

SUSPENSION

Rear Suspension - CTS Sedan

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Adjust Link Inner Nut (1)		
• First Pass	100	74 lb ft
• Final Pass	plus 105 degrees	
Adjust Link Outer Bolt (1)		
• First Pass	70	52 lb ft
• Final Pass	plus 105 degrees	
Lower Control Arm Inner Nut (1)		
• First Pass	115	85 lb ft
• Final Pass	plus 105 degrees	
Lower Control Arm Outer Nut (1)		
• First Pass	150	110 lb ft
• Final Pass	plus 105 degrees	
Rear Suspension Bracket Front Bolts (1)		
Rear Suspension Bracket Bolts (1)		
• First Pass	100	74 lb ft
• Final Pass	plus 90 degrees	
Rear Suspension Bracket Nuts		
Rear Wheel Bearing and Hub Bolt		
Shock Absorber Bolt (1)		
• First Pass	100	74 lb ft
• Final Pass	plus 105 degrees	
Shock Absorber Upper Nuts		
Stabilizer Shaft Insulator Clamp Bolts (1)		
Stabilizer Shaft Link Bolt (1)		
Stabilizer Shaft Link Nut		
Trailing Arm Lower Control Arm Inner Nut (1)		
• First Pass	70	52 lb ft
• Final Pass	plus 105 degrees	

Trailing Arm Lower Control Arm Outer Nut (1)		
• First Pass	100	74 lb ft
• Final Pass	plus 105 degrees	
Trailing Arm Upper Control Arm Inner Nut (1)		
• First Pass	70	52 lb ft
• Final Pass	plus 105 degrees	
Trailing Arm Upper Control Arm Outer Nut (1)		
• First Pass	100	74 lb ft
• Final Pass	plus 105 degrees	
Upper Control Arm Inner Nut (1)		
• First Pass	70	52 lb ft
• Final Pass	plus 105 degrees	
Upper Control Arm Outer Nut (1)		
• First Pass	70	52 lb ft
• Final Pass	plus 105 degrees	
NOTE: (1) Torque to yield fastener in use, requires new bolt.		

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Adhesives, Fluids, Lubricants, and Sealers

Application	Type of Material	GM Part Number	
		United States	Canada
Wheel Bearing and Hub Bolt	Threadlocker	89021297	10953488

REPAIR INSTRUCTIONS

REAR WHEEL BEARING AND HUB REPLACEMENT

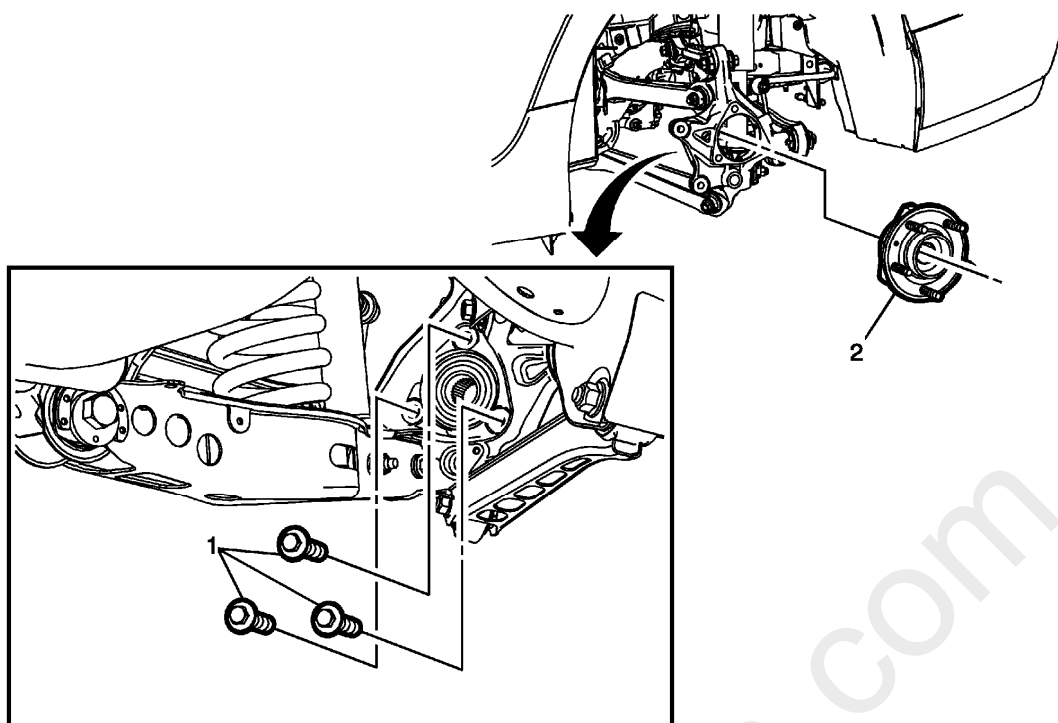


Fig. 1: Rear Wheel Bearing & Hub
 Courtesy of GENERAL MOTORS COMPANY

Rear Wheel Bearing and Hub Replacement

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Remove the rear brake rotor assembly. Refer to <u>Rear Brake Rotor Replacement</u> . 4. Remove the rear wheel speed sensor from the suspension knuckle and reposition. Refer to <u>Rear Wheel Speed Sensor Replacement</u> 5. Separate the wheel drive shaft from the wheel bearing hub assembly. Refer to <u>Rear Wheel Drive Shaft Replacement (LFX,LF3)</u> , <u>Rear Wheel Drive Shaft Replacement (LTG)</u>	
	Wheel Bearing and Hub Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Procedure Prepare the wheel bearing and hub bolts and the threaded holes of the wheel bearing and hub for assembly.

1	1. Thoroughly clean the threadlocker residue from the wheel bearing and hub bolt threads with an approved solvent and allow to dry. 2. Thoroughly clean the threadlocker residue from the wheel bearing and hub threaded holes with an approved solvent and allow to dry. 3. Apply threadlocker to 2/3 of the threaded length of the wheel bearing and hub bolts and the wheel bearing and hub threaded holes. Refer to <u>Adhesives, Fluids, Lubricants, and Sealers</u> . 4. Ensure there are no gaps in the threadlocker along the filled area of the wheel bearing and hub bolts and the wheel bearing and hub threaded holes. 5. Allow the threadlocker to cure approximately 10 minutes before installation. Tighten 130 (96 lb ft)
2	Wheel Bearing and Hub Assembly

KNUCKLE REPLACEMENT

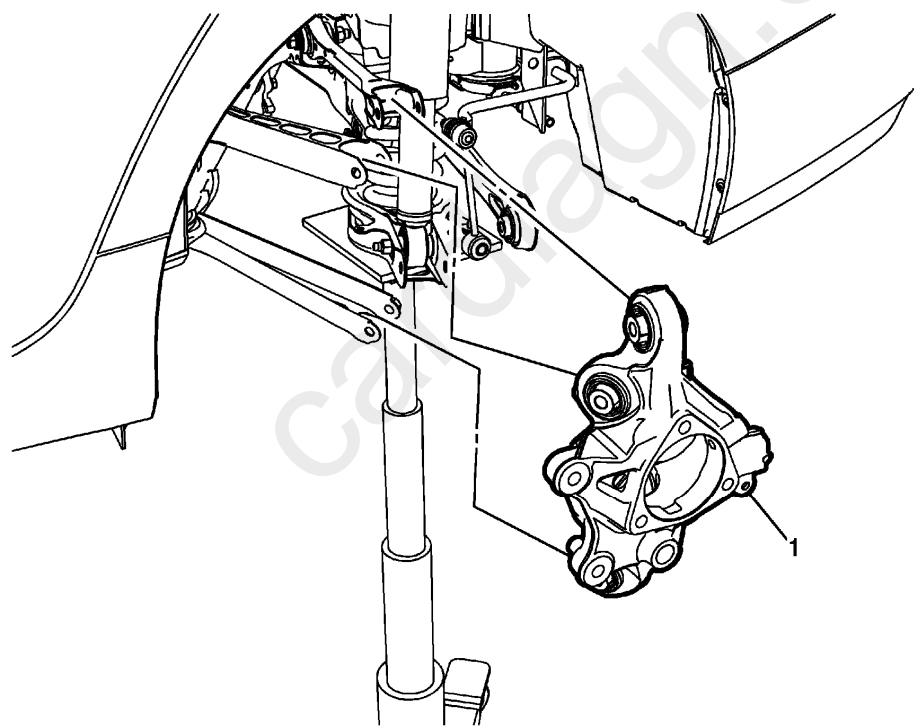


Fig. 2: Knuckle Assembly
 Courtesy of GENERAL MOTORS COMPANY

Knuckle Replacement

Callout	Component Name
Preliminary Procedure	

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
3. Using a suitable hydraulic jack, support the lower control arm.
4. Remove the rear wheel speed sensor. Refer to **Rear Wheel Speed Sensor Replacement** .
5. Remove the rear brake backing plate. Refer to **Rear Parking Brake Anchor Backing Plate Replacement** .
6. Disconnect the upper control arm from the knuckle. Refer to **Upper Control Arm Replacement**.
7. Disconnect the adjust link from the knuckle. Refer to **Adjust Link Replacement**.
8. Disconnect the lower stabilizer link bolt from the knuckle. Refer to **Stabilizer Shaft Link Replacement**.
9. Disconnect the upper and lower trailing arms from the knuckle. Refer to **Trailing Arm Replacement (Upper)**, **Trailing Arm Replacement (Lower)**.
10. Disconnect the lower control arm from the knuckle. Refer to **Lower Control Arm Replacement**.

1

Knuckle Assembly.

Procedure

Align the rear end. Refer to **Rear Camber Adjustment** , and **Rear Toe Adjustment** .

REAR SUSPENSION BRACKET REPLACEMENT (FRONT)

Removal Procedure

NOTE: The following service procedure is to be performed one side at a time.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the under body air deflector. Refer to **Underbody Rear Air Deflector Replacement - Left Side** , or **Underbody Rear Air Deflector Replacement - Right Side** .
3. Using a suitable jack stand, support the rear drive axle.

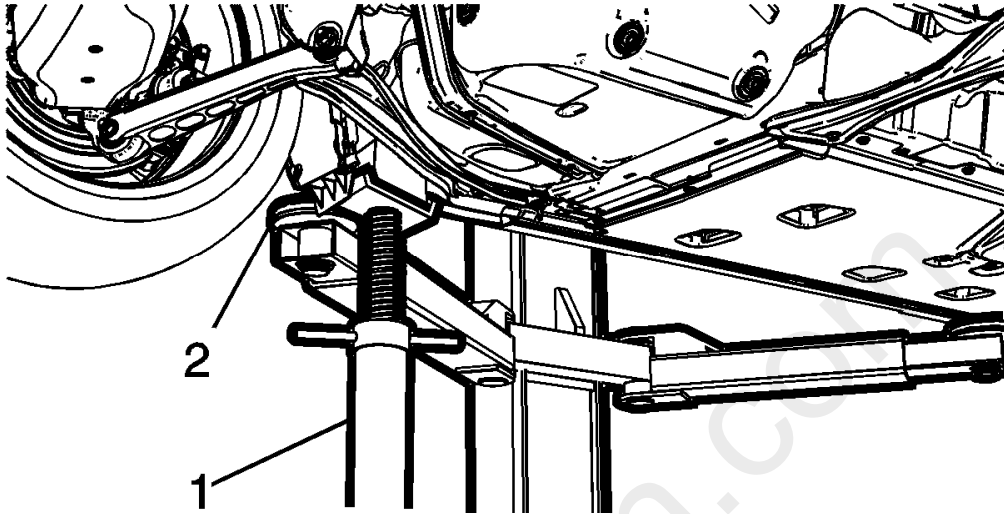


Fig. 3: Jack Stand & Hoist Pad

Courtesy of GENERAL MOTORS COMPANY

4. Position a block of wood and an adjustable jack stand (1) between the frame of the vehicle and the suspension bracket.

