

1. PREFACE
2. DANGERS, WARNINGS, AND CAUTIONS
3. INTRODUCTION
- 4.

Definition of Danger, Warning, Caution, and Note

The diagnosis and repair procedures in a GM Service Manual contain both general and specific Dangers, Warnings, Cautions, Notes or Important. GM is dedicated to the presentation of service information that helps the technician to diagnose and repair the systems necessary for the proper operation of the vehicle, however, certain procedures may present a hazard to the technician if they are not followed in the recommended manner. Dangers, Warnings, Cautions and Notes or Important are elements designed to prevent these hazards, however, not all hazards can be foreseen. This information is placed at strategic locations within the service manual. This information is designed to prevent the following from occurring:

- Serious bodily injury or death to the technician
- Damage to the vehicle
- Unnecessary vehicle repairs
- Unnecessary component replacement
- Improper repair or replacement of vehicle components.
- Any warning or caution that appears in this service category is referenced from the individual service categories.

DANGER Defined

When encountering a DANGER, you will be asked to take a necessary action or not to take a prohibited action. If a DANGER is not heeded, the following consequences may occur:

- Serious bodily injury or death to the technician
- Serious bodily injury or death to other technicians in the workplace area

WARNING Defined

When encountering a WARNING, you will be asked to take a necessary action or not to take a prohibited action. If a WARNING is not heeded, the following consequences may occur:

- Serious bodily injury to the technician
- Serious bodily injury to other technicians in the workplace area
- Serious bodily injury to the driver and/or passenger(s) of the vehicle, if the vehicle has been improperly repaired

CAUTION Defined

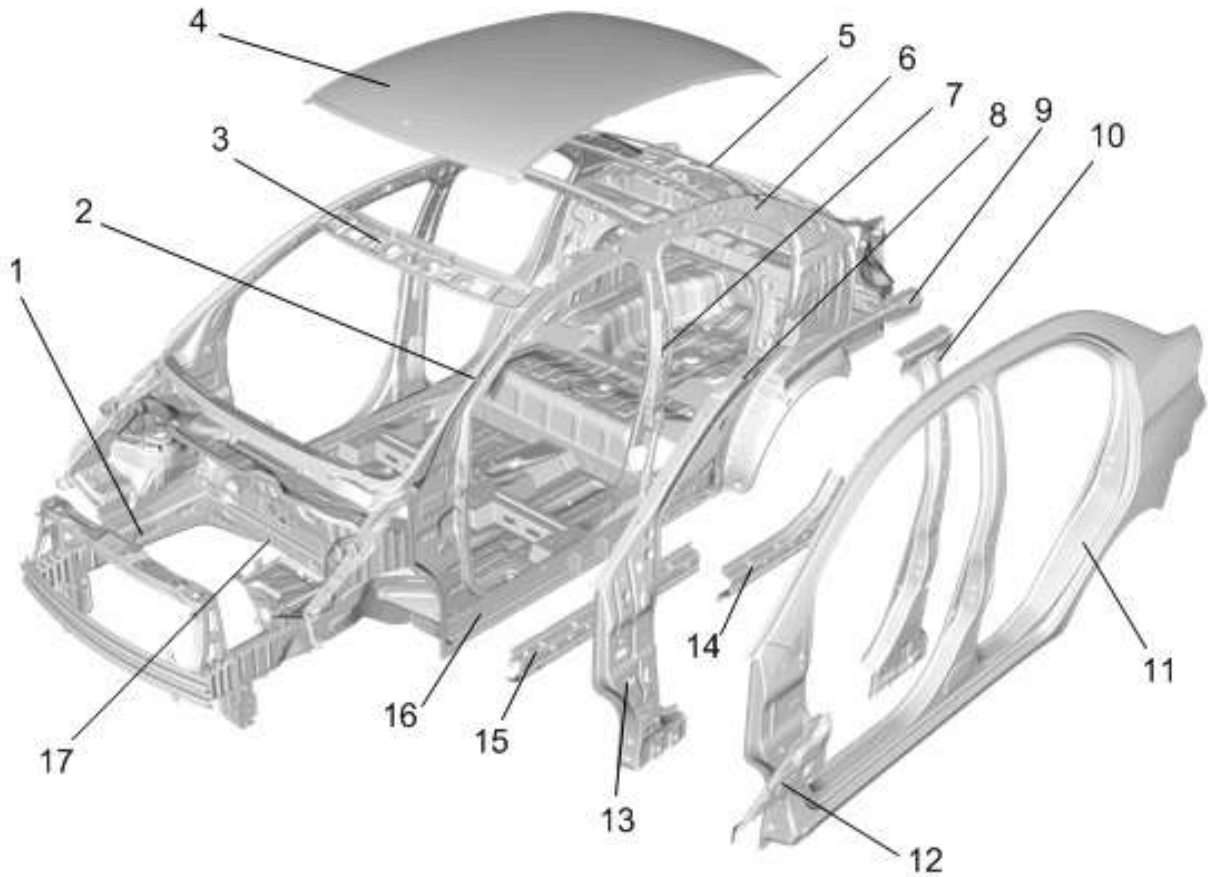
CAUTIONS call special attention to a necessary action or to a prohibited action. If a CAUTION is not heeded, the following consequences may occur:

