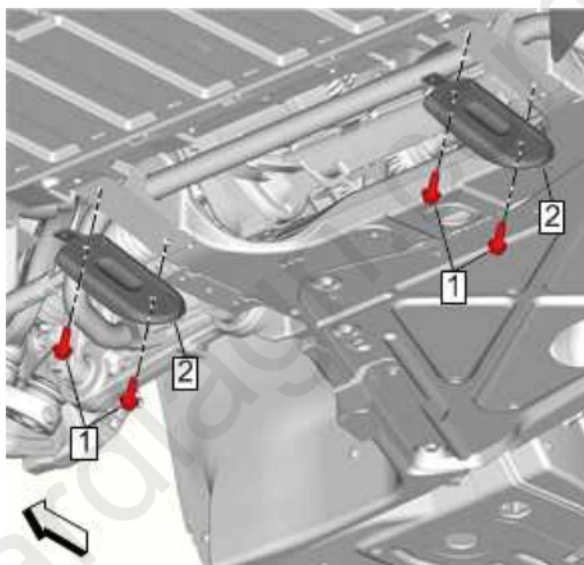


Fig. 11: Front Stabilizer Shaft Insulator Retainer

Courtesy of GENERAL MOTORS COMPANY

DISCARD the bolts.

6. Front Stabilizer Shaft Insulator Retainer (2) » Remove [2x]
7. Remove the front stabilizer shaft (1) from the vehicle.

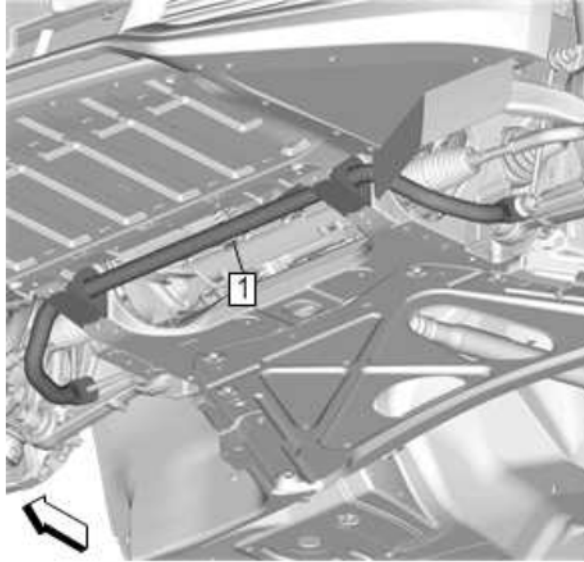


Fig. 12: Front Stabilizer Shaft

Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front stabilizer shaft (1) on the vehicle.

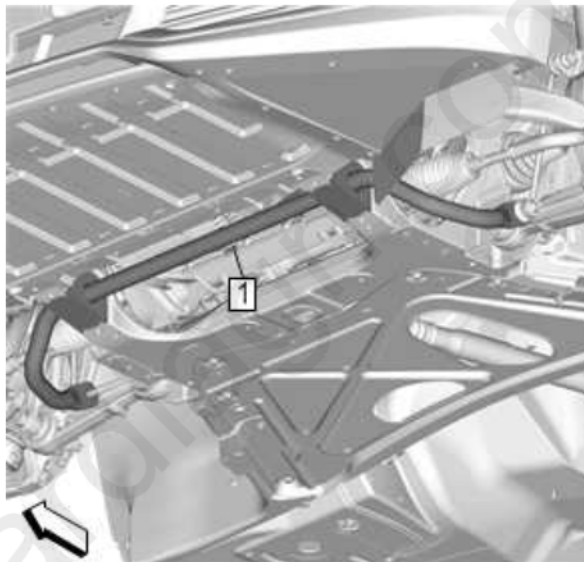
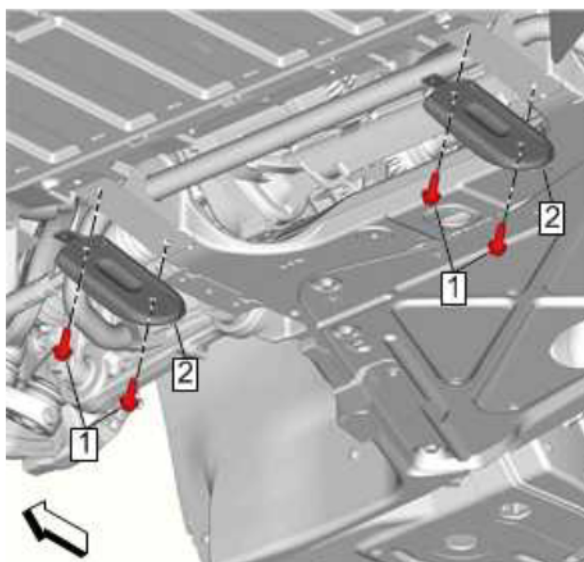


Fig. 13: Front Stabilizer Shaft

Courtesy of GENERAL MOTORS COMPANY

2. Front Stabilizer Shaft Insulator Retainer (2) Install [2x]



3. Front Stabilizer Shaft Insulator Clamp Bolt (1) » Install and tighten [4x]

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

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.

Install NEW bolts.

Tighten

1. First Pass: 58 N.m (43 lb ft)
 2. Final Pass: (15-30 degrees)
4. Front Stabilizer Shaft Link (1) @ Front Stabilizer Shaft » Install [2x] - [Stabilizer Shaft Link Replacement \(AWD\)](#)

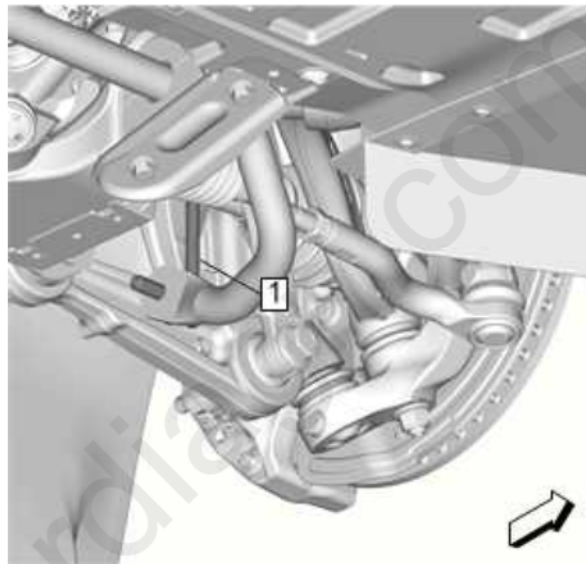


Fig. 15: Front Stabilizer Shaft Link
Courtesy of GENERAL MOTORS COMPANY

5. Underbody Front Air Deflector (1) » Install - [Underbody Front Air Deflector Replacement](#)

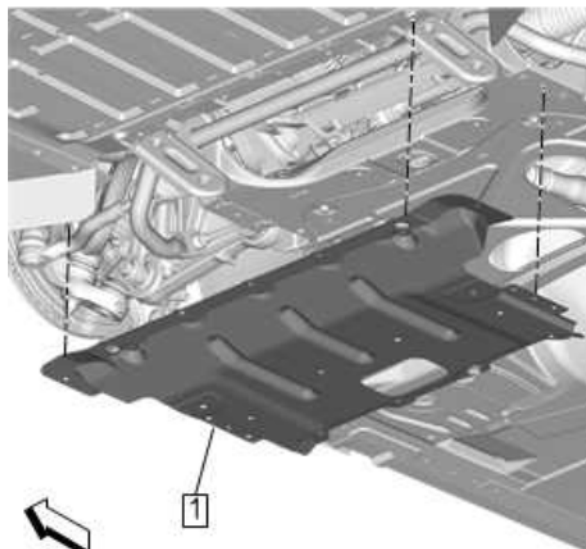


Fig. 16: Underbody Front Air Deflector
Courtesy of GENERAL MOTORS COMPANY

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

STABILIZER SHAFT LINK REPLACEMENT (RWD)

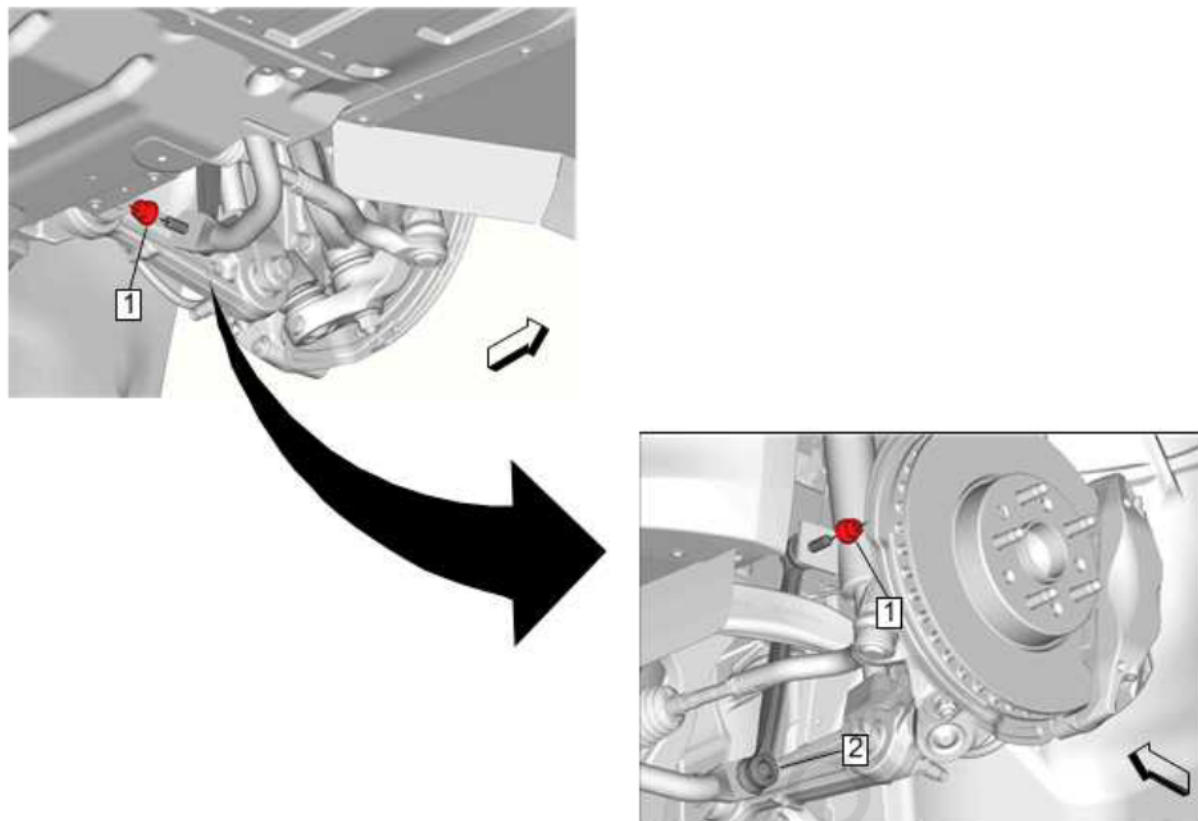


Fig. 17: Stabilizer Shaft Link (RWD)

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 [2x] CAUTION: Refer to Fastener Caution . Tighten 100 N.m (74 lb ft)
2	Front Stabilizer Shaft Link Procedure Install the front tire and wheel assembly. Refer to Tire and Wheel Removal and Installation

STABILIZER SHAFT LINK REPLACEMENT (AWD)

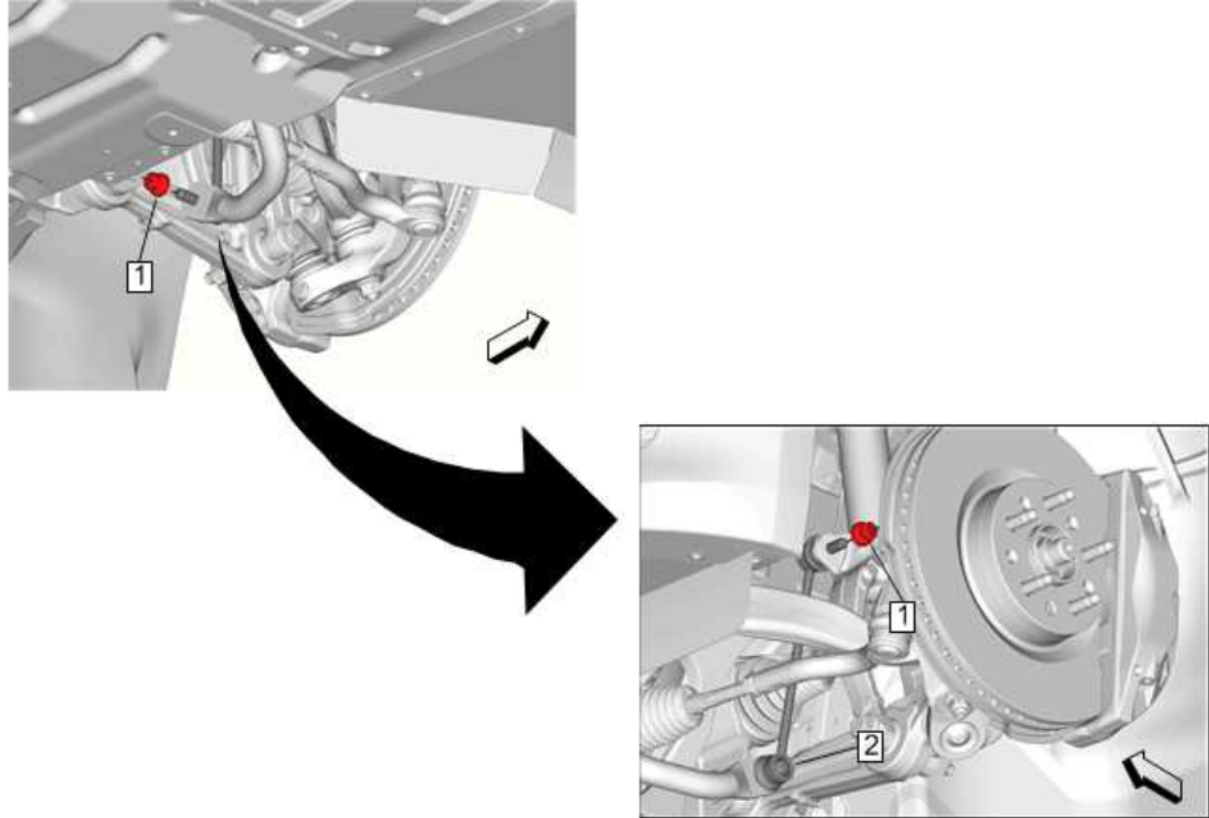


Fig. 18: Stabilizer Shaft Link (AWD)
 Courtesy of GENERAL MOTORS COMPANY

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 [2x] CAUTION: Refer to Fastener Caution . Tighten 100 N.m (74 lb ft)
2	Front Stabilizer Shaft Link Procedure Install the front tire and wheel assembly. Refer to Tire and Wheel Removal and Installation

FRONT WHEEL BEARING AND HUB REPLACEMENT (RWD)

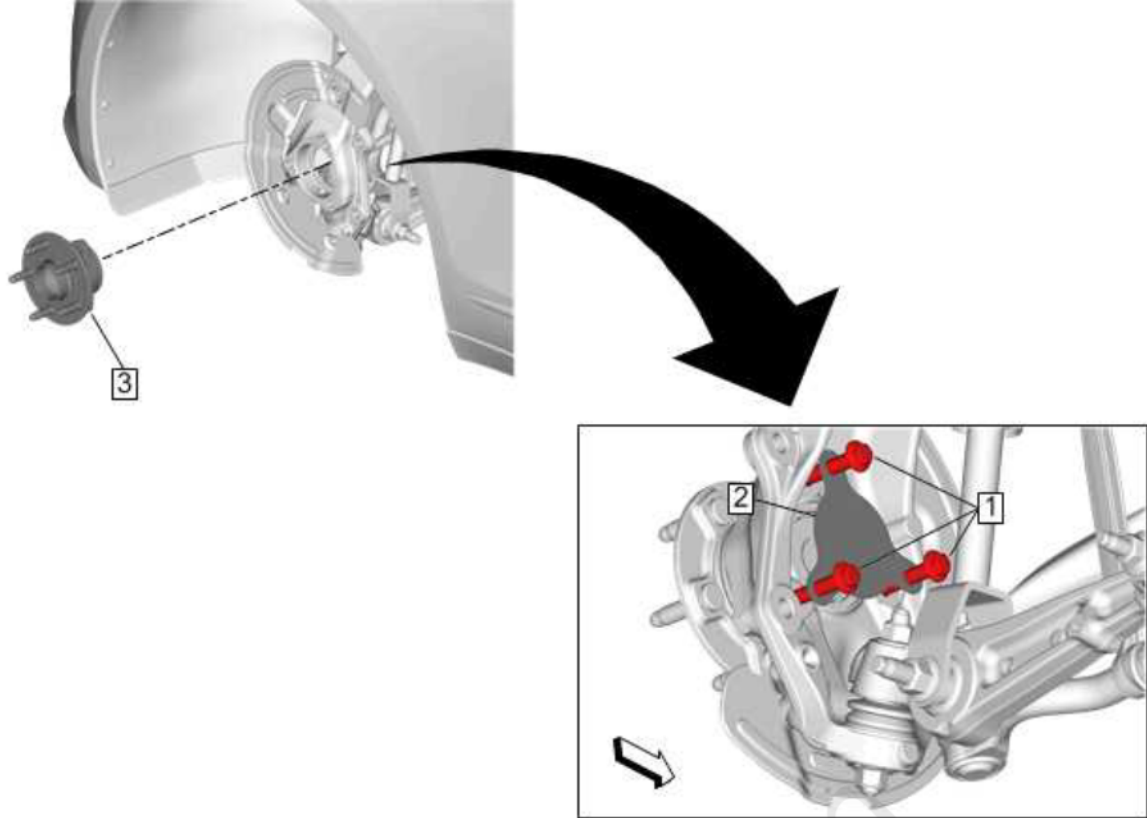


Fig. 19: Front Wheel Bearing and Hub (RWD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Front Wheel Speed Sensor @ Steering Knuckle» Remove - Front Wheel Speed Sensor Replacement 2. Front Brake Rotor Replacement	
1	Front Wheel Bearing and Hub Assembly Bolt [3x] CAUTION: Refer to Fastener Caution . Procedure 1. Clean the threads of the bolt with denatured alcohol or equivalent and allow to dry. 2. Apply thread locking adhesive to the bolt. Refer to Adhesives, Fluids, Lubricants and Sealers Tighten 125 N.m (92 lb ft)
2	Front Wheel Bearing and Hub Assembly Debris Shield
3	Front Wheel Bearing and Hub Assembly Procedure Apply grease evenly and ensure complete coverage to the steering knuckle bearing pilot bore only. Refer to Adhesives, Fluids, Lubricants and Sealers NOTE: Avoid applying grease to any other machined surfaces, holes or threads. Ensure the drain channel at the bottom of the bore is not blocked with grease or debris.

FRONT WHEEL BEARING AND HUB REPLACEMENT (AWD)

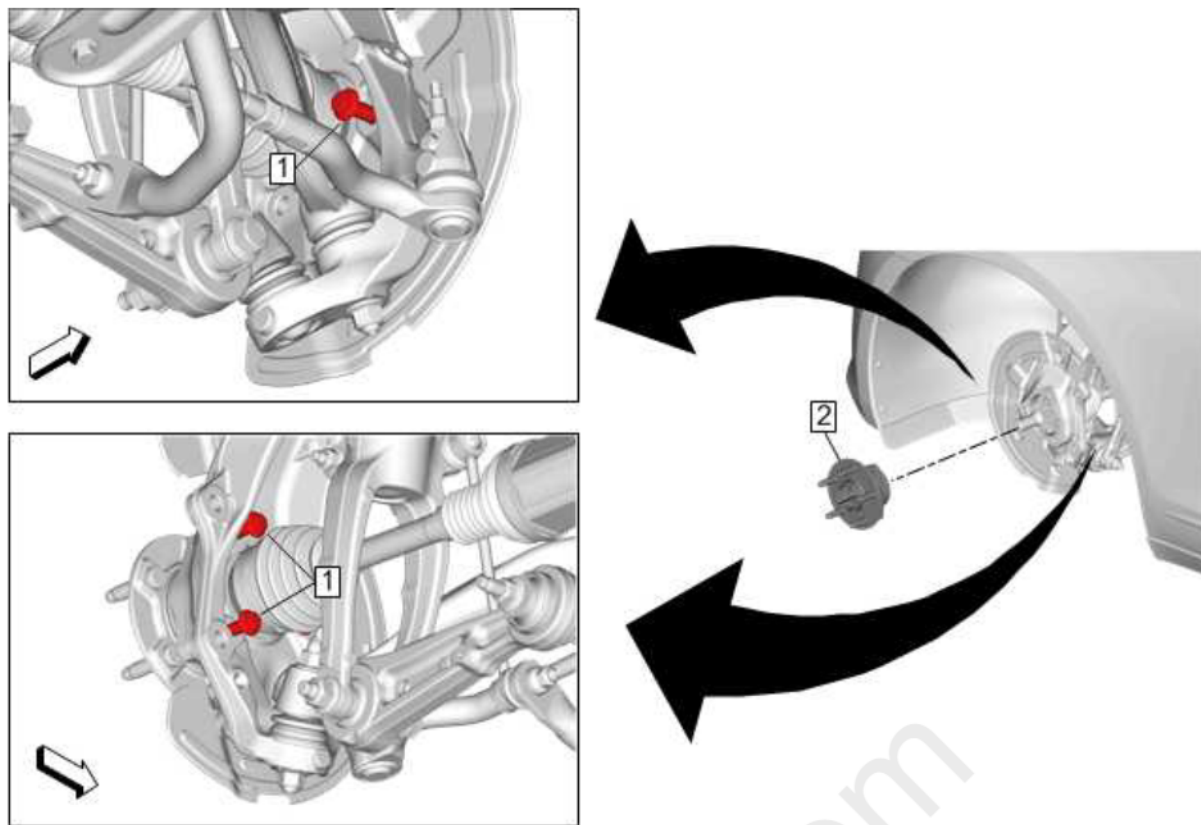


Fig. 20: Front Wheel Bearing And Hub

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Front Wheel Speed Sensor @ Steering Knuckle» Remove - Front Wheel Speed Sensor Replacement 2. Front Wheel Drive Shaft @ Front Wheel Bearing and Hub Assembly» Separate - Front Wheel Drive Shaft Replacement - Left Side or Front Wheel Drive Shaft Replacement - Right Side 3. Front Brake Rotor Replacement	
1	Front Wheel Bearing and Hub Assembly Bolt [3x] CAUTION: Refer to Fastener Caution . Procedure 1. Clean the threads of the bolt with denatured alcohol or equivalent and allow to dry. 2. Apply thread locking adhesive to the bolt. Refer to Adhesives, Fluids, Lubricants and Sealers Tighten 125 N.m (92 lb ft)

Callout	Component Name
2	Front Wheel Bearing and Hub Assembly Procedure Apply grease evenly and ensure complete coverage to the steering knuckle bearing pilot bore only. Refer to Adhesives, Fluids, Lubricants and Sealers NOTE: Avoid applying grease to any other machined surfaces, holes or threads. Ensure the drain channel at the bottom of the bore is not blocked with grease or debris.