NOTE: **DO NOT rise the vehicle higher than necessary.**

5. Using the block of wood and the adjustable jack stand (1), rise the vehicle just enough to reposition the hoist pad (2) from under the vehicle.

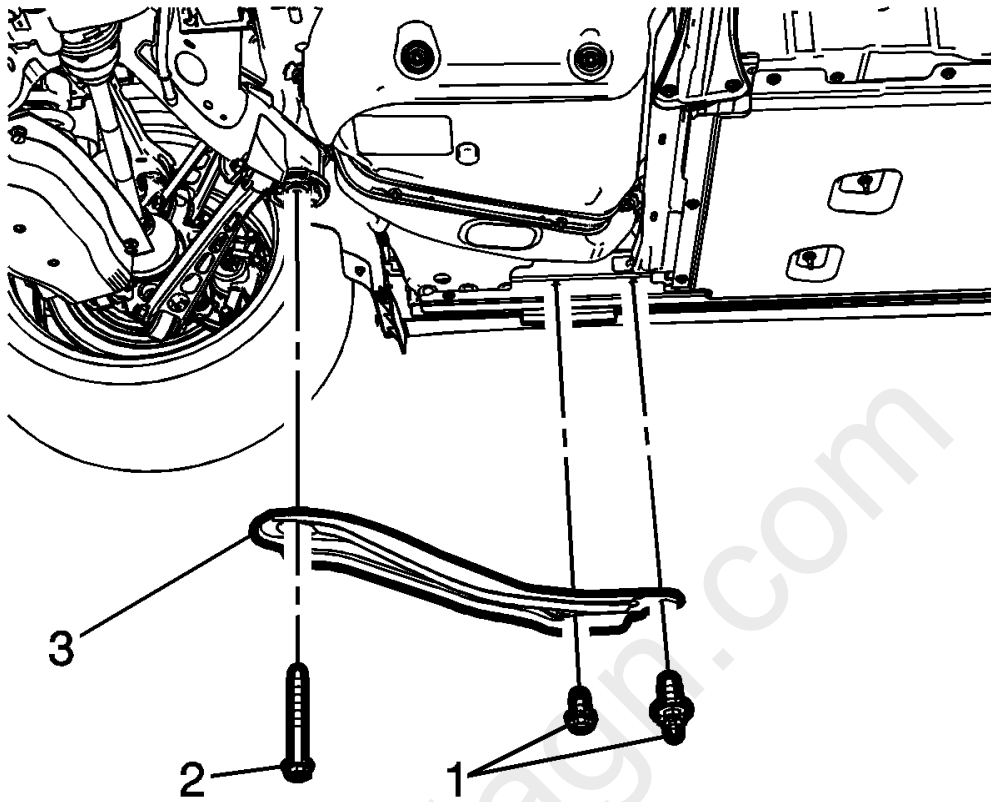


Fig. 4: Rear Suspension Bracket & Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Remove and discard the front and rear mounting bolts (1) and (2) for the rear suspension bracket (3). Do NOT reuse the mounting bolts. Replace with NEW only.
7. Remove the rear suspension bracket (3) from the vehicle.

Installation Procedure

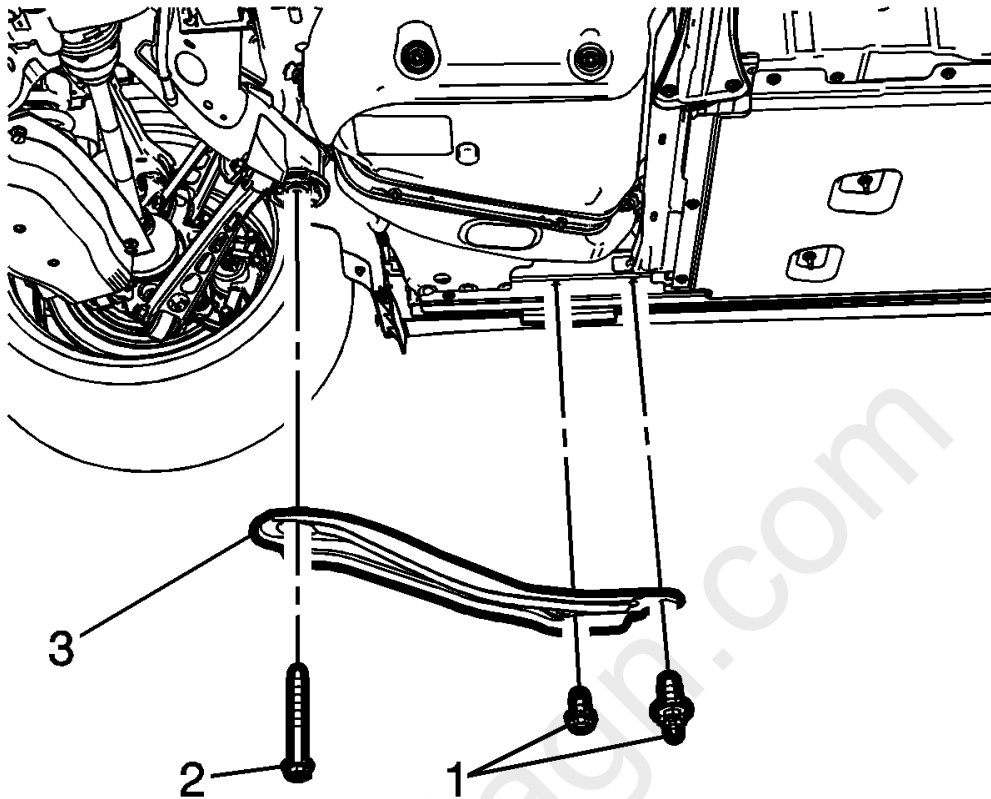


Fig. 5: Rear Suspension Bracket & Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Position the rear suspension bracket (3) to 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.

CAUTION: Refer to Fastener Caution .

2. Install 2 NEW front bracket bolts (1) and tighten to 58 (43 lb ft)
3. Install a NEW rear bracket bolt (2) and tighten to:
 - First Pass: 100 (74 lb ft)
 - Final Pass: plus 90 degrees

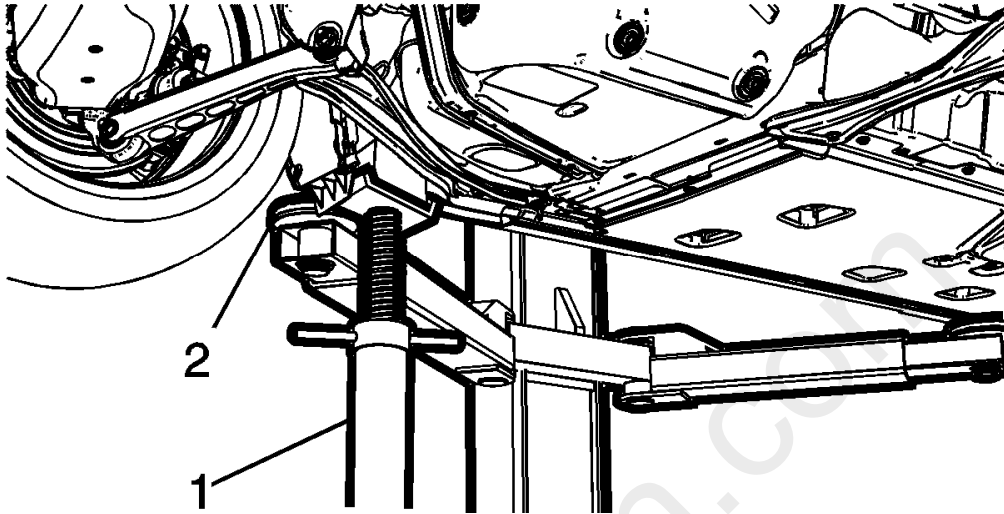


Fig. 6: Jack Stand & Hoist Pad
Courtesy of GENERAL MOTORS COMPANY

4. Reposition the hoist lift pad (2) back underneath the vehicle.
5. Using the adjustable jack stand (1) and the block of wood, slowly lower the vehicle back on the hoist pad (2).
6. Remove the adjustable jack stand (1) and the block of wood from underneath the vehicle.
7. Install the under body air deflector. Refer to **Underbody Rear Air Deflector Replacement - Left Side** , or **Underbody Rear Air Deflector Replacement - Right Side** .
8. Remove the suitable support from the rear drive axle.
9. Remove the support and lower the vehicle.

REAR SUSPENSION BRACKET REPLACEMENT (REAR)

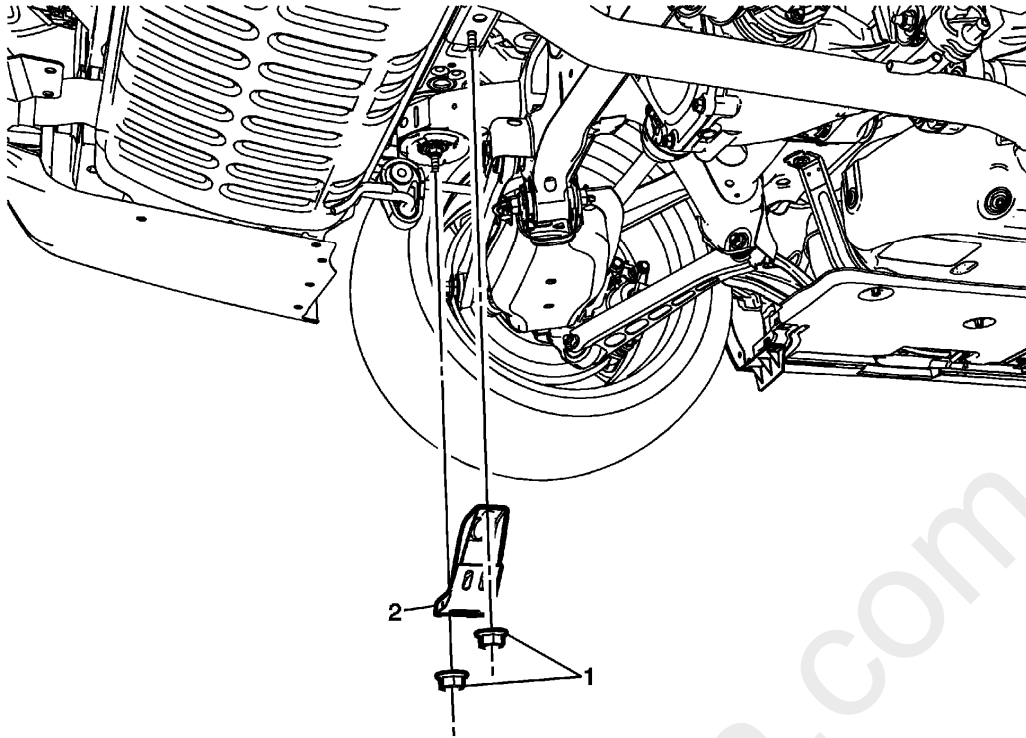


Fig. 7: Rear Suspension Bracket & Nuts
 Courtesy of GENERAL MOTORS COMPANY

Rear Suspension Bracket Replacement (Rear)

Callout	Component Name
Preliminary Procedure	
Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
1	Rear Suspension Bracket Nut (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 58 (43 lb ft)
2	Rear Suspension Bracket

