

2017 ACCESSORIES & EQUIPMENT

Steering Wheel and Column - Encore, Trax

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE:

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

Application	Specification
	Metric (English)
Instrument Panel Steering Column Upper Trim Cover Bolt	2.5 N.m (22 lb in)
Intermediate Steering Shaft Lower Bolt	49 N.m (36 lb ft)
Intermediate Steering Shaft Middle Bolt	49 N.m (36 lb ft)
Intermediate Steering Shaft Upper Bolt	49 N.m (36 lb ft)
Steering Column Lock Control Module Bolt- Rear	14.5 N.m (11 lb ft)
Steering Column Lock Control Module Bolt - Side	9 N.m (80 lb in)
Steering Column Lower Support Bracket Bolt	22 N.m (16 lb ft)
Steering Column Lower Trim Cover Bolt	2.5 N.m (22 lb in)
Steering Column Upper Support Bracket Bolt	22 N.m (16 lb ft)
Steering Wheel Bolt	45 N.m (33 lb ft)
Turn Signal Switch Bracket Bolt	15 N.m (11 lb ft)

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Steering Wheel Bolt	Thread Locking Adhesive	12345382	10953489

SCHEMATIC WIRING DIAGRAMS

STEERING WHEEL WIRING SCHEMATICS (BUICK)

Heated Steering Wheel (Buick with UVD)

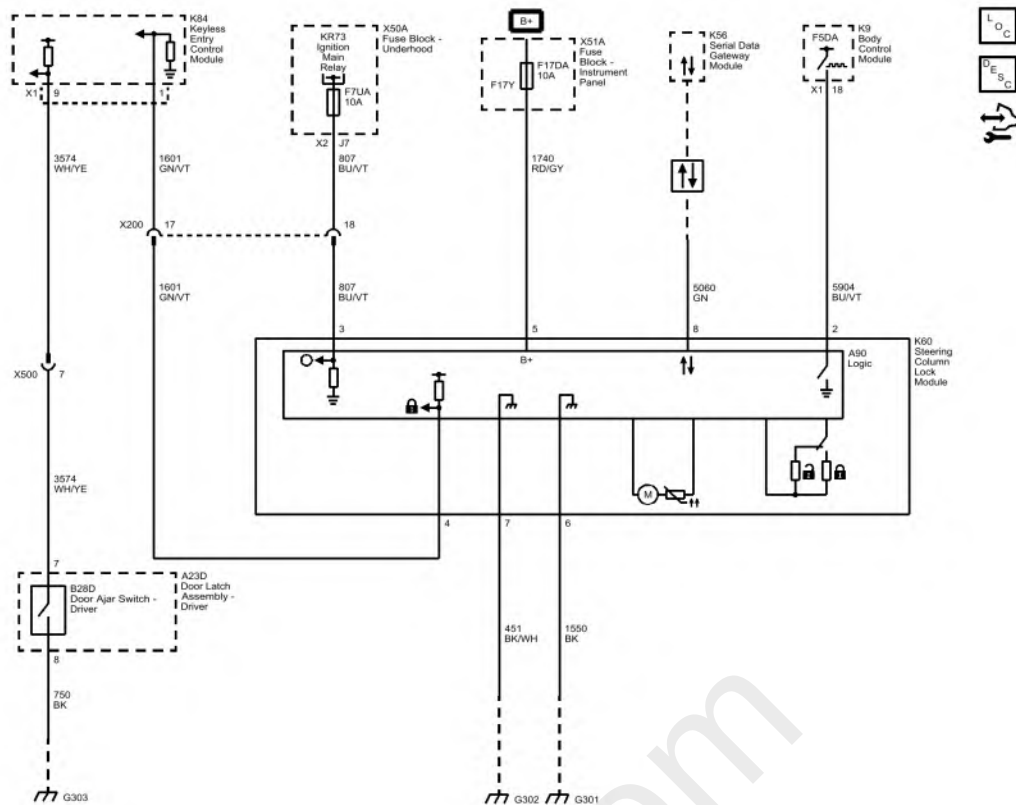


Fig. 3: Steering Column Lock (Chevrolet with N06).
Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B1023: INTEGRAL SWITCH MALFUNCTION

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B1023 00

Integral Switch Malfunction

Circuit/System Description

The vehicle theft deterrent subsystem provides the capability to lock or unlock the steering electrically. The steering column lock module is allowed to unlock when power mode transitions to a non off power mode and an authenticated driver identification device is present. Once the column is unlocked, a crank request can be allowed.

Conditions for Running the DTC

- The ignition is in OFF, ACCESSORY or RUN position.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

The steering column lock module detects an internal sensor malfunction resulting in lock status of invalid to be transmitted on serial data.

Action Taken When the DTC Sets

- DTC B1023 is stored in memory.
- The driver information center displays the service column lock system warning message.
- The steering column lock indicator is ON.

Conditions for Clearing the DTC

- No steering column lock module internal sensor malfunction so lock status of valid is transmitted on serial data.
- The condition for setting the DTC is no longer present.

Reference Information

Schematic Reference

[Column Lock Schematics \(Buick\)](#)[Column Lock Schematics \(Chevrolet\)](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX \(ENCORE\)](#) [COMPONENT CONNECTOR END VIEWS - INDEX \(TRAX\)](#)

Description and Operation

[Steering Wheel and Column Description and Operation](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition ON. Clear all DTCs.
2. Verify that the DTC does not set while operating the integral switch at the steering column lock within the conditions for running the DTC.
 - **If the DTC sets**

Replace the K60 Steering Column Lock Module.
 - **If the DTC does not set**
3. All OK.

Repair Instructions

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

Refer to [Control Module References](#) for steering column lock module replacement, programming and setup.

DTC B144C: INVERTED RUN/START POWER RELAY CIRCUIT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.

- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B144C 01

Inverted Run/Start Power Relay Circuit Short to Battery

DTC B144C 06

Inverted Run/Start Power Relay Circuit Low Voltage/Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	B144C 06	B144C 06	B144C 01	-

Circuit/System Description

The vehicle theft deterrent subsystem provides the capability to lock or unlock the steering column electrically. The steering column lock module is allowed to unlock when power mode transitions to a non off power mode and an authenticated driver identification device is present. Once the column is unlocked, a crank request can be allowed.

Conditions for Running the DTC

- The system voltage is between 9-16 V.
- The DTC can only run when the steering column lock module is awake.

Conditions for Setting the DTC

B144C 01

The steering column lock module detects a short to voltage when the power mode is in the RUN or CRANK for greater than 5 s.

B144C 06

The steering column lock control detects a short to ground or an open in the ignition circuit when the power mode is in the OFF/ACC for greater than 3 s.

Action Taken When the DTC Sets

- The steering column lock module will command the driver information center to display the service column lock warning message.
- The steering column lock module indicator is ON.

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- The DTC will be a history DTC when the voltage is present and the power mode is OFF or ACC or when voltage is not present and the power mode is RUN or CRANK.
- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

- [Column Lock Schematics \(Buick\)](#) [Column Lock Schematics \(Chevrolet\)](#)
- [Power Moding Schematics \(Buick\)](#) [Power Moding Schematics \(Chevrolet\)](#)

Connector End View Reference

Description and Operation

Steering Wheel and Column Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC B144B is not set.
 - **If DTC B144B is set**

Refer to **DTC B144B**
 - **If DTC B144B is not set**
3. Refer to Circuit/System Testing.

Circuit/System Testing

B144C 01

1. Ignition OFF, disconnect the harness connector at the K60 Steering Column Lock Module. Ignition ON.
2. Test for less than 1 V between the ignition circuit terminal 3 and ground.
 - **If 1 V or greater**

Repair the short to voltage on the circuit.
 - **If less than 1 V**
3. Replace the K60 Steering Column Lock Module.

B144C 06

1. Ignition OFF, disconnect the harness connector at the K60 Steering Column Lock Module. Connect a test lamp between the ignition circuit terminal 3 and ground.
2. Verify that a test lamp illuminates between the ignition circuit terminal 3 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, remove the test lamp.
 2. Test for less than 2 Ω in the ignition circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , refer to **Power Mode Mismatch**
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF, remove the test lamp
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K60 Steering Column Lock Module.

- If the test lamp illuminates

3. Replace the K60 Steering Column Lock Module.

Repair Instructions

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

Refer to [Control Module References](#) for control module replacement, programming and setup.

DTC B2515: STEERING COLUMN LOCK MOTOR FEEDBACK CIRCUIT NOT PLAUSIBLE

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B2515 5A

Steering Column Lock Motor Feedback Circuit Not Plausible

Circuit/System Description

The vehicle theft deterrent subsystem provides the capability to lock or unlock the steering electrically. The steering column lock module is allowed to unlock when power mode transitions to a non off power mode and an authenticated driver identification device is present. Once the column is unlocked, a crank request can be allowed.

Conditions for Running the DTC

- The ignition is in OFF, ACCESSORY or RUN position.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

The body control module (BCM) detects a not plausible feedback from the steering column lock module.

Action Taken When the DTC Sets

- DTC B2515 is stored in memory.
- The driver information center displays the service column lock system warning message.
- The steering column lock indicator is ON.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer present.
- The BCM detects a plausible feedback from the steering column lock module.

Reference Information

Schematic Reference

[Column Lock Schematics \(Buick\)](#)[Column Lock Schematics \(Chevrolet\)](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX \(ENCORE\)](#), [COMPONENT CONNECTOR END VIEWS - INDEX \(TRAX\)](#)

Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition ON. Clear all DTCs.
2. Verify DTC B2515 does not set while operating the steering column lock module within the conditions for running the DTC.
 - **If DTC B2515 sets**

Refer to Circuit/System Testing.
 - **If DTC B2515 does not set**
3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the K60 Steering Column Lock Module. It may take up to 5 minutes for all vehicle systems to power down.
2. Test for less than 3 V between the control circuit terminal 2 and ground.

- **If 3 V or greater**

1. Disconnect the harness connector at the K9 Body Control Module. Ignition ON.

NOTE:

For vehicles with push button start, it is necessary to back out the terminal for the steering column lock status signal circuit at the K 9 Body Control Module harness. When the harness connector is removed, the vehicle cannot be put back into an Ignition ON state.

2. Test for less than 3 V between the control circuit terminal 2 and ground.

- If 3 V or greater, repair the short to voltage on the circuit.
- If less than 3 V, replace the K9 Body Control Module.

- **If less than 3 V**

3. Ignition ON.
4. Test for B+ between the control circuit terminal 2 and ground.

- **If less than B+**

1. Disconnect the harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the signal circuit terminal 2 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in the signal circuit terminal 2 end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω
4. Replace the K9 Body Control Module.

- **If B+**

5. Replace the K60 Steering Column Lock Module.

Repair Instructions

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

Refer to [Control Module References](#) for control module replacement, programming and setup.

DTC B2897: STEERING COLUMN LOCK MOTOR LOCK CIRCUIT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B2897

Steering Column Lock Motor Lock Circuit

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Steering Column Lock Motor Lock Signal	B2897 02	B2897 05	B2897 01, 05	-

Circuit/System Description

The vehicle theft deterrent subsystem provides the capability to lock or unlock the steering electrically. The steering column lock module is allowed to unlock when power mode transitions to a non off power mode and an authenticated driver identification device is present. Once the column is unlocked, a crank request can be allowed.

Conditions for Running the DTC

- The ignition is in OFF, ACCESSORY or RUN position.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

B2897 02

The steering column lock enable input circuit is shorted to ground.

B2897 01 or 05

The steering column lock enable input circuit is open or shorted to battery.

Action Taken When the DTC Sets

- DTC B2897 is stored in the steering column lock module memory.
- The steering column lock module will command the driver information center to display the Service Column Lock warning message.
- The steering column lock module indicator is ON.

Conditions for Clearing the DTC

The steering column lock module has received a lock command and detects no longer a malfunction in the steering column lock circuit.

Reference Information

[Column Lock Schematics \(Buick\)](#)[Column Lock Schematics \(Chevrolet\)](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX \(ENCORE\)](#) [COMPONENT CONNECTOR END VIEWS - INDEX \(TRAX\)](#)

Description and Operation

[Steering Wheel and Column Description and Operation](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the K60 Steering Column Lock Module. Ignition ON.
2. Test for less than B+ between the control circuit terminal 4 and ground.
 - **If B+**

Repair the short to voltage on the circuit.
 - **If less than B+**
3. Ignition OFF.
4. Test for infinite resistance between the control circuit terminal 4 and ground.
 - **If less than infinite resistance**
 1. Disconnect the X1 harness connector at the K84 Keyless Entry Control Module.
 2. Test for infinite resistance between the control circuit terminal 4 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K84 Keyless Entry Control Module.
 - **If infinite resistance**
5. Disconnect the X1 harness connector at the K84 Keyless Entry Control Module.
6. Test for less than 2 Ω in the harness connector control circuit terminal 4 at the K60 Steering Column Lock Module end to end.
 - **If 2 Ω or greater**

Repair the open/high resistance in the circuit.
 - **If less than 2 Ω**
7. Replace the K60 Steering Column Lock Module.

Repair Instructions

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

Refer to [Control Module References](#) for steering column lock module or keyless entry control module replacement, programming and setup.

DTC B2910: STEERING COLUMN LOCK PASSWORD INCORRECT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B2910

Steering Column Lock Password Incorrect

For symptom byte information, refer to [Symptom Byte List](#) .

Circuit/System Description

The vehicle theft deterrent subsystem provides the capability to lock or unlock the steering electrically. The steering column lock module is allowed to unlock when power mode transitions to a non off power mode and an authenticated driver identification device is present. Once the column is unlocked, a crank request can be allowed.

Conditions for Running the DTC

- The ignition is in OFF, ACCESSORY or RUN position.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

The steering column lock module has not received the correct password or did not receive a password with the command to unlock the steering column.

Action Taken When the DTC Sets

- DTC B2910 is stored in memory.
- The driver information center displays the Service Column Lock warning message.
- The steering column lock indicator is ON.
- The engine will not crank.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer present.
- The steering column lock module has received the correct password with the command to unlock the steering column.

Diagnostic Aids

This DTC may set if the BCM was replaced and the steering column lock module was not programmed.

Reference Information

Schematic Reference

[Column Lock Schematics \(Buick\)](#)[Column Lock Schematics \(Chevrolet\)](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX \(ENCORE\)](#), [COMPONENT CONNECTOR END VIEWS - INDEX \(TRAX\)](#)

Description and Operation

[Steering Wheel and Column Description and Operation](#)

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

NOTE: To ensure that the steering column lock password from the BCM is learned: turn ignition ON and then OFF, close all doors, and wait 5 minutes.

1. Ignition ON. Clear all DTCs.
2. Verify DTC B2910 does not set while operating the steering column lock module within the conditions for running the DTC.
 - **If DTC B2910 sets**
 1. Program the K60 Steering Column Lock Module.
 2. Ignition ON. Clear all DTCs.
 3. Verify DTC B2910 does not set while operating the steering column lock module within the conditions for running the DTC.
 - If DTC B2910 sets, replace the K60 Steering Column Lock Module.
 - If DTC B2910 does not set
 4. All OK.
 - **If DTC B2910 does not set**
3. All OK.

Repair Instructions

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

Refer to [Control Module References](#) for steering column lock module replacement, programming and setup.

DTC B305A: NO RESPONSE FROM STEERING COLUMN LOCK RECEIVED

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC B305A 00

No Response From Steering Column Lock Received

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Steering Column Lock Status Signal	B305A 00	B305A 00 B2515 5A	B305A 00 B2515 5A	-

Circuit/System Description

The vehicle theft deterrent subsystem provides the capability to lock or unlock the steering electrically. The steering column lock module is allowed to unlock when power mode transitions to a non off power mode and an authenticated driver identification device is present. Once the column is unlocked, a crank request can be allowed.

Conditions for Running the DTC

- The ignition is in OFF, ACCESSORY or RUN position.
- The system voltage is between 9-16 V.

Conditions for Setting the DTC

The body control module (BCM) has not received any response from the steering column lock module.

Action Taken When the DTC Sets

- DTC B305A is stored in the BCM memory.
- The driver information center displays the Service Steering Column Lock message.
- The steering column lock indicator is ON.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer present.
- The BCM has received response from the steering column lock module.

Reference Information

Schematic Reference

Column Lock Schematics (Buick) Column Lock Schematics (Chevrolet)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX (ENCORE) COMPONENT CONNECTOR END VIEWS - INDEX (TRAX)

Description and Operation

Steering Wheel and Column Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition ON. Clear all DTCs.
2. Verify the scan tool communicates with the control module and there are no U codes set.
 - **If the scan tool does not communicate with the control module and there are U codes set**

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) .
 - **If the scan tool does not communicate with the control module and there are no codes set**

Refer to [Scan Tool Does Not Communicate with Low Speed GMLAN Device](#).

- If the scan tool communicates with the control module and there are no codes set
3. Verify DTC B305A does not set while operating the steering column lock module within the conditions for running the DTC.
- If DTC B305A sets

Refer to Circuit/System Testing.

- If DTC B305A does not set
4. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the K60 Steering Column Lock Module. It may take up to 5 minutes for all vehicle systems to power down.
2. Test for less than 2 Ω between the following terminals and ground.
 - Terminal 6
 - Terminal 7
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω
3. Test for less than 3 V between the control circuit terminal 2 and ground.

- If 3 V or greater

1. Disconnect the harness connector at the K9 Body Control Module. Ignition ON.

NOTE:

For vehicles with push button start, it is necessary to back out the terminal for the steering column lock status signal circuit at the K 9 Body Control Module harness. When the harness connector is removed, the vehicle cannot be put back into an Ignition ON state.

2. Test for less than 3 V between the control circuit terminal 2 and ground.
 - If 3 V or greater, repair the short to voltage on the circuit.
 - If less than 3 V, replace the K9 Body Control Module.
 - If less than 3 V
4. Ignition ON.
5. Test for B+ between the control circuit terminal 2 and ground.
- If less than B+
1. Disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 2 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the signal circuit terminal 2 end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω
 4. Replace the K9 Body Control Module.
- If B+
6. Replace the K60 Steering Column Lock Module.

Repair Instructions

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

Refer to [Control Module References](#) for control module replacement, programming and setup.

SYMPTOMS - STEERING WHEEL AND COLUMN

Review the system description and operation in order to familiarize yourself with the system functions. Refer to [Steering Wheel and Column Description and Operation](#).

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the steering wheel and column.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Symptoms List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- [High Telescoping Effort](#)
- [Noise in Steering Column](#)
- [Looseness in Steering Column](#)

HEATED STEERING WHEEL INDICATOR MALFUNCTION

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	1	1	-	-
Switch Signal	2	1	-	-
Indicator Dimming Control 2	3	3	-	-
Heated Steering Wheel Switch LED Control	4	3	3	-
Switch Ground	-	1	-	-
Module Ground	-	1	-	-
1. Heated Steering Wheel System Inoperative 2. Heated Steering Wheel Always ON 3. LED Inoperative 4. LED Always ON				

Circuit/System Description

The Steering Wheel Heating Control Module controls the heated steering wheel and the heated steering wheel ON indicator based on an input from the heated steering wheel switch. When the heated steering wheel switch is pressed, the switch signal circuit is pulled to ground. This indicates to the heating steering wheel control module that steering wheel heat is requested. When the request is seen, the heated steering module supplies voltage to the indicator lamp and supplies voltage to the heating elements, which are internal to the steering wheel.

Reference Information

Schematic Reference

[Steering Wheel Schematics \(Buick\)](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX \(ENCORE\)](#)

Steering Wheel and Column Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Circuit/System Verification

1. Ignition ON.
2. Verify the A26 HVAC Controls is OFF. The steering wheel heater indicator should not be illuminated and the left and right sides of the steering wheel should not be warm.
 - **The steering wheel is always warm**
Refer to [Heated Steering Wheel Malfunction](#)
 - **The steering wheel does not become warm and the heater indicator is illuminated**
Refer to Circuit/System Testing
 - **The steering wheel does not become warm and the heater indicator is not illuminated**
3. Press and release the A26 HVAC Controls. The steering wheel heater indicator should illuminate and the left and right sides of the steering wheel should become warm.
 - **The steering wheel does not become warm**
Refer to [Heated Steering Wheel Malfunction](#)
 - **The steering wheel becomes warm and the heater indicator does not illuminate**
Refer to Circuit/System Testing
 - **The steering wheel becomes warm and the heater indicator illuminates**
4. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the X4 in-line harness connector at the K32 Heated Steering Wheel Control Module.
2. Test for less than 10 Ω between the ground circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the ignition voltage circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, remove the test lamp.
 2. Test for less than 2 Ω in the ignition circuit end to end.
 - If less than 2 Ω , verify the fuse is OK and there is voltage at the fuse. Refer to [Power Mode Mismatch](#).
 - If 2 Ω or greater

3. Verify the in-line fuse is OK and there is voltage at the fuse.
 - If the in-line fuse is blown, replace the K32 Steering Wheel Heating Control Module.
 - If the in-line fuse is OK, repair the open/high resistance in the circuit.
- **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition voltage circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K32 Steering Wheel Heating Control Module.
- **If the test lamp illuminates**
5. Ignition OFF, connect the X4 in-line harness connector. Disconnect the harness connector at the A26 HVAC Controls.
6. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, remove the test lamp.
 2. Test for less than ∞ in the B+ circuit end to end.
 - If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - If less than $2\ \Omega$, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF, remove the test lamp.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the A26 HVAC Controls.
 - **If the test lamp illuminates**
7. Ignition ON.
8. Test for less than 1 V between the control circuit terminal 4 and ground.
 - **If greater than 1 V**
 1. Disconnect the X2 harness connector at the X85 Steering Wheel Air Bag Coil.
 2. Test for less than 1 V between the Steering Wheel Air Bag Coil terminal 2 and ground.
 - If greater than 1 V, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Replace the K32 Steering Wheel Heating Control Module.
 - **If less than 1 V**
9. Ignition OFF.
10. Test for infinite resistance between the control circuit terminal 4 and ground.
 - **If less than infinite resistance**
 1. Disconnect the X2 harness connector at the X85 Steering Wheel Air Bag Coil.
 2. Test for infinite resistance between the signal circuit at the Steering Wheel Air Bag Coil and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Replace the K32 Steering Wheel Heating Control Module.
 - **If infinite resistance**
11. Connect the A26 HVAC Controls.
12. Install a 3 A fused jumper wire between the Steering Wheel Air Bag Coil terminal 2 and ground. Ignition ON.
13. Verify the steering wheel heat indicator is illuminated.
 - **If the steering wheel heat indicator does not illuminate**
 1. Disconnect the A26 HVAC Controls harness connector.
 2. Test for less than $2\ \Omega$ in the signal circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the A26 HVAC Controls.

- **If the steering wheel heat indicator illuminates**

14. Replace the K32 Steering Wheel Heating Control Module.

Repair Instructions

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

- Refer to [Cruise Control Switch Replacement \(Buick\)](#), [Cruise Control Switch Replacement \(Chevrolet\)](#)
- Refer to [Steering Wheel Replacement \(Buick\)](#), [Steering Wheel Replacement \(Chevrolet\)](#)
- Refer to [Control Module References](#) for steering wheel heating control module replacement, programming and setup

HEATED STEERING WHEEL MALFUNCTION

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	1	1	-	-
Switch Signal	2	1	-	-
Switch and LED Ground	-	1	-	-
Temperature Sensor Signal	3	3	3	-
Temperature Sensor Ground	-	3	-	-
Heater Element Control	3	3	2	-
Heater Element Ground	-	3	-	-
Module Ground	-	1	-	-
1. Heated Steering Wheel System Inoperative 2. Heated Steering Wheel Always ON 3. Heated Steering Wheel Inoperative				

Circuit/System Description

The heated steering wheel control module controls the heated steering wheel and the heated steering wheel ON indicator based on an input from the heated steering wheel switch. When the heated steering wheel switch is pressed, the switch signal circuit is pulled to ground. This indicates to the heating steering wheel control module that steering wheel heat is requested. When the request is seen, the heated steering wheel control module supplies voltage to the indicator lamp and supplies voltage to the heating elements, which are internal to the steering wheel.

Diagnostic Aids

- Before replacing the steering wheel for complaints of not getting hot enough, a reliable infrared temperature gun should be used to measure the temperature at various points around the rim. The steering wheel's normal operating temperature is 32°C (89.6°F) and takes approximately 10 min to reach that temperature. It may take up to 20 min for the normal operating temperature to stabilize within the steering wheel rim. There may be spike in temperature during the first 3-4 min before it stabilizes at normal operating temperature. The steering wheel will take longer to heat up if the vehicle temperature is below -21°C (-5.8°F). The steering wheel heater will not operate when the steering wheel temperature is above 32°C (89.6°F).

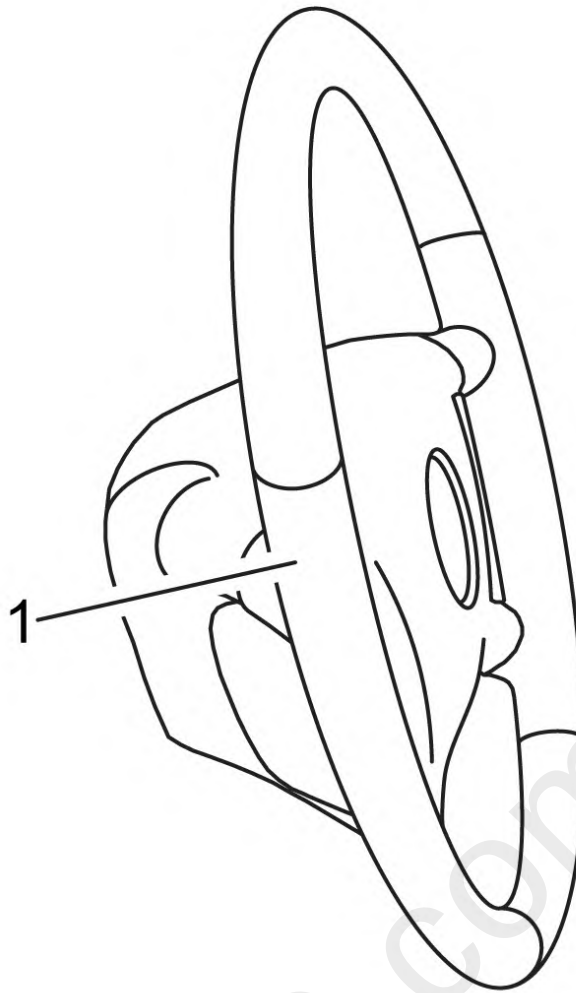


Fig. 4: Steering Wheel Rim Infrared Measurement Point
Courtesy of GENERAL MOTORS COMPANY

- The infrared measurements are made at the rim (1) at the 3 and 9 o'clock positions of the steering wheel.

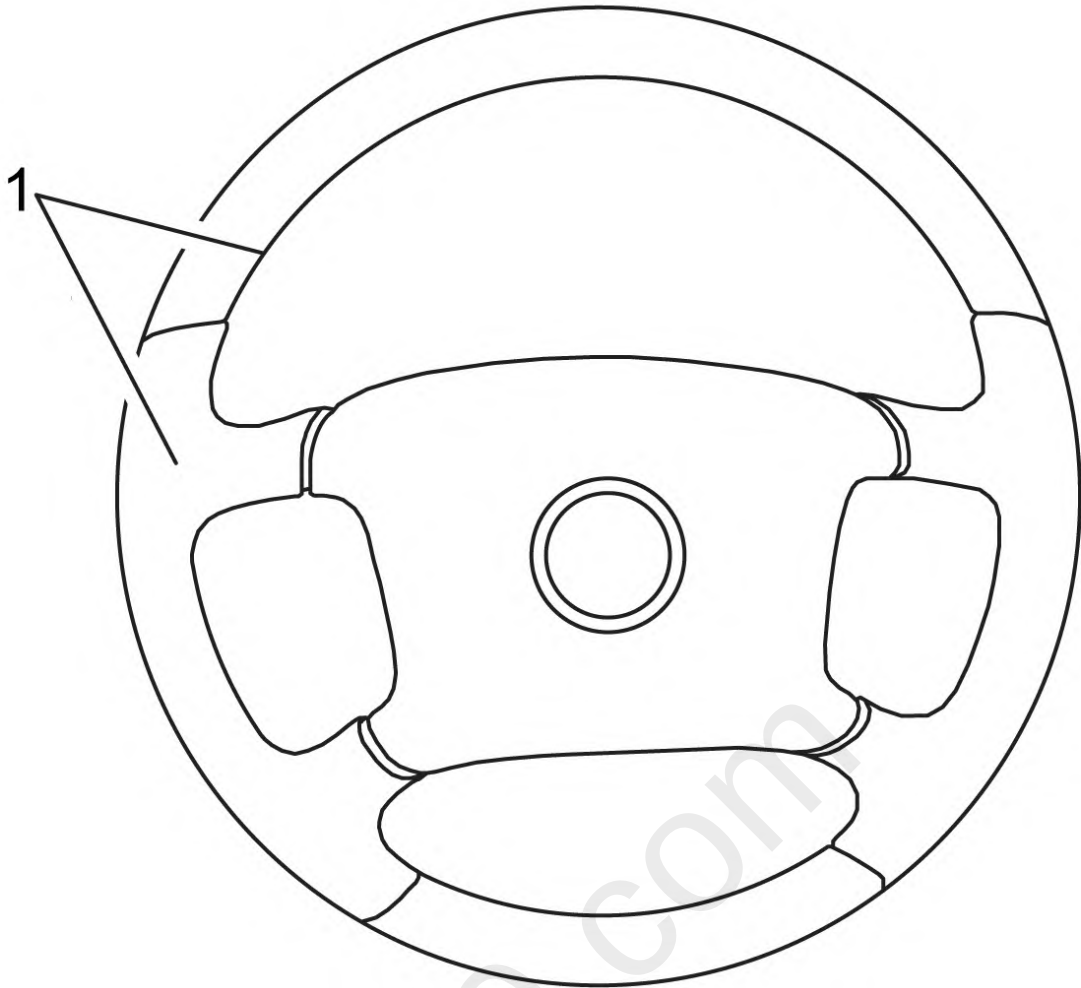


Fig. 5: Temperature Measurement Points
Courtesy of GENERAL MOTORS COMPANY

- The wood sections and the stitching are not heated. Temperature measurements should not be made on the face (1) to insure accurate temperature readings.

Reference Information

Schematic Reference

Steering Wheel Schematics (Buick)

Connector End View Reference

Component Connector End Views (Buick), Component Connector End Views (Buick), Component Connector End Views (Buick), Component Connector End Views (Buick), Component Connector End Views (Buick)

Description and Operation

Steering Wheel and Column Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Circuit/System Verification

1. Engine running, all accessories OFF.
2. Verify the steering wheel heater switch is OFF and the steering wheel heater indicator should not be illuminated.
 - **If the heater indicator is illuminated**
Refer to [Heated Steering Wheel Indicator Malfunction](#)
 - **If the heater indicator is not illuminated**

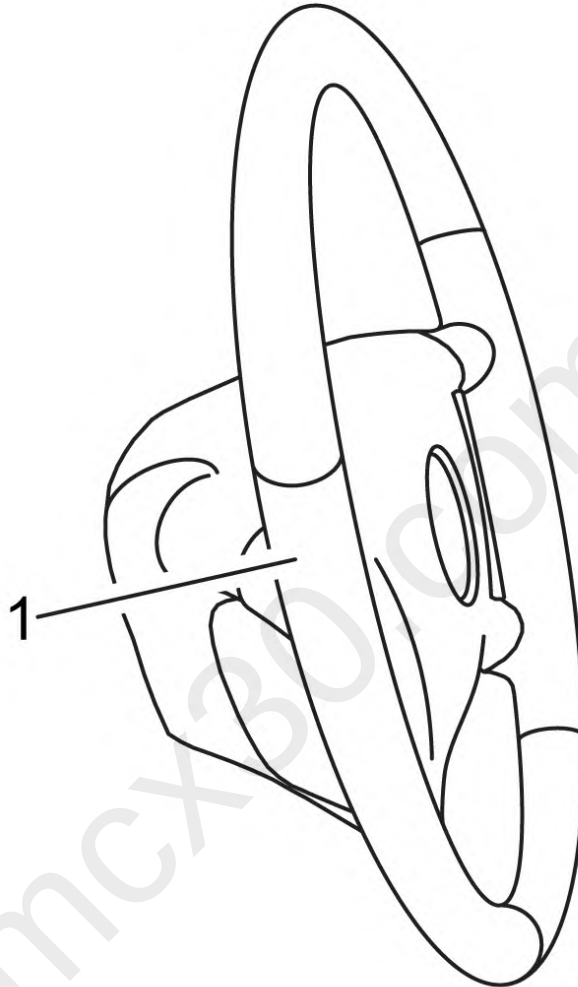


Fig. 6: Steering Wheel Rim Infrared Measurement Point
Courtesy of GENERAL MOTORS COMPANY

NOTE: The Infrared Temperature Gun should be within 50.8 mm (2 in) and parallel to the steering wheel rim when taking temperature readings.

3. Measure the temperature readings at the 3 and 9 o'clock positions on the steering wheel rim (1).
4. Verify that the steering wheel temperature is 25°C (77°F) or below.
 - **If the steering wheel temperature is greater than 25°C (77°F)**
Allow the steering wheel to cool before proceeding to next step.
 - **If the steering wheel temperature is 25°C (77°F) or below**
5. Press and release the steering wheel heater switch. The steering wheel heater indicator should illuminate. Allow the steering wheel to heat for a minimum of 10 min so that the temperature stabilizes.
 - **If the heater indicator does not illuminate**

- If the heater indicator illuminates

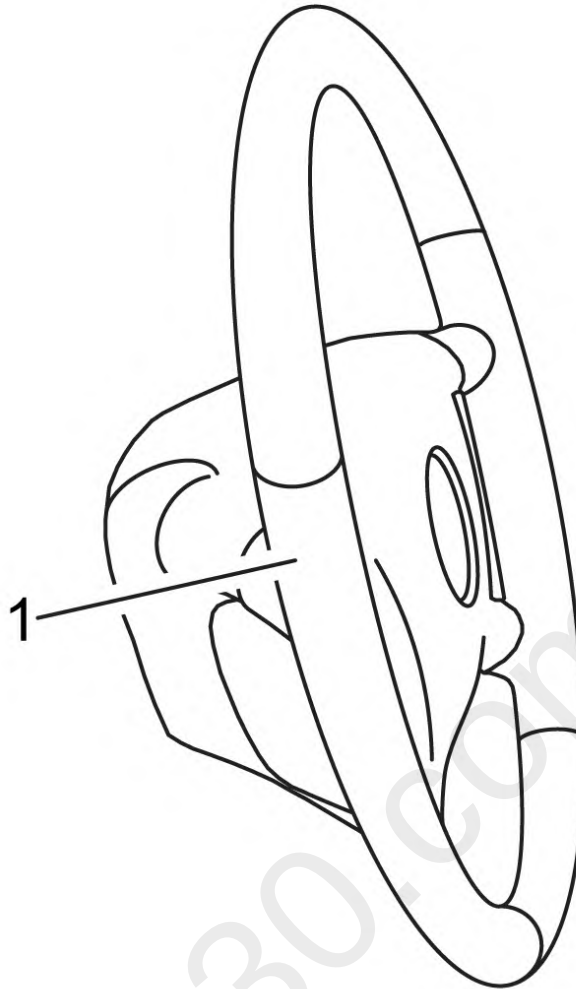


Fig. 7: Steering Wheel Rim Infrared Measurement Point
Courtesy of GENERAL MOTORS COMPANY

NOTE: The Infrared Temperature Gun should be within 50.8 mm (2 in) and parallel to the steering wheel rim when taking temperature readings.

6. Measure the temperature readings at the 3 and 9 o'clock positions on the steering wheel rim (1).
7. Verify that the steering wheel temperature is greater than 28°C (82.4°F) within 20 min.
 - If after 20 minutes the measured temperature is less than 28°C (82.4°F)

Refer to Circuit System Testing.

- If after 20 minutes the measured temperature is 28°C (82.4°F) or greater
8. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the X4 in-line harness connector at the K32 Heated Steering Wheel Control Module.
2. Test for less than $10\ \Omega$ between the ground circuit terminal 2 and ground.
 - If $10\ \Omega$ or greater
 1. Ignition OFF.
 2. Test for less than $2\ \Omega$ in the ground circuit end to end.
 - If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

- If less than 2 Ω , repair the open/high resistance in the ground connection.

- **If less than 10 Ω**

3. Ignition ON.

4. Verify a test lamp illuminates between the ignition voltage circuit terminal 1 and ground.

- **If the test lamp does not illuminate and the circuit fuse is good**

1. Ignition OFF, remove the test lamp.

2. Test for less than 2 Ω in the ignition circuit end to end.

- If less than 2 Ω , verify the fuse is OK and there is voltage at the fuse. Refer to [Power Mode Mismatch](#).
- If 2 Ω or greater

3. Verify the in-line fuse is OK and there is voltage at the fuse.

- If the in-line fuse is blown, replace the K32 Steering Wheel Heating Control Module.
- If the in-line fuse is OK, repair the open/high resistance in the circuit.

- **If the test lamp does not illuminate and the circuit fuse is open**

1. Ignition OFF.

2. Test for infinite resistance between the ignition voltage circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K32 Steering Wheel Heating Control Module.

- **If the test lamp illuminates**

5. Ignition OFF, connect the in-line harness connector X4. Disconnect the harness connector at the A26 HVAC Controls.

6. Test for less than 10 Ω between the ground circuit terminal 2 and ground.

- **If 10 Ω or greater**

1. Ignition OFF.

2. Test for less than 2 Ω in the ground circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , repair the open/high resistance in the ground connection.

- **If less than 10 Ω**

7. Ignition ON.

8. Test for 4-5 V between the signal circuit terminal 5 and ground.

- **If less than 4-5 V**

1. Ignition OFF, disconnect the X2 harness at the X85 Steering Wheel Air Bag Coil.

2. Test for infinite resistance between the Steering Wheel Air Bag Coil terminal 1 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the control circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K32 Steering Wheel Heating Control Module.

- **If greater than 4-5 V**

1. Ignition OFF, disconnect the X2 harness at the X85 Steering Wheel Air Bag Coil.

2. Ignition ON.

3. Test for less than 1 V between the Steering Wheel Air Bag Coil terminal 1 and ground.

4. If greater than 1 V, repair the short to voltage on the circuit

- **If 4-5 V**

9. Ignition OFF, connect the harness connector at the A26 HVAC Controls.

10. Test for infinite resistance between the X2 terminal 1 of the Steering Wheel Air Bag Coil and ground at the while the steering wheel heat switch is not being pressed.

- **If less than infinite resistance**

Replace the A26 HVAC Controls.

- **If infinite resistance**

11. Test for less than 60 Ω between the X2 terminal 1 of the Steering Wheel Air Bag Coil and ground while the steering wheel heat switch is being pressed.

- **If 60 Ω or greater**

Replace the A26 HVAC Controls.

- **If less than 60 Ω**

12. Disconnect the in-line harness connector at the E15 Steering Wheel Heater.

13. Test for less than 10 Ω between the ground circuit terminal A at the K32 Steering Wheel Heating Control Module and ground.

- **If 10 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 10 Ω**

14. Test for 1.5-3.0 Ω between the signal terminal B and the ground terminal A at the E15 Steering Wheel Heater.

- **If not within the specified range**

Replace the E15 Steering Wheel Heater.

- **If within the specified range**

15. Test for 9-12k Ω between the control circuit terminal C and the ground terminal D on the E15 Steering Wheel Heater.

- **If not within the specified range**

Replace the E15 Steering Wheel Heater.

- **If within the specified range**

16. Replace the K32 Steering Wheel Heating Control Module.

Repair Instructions

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

- Refer to [Steering Wheel Replacement \(Buick\)](#).
- Refer to [Heater and Air Conditioning User Interface Control Replacement \(C67\)](#).
- Refer to [Control Module References](#) for control module replacement, programming and setup.

HIGH TELESCOPING EFFORT

Checks	Action
The steering shaft assembly is bent or damaged.	If necessary, replace the steering column. Refer to Steering Column Replacement (Buick, Mexico, NJ1, With BTM, With N06) Steering Column Replacement (Buick, Canada/United States, NJ1, With BTM, Without N06) Steering Column Replacement (Chevrolet, Mexico, NJ1, With BTM, With N06) Steering Column Replacement (Chevrolet, Canada/United States, NJ1, With BTM, Without N06) Steering Column Replacement (Chevrolet, Canada/United States, NJ1, Without BTM, Without N06) Steering Column Replacement (Chevrolet, Mexico, NJ1, Without BTM, Without N06) Steering Column Replacement (Mexico, N40) .