STEERING KNUCKLE REPLACEMENT (RWD)

Removal Procedure

1. Front Wheel Bearing and Hub Assembly (1)» Remove - [Front Wheel Bearing and Hub Replacement \(RWD\)](#)



Fig. 21: Front Wheel Bearing and Hub Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Front Brake Shield (1)» Remove - [Front Brake Shield Replacement](#)

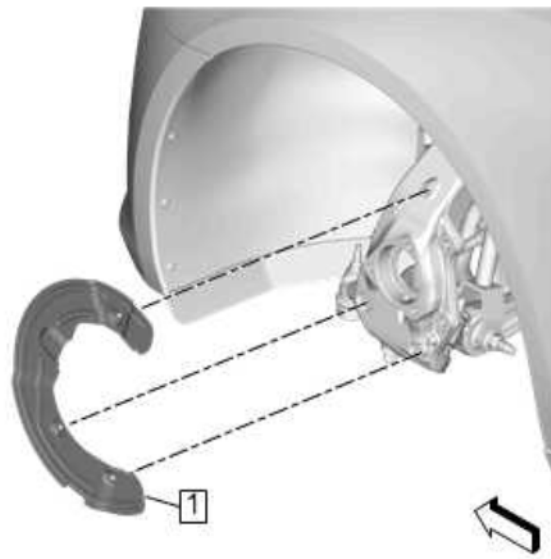


Fig. 22: Front Brake Shield
Courtesy of GENERAL MOTORS COMPANY

3. Steering Linkage Outer Tie Rod (1) @ Steering Knuckle» Separate - [Steering Linkage Outer Tie Rod Replacement](#)

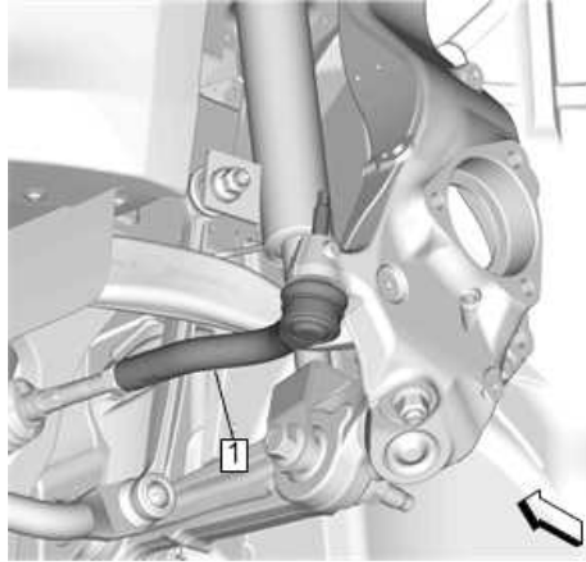


Fig. 23: Steering Linkage Outer Tie Rod

Courtesy of GENERAL MOTORS COMPANY

4. Front Lower Control Front Link (1) @ Steering Knuckle» Separate - **Front Lower Control Front Link Replacement (RWD)**

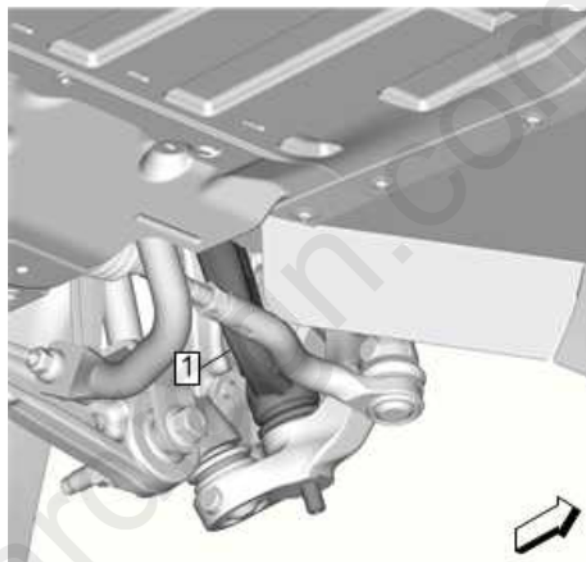
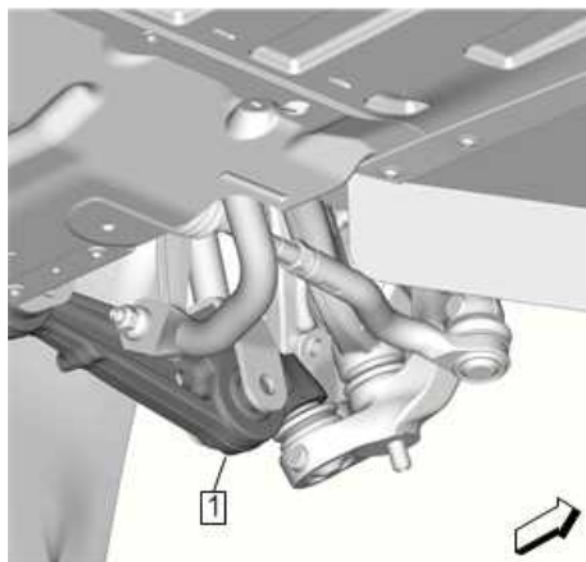


Fig. 24: Front Lower Control Front Link

Courtesy of GENERAL MOTORS COMPANY

5. Front Lower Control Rear Link (1) @ Steering Knuckle» Separate - **Front Lower Control Rear Link Replacement (RWD)**



6. Front Upper Control Arm (1) @ Steering Knuckle» Separate - **Upper Control Arm Replacement (RWD)**

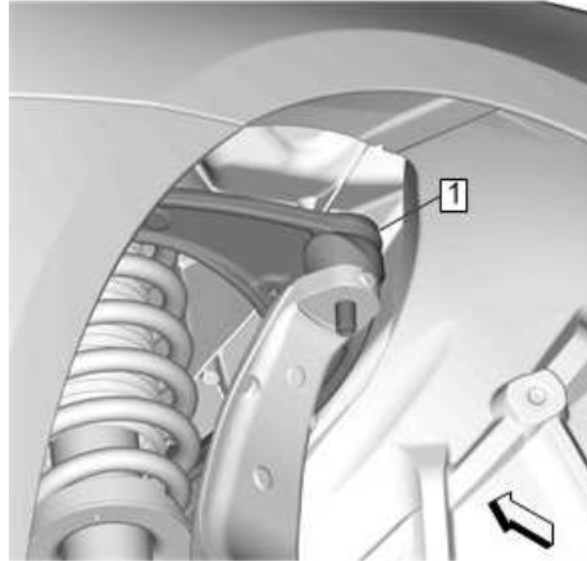


Fig. 26: Front Upper Control Arm
Courtesy of GENERAL MOTORS COMPANY

7. Remove the steering knuckle (1) from the vehicle.

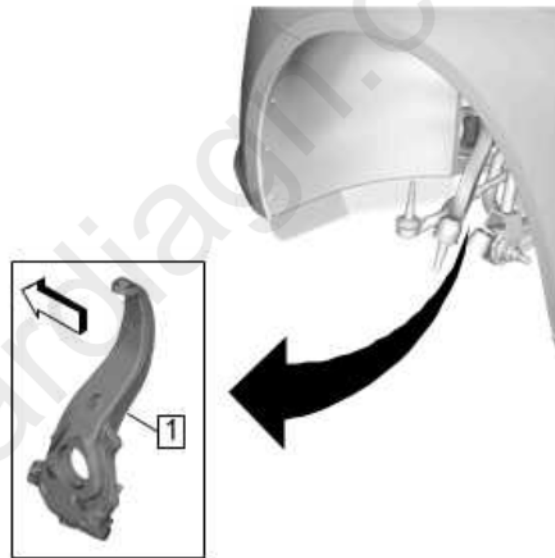


Fig. 27: Steering Knuckle
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the steering knuckle (1) on the vehicle.

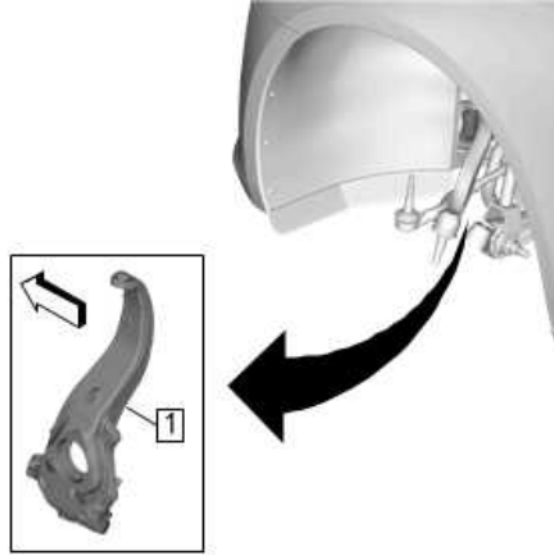


Fig. 28: Steering Knuckle

Courtesy of GENERAL MOTORS COMPANY

2. Front Upper Control Arm (1) @ Steering Knuckle» Install - **Upper Control Arm Replacement (RWD)**

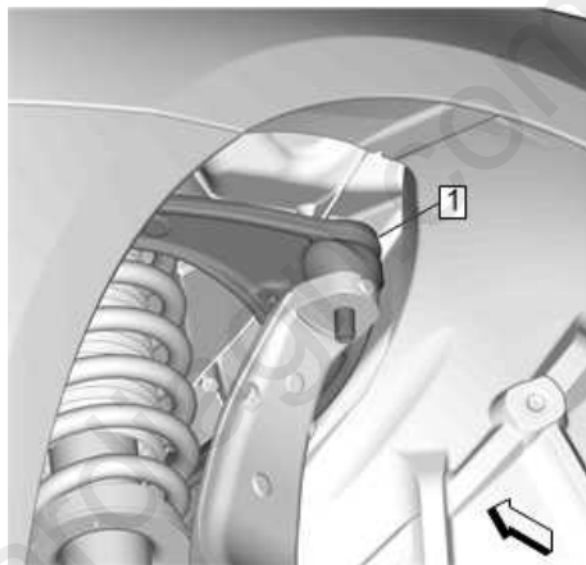


Fig. 29: Front Upper Control Arm

Courtesy of GENERAL MOTORS COMPANY

3. Front Lower Control Rear Link (1) @ Steering Knuckle» Install - **Front Lower Control Rear Link Replacement (RWD)**

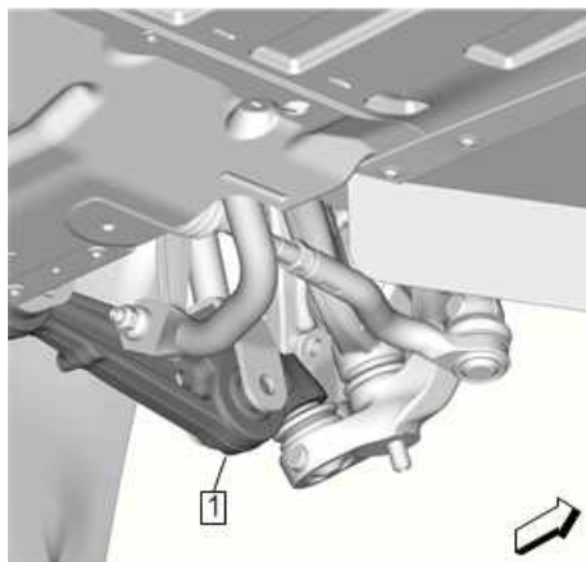


Fig. 30: Front Lower Control Rear Link
Courtesy of GENERAL MOTORS COMPANY

4. Front Lower Control Front Link (1) @ Steering Knuckle» Install - **Front Lower Control Front Link Replacement (RWD)**

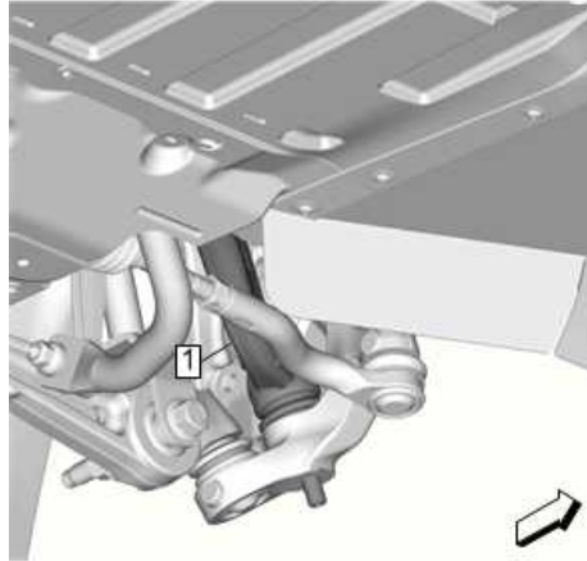


Fig. 31: Front Lower Control Front Link
Courtesy of GENERAL MOTORS COMPANY

5. Steering Linkage Outer Tie Rod (1) @ Steering Knuckle» Install - **Steering Linkage Outer Tie Rod Replacement**

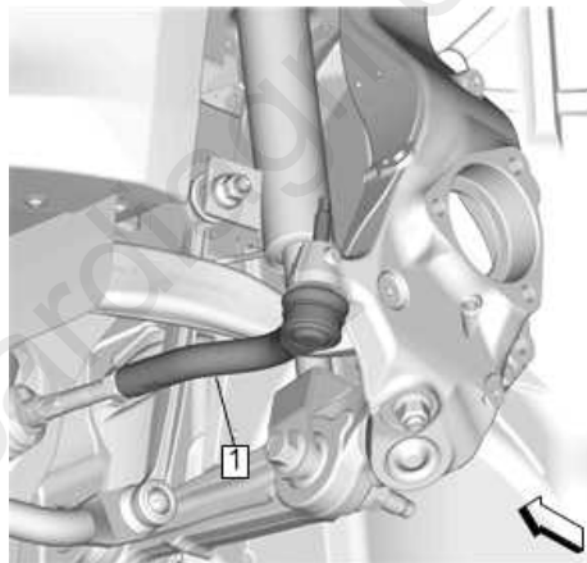


Fig. 32: Steering Linkage Outer Tie Rod
Courtesy of GENERAL MOTORS COMPANY

6. Front Brake Shield (1)» Install - **Front Brake Shield Replacement**

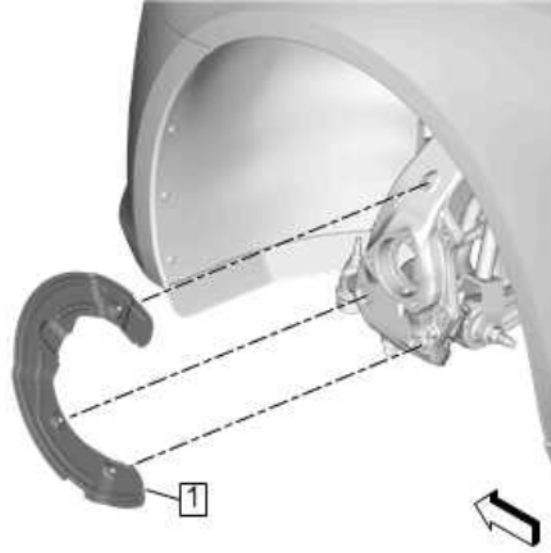


Fig. 33: Front Brake Shield

Courtesy of GENERAL MOTORS COMPANY

7. Front Wheel Bearing and Hub Assembly (1) » Install - **Front Wheel Bearing and Hub Replacement (RWD)**



Fig. 34: Front Wheel Bearing and Hub Assembly

Courtesy of GENERAL MOTORS COMPANY

STEERING KNUCKLE REPLACEMENT (AWD)

Removal Procedure

1. Front Wheel Bearing and Hub Assembly (1) » Remove - **Front Wheel Bearing and Hub Replacement (AWD)**

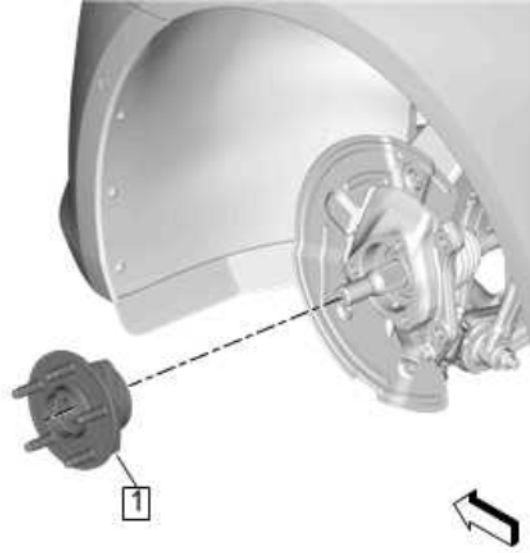


Fig. 35: Front Wheel Bearing And Hub Assembly
 Courtesy of GENERAL MOTORS COMPANY

2. Front Brake Shield (1) » Remove - **Front Brake Shield Replacement**

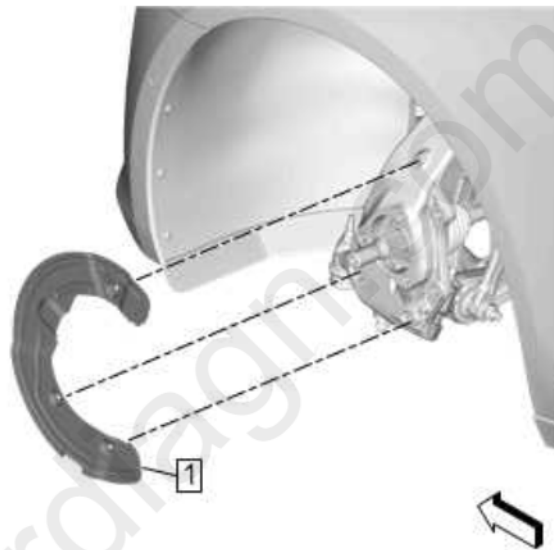


Fig. 36: Front Brake Shield
 Courtesy of GENERAL MOTORS COMPANY

3. Steering Linkage Outer Tie Rod (1) @ Steering Knuckle » Separate - **Steering Linkage Outer Tie Rod Replacement**

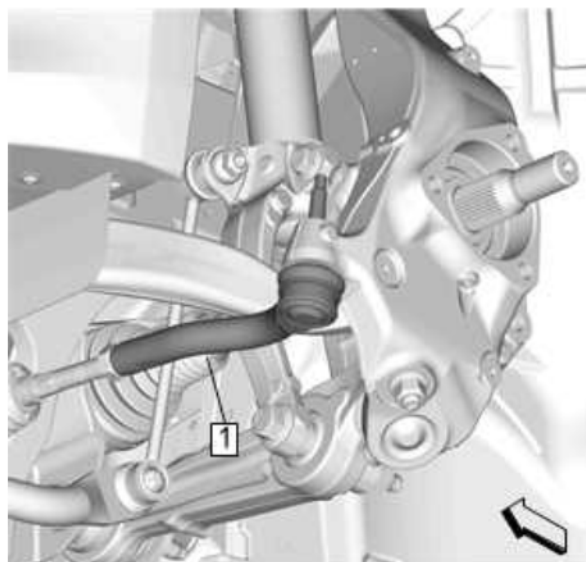


Fig. 37: Steering Linkage Outer Tie Rod
 Courtesy of GENERAL MOTORS COMPANY

4. Front Lower Control Front Link (1) @ Steering Knuckle» Separate - [Front Lower Control Front Link Replacement \(AWD\)](#)

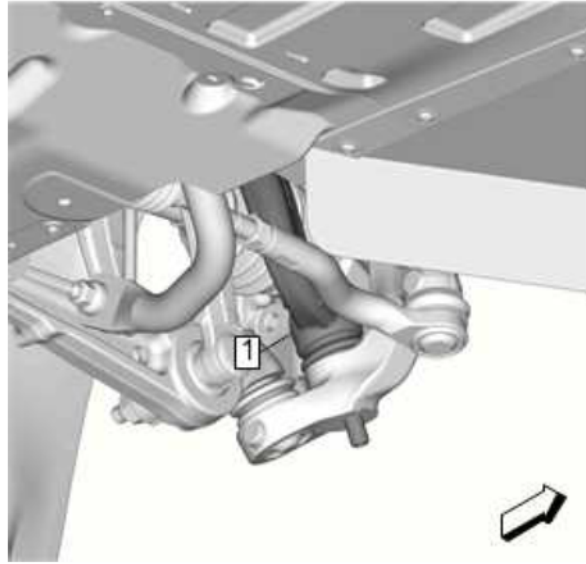


Fig. 38: Front Lower Control Front Link
Courtesy of GENERAL MOTORS COMPANY

5. Front Lower Control Rear Link (1) @ Steering Knuckle» Separate - [Front Lower Control Rear Link Replacement \(AWD\)](#)

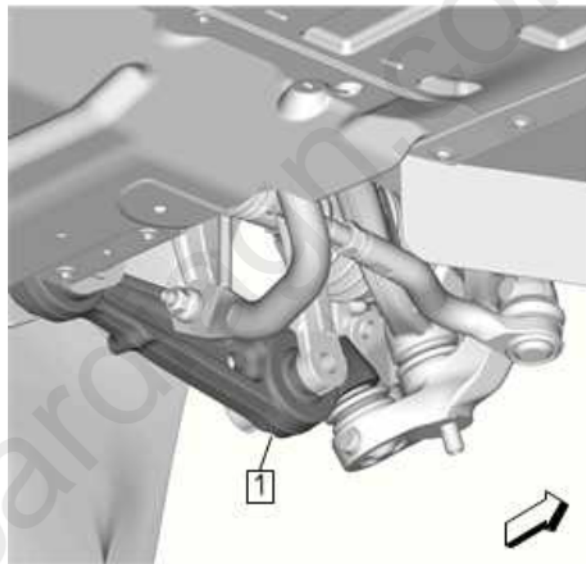


Fig. 39: Front Lower Control Rear Link
Courtesy of GENERAL MOTORS COMPANY

6. Front Upper Control Arm (1) @ Steering Knuckle» Separate - [Upper Control Arm Replacement \(AWD\)](#)

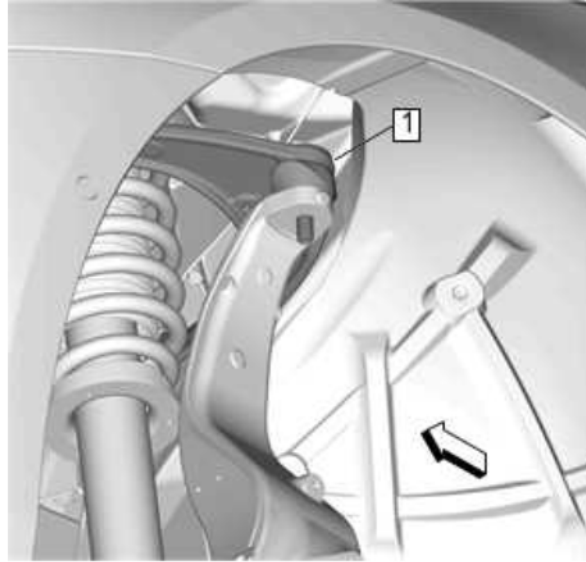


Fig. 40: Front Upper Control Arm
 Courtesy of GENERAL MOTORS COMPANY

7. Remove the steering knuckle (1) from the vehicle.

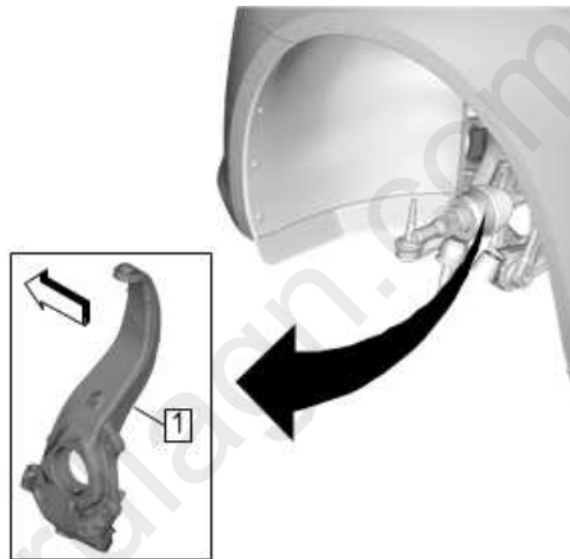


Fig. 41: Steering Knuckle
 Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the steering knuckle (1) on the vehicle.