- Damage to the vehicle
- Unnecessary vehicle repairs
- Unnecessary component replacement
- Improper operation or performance of the system or component under repair
- Damage to any systems or components which are dependent upon the proper operation of the system or component under repair
- Improper operation or performance of any systems or components which are dependent upon the proper operation or performance of the system or component under repair
- Damage to fasteners, basic tools, or special tools
- The leakage of coolant, lubricant, or other vital fluids

NOTE or IMPORTANT Defined

1. BODY REPAIR
2. COLLISION REPAIR
3. VISUAL IDENTIFICATION
- 4.

Structure Identification (4NB)



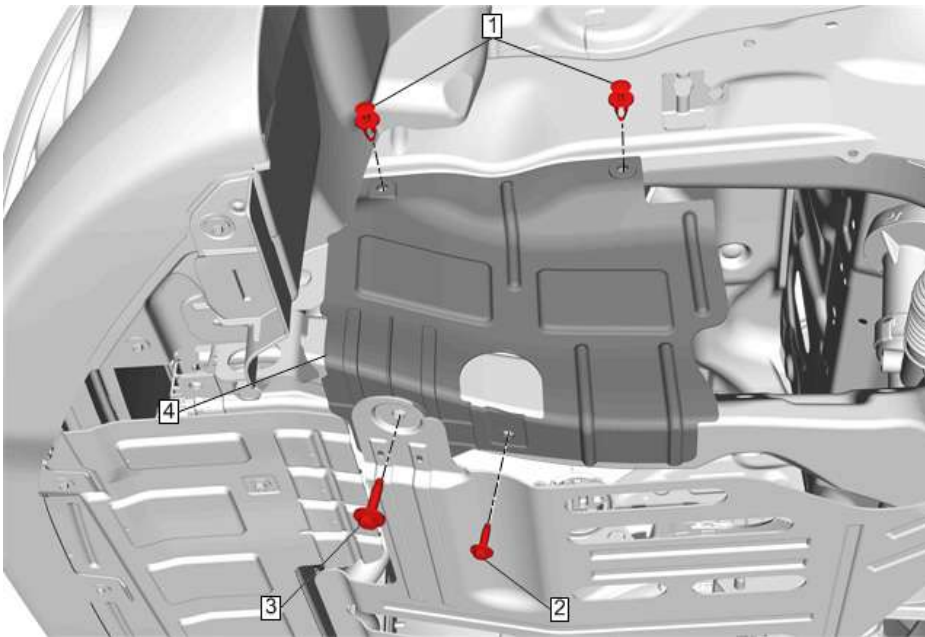
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Front View