NOISE IN STEERING COLUMN

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and Operation and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Steering Wheel and Column
2	Verify that noise is present in the steering column during operation. Is noise present in the steering column during operation?	Go to Step 3	System OK
3	Inspect the steering column mounting features for the following conditions: • The steering column mounting fasteners are loose. • The steering column mounting features are sheared. Are the steering column mounting features loose or sheared?	Go to Step 10	Go to Step 4
4	Inspect the SIR/SRS coil for noise. Is the SIR/SRS coil noisy?	Go to Step 11	Go to Step 5
5	If equipped, inspect the lock plate retaining ring for correct installation. Is the lock plate retaining ring installed incorrectly?	Go to Step 12	Go to Step 6
6	Inspect the steering column upper and lower bearings for the following conditions: • Damage • Lubrication • Wear • Proper seating Are the bearings in need of repair or replacement?	Go to Step 13	Go to Step 7
7	Does the steering column tilt joint need to be lubricated?	Go to Step 14	Go to Step 8
8	NOTE: Inspect the intermediate steering shaft for noise while driving the vehicle, turning the steering wheel, and applying the brakes. Inspect the intermediate steering shaft for noise. Is the intermediate steering shaft noisy?	Go to Step 15	Go to Step 9
9	NOTE: For vehicles equipped with a telescoping steering column, perform this step. If not equipped, go to next step. Inspect the steering column for noise while telescoping the column. Is the steering column noisy while telescoping?	Go to Step 16	Go to Step 17

Step	Action	Yes	No
10	NOTE: If the steering column mounting features are damaged or sheared, replace the steering column. Refer to Steering Column Replacement (Buick, Mexico, NJ1, With BTM, With N06)Steering Column Replacement (Buick, Canada/United States, NJ1, With BTM, Without N06)Steering Column Replacement (Chevrolet, Mexico, NJ1, With BTM, With N06)Steering Column Replacement (Chevrolet, Canada/United States, NJ1, With BTM, Without N06)Steering Column Replacement (Chevrolet, Canada/United States, NJ1, Without BTM, Without N06)Steering Column Replacement (Chevrolet, Mexico, NJ1, Without BTM, Without N06)Steering Column Replacement (Mexico, N40). Tighten the steering column mounting fasteners to specification. Refer to Fastener Specifications. Did you complete the repair?	Go to Step 17	-
11	Replace the SIR/SRS coil. Refer to Steering Wheel Airbag Coil Replacement (Buick)Steering Wheel Airbag Coil Replacement (Chevrolet, Without BTM)Steering Wheel Airbag Coil Replacement (Chevrolet, With BTM). Did you complete the repair?	Go to Step 17	-
12	Install the lock plate retaining ring correctly. Did you complete the repair?	Go to Step 17	-
13	NOTE: If the steering column upper and/or lower bearings are not serviceable, replace the steering column. Refer to Steering Column Replacement (Buick, Mexico, NJ1, With BTM, With N06)Steering Column Replacement (Buick, Canada/United States, NJ1, With BTM, Without N06)Steering Column Replacement (Chevrolet, Mexico, NJ1, With BTM, With N06)Steering Column Replacement (Chevrolet, Canada/United States, NJ1, With BTM, Without N06)Steering Column Replacement (Chevrolet, Canada/United States, NJ1, Without BTM, Without N06)Steering Column Replacement (Chevrolet, Mexico, NJ1, Without BTM, Without N06)Steering Column Replacement (Mexico, N40). Replace the steering column upper and/or lower bearings, if serviceable. Did you complete the replacement?	Go to Step 17	-
14	Lubricate the steering column tilt joint. Did you complete the repair?	Go to Step 17	-

Step	Action	Yes	No
15	Replace the appropriate intermediate steering shaft component. Did you complete the repair?	Go to Step 17	-
16	Redistribute or add lubricant to the steering column lower jacket with the column telescoped to its end of outward travel. Did you complete the repair?	Go to Step 17	-
17	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

LOOSENESS IN STEERING COLUMN

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and Operation and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Steering Wheel and Column
2	Verify that the steering column is loose. Is the steering column loose?	Go to Step 3	System OK
3	Inspect the steering column mounting features for the following conditions. - The steering column mounting fasteners are loose. - The steering column mounting features are sheared. Are the steering column mounting features loose or sheared?	Go to Step 5	Go to Step 4
4	Inspect the upper and/or lower bearings for looseness. Are any of the bearings worn or loose?	Go to Step 6	Go to Step 7
5	NOTE: If the steering column mounting features are damaged or sheared, replace the steering column. Refer to Steering Column Replacement (Buick, Mexico, NJ1, With BTM, With N06) Steering Column Replacement (Buick, Canada/United States, NJ1, With BTM, Without N06) Steering Column Replacement (Chevrolet, Mexico, NJ1, With BTM, With N06) Steering Column Replacement (Chevrolet, Canada/United States, NJ1, With BTM, Without N06) Steering Column Replacement (Chevrolet, Canada/United States, NJ1, Without BTM, Without N06) Steering Column Replacement (Chevrolet, Mexico, NJ1, Without BTM, Without N06) Steering Column Replacement (Mexico, N40) . Tighten the steering column mounting fasteners to specification. Refer to Fastener Specifications . Did you complete the repair?	Go to Step 7	-

Step	Action	Yes	No
6	NOTE: If the steering column upper and/or lower bearings are not serviceable, replace the steering column. Refer to Steering Column Replacement (Buick, Mexico, NJ1, With BTM, With N06)Steering Column Replacement (Buick, Canada/United States, NJ1, With BTM, Without N06)Steering Column Replacement (Chevrolet, Mexico, NJ1, With BTM, With N06)Steering Column Replacement (Chevrolet, Canada/United States, NJ1, With BTM, Without N06)Steering Column Replacement (Chevrolet, Canada/United States, NJ1, Without BTM, Without N06)Steering Column Replacement (Chevrolet, Mexico, NJ1, Without BTM, Without N06)Steering Column Replacement (Mexico, N40). Replace the upper and/or lower bearings, if serviceable. Did you complete the repair?	Go to Step 7	-
7	Operate the steering column in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

REPAIR INSTRUCTIONS

WIRE TO WIRE REPAIR - STEERING

Special Tools

- EL-38125-10 Splice Sleeve Crimping Tool (non GMNA)
- J-38125-5A Ultra Torch Special Tool
- J-38125-8 Splice Sleeve Crimping Tool (GMNA)

For equivalent regional tools, refer to [Special Tools](#).

WARNING: In order to reduce the risk of personal injury, loss of high voltage isolation to ground and higher system impedance, do not attempt to repair any HV wiring, connector, or terminal that is damaged. High voltage coaxial type cables are not repairable. Never attempt to repair a coaxial type cable. The entire cable/harness or component must be replaced. In order to maintain system integrity and personal safety, never attempt to repair any high voltage wiring, cables, or terminals. Performing this procedure on high voltage circuits may result in serious injury or death.

NOTE: If the wiring harness internal to the transmission is damaged, the wiring harness must be replaced. The use of splice sleeves in an attempt to repair the internal transmission wires, connectors, or terminals could result in performance issues.

NOTE: Do not splice wires in Door Harness Grommets.

NOTE: The DuraSeal splice sleeves have the following 2 critical features:

- A special heat shrink sleeve environmentally seals the splice. The heat shrink sleeve contains a sealing adhesive inside.

- **A cross hatched (knurled) core crimp provides the necessary low resistance contact integrity for these sensitive, low energy circuits.**

Use only DuraSeal splice sleeves to form a one-to-one splice on all types of insulation except high voltage and specialty cables. Use DuraSeal splice sleeves where there are special requirements such as moisture sealing. Follow the instructions below in order to splice copper wire using DuraSeal splice sleeves.

Splice Sleeve Selection

Splice Sleeve Color	Crimp Tool Nest Color		Wire Gauge mm ² / (AWG)
	3 Crimp Nests	4 Crimp Nests	
Salmon (Yellow-Pink) 19300089	Red (1) or Red/Green (1)	Red (2)	0.22-0.8/(18-26)
Blue 19168447	Blue (2)	Blue (3)	1.0-2.0/(14-16)
Yellow 19168448	Yellow (3)	Yellow (4)	3.0-5.0/(10-12)

NOTE: You must perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. You must obtain a clean strip with all of the wire strands intact.

1. Open the harness by removing any tape:
 - Use a sewing seam ripper, available from sewing supply stores, in order to cut open the harness in order to avoid wire insulation damage.
 - Use the DuraSeal splice sleeves on all types of insulation except Tefzel and coaxial.
 - Do not use the crimp and DuraSeal splice sleeve to form a splice with more than 2 wires coming together.
2. Cut as little wire off the harness as possible. You may need the extra length of wire in order to change the location of a splice.

Adjust splice locations so that each splice is at least 40 mm (1.5 in) away from the other splices, harness branches, or connectors.

3. Strip the insulation:
 - When adding a length of wire to the existing harness, use the same size wire as the original wire.
 - Perform one of the following items in order to find the correct wire size:
 - Find the wire on the schematic and convert to regional wiring gauge size.
 - If you are unsure of the wire size, begin with the largest opening in the wire stripper and work down until achieving a clean strip of the insulation.
 - Strip approximately 5.0 mm (0.20 in) of insulation from each wire to be spliced.
 - Do not nick or cut any of the strands. Inspect the stripped wire for nicks or cut strands.
 - If the wire is damaged, repeat this procedure after removing the damaged section.
4. For high temperature wiring, slide a section of high temperature SCT1 shrink tubing down the length of wire to be spliced. Ensure that the shrink tubing will not interfere with the splice procedure.
5. Select the proper DuraSeal splice sleeve according to the wire size. Refer to the above table at the beginning of the repair procedure for the color coding of the DuraSeal splice sleeves and the crimp tool nests.

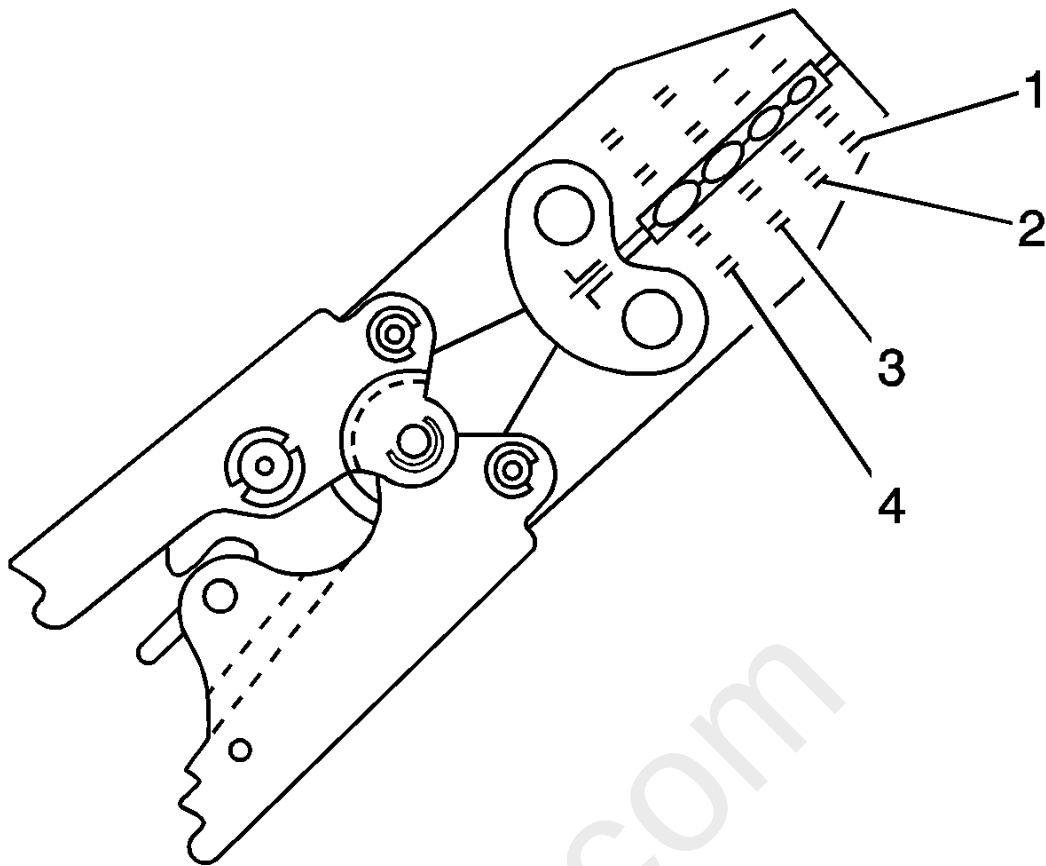


Fig. 8: Splice Sleeve Crimping Tool With 4 Crimp Nests
Courtesy of GENERAL MOTORS COMPANY

6. The **EL-38125-10** splice sleeve crimping tool has four crimp nests. The largest crimp nest (4) is used for crimping 10 and 12 gauge wires. The second largest crimp nest (3) is used for crimping 14 and 16 gauge wires. The third largest crimp nest (2) is used for crimping 18 and 20 gauge wires. The smallest crimp nest (1) is used for crimping 22 to 26 gauge wires. The crimp nests are referenced in the table (farther above) under the crimp tool nest color.

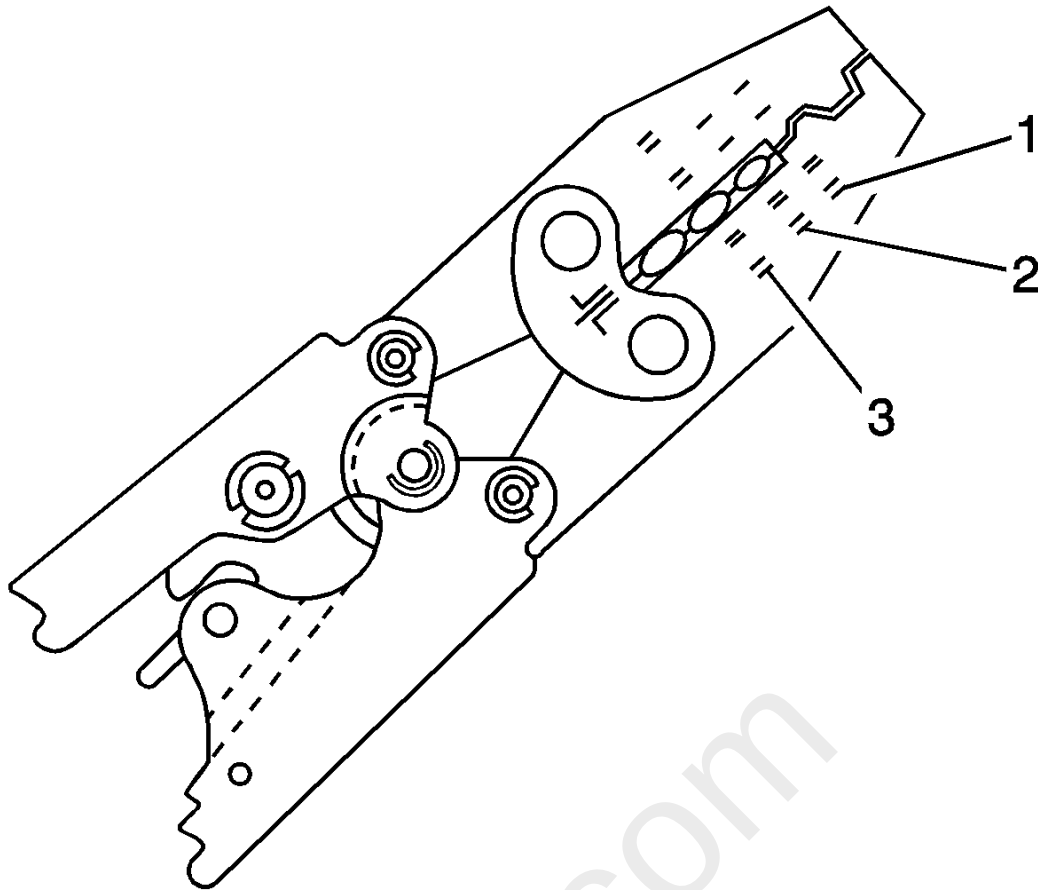


Fig. 9: Splice Sleeve Crimping Tool With 3 Crimp Nests
 Courtesy of GENERAL MOTORS COMPANY

7. The **J-38125-8** splice sleeve crimping tool has three crimp nests. The largest crimp nest (3) is used for crimping 10 and 12 gauge wires. The second largest crimp nest (2) is used for crimping 14 and 16 gauge wires. The smallest crimp nest (1) is used for crimping 18 to 20 gauge wires. The crimp nests are referenced in the table (farther above) under the crimp tool nest color.
8. Use the splice sleeve crimp tool in order to position the DuraSeal splice sleeve in the proper color nest of the splice sleeve crimp tool. For the four crimp nest tool, use the three largest crimp nests to crimp the splice sleeves. For the three crimp nest tool, use all three crimp nests to crimp the splice sleeves. Use the four and three crimp tool diagrams (above) and the table (farther above) to match the splice sleeve with the correct crimp nest. The crimp tool diagram callout numbers match the numbers in the table (under crimp tool nest color).

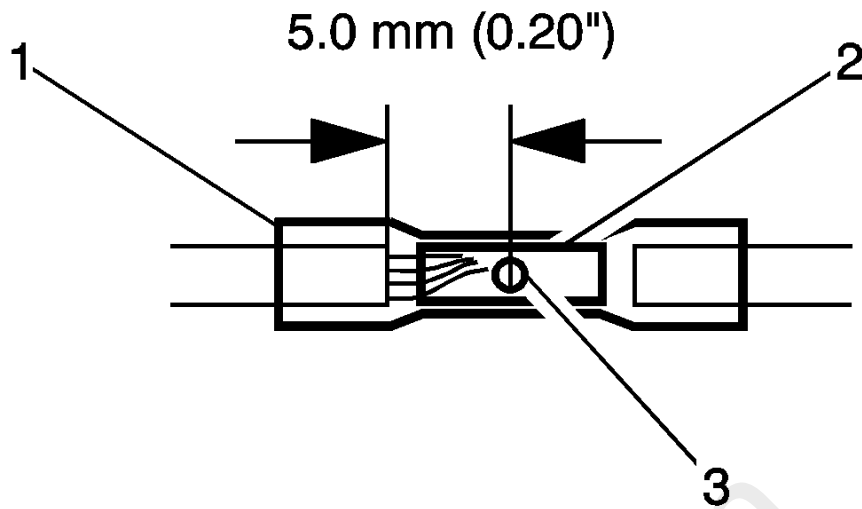


Fig. 10: Identifying DuraSeal Splice Sleeve
Courtesy of GENERAL MOTORS COMPANY

9. Place the DuraSeal splice sleeve in the nest. Ensure that the crimp falls midway between the end of the barrel and the stop. The sleeve has a stop (3) in the middle of the barrel (2) in order to prevent the wire (1) from going further. Close the hand crimper handles slightly in order to firmly hold the DuraSeal splice sleeve in the proper nest.



Fig. 11: Crimped DuraSeal Splice Sleeve

Courtesy of GENERAL MOTORS COMPANY

10. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop. Refer to **Folded-Over Wire Repair** for splicing wires of 0.35 mm or less (22, 24, 26 gauge sizes) and for splicing wires of different gauges.
11. Tightly close the handles of the crimp tool until the crimper handles open when released.

The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Repeat steps 4 and 6 for the opposite end of the splice.



Fig. 12: Heated Splice Sleeve

Courtesy of GENERAL MOTORS COMPANY

12. Using the heat torch, apply heat to the crimped area of the barrel.
13. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
 - The tubing will shrink completely as the heat is moved along the insulation.
 - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

Weatherpack™ Wiring Repair

NOTE: Some replacement pigtail connectors may be delivered without the terminated leads installed into the connector. For Weatherpack™ connectors, all terminated leads included in the package should to be installed into the connector. If the connector end view shows that a terminal is not occupied, the extra terminated lead(s) need to be installed and the end(s) sealed using a DuraSeal splice sleeve and taped back into the harness.

1. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop. Refer to **Folded-Over Wire Repair** for splicing wires of 0.35 mm or less (22, 24, 26 gauge sizes) and for splicing wires of different gauges.

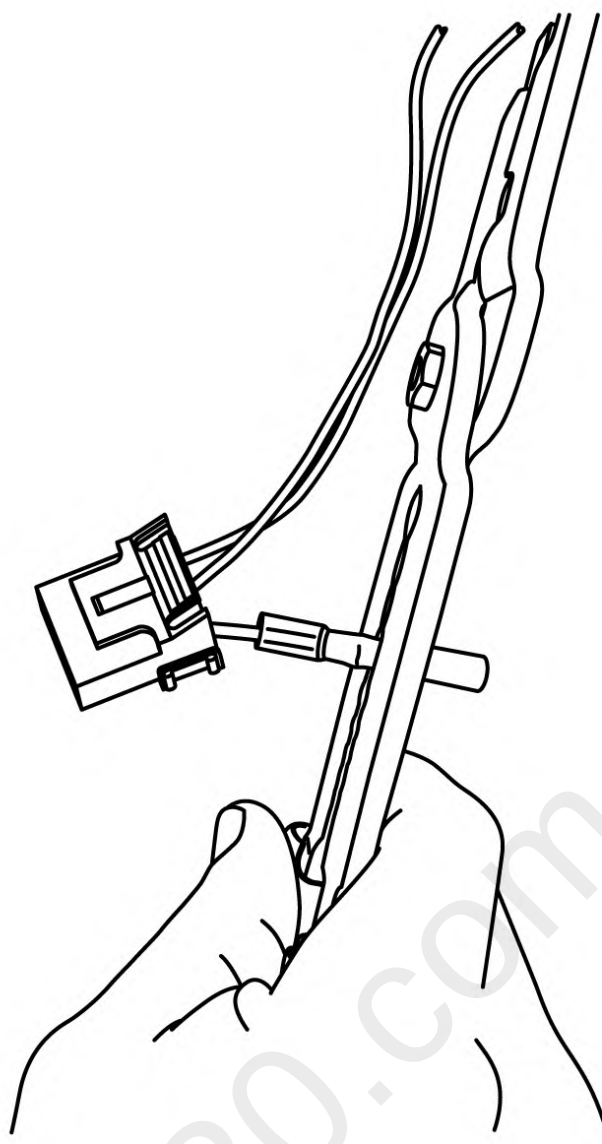


Fig. 13: Tightly Close Handles Of Crimp Tool
Courtesy of GENERAL MOTORS COMPANY

2. Tightly close the handles of the crimp tool until the crimper handles open when released.

The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Holding the DuraSeal with one hand gently tug on the wire to ensure it is crimped in the DuraSeal.

3. Using the heat torch, apply heat to the crimped area of the barrel.

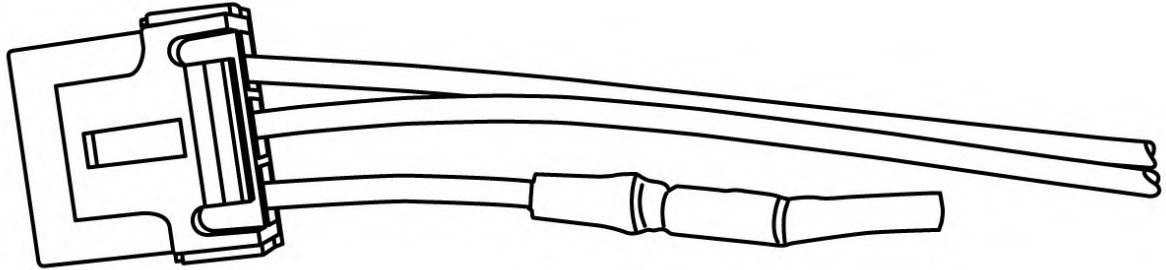


Fig. 14: Heat To Crimped Area Of Barrel

Courtesy of GENERAL MOTORS COMPANY

4. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
 - The tubing will shrink completely as the heat is moved along the insulation.
 - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

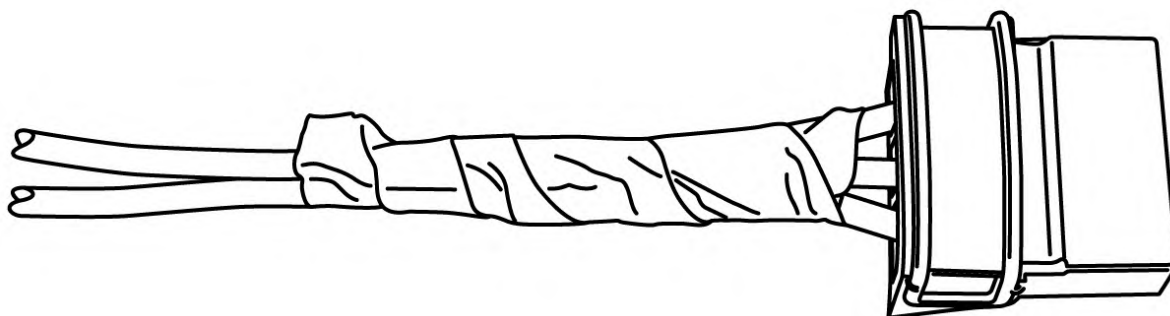


Fig. 15: Taping Extra Terminated Leads Back Into Harness
Courtesy of GENERAL MOTORS COMPANY

5. Tape the extra terminated lead(s) back into the harness.

High Temperature Wiring Repairs

Use the following procedures to perform high temperature wiring repairs:

1. Center the high temperature SCT1 shrink tube over the DuraSeal splice sleeve.
2. Using the heat torch, apply heat to the high temperature heat shrink tubing.
3. Gradually move the heat from the center to the open end of the tubing:
 - The tubing will shrink completely as the heat is moved along the insulation.
 - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.
4. Replace any reflective tape and clips that may have been removed during the repair.

CONNECTOR RECONNECTION - STEERING

Special Tools

EL-35616 Terminal Test Probe Kit

For equivalent regional tools, refer to [Special Tools](#) .

When the condition is not currently present, but is indicated in DTC history, the cause may be intermittent. An intermittent may also be the cause when there is a customer complaint, but the symptom cannot be duplicated. Refer to the Symptom Table of the system that is suspect of causing the condition before trying to locate an intermittent condition.

Most intermittent conditions are caused by faulty electrical connections or wiring. Inspect for the following items:

- Loose, corroded, or painted terminal stud/fastener
- Wiring broken inside the insulation
- Poor connection between the male and female terminal at a connector
- A terminal not seated all the way into the connector body
- Poor terminal to wire connection - Some conditions which fall under this description are poor crimps, poor solder joints, crimping over the wire insulation rather than the wire itself, and corrosion in the wire to terminal contact area, etc.
- Pierced or damaged insulation can allow moisture to enter the wiring causing corrosion. The conductor can corrode inside the insulation, with little visible evidence. Look for swollen and stiff sections of wire in the suspect circuits.
- Wiring which has been pinched, cut, or its insulation rubbed through may cause an intermittent open or short as the bare area touches other wiring or parts of the vehicle.
- Wiring that comes in contact with hot or exhaust components
- Refer to [**Inducing Intermittent Fault Conditions**](#) in order to duplicate the conditions required, in order to verify the customer concern.
- Refer to [**Testing for Electrical Intermittents**](#) for test procedures to detect intermittent open, high resistance, short to ground, and short to voltage conditions.
- Refer to [**Scan Tool Snapshot Procedure**](#) for advanced intermittent diagnosis and Vehicle Data Recorder operation.

Testing for Terminal Fretting

Some intermittent conditions can be caused by wire terminal fretting corrosion. Fretting corrosion is a build-up of insulating, oxidized wear debris that can form when there is a small motion between electrical contacts. The oxidized wear debris can pile up enough at the electrical contact spots that the electrical resistance across the connection increases. Movement between the contacting surfaces as small as 10 to 100 microns can cause fretting. To put this in perspective, a sheet of paper is about 100 microns thick, so fretting motion is small and hard to see. Vibration and thermal expansion/contraction are the main sources that create fretting motion. Since vehicles vibrate and can experience large temperature swings, they are a good source for fretting motion. Tin, copper, nickel, and iron surfaces are all susceptible to fretting corrosion. Fretting corrosion can be difficult to see but it looks like small, dark smudges on the terminals contact surface.

To correct a fretting condition disconnect the suspect connector and add dielectric grease/lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087) to both sides of the connector terminals. Then reconnect the connector and wipe away any excess lubricant. This will correct the additional terminal contact resistance due to the terminal fretting corrosion.

Testing for Proper Terminal Contact

It is important to test terminal contact at the component and any inline connectors before replacing a suspect component. Mating terminals must be inspected to ensure good terminal contact. A poor connection between the male and female terminal at a connector may be the result of contamination or deformation.

Contamination may be caused by the connector halves being improperly connected. A missing or damaged connector seal, damage to the connector itself, or exposing the terminals to moisture and dirt can also cause contamination. Contamination, usually in the underhood or underbody connectors, leads to terminal corrosion, causing an open circuit or intermittently open circuit.

Deformation is caused by probing the mating side of a connector terminal without the proper adapter. Always use the **EL-35616** kit when probing connectors. Other causes of terminal deformation are improperly joining the connector halves, or repeatedly separating and joining the connector halves. Deformation, usually to the female terminal contact tang, can result in poor terminal contact causing an open or intermittently open circuit.

Testing for Proper Terminal Contact in Bussed Electrical Centers

It is very important to use the correct test adapter when testing for proper terminal contact of fuses and relays in a bussed electrical center. Use the **EL-35616** kit to test for proper terminal contact. Failure to use the **EL-35616** kit can result in improper diagnosis of the bussed electrical center.

Follow the procedure below in order to test terminal contact:

1. Separate the connector halves.
2. Visually inspect the connector halves for contamination. Contamination may result in a white or green build-up within the connector body or between terminals. This causes high terminal resistance, intermittent contact, or an open circuit. An underhood or underbody connector that shows signs of contamination should be replaced in its entirety: terminals, seals, and connector body.
3. Using an equivalent male terminal/terminated lead, verify that the retention force is significantly different between a known good terminal and the suspect terminal. Replace the female terminal in question.

Flat Wire Connectors

There are no serviceable parts for flat wire connectors on the harness side or the component side.

Follow the procedure below in order to test terminal contact:

1. Remove the component in question.
2. Visually inspect each side of the connector for signs of contamination. Avoid touching either side of the connector as oil from your skin may be a source of contamination as well.
3. Visually inspect the terminal bearing surfaces of the flat wire circuits for splits, cracks, or other imperfections that could cause poor terminal contact. Visually inspect the component side connector to ensure that all of the terminals are uniform and free of damage or deformation.
4. Insert the appropriate adapter into the flat wire harness connector in order to test the circuit in question.

Control Module/Component Voltage and Grounds

Poor voltage or ground connections can cause widely varying symptoms.

- Test all control module voltage supply circuits. Many vehicles have multiple circuits supplying voltage to a control module. Other components in the system may have separate voltage supply circuits that may also need to be tested. Inspect connections at the module/component connectors, fuses, and any intermediate connections between the voltage source and the module/component. A test lamp or a DMM may indicate that voltage is present, but neither tests the ability of the circuit to carry sufficient current. Operate the component to test the ability of the circuit to carry sufficient current. Refer to [Circuit Testing](#) , and [Power Distribution Schematics \(Buick\)](#) , [Power Distribution Schematics \(Chevrolet\)](#) .
- Test all control module ground and system ground circuits. The control module may have multiple ground circuits. Other components in the system may have separate grounds that may also need to be tested. Inspect grounds for clean and tight connections at the grounding point (screw or stud). Inspect the connections at the component and in splice packs, where applicable. Operate the component to test the ability of the circuit to carry sufficient current. Refer to [Circuit Testing](#) , and [Ground Distribution Schematics \(Buick\)](#) , [Ground Distribution Schematics \(Chevrolet\)](#) .

Temperature Sensitivity

- An intermittent condition may occur when a component/connection reaches normal operating temperature. The condition may occur only when the component/connection is cold, or only when the component/connection is hot.
- Freeze Frame, Failure Records, Snapshot, or Vehicle Data Recorder data may help with this type of intermittent condition, where applicable.
- If the intermittent is related to heat, review the data for a relationship with the following:
 - High ambient temperatures
 - Underhood/engine generated heat

- Circuit generated heat due to a poor connection, or high electrical load
- Higher than normal load conditions, towing, etc.
- If the intermittent is related to cold, review the data for the following:
 - Low ambient temperatures - In extremely low temperatures, ice may form in a connection or component. Inspect for water intrusion.
 - The condition only occurs on a cold start.
 - The condition goes away when the vehicle warms up.
- Information from the customer may help to determine if the trouble follows a pattern that is temperature related.
- If temperature is suspected of causing an intermittent fault condition, attempt to duplicate the condition. Refer to [Inducing Intermittent Fault Conditions](#) in order to duplicate the conditions required.

Electromagnetic Interference and Electrical Noise

Some electrical components/circuits are sensitive to electromagnetic interference or other types of electrical noise. Inspect for the following conditions:

- A mis-routed harness that is too close to high voltage/high current devices such as secondary ignition components, motors, generator etc. - These components may induce electrical noise on a circuit that could interfere with normal circuit operation.
- Electrical system interference caused by a malfunctioning relay, or a control module driven solenoid or switch - These conditions can cause a sharp electrical surge. Normally, the condition will occur when the malfunctioning component is operating.
- Installation of non-factory or aftermarket add on accessories such as lights, 2-way radios, amplifiers, electric motors, remote starters, alarm systems, cell phones, etc. - These accessories may create interference in other circuits while operating and the interference would disappear when the accessory is not operating. Refer to [Checking Aftermarket Accessories](#).
- Test for an open diode across the A/C compressor clutch and for other open diodes. Some relays may contain a clamping diode.
- The generator may be allowing AC noise into the electrical system.

Incorrect Control Module

- There are only a few situations where reprogramming a control module is appropriate:
 - A new service control module is installed.
 - A control module from another vehicle is installed.
 - Revised software/calibration files have been released for this vehicle.

NOTE: **DO NOT re-program the control module with the SAME software/calibration files that are already present in the control module. This is not an effective repair for any type of concern.**

- Verify that the control module contains the correct software/calibration. If incorrect programming is found, reprogram the control module with the most current software/calibration. Refer to [Control Module References](#) for replacement, setup, and programming.

INTERMEDIATE STEERING SHAFT UPPER SEAL REPLACEMENT

Removal Procedure

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column

- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

1. With the steering wheel in the straight ahead position, LOCK the steering column.
2. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.
3. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

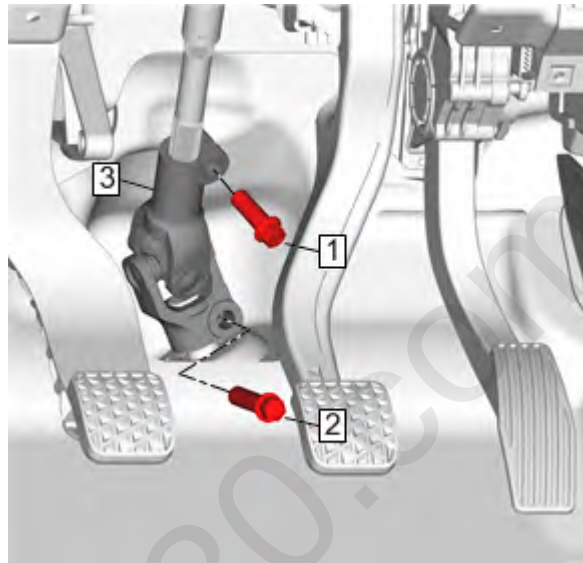
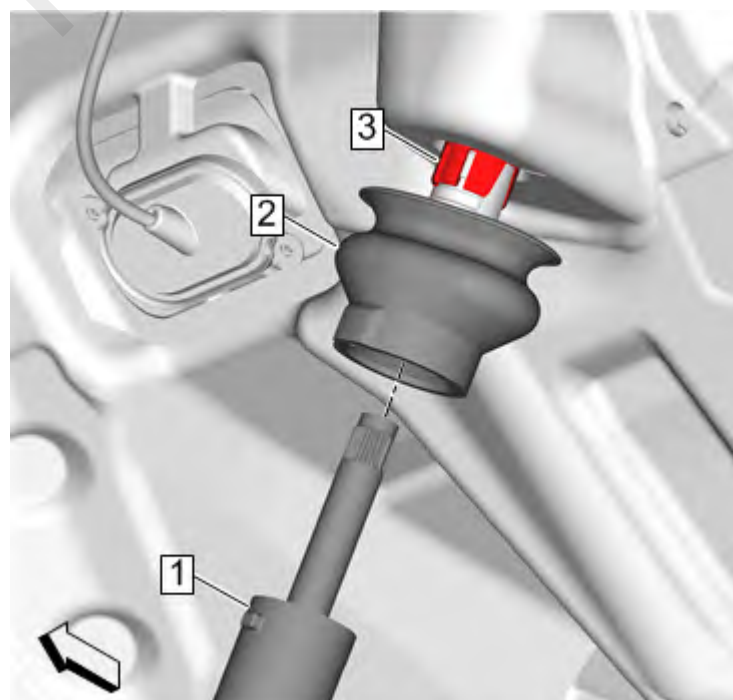


Fig. 16: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Remove Intermediate Steering Shaft Middle Bolt (1)
5. Remove Intermediate Steering Shaft Lower Bolt (2)
6. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.



NOTE: The intermediate steering shaft inner boot retaining tabs **CANNOT** be released from inside of the vehicle. The retaining tabs **MUST** be released from underneath the vehicle.

7. Lower the steering gear (1) to gain full access the intermediate steering shaft boot (2). Refer to [Steering Gear Replacement \(N40 With MNK\)](#), [Steering Gear Replacement \(NJ1 With MNH or MNK\)](#), [Steering Gear Replacement \(NJ1 With MR5\)](#), [Steering Gear Replacement \(N40 With M4P\)](#).
8. Position the upper lip of the intermediate steering shaft boot (2) downwards to expose the intermediate steering shaft inner boot retaining tabs (3).
9. Release the intermediate steering shaft inner boot retaining tabs (3) and completely disengage the intermediate steering shaft boot (2).



Fig. 18: Intermediate Steering Shaft Inner Boot
Courtesy of GENERAL MOTORS COMPANY

10. Remove the intermediate steering shaft inner boot (1) from inside of the vehicle.

Installation Procedure



Fig. 19: Intermediate Steering Shaft Inner Boot
Courtesy of GENERAL MOTORS COMPANY

1. Use an assistant to position and hold the intermediate steering shaft inner boot (1) inside of the vehicle.

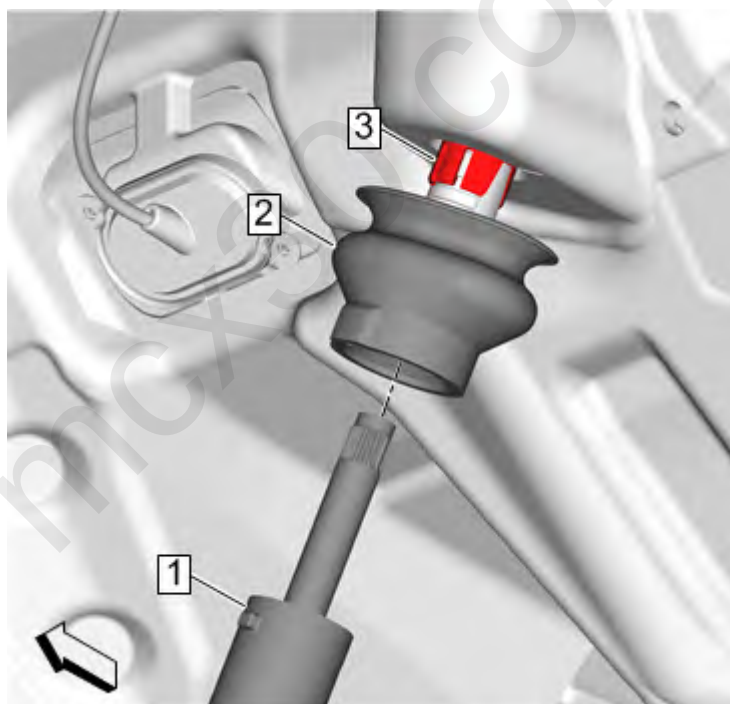


Fig. 20: Steering Gear, Intermediate Steering Shaft Boot And Inner Boot Retaining Tabs
Courtesy of GENERAL MOTORS COMPANY

2. Underneath the vehicle, position the upper lip of the intermediate steering shaft boot (2) downwards and align the plastic piece of the boot with the intermediate steering shaft inner boot retaining tabs (3) and push upwards until ALL of the retaining tabs are completely locked in place.
3. Release the upper lip of the intermediate steering shaft boot (2) and position the boot in the same exact position it was in before removing.
4. Slowly raise the steering gear (1) while keeping the notch on the intermediate steering shaft boot (2) aligned with the notch on the steering gear.
5. Once properly aligned, finish installing all components underneath the vehicle. Refer to [Steering Gear Replacement \(N40 With MNK\)](#), [Steering Gear Replacement \(NJ1 With MNH or MNK\)](#), [Steering Gear Replacement \(NJ1 With MR5\)](#), [Steering Gear Replacement \(N40 With M4P\)](#).

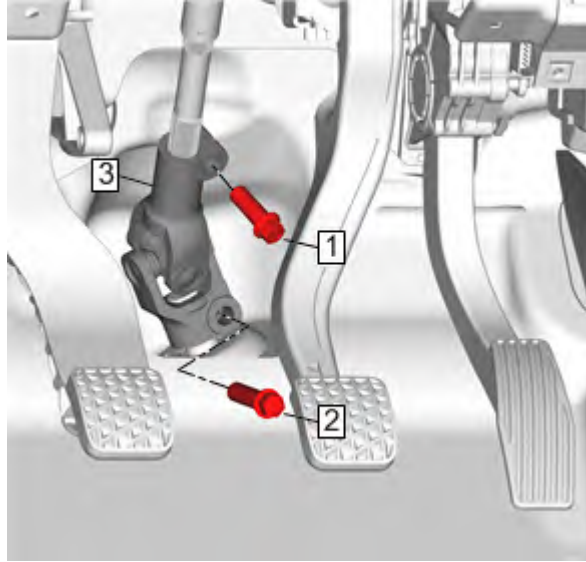


Fig. 21: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
7. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
8. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

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

9. Install and tighten Intermediate Steering Shaft Lower Bolt (2) to 49 N.m (36 lb ft)
10. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)

INTERMEDIATE STEERING SHAFT BOOT REPLACEMENT

Removal Procedure

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

1. With the steering wheel in the straight ahead position, LOCK the steering column.
2. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.
3. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

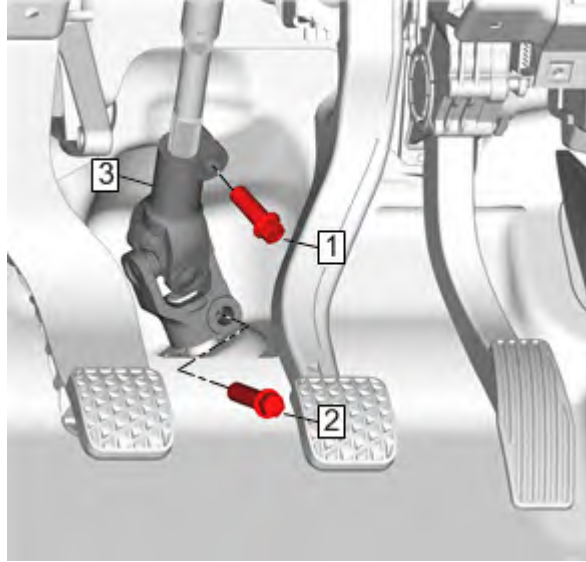


Fig. 22: Intermediate Steering Shaft Lower Universal Joint And Bolts
 Courtesy of GENERAL MOTORS COMPANY

4. Remove Intermediate Steering Shaft Middle Bolt (1)
5. Remove Intermediate Steering Shaft Lower Bolt (2)
6. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.

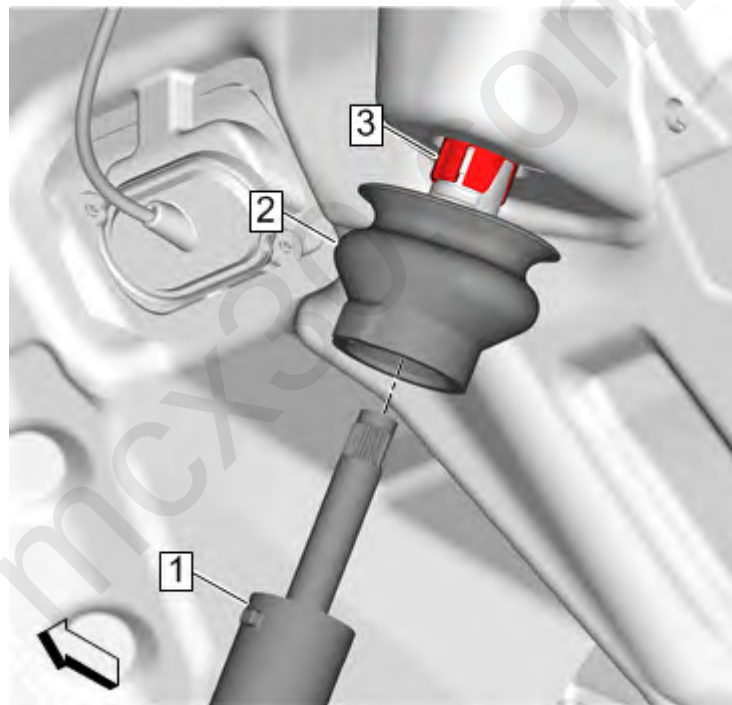


Fig. 23: Steering Gear, Intermediate Steering Shaft Boot And Inner Boot Retaining Tabs
 Courtesy of GENERAL MOTORS COMPANY

NOTE: The intermediate steering shaft inner boot retaining tabs **CANNOT** be released from inside of the vehicle. The retaining tabs **MUST** be released from underneath the vehicle.

7. Lower the steering gear (1) to gain full access the intermediate steering shaft boot (2). Refer to [Steering Gear Replacement \(N40 With MNK\)](#), [Steering Gear Replacement \(NJ1 With MNH or MNK\)](#), [Steering Gear Replacement \(NJ1 With MR5\)](#), [Steering Gear Replacement \(N40 With M4P\)](#).
8. Position the upper lip of the intermediate steering shaft boot (2) downwards to expose the intermediate steering shaft inner boot retaining tabs (3).
9. Release the intermediate steering shaft inner boot retaining tabs (3) and completely disengage the intermediate steering shaft boot (2).