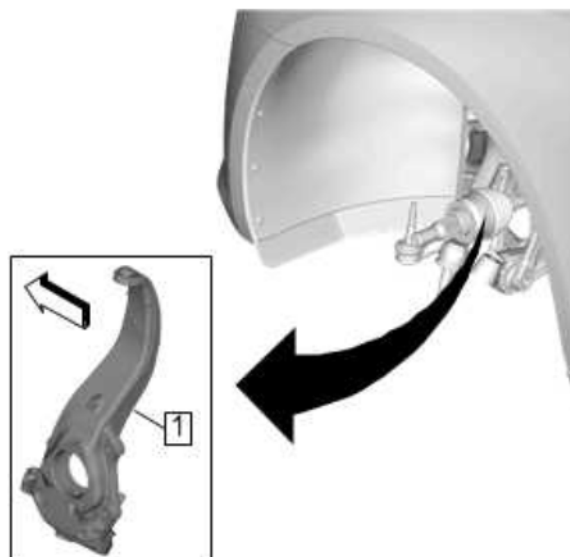


Fig. 42: Steering Knuckle
Courtesy of GENERAL MOTORS COMPANY

2. Front Upper Control Arm (1) @ Steering Knuckle» Install - **Upper Control Arm Replacement (AWD)**

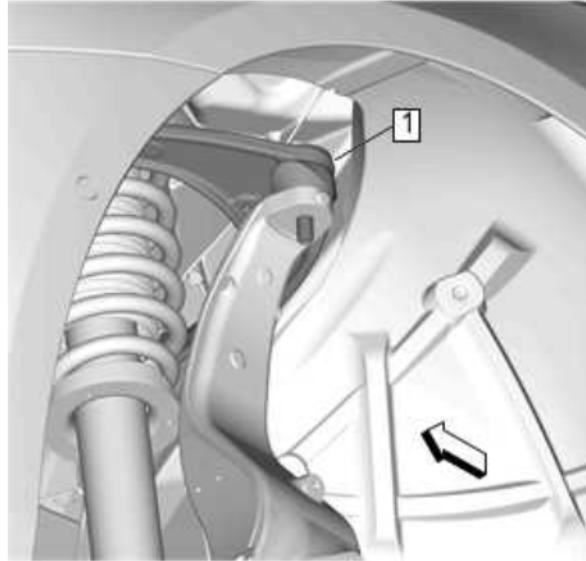


Fig. 43: Front Upper Control Arm
Courtesy of GENERAL MOTORS COMPANY

3. Front Lower Control Rear Link (1) @ Steering Knuckle» Install - **Front Lower Control Rear Link Replacement (AWD)**

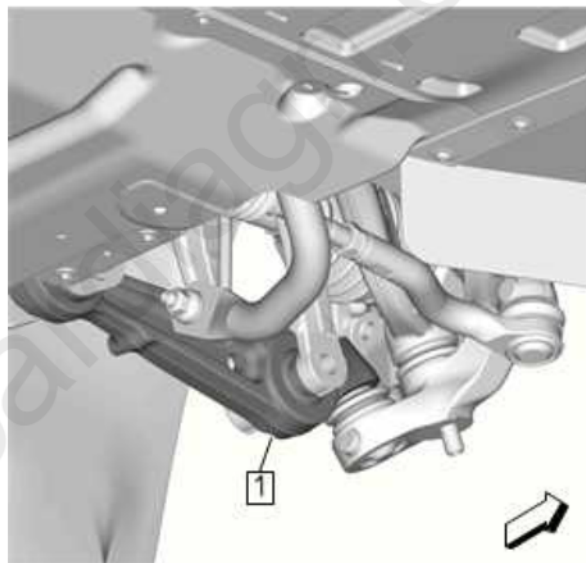


Fig. 44: Front Lower Control Rear Link
Courtesy of GENERAL MOTORS COMPANY

4. Front Lower Control Front Link (1) @ Steering Knuckle» Install - **Front Lower Control Front Link Replacement (AWD)**

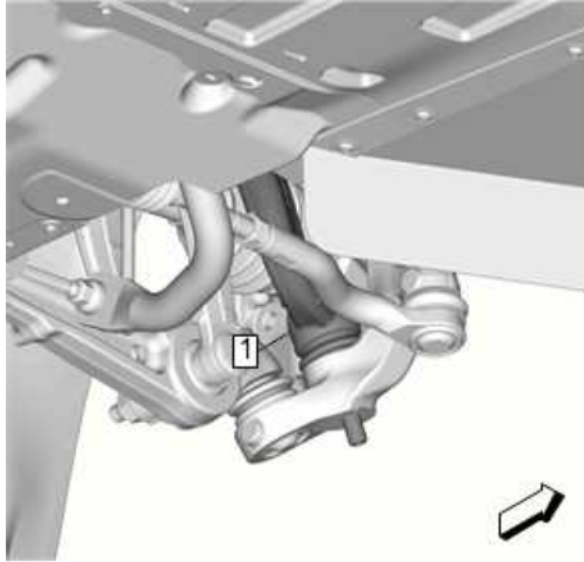


Fig. 45: Front Lower Control Front Link
 Courtesy of GENERAL MOTORS COMPANY

5. Steering Linkage Outer Tie Rod (1) @ Steering Knuckle» Install - **Steering Linkage Outer Tie Rod Replacement**

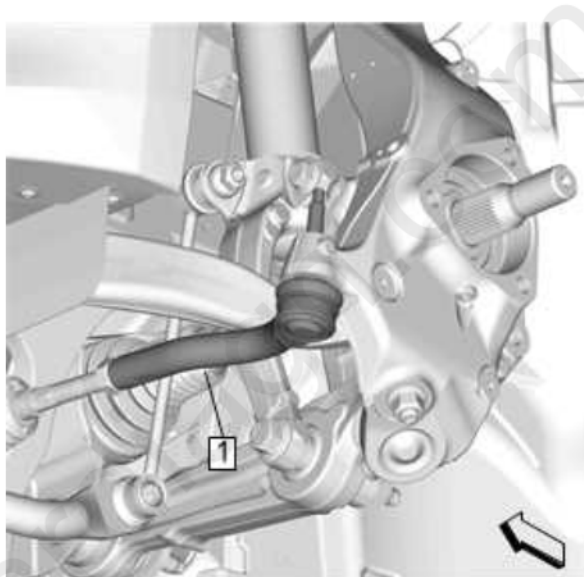


Fig. 46: Steering Linkage Outer Tie Rod
 Courtesy of GENERAL MOTORS COMPANY

6. Front Brake Shield (1)» Install - **Front Brake Shield Replacement**

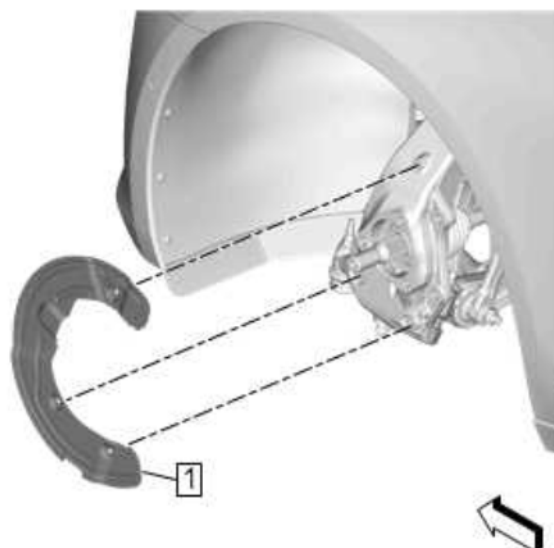


Fig. 47: Front Brake Shield
 Courtesy of GENERAL MOTORS COMPANY

7. Front Wheel Bearing and Hub Assembly (1)A» Install - [Front Wheel Bearing and Hub Replacement \(AWD\)](#)

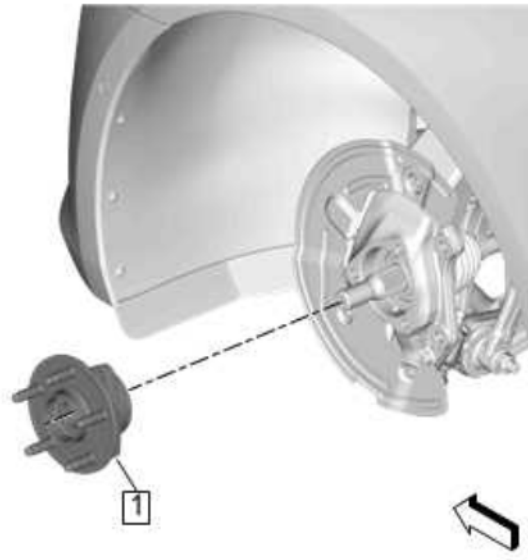


Fig. 48: Front Wheel Bearing And Hub Assembly
Courtesy of GENERAL MOTORS COMPANY

UPPER CONTROL ARM REPLACEMENT (RWD)

Special Tools

CH-43631 Ball Joint Separator

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Front Shock Absorber and Spring Assembly (1)A» Remove - [Shock Absorber and Spring Removal and Installation \(RWD Without F55\)](#) and/or [Shock Absorber and Spring Removal and Installation \(RWD With F55\)](#)

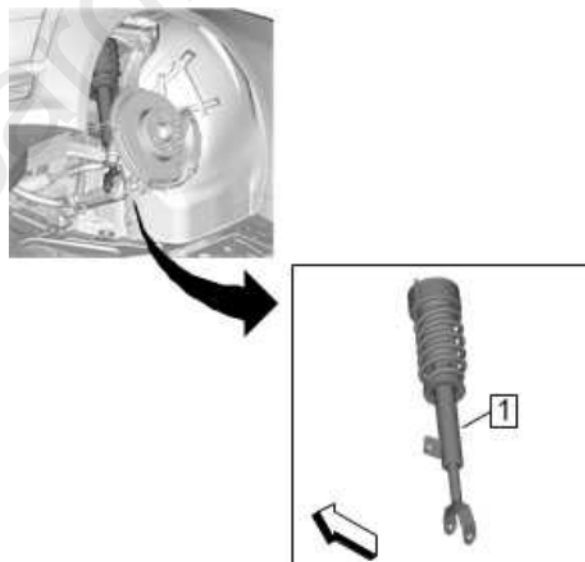


Fig. 49: Front Shock Absorber And Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Front Upper Control Arm Ball Stud Nut (1)A» Remove

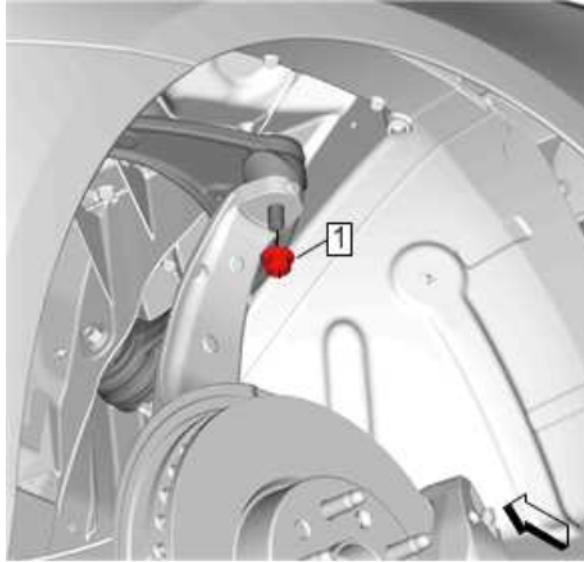


Fig. 50: Front Upper Control Arm Ball Stud Nut
 Courtesy of GENERAL MOTORS COMPANY

3. Use the **CH-43631** separator (1) to separate the front upper control arm from the steering knuckle.

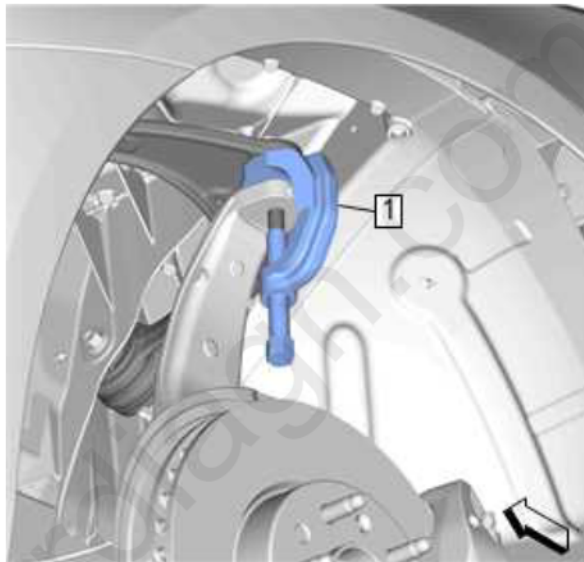


Fig. 51: CH-43631 Separator
 Courtesy of GENERAL MOTORS COMPANY

4. Front Upper Control Arm Bolt (1)» Remove [2x]

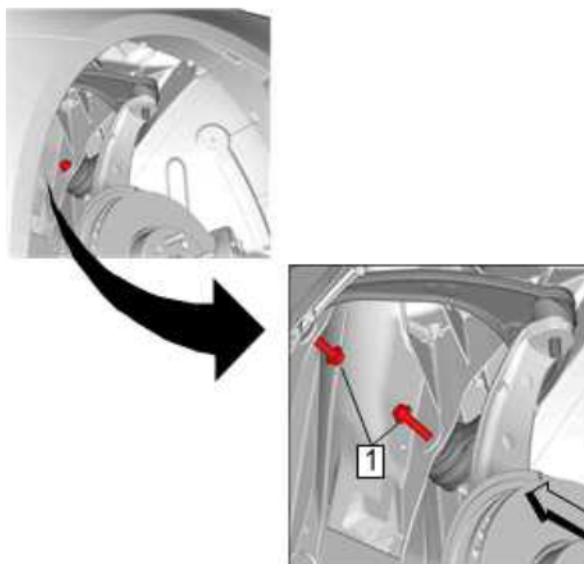


Fig. 52: Front Upper Control Arm Bolt
 Courtesy of GENERAL MOTORS COMPANY

DISCARD the bolts.

5. Remove the front upper control arm (1) from the vehicle.

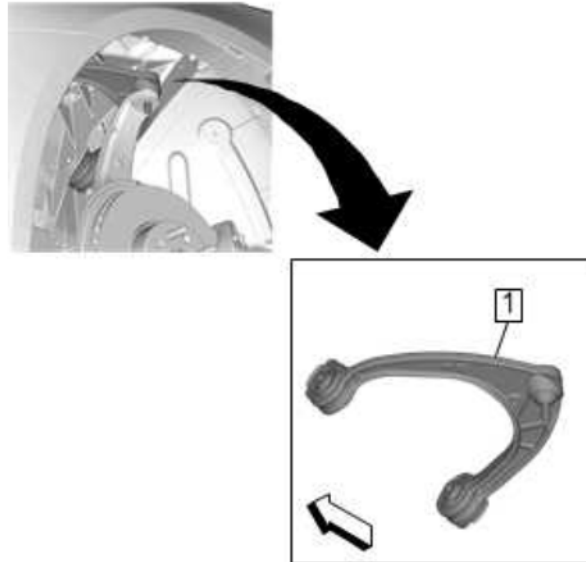


Fig. 53: Front Upper Control Arm

Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front upper control arm (1) on the vehicle.

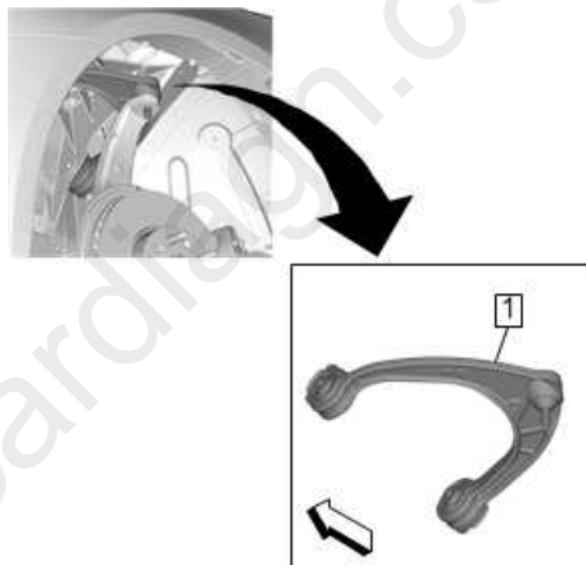


Fig. 54: Front Upper Control Arm

Courtesy of GENERAL MOTORS COMPANY

2. Front Upper Control Arm Bolt (1)» Install and tighten [2x]

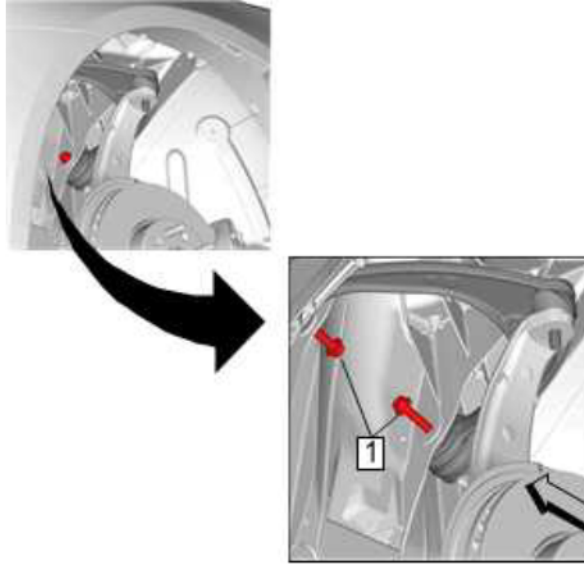


Fig. 55: Front Upper Control Arm Bolt

Courtesy of GENERAL MOTORS COMPANY

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

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.

Install NEW bolts.

Tighten

1. First Pass: 58 N.m (43 lb ft)
2. Final Pass: (90-105 degrees)
3. Front Upper Control Arm Ball Stud Nut (1)» Install and tighten 100 N.m (74 lb ft)

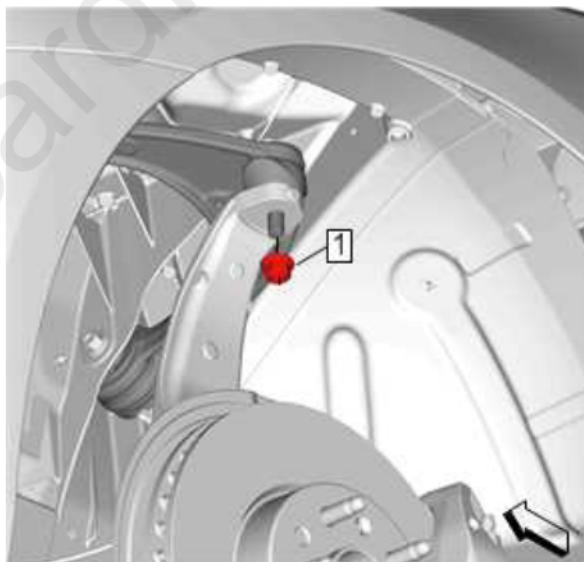


Fig. 56: Front Upper Control Arm Ball Stud Nut

Courtesy of GENERAL MOTORS COMPANY

4. Front Shock Absorber and Spring Assembly (1)» Install - [Shock Absorber and Spring Removal and Installation \(RWD Without F55\)](#) and/or [Shock Absorber and Spring Removal and Installation \(RWD With F55\)](#)

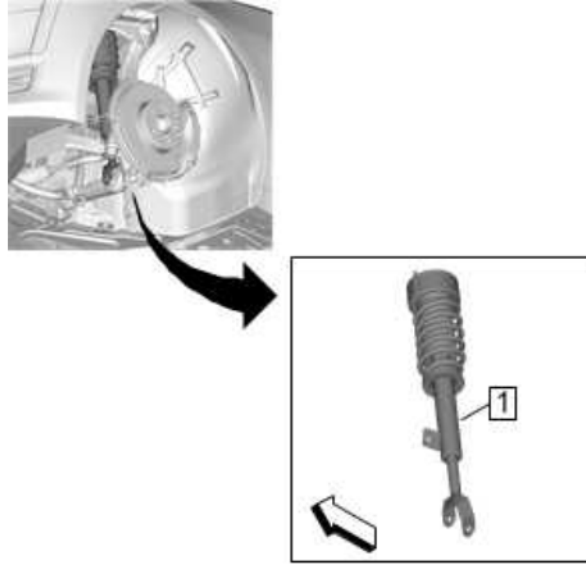


Fig. 57: Front Shock Absorber And Spring Assembly
 Courtesy of GENERAL MOTORS COMPANY

5. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

UPPER CONTROL ARM REPLACEMENT (AWD)

Special Tools

CH-43631 Ball Joint Separator

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Front Shock Absorber and Spring Assembly (1) » Remove - [Shock Absorber and Spring Removal and Installation \(AWD Without F55\)](#) and/or [Shock Absorber and Spring Removal and Installation \(AWD With F55\)](#)

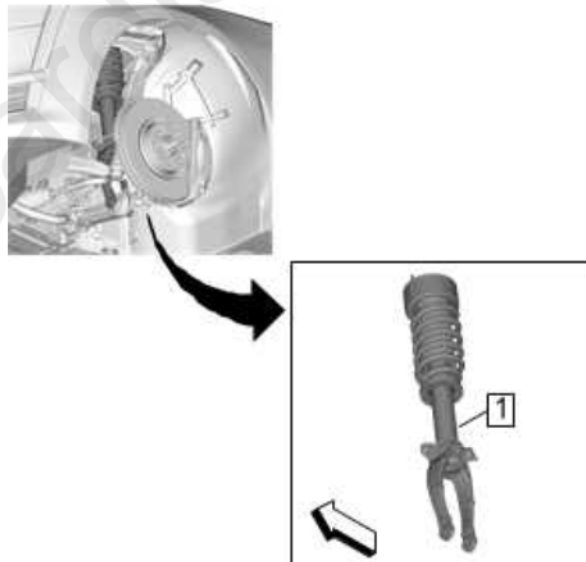


Fig. 58: Shock Absorber and Spring
 Courtesy of GENERAL MOTORS COMPANY

2. Front Upper Control Arm Ball Stud Nut (1) » Remove

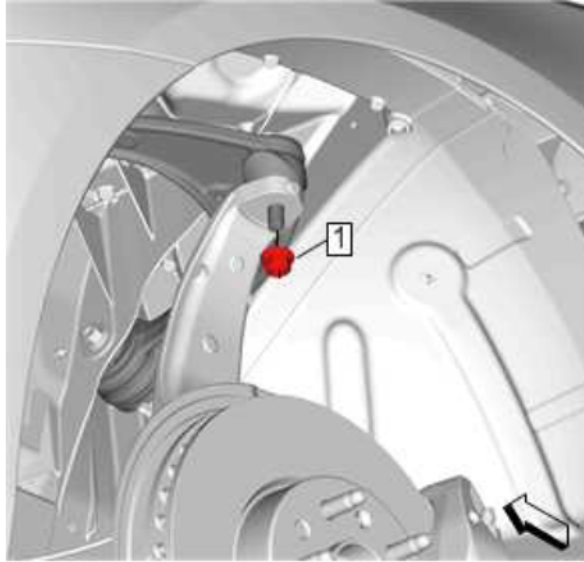


Fig. 59: Front Upper Control Arm Ball Stud Nut
 Courtesy of GENERAL MOTORS COMPANY

3. Use the **CH-43631** separator (1) to separate the front upper control arm from the steering knuckle.

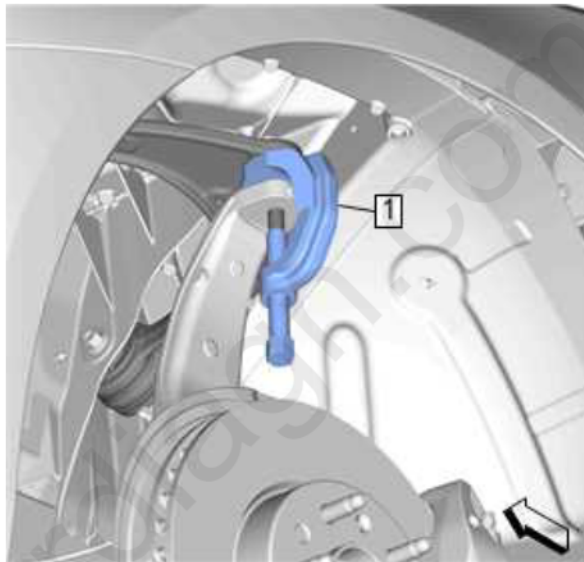


Fig. 60: CH-43631 Separator
 Courtesy of GENERAL MOTORS COMPANY

4. Front Upper Control Arm Bolt (1)» Remove [2x]

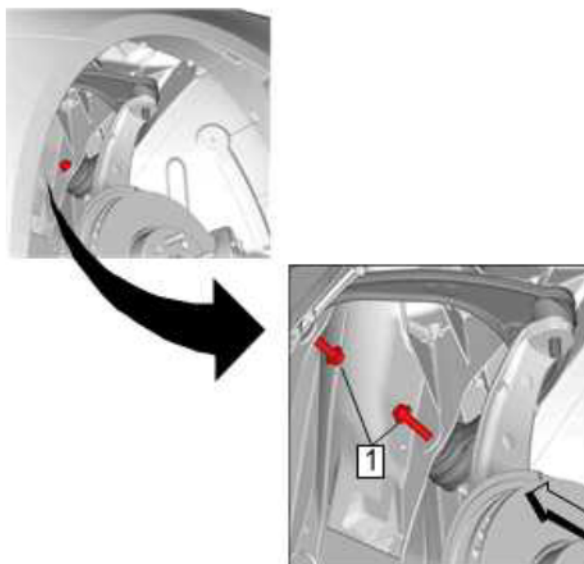


Fig. 61: Front Upper Control Arm Bolt
 Courtesy of GENERAL MOTORS COMPANY

DISCARD the bolts.

5. Remove the front upper control arm (1) from the vehicle.

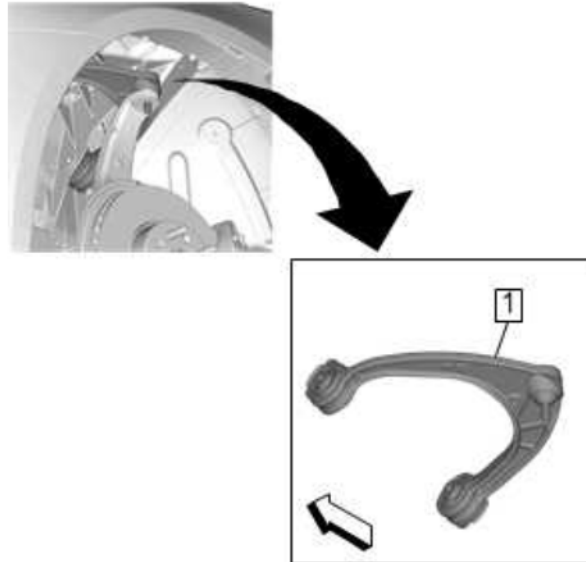


Fig. 62: Front Upper Control Arm

Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front upper control arm (1) on the vehicle.

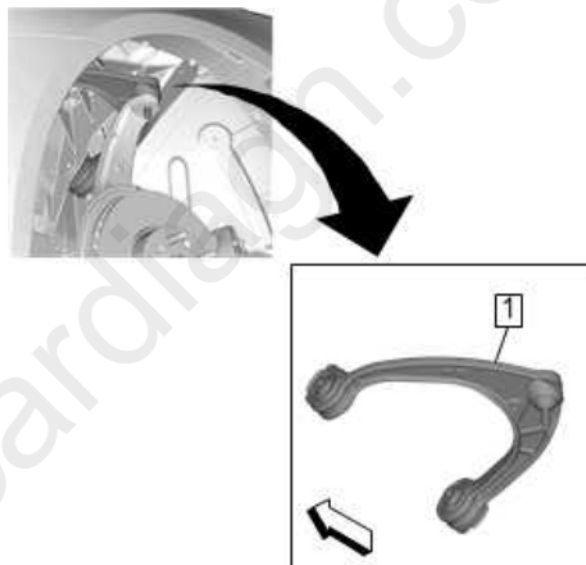


Fig. 63: Front Upper Control Arm

Courtesy of GENERAL MOTORS COMPANY

2. Front Upper Control Arm Bolt (1)» Install and tighten [2x]

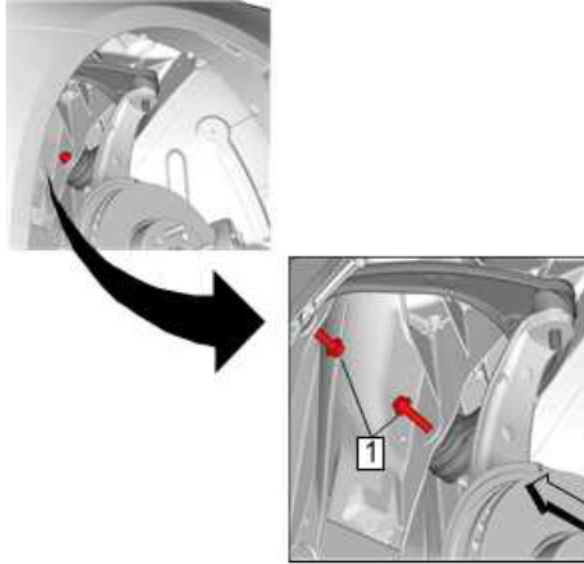


Fig. 64: Front Upper Control Arm Bolt

Courtesy of GENERAL MOTORS COMPANY

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

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.