STABILIZER SHAFT REPLACEMENT

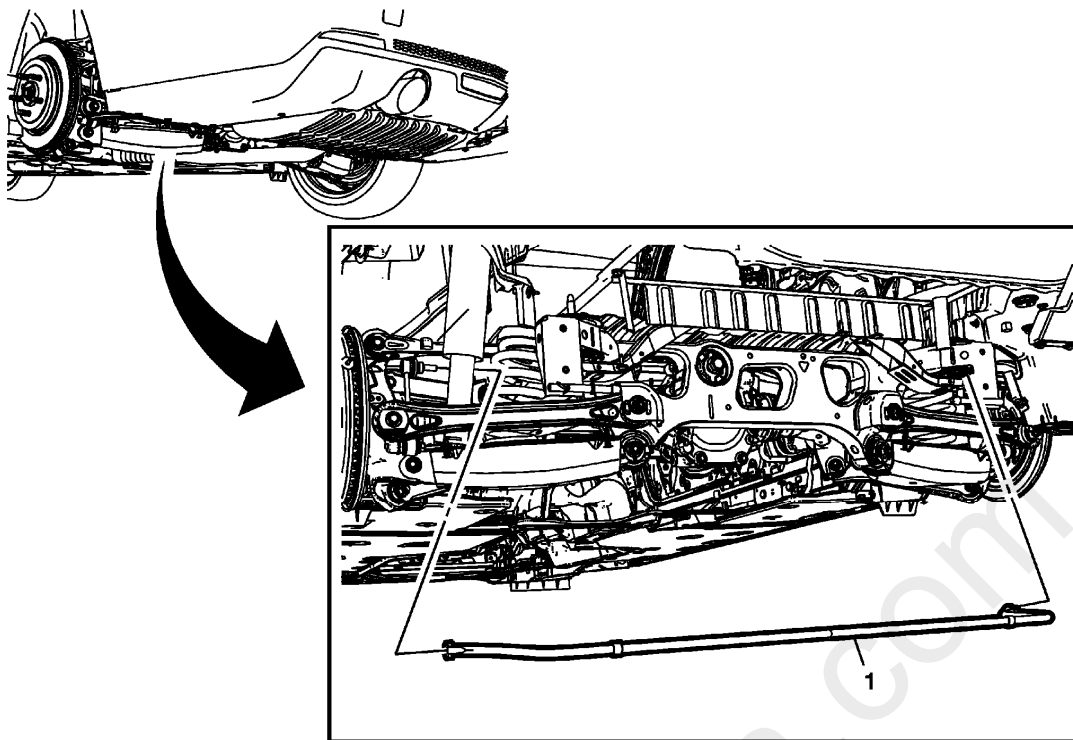


Fig. 8: Stabilizer Shaft
Courtesy of GENERAL MOTORS COMPANY

Stabilizer Shaft Replacement

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assemblies. Refer top <u>Tire and Wheel Removal and Installation</u> . 3. Remove the upper stabilizer link nuts from the stabilizer shaft. Refer to <u>Stabilizer Shaft Link Replacement</u>. 4. Remove the stabilizer shaft insulators. Refer to <u>Stabilizer Shaft Insulator Replacement</u>. 5. In order to gain enough room to manipulate the stabilizer shaft out of the vehicle, disconnect the two rubber exhaust hangers on the front side of the muffler. Refer to <u>Exhaust System Replacement (LF3)</u> , <u>Exhaust System Replacement (LFX)</u> , for LFX Engines or <u>Exhaust Muffler Replacement (LTG)</u> for LCV or LTG Engines.	
1	Stabilizer Shaft

STABILIZER SHAFT INSULATOR REPLACEMENT

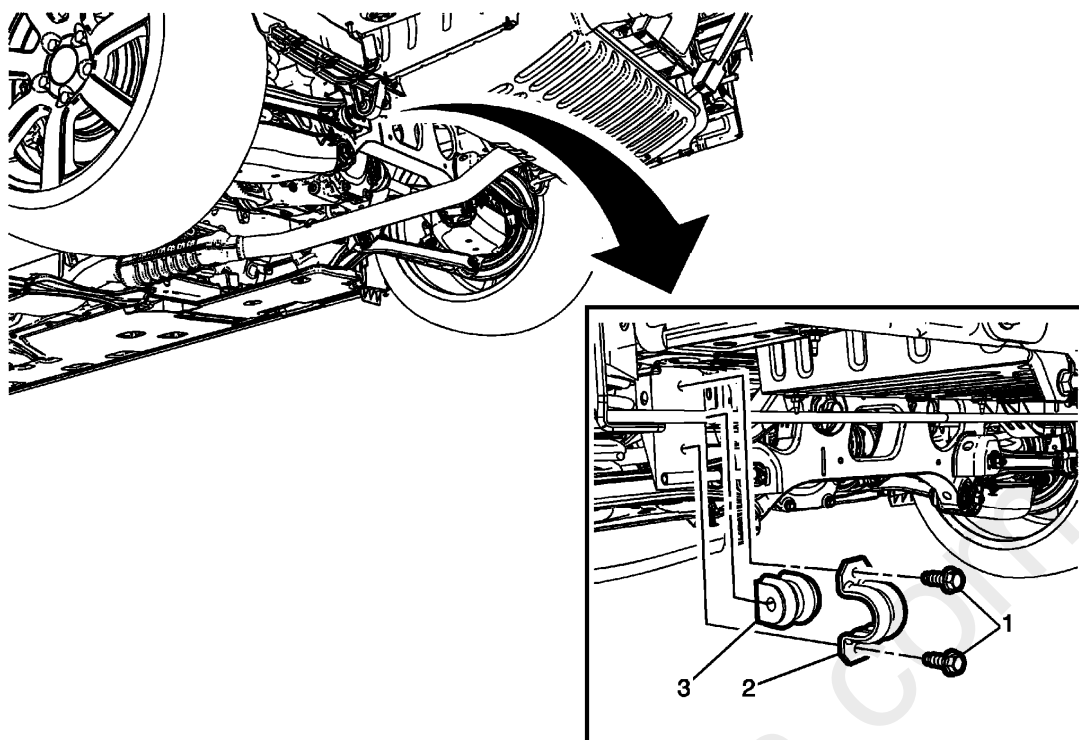


Fig. 9: Stabilizer Shaft Insulator & Clamp
 Courtesy of GENERAL MOTORS COMPANY

Stabilizer Shaft Insulator Replacement

Callout	Component Name
Preliminary Procedure Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .	
1	Rear Stabilizer Shaft Insulator Clamp Bolt (Qty: 2) CAUTION: Refer to Fastener Caution . Procedure Remove the rear stabilizer shaft insulator clamp bolts. Tighten 22 (16 lb ft)
2	Rear Stabilizer Shaft Insulator Clamp
3	Rear Stabilizer Shaft Insulator

STABILIZER SHAFT LINK REPLACEMENT

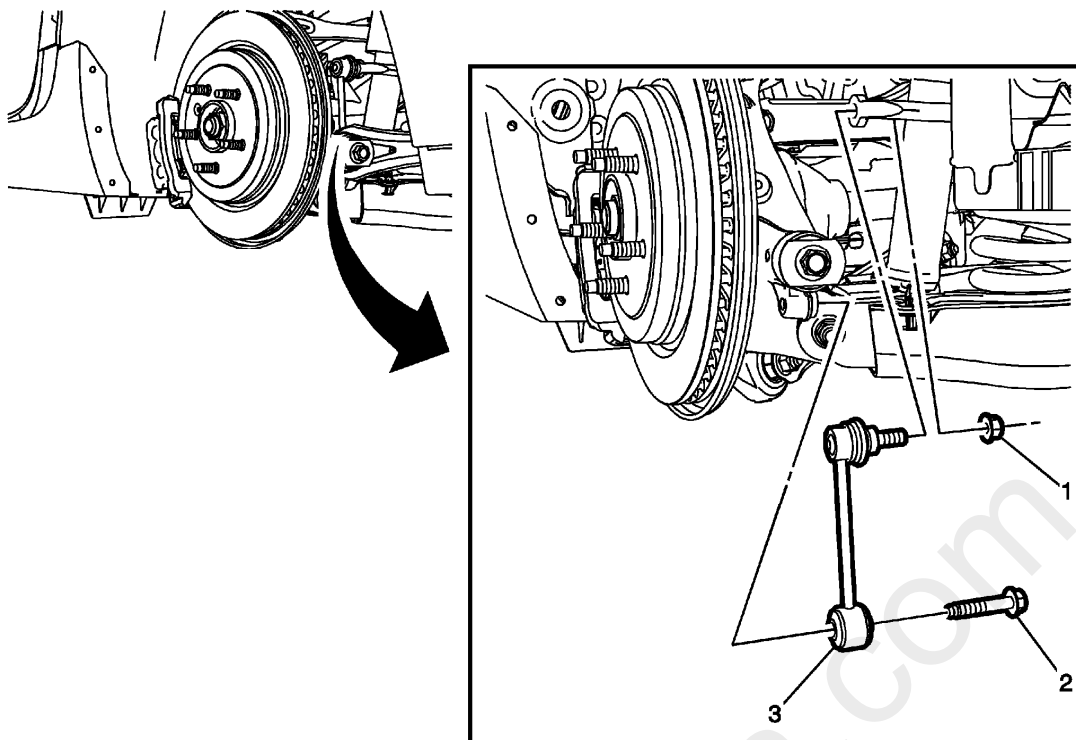


Fig. 10: Stabilizer Shaft Link
 Courtesy of GENERAL MOTORS COMPANY

Stabilizer Shaft Link Replacement

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Remove the rear suspension lower control arm cover. Refer to <u>Rear Suspension Lower Control Arm Cover Replacement</u>.	
1	Stabilizer Shaft Link Nut CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. Using the proper size allen wrench, hold the upper stabilizer shaft ball stud. 2. Remove the upper stabilizer shaft link nut. NOTE: DO NOT allow the upper stabilizer shaft ball stud to rotate.

	Tighten 43 (32 lb ft)
2	Stabilizer Shaft Link Bolt Procedure Remove the stabilizer shaft bolt. Tighten 58 (43 lb ft)
3	Stabilizer Shaft Link

STRUT AND SHOCK ABSORBER INSPECTION

NOTE: The shock absorber 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 lower shock absorber tube is normal. **DO NOT** replace the shock absorber for this condition.

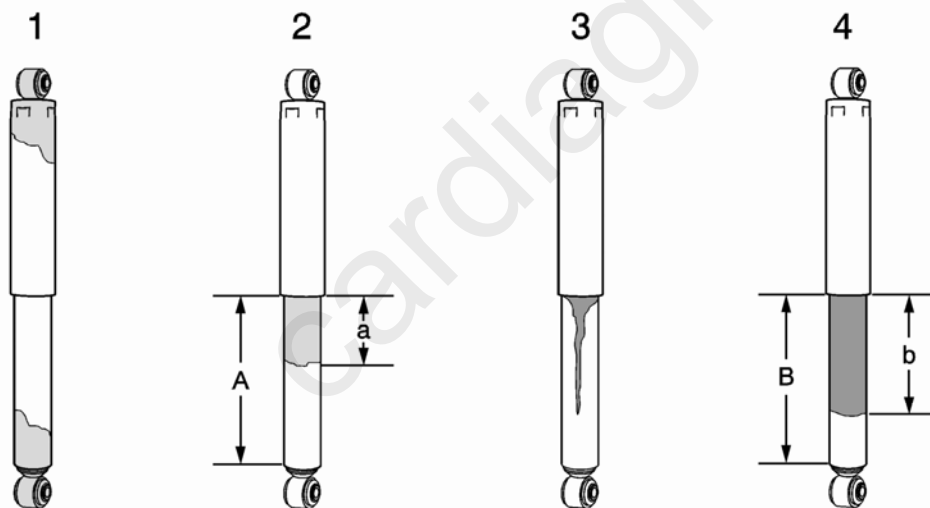


Fig. 11: Identifying Shock Absorber Conditions
Courtesy of GENERAL MOTORS COMPANY

Condition 1

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

Condition 2

Light film/residue on approximately 1/3 (a) or less of the lower shock tube (A) and originating from the shaft seal, is a NORMAL condition. DO NOT replace the shock absorber.