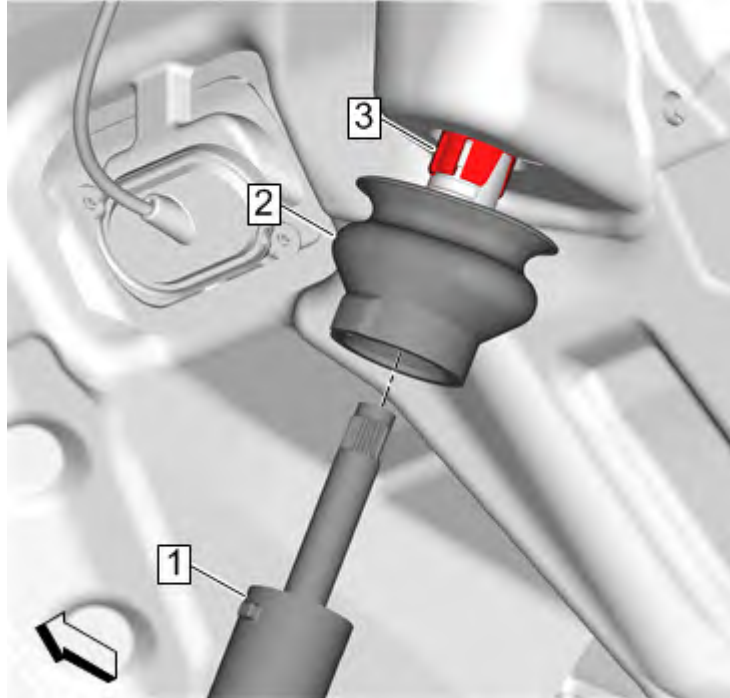


Fig. 24: Steering Gear, Intermediate Steering Shaft Boot And Inner Boot Retaining Tabs
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Use an assistant to position and hold the intermediate steering shaft inner boot inside of the vehicle.

1. Underneath the vehicle, position the upper lip of the intermediate steering shaft boot (2) downwards and align the plastic piece of the boot with the intermediate steering shaft inner boot retaining tabs (3) and push upwards until ALL of the retaining tabs are completely locked in place.
2. Release the upper lip of the intermediate steering shaft boot (2) and position the boot in the same exact position it was in before removing.
3. Slowly raise the steering gear (1) while keeping the notch on the intermediate steering shaft boot (2) aligned with the notch on the steering gear.
4. Once properly aligned, finish installing all components underneath the vehicle. Refer to [Steering Gear Replacement \(N40 With MNK\)](#), [Steering Gear Replacement \(NJ1 With MNH or MNK\)](#), [Steering Gear Replacement \(NJ1 With MR5\)](#), [Steering Gear Replacement \(N40 With M4P\)](#).

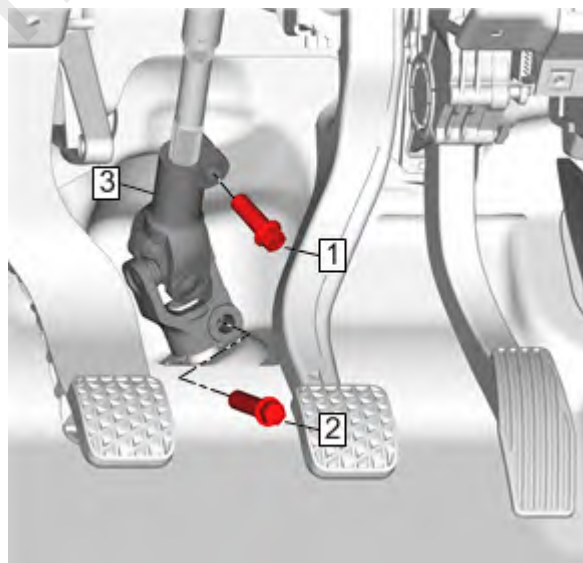


Fig. 25: Intermediate Steering Shaft Lower Universal Joint And Bolts
 Courtesy of GENERAL MOTORS COMPANY

5. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
6. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

7. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

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

8. Install and tighten Intermediate Steering Shaft Lower Bolt (2) to 49 N.m (36 lb ft)
9. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)

INTERMEDIATE STEERING SHAFT REPLACEMENT (N40)

Removal Procedure

1. Remove Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Buick, With BTM\)](#), [Steering Column Lower Trim Cover Replacement \(Chevrolet, With BTM\)](#), [Steering Column Lower Trim Cover Replacement \(Chevrolet, Without BTM\)](#)

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

2. With the steering wheel in the straight ahead position, LOCK the steering column.
3. Remove Instrument Panel Knee Bolster Inner Bracket. Refer to [Instrument Panel Knee Bolster Inner Bracket Replacement](#)
4. Remove Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#), [Floor Front Air Outlet Duct Replacement - Left Side \(Buick\)](#)
5. Disconnect any electrical connectors as necessary.
6. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.
7. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

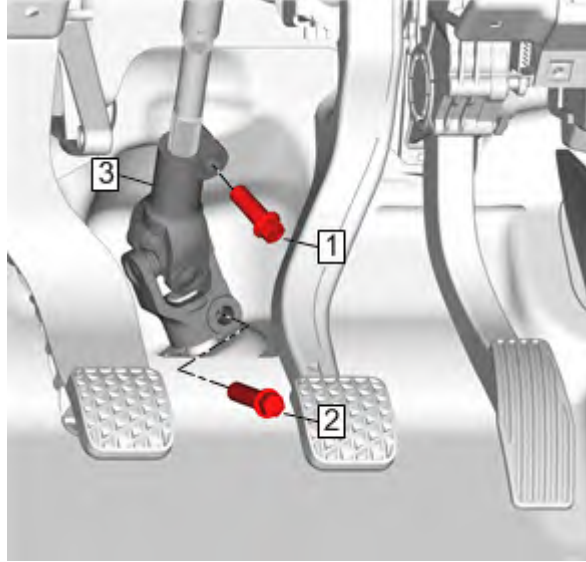


Fig. 26: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Remove Intermediate Steering Shaft Middle Bolt (1)
9. Remove Intermediate Steering Shaft Lower Bolt (2)

NOTE: If the intermediate steering shaft lower universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slots as necessary.

10. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.
11. Place match marks on the intermediate steering shaft upper universal joint and the steering column shaft.

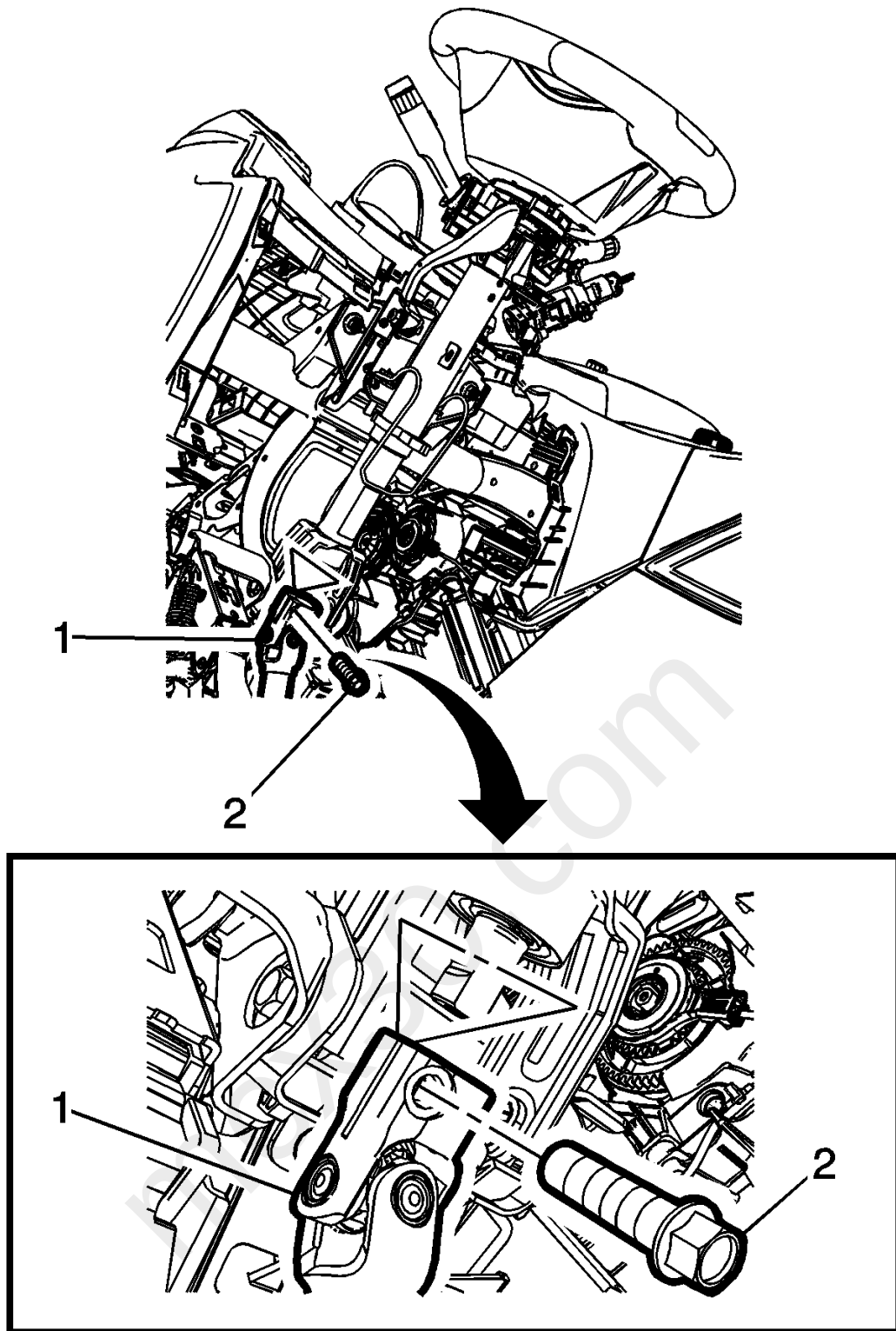


Fig. 27: Intermediate Steering Shaft Upper Universal Joint And Bolt
 Courtesy of GENERAL MOTORS COMPANY

12. Remove Intermediate Steering Shaft Upper Bolt (2)

NOTE: If the intermediate steering shaft upper universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slot as necessary.

13. Separate Intermediate Steering Shaft Upper Universal Joint (1) @ Steering Column

14. Remove the intermediate steering shaft and upper universal joint (1) from the vehicle.

15. If replacing the intermediate steering shaft, copy the match marks from the OLD shaft to the NEW shaft.

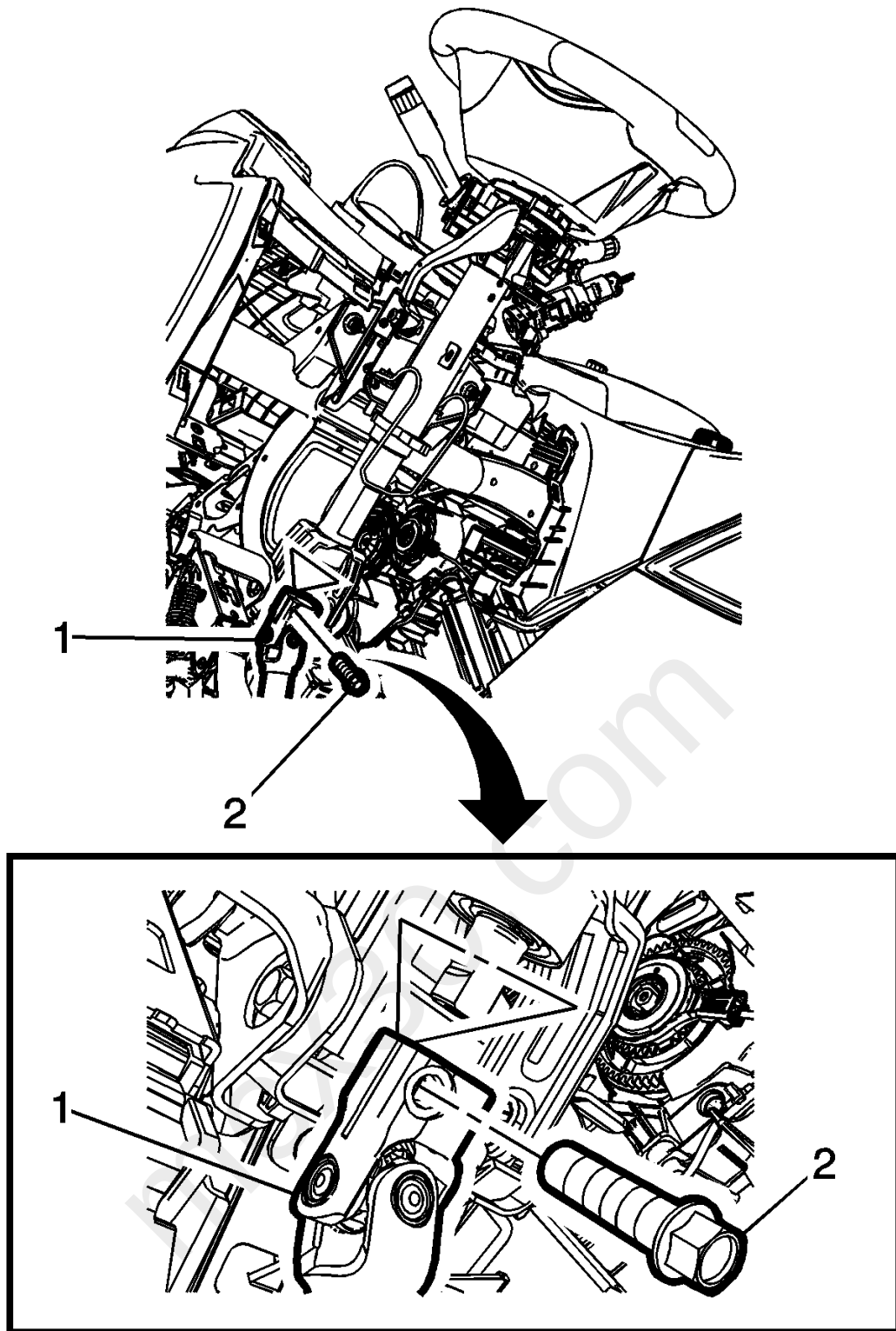


Fig. 28: Intermediate Steering Shaft Upper Universal Joint And Bolt
 Courtesy of GENERAL MOTORS COMPANY

1. Position the intermediate steering shaft and upper universal joint (1) in the vehicle.
2. Align the match marks on the intermediate steering shaft upper universal joint and the steering column shaft to aid in installation.
3. Install Intermediate Steering Shaft Upper Universal Joint (1 @ Steering Column

CAUTION: Refer to **Fastener Caution** .

4. Install and tighten Intermediate Steering Shaft Upper Bolt (2) to 49 N.m (36 lb ft)
5. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
6. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

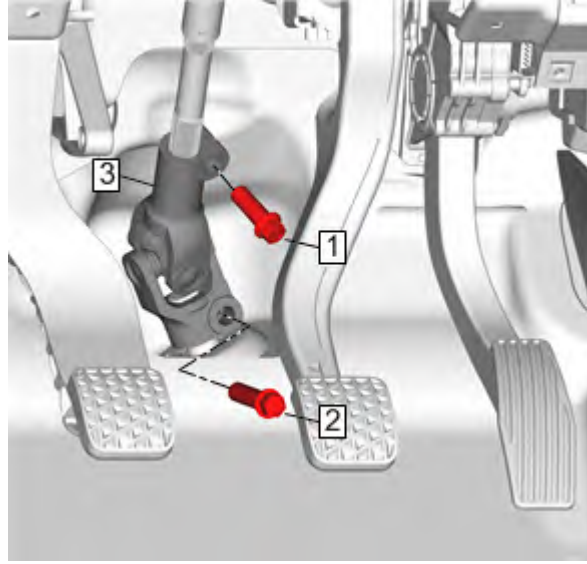


Fig. 29: Intermediate Steering Shaft Lower Universal Joint And Bolts
 Courtesy of GENERAL MOTORS COMPANY

7. Install the intermediate steering shaft lower universal joint (3) in the vehicle.
8. Install and tighten Intermediate Steering Shaft Lower Bolt (2) to 49 N.m (36 lb ft)
9. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)
10. Connect any electrical connectors as necessary.
11. Install Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#), [Floor Front Air Outlet Duct Replacement - Left Side \(Buick\)](#).
12. Install Instrument Panel Knee Bolster Inner Bracket. Refer to [Instrument Panel Knee Bolster Inner Bracket Replacement](#)
13. Install Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Buick, With BTM\)](#), [Steering Column Lower Trim Cover Replacement \(Chevrolet, With BTM\)](#), [Steering Column Lower Trim Cover Replacement \(Chevrolet, Without BTM\)](#).
14. Center the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#)

INTERMEDIATE STEERING SHAFT REPLACEMENT (NJ1)

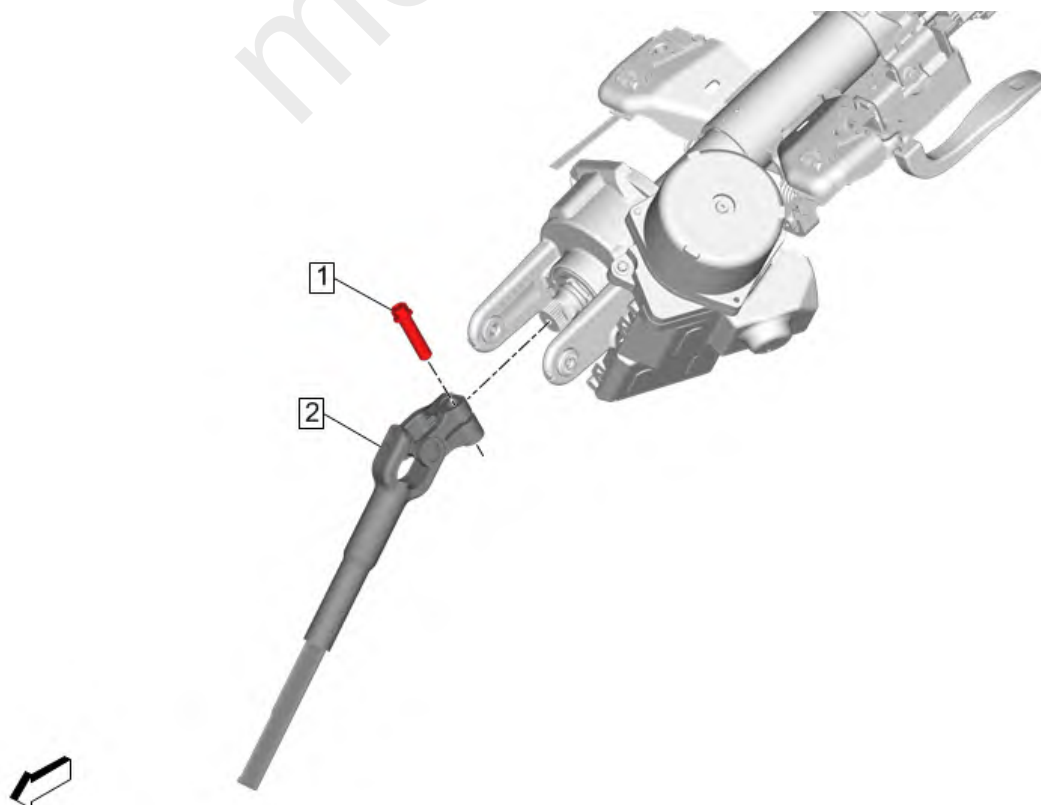


Fig. 30: Intermediate Steering Shaft (NJ1)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Column. Refer to Steering Column Replacement (Buick, Mexico, NJ1, With BTM, With N06) Steering Column Replacement (Buick, Canada/United States, NJ1, With BTM, Without N06) Steering Column Replacement (Chevrolet, Mexico, NJ1, With BTM, With N06) Steering Column Replacement (Chevrolet, Canada/United States, NJ1, With BTM, Without N06) Steering Column Replacement (Chevrolet, Canada/United States, NJ1, Without BTM, Without N06) Steering Column Replacement (Chevrolet, Mexico, NJ1, Without BTM, Without N06) .	
1	Intermediate Steering Shaft Upper Bolt CAUTION: Refer to Fastener Caution . Tighten 49 N.m (36 lb ft)
2	Intermediate Steering Shaft Procedure 1. Program the power steering control module. Refer to Power Steering Control Module Programming and Setup 2. Center the steering angle sensor. Refer to Steering Wheel Angle Sensor Centering

STEERING COLUMN UPPER TRIM COVER REPLACEMENT (CHEVROLET, WITH BTM)

Removal Procedure

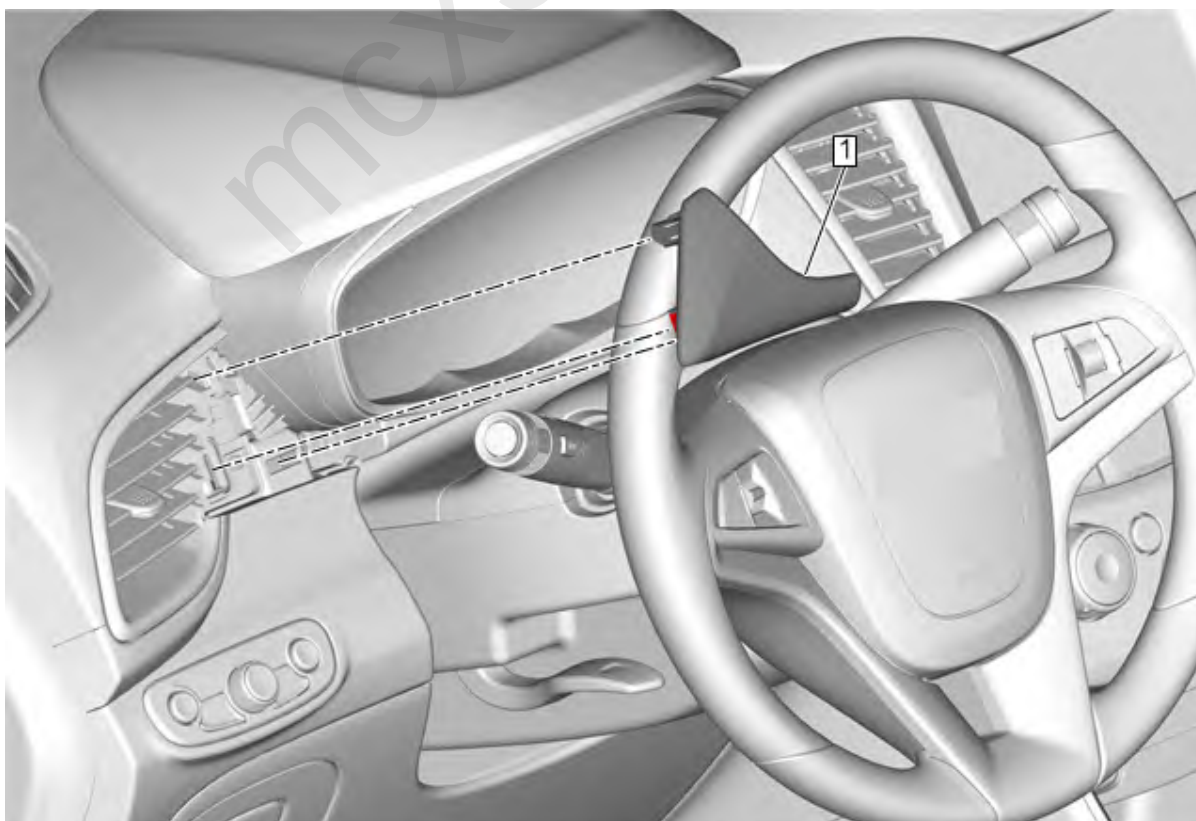


Fig. 31: Instrument Panel Upper Trim Panel - Left Side
 Courtesy of GENERAL MOTORS COMPANY

1. Remove Instrument Panel Upper Trim Panel - Left Side (1). Refer to [Instrument Panel Upper Trim Panel Replacement - Left Side \(Chevrolet\)](#).

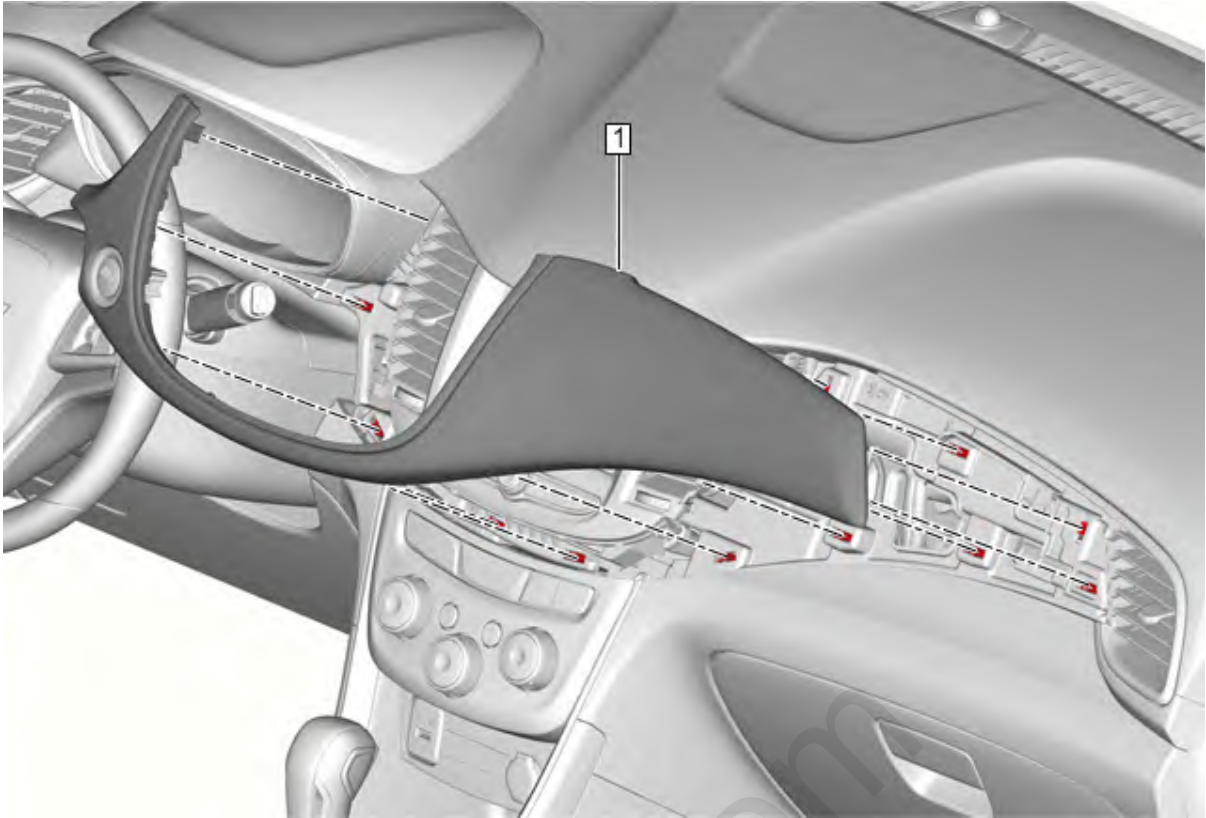


Fig. 32: Instrument Panel Upper Trim Panel - Right Side
Courtesy of GENERAL MOTORS COMPANY

2. Remove Instrument Panel Upper Trim Panel - Right Side (1). Refer to [Instrument Panel Upper Trim Panel Replacement - Right Side \(Chevrolet\)](#).

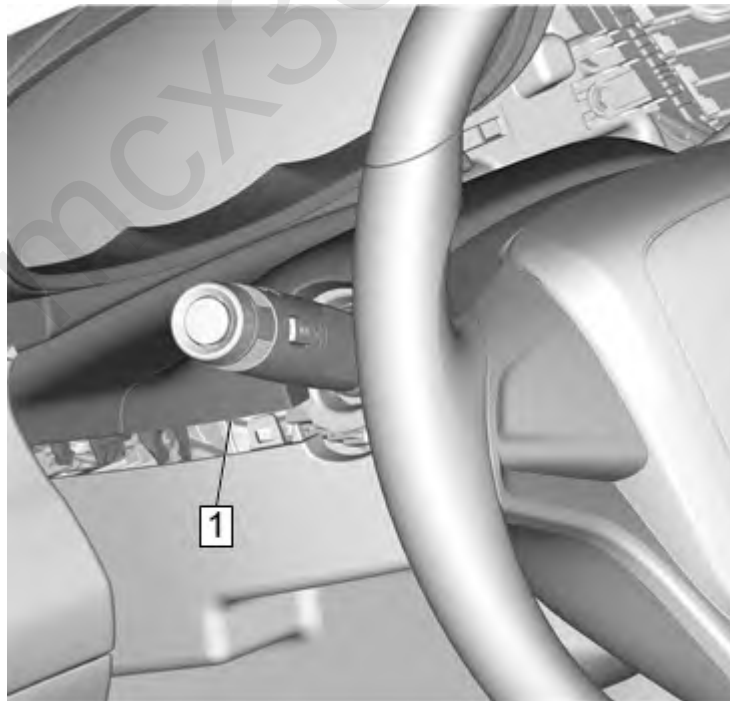


Fig. 33: Steering Column Upper Trim Cover
Courtesy of GENERAL MOTORS COMPANY

3. Unclip the steering column upper trim cover (1) from the steering column lower trim cover.
Use a flat bladed plastic trim tool.

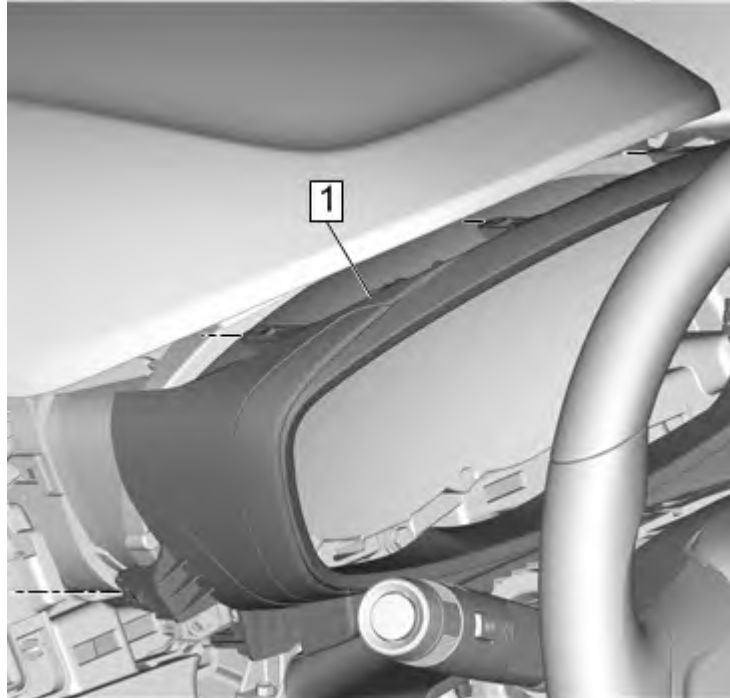


Fig. 34: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

4. Unclip the steering column upper trim cover (1) from the instrument panel instrument cluster hood.

Use a flat bladed plastic trim tool.

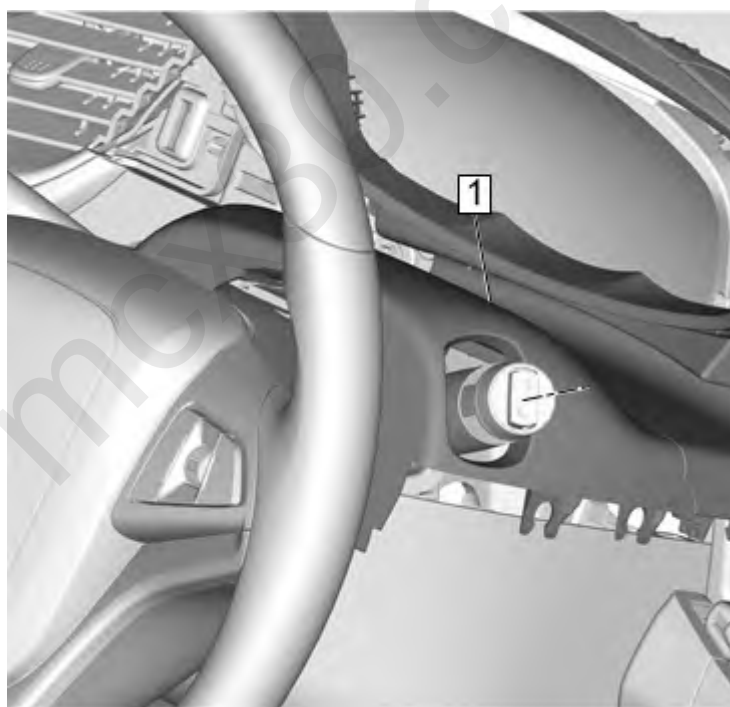


Fig. 35: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

5. Slide the steering column upper trim cover (1) over the windshield wiper and washer switch and remove the trim cover from the instrument panel.

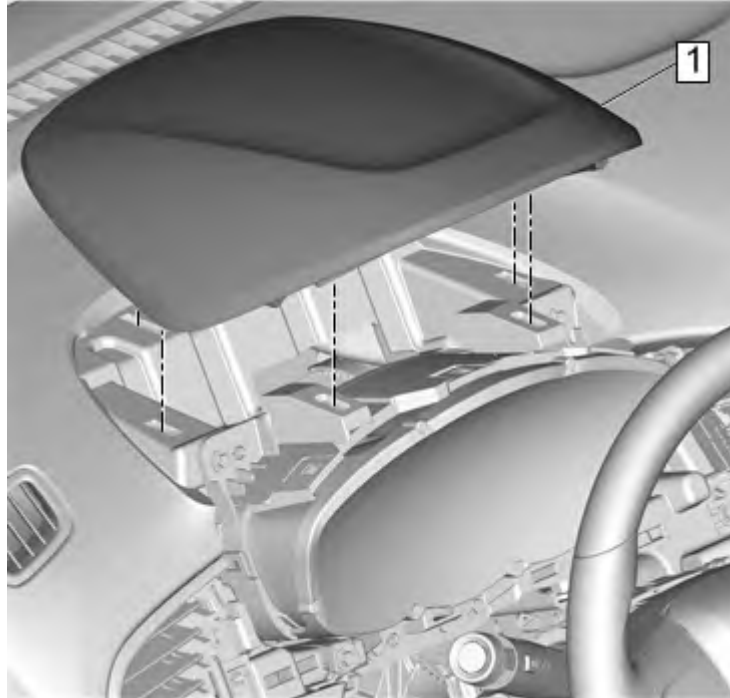


Fig. 36: Instrument Panel Instrument Cluster Hood
Courtesy of GENERAL MOTORS COMPANY

6. Finish removing the instrument panel instrument cluster hood (1). Refer to [Instrument Panel Instrument Cluster Hood Replacement \(Chevrolet\)](#).

Installation Procedure

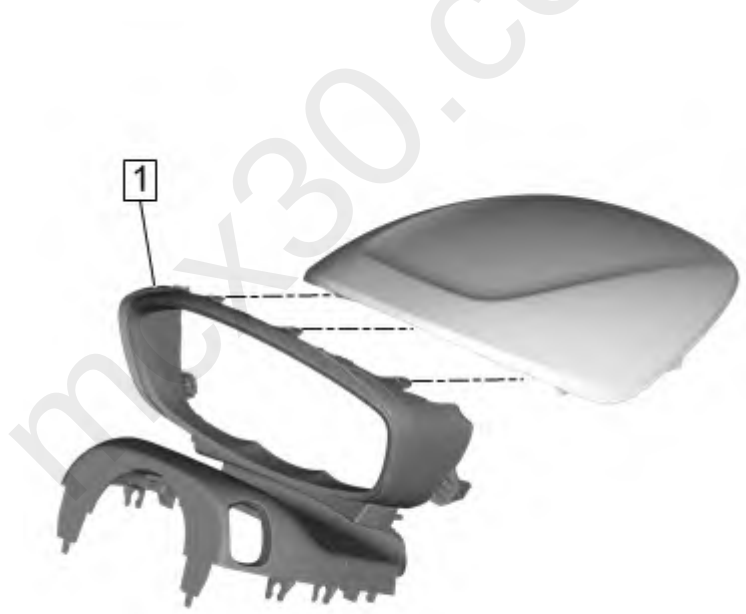


Fig. 37: Steering Column Upper Trim Cover
Courtesy of GENERAL MOTORS COMPANY

1. Clip the steering column upper trim cover (1) to the instrument panel instrument cluster hood.

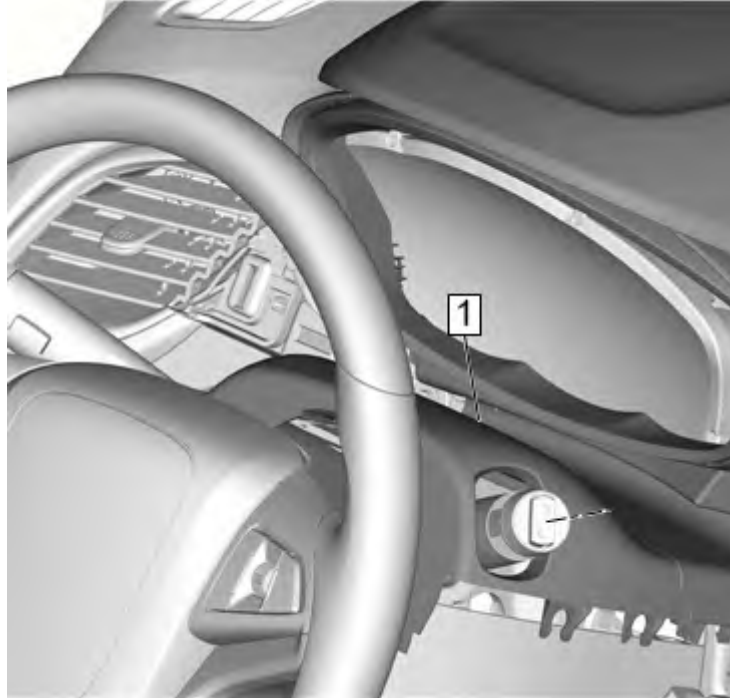


Fig. 38: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

2. Slide the steering column upper trim cover (1) and the instrument panel instrument cluster hood over the windshield wiper and washer switch and clip the trim cover and the cluster hood to the instrument panel. Refer to [Instrument Panel Instrument Cluster Hood Replacement \(Chevrolet\)](#)

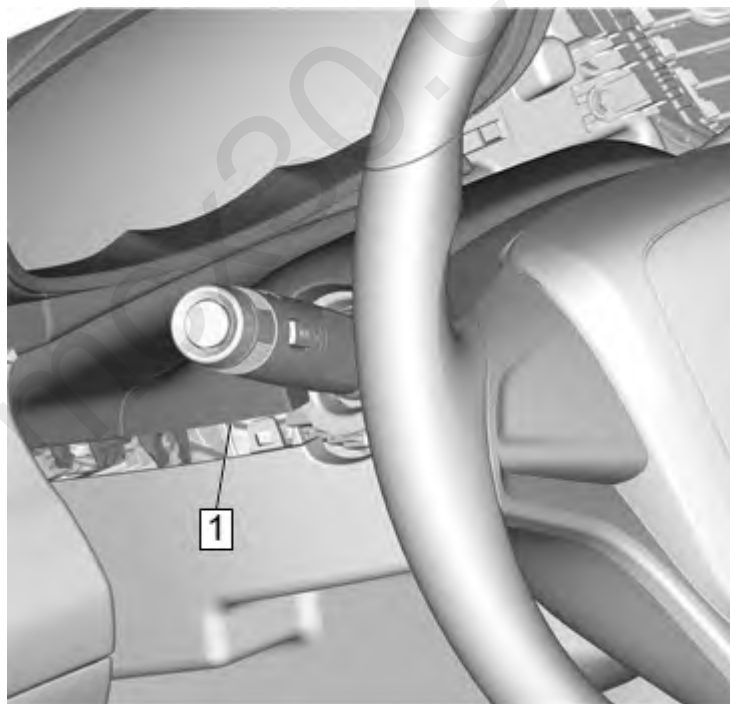


Fig. 39: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

3. Clip the steering column upper trim cover (1) to the steering column lower trim cover.

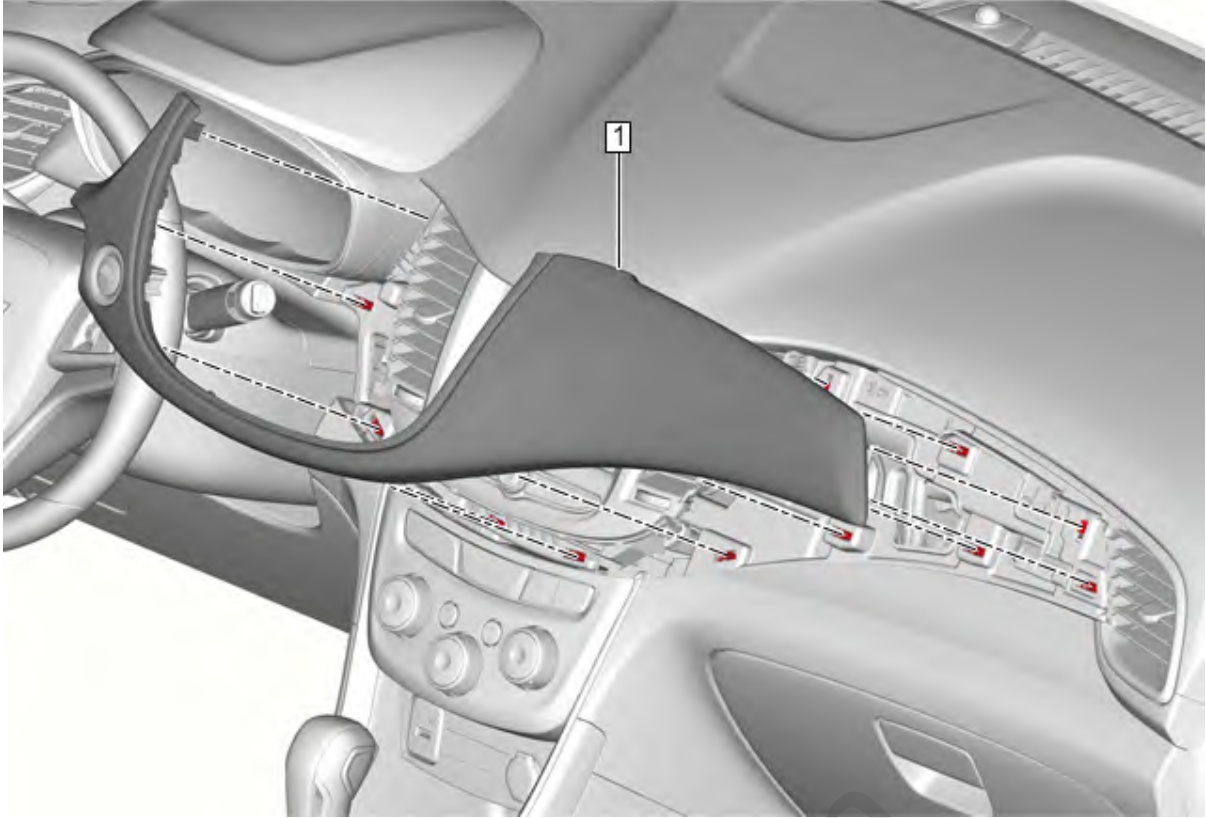


Fig. 40: Instrument Panel Upper Trim Panel - Right Side
 Courtesy of GENERAL MOTORS COMPANY

4. Install Instrument Panel Upper Trim Panel - Right Side (1). Refer to [Instrument Panel Upper Trim Panel Replacement - Right Side \(Chevrolet\)](#)