Install NEW bolts.

Tighten

1. First Pass: 58 N.m (43 lb ft)
2. Final Pass: (90-105 degrees)
3. Front Upper Control Arm Ball Stud Nut (1)» Install and tighten 100 N.m (74 lb ft)

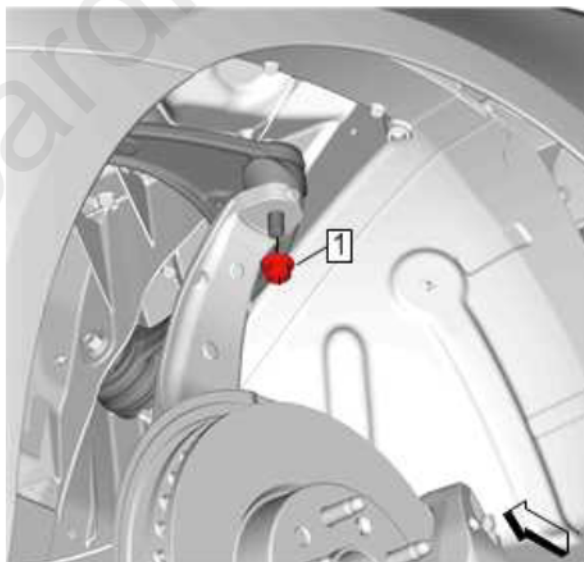


Fig. 65: Front Upper Control Arm Ball Stud Nut

Courtesy of GENERAL MOTORS COMPANY

4. Front Shock Absorber and Spring Assembly (1)» Install - [Shock Absorber and Spring Removal and Installation \(AWD Without F55\)](#) and/or [Shock Absorber and Spring Removal and Installation \(AWD With F55\)](#)

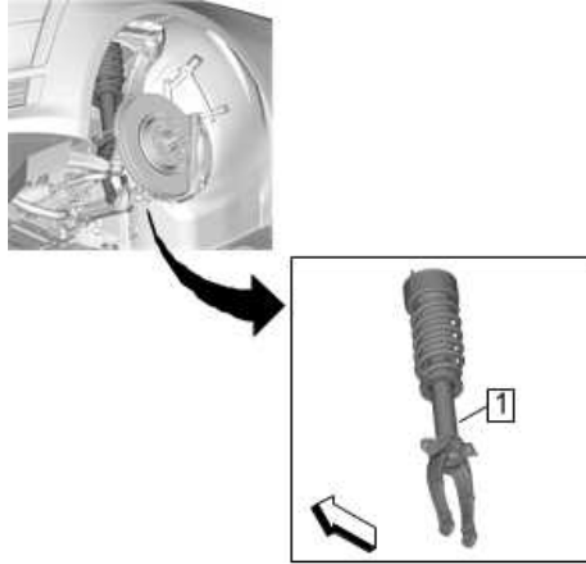


Fig. 66: Shock Absorber and Spring

Courtesy of GENERAL MOTORS COMPANY

5. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

FRONT LOWER CONTROL FRONT LINK REPLACEMENT (RWD)

Special Tools

CH-43631 Ball Joint Separator

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Remove the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
2. Front Wheelhouse Liner (1)» Remove - [Front Wheelhouse Liner Replacement](#)

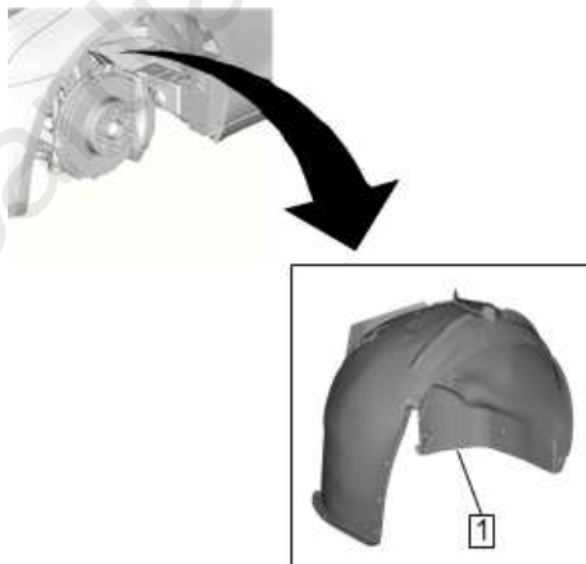


Fig. 67: Front Wheelhouse Liner

Courtesy of GENERAL MOTORS COMPANY

3. Steering Knuckle Nut (1)» Remove

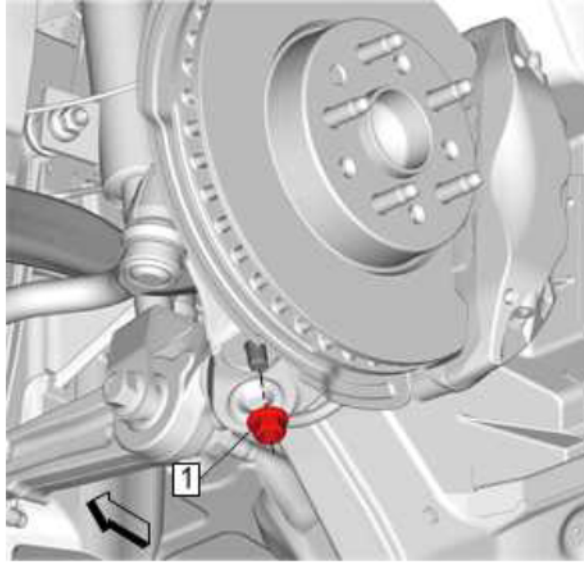


Fig. 68: Steering Knuckle Nut

Courtesy of GENERAL MOTORS COMPANY

4. Use the **CH-43631** separator (1) to separate the front lower control front link from the steering knuckle.

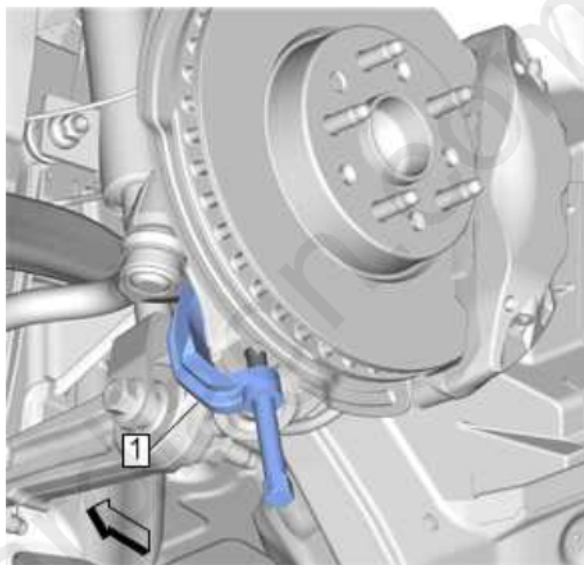


Fig. 69: CH-43631 Separator

Courtesy of GENERAL MOTORS COMPANY

5. Front Lower Control Front Link Nut (1)» Remove

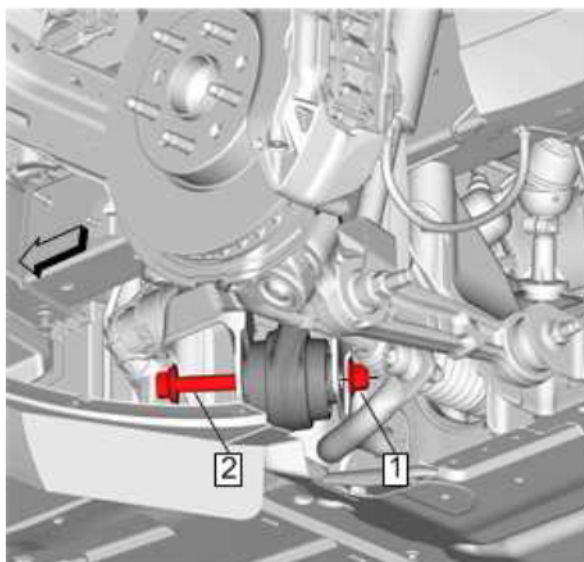


Fig. 70: Front Lower Control Front Link Bolt

Courtesy of GENERAL MOTORS COMPANY

6. Front Lower Control Front Link Bolt (2)» Remove

DISCARD the bolt.

7. Remove the front lower control front link (1) from the vehicle.

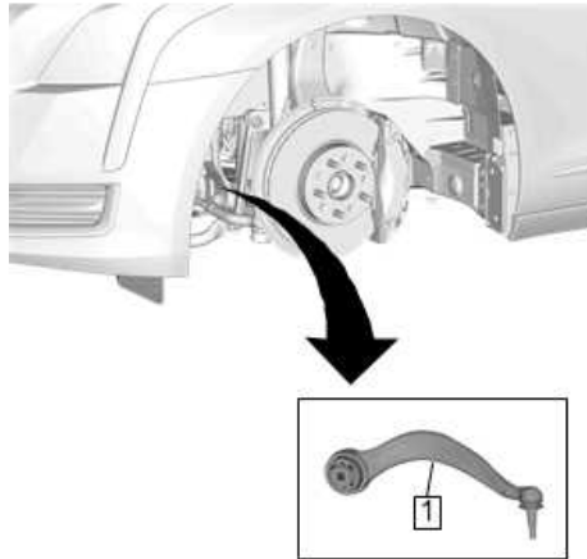


Fig. 71: Front Lower Control Front Link
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front lower control front link (1) on the vehicle.

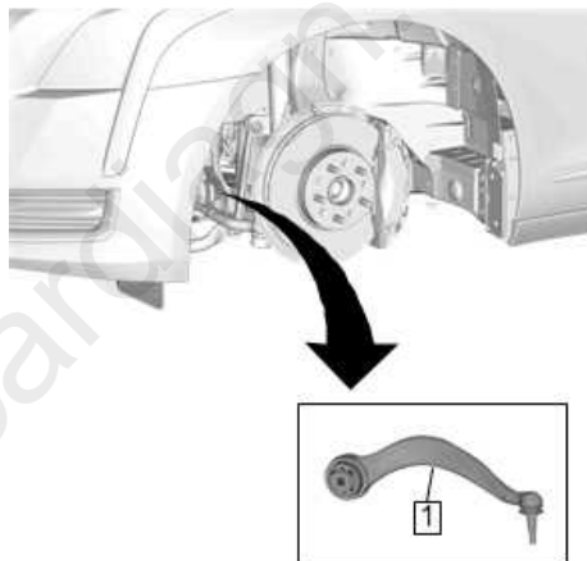


Fig. 72: Front Lower Control Front Link
Courtesy of GENERAL MOTORS COMPANY

2. Front Lower Control Front Link Bolt (2)» Install

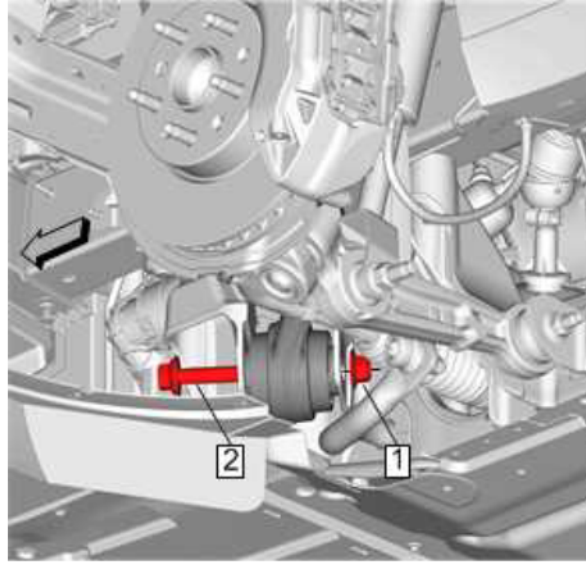


Fig. 73: Front Lower Control Front Link Bolt
Courtesy of GENERAL MOTORS COMPANY

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.

Install a NEW bolt.

3. Front Lower Control Front Link Nut (1)» Install
4. Front Lower Control Front Link Bolt (2)» Tighten

CAUTION: Refer to **Fastener Caution** .

Tighten

1. First Pass: 240 N.m (177 lb ft)
 2. Final Pass: (45-60 degrees)
5. Steering Knuckle Nut (1)» Install and tighten

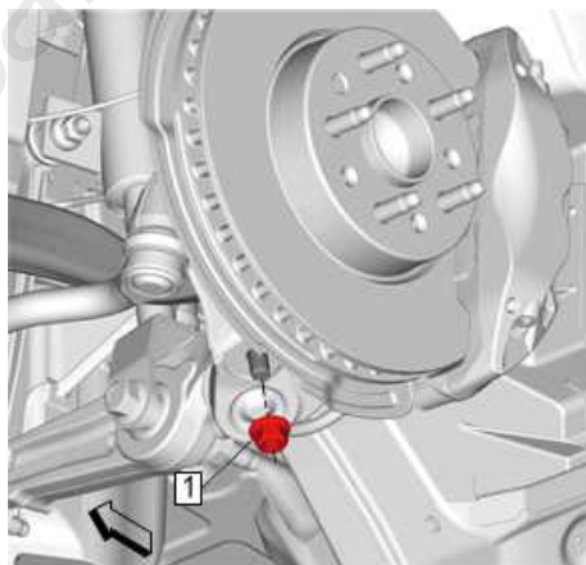


Fig. 74: Steering Knuckle Nut
Courtesy of GENERAL MOTORS COMPANY

Tighten

1. First Pass: 40 N.m (30 lb ft)
2. Final Pass: (120-135 degrees)

6. Front Wheelhouse Liner (1)A» Install - [Front Wheelhouse Liner Replacement](#)

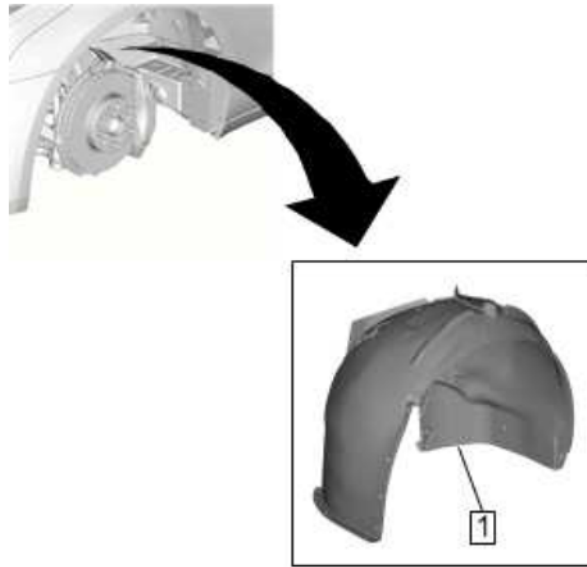


Fig. 75: Front Wheelhouse Liner

Courtesy of GENERAL MOTORS COMPANY

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

8. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

FRONT LOWER CONTROL FRONT LINK REPLACEMENT (AWD)

Special Tools

CH-43631 Ball Joint Separator

Equivalent regional tools: [Special Tools](#)

Removal Procedure

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

2. Front Wheelhouse Liner (1)A» Remove - [Front Wheelhouse Liner Replacement](#)

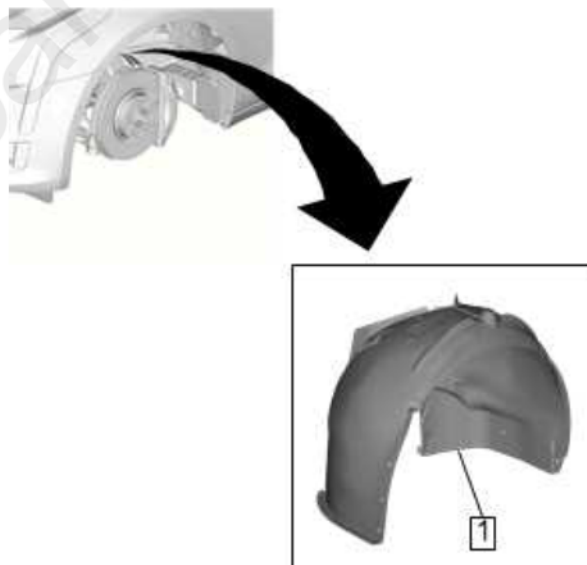


Fig. 76: Front Wheelhouse Liner

Courtesy of GENERAL MOTORS COMPANY

3. Front Wheel Drive Shaft (1) @ Front Wheel Bearing and Hub AssemblyA» Separate - [Front Wheel Drive Shaft Replacement - Left Side](#) or [Front Wheel Drive Shaft Replacement - Right Side](#)



Fig. 77: Front Wheel Drive Shaft

Courtesy of GENERAL MOTORS COMPANY

4. Steering Knuckle Nut (1)» Remove

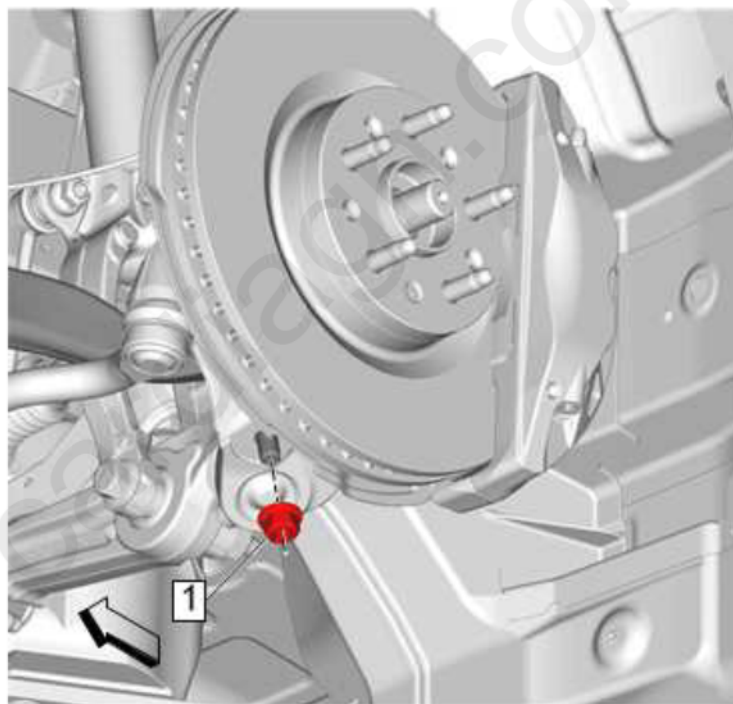


Fig. 78: Steering Knuckle Nut

Courtesy of GENERAL MOTORS COMPANY

5. Use the **CH-43631** separator (1) to separate the front lower control front link from the steering knuckle.

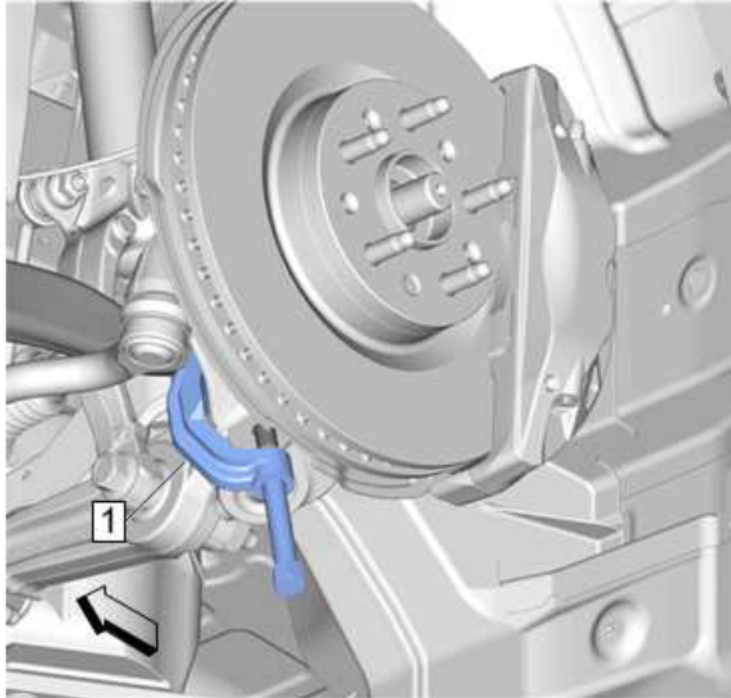


Fig. 79: CH-43631 Separator

Courtesy of GENERAL MOTORS COMPANY

6. Front Lower Control Front Link Nut (1)» Remove

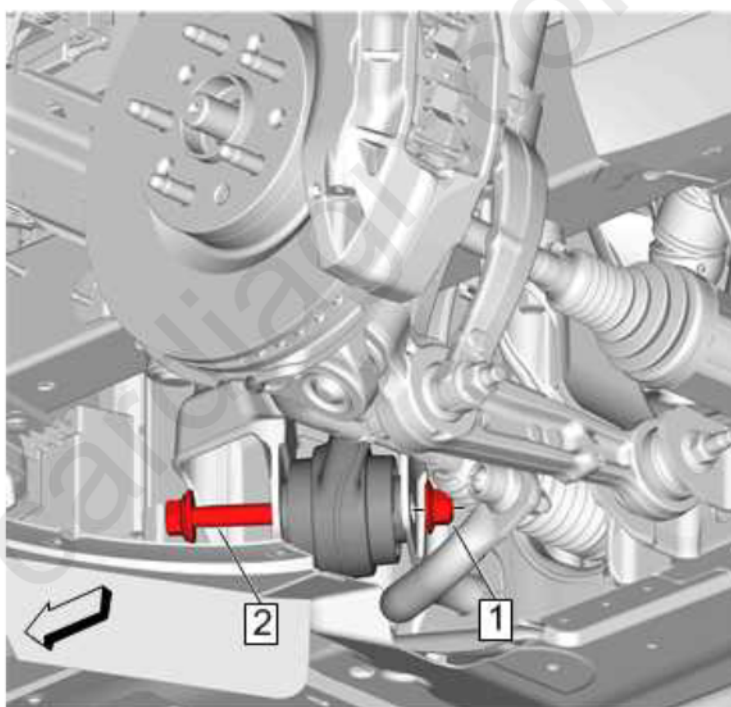


Fig. 80: Front Lower Control Front Link Bolt

Courtesy of GENERAL MOTORS COMPANY

7. Front Lower Control Front Link Bolt (2)» Remove

DISCARD the bolt.

8. Remove the front lower control front link (1) from the vehicle.

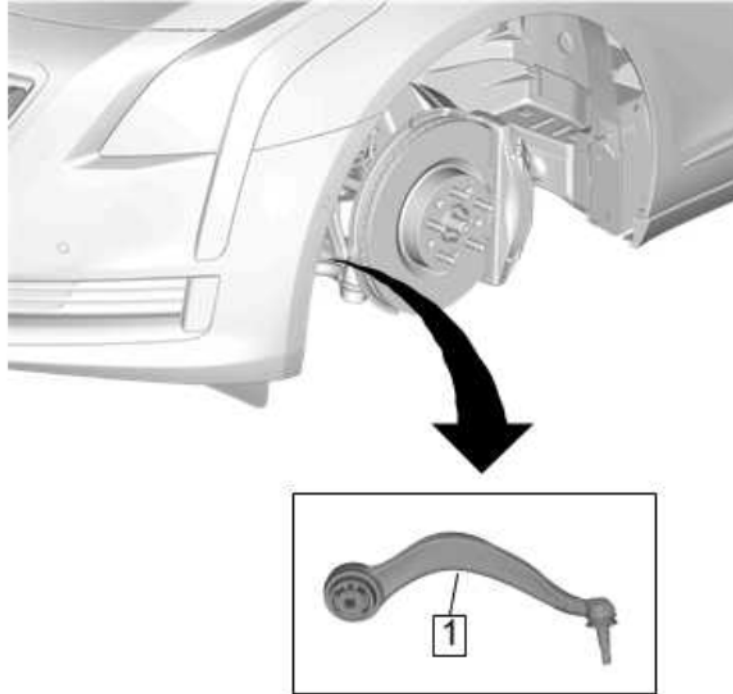


Fig. 81: Front Lower Control Front Link
 Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front lower control front link (1) on the vehicle.