Condition 3

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

Condition 4

An extreme wet film of oil covering more than 1/3 (b) of the lower shock tube and originating from the shaft seal (B), is an ABNORMAL condition. Replace the shock absorber. Refer to **Shock Absorber Replacement**.

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 shock absorber 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 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 shock absorber. Refer to **Shock Absorber 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 shock absorber. If the shock absorber does not exceed 2 cycles, NO repair is necessary.

SHOCK ABSORBER REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
3. Remove the rear wheelhouse panel liner. Refer to **Rear Wheelhouse Liner Replacement** .
4. Remove the rear suspension lower control arm cover . Refer to **Rear Suspension Lower Control Arm Cover Replacement**.

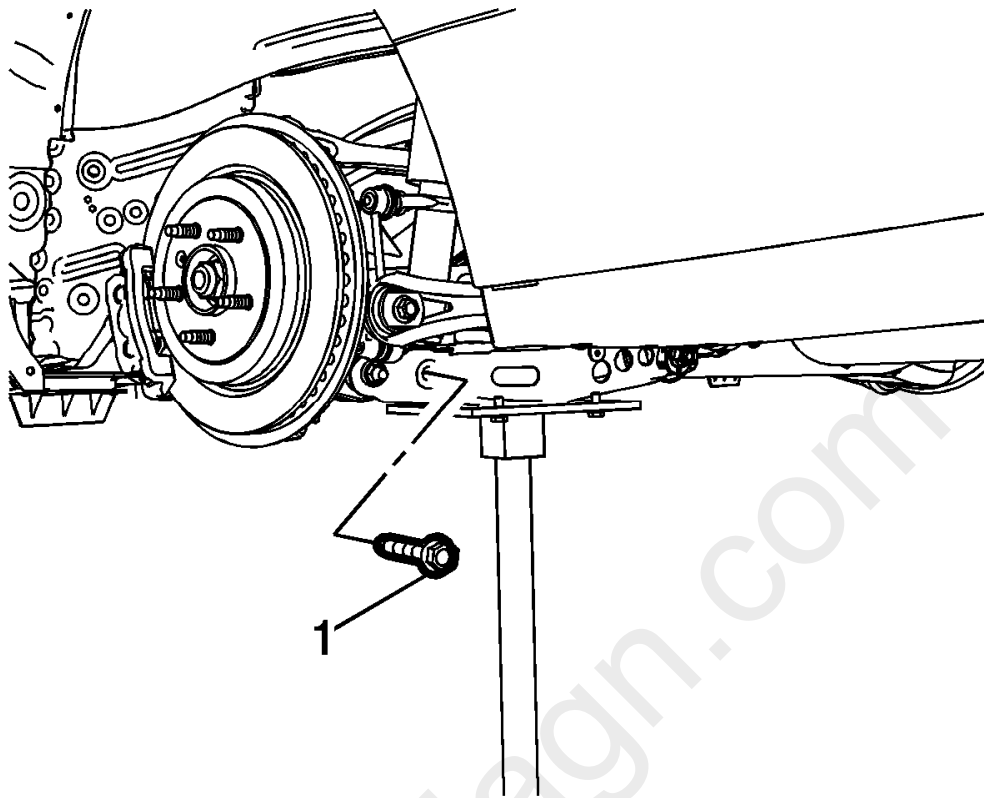


Fig. 12: Lower Rear Shock Absorber Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Using a hydraulic jack, support the rear lower control arm.
6. Remove and discard the lower rear shock absorber bolt (1).
7. Remove the rear shock absorber electrical connection, if applicable.