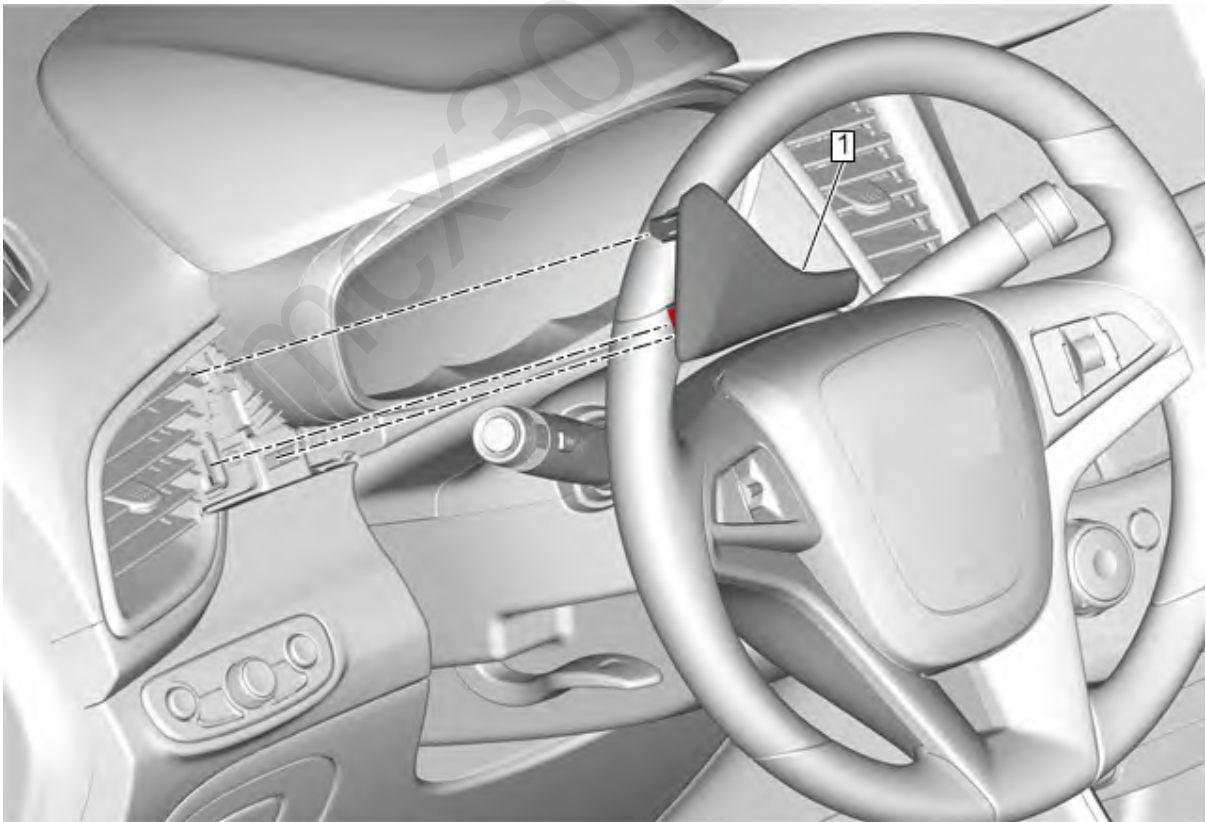


Fig. 41: Instrument Panel Upper Trim Panel - Left Side
 Courtesy of GENERAL MOTORS COMPANY

5. Install Instrument Panel Upper Trim Panel - Left Side (1). Refer to [Instrument Panel Upper Trim Panel Replacement - Left Side \(Chevrolet\)](#)

STEERING COLUMN UPPER TRIM COVER REPLACEMENT (CHEVROLET, WITHOUT BTM)

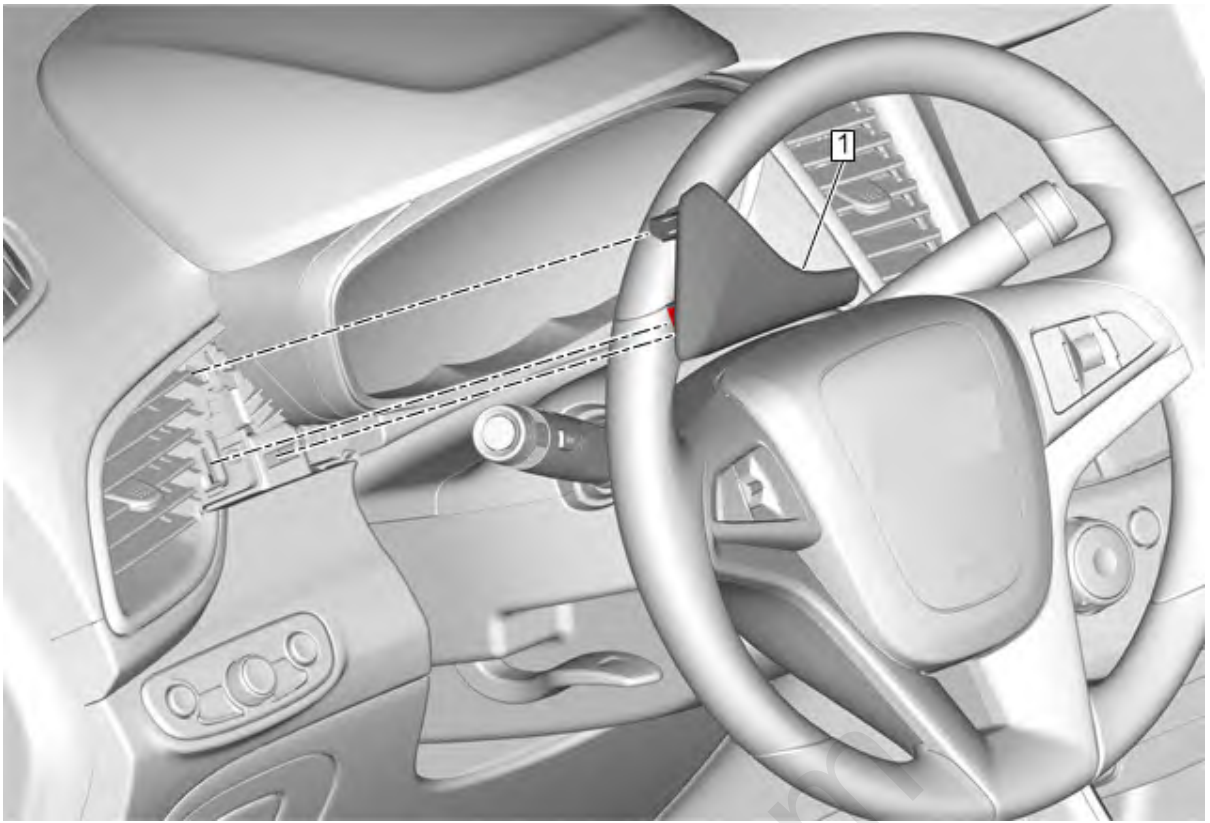


Fig. 42: Instrument Panel Upper Trim Panel - Left Side

Courtesy of GENERAL MOTORS COMPANY

1. Remove Instrument Panel Upper Trim Panel - Left Side (1). Refer to [Instrument Panel Upper Trim Panel Replacement - Left Side \(Chevrolet\)](#).

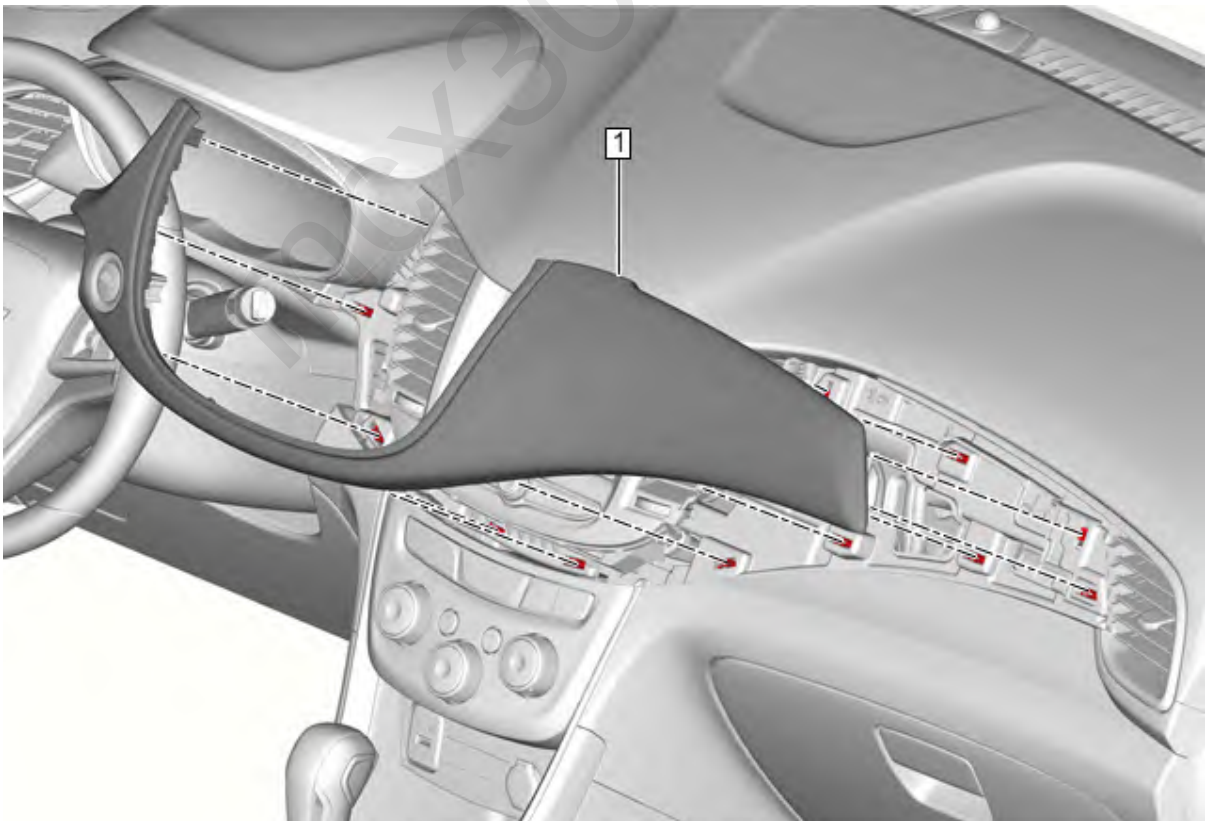


Fig. 43: Instrument Panel Upper Trim Panel - Right Side

Courtesy of GENERAL MOTORS COMPANY

2. Remove Instrument Panel Upper Trim Panel - Right Side (1). Refer to [Instrument Panel Upper Trim Panel Replacement - Right Side \(Chevrolet\)](#).

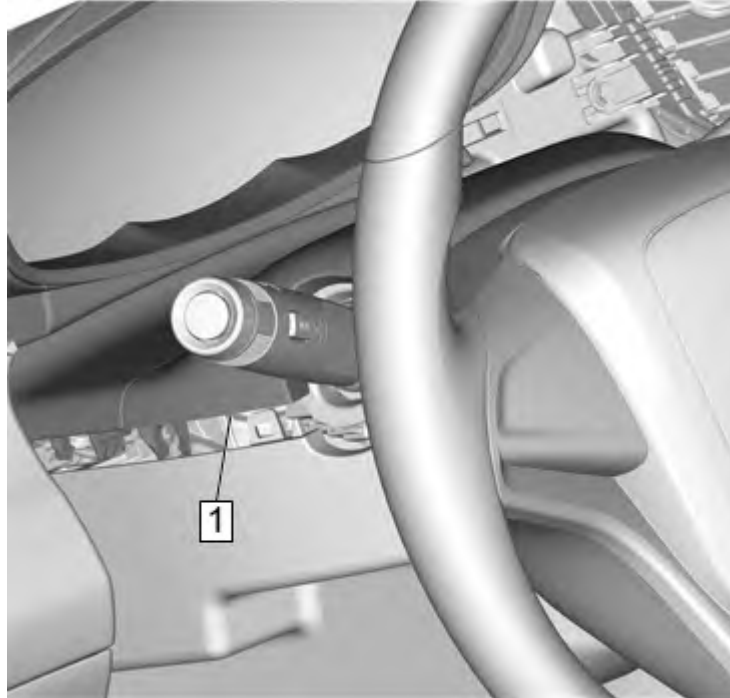


Fig. 44: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

3. Unclip the steering column upper trim cover (1) from the steering column lower trim cover.

Use a flat bladed plastic trim tool.

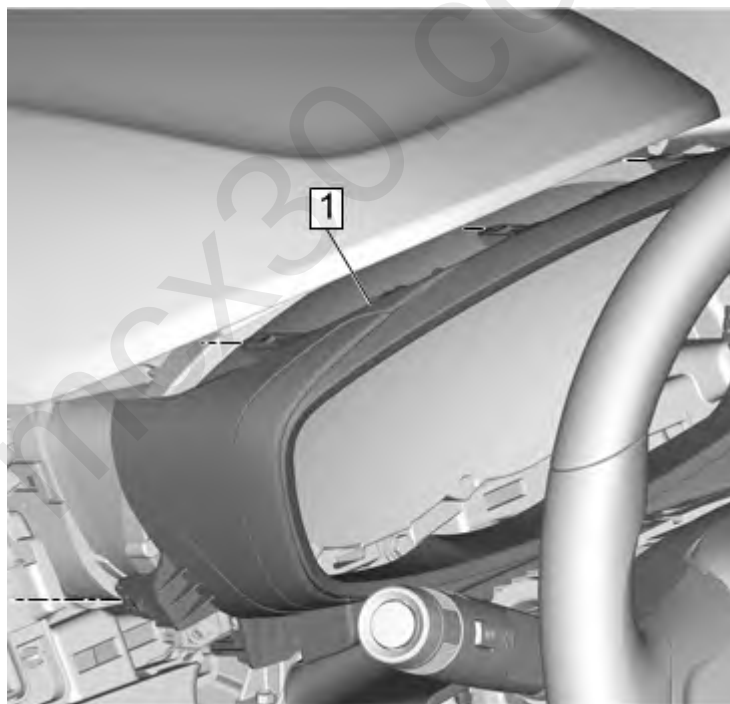


Fig. 45: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

4. Unclip the steering column upper trim cover (1) from the instrument panel instrument cluster hood.

Use a flat bladed plastic trim tool.

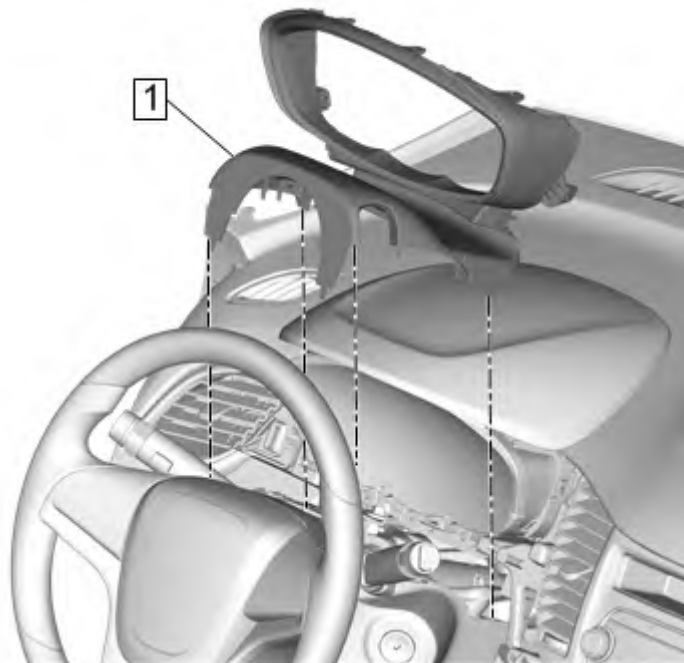


Fig. 46: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

5. Remove the steering column upper trim cover (1) from the instrument panel.

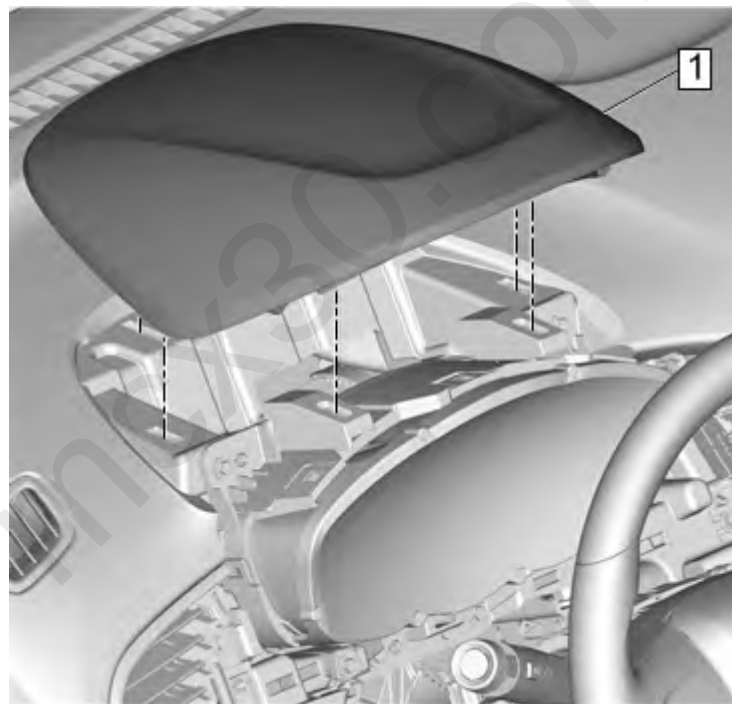


Fig. 47: Instrument Panel Instrument Cluster Hood

Courtesy of GENERAL MOTORS COMPANY

6. Finish removing the instrument panel instrument cluster hood (1). Refer to [Instrument Panel Instrument Cluster Hood Replacement \(Chevrolet\)](#).

Installation Procedure



Fig. 48: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

1. Clip the steering column upper trim cover (1) to the instrument panel instrument cluster hood.

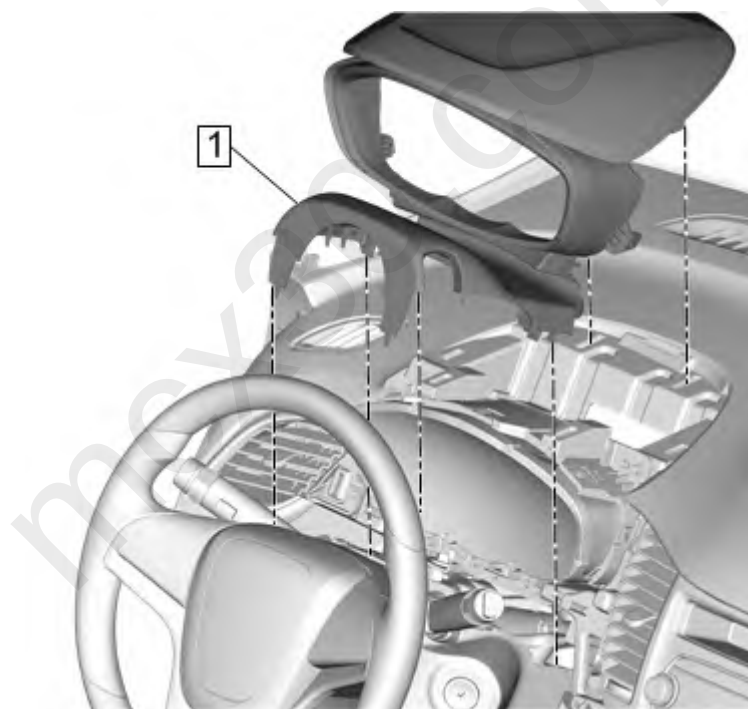


Fig. 49: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

2. Clip the steering column upper trim cover (1) and the instrument panel instrument cluster hood to the instrument panel. [Instrument Panel Instrument Cluster Hood Replacement \(Chevrolet\)](#)

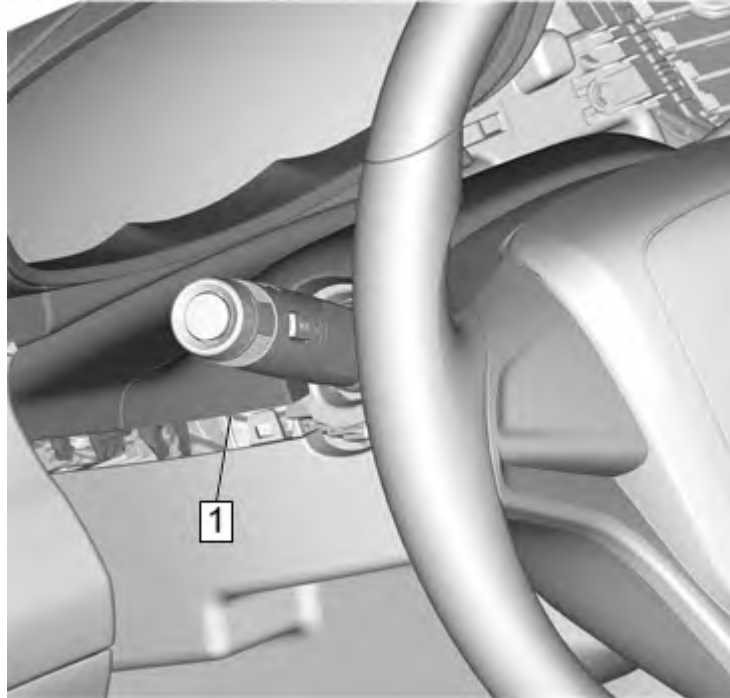


Fig. 50: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

3. Clip the steering column upper trim cover (1) to the steering column lower trim cover.

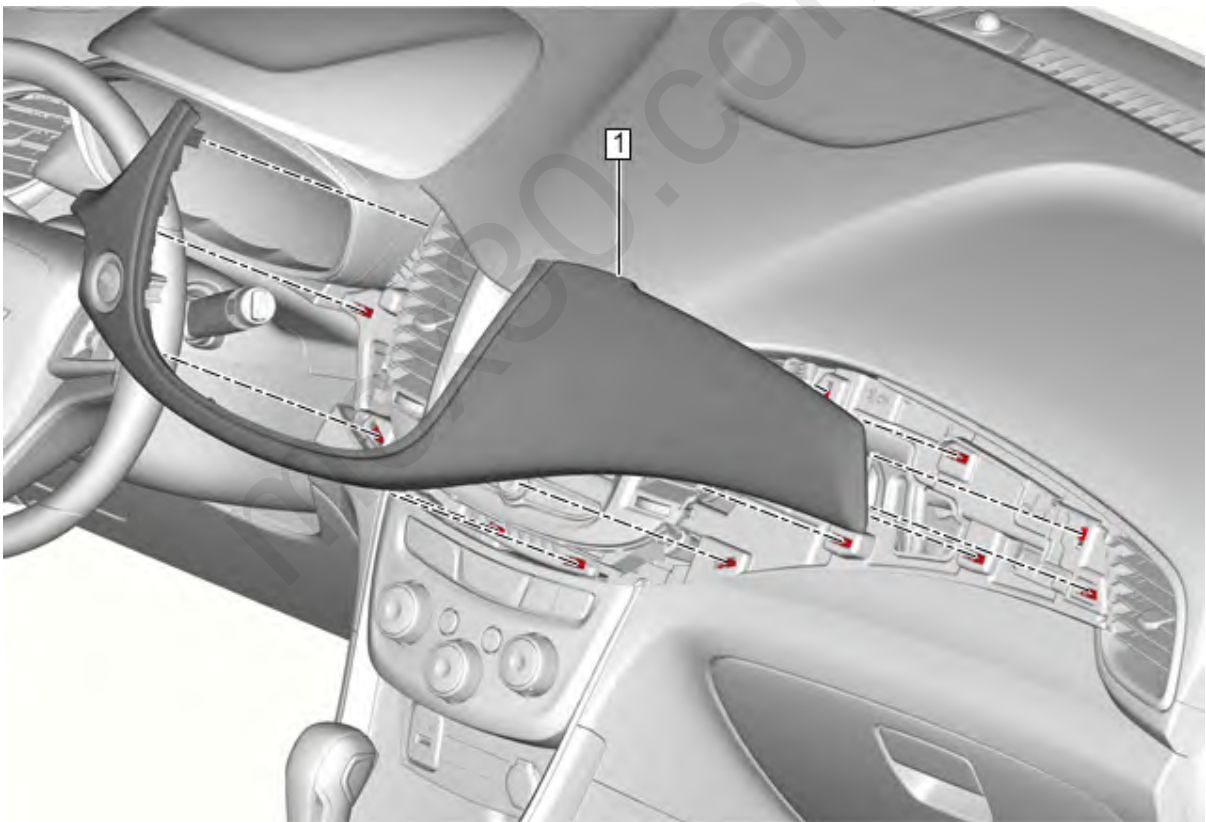


Fig. 51: Instrument Panel Upper Trim Panel - Right Side

Courtesy of GENERAL MOTORS COMPANY

4. Install Instrument Panel Upper Trim Panel - Right Side (1). Refer to [Instrument Panel Upper Trim Panel Replacement - Right Side \(Chevrolet\)](#)

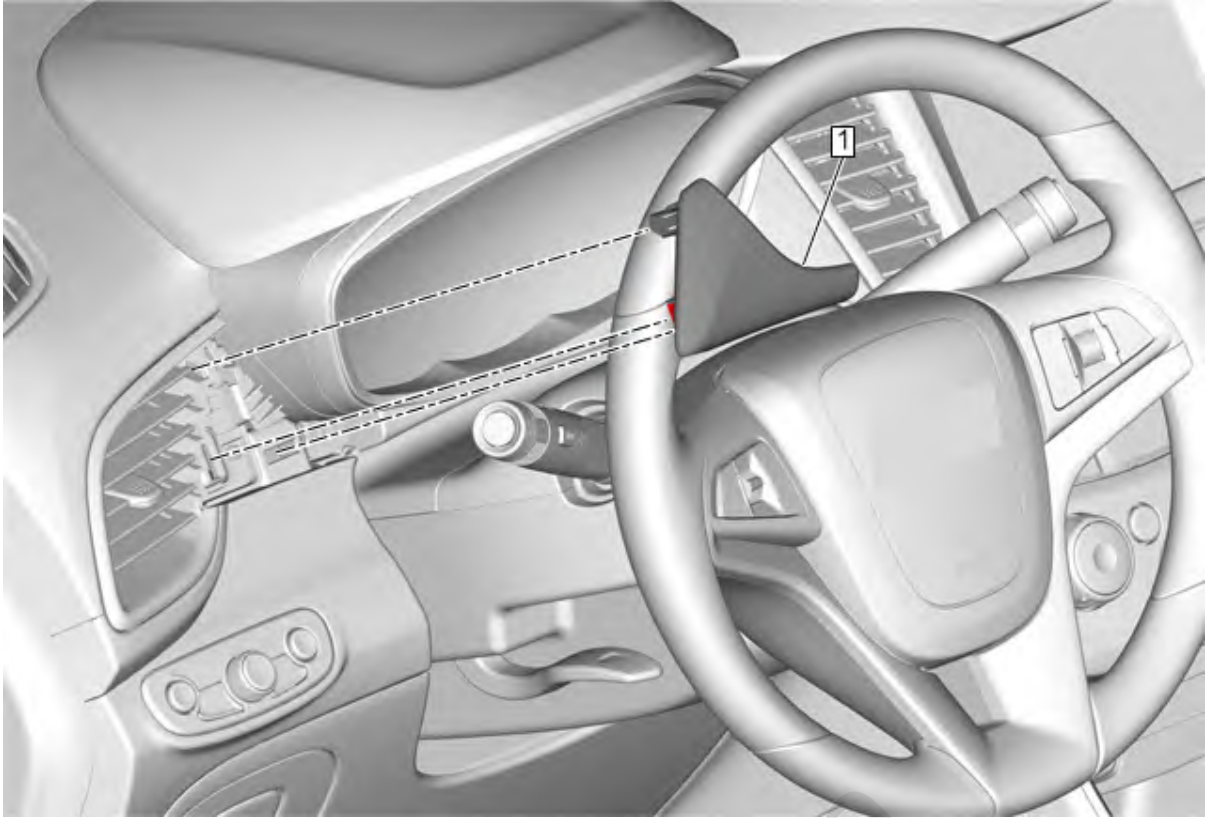


Fig. 52: Instrument Panel Upper Trim Panel - Left Side

Courtesy of GENERAL MOTORS COMPANY

5. Install Instrument Panel Upper Trim Panel - Left Side (1). Refer to [Instrument Panel Upper Trim Panel Replacement - Left Side \(Chevrolet\)](#).

STEERING COLUMN UPPER TRIM COVER REPLACEMENT (BUICK, WITH BTM)

Removal Procedure

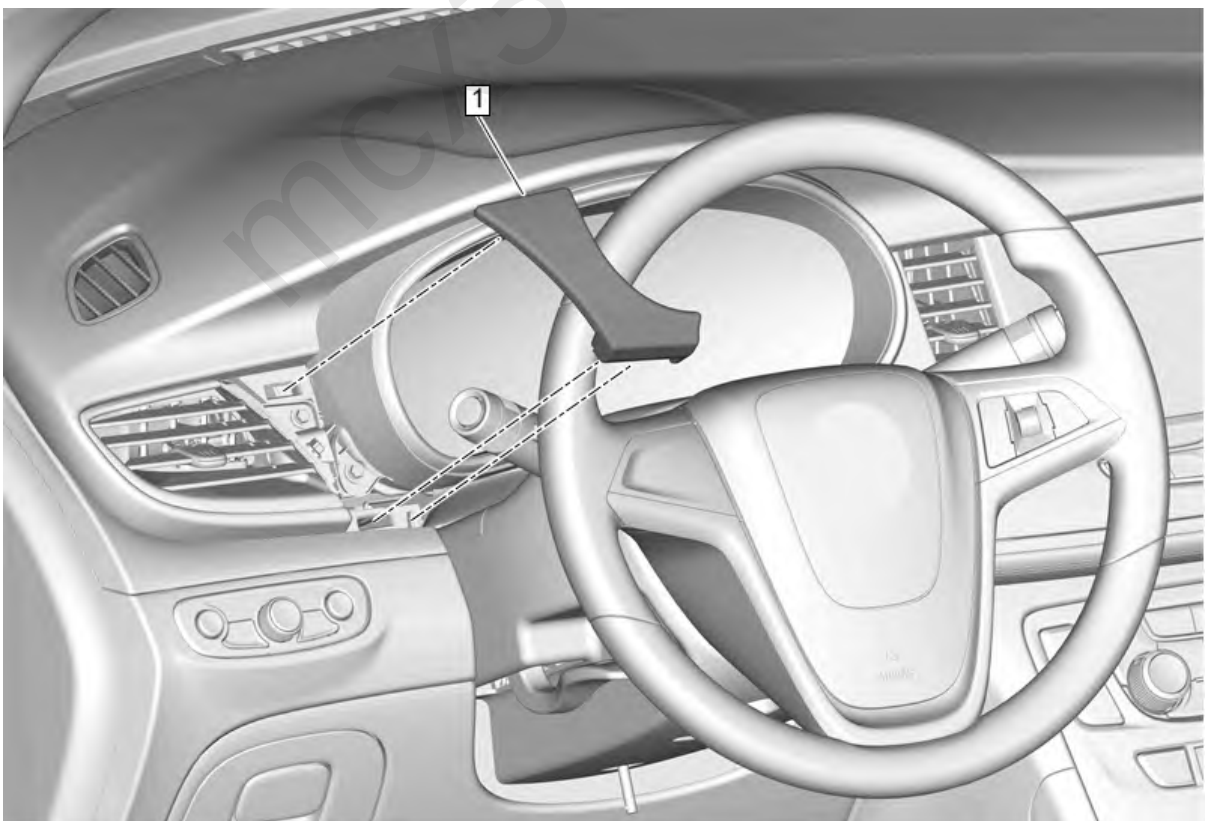


Fig. 53: Instrument Panel Lower Trim Plate Applique - Left Side

Courtesy of GENERAL MOTORS COMPANY

1. Remove Instrument Panel Lower Trim Plate Applique - Left Side (1). Refer to [Instrument Panel Lower Trim Plate Applique Replacement - Left Side \(Buick\)](#).

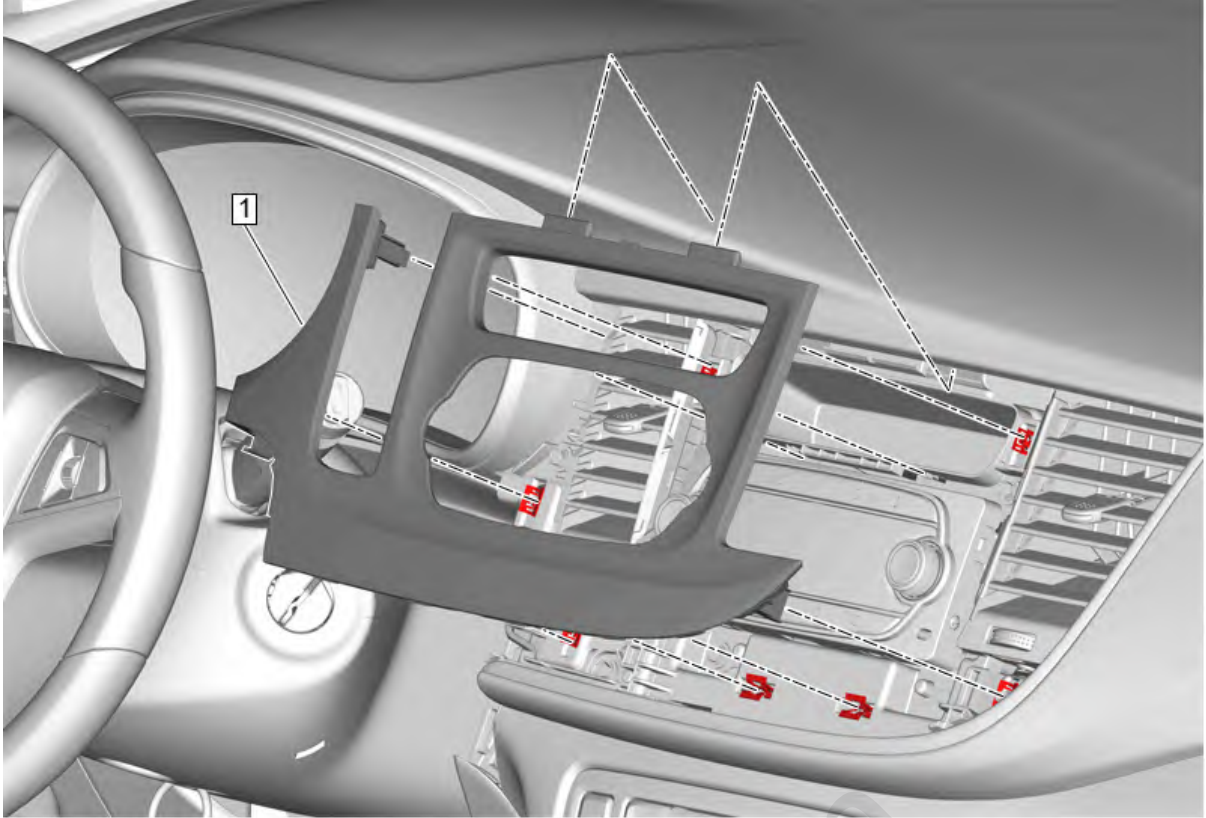


Fig. 54: Instrument Panel Trim Plate

Courtesy of GENERAL MOTORS COMPANY

2. Remove Instrument Panel Trim Plate (1). Refer to [Instrument Panel Trim Plate Replacement \(Buick\)](#)

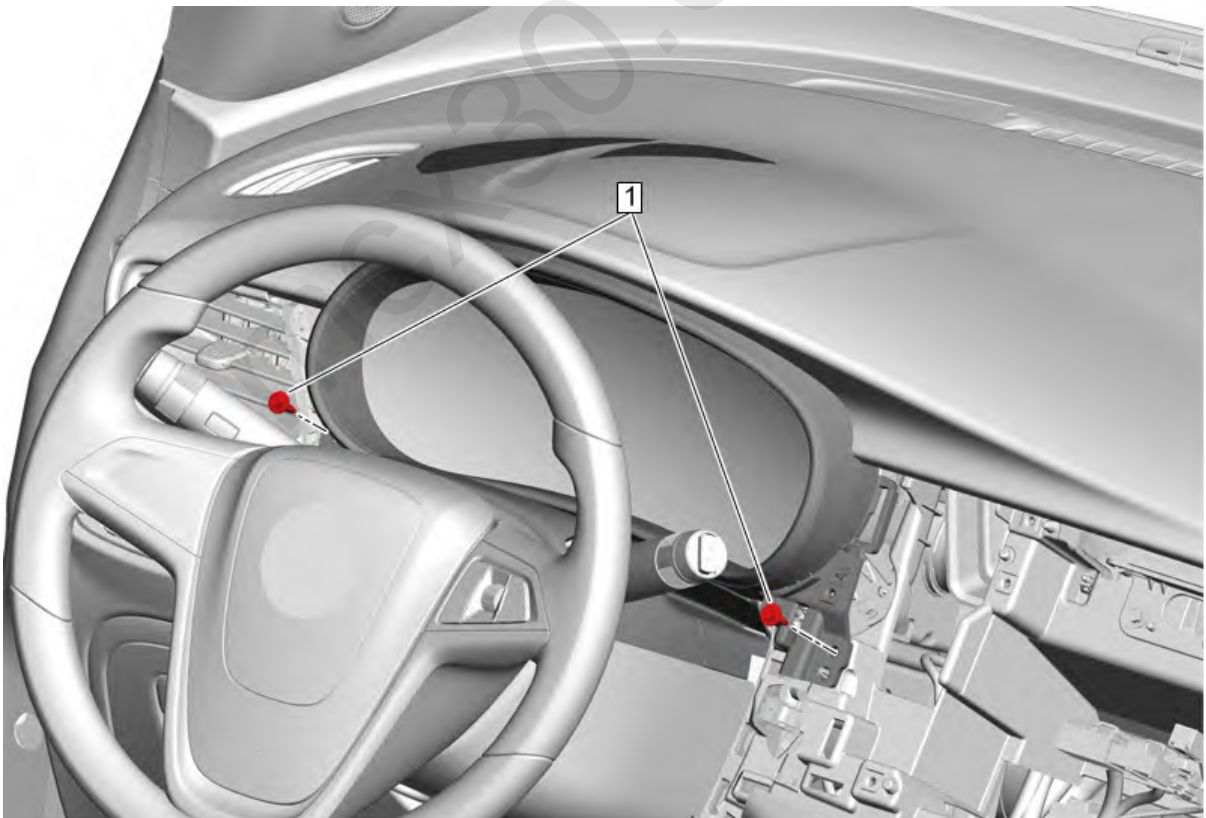


Fig. 55: Instrument Panel Steering Column Upper Trim Cover Bolts

Courtesy of GENERAL MOTORS COMPANY

3. Remove Instrument Panel Steering Column Upper Trim Cover Bolts (1) (Qty: 2)

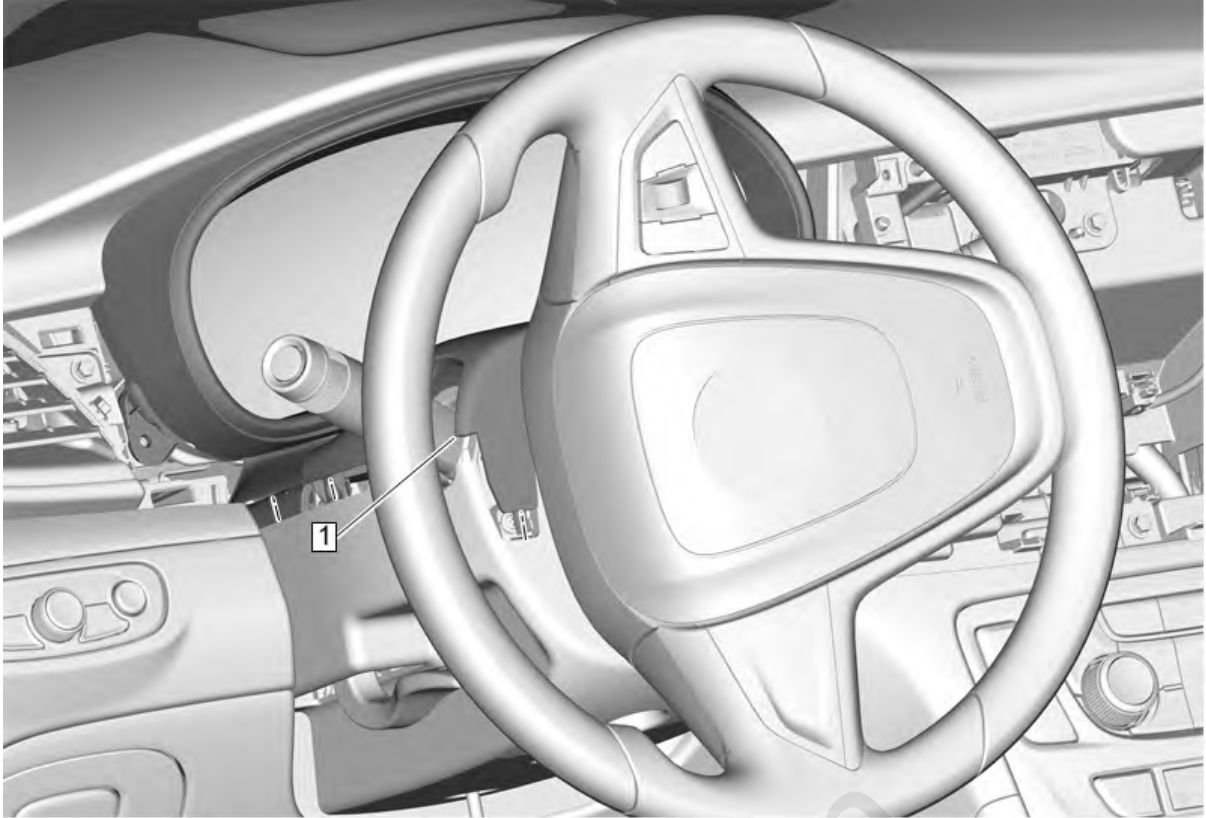


Fig. 56: Steering Column Upper Trim Cover
Courtesy of GENERAL MOTORS COMPANY

4. Unclip the steering column upper trim cover (1) from the steering column lower trim cover.

Use a flat bladed plastic trim tool.