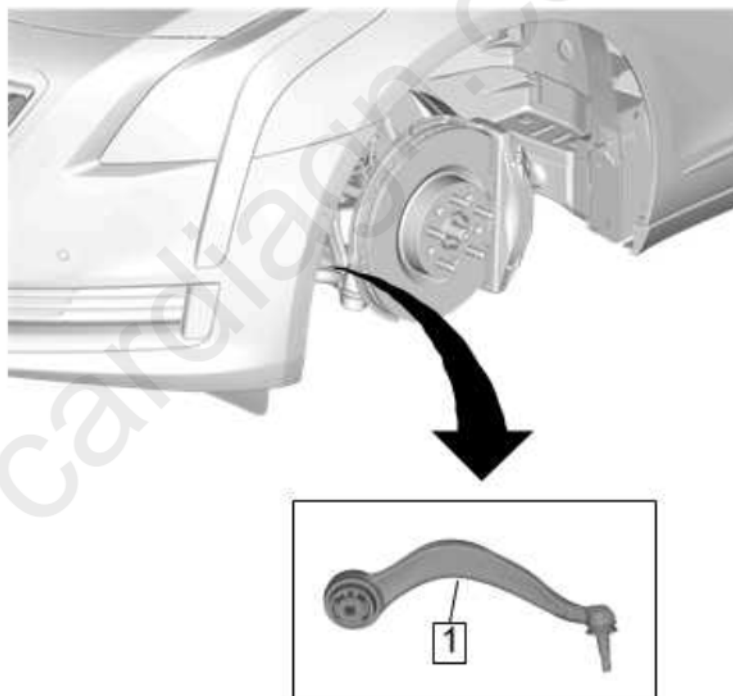


Fig. 82: Front Lower Control Front Link
 Courtesy of GENERAL MOTORS COMPANY

2. Front Lower Control Front Link Bolt (2)» Install

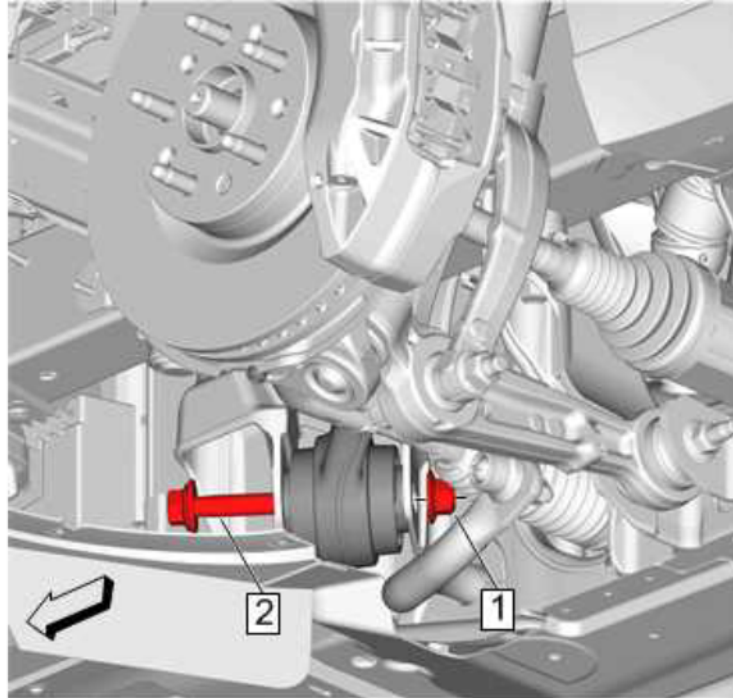


Fig. 83: Front Lower Control Front Link Bolt
 Courtesy of GENERAL MOTORS COMPANY

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.

Install a NEW bolt.

3. Front Lower Control Front Link Nut (1)» Install
4. Front Lower Control Front Link Bolt (2)» Tighten

CAUTION: Refer to **Fastener Caution** .

Tighten

1. First Pass: 240 N.m (177 lb ft)
 2. Final Pass: (45-60 degrees)
5. Steering Knuckle Nut (1)» Install and tighten

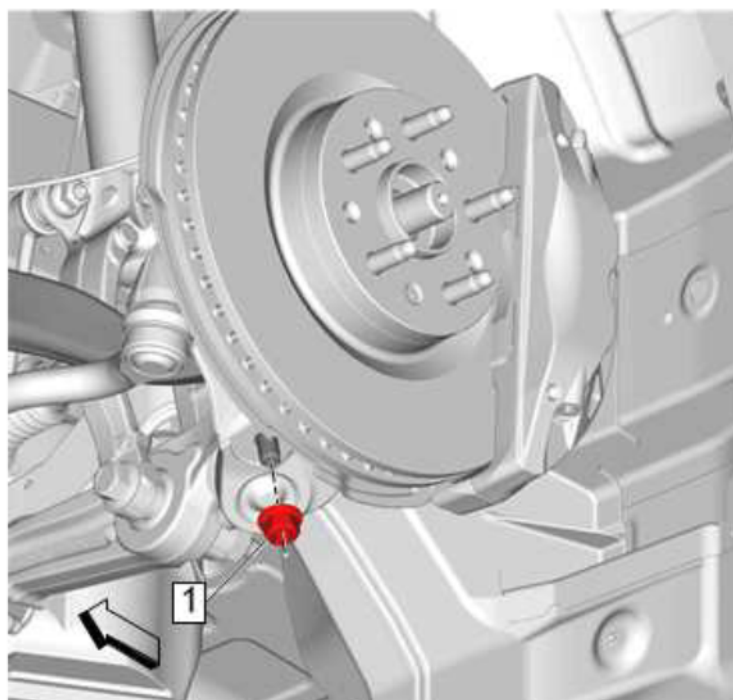


Fig. 84: Steering Knuckle Nut
Courtesy of GENERAL MOTORS COMPANY

Tighten

1. First Pass: 40 N.m (30 lb ft)
 2. Final Pass: (120-135 degrees)
6. Front Wheel Drive Shaft (1) @ Front Wheel Bearing and Hub Assembly» Install - [Front Wheel Drive Shaft Replacement - Left Side](#) or [Front Wheel Drive Shaft Replacement - Right Side](#)



Fig. 85: Front Wheel Drive Shaft
Courtesy of GENERAL MOTORS COMPANY

7. Front Wheelhouse Liner (1)» Install - [Front Wheelhouse Liner Replacement](#)

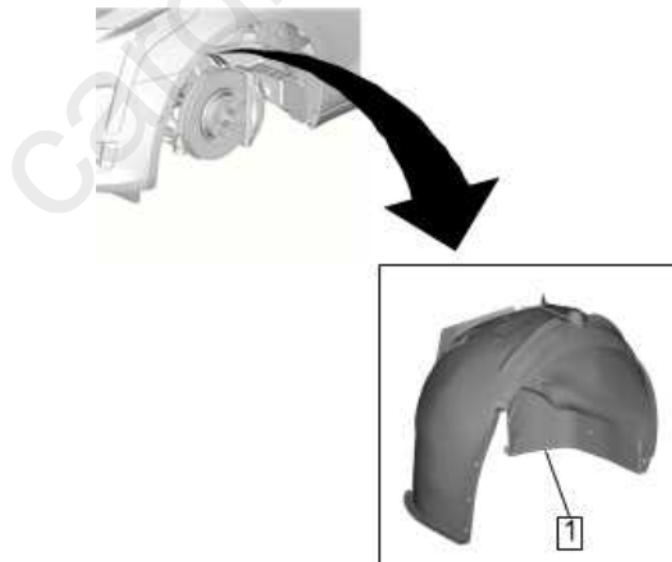


Fig. 86: Front Wheelhouse Liner
Courtesy of GENERAL MOTORS COMPANY

8. Install the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
9. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

FRONT LOWER CONTROL REAR LINK REPLACEMENT (RWD)

Special Tools

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Remove the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
2. {If equipped} Electronic Suspension Front Position Sensor @ Front Lower Control Rear Link» Disconnect - [Electronic Suspension Front Position Sensor Replacement](#)
3. Front Shock Absorber and Spring Assembly (1) @ Front Lower Control Rear Link» Separate - [Shock Absorber and Spring Removal and Installation \(RWD Without F55\)](#) and/or [Shock Absorber and Spring Removal and Installation \(RWD With F55\)](#)

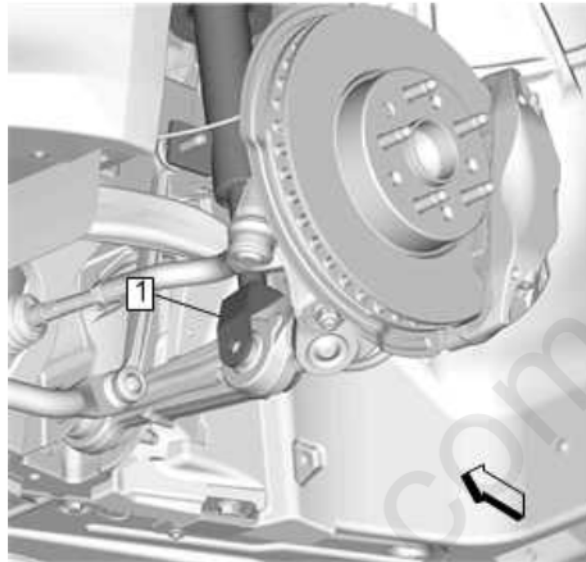


Fig. 87: Front Shock Absorber and Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

4. Front Lower Control Arm Ball Stud Nut (1)» Loosen

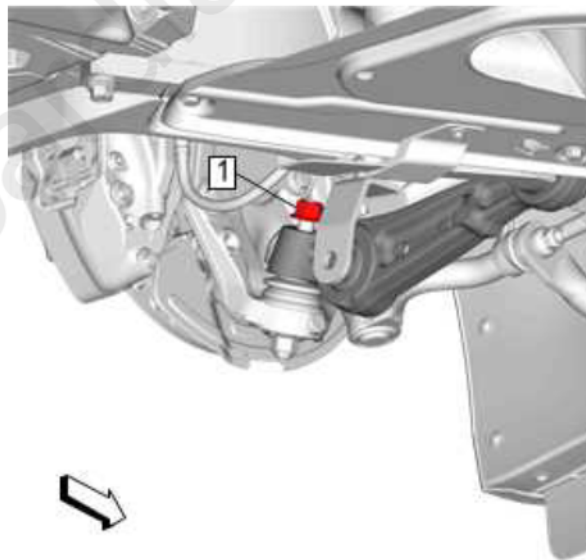


Fig. 88: Front Lower Control Arm Ball Stud Nut
Courtesy of GENERAL MOTORS COMPANY

Do NOT remove the nut.

5. Use the **CH-42188-B** separator (1) to separate the front lower control rear link from the steering knuckle.

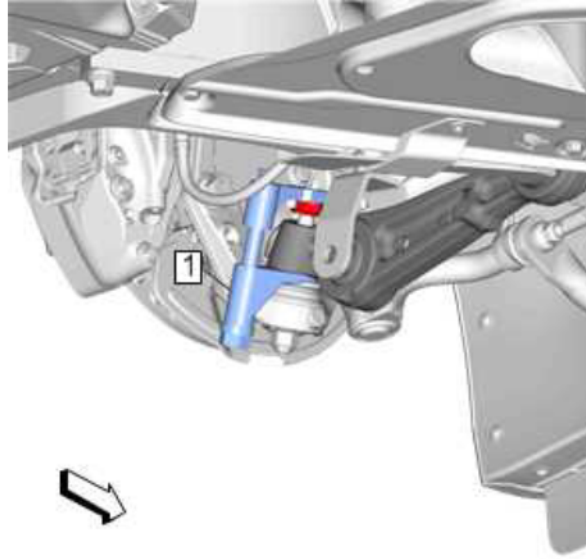


Fig. 89: CH-42188--B Separator

Courtesy of GENERAL MOTORS COMPANY

6. Front Lower Control Arm Ball Stud Nut (1)» Remove

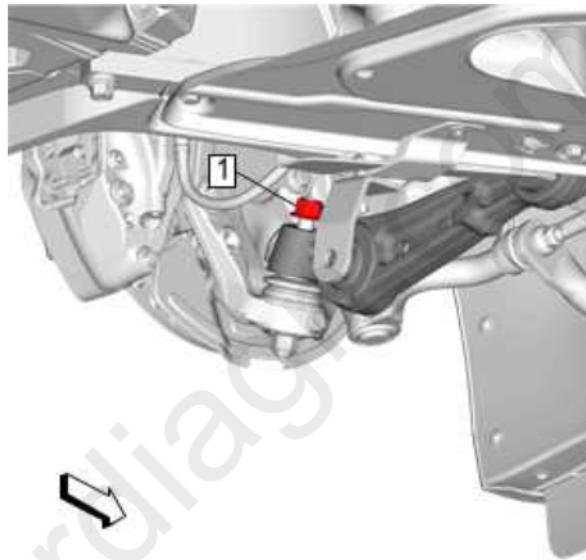


Fig. 90: Front Lower Control Arm Ball Stud Nut

Courtesy of GENERAL MOTORS COMPANY

7. Front Lower Control Rear Link Nut (1)» Remove

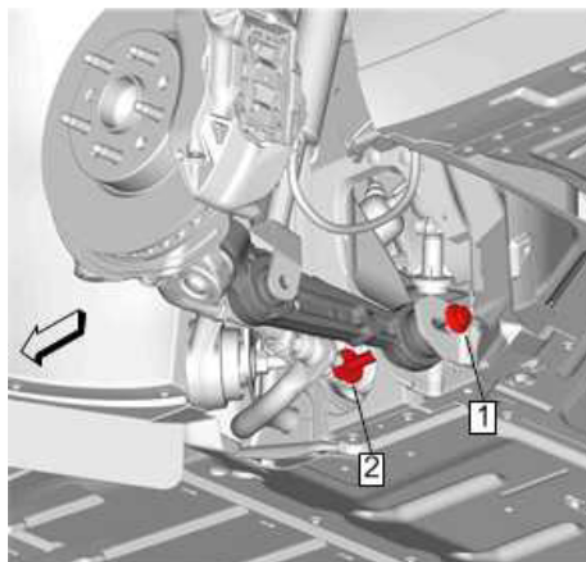


Fig. 91: Front Lower Control Rear Link Bolt

Courtesy of GENERAL MOTORS COMPANY

8. Front Lower Control Rear Link Bolt (2)» Remove

DISCARD the bolt.

9. Remove the front lower control rear link (1) from the vehicle.

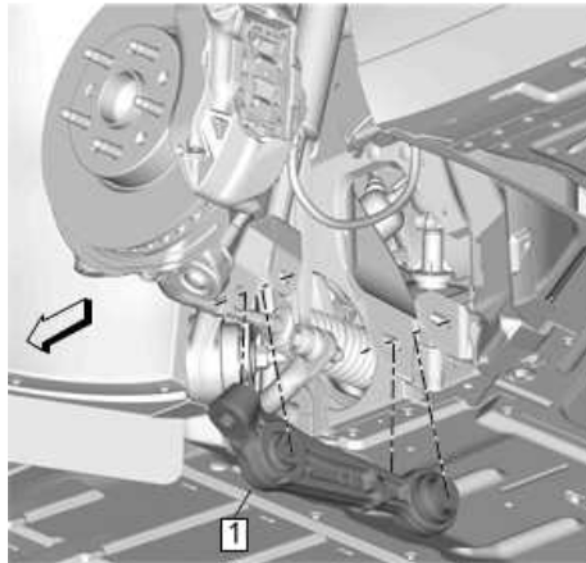


Fig. 92: Front Lower Control Rear Link

Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front lower control rear link (1) on the vehicle.

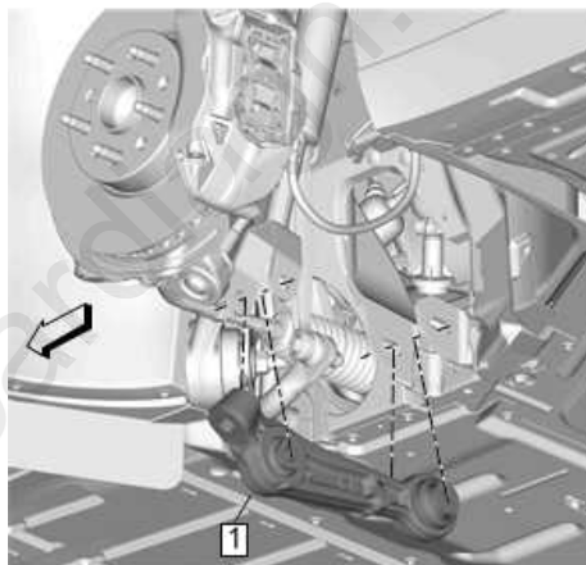


Fig. 93: Front Lower Control Rear Link

Courtesy of GENERAL MOTORS COMPANY

2. Front Lower Control Rear Link Bolt (2)» Install

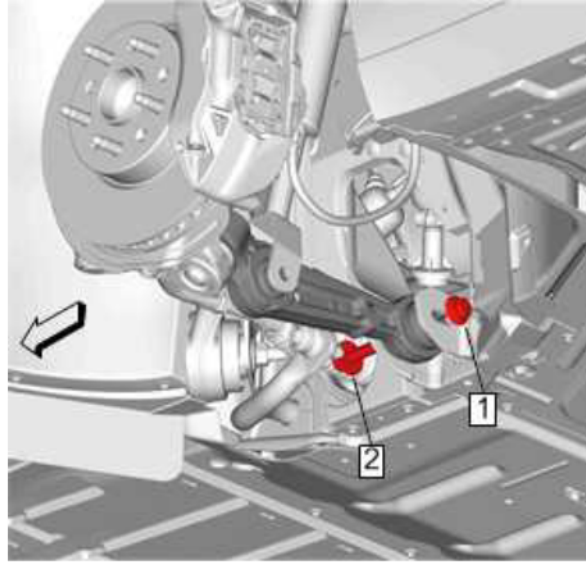


Fig. 94: Front Lower Control Rear Link Bolt
Courtesy of GENERAL MOTORS COMPANY

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.

Install a NEW bolt.

3. Front Lower Control Rear Link Nut (1)» Install
4. Front Lower Control Rear Link Bolt (2)» Tighten

CAUTION: Refer to **Fastener Caution** .

Tighten

1. First Pass: 160 N.m (118 lb ft)
 2. Final Pass: (45-60 degrees)
5. Front Lower Control Arm Ball Stud Nut (1)» Install and tighten

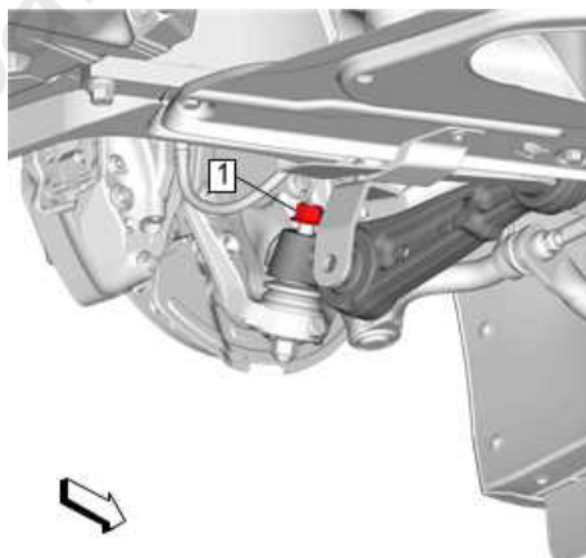


Fig. 95: Front Lower Control Arm Ball Stud Nut
Courtesy of GENERAL MOTORS COMPANY

Tighten

1. First Pass: 40 N.m (30 lb ft)
2. Final Pass: (120-135 degrees)

6. Front Shock Absorber and Spring Assembly @ Front Lower Control Rear LinkA» Install - [Shock Absorber and Spring Removal and Installation \(RWD Without F55\)](#) and/or [Shock Absorber and Spring Removal and Installation \(RWD With F55\)](#)

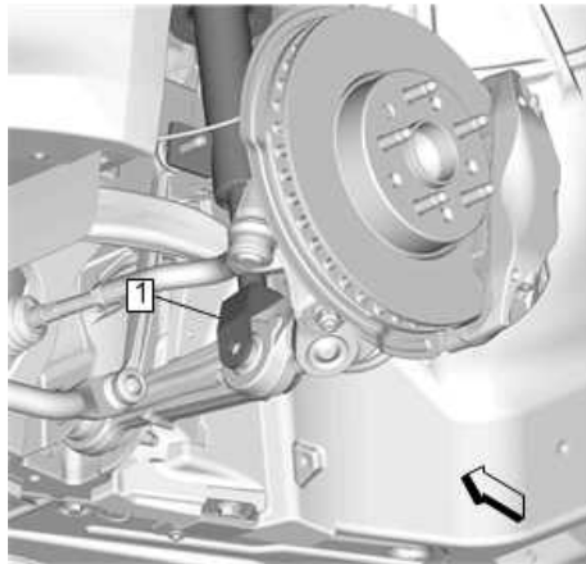


Fig. 96: Front Shock Absorber and Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

7. {If equipped} Electronic Suspension Front Position Sensor @ Front Lower Control Rear LinkA» Connect - [Electronic Suspension Front Position Sensor Replacement](#)
8. Install the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
9. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

FRONT LOWER CONTROL REAR LINK REPLACEMENT (AWD)

Special Tools

CH-42188-B Ball Joint Separator

Equivalent regional tools: [Special Tools](#)

Removal Procedure

1. Remove the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
2. {If equipped} Electronic Suspension Front Position Sensor @ Front Lower Control Rear LinkA» Disconnect - [Electronic Suspension Front Position Sensor Replacement](#)
3. Front Shock Absorber and Spring Assembly (1) @ Front Lower Control Rear LinkA» Separate - [Shock Absorber and Spring Removal and Installation \(AWD Without F55\)](#)[Shock Absorber and Spring Removal and Installation \(AWD With F55\)](#)

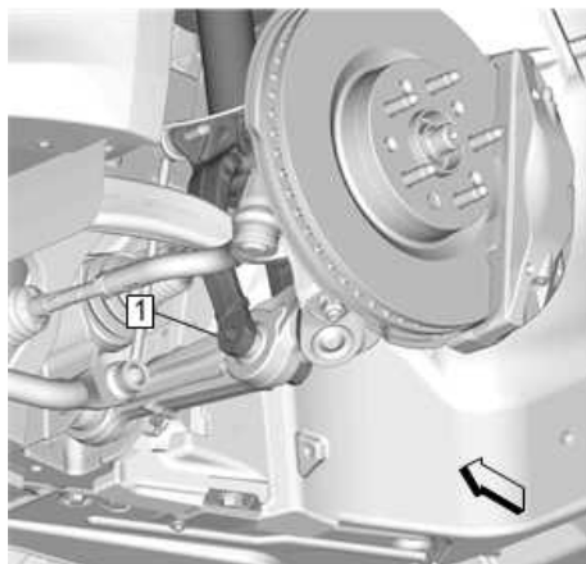


Fig. 97: Front Shock Absorber And Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

4. Front Lower Control Arm Ball Stud Nut (1)» Loosen

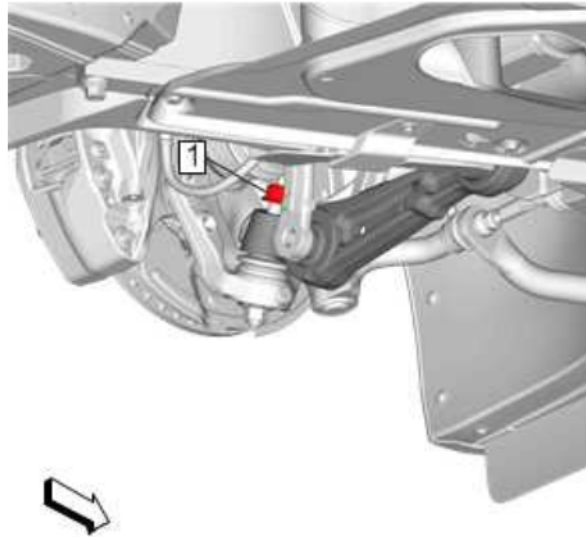


Fig. 98: Front Lower Control Arm Ball Stud Nut
Courtesy of GENERAL MOTORS COMPANY

Do NOT remove the nut.

5. Use the **CH-42188-B** separator (1) to separate the front lower control rear link from the steering knuckle.

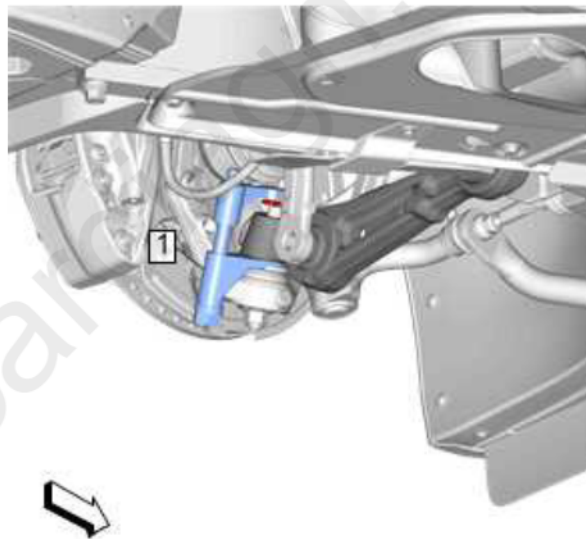


Fig. 99: CH-42188-B Separator
Courtesy of GENERAL MOTORS COMPANY

6. Front Lower Control Arm Ball Stud Nut (1)» Remove

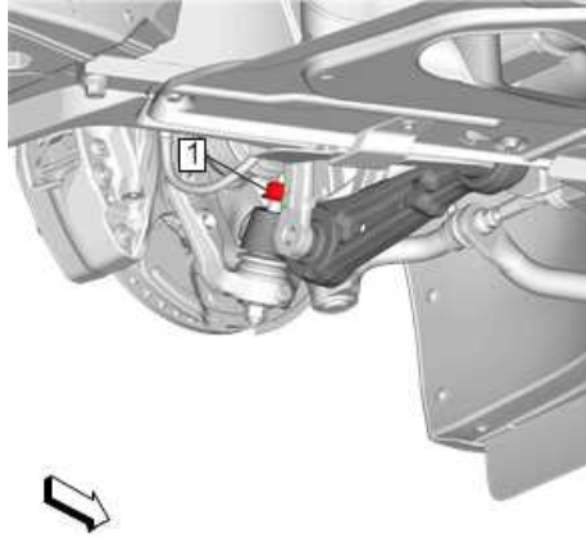


Fig. 100: Front Lower Control Arm Ball Stud Nut
 Courtesy of GENERAL MOTORS COMPANY

7. Front Lower Control Rear Link Nut (1) » Remove

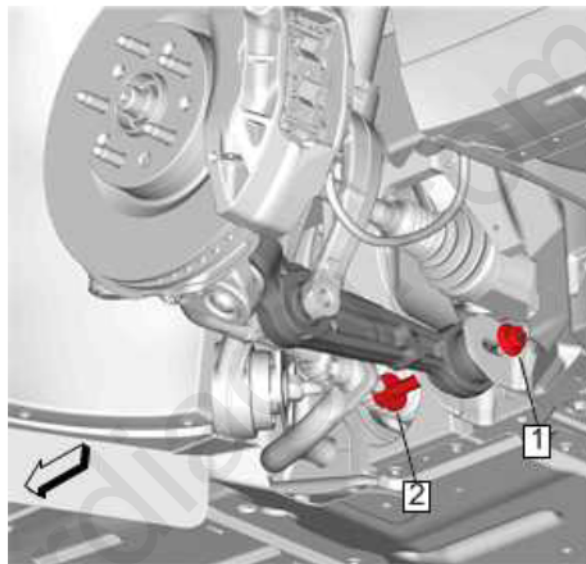
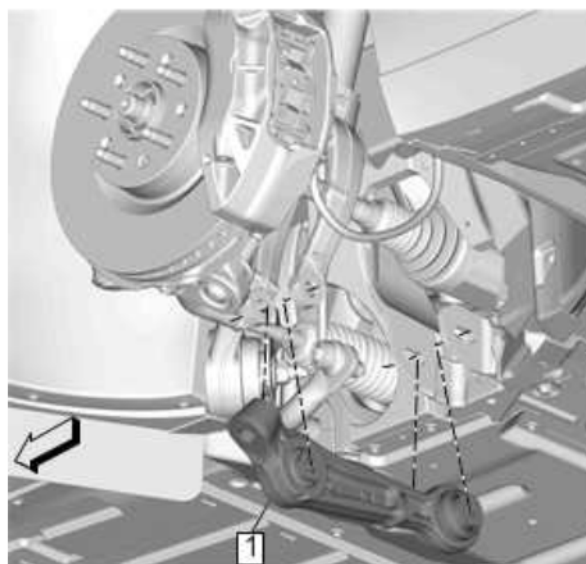


Fig. 101: Front Lower Control Rear Link Bolt
 Courtesy of GENERAL MOTORS COMPANY

8. Front Lower Control Rear Link Bolt (2) » Remove

DISCARD the bolt.