Number	Description	Material	Procedure
1	Front Compartment Side Rail (Front)	High Strength Low Alloy Steel	Front Compartment Side Rail Bracket Replacement
2	Roof Inner Front Side Rail	Dual Phase Steel	â€”
3	Roof Front Inner Panel	Mild Steel	Roof Front Header Panel Replacement
4	Roof Panel	Mild Steel	Roof Outer Panel Replacement
5	Roof Rear Inner Panel Assembly	Mild Steel	Roof Rear Header Panel Replacement
6	Roof Inner Rear Side Rail	Dual Phase Steel	â€”
7	Center Pillar Inner Panel	Dual Phase Steel	Body Lock Pillar Inner Panel Replacement
8	Roof Outer Front Side Rail	Dual Phase Steel	â€”
9	Roof Outer Rear Side Rail	Dual Phase Steel	â€”
10	Center Pillar Reinforcement	High Strength Low Alloy Steel	Body Lock Pillar Outer Panel Reinforcement Replacement
11	Body Side Outer Panel	Mild Steel	Front Hinge Pillar Body Sectioning
12	Front Compartment Upper Side Rail	High Strength Low Alloy Steel	Front Compartment Upper Side Rail Replacement
13	Hinge Pillar Outer Lower Reinforcement	Dual Phase Steel	Body Hinge Pillar Lower Reinforcement Replacement
14	Rocker Outer Panel Center Pillar Reinforcement Assembly	Dual Phase Steel	Body Side Outer Panel Reinforcement Replacement
15	Rocker Front Outer Panel Reinforcement	Ultra High Strength Dual Phase Steel	Body Side Outer Panel Reinforcement Replacement
16	Rocker Inner Panel	Dual Phase Steel	â€”
17	Floor Panel #2 Cross Bar	Ultra High Strength Dual Phase Steel	â€”
18	Floor Panel #1 Cross Bar	Ultra High Strength Dual Phase Steel	â€”

1. BODY REPAIR
2. FRAME AND UNDERBODY
3. REPAIR INSTRUCTIONS
- 4.

Front Compartment Splash Shield Replacement

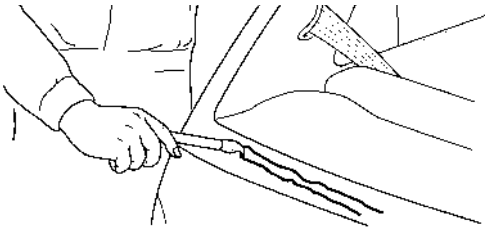


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Callout	Component Name
1	Front Compartment Splash Shield Retainer (Qtyâ€™%02)
2	Front Compartment Splash Shield Bolt Caution: Refer to Fastener Caution . Tighten 9â€™%0N-m (80â€™%0lbâ€™%0in)
3	Drivetrain and Front Suspension Frame Skid Plate Bolt (Qtyâ€™%01) {If equipped} Tighten 22â€™%0N-m (16â€™%0lbâ€™%0ft)
4	Front Compartment Splash Shield

Related Part Information

Part Name	Catalog Name	Part Code
Front Compartment Splash Shield	SHIELD,F/CMPT SPH	5460B



1. [Click here for full size](#)
2. Apply tape to the new weatherstrip and the rear window to hold the weatherstrip in place.
3. Apply adhesive primer to the rear window frame and the perimeter of the rear window.

4. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminalâ€™%30 and ground.
5.
 - If the test lamp illuminates, test the control circuit for a short to voltage.
6. Verify that a test lamp illuminates between the B+ circuit terminalâ€™%86 and ground.
7.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
8. Verify that a test lamp illuminates between the B+ circuit terminalâ€™%87 and ground.
9.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
10. Connect a test lamp between the control circuit terminal â€™%85 and the B+ circuit terminalâ€™%86.
11. Ignition ON, command the doors to UNLOCK by using the remote keyless entry transmitter. The test lamp should briefly illuminate during the UNLOCK command.
12.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the I/P fuse block.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the I/P fuse block.
13. Ignition OFF, connect the DOOR UNLOCK relay and disconnect the harness connector at the appropriate door lock actuator.
14. Test for less than 5Î© between the control circuit terminalâ€™%B and ground.
15.
 - If greater than the specified range, test the control circuit for a short to voltage or an open/high resistance. If the circuits test normal, replace the DOOR UNLOCK relay.
16. Ignition OFF, connect a test lamp between the control circuit terminalâ€™%A and ground.
17. Ignition ON, command the doors to UNLOCK by using the remote keyless entry transmitter. The test lamp should briefly illuminate when commanding the UNLOCK state.
18.
 - If the test lamp is always OFF, test the control circuit for a short to ground. If the circuit tests normal, test or replace the DOOR UNLOCK relay.
19. If all circuits test normal, test or replace the door lock actuator.