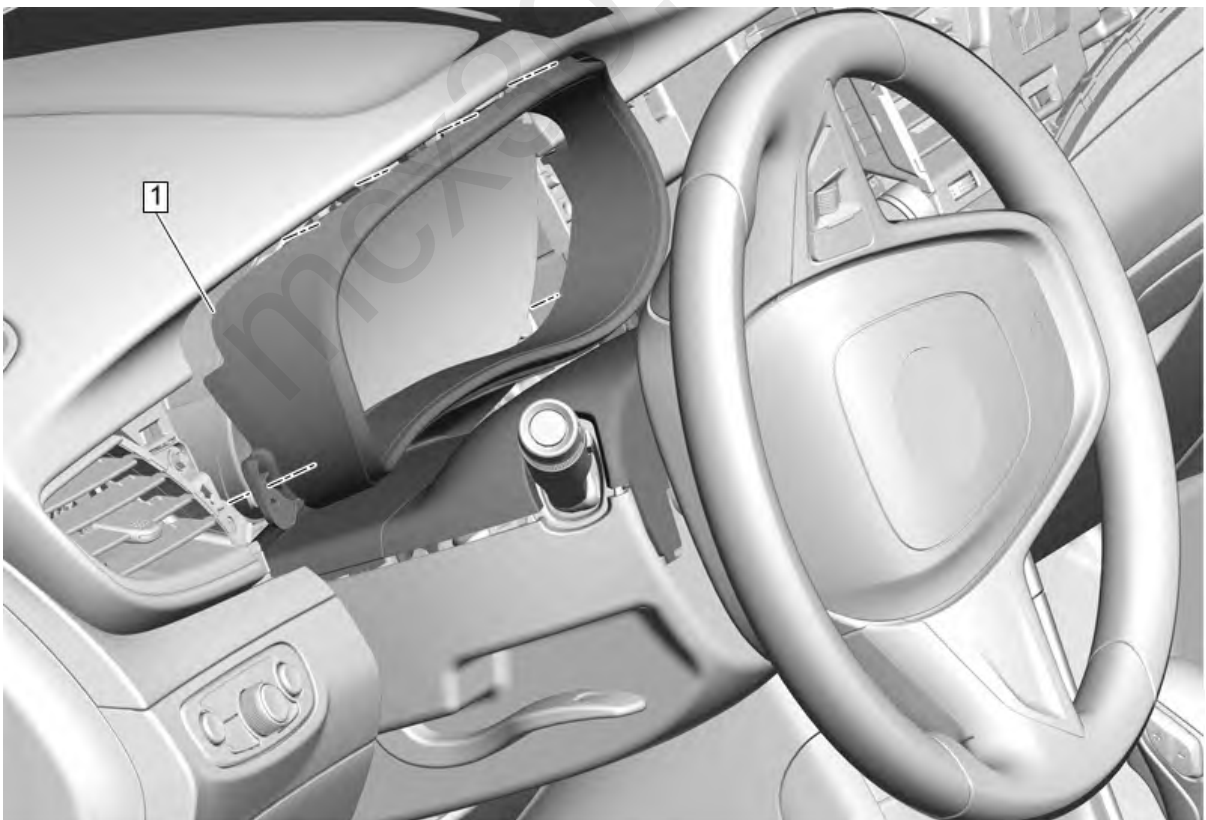


Fig. 57: Steering Column Upper Trim Cover
Courtesy of GENERAL MOTORS COMPANY

5. Unclip the steering column upper trim cover (1) from the instrument cluster.

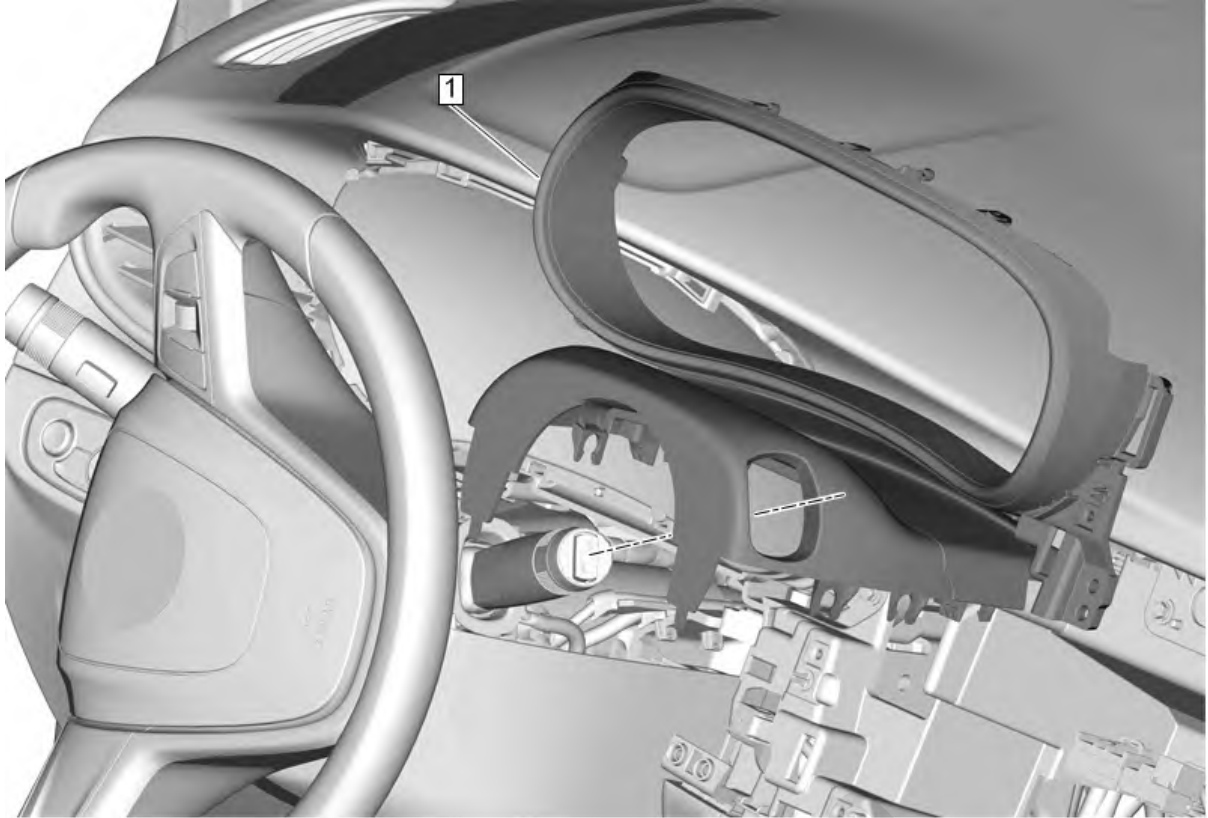


Fig. 58: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

6. Slide the steering column upper trim cover (1) over the windshield wiper and washer switch.

Installation Procedure

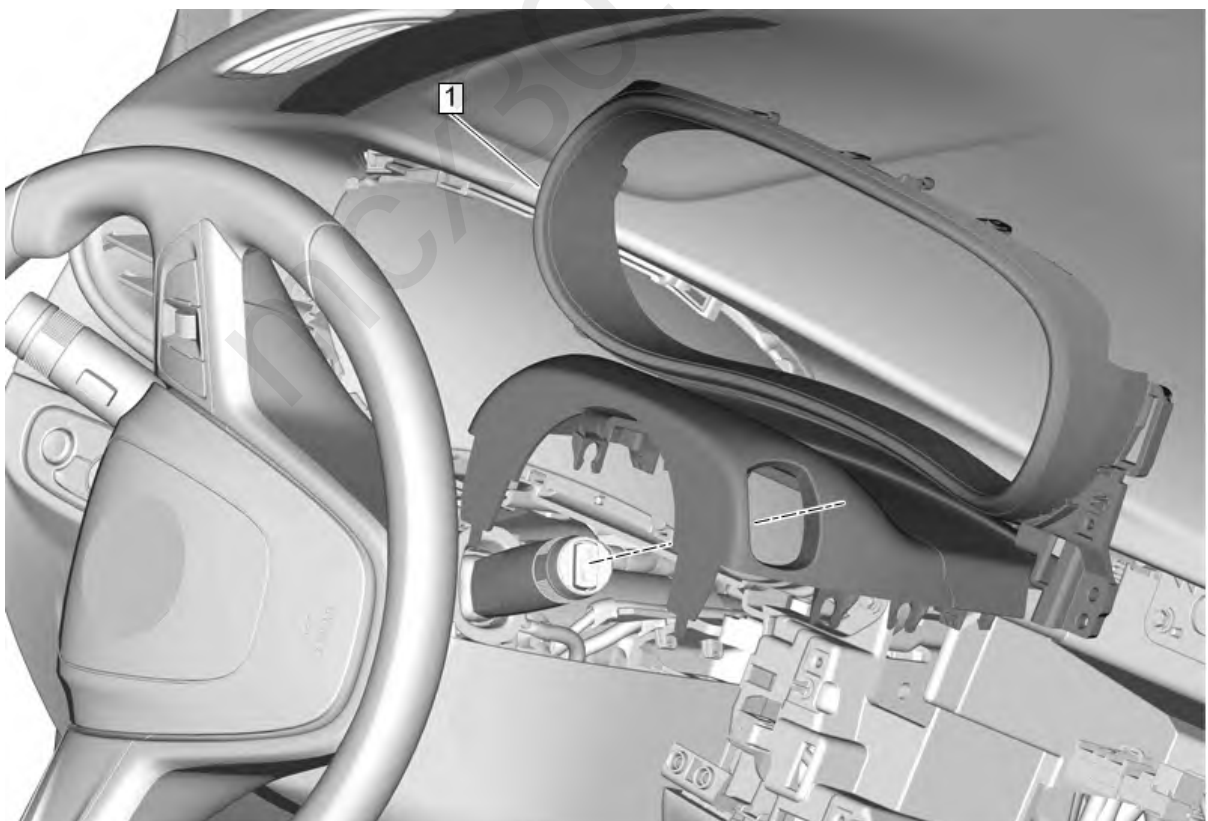


Fig. 59: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

1. Slide the steering column upper trim cover (1) over the windshield wiper and washer switch.

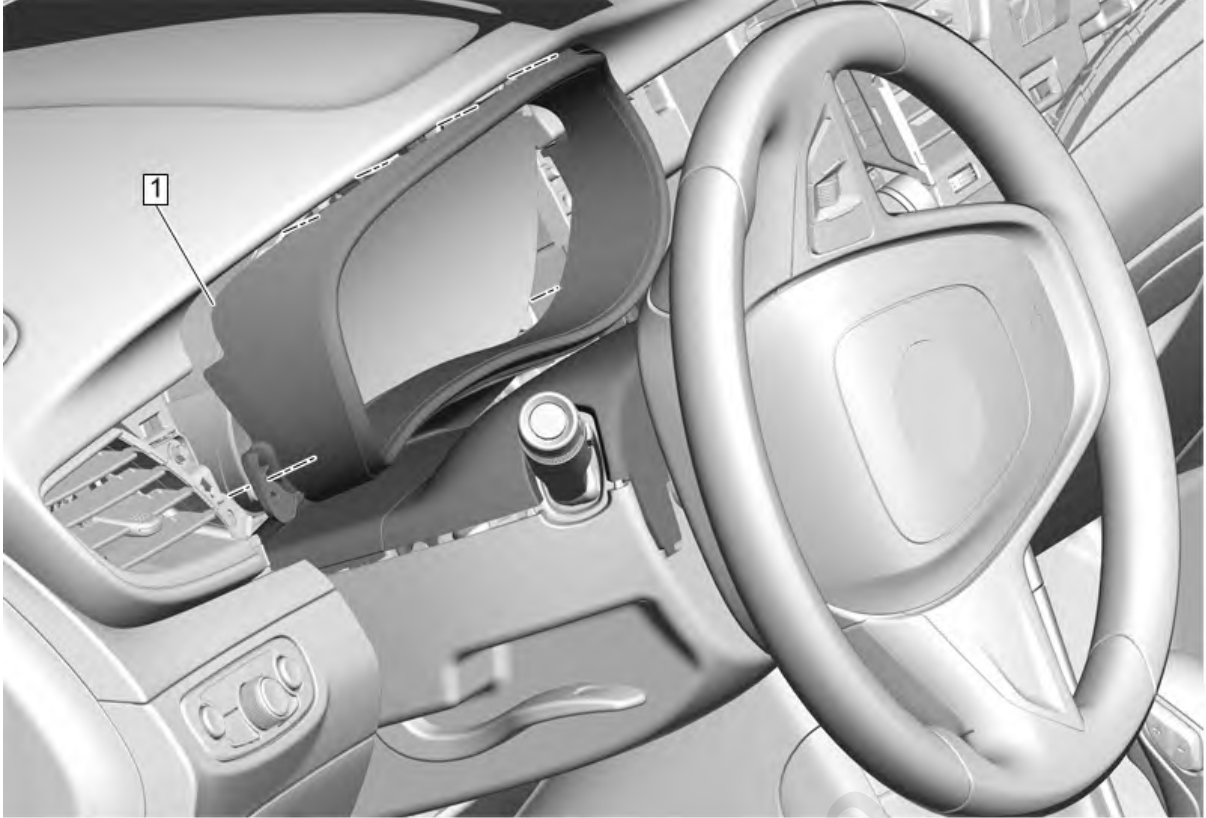


Fig. 60: Steering Column Upper Trim Cover
Courtesy of GENERAL MOTORS COMPANY

2. Clip the steering column upper trim cover (1) to the instrument cluster.

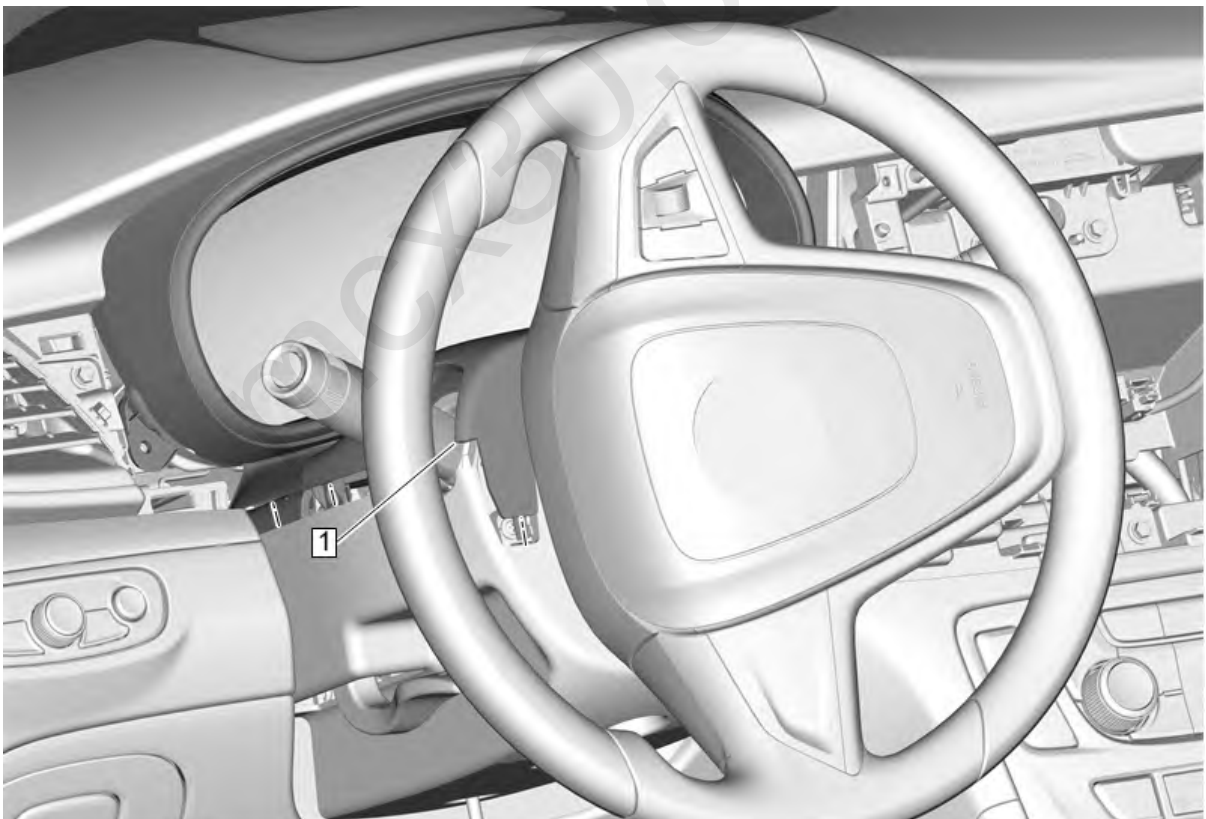


Fig. 61: Steering Column Upper Trim Cover
Courtesy of GENERAL MOTORS COMPANY

3. Clip the steering column upper trim cover (1) to the steering column lower trim cover.

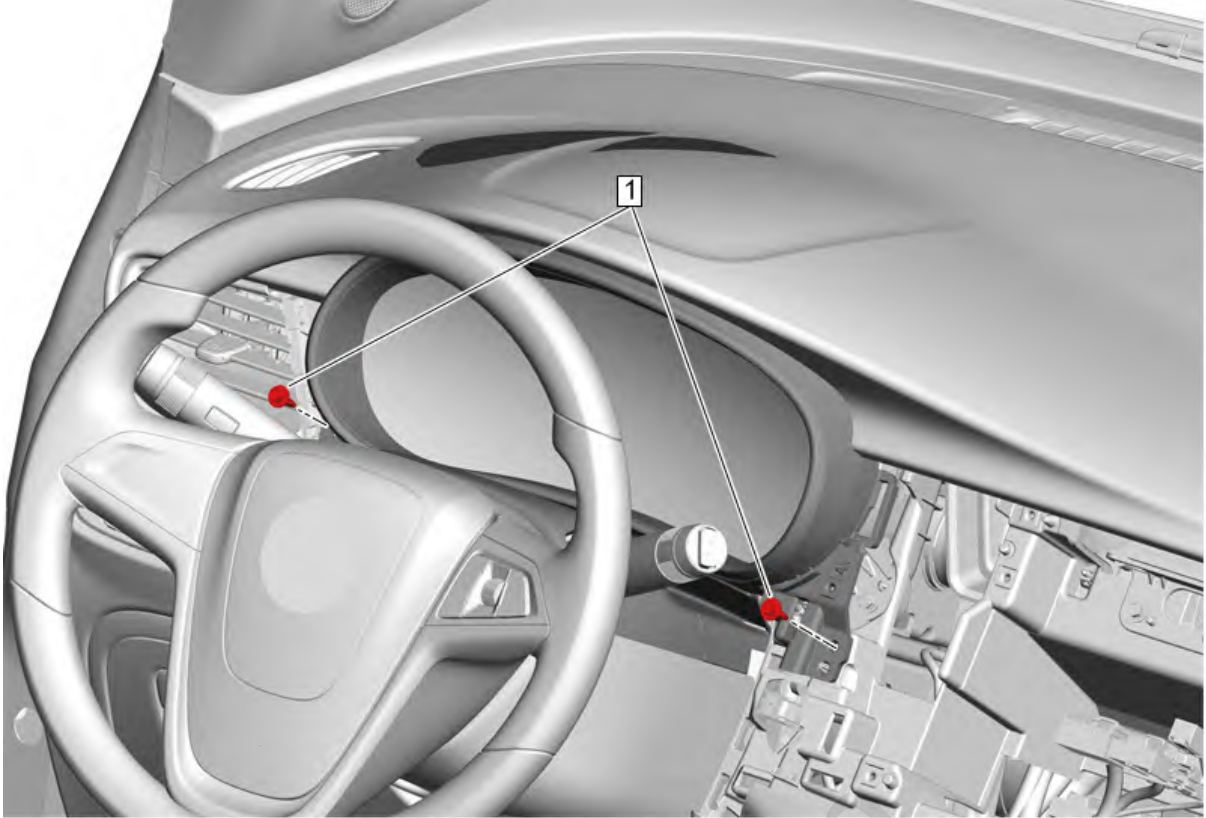


Fig. 62: Instrument Panel Steering Column Upper Trim Cover Bolts
 Courtesy of GENERAL MOTORS COMPANY

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

4. Install and tighten Instrument Panel Steering Column Upper Trim Cover Bolts (1) (Qty: 2) to 2.5 N.m (22 lb in)

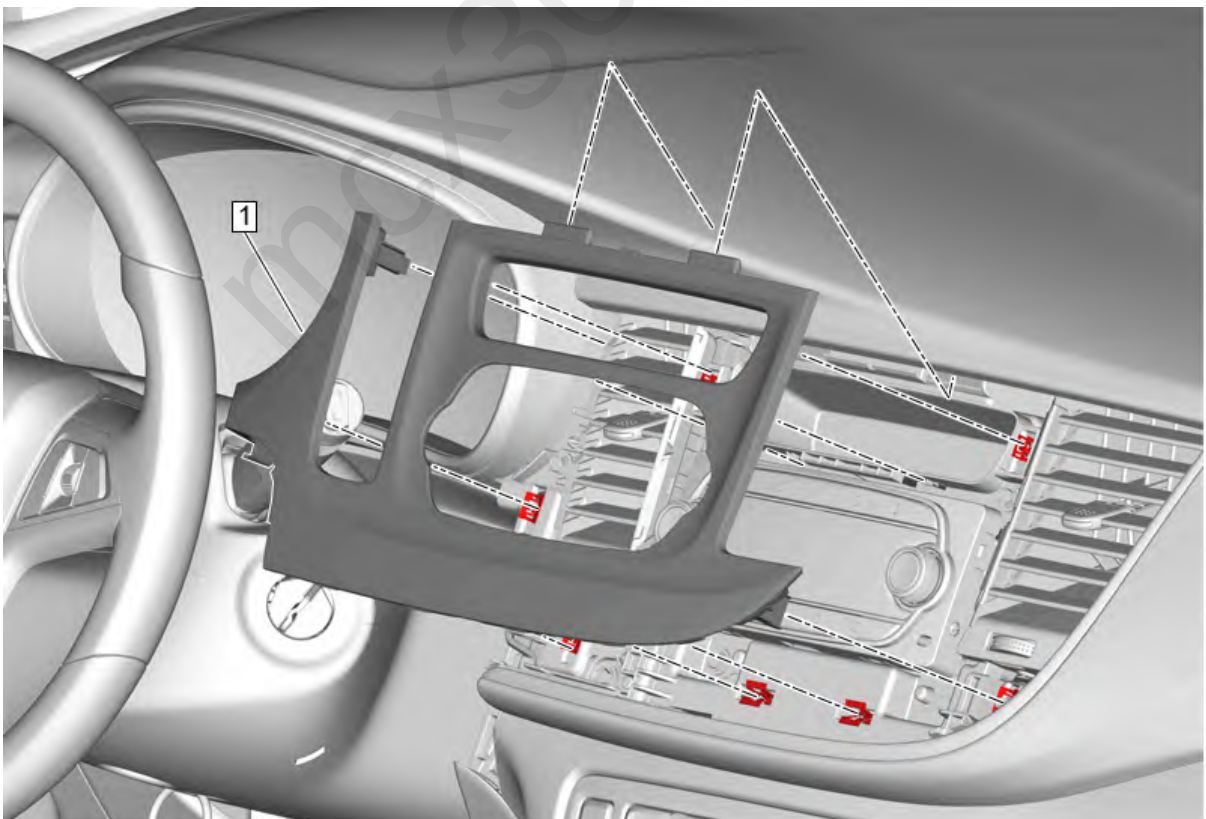


Fig. 63: Instrument Panel Trim Plate
 Courtesy of GENERAL MOTORS COMPANY

5. Install Instrument Panel Trim Plate (1). Refer to [Instrument Panel Trim Plate Replacement \(Buick\)](#)

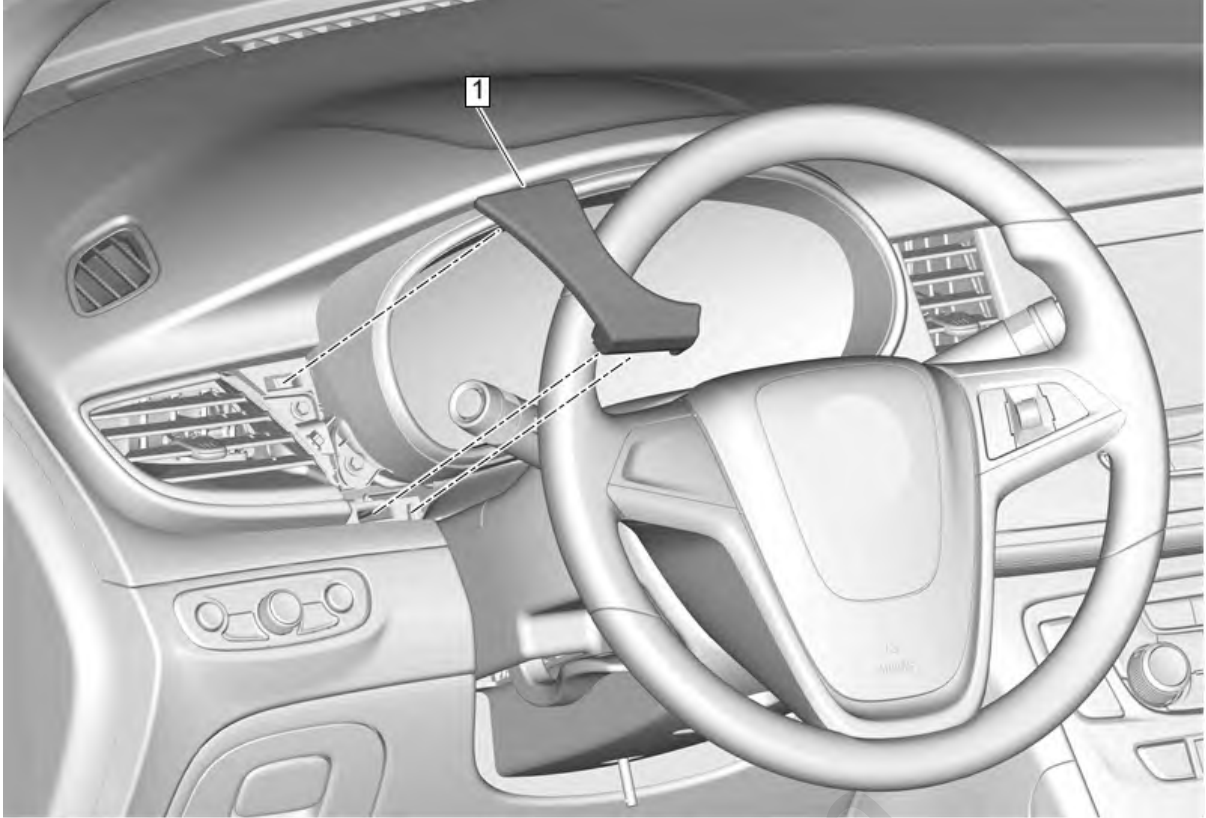


Fig. 64: Instrument Panel Lower Trim Plate Applique - Left Side
 Courtesy of GENERAL MOTORS COMPANY

6. Install Instrument Panel Lower Trim Plate Applique - Left Side (1). Refer to [Instrument Panel Lower Trim Plate Applique Replacement - Left Side \(Buick\)](#).

STEERING COLUMN LOWER TRIM COVER REPLACEMENT (BUICK, WITH BTM)

Removal Procedure

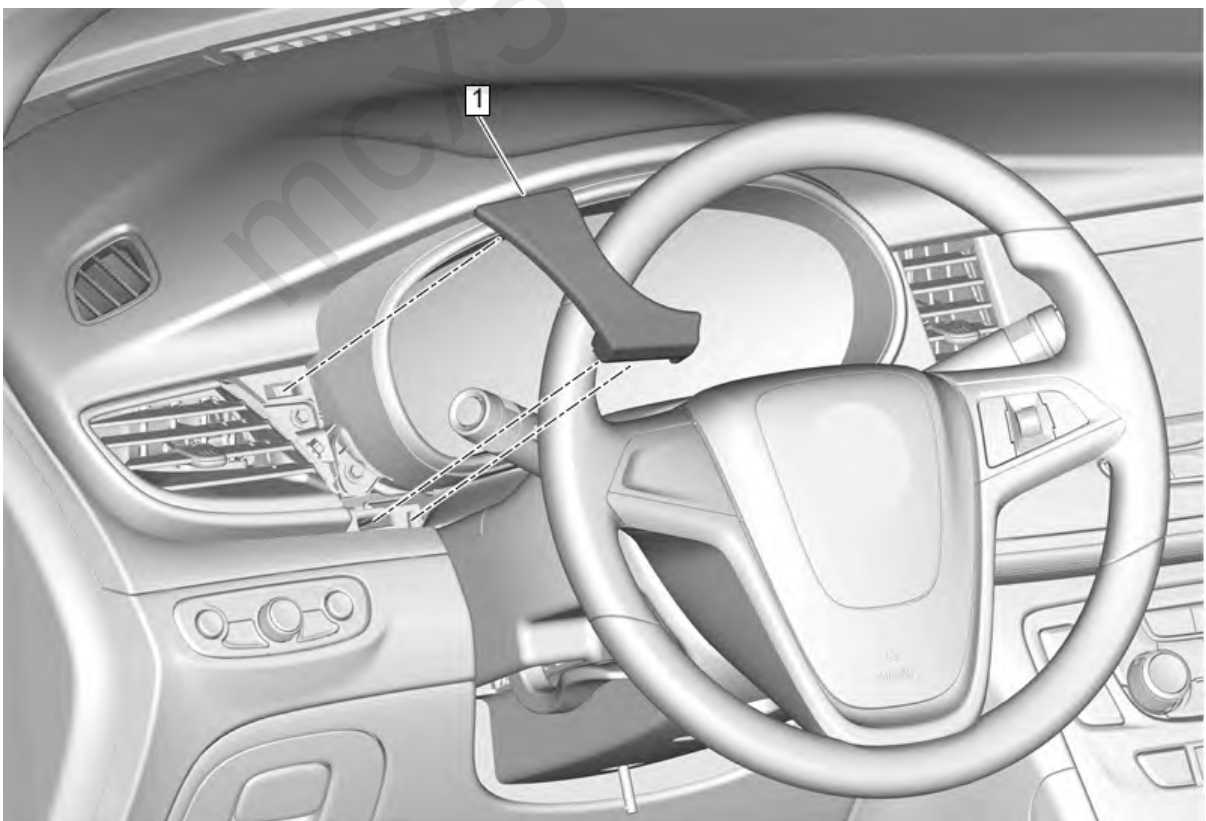


Fig. 65: Instrument Panel Lower Trim Plate Applique - Left Side
 Courtesy of GENERAL MOTORS COMPANY

1. Remove Instrument Panel Lower Trim Plate Applique - Left Side (1). Refer to [Instrument Panel Lower Trim Plate Applique Replacement - Left Side \(Buick\)](#).

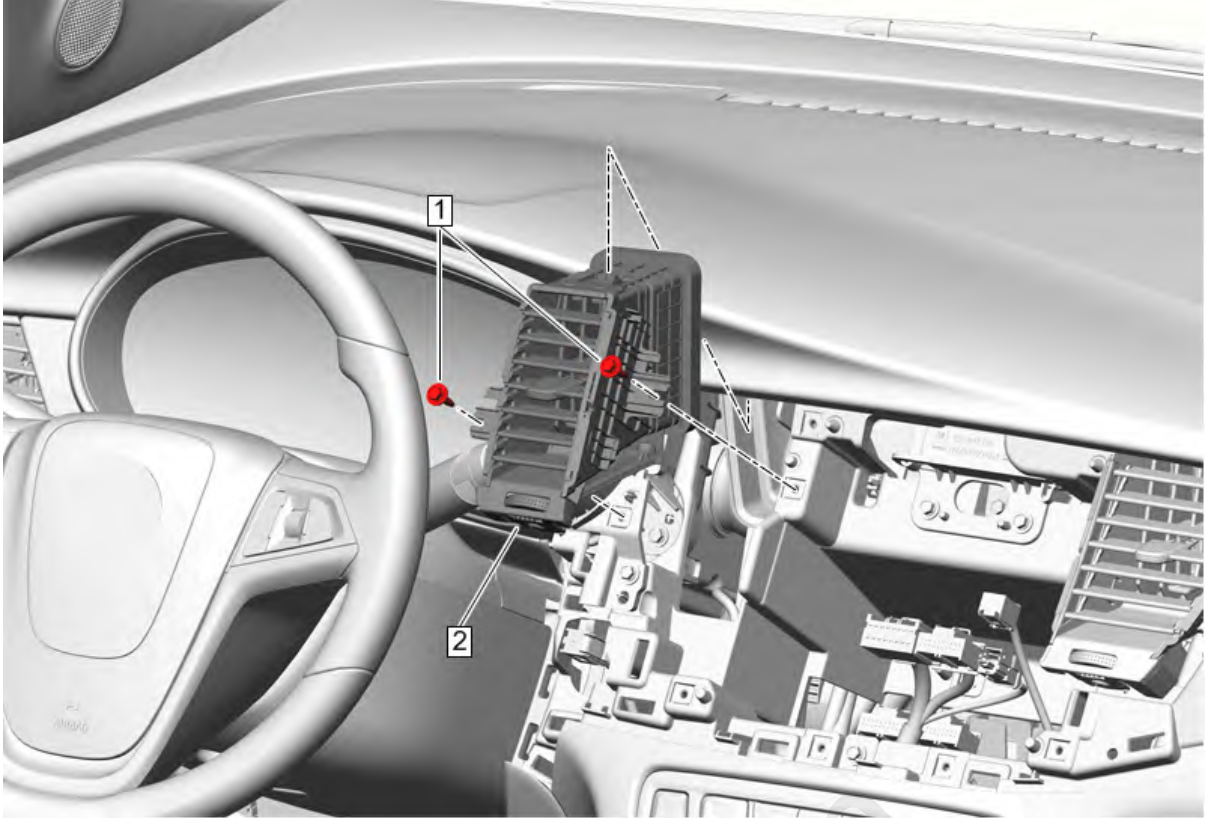


Fig. 66: Instrument Panel Center Air Outlet - Left Side (Encore)

Courtesy of GENERAL MOTORS COMPANY

2. Remove Instrument Panel Center Air Outlet - Left Side (2). Refer to [Instrument Panel Center Air Outlet Replacement - Left Side \(Buick\)](#)

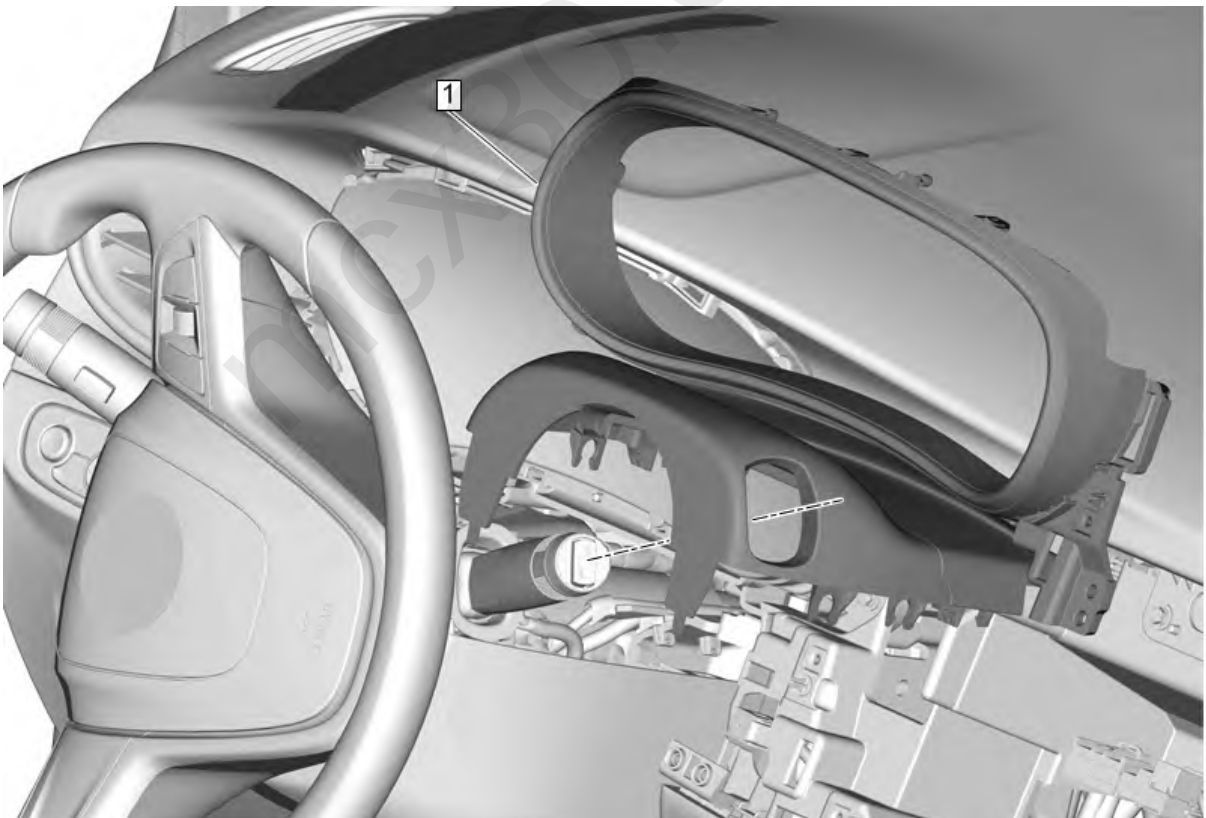


Fig. 67: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

3. Remove Steering Column Upper Trim Cover (1). Refer to [Steering Column Upper Trim Cover Replacement \(Buick, With BTM\)](#)

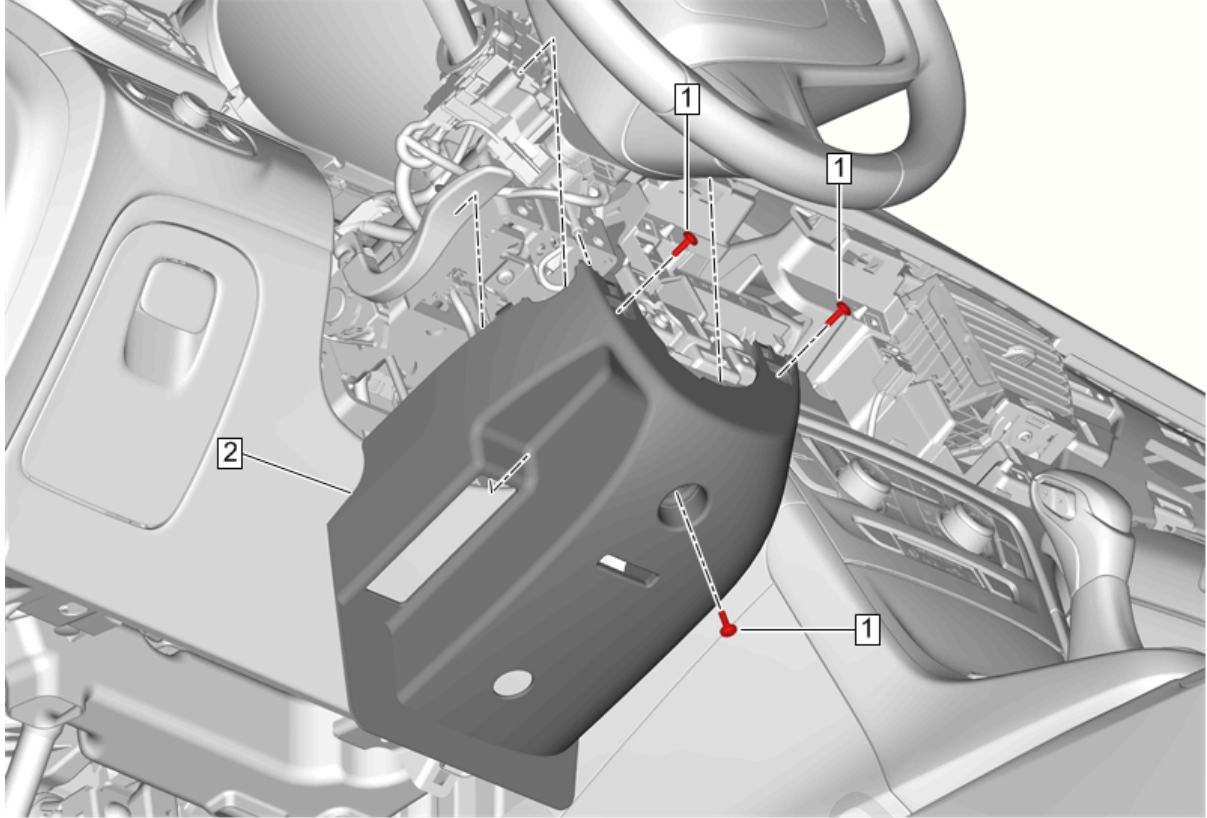


Fig. 68: Steering Column Lower Trim Cover And Bolts
 Courtesy of GENERAL MOTORS COMPANY

4. Remove Steering Column Lower Trim Cover Bolts (1) (Qty: 3)
5. Remove Steering Column Lower Trim Cover (2)

Installation Procedure

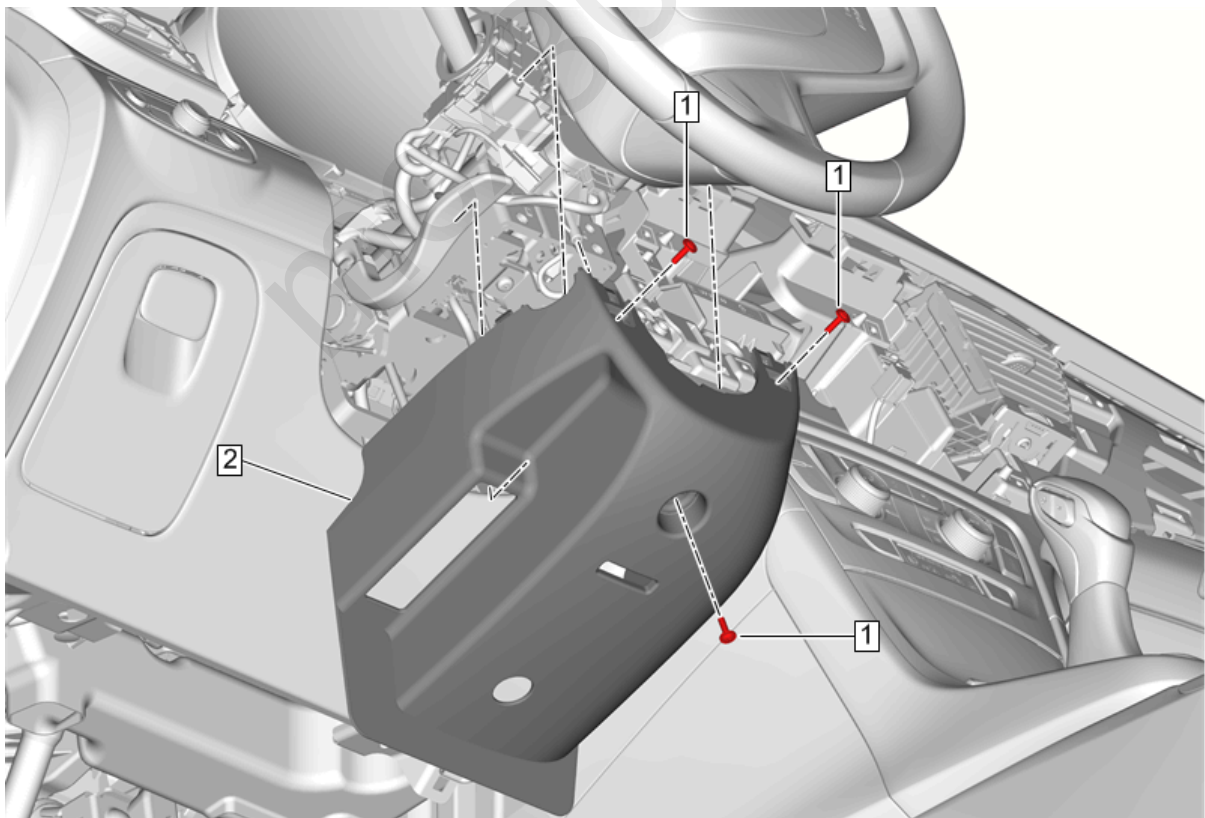


Fig. 69: Steering Column Lower Trim Cover And Bolts
 Courtesy of GENERAL MOTORS COMPANY

1. Install Steering Column Lower Trim Cover (2)

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

2. Install and tighten Steering Column Lower Trim Cover Bolts (1) (Qty: 3) to 2.5 N.m (22 lb in)

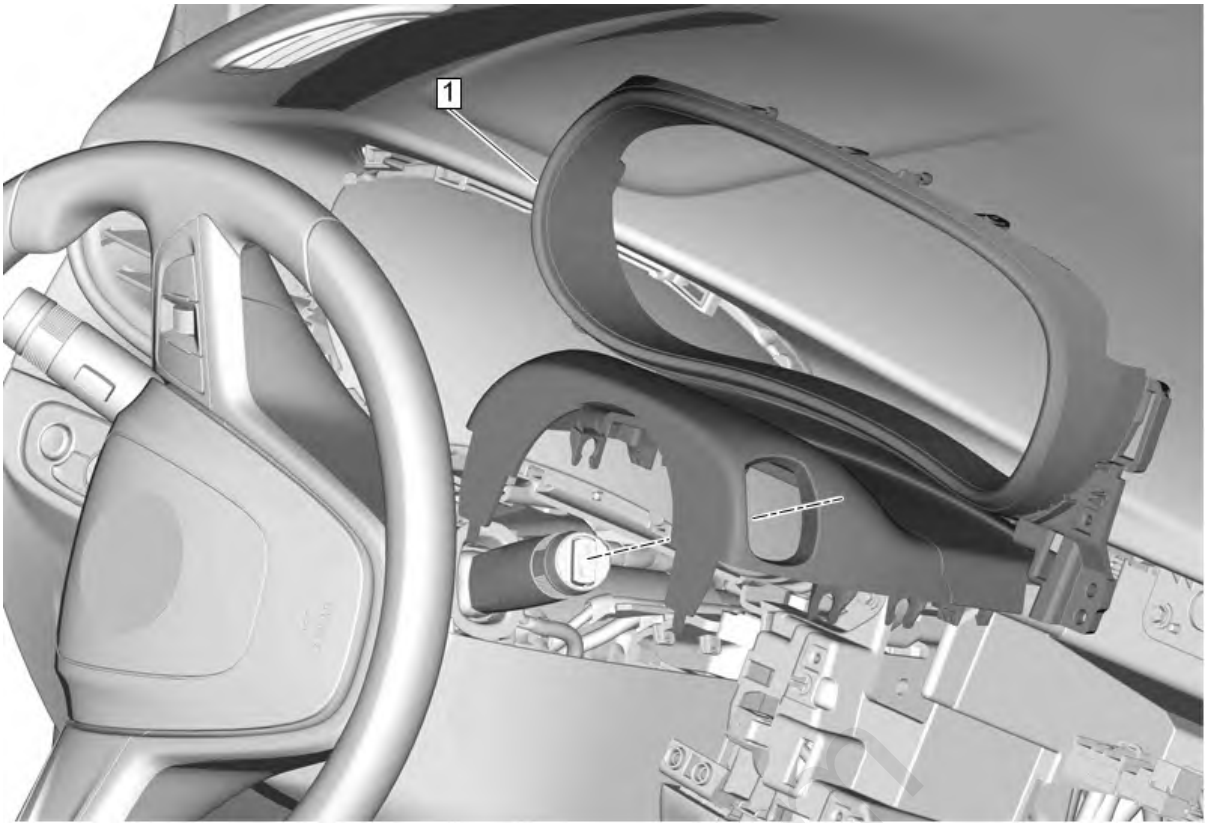


Fig. 70: Steering Column Upper Trim Cover

Courtesy of GENERAL MOTORS COMPANY

3. Install Steering Column Upper Trim Cover (1). Refer to [Steering Column Upper Trim Cover Replacement \(Buick, With BTM\)](#).