9. Remove the front lower control rear link (1) from the vehicle.



Installation Procedure

1. Position the front lower control rear link (1) on the vehicle.

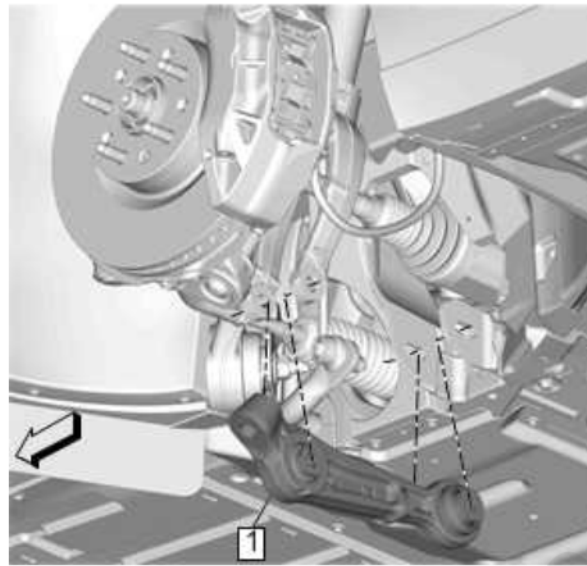


Fig. 103: Front Lower Control Rear Link
Courtesy of GENERAL MOTORS COMPANY

2. Front Lower Control Rear Link Bolt (2)» Install

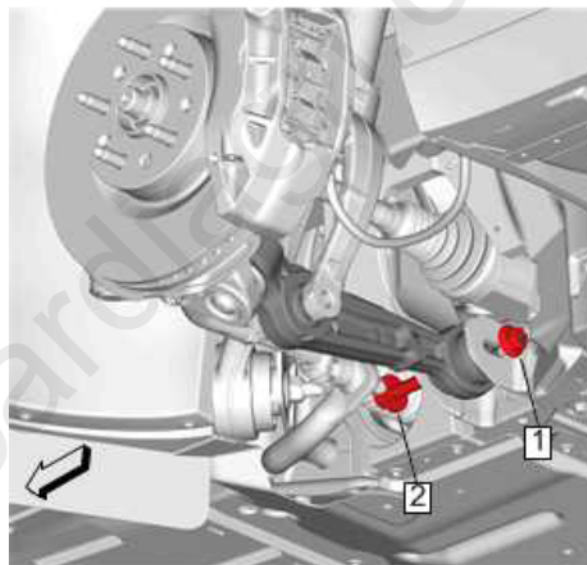


Fig. 104: Front Lower Control Rear Link Bolt
Courtesy of GENERAL MOTORS COMPANY

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.

Install a NEW bolt.

3. Front Lower Control Rear Link Nut (1)» Install
4. Front Lower Control Rear Link Bolt (2)» Tighten

CAUTION: Refer to **Fastener Caution** .

Tighten

1. First Pass: 160 N.m (118 lb ft)
2. Final Pass: (45-60 degrees)
5. Front Lower Control Arm Ball Stud Nut (1)» Install and tighten

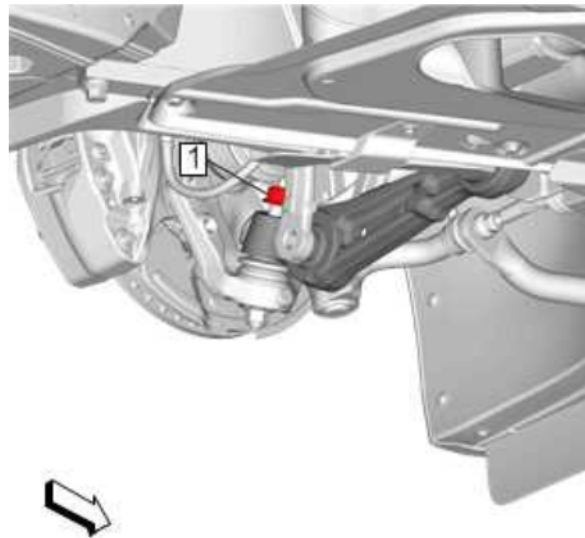


Fig. 105: Front Lower Control Arm Ball Stud Nut
Courtesy of GENERAL MOTORS COMPANY

Tighten

1. First Pass: 40 N.m (30 lb ft)
2. Final Pass: (120-135 degrees)
6. Front Shock Absorber and Spring Assembly (1) @ Front Lower Control Rear Link» Install - **Shock Absorber and Spring Removal and Installation (AWD Without F55)****Shock Absorber and Spring Removal and Installation (AWD With F55)**

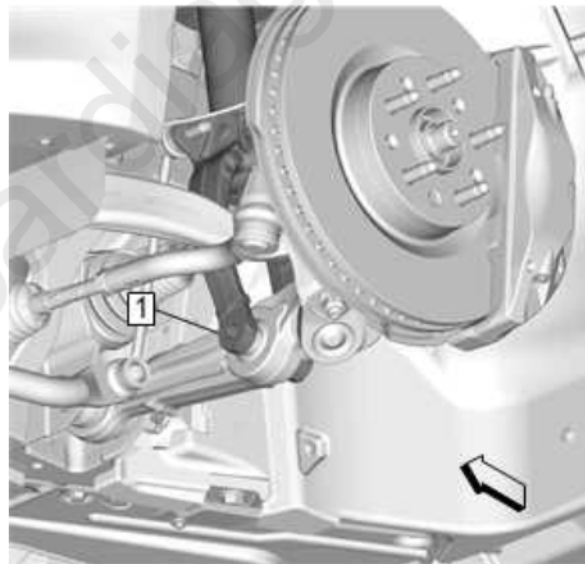


Fig. 106: Front Shock Absorber And Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

7. {If equipped} Electronic Suspension Front Position Sensor @ Front Lower Control Rear Link» Connect - **Electronic Suspension Front Position Sensor Replacement**
8. Install the front tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation**
9. Measure and adjust the wheel alignment. Refer to **Wheel Alignment Measurement**

WHEEL STUD REPLACEMENT

Special Tools

CH-43631 Ball Joint Separator

Removal Procedure

1. Front Wheel Bearing and Hub Assembly » Remove - [Front Wheel Bearing and Hub Replacement \(RWD\)](#) and/or [Front Wheel Bearing and Hub Replacement \(AWD\)](#)
2. Use the **CH-43631** separator (1) to remove the wheel stud (2) from the flange on the hub assembly.

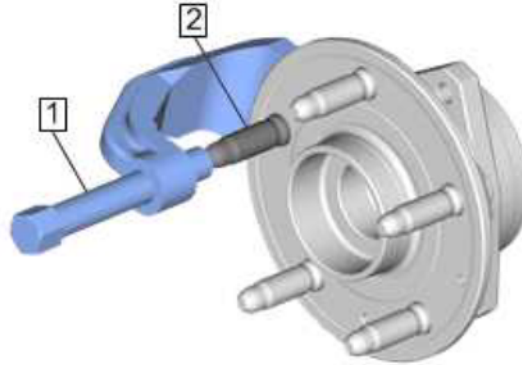


Fig. 107: CH-43631 Separator
Courtesy of GENERAL MOTORS COMPANY

DISCARD the stud.

Installation Procedure

1. Position the NEW wheel stud (1) in the flange of the hub assembly.

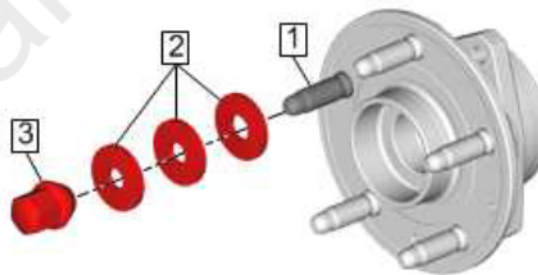


Fig. 108: Wheel Stud
Courtesy of GENERAL MOTORS COMPANY

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. Front Wheel Bearing and Hub Assembly » Install - [Front Wheel Bearing and Hub Replacement \(RWD\)](#)[Front Wheel Bearing and Hub Replacement \(AWD\)](#)

Removal Procedure

1. Remove the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
2. Front Stabilizer Shaft Link (1) @ Front Shock Absorber and Spring Assembly» Separate - [Stabilizer Shaft Link Replacement \(RWD\)](#)

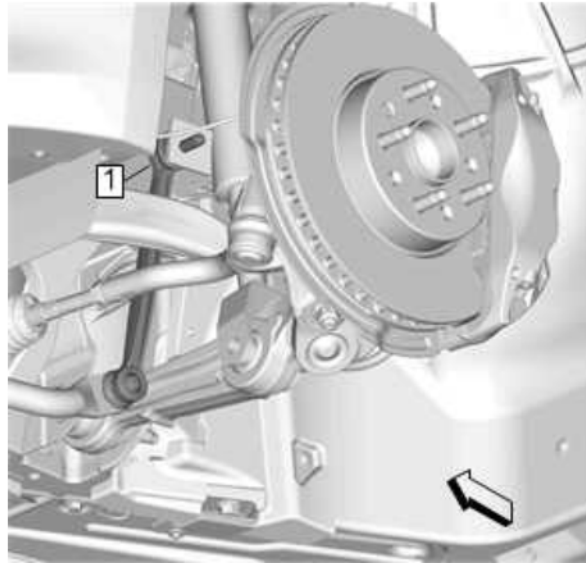


Fig. 109: Front Stabilizer Shaft Link
Courtesy of GENERAL MOTORS COMPANY

3. Front Suspension Strut Nut (1)» Remove

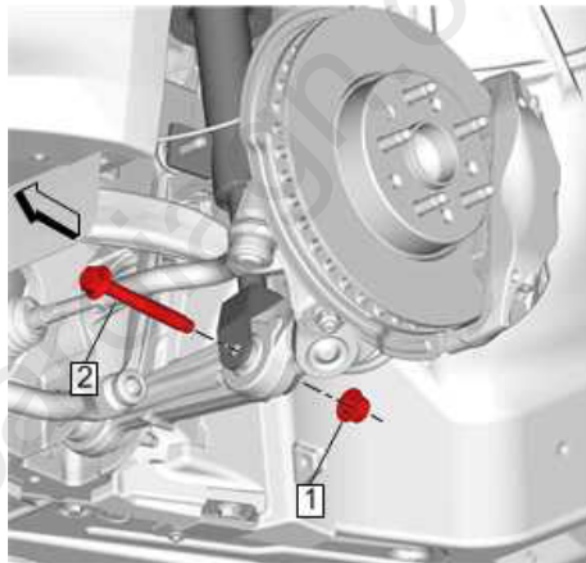


Fig. 110: Front Suspension Strut Bolt
Courtesy of GENERAL MOTORS COMPANY

4. Front Suspension Strut Bolt (2)» Remove
DISCARD the bolt.
5. Partially lower the vehicle.
6. Front Suspension Mount Upper Bolt (1)» Remove [3x]

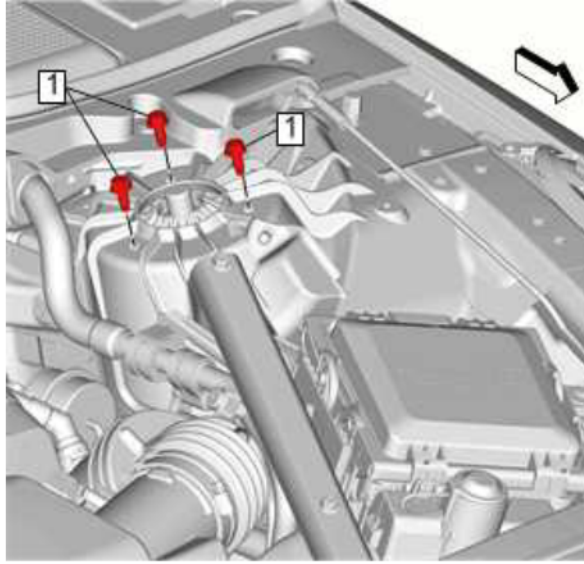


Fig. 111: Front Suspension Mount Upper Bolt
Courtesy of GENERAL MOTORS COMPANY

7. Raise the vehicle.
8. Remove the front shock absorber and spring assembly (1) from the vehicle.



Fig. 112: Front Shock Absorber And Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

9. Transfer components as necessary.

Installation Procedure

1. Position the front shock absorber and spring assembly (1) on the vehicle.

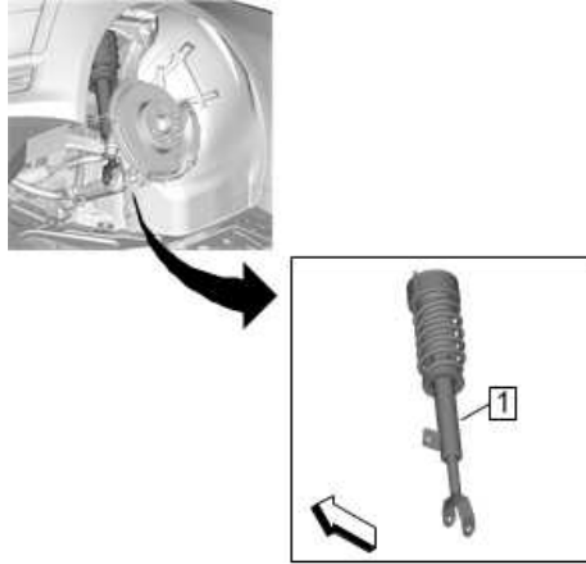


Fig. 113: Front Shock Absorber And Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Partially lower the vehicle.
3. Front Suspension Mount Upper Bolt (1)» Tighten [3x] 22 N.m (16 lb ft)

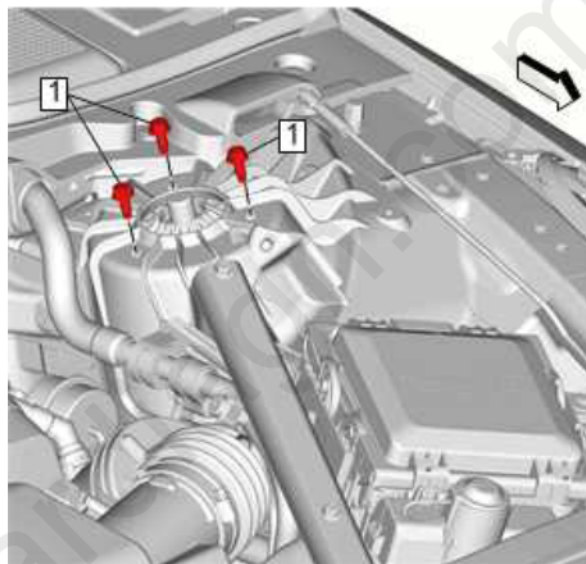
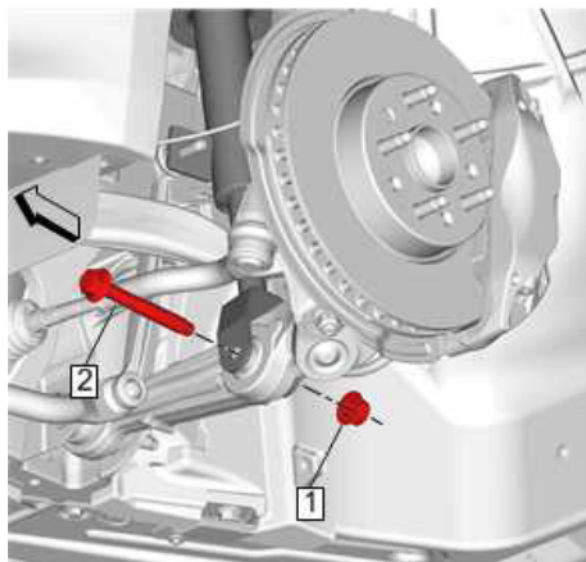


Fig. 114: Front Suspension Mount Upper Bolt
Courtesy of GENERAL MOTORS COMPANY

4. Raise the vehicle.
5. Front Suspension Strut Bolt (2)» Install



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

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.

Install a NEW bolt.

6. Front Suspension Strut Nut (1) » Install and tighten

Tighten

1. First Pass: 240 N.m (177 lb ft)
 2. Final Pass: (45-60 degrees)
7. Front Stabilizer Shaft Link (1) @ Front Shock Absorber and Spring Assembly » Install - [Stabilizer Shaft Link Replacement \(RWD\)](#)

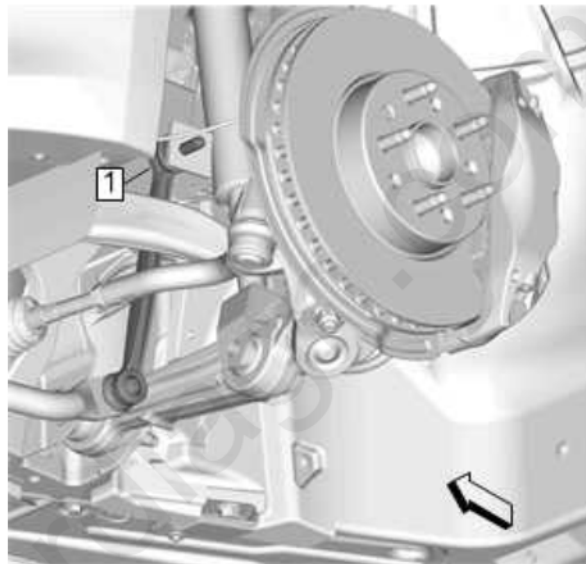


Fig. 116: Front Stabilizer Shaft Link
Courtesy of GENERAL MOTORS COMPANY

8. Install the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
9. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

SHOCK ABSORBER AND SPRING REMOVAL AND INSTALLATION (AWD WITHOUT F55)

Removal Procedure

1. Remove the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
2. Front Stabilizer Shaft Link (1) @ Front Shock Absorber and Spring Assembly » Separate - [Stabilizer Shaft Link Replacement \(AWD\)](#)

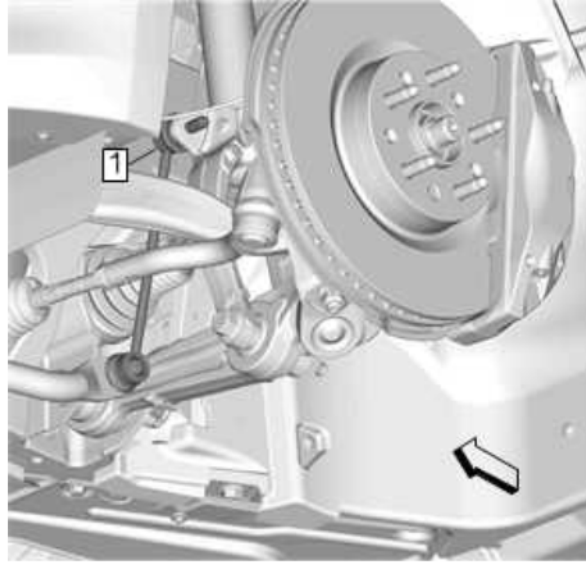


Fig. 117: Front Stabilizer Shaft Link
Courtesy of GENERAL MOTORS COMPANY

3. Front Suspension Strut Nut (1)» Remove

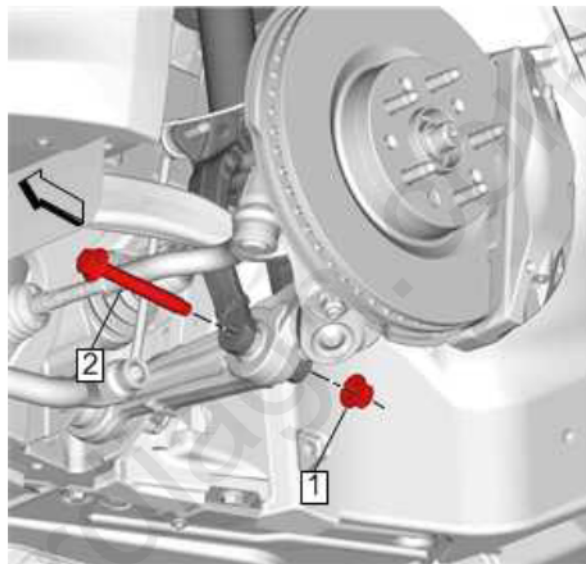


Fig. 118: Front Suspension Strut Bolt
Courtesy of GENERAL MOTORS COMPANY

4. Front Suspension Strut Bolt (2)» Remove
 DISCARD the bolt.
5. Partially lower the vehicle.
6. Front Suspension Mount Upper Bolt (1)» Remove [3x]

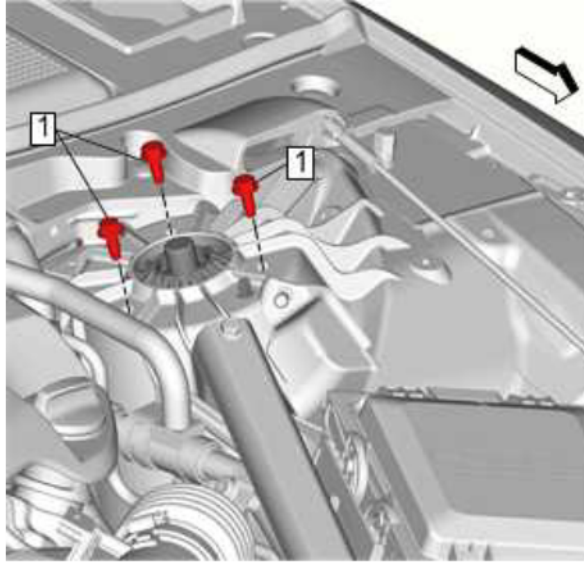


Fig. 119: Front Suspension Mount Upper Bolt
 Courtesy of GENERAL MOTORS COMPANY

7. Raise the vehicle.
8. Remove the front shock absorber and spring assembly (1) from the vehicle.



Fig. 120: Shock Absorber and Spring
 Courtesy of GENERAL MOTORS COMPANY

9. Transfer components as necessary.

Installation Procedure

1. Position the front shock absorber and spring assembly (1) on the vehicle.

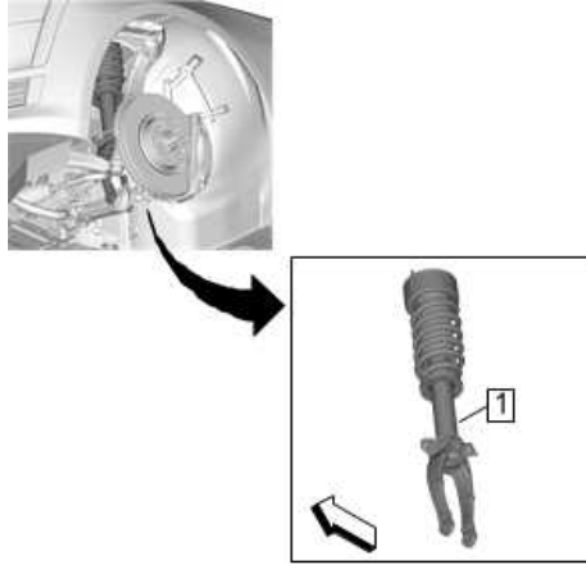


Fig. 121: Shock Absorber and Spring
 Courtesy of GENERAL MOTORS COMPANY

2. Partially lower the vehicle.
3. Front Suspension Mount Upper Bolt (1)» Tighten [3x] 22 N.m (16 lb ft)

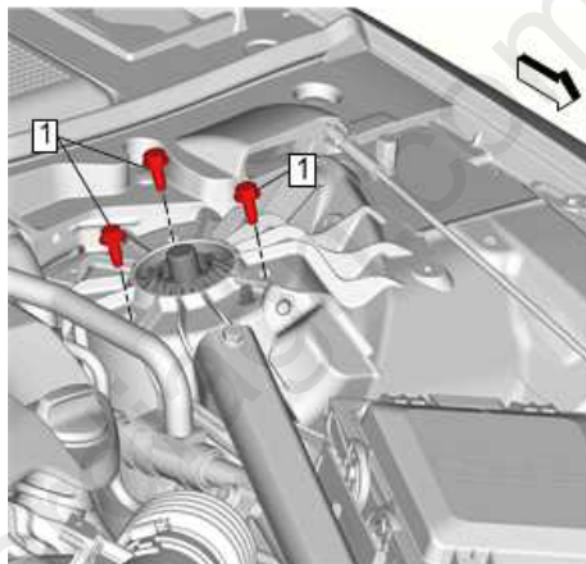
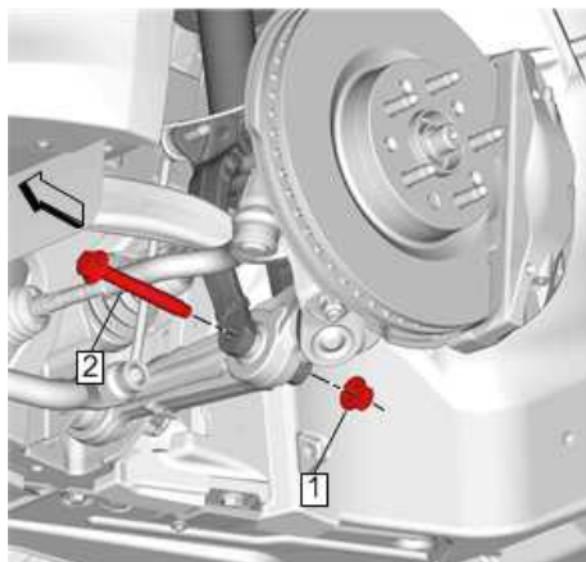


Fig. 122: Front Suspension Mount Upper Bolt
 Courtesy of GENERAL MOTORS COMPANY

4. Raise the vehicle.
5. Front Suspension Strut Bolt (2)» Install



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

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.