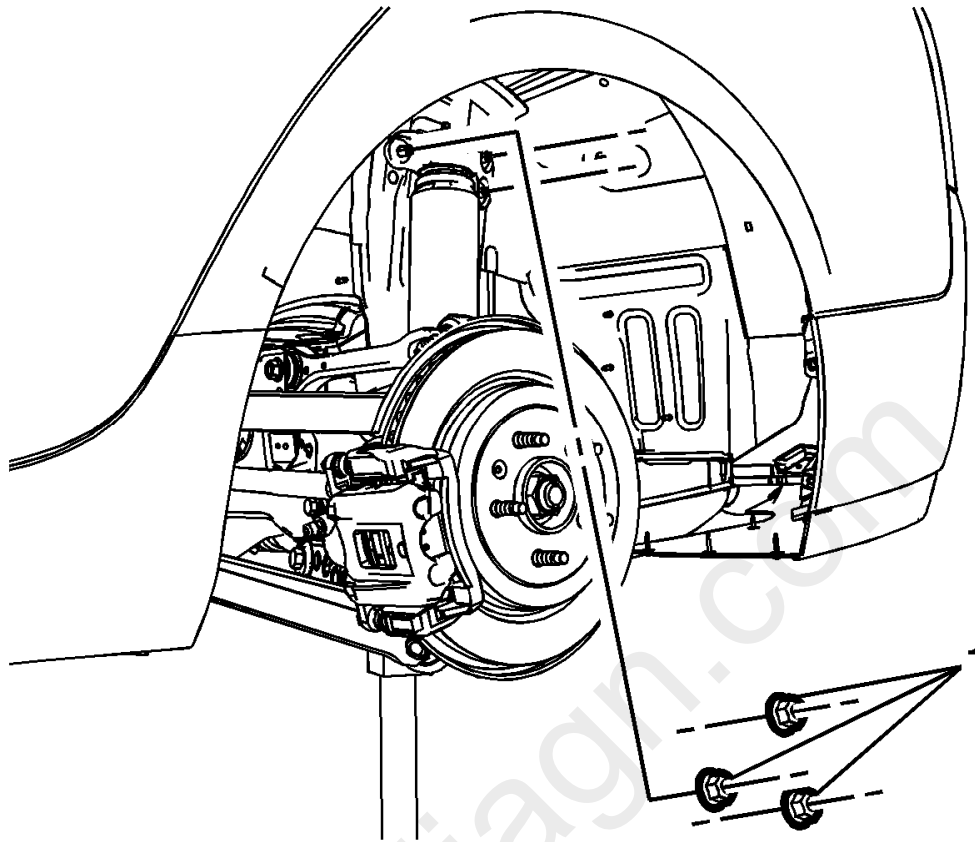


Fig. 13: Upper Shock Absorber Nuts
Courtesy of GENERAL MOTORS COMPANY

8. Remove the 3 upper shock absorber nuts (1).

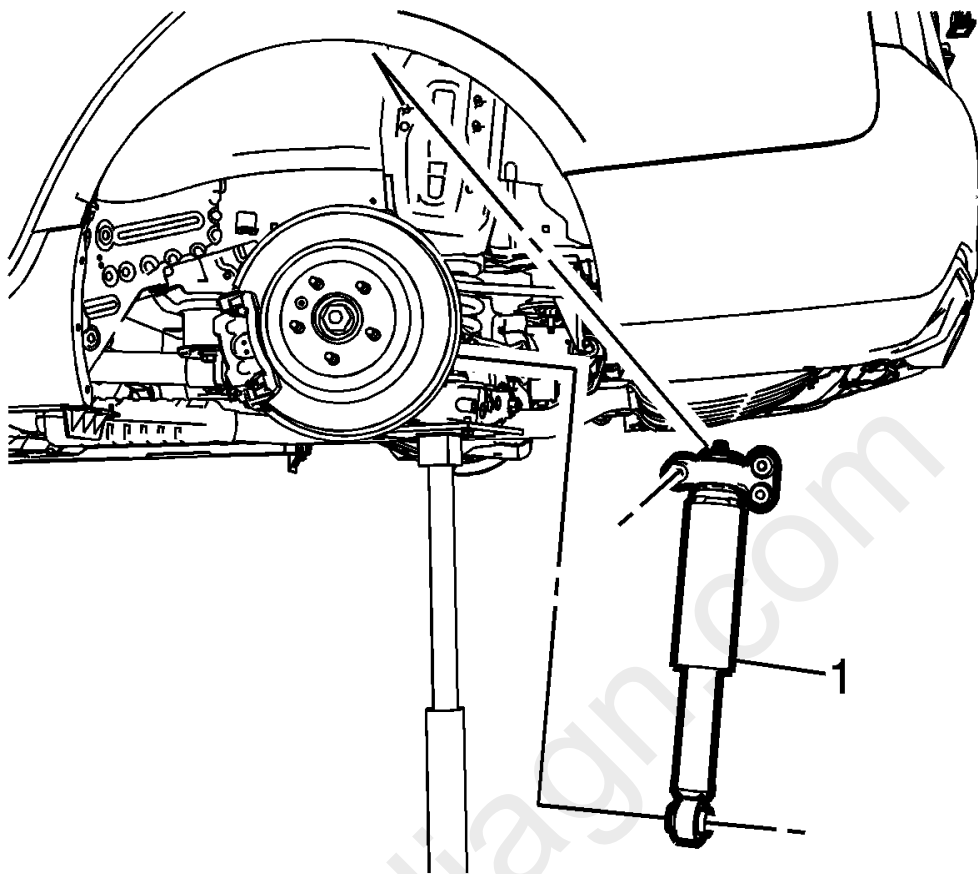


Fig. 14: Rear Shock Absorber
Courtesy of GENERAL MOTORS COMPANY

9. Remove the rear shock absorber (1) from the vehicle.

Installation Procedure

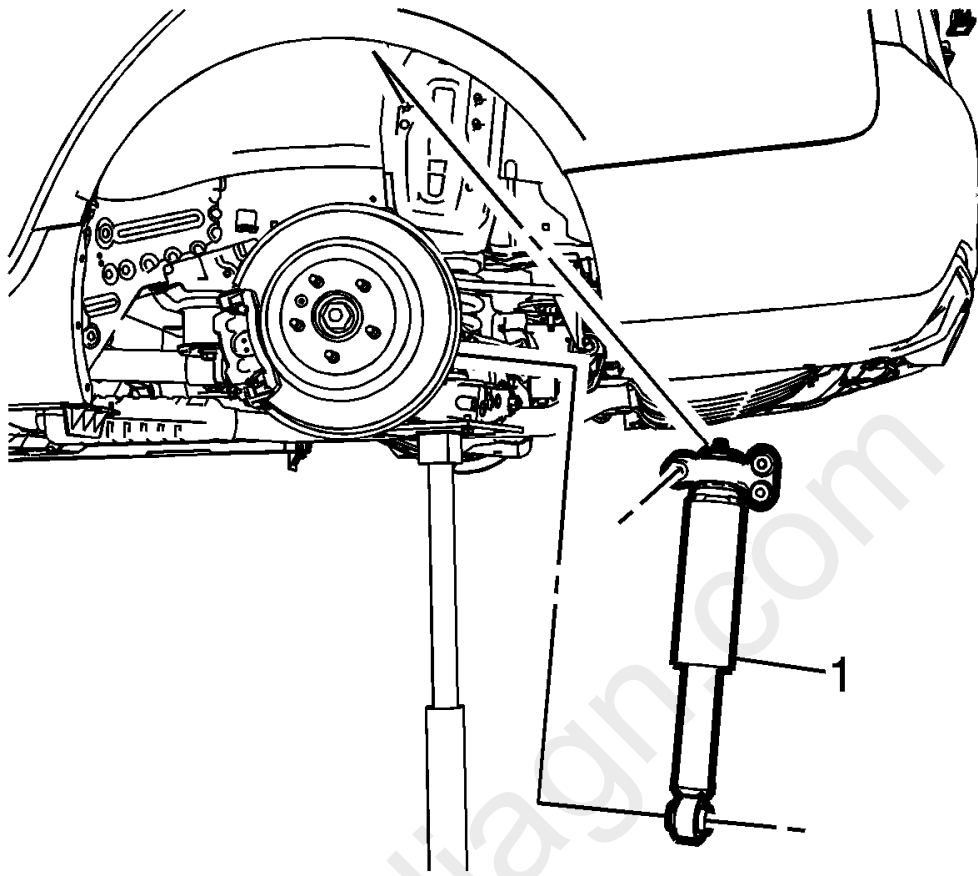


Fig. 15: Rear Shock Absorber
Courtesy of GENERAL MOTORS COMPANY

1. Position the shock absorber (1) in the vehicle.

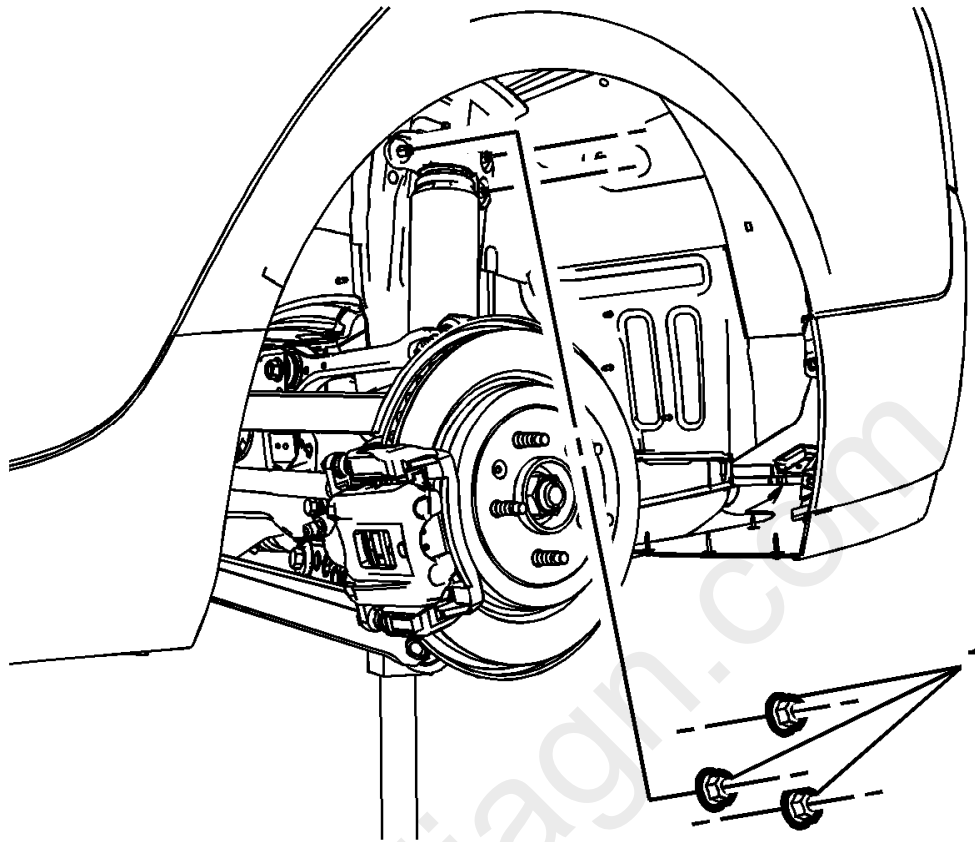


Fig. 16: Upper Shock Absorber Nuts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

2. Install the 3 upper shock absorber nuts (1) and tighten to 43 (32 lb ft).
3. Install the rear shock absorber electrical connection, if applicable.

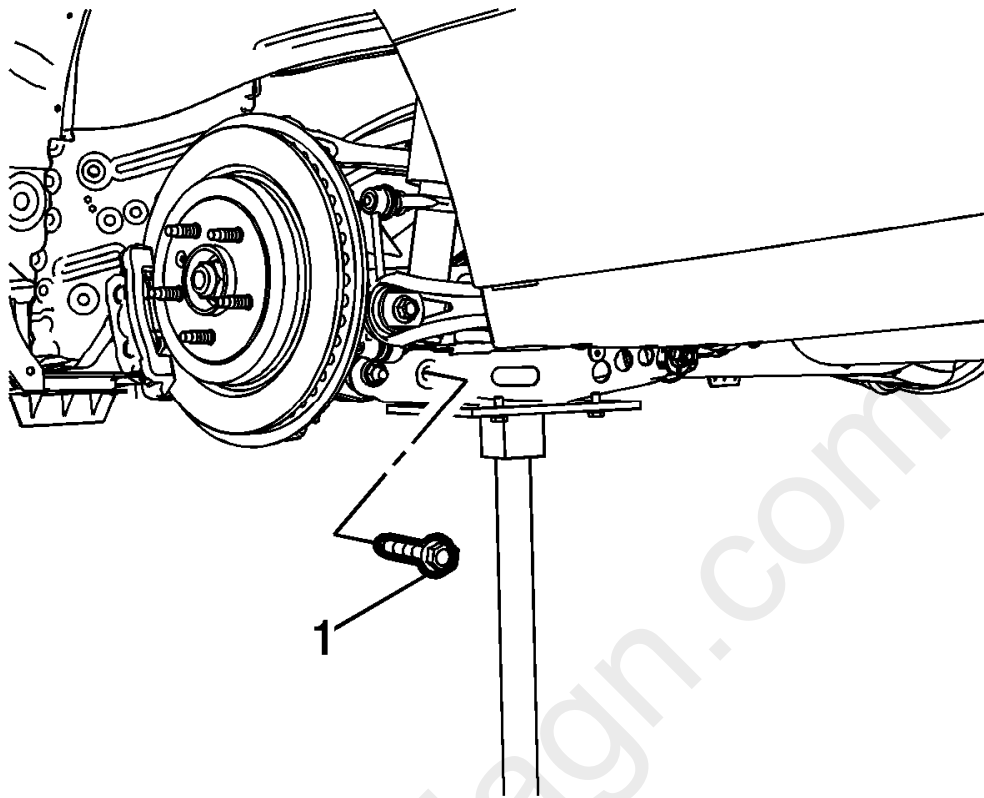


Fig. 17: Lower Rear Shock Absorber Bolt
Courtesy of GENERAL MOTORS COMPANY

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.

4. Install the lower rear shock absorber bolt (1).

Tighten

- First Pass: 100 (74 lb ft)
 - Final Pass: plus 105 degrees
5. Remove the hydraulic jack from the lower control arm.
 6. Install the rear wheelhouse panel liner. Refer to **Rear Wheelhouse Liner Replacement** .
 7. Install the rear suspension lower control arm cover. Refer to **Rear Suspension Lower Control Arm Cover Replacement**.

8. Install the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
9. Remove the supports and lower the vehicle.

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.

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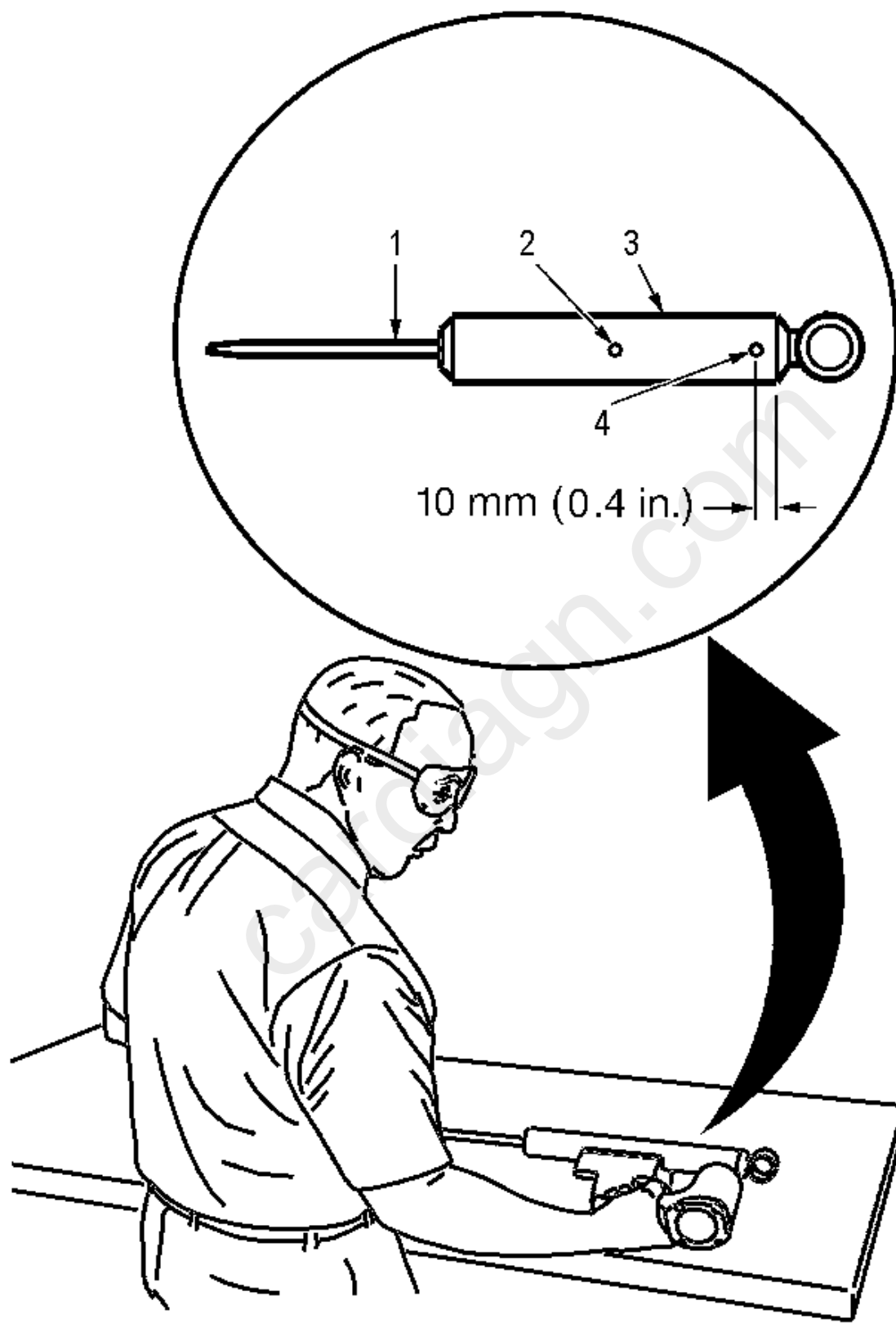


Fig. 18: Drilling Hole In Shock Absorber At Centerpunched Locations

Courtesy of GENERAL MOTORS COMPANY

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

REAR COIL SPRING REPLACEMENT

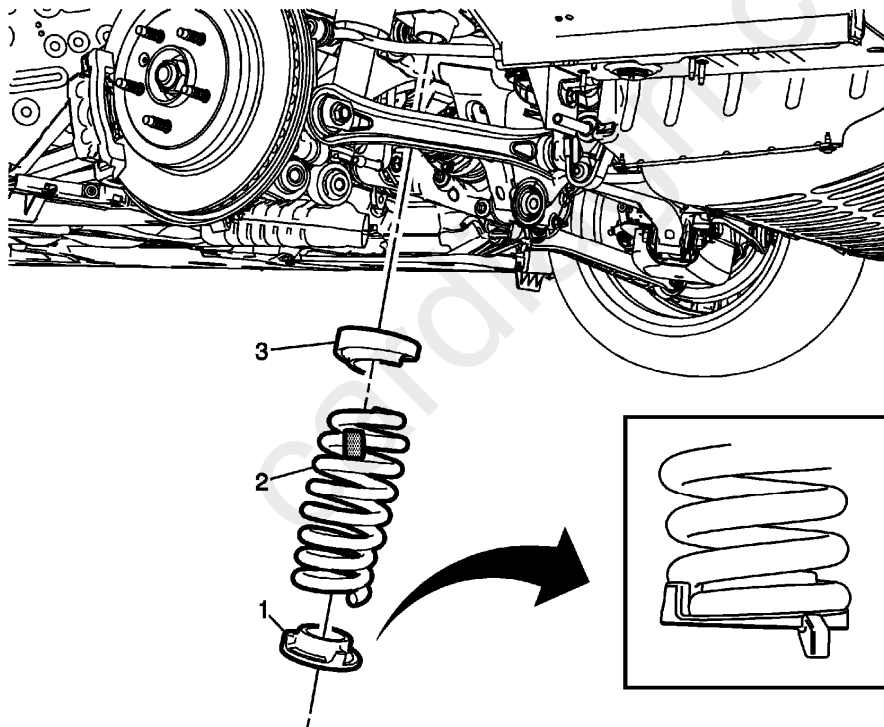


Fig. 19: Rear Coil Spring & Insulators
Courtesy of GENERAL MOTORS COMPANY

Rear Coil Spring Replacement

Callout	Component Name
Preliminary Procedure	

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tire and wheel assembly. Refer **Tire and Wheel Removal and Installation** .
3. Remove the lower control arm. Refer to **Lower Control Arm Replacement**.