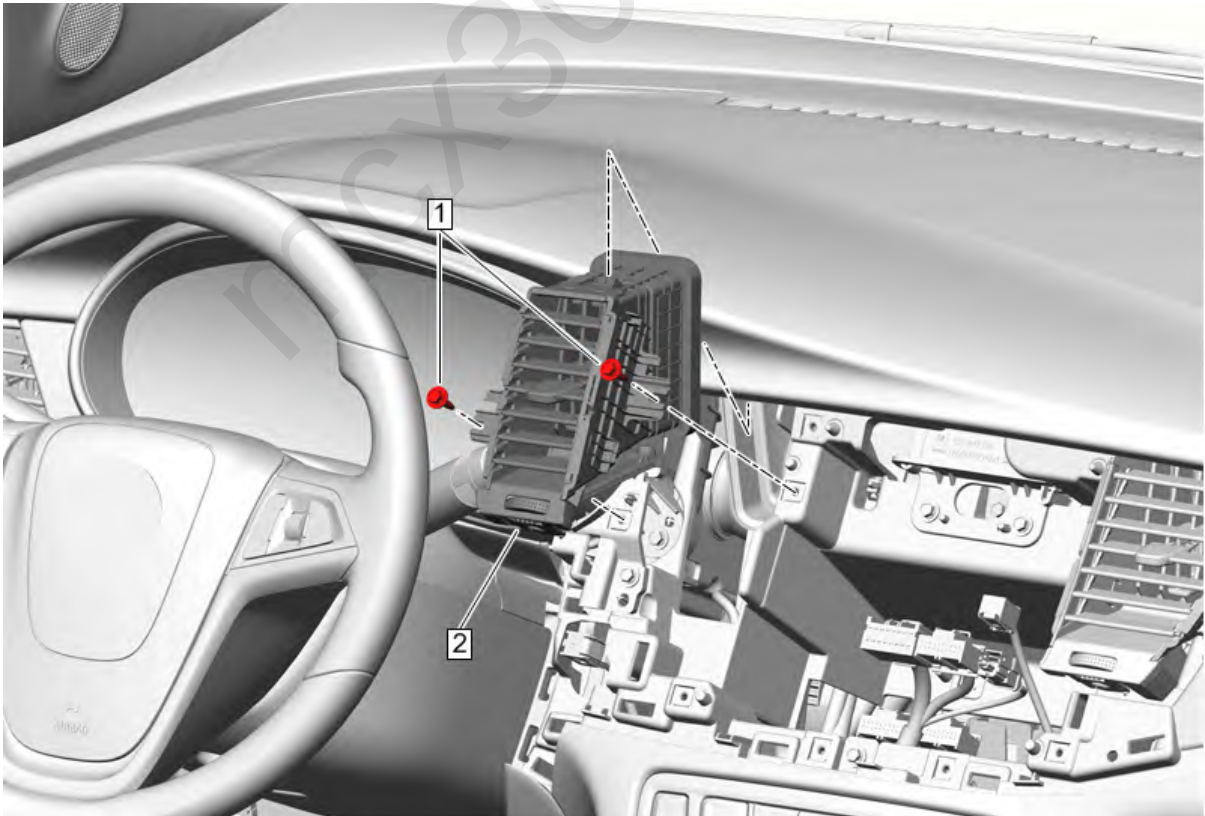


Fig. 71: Instrument Panel Center Air Outlet - Left Side (Encore)

Courtesy of GENERAL MOTORS COMPANY

4. Install Instrument Panel Center Air Outlet - Left Side (2). Refer to [Instrument Panel Center Air Outlet Replacement - Left Side \(Buick\)](#).

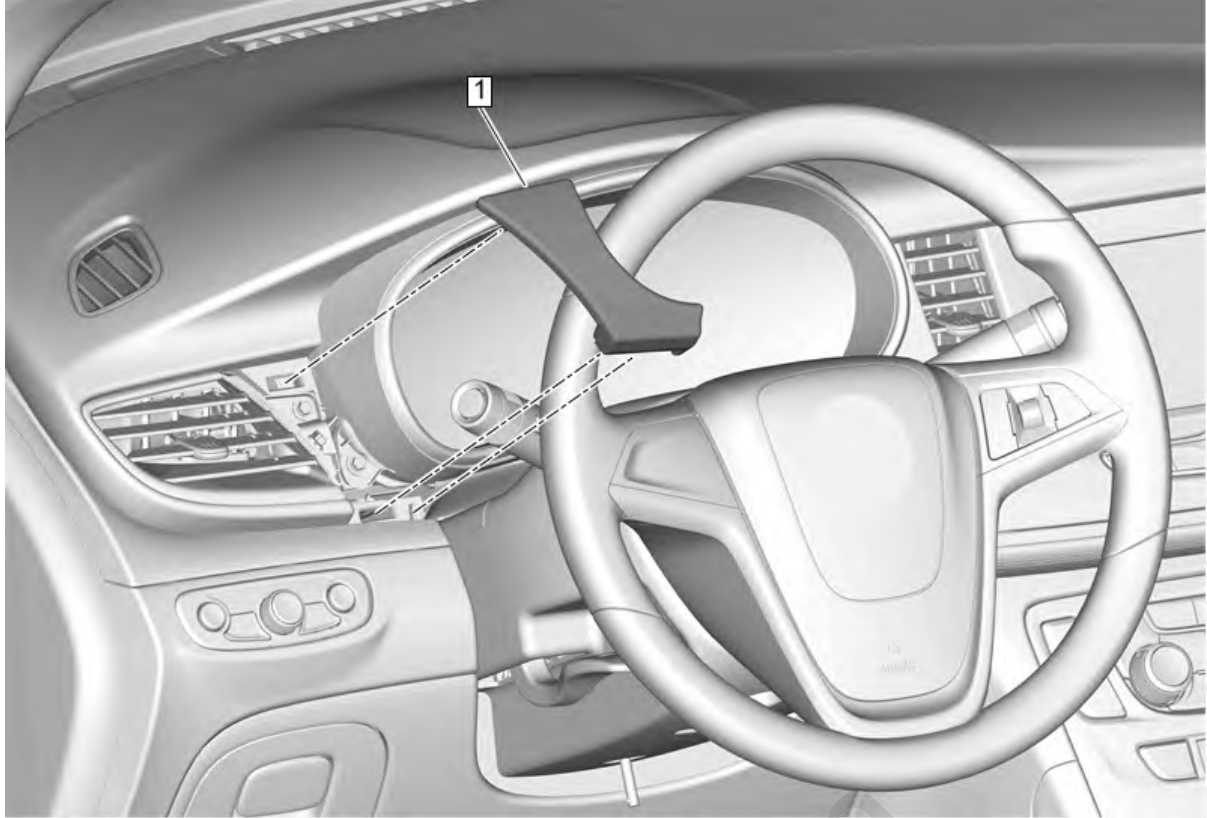


Fig. 72: Instrument Panel Lower Trim Plate Applique - Left Side
 Courtesy of GENERAL MOTORS COMPANY

5. Install Instrument Panel Lower Trim Plate Applique - Left Side (1). Refer to [Instrument Panel Lower Trim Plate Applique Replacement - Left Side \(Buick\)](#)

STEERING COLUMN LOWER TRIM COVER REPLACEMENT (CHEVROLET, WITH BTM)

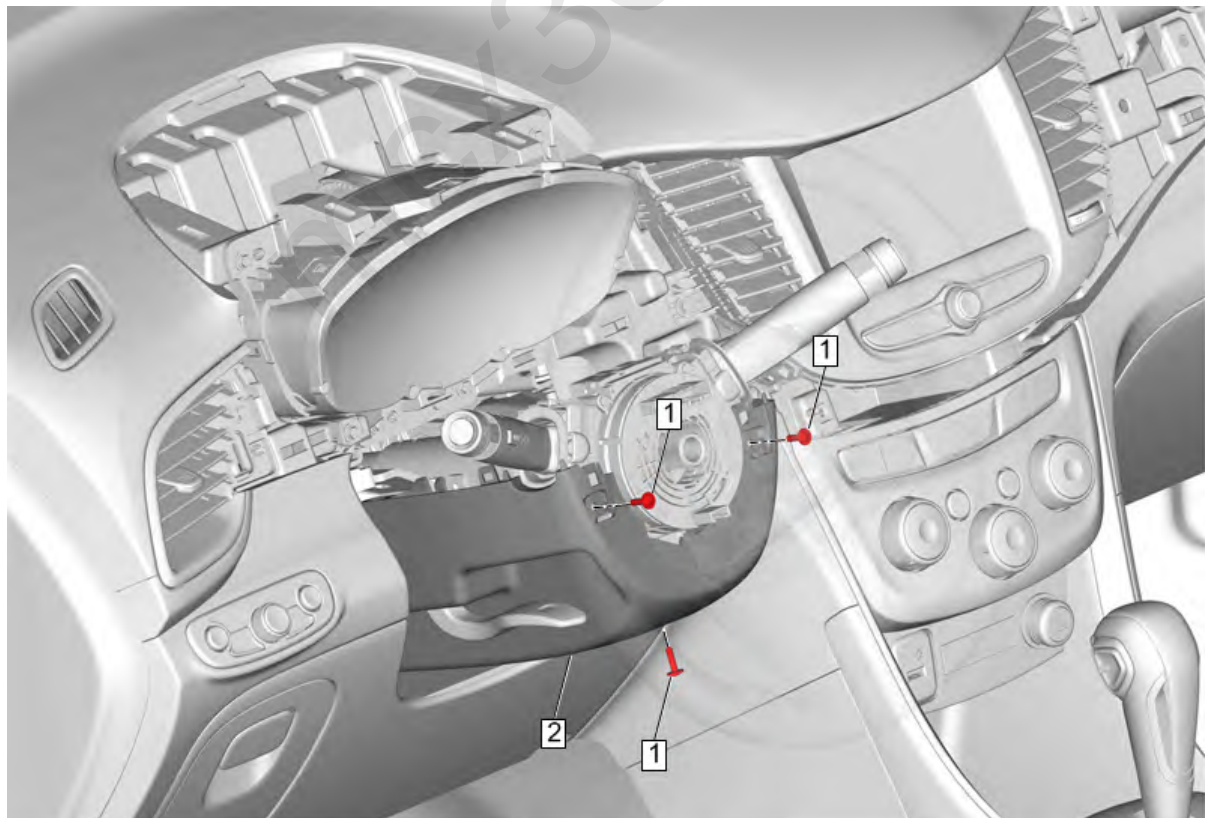


Fig. 73: Steering Column Lower Trim Cover (Trax, With BTM)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedure Remove Steering Column Upper Trim Cover. Refer to Steering Column Upper Trim Cover Replacement (Chevrolet, With BTM) .	
1	Steering Column Lower Trim Cover Bolt (Qty: 3) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Steering Column Lower Trim Cover Procedure Rotate the steering wheel left and right to access the fasteners securing the lower trim cover to the turn signal switch bracket.

STEERING COLUMN LOWER TRIM COVER REPLACEMENT (CHEVROLET, WITHOUT BTM)

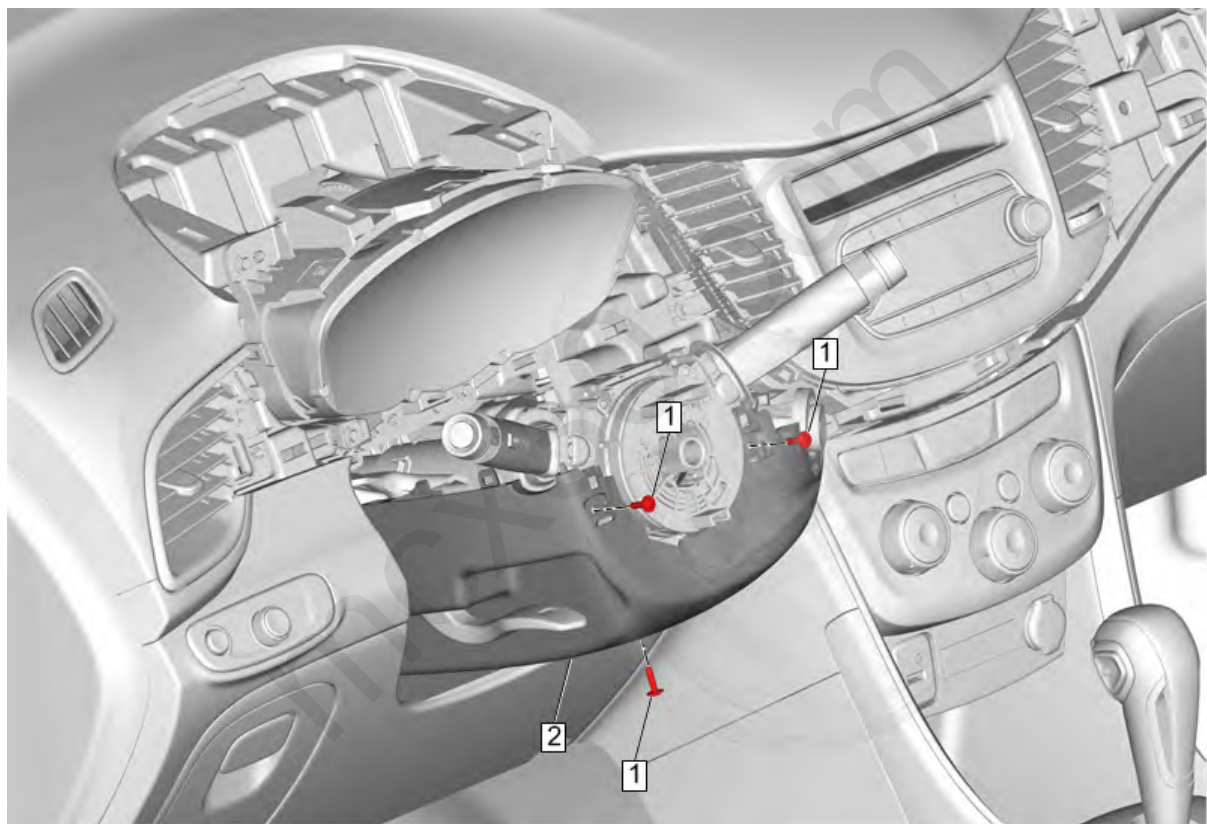


Fig. 74: Steering Column Lower Trim Cover (Trax, Without BTM)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Column Upper Trim Cover. Refer to Steering Column Upper Trim Cover Replacement (Chevrolet, Without BTM) .	
1	Steering Column Lower Trim Cover Bolt (Qty: 3) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)

Callout	Component Name
2	Steering Column Lower Trim Cover Procedure Rotate the steering wheel left and right to access the fasteners securing the lower trim cover to the turn signal switch bracket.

STEERING COLUMN LOCK CONTROL MODULE REPLACEMENT (CHEVROLET)

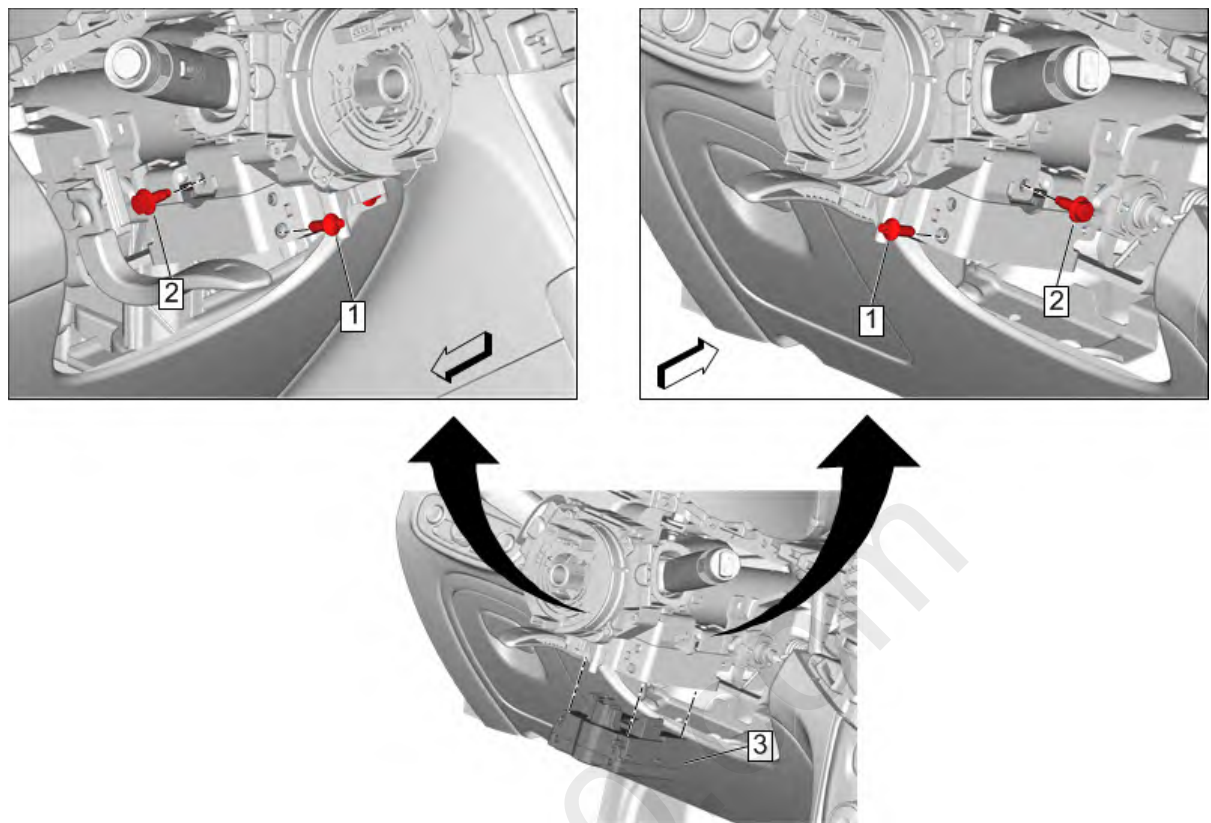


Fig. 75: Steering Column Lock Control Module (Trax).
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure - If equipped, deactivate the steering column lock control module using the following procedure: - With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the ACCESSORY mode and unlock the steering column for 5 minutes. - Turn the steering wheel to verify the steering column is NOT locked. - Remove the fuse for the steering column lock control module. The fuse is found in the instrument panel fuse block and is labeled ESCL. Refer to Electrical Center Identification Views (Chevrolet). - With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the OFF mode and leave the steering column unlocked as long as the electrical connectors are disconnected. - Remove Steering Column Lower Trim Cover. Refer to Steering Column Lower Trim Cover Replacement (Chevrolet, With BTM)Steering Column Lower Trim Cover Replacement (Chevrolet, Without BTM).	

Callout	Component Name
1	Steering Column Lock Control Module Bolt - Rear (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 14.5 N.m (11 lb ft)
2	Steering Column Lock Control Module Bolt - Side (Qty: 2) Tighten 9 N.m (80 lb in)
3	Steering Column Lock Control Module Procedure Program the steering column lock control module. Refer to Control Module References

TURN SIGNAL SWITCH REPLACEMENT (BUICK, WITH BTM)

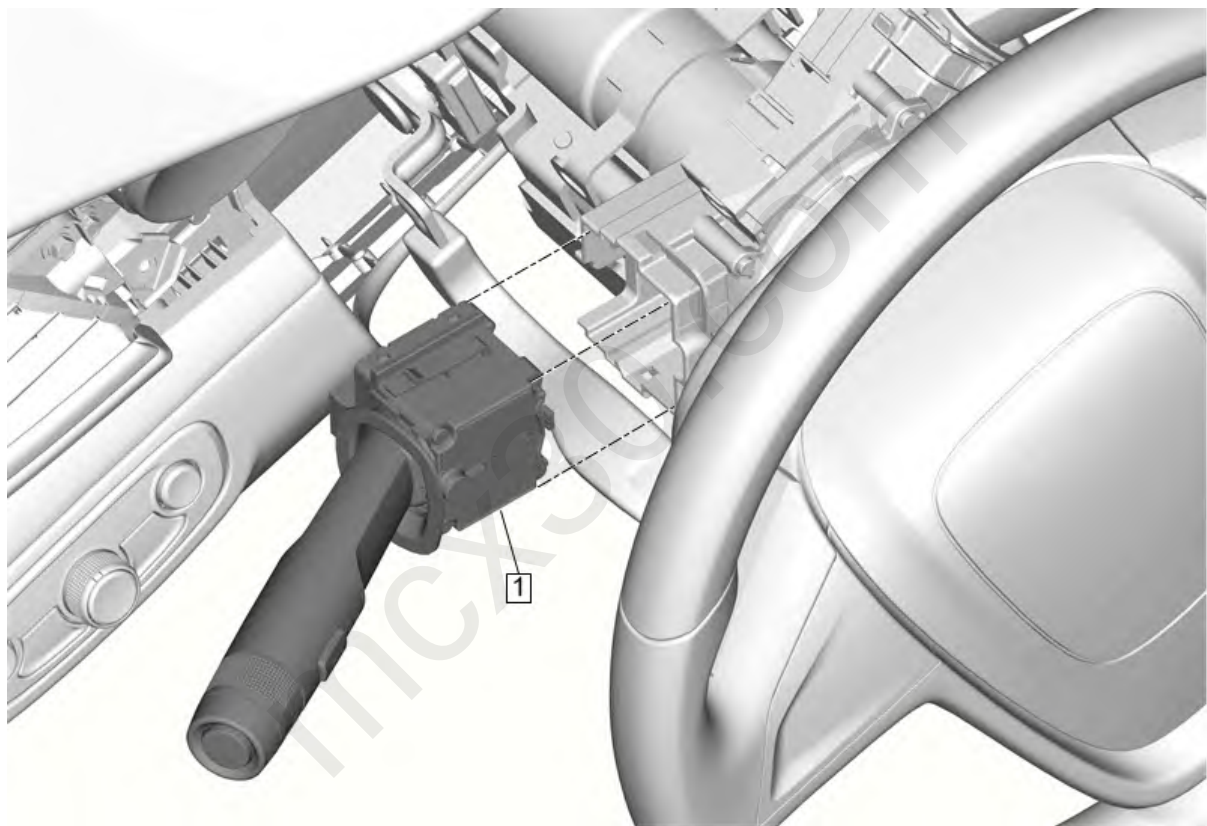


Fig. 76: Turn Signal Switch (Encore, With BTM)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Remove Steering Column Lower Trim Cover. Refer to Steering Column Lower Trim Cover Replacement (Buick, With BTM) .	
1	Turn Signal Switch Procedure 1. Disconnect the electrical connector. 2. Release the retaining tabs and remove the turn signal switch from the turn signal switch bracket.

TURN SIGNAL SWITCH REPLACEMENT (CHEVROLET, WITHOUT BTM)

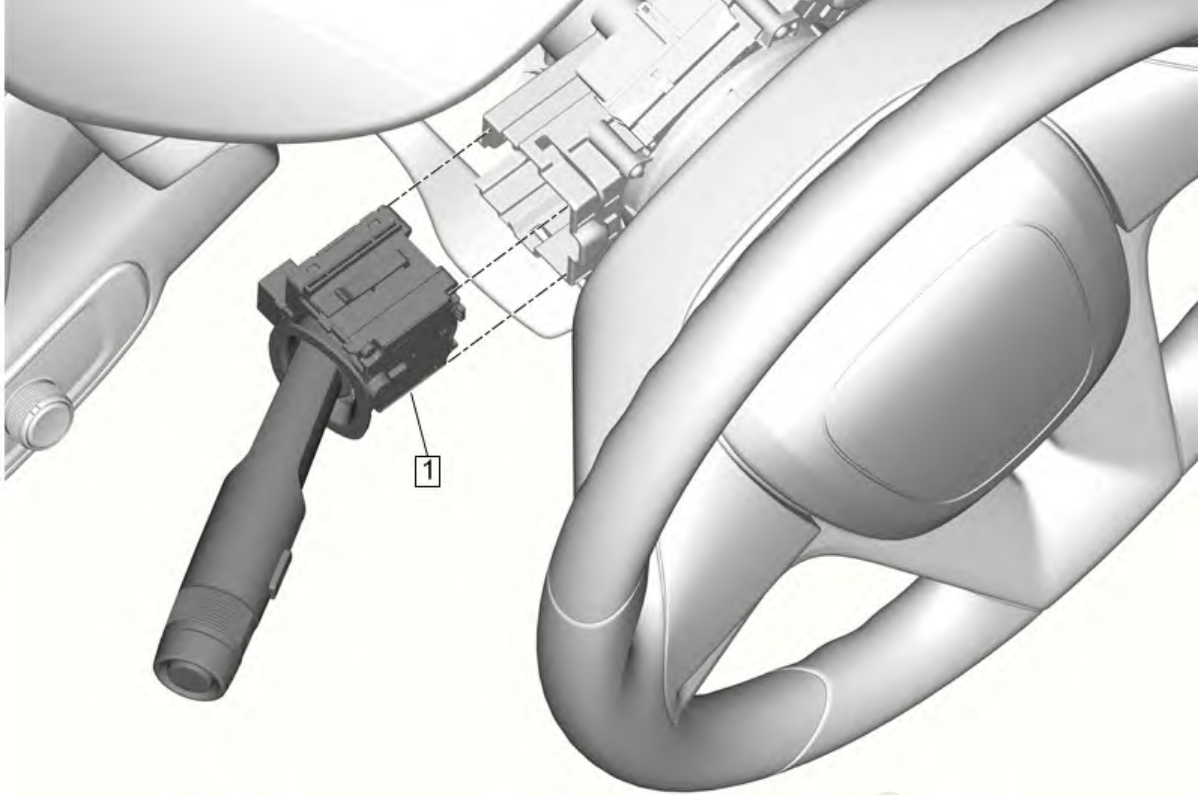


Fig. 77: Turn Signal Switch (Trax, Without BTM).
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Reposition the steering column upper trim cover as necessary. Refer to Steering Column Upper Trim Cover Replacement (Chevrolet, Without BTM). 2. Remove Ignition Lock Cylinder Opening Trim Cover. Refer to Ignition Lock Cylinder Opening Trim Cover Replacement (Chevrolet, Without BTM). 3. Remove Steering Column Lower Trim Cover. Refer to Steering Column Lower Trim Cover Replacement (Chevrolet, Without BTM).	
1	Turn Signal Switch Procedure 1. Disconnect the electrical connector. 2. Release the retaining tabs and remove the turn signal switch from the turn signal switch bracket.

TURN SIGNAL SWITCH REPLACEMENT (CHEVROLET, WITH BTM)

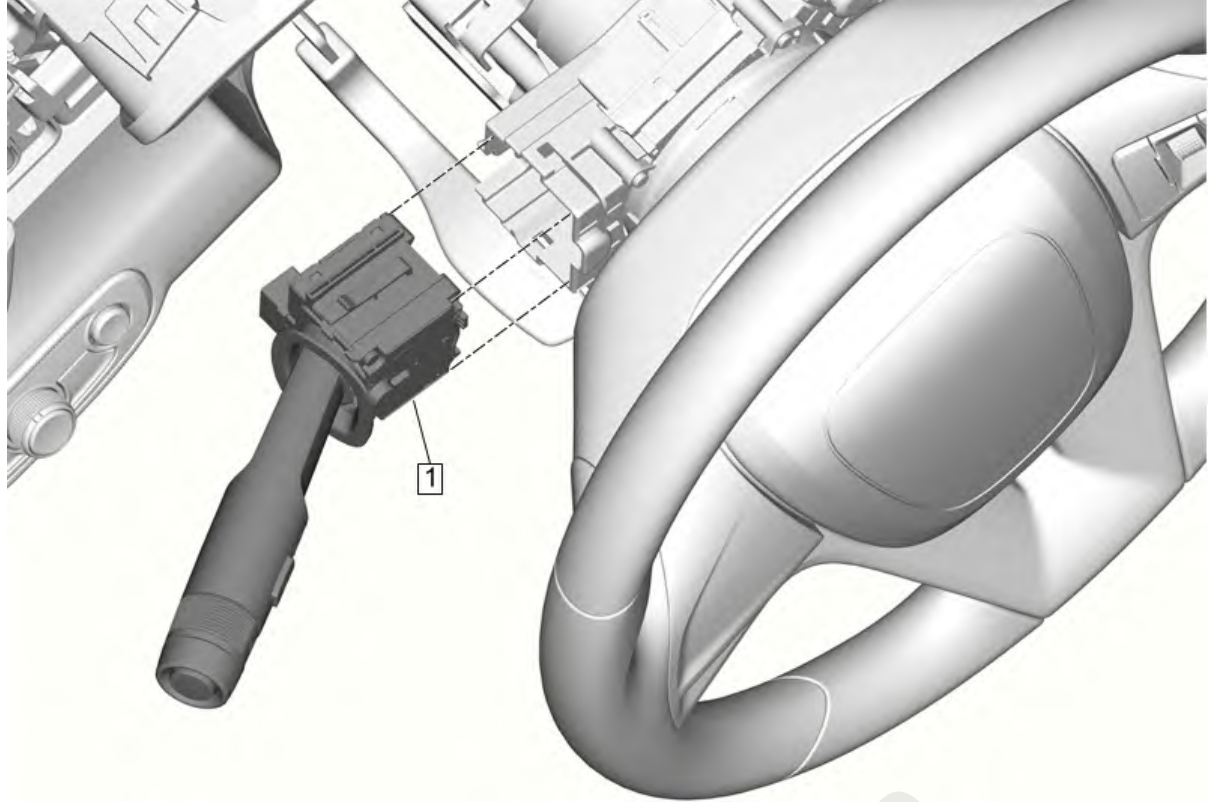


Fig. 78: Turn Signal Switch (Trax, With BTM)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Remove Steering Column Lower Trim Cover. Refer to Steering Column Lower Trim Cover Replacement (Chevrolet, With BTM)	
1	Turn Signal Switch Procedure 1. Disconnect the electrical connector. 2. Release the retaining tabs and remove the turn signal switch from the turn signal switch bracket.

TURN SIGNAL SWITCH BRACKET REPLACEMENT (BUICK, WITH BTM)

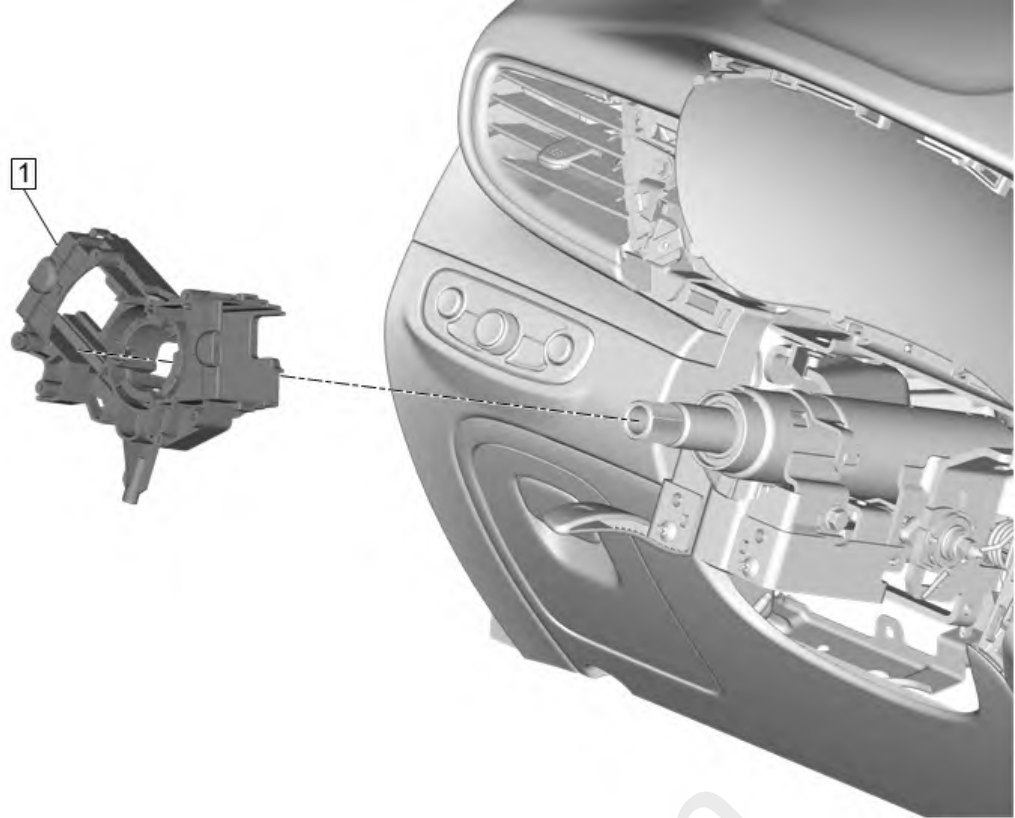


Fig. 79: Turn Signal Switch Bracket (Encore, With BTM).

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Steering Wheel Airbag Coil. Refer to Steering Wheel Airbag Coil Replacement (Buick). 2. Remove Turn Signal Switch. Refer to Turn Signal Switch Replacement (Buick, With BTM). 3. Remove Windshield Wiper and Washer Switch. Refer to Windshield Wiper and Washer Switch Replacement (Buick).	
1	Turn Signal Switch Bracket Procedure Release the retaining tabs and remove the turn signal switch bracket from the steering column.

TURN SIGNAL SWITCH BRACKET REPLACEMENT (CHEVROLET, WITHOUT BTM)

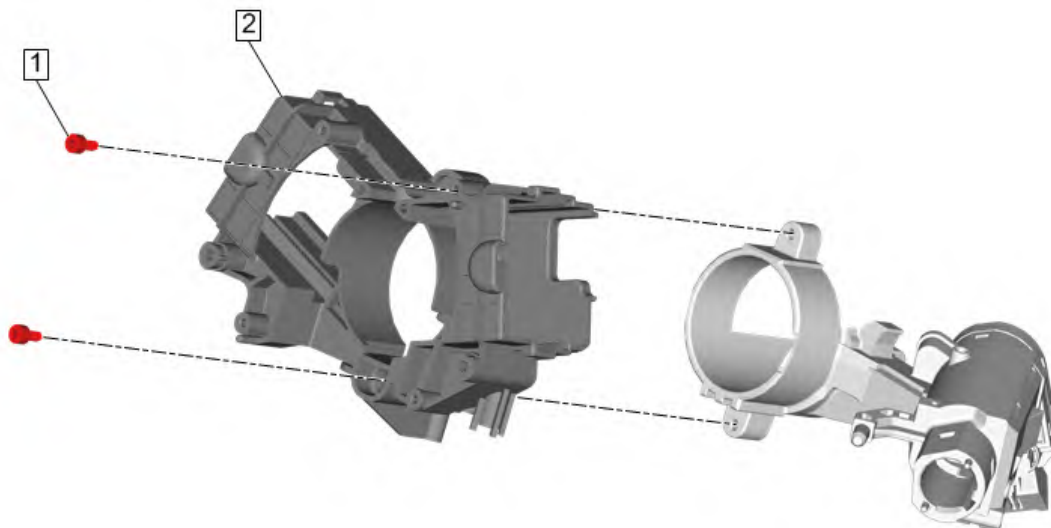


Fig. 80: Turn Signal Switch Bracket (Trax, Without BTM)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Ignition and Start Switch Housing. Refer to Ignition and Start Switch Housing Replacement (Chevrolet) .	
1	Turn Signal Switch Bracket Bolt (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 15 N.m (11 lb ft)
2	Turn Signal Switch Bracket

TURN SIGNAL SWITCH BRACKET REPLACEMENT (CHEVROLET, WITH BTM)

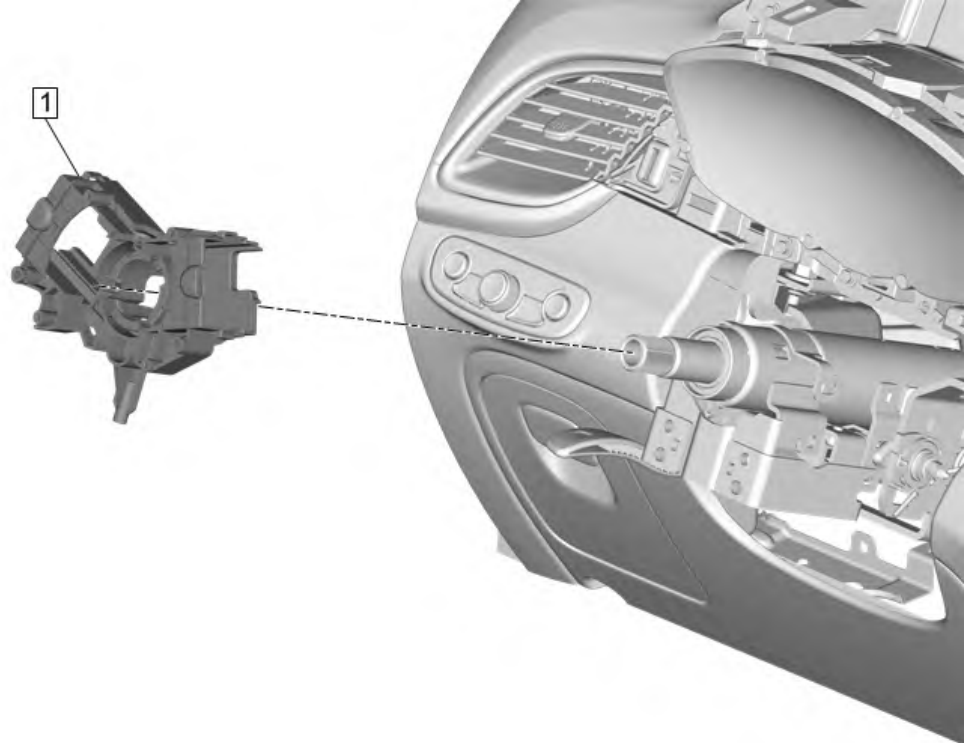


Fig. 81: Turn Signal Switch Bracket (Trax, With BTM).

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Steering Wheel Airbag Coil. Refer to Steering Wheel Airbag Coil Replacement (Chevrolet, With BTM). 2. Remove Turn Signal Switch. Refer to Turn Signal Switch Replacement (Chevrolet, With BTM). 3. Remove Windshield Wiper and Washer Switch. Refer to Windshield Wiper and Washer Switch Replacement (Chevrolet, With BTM).	
1	Turn Signal Switch Bracket Procedure Release the retaining tabs and remove the turn signal switch bracket from the steering column.

STEERING WHEEL PAD ACCESSORY WIRING HARNESS REPLACEMENT (BUICK, CHEVROLET, WITH STEERING WHEEL SWITCHES)

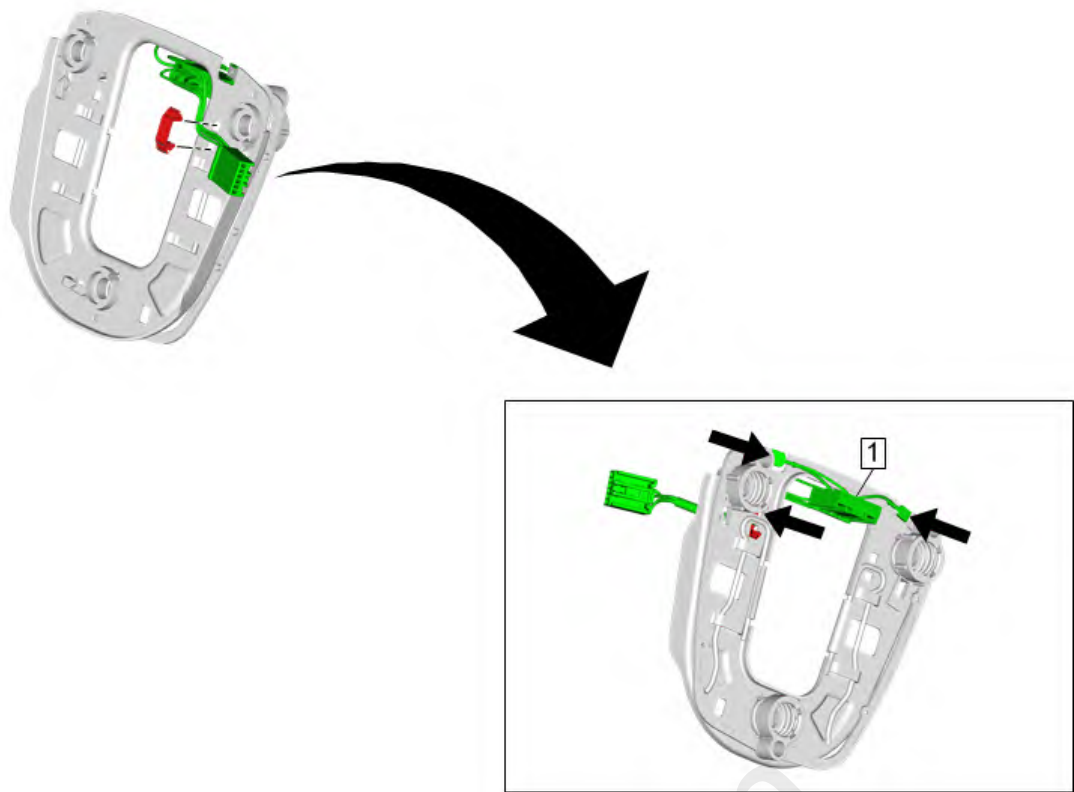


Fig. 82: Steering Wheel Pad Accessory Wiring Harness (Encore & Trax, With Steering Wheel Switches).