Door Lock Relay Malfunction

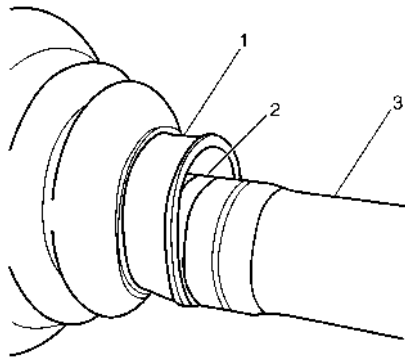
1. Ignition OFF, disconnect the DOOR LOCK relay.
2. Test for less than 1Î© between the ground circuit terminalâ€™%87A and ground.
3.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminalâ€™%30 and ground.
5.
 - If the test lamp illuminates, test the control circuit for a short to voltage.
6. Verify that a test lamp illuminates between the B+ circuit terminalâ€™%86 and ground.
7.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.

5. [Click here for full size](#)
6. Apply a very thin coating of high temperature silicone brake lubricant to the pad hardware mating surfaces of the caliper bracket(3) only.
7. Clean the brake pad mating surfaces of the brake pad retainers(2).
8. Install the brake pad retainers(2) to the brake caliper bracket.
9. Note:

The wear sensor equipped disc brake pad must be mounted inboard of the rotor with the leading edge of the sensor facing the brake rotor during forward wheel rotation, or at the top of the pad when installed in vehicle position.
10. Install the brake pads(1) to the brake caliper bracket.
11. Remove the support and reposition the brake caliper over the brake pads and to the mounting bracket. Refer to [Front Brake Caliper Replacement](#).

Related Part Information

Part Name	Catalog Name	Part Code
Front Brake Caliper Bracket	BRACKET,FRT BRK CLPR	X0006
Front Brake Caliper Bracket	BRACKET,FRT BRK CLPR	X0161
Front Brake Caliper Bracket	BRACKET KIT,FRT BRK CLPR	X0164



4.

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5. Ensure that the boot(1) is properly seated in the groove(2) in the wheel drive shaft(3).

3. Test for less than 2> Ω between the test points:Control circuit terminal 3/C @ Component harness & The other end of the circuit @ Control module harness

4.

- If 2> Ω or greater >> Repair the open/high resistance in the circuit.
- If less than 2> Ω >> Replace the component: K20 Engine Control Module

25.

- **If the specified state**

26. Test or replace the component: T8 Ignition Coil

Component Testing

1. Note :

Circuit/System Testing must be performed before proceeding with Component Testing.

2. Ignition/Vehicle >> Off

3. Remove the appropriate component: T8 Ignition Coil - Leave the electrical connector connected.

4. Install the special tool: <sptool><sptool-no>J-26792</sptool-no><sptool-desc>Ignition Spark Tester</sptool-desc></sptool>

5. Engine >> Running

6. Note :

An erratic or weak spark is considered a no spark condition.

7. Verify there is spark at the tool.

8.

- **If there is no spark**
- Replace the component: T8 Ignition Coil

9.

- **If there is spark**

10. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: [Diagnostic Repair Verification](#)

- [Ignition Coil Replacement](#)
- For control module replacement, programming, and setup refer to: [Control Module References](#)

1. ENGINE/PROPULSION
2. ENGINE CONTROLS AND FUEL - 1.0L, 1.19L, OR 1.2L
3. REPAIR INSTRUCTIONS
- 4.

Throttle Body Inspection and Cleaning

Note:

Over extended time and mileage, deposits may accumulate on the back of the throttle valve plate. The source of the deposit is exhaust gas. Typically these deposits pose no problem. Occasionally the deposit may accumulate to a point where perceived pedal effort or throttle valve movement is affected. This procedure should not be performed on vehicles with mileage under 80,450 km (50,000 mi).