1	Rear Coil Spring Lower Insulator Procedure When installing the lower insulator on the coil spring, ensure that the insulator stop is against the last coil on the spring. NOTE: The spring tag should be on the top side of coil spring, toward the upper insulator for correct installation of the coil spring and insulators.
2	Rear Coil Spring Procedure When installing the coil spring, ensure that the coil spring is properly seated in both insulators.
3	Rear Coil Spring Upper Insulator Procedure When installing the upper insulator on the coil spring, ensure that the insulator stop is against the last coil on the spring.

TRAILING ARM REPLACEMENT (UPPER)

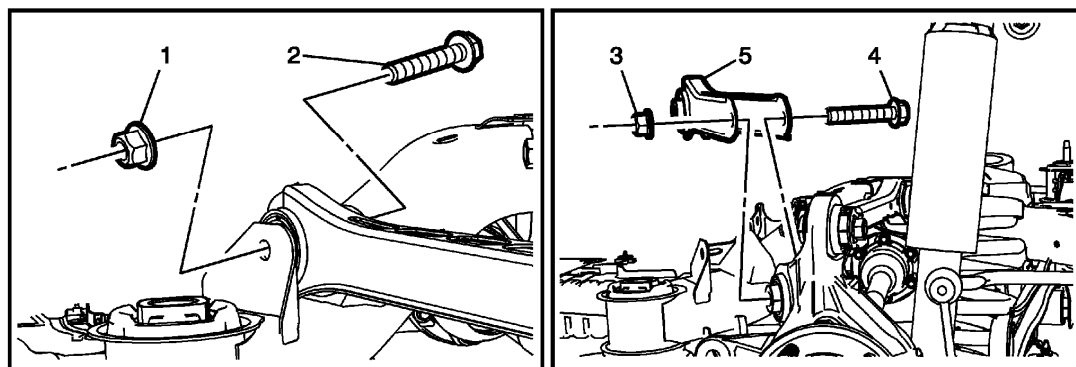
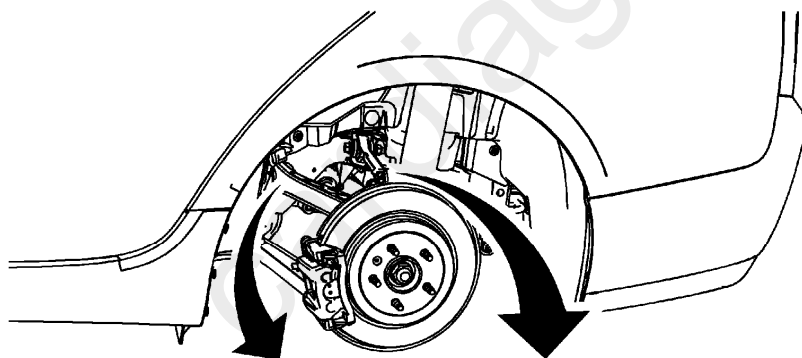


Fig. 20: Upper Trailing Arm & Mounting Components
 Courtesy of GENERAL MOTORS COMPANY

Trailing Arm Replacement (Upper)

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Using a hydraulic jack stand, support the rear knuckle. 4. Remove the upper control arm outer nut and bolt only. Refer to <u>Upper Control Arm Replacement</u>	
1	Upper Trailing Arm Inner Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten • First Pass: 70 (52 lb ft) • Final Pass: plus 105 degrees
2	Upper Trailing Arm Inner 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. DO NOT re-use, replace with NEW only.
3	Upper Trailing Arm Outer Nut Tighten • First Pass: 100 (74 lb ft) • Final Pass: plus 105 degrees
4	Upper Trailing Arm Outer 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. DO NOT re-use, replace with NEW only.
5	Upper Trailing Arm Procedure 1. Pull outward on the upper portion of the knuckle to allow clearance to remove the upper trailing arm. 2. Verify the rear wheel alignment. Refer to <u>Wheel Alignment Specifications</u> .

TRAILING ARM REPLACEMENT (LOWER)

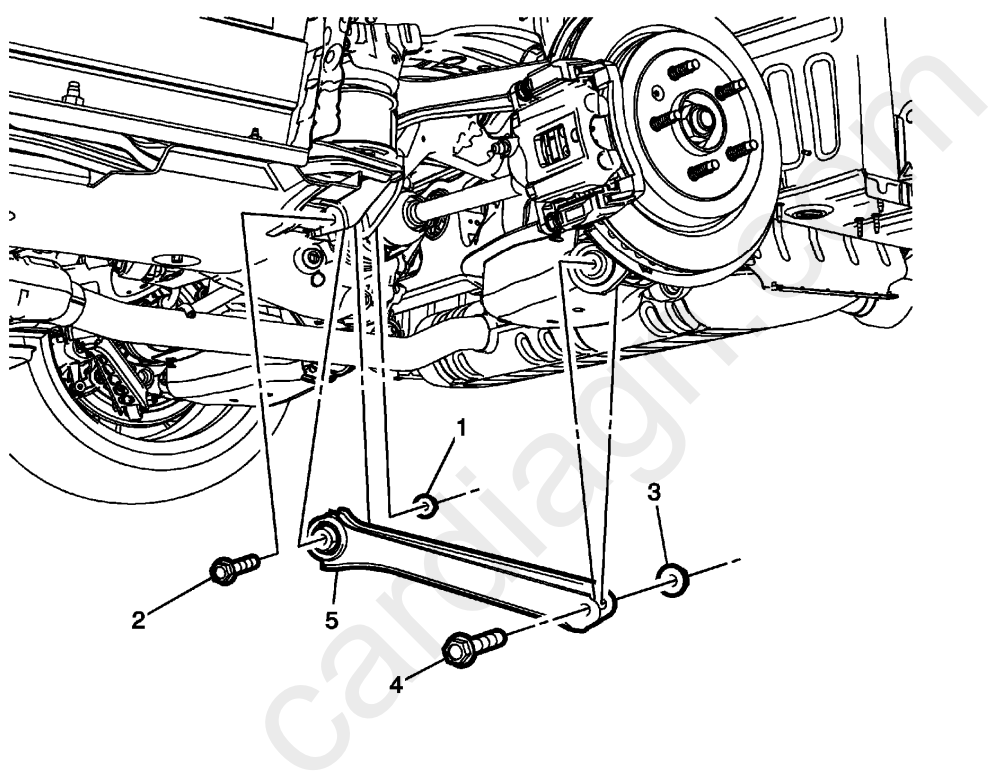


Fig. 21: Lower Trailing Arm & Mounting Components
 Courtesy of GENERAL MOTORS COMPANY

Trailing Arm Replacement (Lower)

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Using a hydraulic jack stand, support the rear knuckle.	
	Lower Trailing Arm Inner nut
	CAUTION:

1	Refer to <u>Fastener Caution</u> . Tighten • First Pass: 70 (52 lb ft) • Final Pass: plus 105 degrees
2	Lower Trailing Arm Inner 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. DO NOT re-use, replace with NEW only.
3	Lower Control Arm Outer Nut Tighten • First Pass: 100 (74 lb ft) • Final Pass: plus 105 degrees
4	Lower Trailing Arm Outer 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. DO NOT re-use, replace with NEW only.
5	Lower Trailing Arm Procedure Verify the rear wheel alignment. Refer to <u>Wheel Alignment Specifications</u> .

ADJUST LINK REPLACEMENT

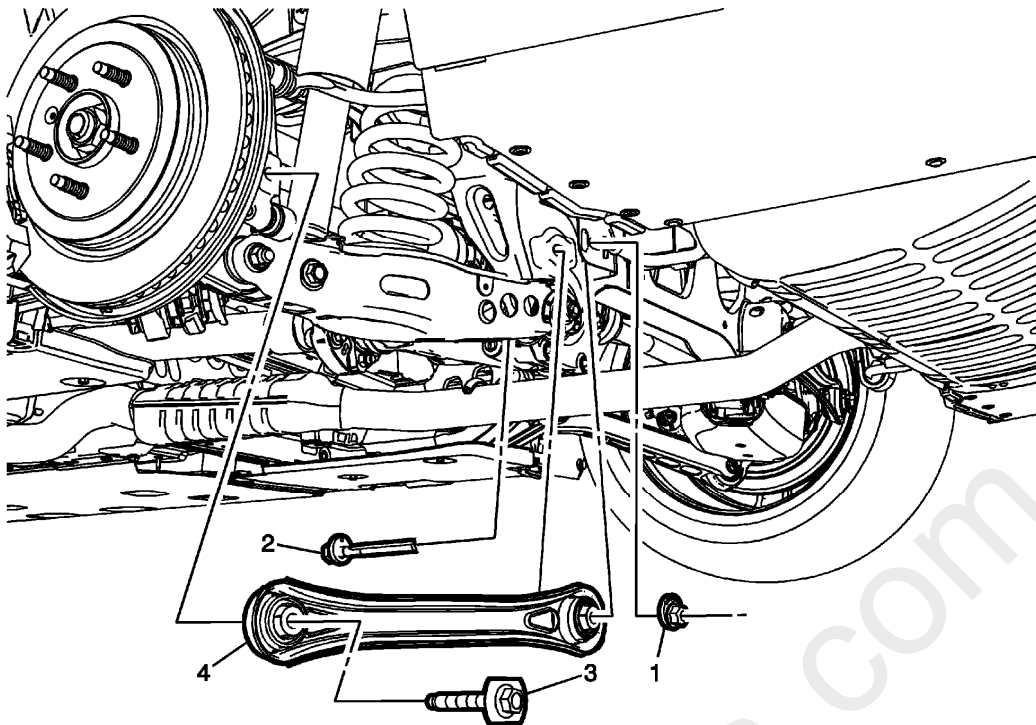


Fig. 22: Rear Suspension Adjust Link & Mounting Components
 Courtesy of GENERAL MOTORS COMPANY

Adjust Link Replacement

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Rear Suspension Adjust Link Inner Nut CAUTION: Refer to <u>Fastener Caution</u> . NOTE: Ensure the cam washer is sitting flat in the cradle bracket. Tighten • First Pass: 100 (74 lb ft) • Final Pass: plus 105 degrees
	Rear Suspension Adjust Link Inner Bolt

2	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. Remove and discard the inner bolt. DO NOT re-use. Replace with NEW only. NOTE: Ensure the cam washer is sitting flat in the cradle bracket.
3	Rear Suspension Adjust Link Outer 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. CAUTION: Refer to <u>Fastener Caution</u> . NOTE: Discard the outer bolt. DO NOT re-use. Replace with NEW only Tighten • First Pass: 70 (52 lb ft) • Final Pass: plus 105 degrees
4	Rear Suspension Adjust Link Procedure Align the rear end of the vehicle. Refer to <u>Rear Toe Adjustment</u> . NOTE: Note the orientation of the adjust link when removing for proper installation. Flat side of adjust link should face front of vehicle.