Install a NEW bolt.

6. Front Suspension Strut Nut (1) » Install and tighten

Tighten

1. First Pass: 240 N.m (177 lb ft)
 2. Final Pass: (45-60 degrees)
7. Front Stabilizer Shaft Link (1) @ Front Shock Absorber and Spring Assembly » Install - [Stabilizer Shaft Link Replacement \(AWD\)](#)

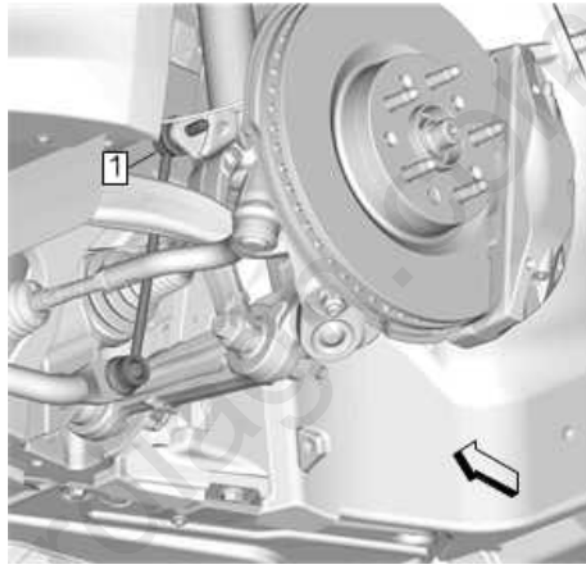


Fig. 124: Front Stabilizer Shaft Link
Courtesy of GENERAL MOTORS COMPANY

8. Install the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
9. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

SHOCK ABSORBER AND SPRING REMOVAL AND INSTALLATION (RWD WITH F55)

Removal Procedure

1. Remove the front tire and wheel assembly. [Tire and Wheel Removal and Installation](#)
2. Front Stabilizer Shaft Link (1) @ Front Shock Absorber and Spring Assembly » Separate - [Stabilizer Shaft Link Replacement \(RWD\)](#)

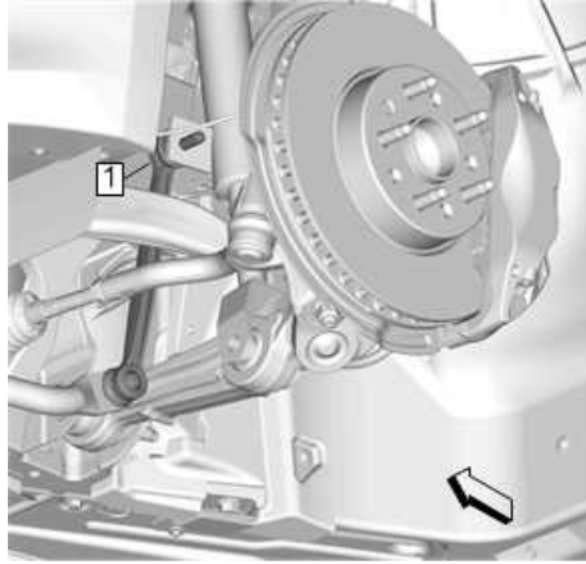


Fig. 125: Front Stabilizer Shaft Link
Courtesy of GENERAL MOTORS COMPANY

3. Front Suspension Strut Nut (1)» Remove

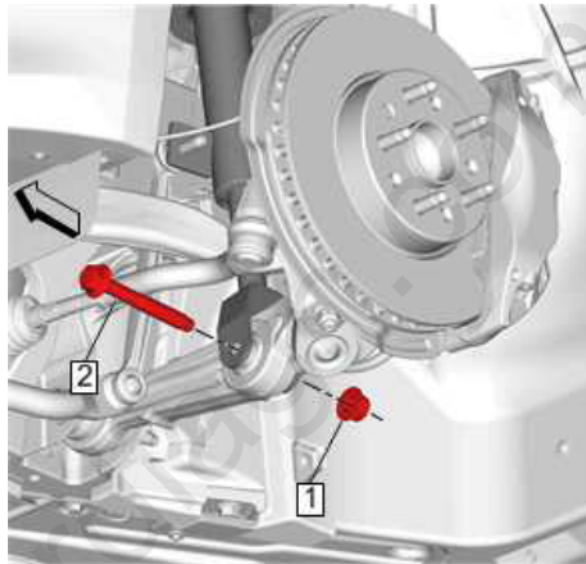


Fig. 126: Front Suspension Strut Bolt
Courtesy of GENERAL MOTORS COMPANY

4. Front Suspension Strut Bolt (2)» Remove

DISCARD the bolt.

5. Partially lower the vehicle.

6. Release the front shock absorber electrical connector (1) from the plastic retaining clip and disconnect the connector from the vehicle wiring harness.

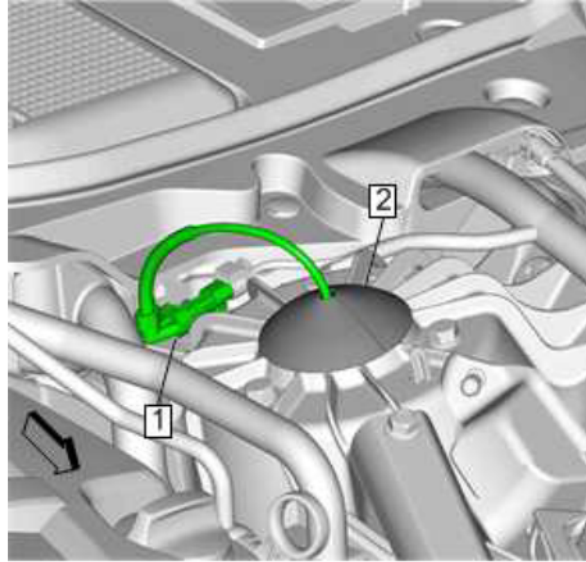


Fig. 127: Front Shock Absorber Electrical Connector
 Courtesy of GENERAL MOTORS COMPANY

7. Front Suspension Strut Nut Cap (2)» Remove
8. Front Suspension Mount Upper Bolt (1)» Remove [3x]

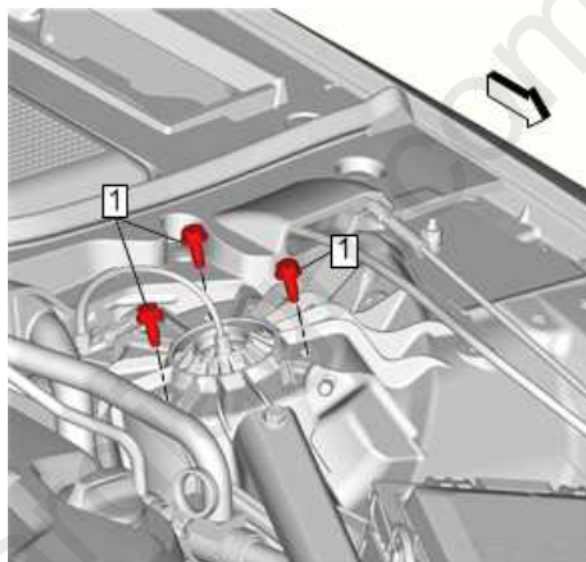


Fig. 128: Front Suspension Upper Mounts
 Courtesy of GENERAL MOTORS COMPANY

9. Raise the vehicle.
10. Remove the front shock absorber and spring assembly (1) from the vehicle.



Fig. 129: Front Shock Absorber And Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

11. Transfer components as necessary.

Installation Procedure

1. Position the front shock absorber and spring assembly (1) on the vehicle.

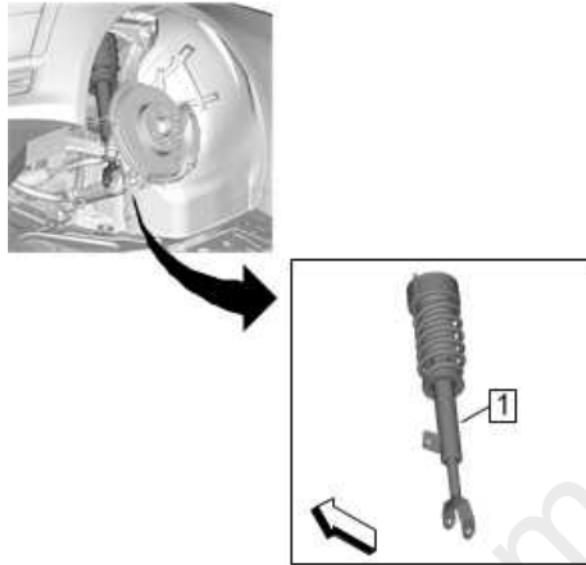


Fig. 130: Front Shock Absorber And Spring Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Partially lower the vehicle.

3. Front Suspension Mount Upper Bolt (1)» Tighten [3x] 22 N.m (16 lb ft)

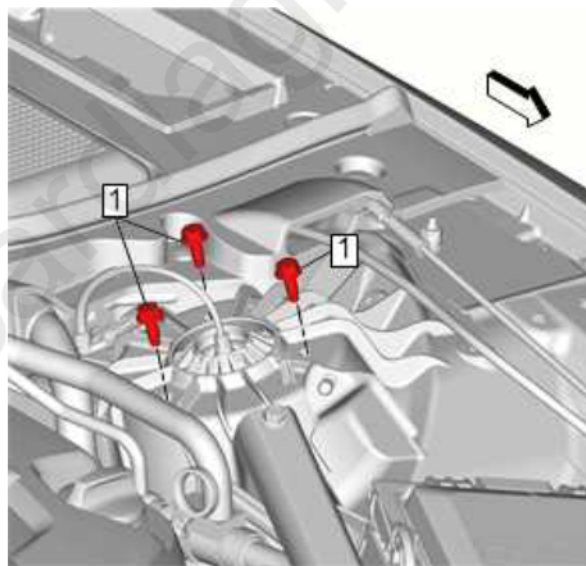


Fig. 131: Front Suspension Upper Mounts
Courtesy of GENERAL MOTORS COMPANY

4. Front Suspension Strut Nut Cap (2)» Install

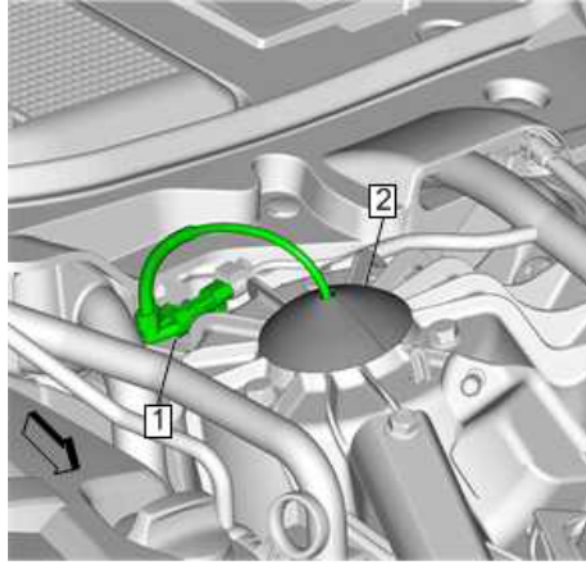


Fig. 132: Front Shock Absorber Electrical Connector
 Courtesy of GENERAL MOTORS COMPANY

5. Connect the front shock absorber electrical connector (1) to the vehicle wiring harness and secure the connector in the plastic retaining clip.
6. Raise the vehicle.
7. Front Suspension Strut Bolt (2) » Install

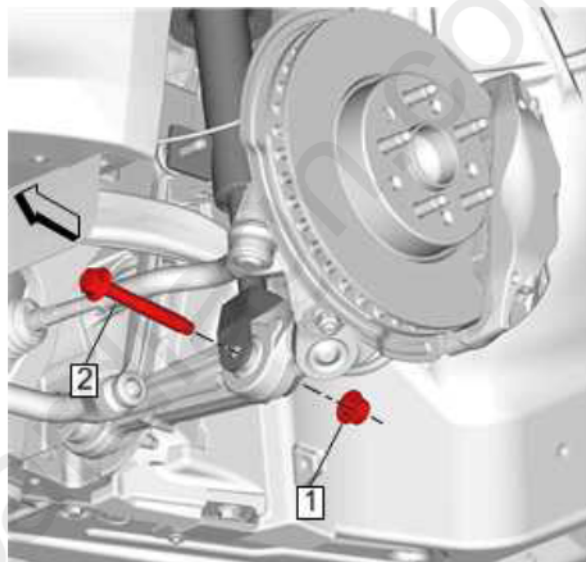


Fig. 133: Front Suspension Strut Bolt
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution** .

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.

Install a NEW bolt.

8. Front Suspension Strut Nut (1) » Install and tighten

Tighten

1. First Pass: 240 N.m (177 lb ft)
2. Final Pass: (45-60 degrees)

9. Front Stabilizer Shaft Link (1) @ Front Shock Absorber and Spring Assembly » Install - **Stabilizer Shaft Link Replacement (RWD)**

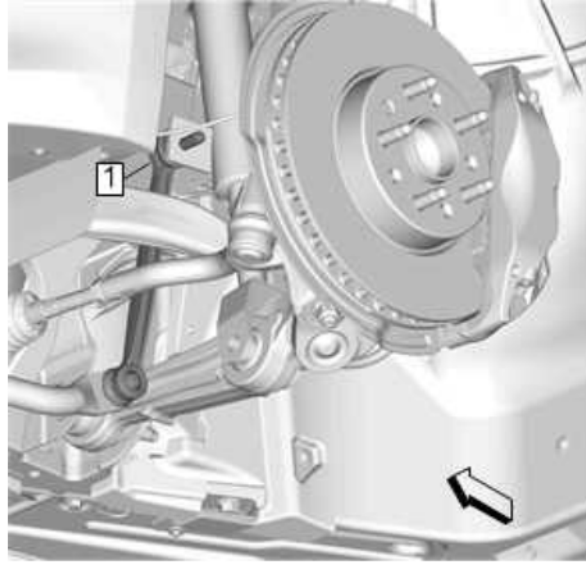


Fig. 134: Front Stabilizer Shaft Link

Courtesy of GENERAL MOTORS COMPANY

10. Install the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
11. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

SHOCK ABSORBER AND SPRING REMOVAL AND INSTALLATION (AWD WITH F55)

Removal Procedure

1. Remove the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
2. Front Stabilizer Shaft Link (1) @ Front Shock Absorber and Spring Assembly» Separate - [Stabilizer Shaft Link Replacement \(AWD\)](#)

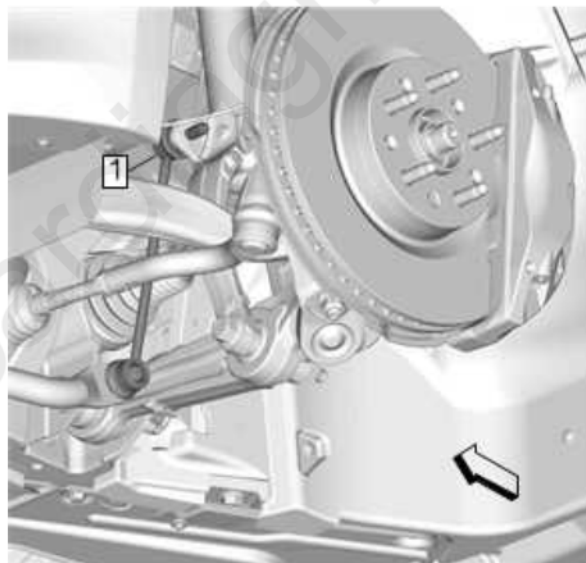


Fig. 135: Front Stabilizer Shaft Link

Courtesy of GENERAL MOTORS COMPANY

3. Front Suspension Strut Nut (1)» Remove

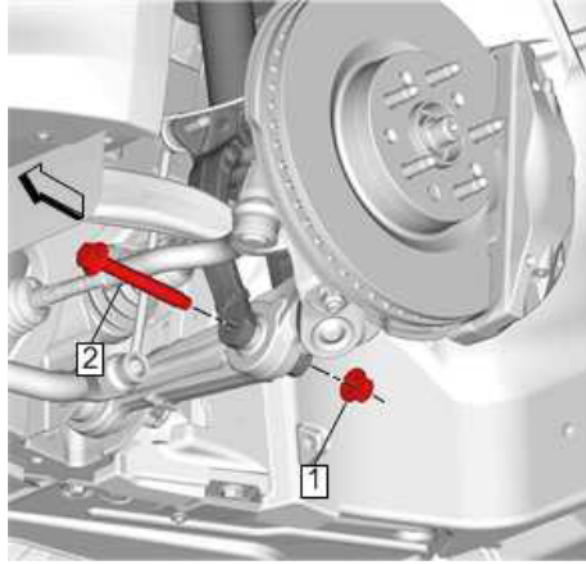


Fig. 136: Front Suspension Strut Bolt

Courtesy of GENERAL MOTORS COMPANY

4. Front Suspension Strut Bolt (2) » Remove

DISCARD the bolt.

5. Partially lower the vehicle.

6. Release the front shock absorber electrical connector (1) from the plastic retaining clip and disconnect the connector from the vehicle wiring harness.

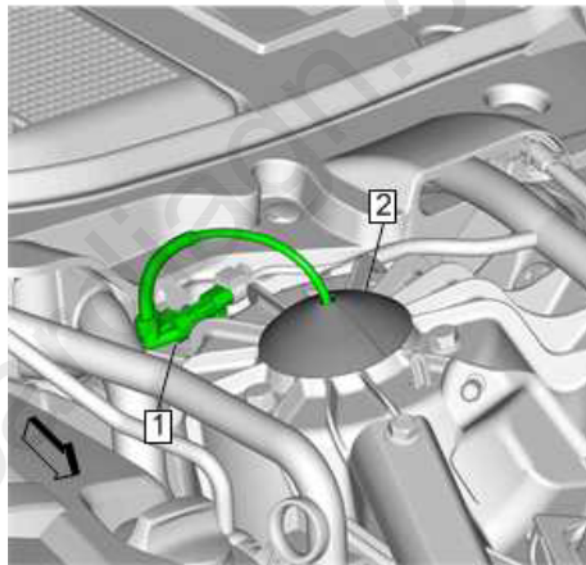


Fig. 137: Front Shock Absorber Electrical Connector

Courtesy of GENERAL MOTORS COMPANY

7. Front Suspension Strut Nut Cap (2) » Remove

8. Front Suspension Mount Upper Bolt (1) » Remove [3x]

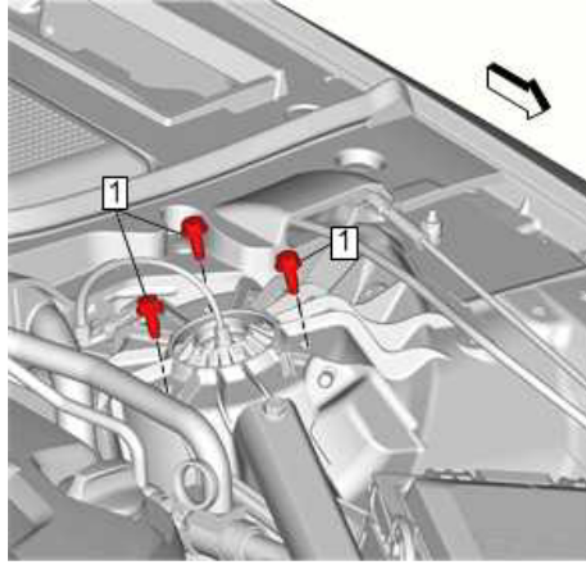


Fig. 138: Front Suspension Upper Mounts
 Courtesy of GENERAL MOTORS COMPANY

9. Raise the vehicle.
10. Remove the front shock absorber and spring assembly (1) from the vehicle.



Fig. 139: Shock Absorber and Spring
 Courtesy of GENERAL MOTORS COMPANY

11. Transfer components as necessary.

Installation Procedure

1. Position the front shock absorber and spring assembly (1) on the vehicle.

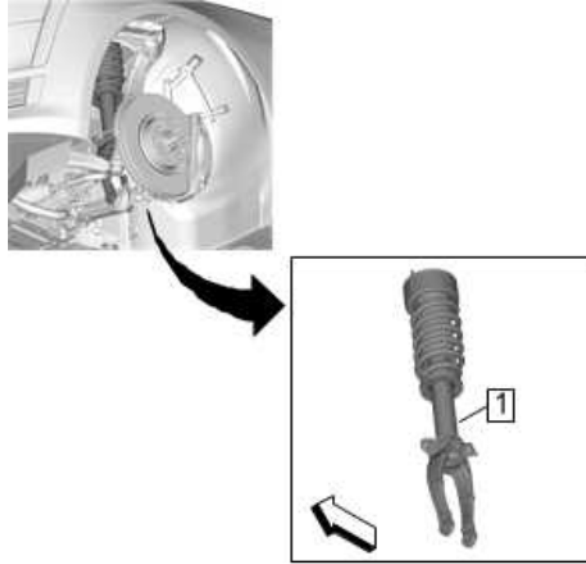


Fig. 140: Shock Absorber and Spring
Courtesy of GENERAL MOTORS COMPANY

2. Partially lower the vehicle.
3. Front Suspension Mount Upper Bolt (1)» Tighten [3x] 22 N.m (16 lb ft)

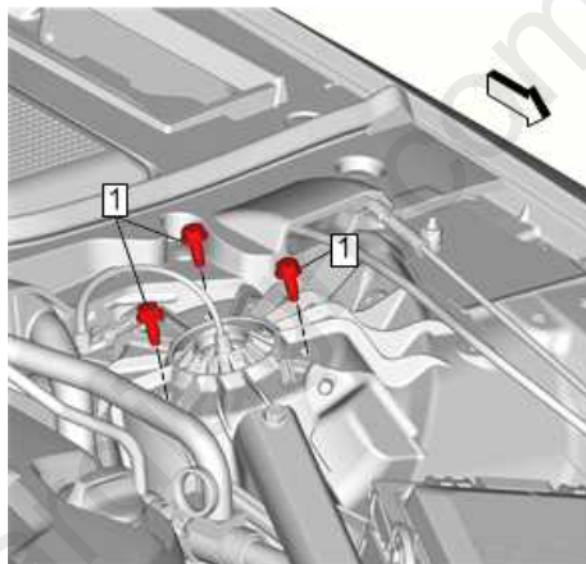


Fig. 141: Front Suspension Upper Mounts
Courtesy of GENERAL MOTORS COMPANY

4. Front Suspension Strut Nut Cap (2)» Install

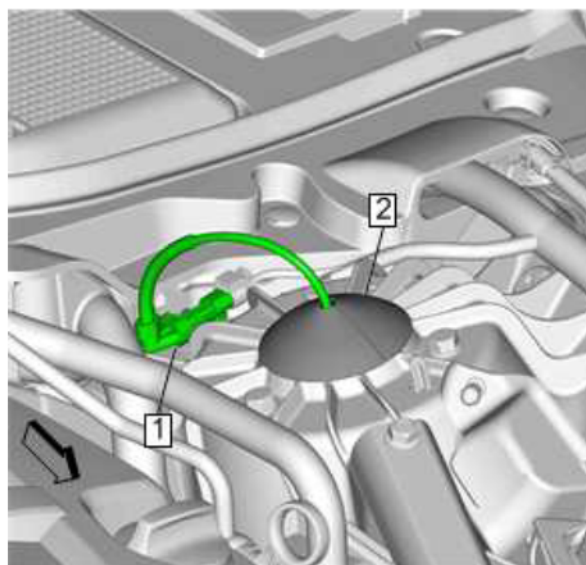


Fig. 142: Front Shock Absorber Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

5. Connect the front shock absorber electrical connector (1) to the vehicle wiring harness and secure the connector in the plastic retaining clip.
6. Raise the vehicle.
7. Front Suspension Strut Bolt (2)» Install

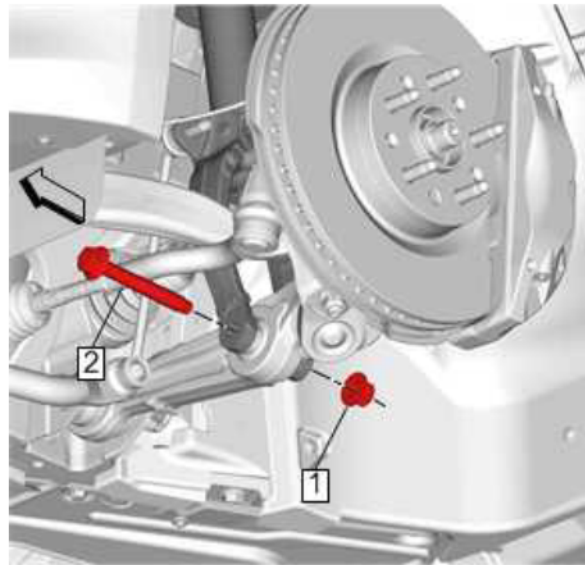


Fig. 143: Front Suspension Strut Bolt
Courtesy of GENERAL MOTORS COMPANY

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

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.