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Wheel Horn Contact. Refer to Steering Wheel Horn Contact Replacement (Buick) . Steering Wheel Horn Contact Replacement (Chevrolet) .	
1	Steering Wheel Pad Accessory Wiring Harness Procedure 1. Remove the wiring harness retainer from the steering wheel horn contact. 2. Disconnect the electrical connectors.

**STEERING WHEEL PAD ACCESSORY WIRING HARNESS REPLACEMENT
(CHEVROLET, WITHOUT STEERING WHEEL SWITCHES)**

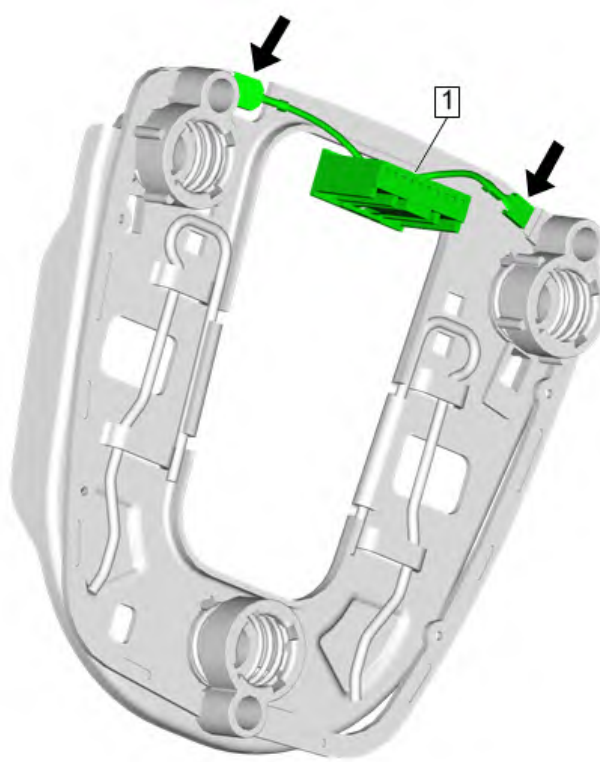


Fig. 83: Steering Wheel Pad Accessory Wiring Harness (Trax, Without Steering Wheel Switches)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Wheel Horn Contact. Refer to Steering Wheel Horn Contact Replacement (Chevrolet) .	
1	Steering Wheel Pad Accessory Wiring Harness Procedure Disconnect the electrical connectors.

STEERING WHEEL REPLACEMENT (BUICK)



Fig. 84: Steering Wheel (Encore).
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Wheel Airbag. Refer to Steering Wheel Airbag Replacement	
1	Steering Wheel Bolt 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 45 N.m (33 lb ft)
2	Steering Wheel Procedure 1. Disconnect the electrical connectors. 2. Install the steering wheel bolt until 2 to 3 threads are engaged. 3. Wiggle the steering wheel until the wheel disengages completely. 4. Remove Steering Wheel Bolt 5. Remove Steering Wheel 6. Transfer components as necessary.

STEERING WHEEL REPLACEMENT (CHEVROLET)



Fig. 85: Steering Wheel (Trax).
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Wheel Airbag. Refer to Steering Wheel Airbag Replacement	
1	Steering Wheel Bolt 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 45 N.m (33 lb ft)
2	Steering Wheel Procedure 1. Disconnect the electrical connectors. 2. Install the steering wheel bolt until 2 to 3 threads are engaged. 3. Wiggle the steering wheel until the wheel disengages completely. 4. Remove Steering Wheel Bolt 5. Remove Steering Wheel 6. Transfer components as necessary.

STEERING WHEEL SPOKE COVER REPLACEMENT (BUICK)

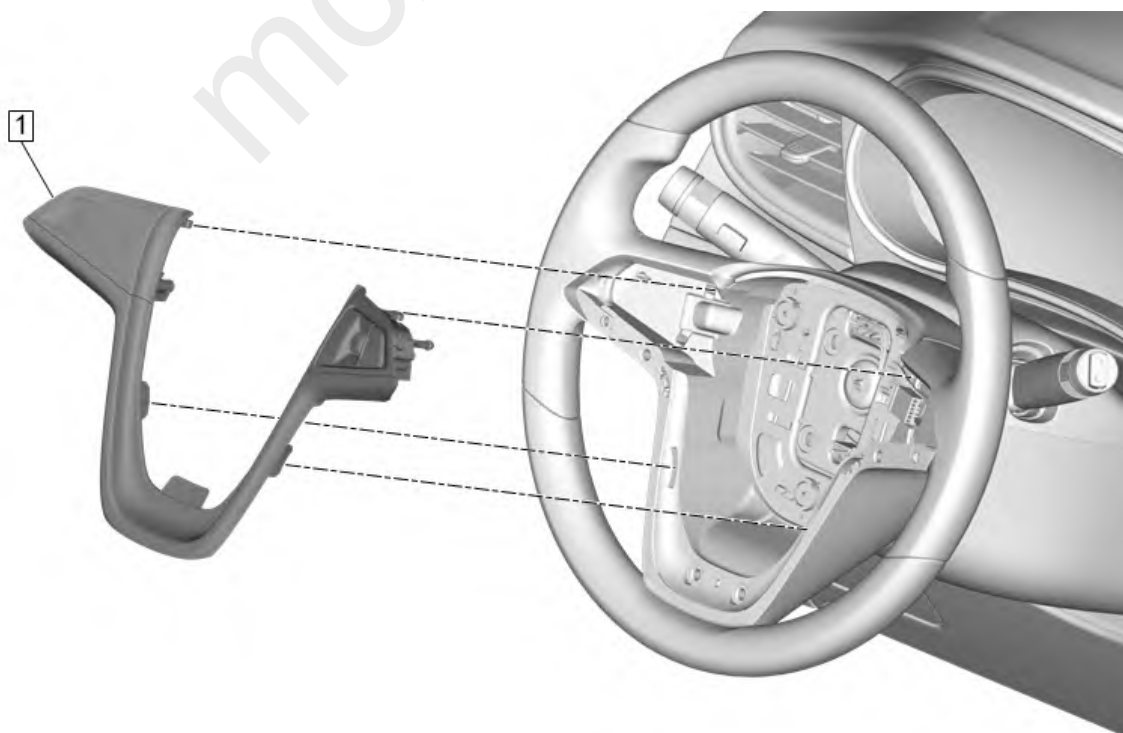


Fig. 86: Steering Wheel Spoke Cover (Encore)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Wheel Airbag. Refer to Steering Wheel Airbag Replacement	
1	Steering Wheel Spoke Cover Procedure 1. Use a flat bladed plastic tool to remove. 2. Disconnect the electrical connectors. 3. Transfer components as necessary.

STEERING WHEEL SPOKE COVER REPLACEMENT (CHEVROLET)

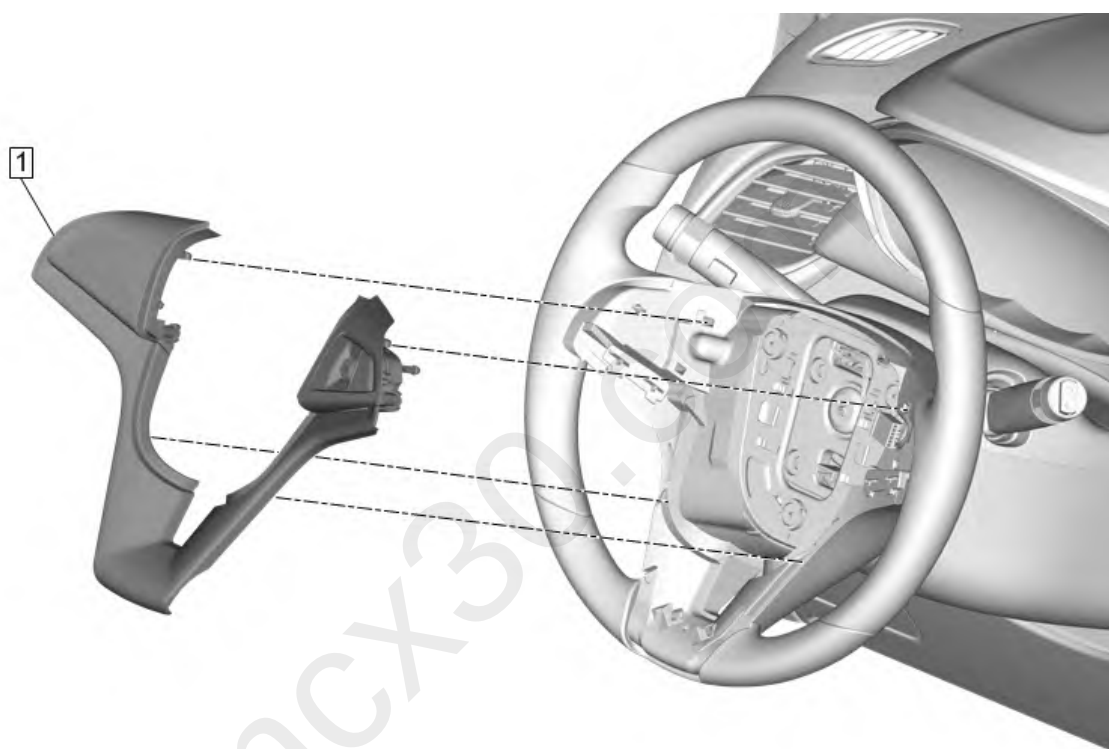


Fig. 87: Steering Wheel Spoke Cover (Trax)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Wheel Airbag. Refer to Steering Wheel Airbag Replacement	
1	Steering Wheel Spoke Cover Procedure 1. Use a flat bladed plastic tool to remove. 2. Disconnect the electrical connectors. 3. Transfer components as necessary.

STEERING COLUMN REPLACEMENT (BUICK, MEXICO, NJ1, WITH BTM, WITH N06)

Removal Procedure

1. If equipped, deactivate the steering column lock control module using the following procedure:

1. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the ACCESSORY mode and unlock the steering column for 5 minutes.
2. Turn the steering wheel to verify the steering column is NOT locked.
3. Remove the fuse for the steering column lock control module. The fuse is found in the instrument panel fuse block and is labeled ESCL. Refer to [Electrical Center Identification Views \(Buick\)](#).
4. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the OFF mode and leave the steering column unlocked as long as the electrical connectors are disconnected.

WARNING: Refer to [SIR Warning](#) .

WARNING: Refer to [SIR Inflator Module Handling and Storage Warning](#) .

2. Disable the SIR system. [SIR Disabling and Enabling](#)
3. Remove Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Buick, With BTM\)](#).

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

4. With the steering wheel in the straight ahead position, LOCK the steering column.
5. Remove Instrument Panel Knee Bolster. Refer to [Instrument Panel Knee Bolster Replacement \(Buick\)](#).
6. Remove Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Buick\)](#).
7. Disconnect any electrical connectors as necessary.
8. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.
9. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

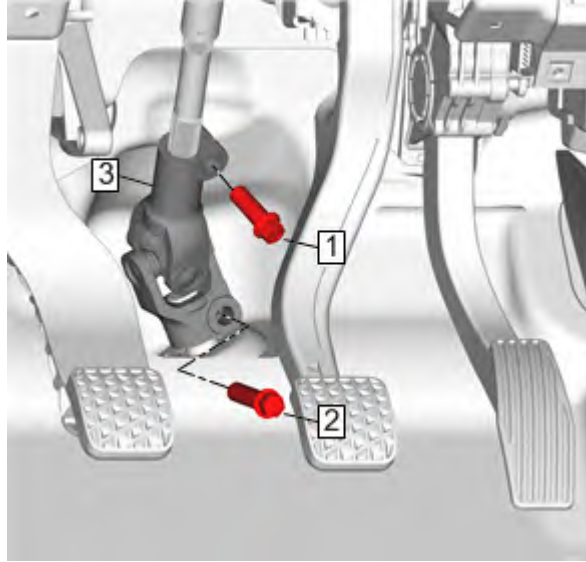


Fig. 88: Intermediate Steering Shaft Lower Universal Joint And Bolts
 Courtesy of GENERAL MOTORS COMPANY

10. Remove Intermediate Steering Shaft Middle Bolt (1)
11. Remove Intermediate Steering Shaft Lower Bolt (2)

NOTE: If the intermediate steering shaft lower universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slots as necessary.

12. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.

CAUTION: Do not support the steering column by only the lower or upper support bracket. Damage to the column lower bearing adapter could result.

13. Support the steering column.

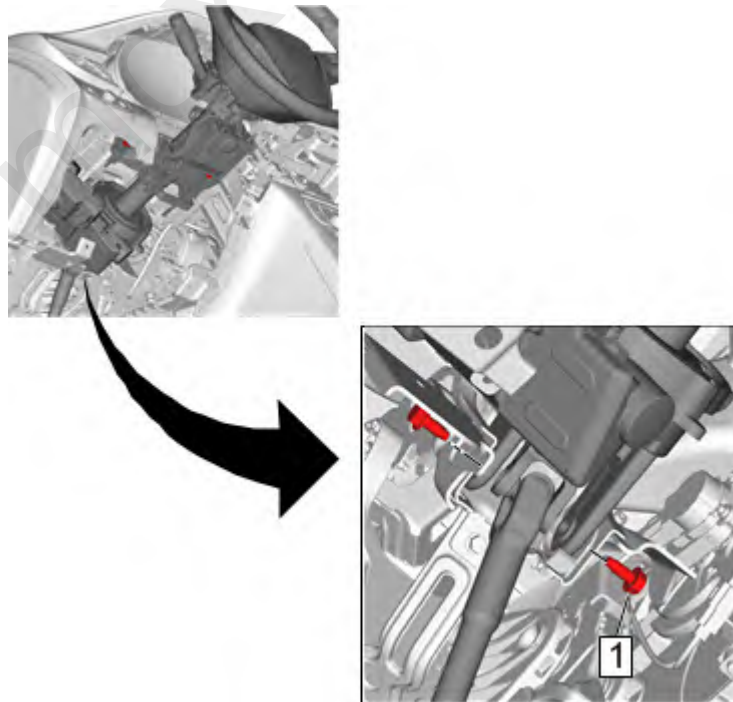


Fig. 89: Steering Column Lower Support Bracket Bolts
 Courtesy of GENERAL MOTORS COMPANY

14. Remove Steering Column Lower Support Bracket Bolts (1) (Qty: 2)

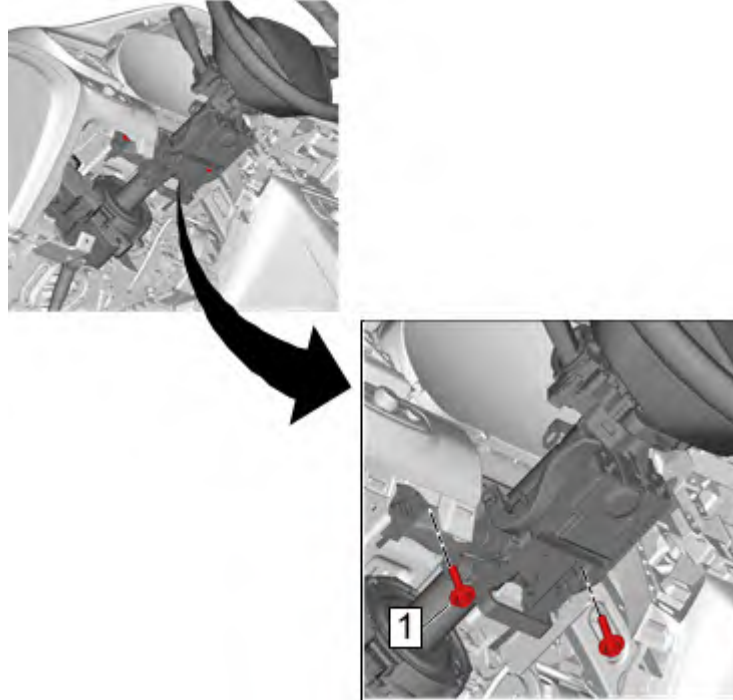


Fig. 90: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

15. Remove Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

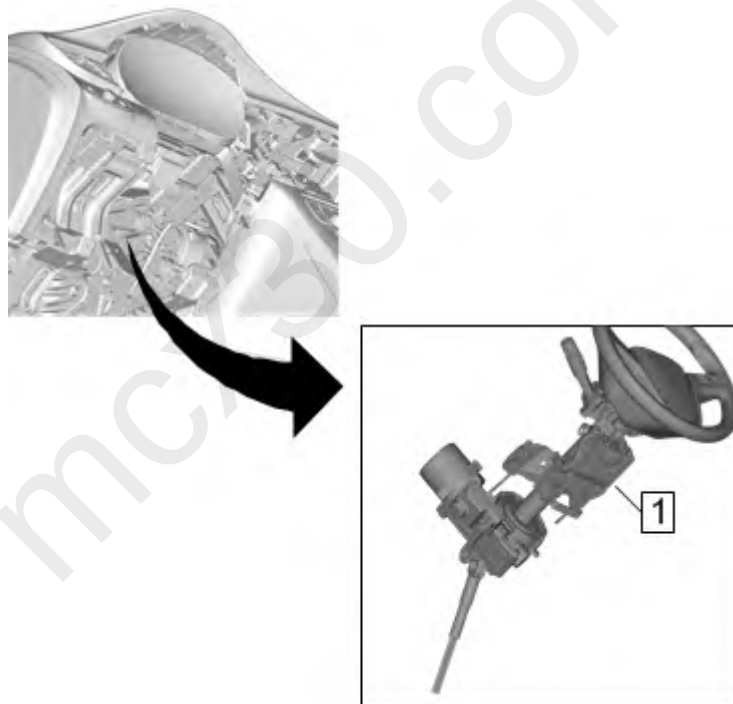


Fig. 91: Steering Column Assembly

Courtesy of GENERAL MOTORS COMPANY

CAUTION:

Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

16. Remove the steering column assembly (1) from the vehicle.
17. Transfer components as necessary.

18. If replacing the steering column, copy the match marks from the OLD steering column to the NEW steering column.

Installation Procedure

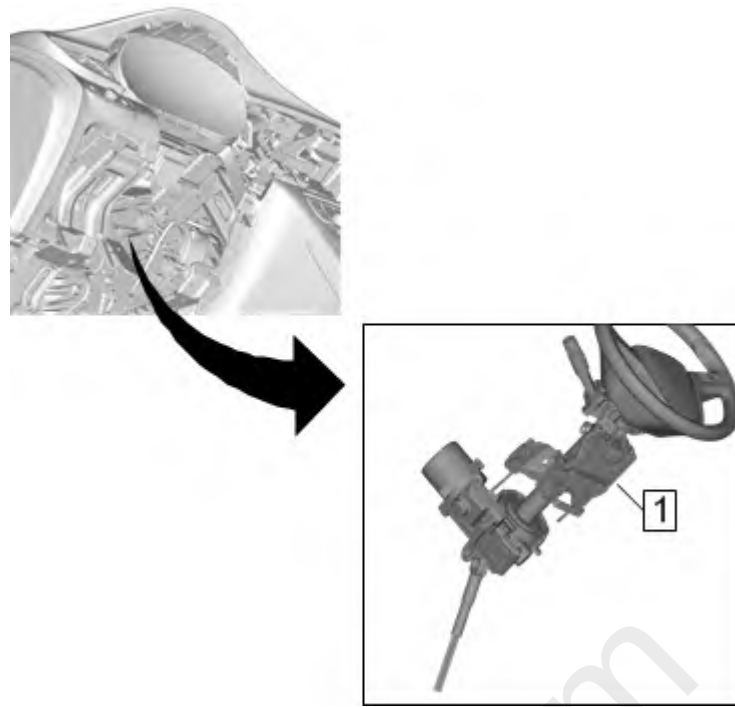


Fig. 92: Steering Column Assembly.

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do NOT allow the wiring harness to be pinched between the motor/module assembly and the steering column during installation. A pinched harness will cause diagnostic trouble codes to be set and may require replacement of the steering column.

1. Position the steering column assembly (1) in the vehicle.
2. Support the steering column.

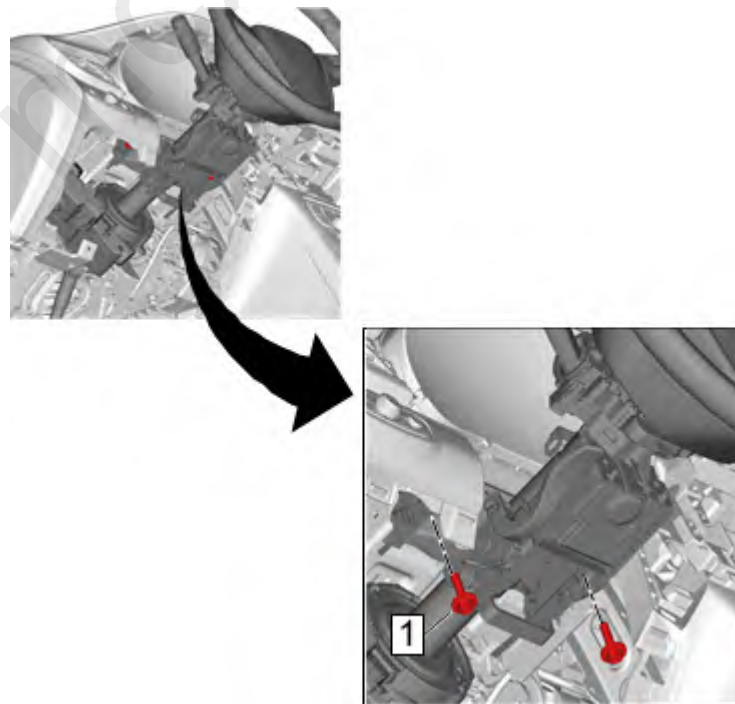


Fig. 93: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

3. Install, but do NOT tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

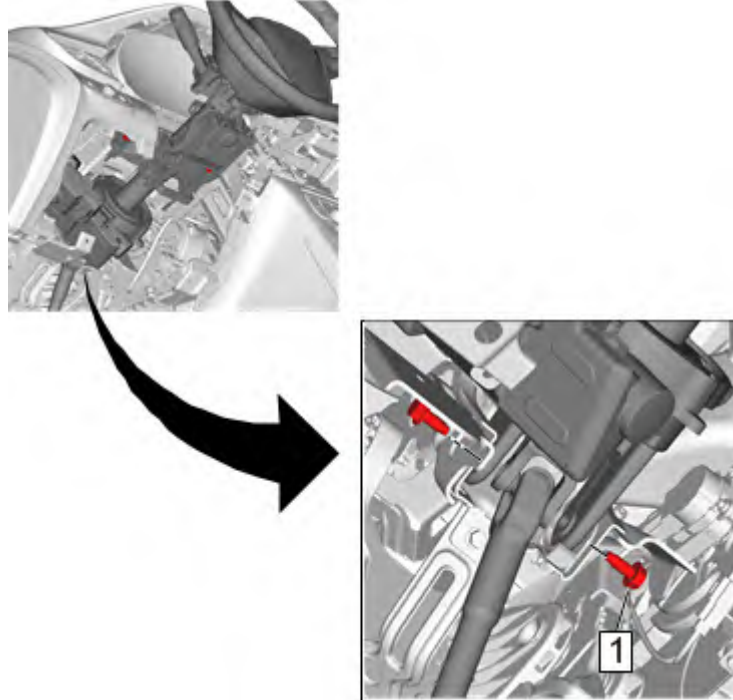


Fig. 94: Steering Column Lower Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

WARNING: In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

- Tighten the steering column lower fasteners before you tighten the steering column upper fasteners. Failure to do this can damage the steering column.
- Tighten the steering column fasteners to the specified torque. Overtightening the upper steering column fasteners could affect the steering column collapse.

CAUTION: Ensure all fasteners are securely seated before applying needed torque. Failure to do so may result in component damage or malfunctioning of steering column.

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

4. Install and tighten Steering Column Lower Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)

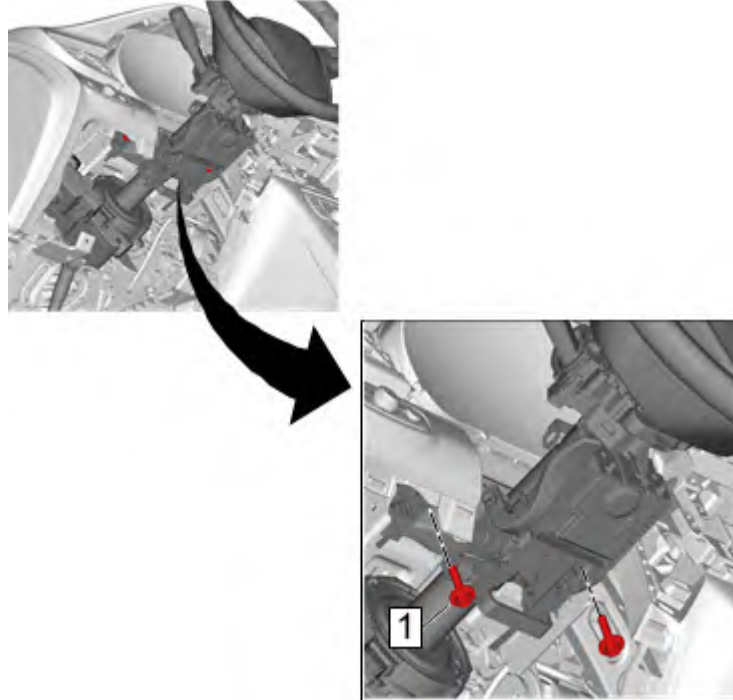


Fig. 95: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

5. Tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)
6. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
7. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

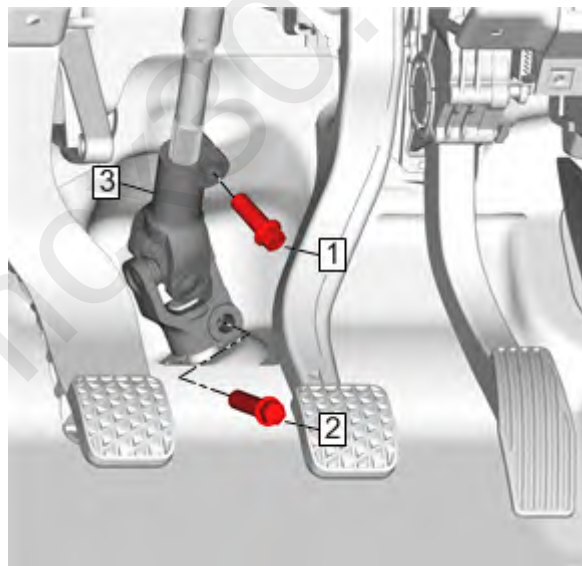


Fig. 96: Intermediate Steering Shaft Lower Universal Joint And Bolts

Courtesy of GENERAL MOTORS COMPANY

8. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
9. Install and tighten Intermediate Steering Shaft Lower Bolt (2) to 49 N.m (36 lb ft)
10. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)
11. Connect any electrical connectors as necessary.
12. Install Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Buick\)](#)
13. Install Instrument Panel Knee Bolster. Refer to [Instrument Panel Knee Bolster Replacement \(Buick\)](#)
14. Install Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Buick, With BTM\)](#)
15. Enable the SIR System. Refer to [SIR Disabling and Enabling](#)

16. Program the steering column lock control module. Refer to [Control Module References](#)
17. Program the power steering control module. Refer to [Control Module References](#)
18. Center the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#)

STEERING COLUMN REPLACEMENT (BUICK, CANADA/UNITED STATES, NJ1, WITH BTM, WITHOUT N06)

Removal Procedure

1. If equipped, deactivate the steering column lock control module using the following procedure:
 1. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the ACCESSORY mode and unlock the steering column for 5 minutes.
 2. Turn the steering wheel to verify the steering column is NOT locked.
 3. Remove the fuse for the steering column lock control module. The fuse is found in the instrument panel fuse block and is labeled ESCL. Refer to [Electrical Center Identification Views \(Buick\)](#).
 4. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the OFF mode and leave the steering column unlocked as long as the electrical connectors are disconnected.

WARNING: Refer to [SIR Warning](#) .

WARNING: Refer to [SIR Inflator Module Handling and Storage Warning](#) .

2. Disable the SIR system. Refer to [SIR Disabling and Enabling](#)
3. Remove Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Buick, With BTM\)](#).

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

4. With the steering wheel in the straight ahead position, LOCK the steering column.
5. Remove Instrument Panel Lower Airbag - Driver Side. Refer to [Instrument Panel Lower Airbag Replacement - Driver Side \(AYF\)](#).
6. Remove Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Buick\)](#).
7. Remove Instrument Panel Knee Bolster Outer Bracket. Refer to [Instrument Panel Knee Bolster Outer Bracket Replacement](#)
8. Disconnect any electrical connectors as necessary.
9. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

10. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

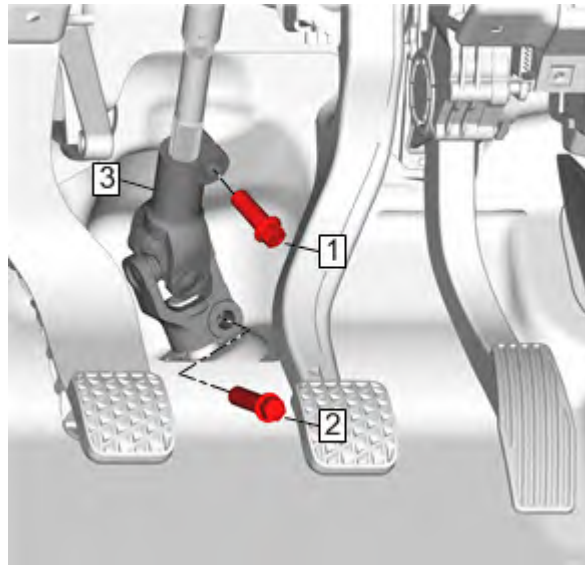


Fig. 97: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

11. Remove Intermediate Steering Shaft Middle Bolt (1)
12. Remove Intermediate Steering Shaft Lower Bolt (2)

NOTE: If the intermediate steering shaft lower universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slots as necessary.

13. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.

CAUTION: Do not support the steering column by only the lower or upper support bracket. Damage to the column lower bearing adapter could result.

14. Support the steering column.

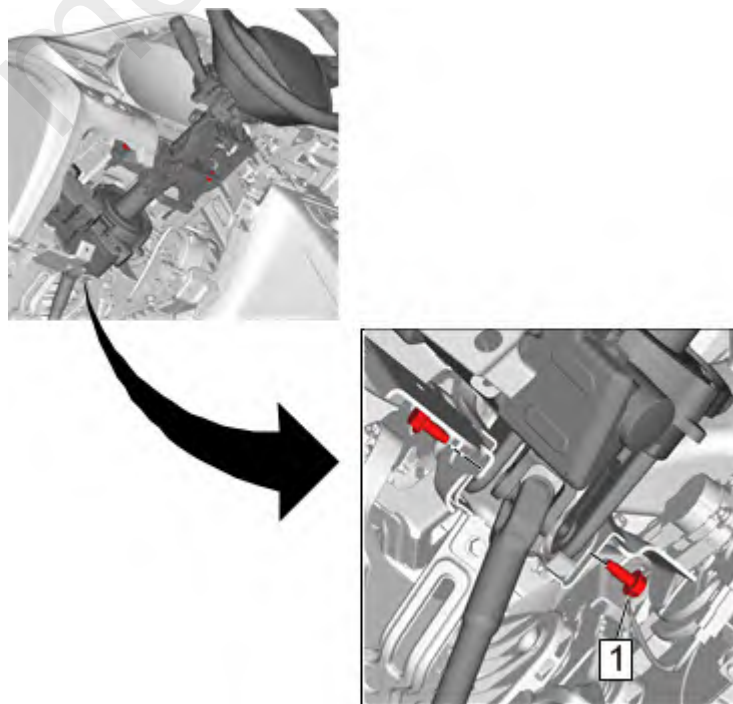


Fig. 98: Steering Column Lower Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

15. Remove Steering Column Lower Support Bracket Bolts (1) (Qty: 2)

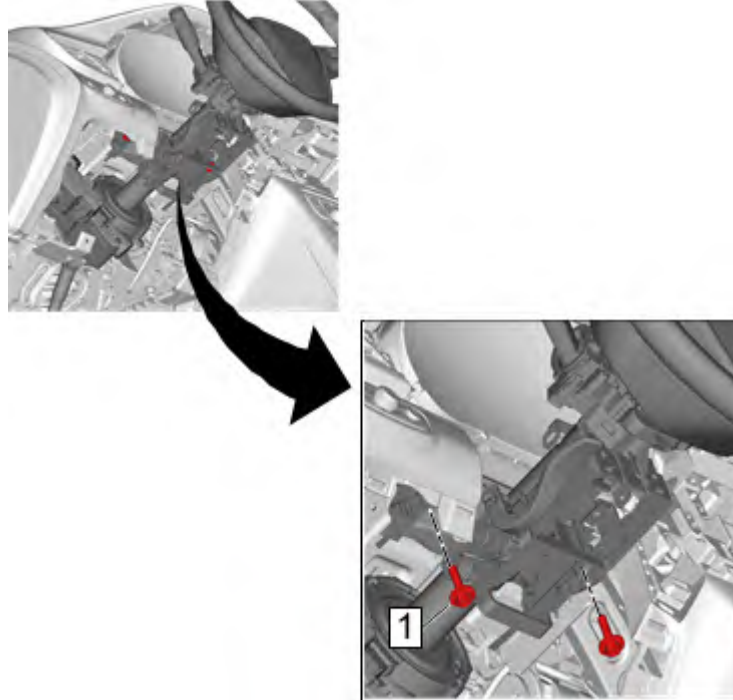


Fig. 99: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

16. Remove Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

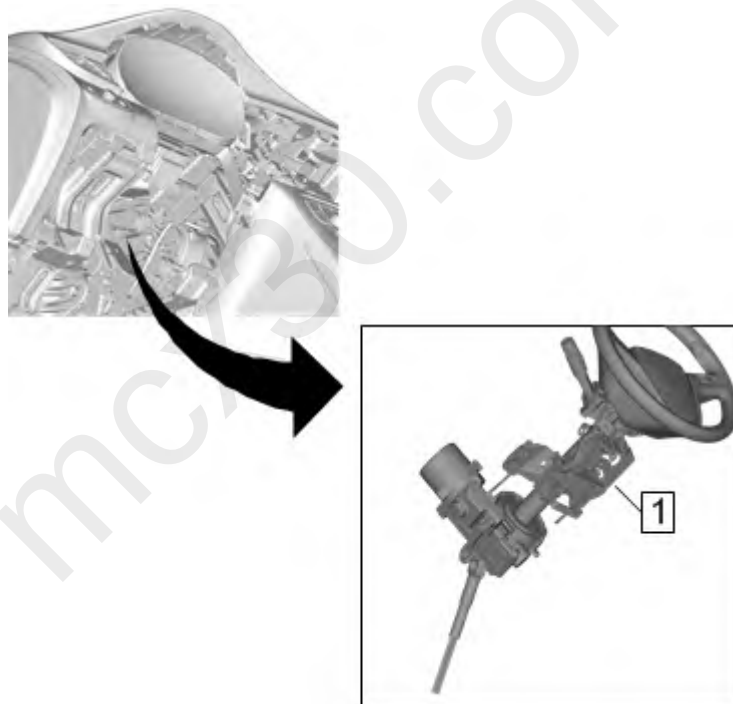


Fig. 100: Steering Column Assembly

Courtesy of GENERAL MOTORS COMPANY

CAUTION:

Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

17. Remove the steering column assembly (1) from the vehicle.
18. Transfer components as necessary.

19. If replacing the steering column, copy the match marks from the OLD steering column to the NEW steering column.

Installation Procedure

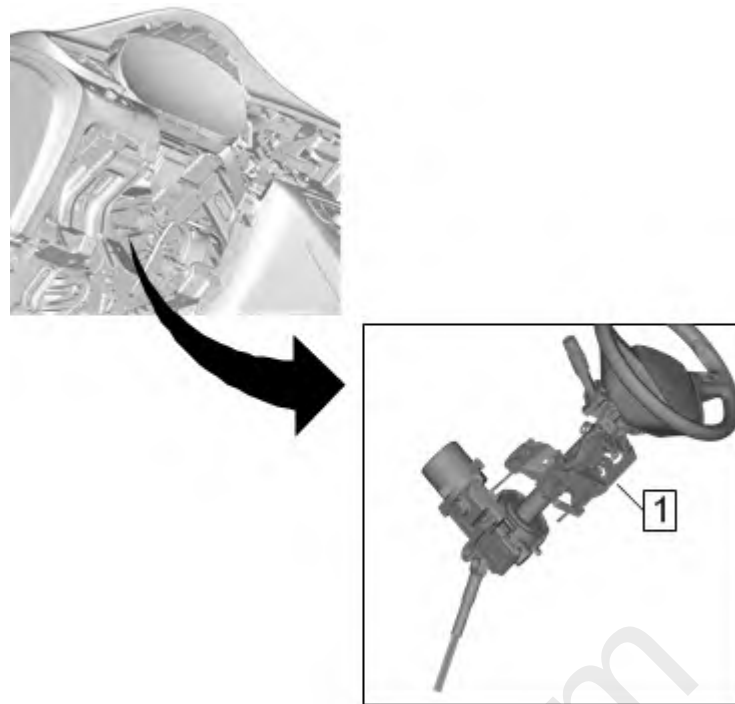


Fig. 101: Steering Column Assembly
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do NOT allow the wiring harness to be pinched between the motor/module assembly and the steering column during installation. A pinched harness will cause diagnostic trouble codes to be set and may require replacement of the steering column.

1. Position the steering column assembly (1) in the vehicle.
2. Support the steering column.

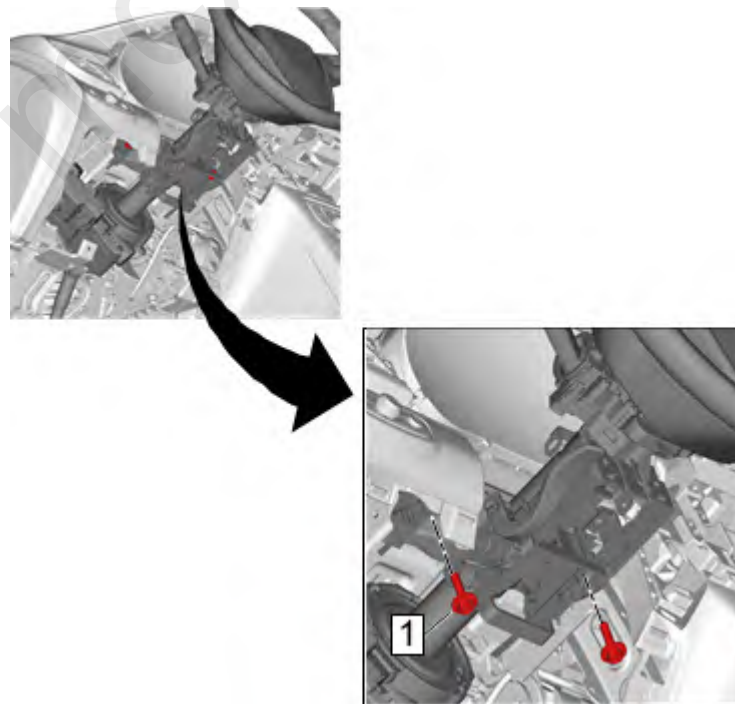


Fig. 102: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Install, but do not tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

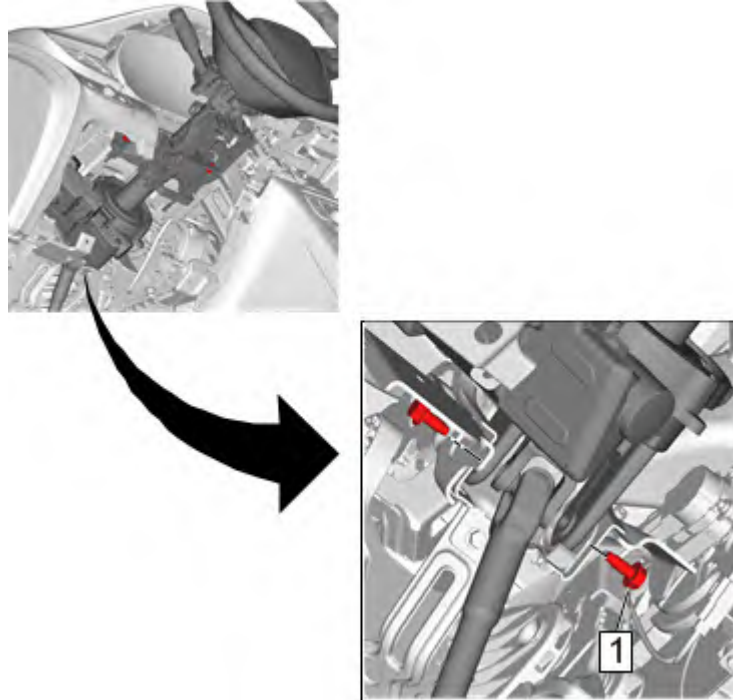


Fig. 103: Steering Column Lower Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

WARNING:

In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

- Tighten the steering column lower fasteners before you tighten the steering column upper fasteners. Failure to do this can damage the steering column.
- Tighten the steering column fasteners to the specified torque. Overtightening the upper steering column fasteners could affect the steering column collapse.

CAUTION:

Ensure all fasteners are securely seated before applying needed torque. Failure to do so may result in component damage or malfunctioning of steering column.

CAUTION:

Refer to [Fastener Caution](#) .