UPPER CONTROL ARM REPLACEMENT

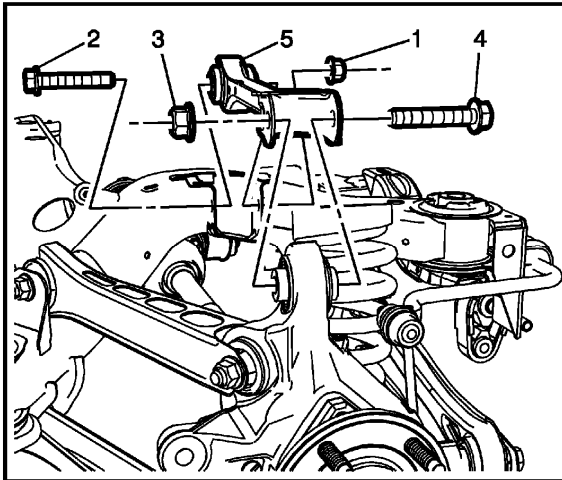
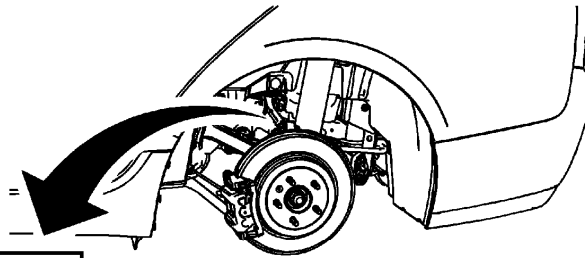


Fig. 23: Rear Suspension Upper Control Arm & Mounting Components
 Courtesy of GENERAL MOTORS COMPANY

Upper Control Arm Replacement

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Using a hydraulic jack stand, support the rear knuckle. 4. Disconnect rear wheel speed sensor harness.	
1	Rear Suspension Upper Control Arm Inner Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten • First Pass: 70 (52 lb ft) • Final Pass: plus 105 degrees
	Rear Suspension Upper Control Arm Inner Bolt CAUTION:

2	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 inner bolt. Do Not reuse. Replace with NEW only.
3	Rear Suspension Upper Control Arm Outer Nut Tighten • First Pass: 70 (52 lb ft) • Final Pass: plus 105 degrees
4	Rear Suspension Upper Control Arm Outer 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 outer bolt. Do Not reuse. Replace with NEW only.
5	Rear Suspension Upper Control Arm Procedure Verify the rear wheel alignment. Refer to <u>Wheel Alignment Specifications</u> .

REAR SUSPENSION LOWER CONTROL ARM COVER REPLACEMENT

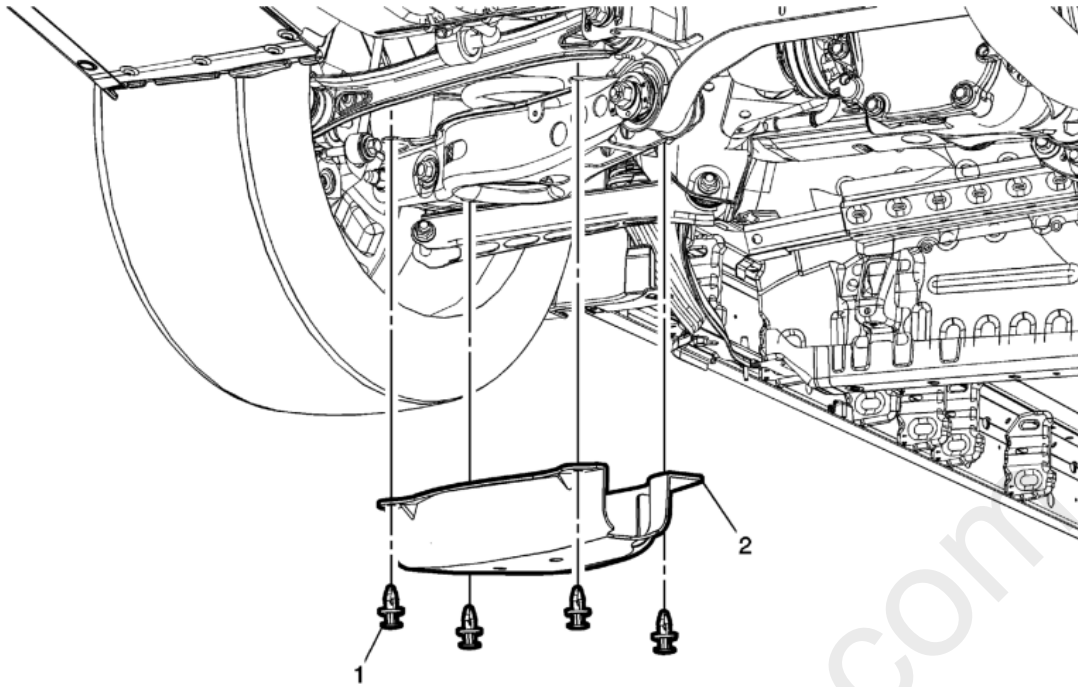


Fig. 24: Rear Suspension Lower Control Arm Cover
 Courtesy of GENERAL MOTORS COMPANY

Rear Suspension Lower Control Arm Cover Replacement

Callout	Component Name
Preliminary Procedures	
Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
1	Rear Suspension Lower Control Arm Cover Retainers (Qty: 4)
2	Rear Suspension Lower Control Arm Cover

LOWER CONTROL ARM REPLACEMENT

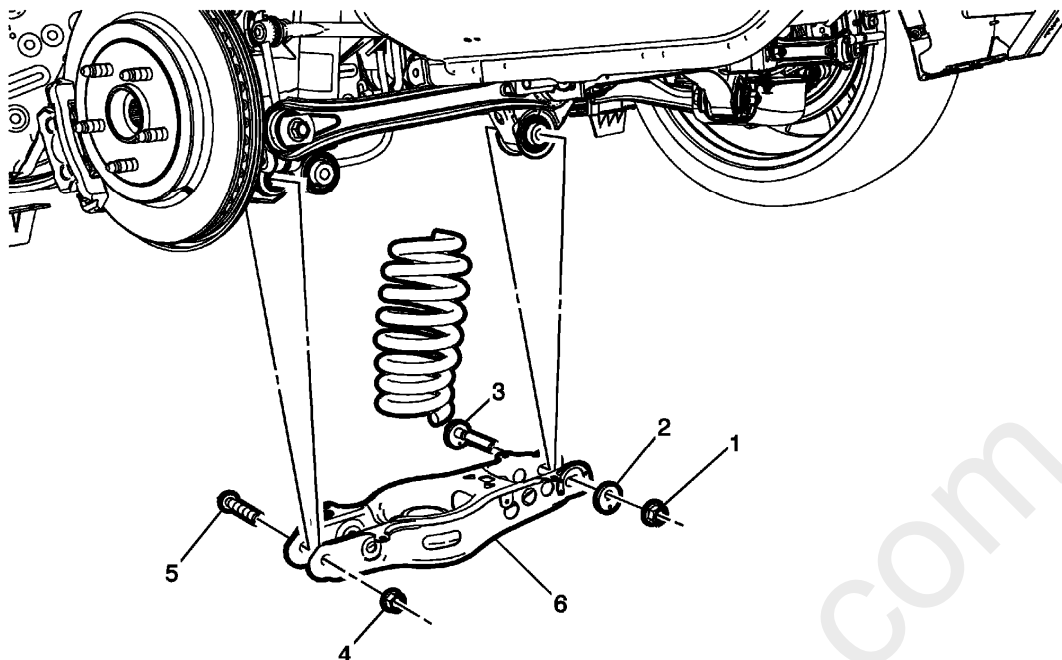


Fig. 25: Lower Control Arm & Mounting Components
 Courtesy of GENERAL MOTORS COMPANY

Lower Control Arm Replacement

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Remove the rear suspension lower control arm cover. Refer to <u>Rear Suspension Lower Control Arm Cover Replacement</u>. 4. Disconnect the electronic suspension rear sensor link from the lower control arm. Refer to <u>Electronic Suspension Rear Position Sensor Replacement</u> . 5. Remove the shock absorber nut and bolt. Refer to <u>Shock Absorber Replacement</u>. 6. Remove the lower trailing arm. Refer to <u>Trailing Arm Replacement (Upper)</u>, <u>Trailing Arm Replacement (Lower)</u>. 7. Support the lower control arm with a suitable hydraulic jack.	
	Lower Control Arm Inner Nut CAUTION: Refer to <u>Fastener Caution</u> . NOTE:

1	Ensure that cam washer is sitting flat against the lower control arm. Tighten • First Pass: 115 (85 lb ft) • Final Pass: plus 105 degrees
2	Lower Control Arm Inner Washer
3	Lower Control Arm Inner 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 Discard lower control arm bolt. DO NOT re-use, replace with NEW only. NOTE: Ensure that cam washer is sitting flat in the cradle bracket.
4	Lower Control Arm Outer Nut Tighten • First Pass: 150 (110 lb ft) • Final Pass: plus 105 degrees
5	Lower Control Arm Outer 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 Discard lower control arm outer bolt. DO NOT re-use, replace with NEW only.
6	Lower Control Arm Procedure 1. Transfer ride height sensor ball stud, if equipped. 2. Check and adjust the rear camber for appropriate wheel. Refer to <u>Rear Camber Adjustment</u> .

NOTE:

The rear coil spring will disengage itself from the upper and lower spring seats when the lower control arm is removed.

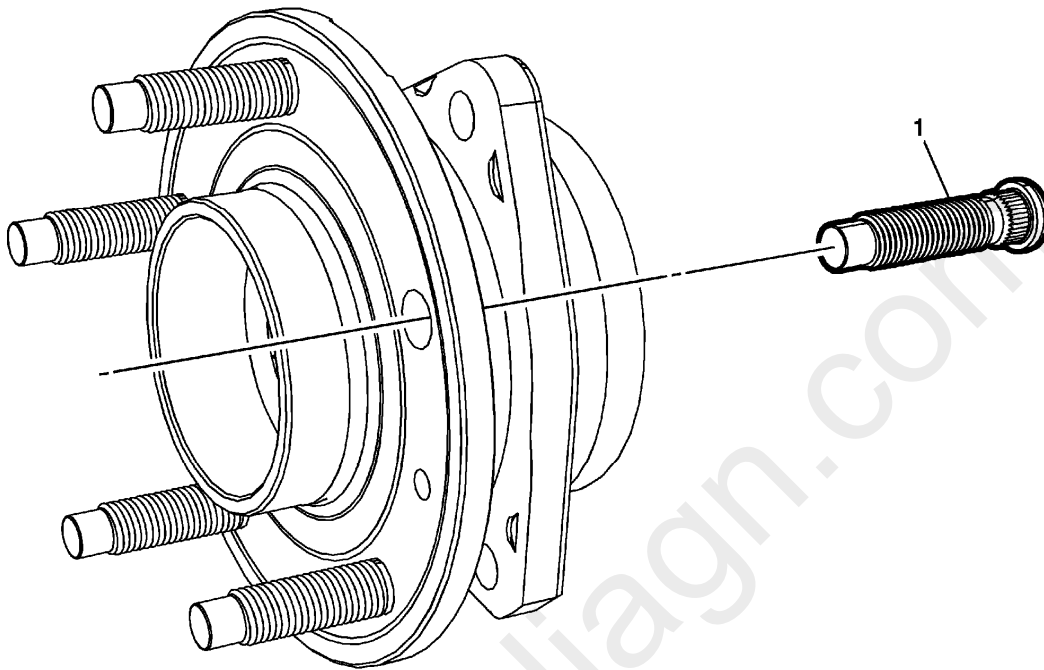
WHEEL STUD REPLACEMENT

Fig. 26: Wheel Stud

Courtesy of GENERAL MOTORS COMPANY

Wheel Stud Replacement

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Remove the rear wheel bearing and hub. Refer to <u>Rear Wheel Bearing and Hub Replacement</u>.	
1	Wheel Stud Procedure 1. Position the wheel bearing and hub assembly in a suitable vise. 2. Using the CH-43631 remover , remove the wheel stud. 3. Position NEW wheel stud in the wheel bearing and hub assembly.