1. Remove the air cleaner outlet duct. Refer to [Air Cleaner Assembly Replacement](#).
2. Warning:
Turn OFF the ignition before inserting fingers into the throttle bore. Unexpected movement of the throttle blade could cause personal injury.
3. Caution:
Do not insert any tools into the throttle body bore in order to avoid damage to the throttle valve plate.
4. Inspect the throttle body bore and the throttle valve plate for deposits. You will need to open the throttle valve in order to inspect all surfaces.
5. Caution:
Do not use any solvent that contains Methyl Ethyl Ketone (MEK). This solvent may damage fuel system components.
6. Clean the throttle body bore and the throttle valve plate using a clean shop towel with an appropriate cleaner.
7. Install the air cleaner outlet duct. Refer to [Air Cleaner Assembly Replacement](#).
8. Perform the throttle/idle learn procedure. Refer to [Throttle or Idle Learn](#).

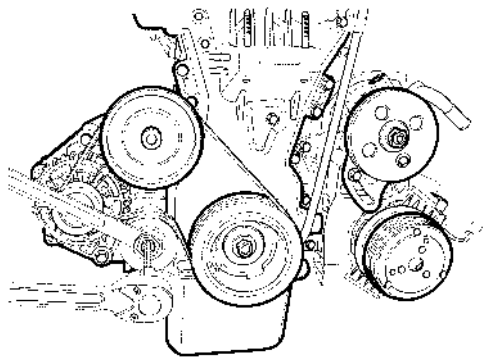
Related Part Information

Part Name	Catalog Name	Part Code
Throttle Body	BODY,THROT (W/ THERM BYPASS PIPE)	1767A
Throttle Body	BODY,THROT(W/MASS AIR FLOW SEN)	1768A
Throttle Body	BODY,THROT(W/MASS AIR FLOW SEN)	1769A
Throttle Body	BODY,THROT	1770A
Throttle Body	BODY,THROT	1770B
Throttle Body	BODY,THROT (CSTG)	1770C
Throttle Body	BODY,THROT (W/SEN)	1777A
Throttle Body	BODY,THROT(W/TBI)	X0213
Throttle Body	BODY KIT,THROT	X0277
Throttle Body	BODY KIT,THROT(W/TBI)	X0301
Throttle Body	BODY KIT,THROT(W/THROT POSN SEN)	X0320
Throttle Body	BODY,THROT(W/THROT ACTR)	X0474
Throttle Body	BODY KIT,THROT (W/ THROT ACTR)	X0483
Throttle Body	BODY,THROT	SJ035

1. ENGINE/PROPULSION
2. ENGINE HEATING AND COOLING
3. DIAGNOSTIC INFORMATION AND PROCEDURES
- 4.

Loss of Coolant

Step	Action	Yes	No
DEFINITION: Loss of coolant in the coolant system internally or externally.			
1	Inspect the coolant level. Is the coolant at the correct level?	Go to Step 6	Go to Step 4
2	Fill the cooling system to the correct level. Is the action complete?	Go to Step 5	â€”
3	If the engine is suspected to have a coolant leak into a cylinder, the coolant can hydraulically lock the engine. Does the engine crankshaft rotate?	Go to Step 6	Repair the condition in which the engine cannot be cranked. Go to Engine Will Not Crank - Crankshaft Will Not Rotate
4	Engine overheating can cause a loss of coolant. Is the engine overheating?	Go to Engine Overheating	Go to Step 7
5	Extended operation with a low coolant level can cause engine internal component failure. Is the engine knocking?	Repair the engine knock. Refer to Lower Engine Noise, Regardless of Engine Speed	Go to Step 8
6	1. Idle the engine at the normal operation temperature. 2. Inspect for heavy white smoke coming out of the exhaust system. Is a heavy white smoke present from the exhaust pipe?	Go to Step 9	Go to Step 10
7	<ul style="list-style-type: none"> • Coolant in the exhaust system creates a distinctive, burning coolant odor in the exhaust. • Condensation in the exhaust system can cause an odorless white smoke during engine warm up. Does the white smoke have a burning coolant type odor?	Repair the engine internal coolant leak. Refer to Coolant in Engine Oil	Go to Step 10
8	With the engine idling, inspect the coolant recovery reservoir. Does the coolant recovery system discharge coolant while the engine is idling?	Repair the engine internal coolant leak. Refer to Coolant in Engine Oil	Go to Step 11