Install a NEW bolt.

8. Front Suspension Strut Nut (1)» Install and tighten

Tighten

1. First Pass: 240 N.m (177 lb ft)
2. Final Pass: (45-60 degrees)

9. Front Stabilizer Shaft Link (1) @ Front Shock Absorber and Spring Assembly» Install - [Stabilizer Shaft Link Replacement \(AWD\)](#)

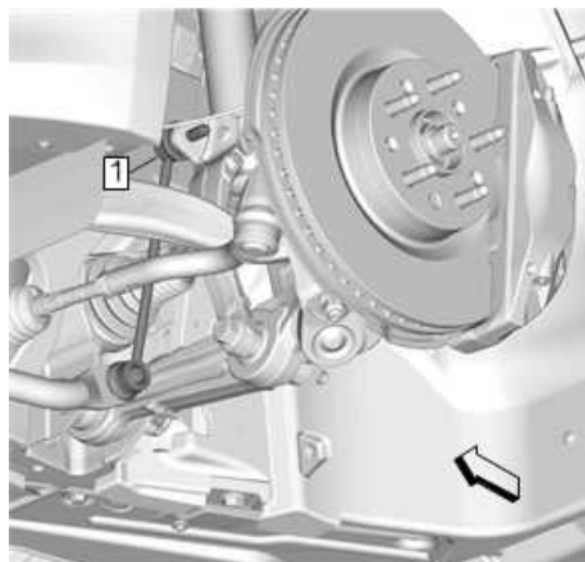


Fig. 144: Front Stabilizer Shaft Link
Courtesy of GENERAL MOTORS COMPANY

10. Install the front tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#)
11. Measure and adjust the wheel alignment. Refer to [Wheel Alignment Measurement](#)

SHOCK ABSORBER, SHOCK ABSORBER COMPONENT OR SPRING REPLACEMENT (RWD WITHOUT F55)

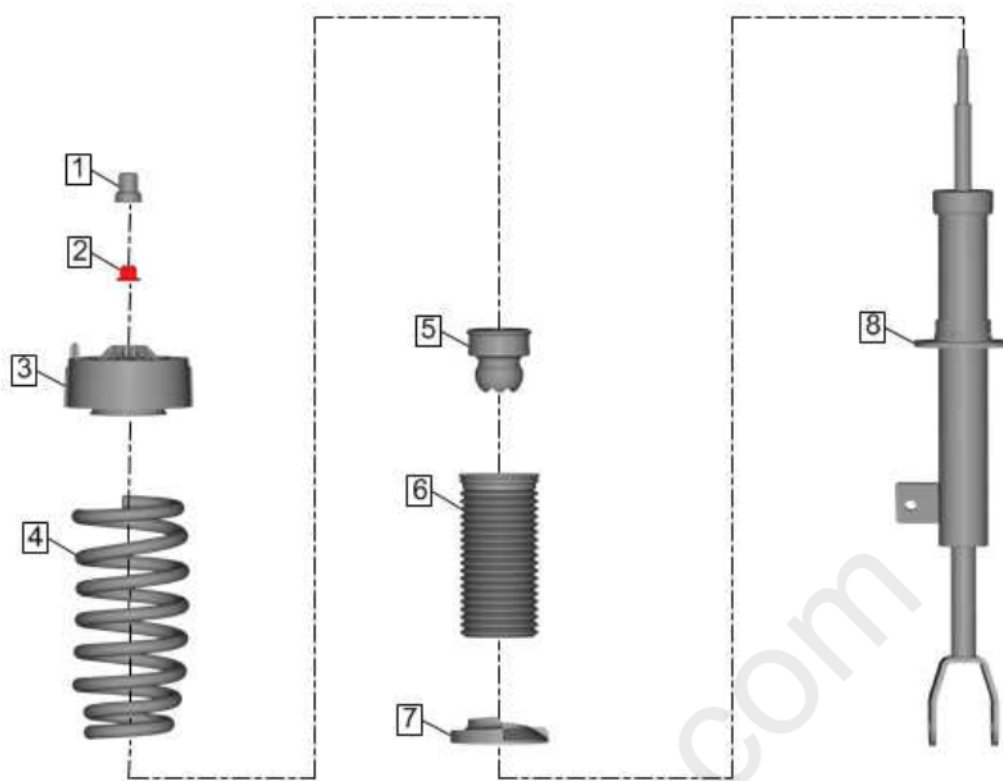


Fig. 145: Shock Absorber, Shock Absorber Component or Spring (RWD Without F55)

Courtesy of GENERAL MOTORS COMPANY

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 Shock Absorber and Spring Removal and Installation (RWD Without F55)	
1	Front Suspension Strut Nut Cap NOTE: Vehicles equipped with F55 will NOT have a front suspension strut nut cap.

Callout	Component Name
2	Front Shock Absorber Nut CAUTION: Refer to Fastener Caution . Procedure 1. Use the CH-45400-B compressor to compress the front coil spring. 2. Use the CH-50732-A socket and a 9 mm wrench to remove and install the front shock absorber nut. Tighten 50 N.m (37 lb ft) Special Tools • CH-45400-B Strut Spring Compressor • CH-50732-A Strut Rod Nut Socket, 18 mm Equivalent regional tools:Special Tools
3	Front Shock Absorber Mount
4	Front Coil Spring
5	Front Shock Absorber Upper Bumper
6	Front Shock Absorber Boot
7	Front Coil Spring Lower Insulator
8	Front Shock Absorber

SHOCK ABSORBER, SHOCK ABSORBER COMPONENT OR SPRING REPLACEMENT (AWD WITHOUT F55)

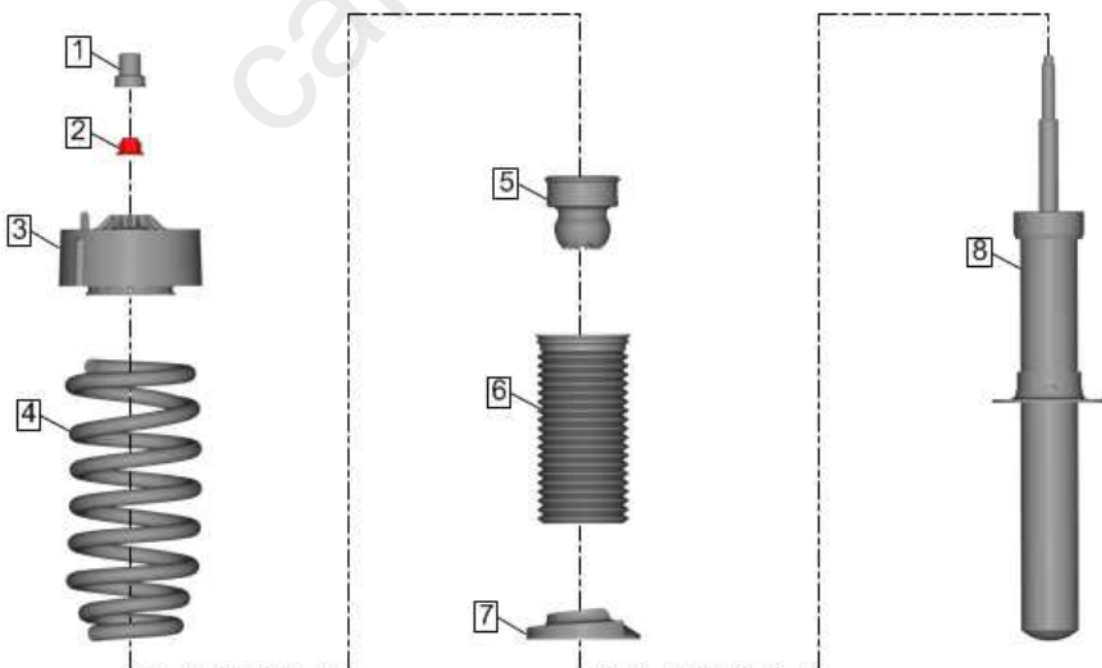


Fig. 146: Shock Absorber, Shock Absorber Component or Spring (AWD Without F55)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
---------	----------------

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 <u>Shock Absorber and Spring Removal and Installation (AWD Without F55)</u>	
1	Front Suspension Strut Nut Cap
2	Front Shock Absorber Nut CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. Use the CH-45400-B compressor to compress the front coil spring. 2. Use the CH-50732-A socket and a 9 mm wrench to remove and install the front shock absorber nut. Tighten 50 N.m (37 lb ft) Special Tools • CH-45400-B Strut Spring Compressor • CH-50732-A Strut Rod Nut Socket, 18 mm Equivalent regional tools: <u>Special Tools</u>
3	Front Shock Absorber Mount
4	Front Coil Spring
5	Front Shock Absorber Upper Bumper
6	Front Shock Absorber Boot
7	Front Coil Spring Lower Insulator
8	Front Shock Absorber

SHOCK ABSORBER, SHOCK ABSORBER COMPONENT OR SPRING REPLACEMENT (AWD WITH F55)

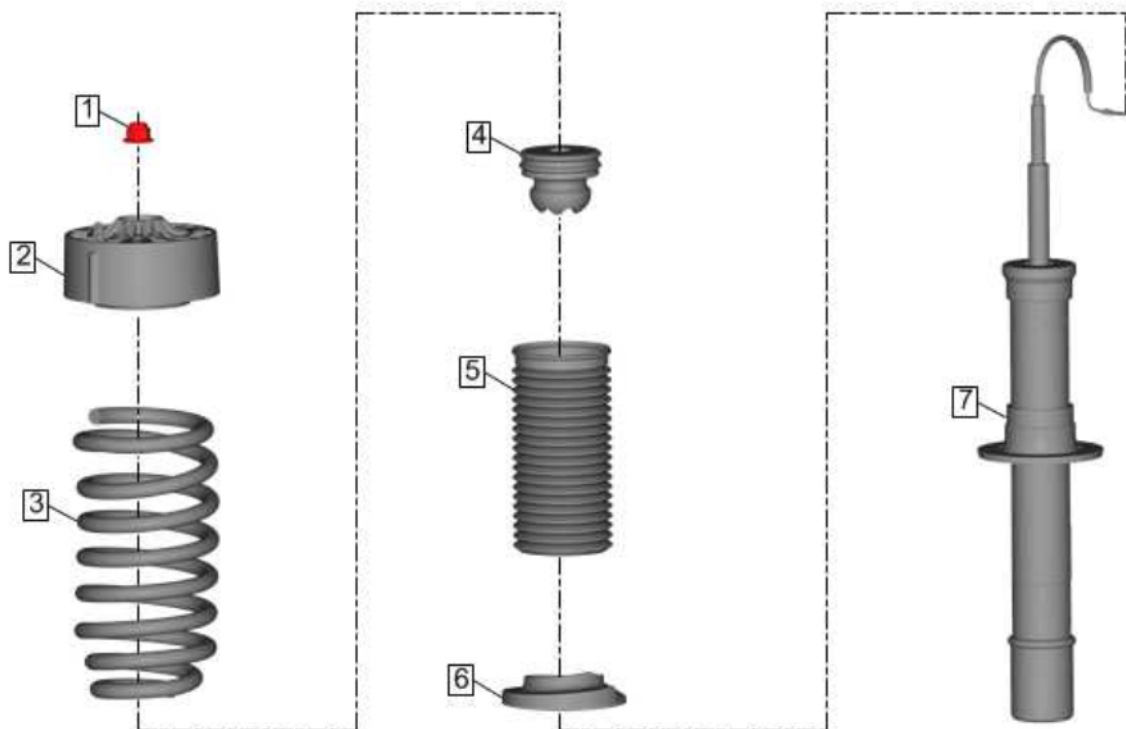


Fig. 147: Shock Absorber, Shock Absorber Component or Spring (AWD With F55)

Courtesy of GENERAL MOTORS COMPANY

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 Procedures 1. Shock Absorber and Spring Removal and Installation (AWD With F55) 2. Disassemble the front shock absorber electrical connector. Refer to Terminal Removal	

Callout	Component Name
1	Front Shock Absorber Nut CAUTION: Refer to Fastener Caution . Procedure 1. Use the CH-45400-B compressor to compress the front coil spring. 2. Use the CH-50732-A socket and a 9 mm wrench to remove and install the front shock absorber nut. Tighten 50 N.m (37 lb ft) Special Tools • CH-45400-B Strut Spring Compressor • CH-50732-A Strut Rod Nut Socket, 18 mm Equivalent regional tools: Special Tools
2	Front Shock Absorber Mount
3	Front Coil Spring
4	Front Shock Absorber Upper Bumper
5	Front Shock Absorber Boot
6	Front Coil Spring Lower Insulator
7	Front Shock Absorber

FRONT SHOCK ABSORBER YOKE REPLACEMENT (AWD)

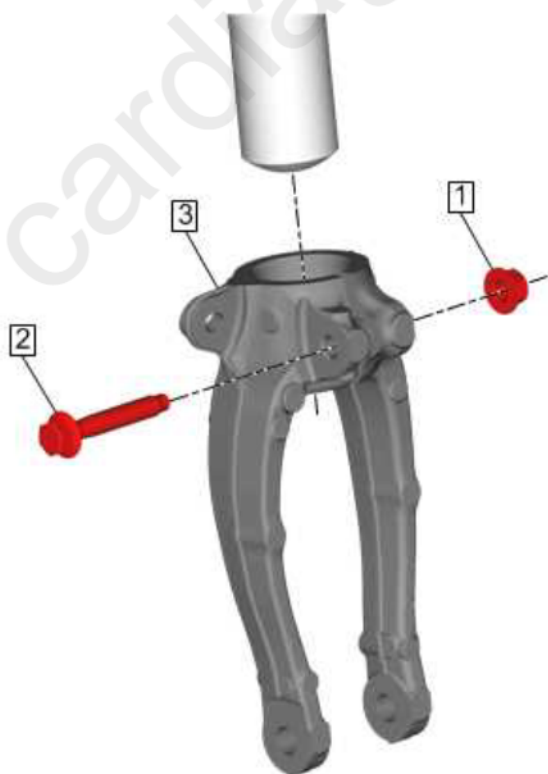


Fig. 148: Front Shock Absorber Yoke (AWD)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedure <u>Shock Absorber and Spring Removal and Installation (AWD Without F55)</u> <u>Shock Absorber and Spring Removal and Installation (AWD With F55)</u>	
1	Front Shock Absorber Yoke Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten 100 N.m (74 lb ft)
2	Front Shock Absorber Yoke Bolt 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. Procedure Remove and DISCARD the bolt.
3	Front Shock Absorber Yoke Procedure Transfer components as necessary.

SHOCK ABSORBER DISPOSAL

WARNING: Gas charged shock absorbers contain high pressure gas. Do not remove the snap ring from inside the top of the tube. If the snap ring is removed, the contents of the shock absorber will come out with extreme force which may result in personal injury.

WARNING: To prevent personal injury, wear safety glasses when centerpunching and drilling the shock absorber. Use care not to puncture the shock absorber tube with the centerpunch.

1. Make an indentation 10 mm (0.4 in) from the bottom (4) of the tube (3) using a centerpunch.

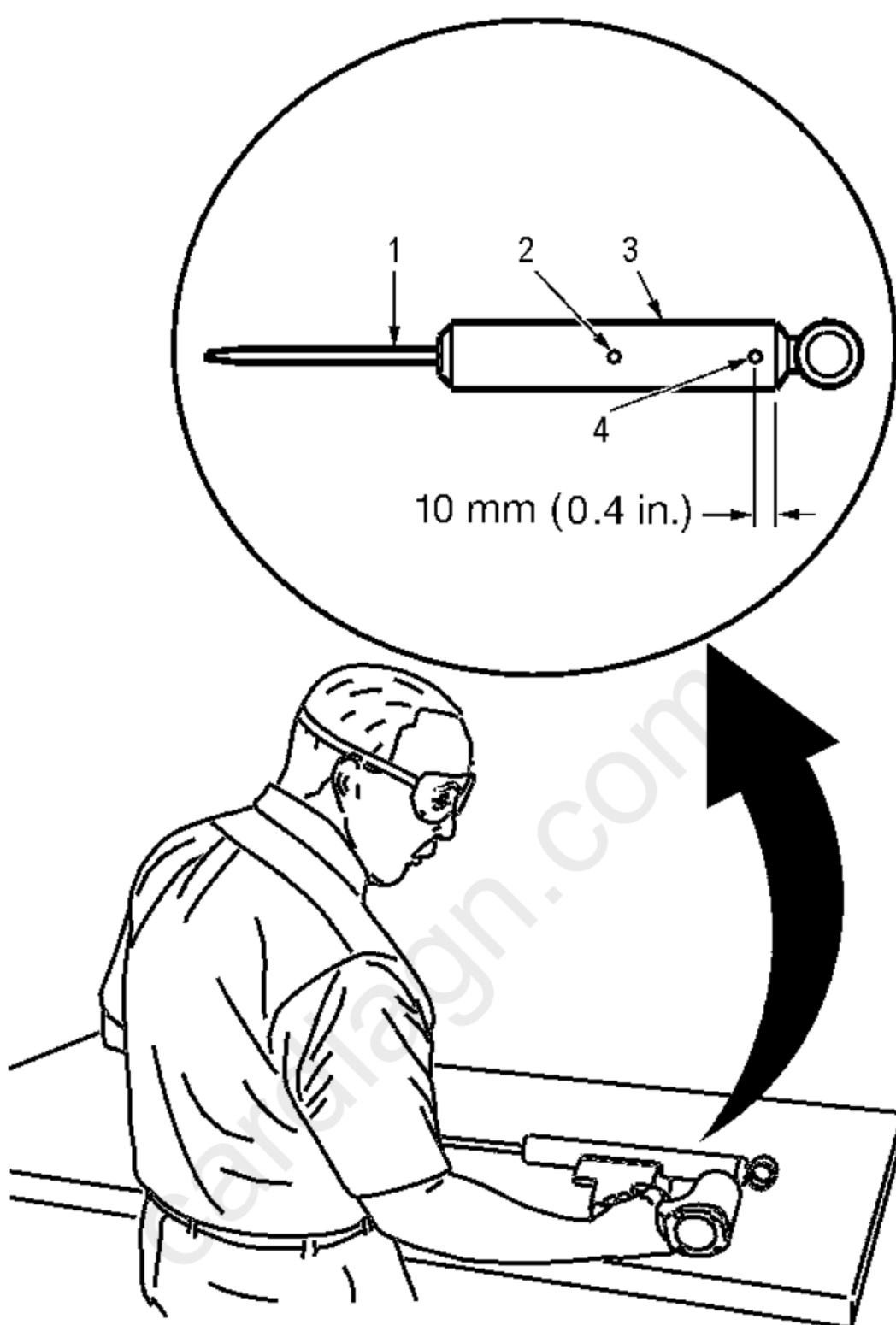


Fig. 149: Drilling Hole In Shock Absorber At Centerpunched Locations

Courtesy of GENERAL MOTORS COMPANY

2. Clamp the shock absorber in a vise horizontally with the shock absorber rod (1) completely extended.
3. Drill a hole in the shock absorber at the centerpunch (4) using a 5 mm (3/16 in) drill bit. Gas or a gas/oil mixture will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.
4. Make an indentation in the middle (2) of the tube (3) with a centerpunch.
5. Drill a second hole in the shock absorber at the centerpunch (2) using a 5 mm (3/16 in) drill bit. Oil will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.
6. Remove the shock absorber from the vise. Hold the shock absorber over a drain pan horizontally with the holes down. Move the rod (1) in and out of the tube (3) to completely drain the oil from the shock absorber.

DESCRIPTION AND OPERATION

FRONT SUSPENSION DESCRIPTION AND OPERATION

General Description

The front suspension system 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. The suspension must allow for the vertical movement of each front tire and wheel assembly as the vehicle travels over irregular road surfaces while maintaining the tire's horizontal relationship to the road.

Front Suspension Components

The front suspension system consists of the following major components:

- Steering Knuckle
- Lower Control Link
- Upper Control Arm
- Shock Absorber Assembly
- Stabilizer Shaft and Stabilizer Shaft Link

Steering Knuckle

NOTE:

- On some vehicles configurations, the upper control arm ball joint/ball stud may be part of the steering knuckle rather than the control arm.
- On some vehicles configurations, one or both lower control link ball joints/ball studs may be part of the steering knuckle rather than the lower control links.

The steering knuckle is suspended between the upper control arm ball joint/ball stud and the lower control link ball joints/ball studs. The upper control arm ball joint/ball stud and lower control link ball joints/ball studs allow the steering knuckle to pivot from side to side. The steering knuckle also houses the wheel bearing and hub assembly and provides a mounting point for the steering gear outer tie rod. The wheel bearing and hub assembly allows the tire to rotate forward and backward and the steering gear outer tie rod directs the steering knuckle to move the tire and wheel assembly side to side.

Lower Control Front Link

NOTE:

On some vehicles configurations, one or both lower control link ball joints/studs may be part of the steering knuckle rather than the lower control links.

The lower control front link attaches to the steering knuckle at the outermost point of the control link. The attachment is through a ball and socket type joint called a ball joint or ball stud. The innermost end of the control link attaches to the vehicle frame through a semi-rigid bushing. The attachment point at the vehicle frame allows upward and downward movement of the control link and steering knuckle. On vehicles using control links, each side of the vehicle will contain 2 control links instead of a lower control arm. On vehicles with a shock absorber assembly, the lower end of the absorber assembly will attach to one of the lower control links.

Lower Control Rear Link

NOTE:

On some vehicles configurations, one or both lower control link ball joints/studs may be part of the steering knuckle rather than the lower control links.

The lower control rear link attaches to the steering knuckle at the outermost point of the control link. The attachment is through a ball and socket type joint called a ball joint or ball stud. The innermost end of the control link attaches to the vehicle frame through a semi-rigid bushing. The attachment point at the vehicle frame allows upward and downward movement of the control link and steering knuckle. On vehicles using control links, each side of the vehicle will contain 2 control links instead of a lower control arm. On vehicles with a shock absorber assembly, the lower end of the absorber assembly will attach to one of the lower control links.

Upper Control Arm

NOTE: On some vehicle configurations, the upper control arm ball joint/ball stud may be part of the steering knuckle rather than the control arm.

The upper control arm attaches to the steering knuckle at the outermost point of the control arm. The attachment is through a ball and socket type joint called a ball joint or ball stud. The innermost end of the control arm attaches at 2 points to the vehicle frame through semi-rigid bushings. The attachment points at the vehicle frame allow up and down movement of the control arm and steering knuckle.

Shock Absorber Assembly

The up and down motion of the steering knuckle, as the vehicle travels over bumps, is absorbed predominantly by the coil spring. A shock absorber is used in conjunction with the coil spring to dampen the oscillations of the spring. The shock absorber is filled with oil and has a moveable shaft that connects to a piston inside the shock absorber. Valves inside the shock absorber offer resistance to oil flow and consequently inhibit rapid movement of the piston and shaft. The shock absorber assembly consists of a shock absorber, coil spring, upper bearing assembly and different combinations of insulators, dust boots, bumpers and hardware. The shock absorber assembly is held together, under pressure, by a fastener at the top of the assembly. On vehicles with a shock absorber assembly, the upper end of the assembly attaches to the vehicle body and the lower end of the assembly attaches to one of the lower control links.

Some vehicles are equipped with an electronic suspension control system. The electronic suspension control system, individually controls the damping force of each of the vehicle shock absorbers to keep the vehicle body as calm as possible. Changes of the damping forces can be accomplished within milliseconds and suspension characteristics can be changed at any time by activating the different available modes. For more information, refer to [Electronic Suspension Control Description and Operation](#).

Stabilizer Shaft and Stabilizer Shaft Links

The stabilizer shaft is mounted to the drivetrain and front suspension frame with bushings and mounting hardware. At each end of the stabilizer shaft, a stabilizer shaft link connects the stabilizer shaft to the shock absorber assembly. The stabilizer shaft controls the amount of independent movement of the front suspension when the vehicle turns.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

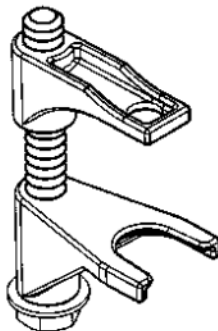
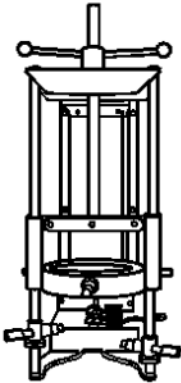
Illustration	Tool Number/Description
	CH-42188-B J-42188-B Ball Joint Separator

Illustration	Tool Number/Description
	CH-43631 CH-49455 J-43631 Ball Joint Separator
	CH-45400-B Strut Spring Compressor
	CH-50732-A Strut Rod Nut Socket, 18 mm