4. Using 3 or 4 washers and an old wheel nut, tighten the wheel nut until the NEW wheel stud is fully seated in the wheel bearing and hub assembly.
5. Remove the washers and the wheel nut.

Special Tools**CH-43631** Ball Joint RemoverFor regional equivalent tools, refer to **Special Tools**.

DESCRIPTION AND OPERATION

REAR SUSPENSION DESCRIPTION AND OPERATION

Description and Operation

The ATS has a 5 link independent rear suspension. The stamped steel suspension links attach to a steel rear cradle assembly and cast aluminum knuckle assemblies. The cradle assemble includes hydro-formed side rails and rubber body mounts for isolation. The coils springs work between the lower control arms and underbody and are isolated to the with urethane upper spring seats. The direct-acting solid steel stabilizer bar provides additional body roll stiffness. The base suspension package (FE2) also includes twin-tube passive damping shock absorbers.

The ATS sport suspension package (FE3) includes Magnetic Ride Control (MRC). MRC is an electronic real-time damping system that responds to road inputs within milliseconds to deliver precise body contact.

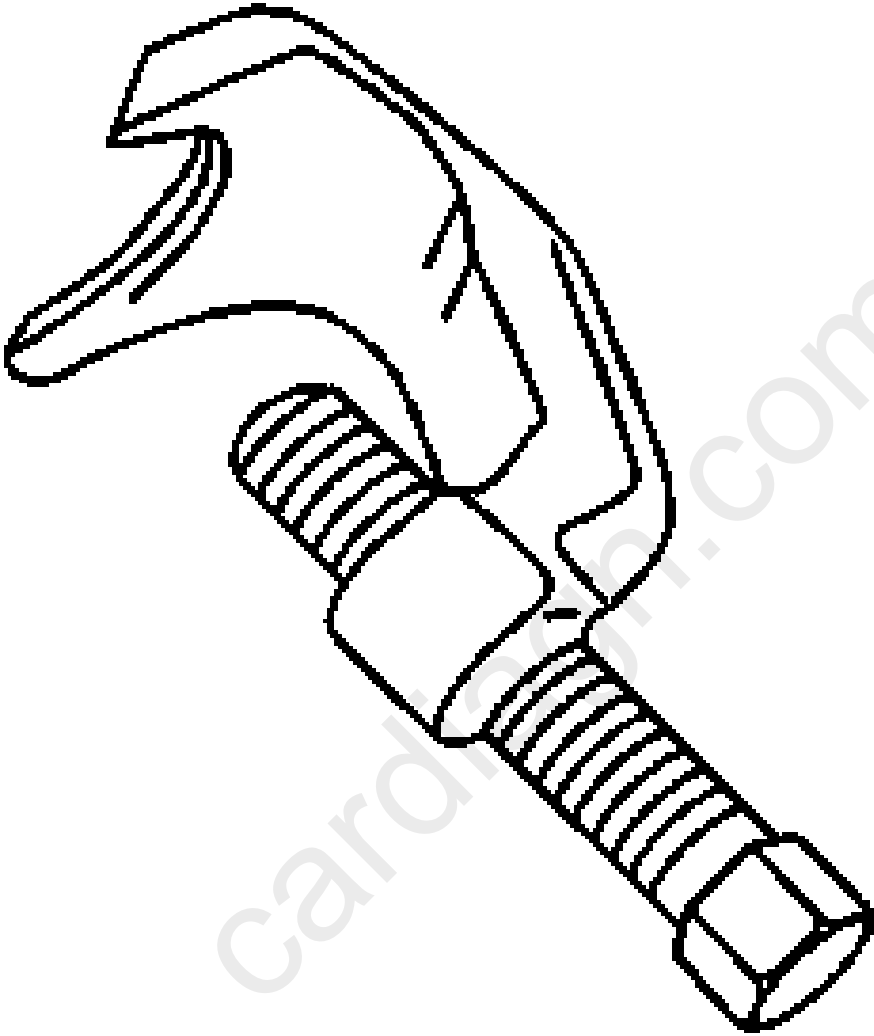
The ATS offers All Wheel Drive (AWD) for improved traction on wet and icy roads.

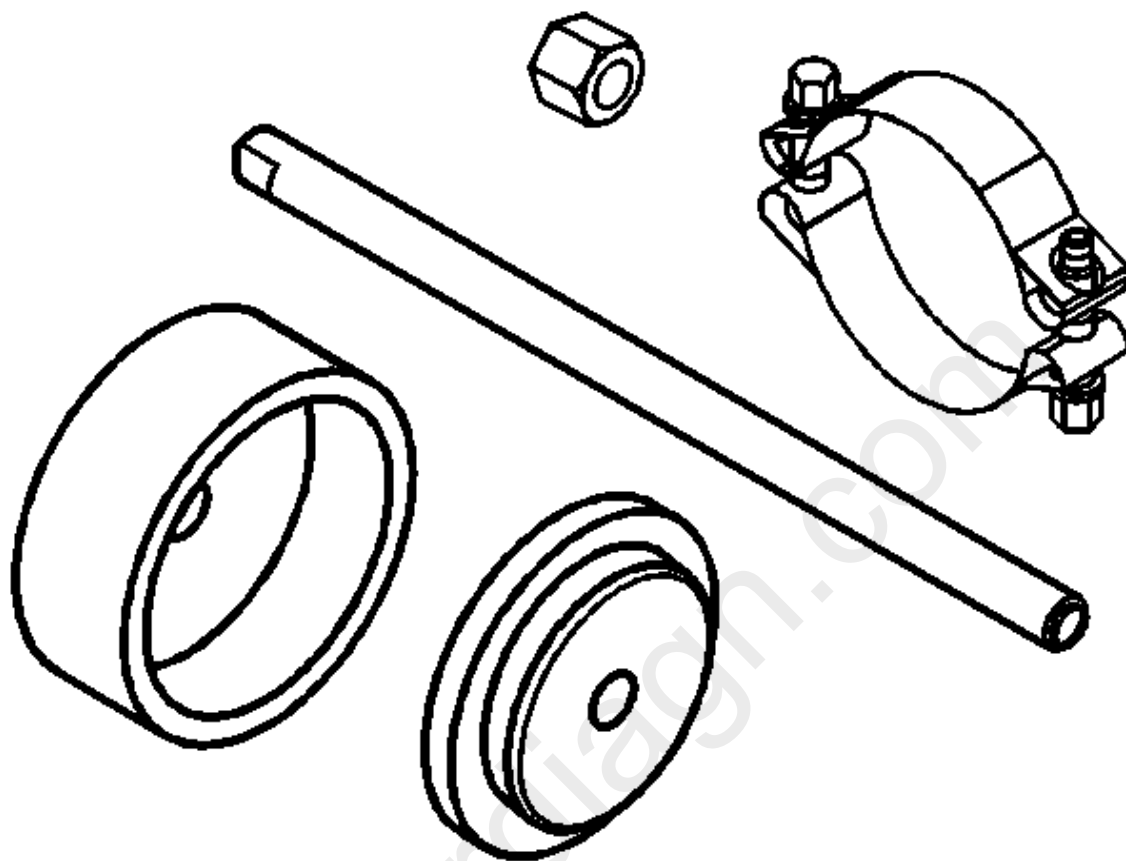
The Rear Suspension Assemblies are:

- Upper Trailing Arm Link Assembly
- Lower Trailing Arm
- Upper Lateral Link Assembly
- Toe Link
- Lower Control Arm
- Rear Cradle Assembly
- Coil Springs & Isolators
- Rear Stabilizer Bar, Links, Clamps and Bushings
- Twin Tube Shock Absorbers
- Rear Knuckle Assembly

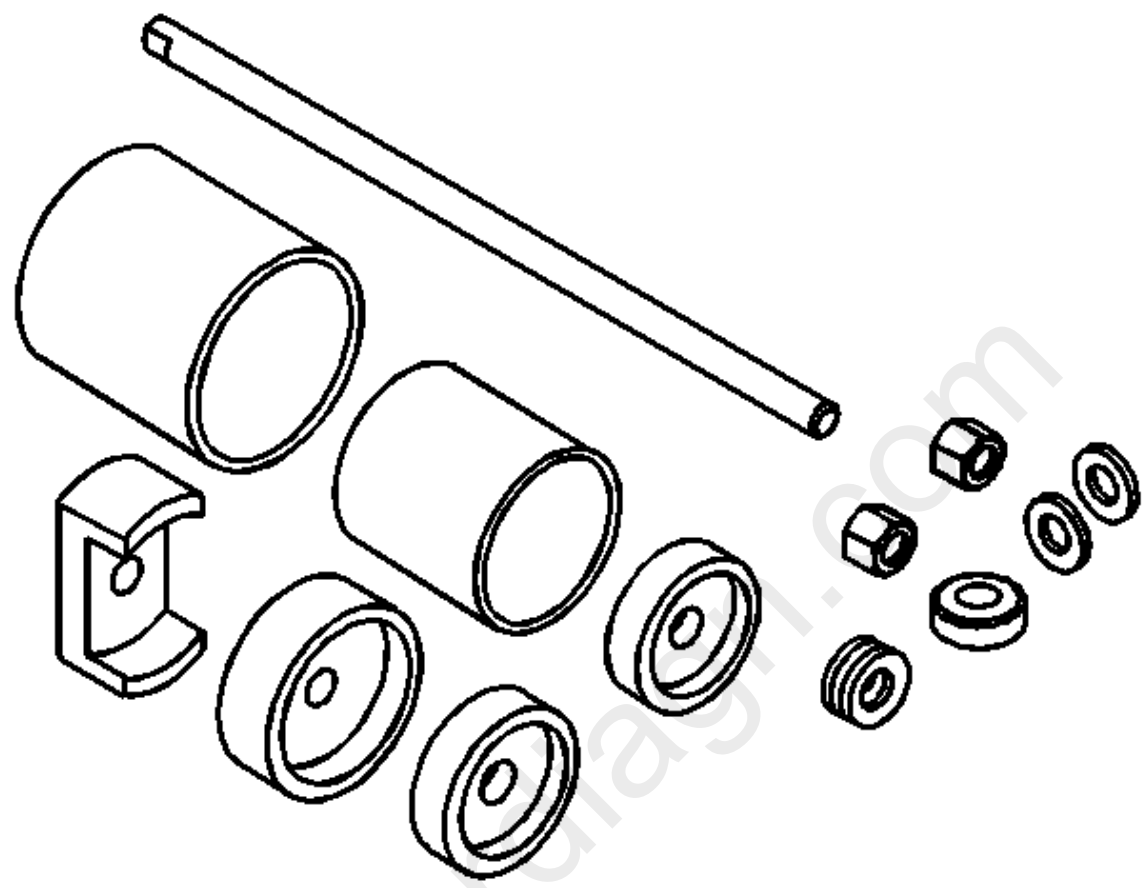
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	CH-43631 CH-49455 J-43631 Ball Joint Remover



CH-45725
J-45725-2
Cradle
Bushings
Replacer



DT-50806
Bushing
Replacer