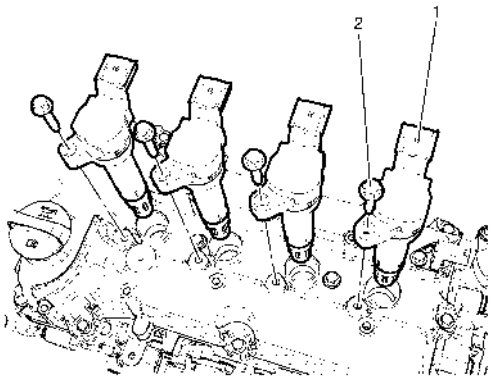
5. [Click here for full size](#)
6. Rotate the outer hex of the tensioner nut counterclockwise and put up the tensioner with a suitable interchangeable head, click-type torque wrench.
7. Tighten
 - New Belt: 24â€%N-m (18â€%lbâ€%ft)

1. ENGINE/PROPULSION
2. ENGINE MECHANICAL - 1.0L, 1.19L, OR 1.2L
3. REPAIR INSTRUCTIONS
- 4.

Camshaft Cover Replacement (LKY)

Removal Procedure

1. Open the hood.
2. Remove the intake manifold. Refer to [Intake Manifold Replacement](#).
3. Remove the ignition coil cover. Refer to [Ignition Coil Cover Replacement](#).



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Caution:

Refer to [Fastener Caution](#).

Install the drive belt tensioner (1), bolt (2), and tighten to 22â€%N-m (16â€%lbâ€%ft).

Related Part Information

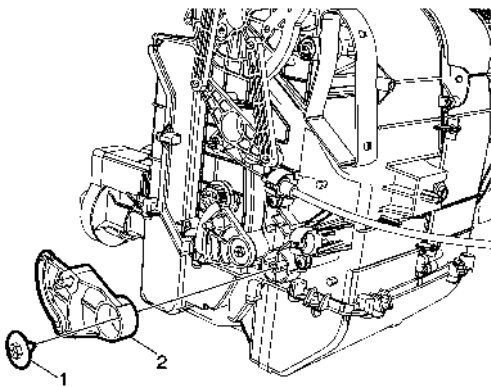
Part Name	Catalog Name	Part Code
Drive Belt Tensioner	TENSIONER,DRV BELT	3100A
Drive Belt Tensioner	TENSIONER,DRV BELT	2000A
Drive Belt Tensioner	TENSIONER,DRV BELT (W/BOLT)	2002A
Drive Belt Tensioner	TENSIONER KIT,DRV BELT	5619Z
Drive Belt Tensioner	TENSIONER,DRV BELT	5620A
Drive Belt Tensioner	TENSIONER,DRV BELT	SJ266

1. HVAC
2. HVAC - MANUAL
3. REPAIR INSTRUCTIONS
- 4.

Temperature Valve Link Replacement

Removal Procedure

1. Remove the steering column opening filler. Refer to [Steering Column Opening Filler Replacement](#).
2. Disconnect the temperature control cable from the air conditioning (A/C) evaporator and blower module assembly. Refer to [Temperature Control Cable Replacement](#).



1. SUSPENSION
2. REAR SUSPENSION
3. REPAIR INSTRUCTIONS
- 4.

Rear Spring Replacement

Removal Procedure

1. Apply the park brake completely.
2. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
3. Support the tire to be replaced with a hydraulic jack stand.
4. Remove the shock absorber strut to rear axle retaining bolt. Refer to [Shock Absorber Replacement](#).
5. Lower the hydraulic jack stand.

6. Note:

The opposite strut to rear axle retaining bolt must be removed so that the rear axle can turn down easily.

KEEP supporting the tire with the hydraulic jack stand to prevent the rear brake hose and rear wheel speed sensor harness from being damaged.

7. Support the opposite tire with the hydraulic jack stand.
8. Remove the opposite strut to rear axle retaining bolt. Refer to [Shock Absorber Replacement](#).
9. Using the hydraulic jack stand, slowly lower the rear axle until the tension is not applied to the rear brake hose and rear wheel speed sensor harness.