4. Install and tighten Steering Column Lower Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)

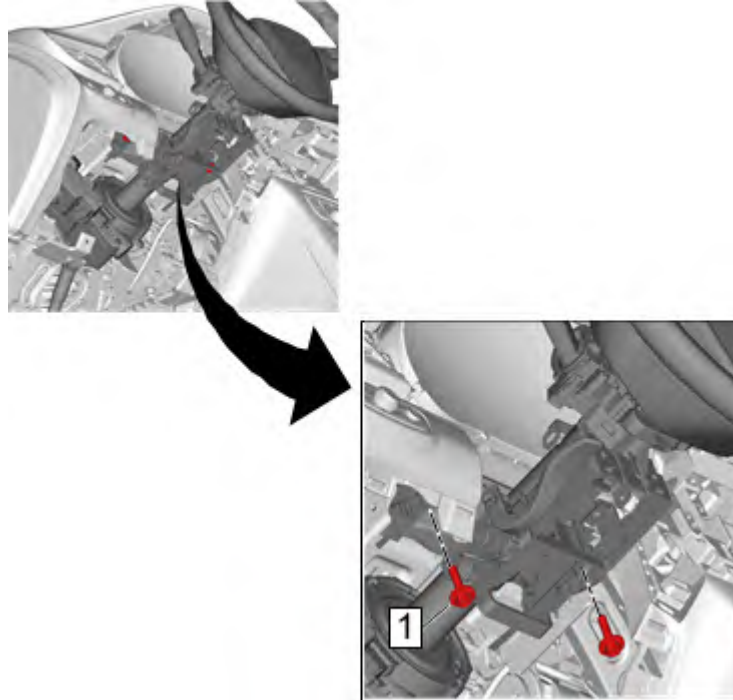


Fig. 104: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

5. Tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)
6. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
7. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

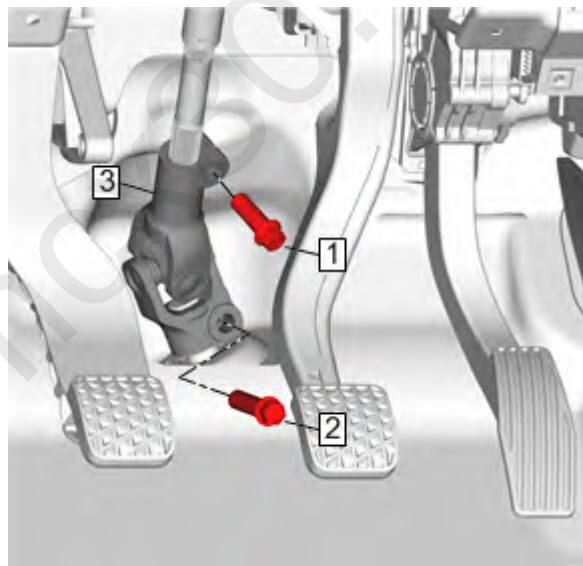


Fig. 105: Intermediate Steering Shaft Lower Universal Joint And Bolts

Courtesy of GENERAL MOTORS COMPANY

8. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
9. Install and tighten Intermediate Steering Shaft Lower Bolts (2) (Qty: 2) to 49 N.m (36 lb ft)
10. Install and tighten Intermediate Steering Shaft Middle Bolts (1) (Qty: 2) to 49 N.m (36 lb ft)
11. Connect any electrical connectors as necessary.
12. Install Instrument Panel Knee Bolster Outer Bracket. Refer to [Instrument Panel Knee Bolster Outer Bracket Replacement](#)
13. Install Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Buick\)](#)
14. Install Instrument Panel Lower Airbag - Driver Side. Refer to [Instrument Panel Lower Airbag Replacement - Driver Side \(AYF\)](#)

15. Install Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Buick, With BTM\)](#).
16. Enable the SIR System. Refer to [SIR Disabling and Enabling](#)
17. Program the power steering control module. Refer to [Control Module References](#)
18. Center the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#)

STEERING COLUMN REPLACEMENT (CHEVROLET, MEXICO, NJ1, WITH BTM, WITH N06)

Removal Procedure

1. If equipped, deactivate the steering column lock control module using the following procedure:
 1. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the ACCESSORY mode and unlock the steering column for 5 minutes.
 2. Turn the steering wheel to verify the steering column is NOT locked.
 3. Remove the fuse for the steering column lock control module. The fuse is found in the instrument panel fuse block and is labeled ESCL. Refer to [Electrical Center Identification Views \(Chevrolet\)](#).
 4. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the OFF mode and leave the steering column unlocked as long as the electrical connectors are disconnected.

WARNING: Refer to [SIR Warning](#) .

WARNING: Refer to [SIR Inflator Module Handling and Storage Warning](#) .

2. Disable the SIR system. Refer to [SIR Disabling and Enabling](#)
3. Remove Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Chevrolet, With BTM\)](#).

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

4. With the steering wheel in the straight ahead position, LOCK the steering column.
5. Remove Instrument Panel Knee Bolster. Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#).
6. Remove Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#).
7. Disconnect any electrical connectors as necessary.
8. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

9. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

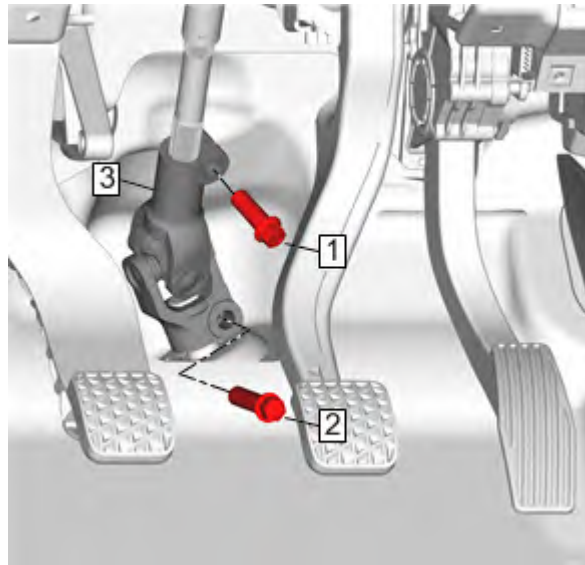


Fig. 106: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

10. Remove Intermediate Steering Shaft Middle Bolt (1)
11. Remove Intermediate Steering Shaft Lower Bolt (2)

NOTE: If the intermediate steering shaft lower universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slots as necessary.

12. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.

CAUTION: Do not support the steering column by only the lower or upper support bracket. Damage to the column lower bearing adapter could result.

13. Support the steering column.

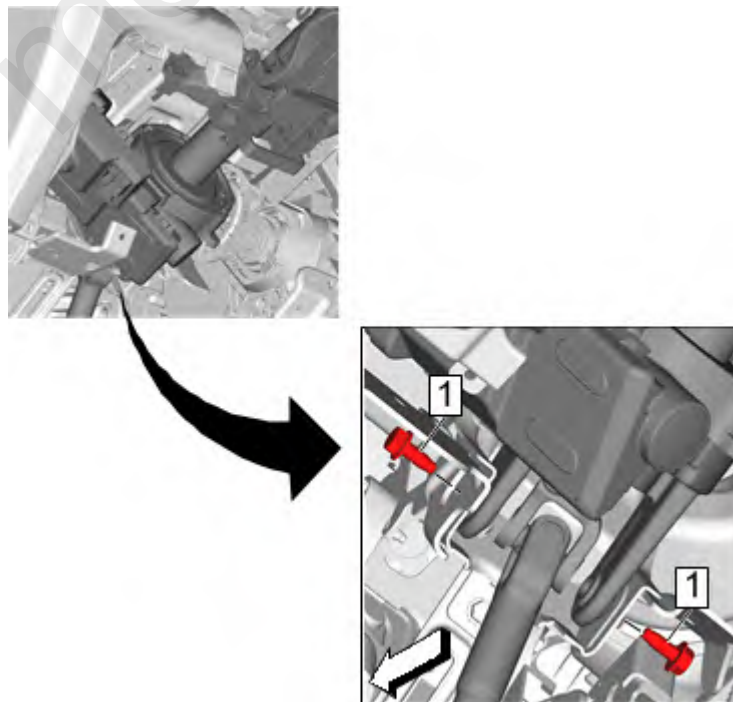


Fig. 107: Steering Column Lower Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

14. Remove Steering Column Lower Support Bracket Bolts (1) (Qty: 2)

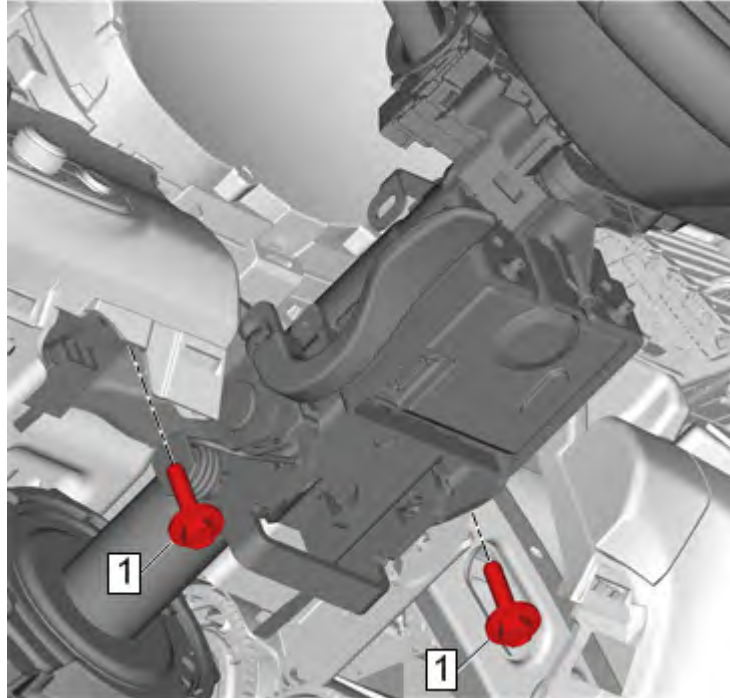


Fig. 108: Steering Column Upper Support Bracket Bolts
 Courtesy of GENERAL MOTORS COMPANY

15. Remove Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

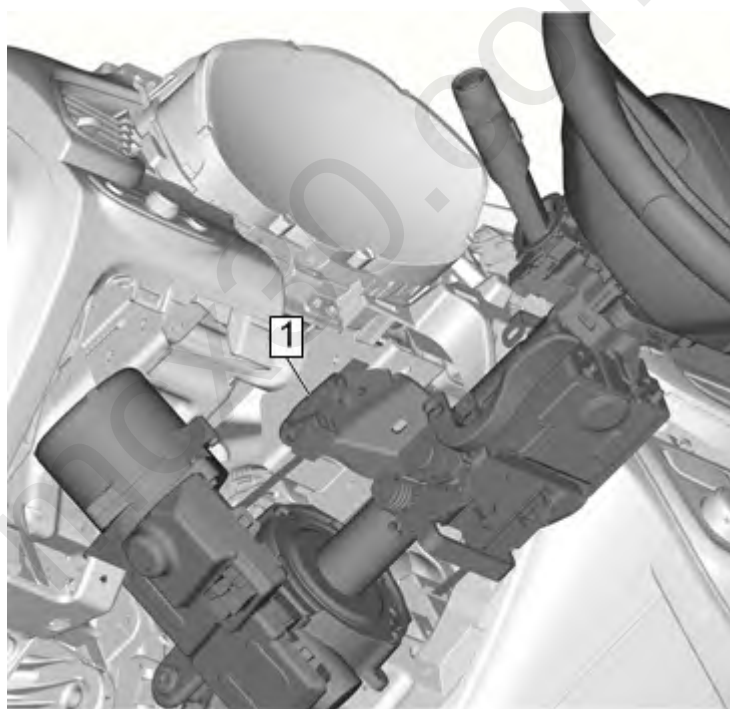


Fig. 109: Steering Column Assembly
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

16. Remove the steering column assembly (1) from the vehicle.
17. Transfer components as necessary.

18. If replacing the steering column, copy the match marks from the OLD steering column to the NEW steering column.

Installation Procedure

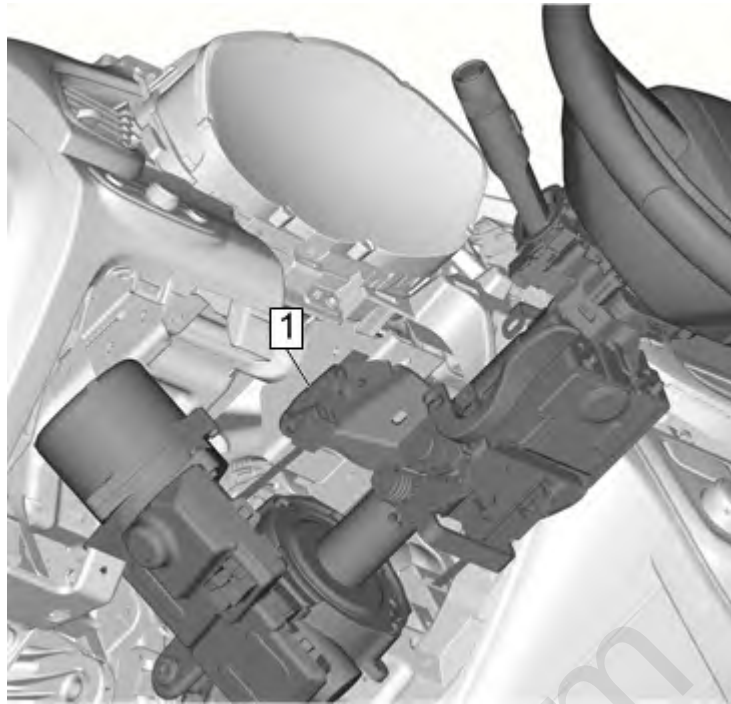


Fig. 110: Steering Column Assembly
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do NOT allow the wiring harness to be pinched between the motor/module assembly and the steering column during installation. A pinched harness will cause diagnostic trouble codes to be set and may require replacement of the steering column.

1. Position the steering column assembly (1) in the vehicle.
2. Support the steering column.

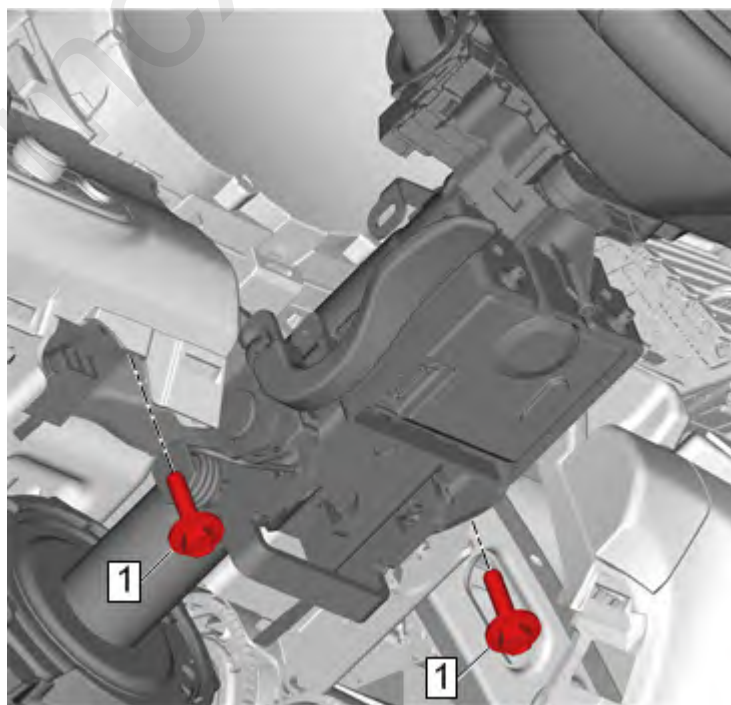


Fig. 111: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Install, but do NOT tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

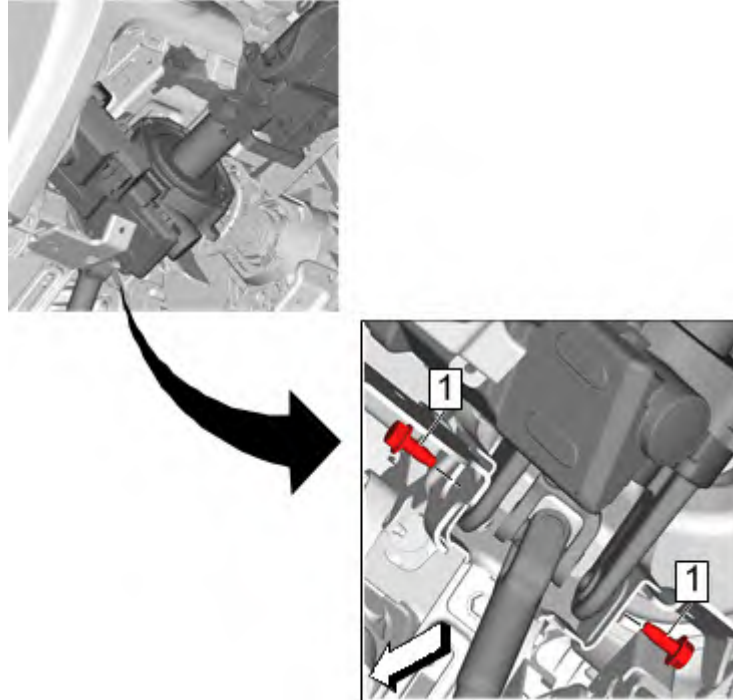


Fig. 112: Steering Column Lower Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

WARNING: In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

- Tighten the steering column lower fasteners before you tighten the steering column upper fasteners. Failure to do this can damage the steering column.
- Tighten the steering column fasteners to the specified torque. Overtightening the upper steering column fasteners could affect the steering column collapse.

CAUTION: Ensure all fasteners are securely seated before applying needed torque. Failure to do so may result in component damage or malfunctioning of steering column.

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

4. Install and tighten Steering Column Lower Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)

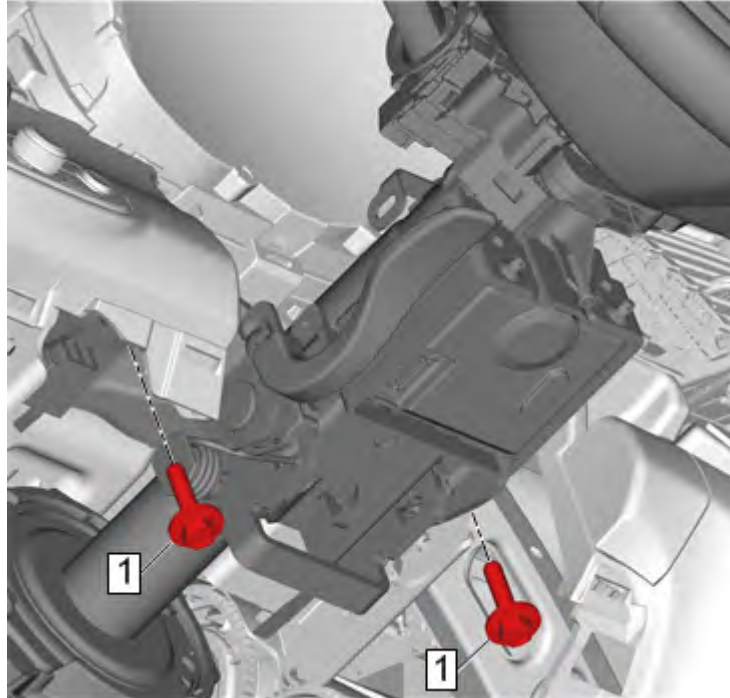


Fig. 113: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

5. Tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)
6. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
7. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

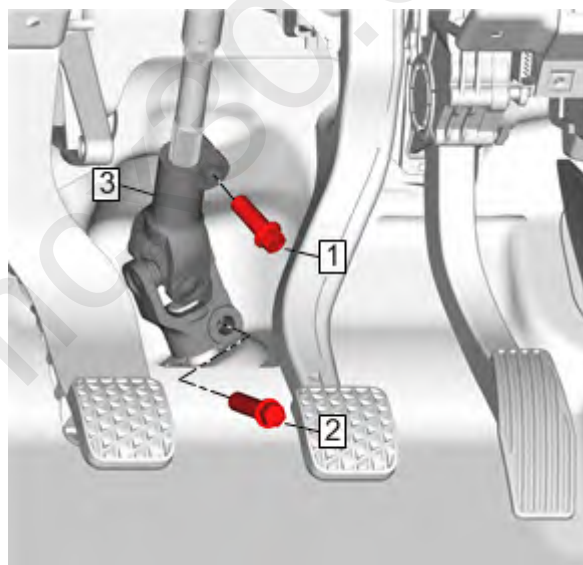


Fig. 114: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
9. Install and tighten Intermediate Steering Shaft Lower Bolt (2) to 49 N.m (36 lb ft)
10. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)
11. Connect any electrical connectors as necessary.
12. Install Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#)
13. Install Instrument Panel Knee Bolster. Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#)
14. Install Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Chevrolet, With BTM\)](#)
15. Enable the SIR System. Refer to [SIR Disabling and Enabling](#)

16. Program the steering column lock control module. Refer to [Control Module References](#)
17. Program the power steering control module. Refer to [Control Module References](#)
18. Center the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#)

STEERING COLUMN REPLACEMENT (CHEVROLET, CANADA/UNITED STATES, NJ1, WITH BTM, WITHOUT N06)

Removal Procedure

1. If equipped, deactivate the steering column lock control module using the following procedure:
 1. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the ACCESSORY mode and unlock the steering column for 5 minutes.
 2. Turn the steering wheel to verify the steering column is NOT locked.
 3. Remove the fuse for the steering column lock control module. The fuse is found in the instrument panel fuse block and is labeled ESCL. Refer to [Electrical Center Identification Views \(Chevrolet\)](#)
 4. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the OFF mode and leave the steering column unlocked as long as the electrical connectors are disconnected.

WARNING: Refer to [SIR Warning](#) .

WARNING: Refer to [SIR Inflator Module Handling and Storage Warning](#) .

2. Disable the SIR system. Refer to [SIR Disabling and Enabling](#)
3. Remove Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Chevrolet, With BTM\)](#)

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

4. With the steering wheel in the straight ahead position, LOCK the steering column.
5. Remove Instrument Panel Lower Airbag - Driver Side. Refer to [Instrument Panel Lower Airbag Replacement - Driver Side \(AYF\)](#)
6. Remove Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#)
7. Remove Instrument Panel Knee Bolster Outer Bracket. Refer to [Instrument Panel Knee Bolster Outer Bracket Replacement](#)
8. Disconnect any electrical connectors as necessary.
9. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

10. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

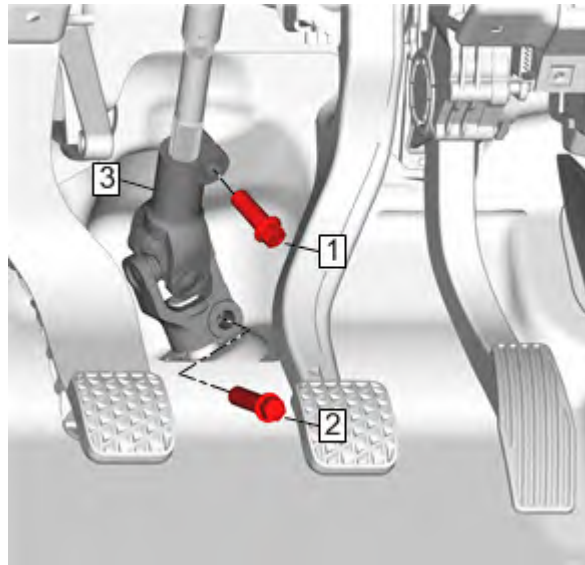


Fig. 115: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

11. Remove Intermediate Steering Shaft Middle Bolt (1)
12. Remove Intermediate Steering Shaft Lower Bolt (2)

NOTE: If the intermediate steering shaft lower universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slots as necessary.

13. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.

CAUTION: Do not support the steering column by only the lower or upper support bracket. Damage to the column lower bearing adapter could result.

14. Support the steering column.

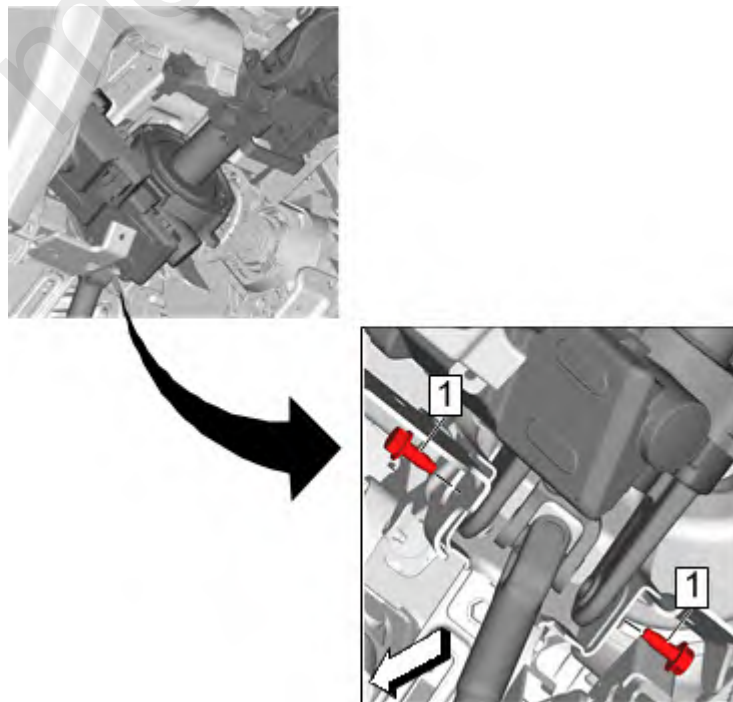


Fig. 116: Steering Column Lower Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

15. Remove Steering Column Lower Support Bracket Bolts (1) (Qty: 2)

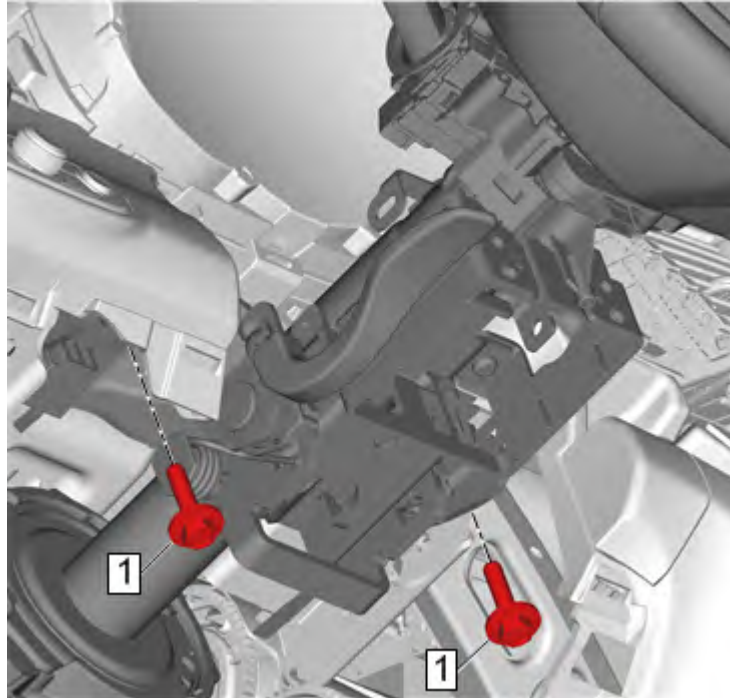


Fig. 117: Steering Column Upper Support Bracket Bolts
 Courtesy of GENERAL MOTORS COMPANY

16. Remove Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

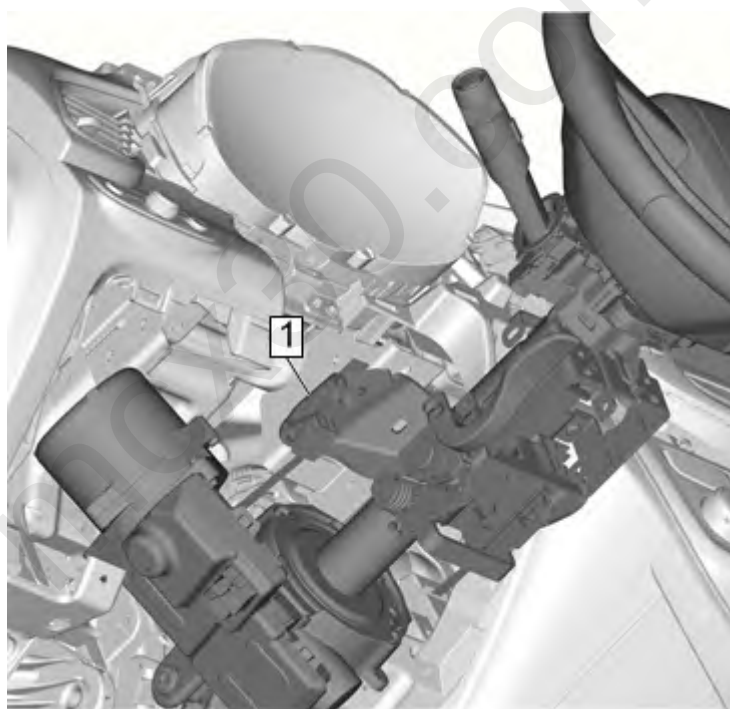


Fig. 118: Steering Column Assembly
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

17. Remove the steering column assembly (1) from the vehicle.
18. Transfer components as necessary.

19. If replacing the steering column, copy the match marks from the OLD steering column to the NEW steering column.

Installation Procedure

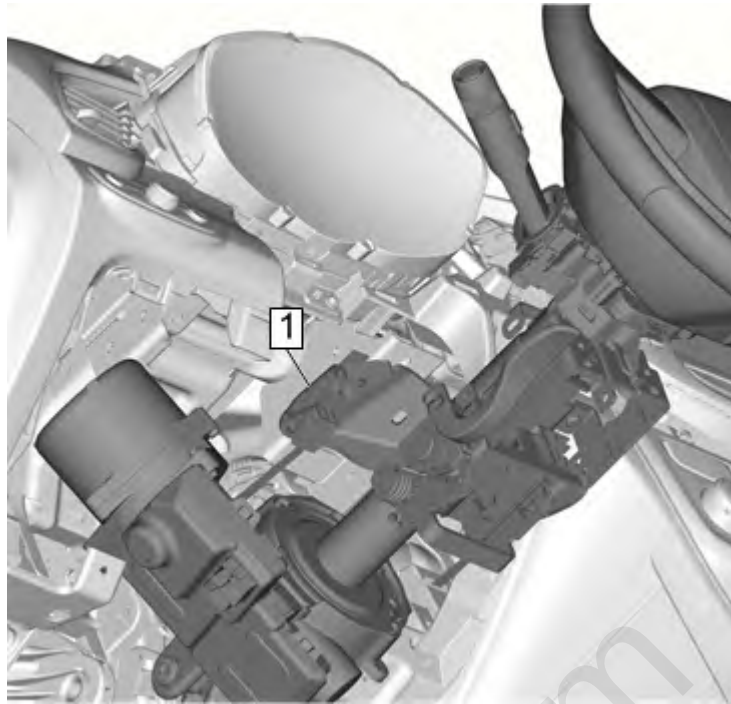


Fig. 119: Steering Column Assembly
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do NOT allow the wiring harness to be pinched between the motor/module assembly and the steering column during installation. A pinched harness will cause diagnostic trouble codes to be set and may require replacement of the steering column.

1. Position the steering column assembly (1) in the vehicle.
2. Support the steering column.

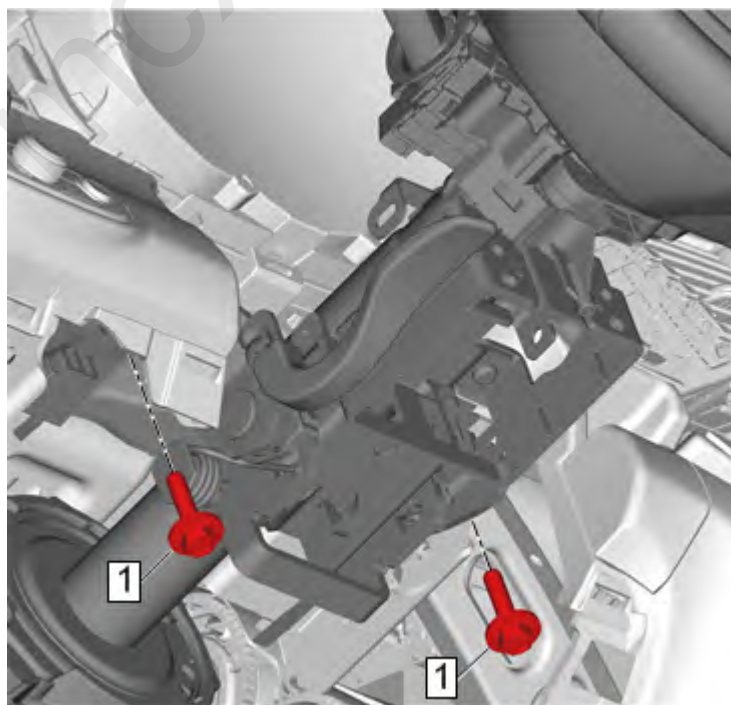


Fig. 120: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Install, but do not tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

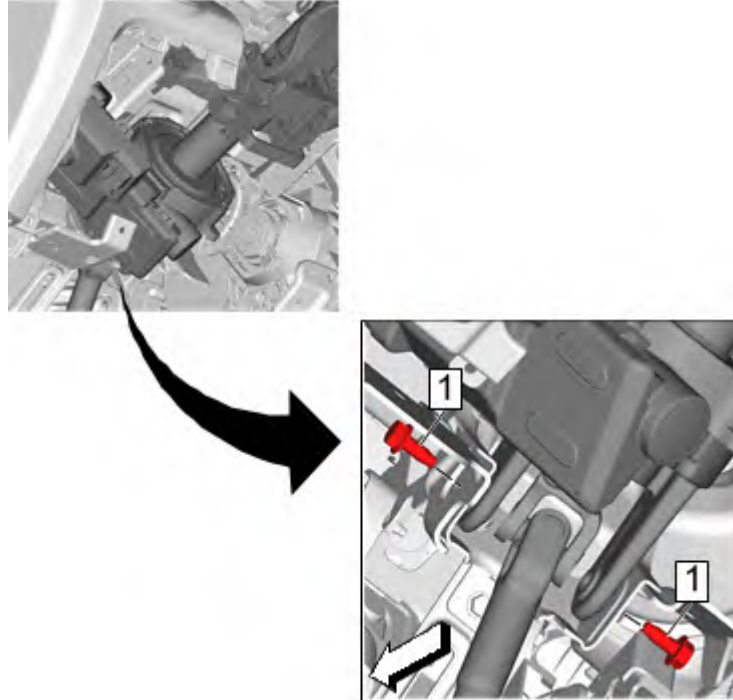


Fig. 121: Steering Column Lower Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

WARNING: In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

- Tighten the steering column lower fasteners before you tighten the steering column upper fasteners. Failure to do this can damage the steering column.
- Tighten the steering column fasteners to the specified torque. Overtightening the upper steering column fasteners could affect the steering column collapse.

CAUTION: Ensure all fasteners are securely seated before applying needed torque. Failure to do so may result in component damage or malfunctioning of steering column.

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

4. Install and tighten Steering Column Lower Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)

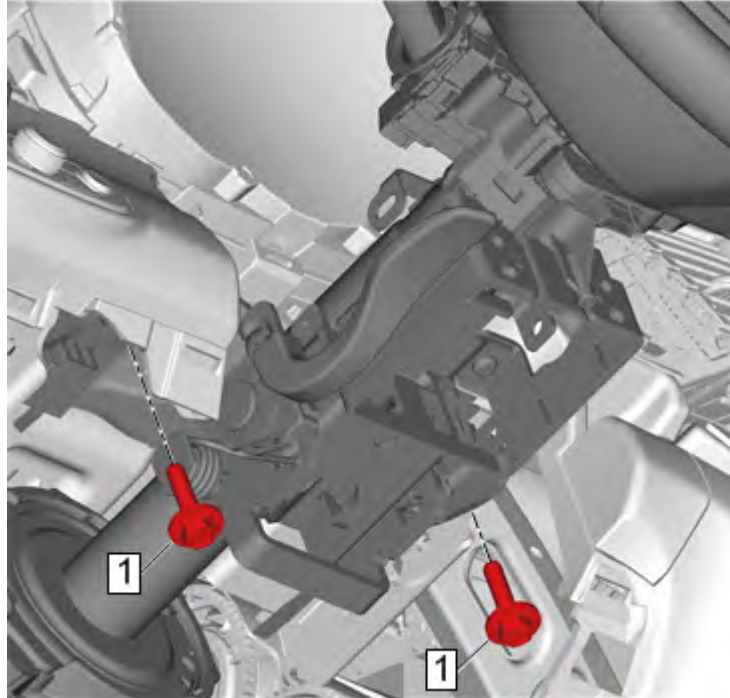


Fig. 122: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

5. Tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)
6. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
7. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

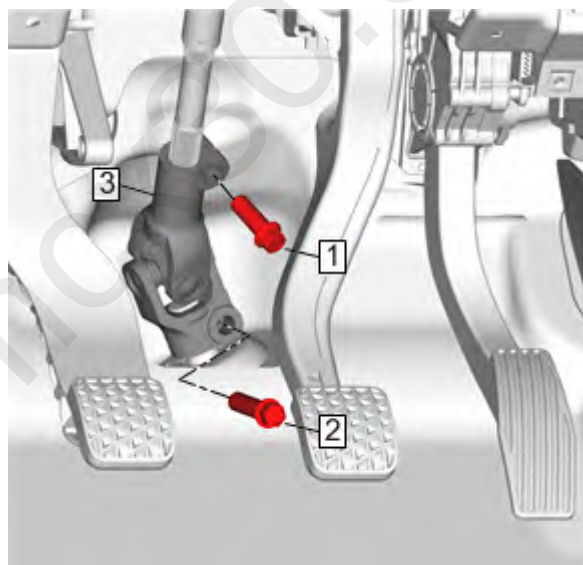


Fig. 123: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
9. Install and tighten Intermediate Steering Shaft Lower Bolt (2) to 49 N.m (36 lb ft)
10. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)
11. Connect any electrical connectors as necessary.
12. Install Instrument Panel Knee Bolster Outer Bracket. Refer to [Instrument Panel Knee Bolster Outer Bracket Replacement](#)
13. Install Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#)
14. Install Instrument Panel Lower Airbag - Driver Side. Refer to [Instrument Panel Lower Airbag Replacement - Driver Side \(AYF\)](#)

15. Install Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Chevrolet, With BTM\)](#).
16. Enable the SIR System. Refer to [SIR Disabling and Enabling](#)
17. Program the power steering control module. Refer to [Control Module References](#)
18. Center the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#)

STEERING COLUMN REPLACEMENT (CHEVROLET, CANADA/UNITED STATES, NJ1, WITHOUT BTM, WITHOUT N06)

Removal Procedure

1. If equipped, deactivate the steering column lock control module using the following procedure:
 1. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the ACCESSORY mode and unlock the steering column for 5 minutes.
 2. Turn the steering wheel to verify the steering column is NOT locked.
 3. Remove the fuse for the steering column lock control module. The fuse is found in the instrument panel fuse block and is labeled ESCL. Refer to [Electrical Center Identification Views \(Chevrolet\)](#).
 4. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the OFF mode and leave the steering column unlocked as long as the electrical connectors are disconnected.

WARNING: Refer to [SIR Warning](#) .

WARNING: Refer to [SIR Inflator Module Handling and Storage Warning](#) .

2. Disable the SIR system. Refer to [SIR Disabling and Enabling](#)
3. Remove Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Chevrolet, Without BTM\)](#).

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

4. With the steering wheel in the straight ahead position, LOCK the steering column.
5. Remove Instrument Panel Lower Airbag - Driver Side. Refer to [Instrument Panel Lower Airbag Replacement - Driver Side \(AYF\)](#).
6. Remove Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#).
7. Remove Instrument Panel Knee Bolster Outer Bracket. Refer to [Instrument Panel Knee Bolster Outer Bracket Replacement](#)
8. Disconnect any electrical connectors as necessary.

9. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.
10. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

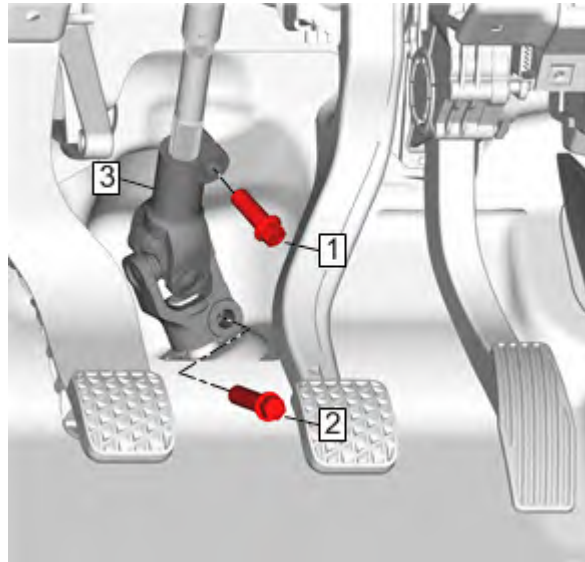


Fig. 124: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

11. Remove Intermediate Steering Shaft Middle Bolt (1)
12. Remove Intermediate Steering Shaft Lower Bolt (2)

NOTE: If the intermediate steering shaft lower universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slots as necessary.

13. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.

CAUTION: Do not support the steering column by only the lower or upper support bracket. Damage to the column lower bearing adapter could result.

14. Support the steering column.

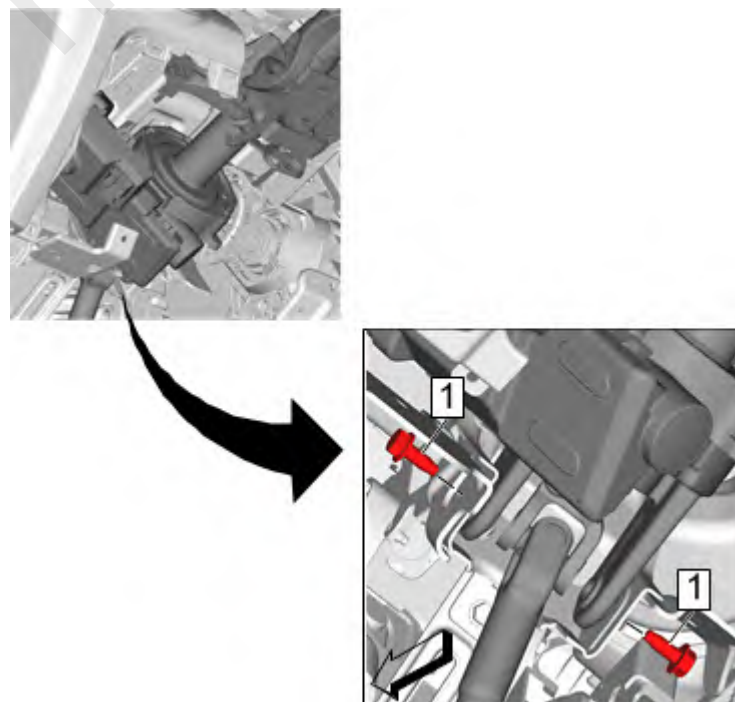


Fig. 125: Steering Column Lower Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

15. Remove Steering Column Lower Support Bracket Bolts (1) (Qty: 2)

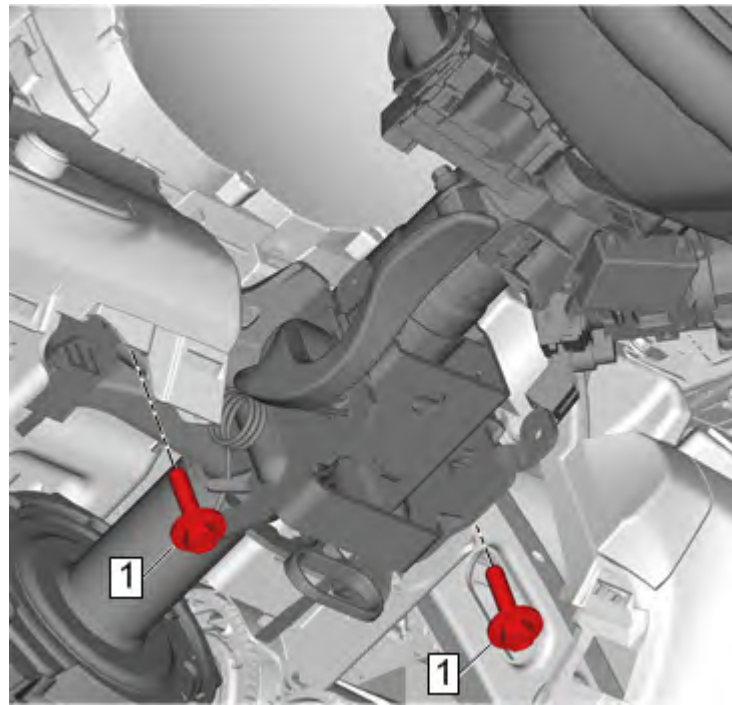


Fig. 126: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

16. Remove Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

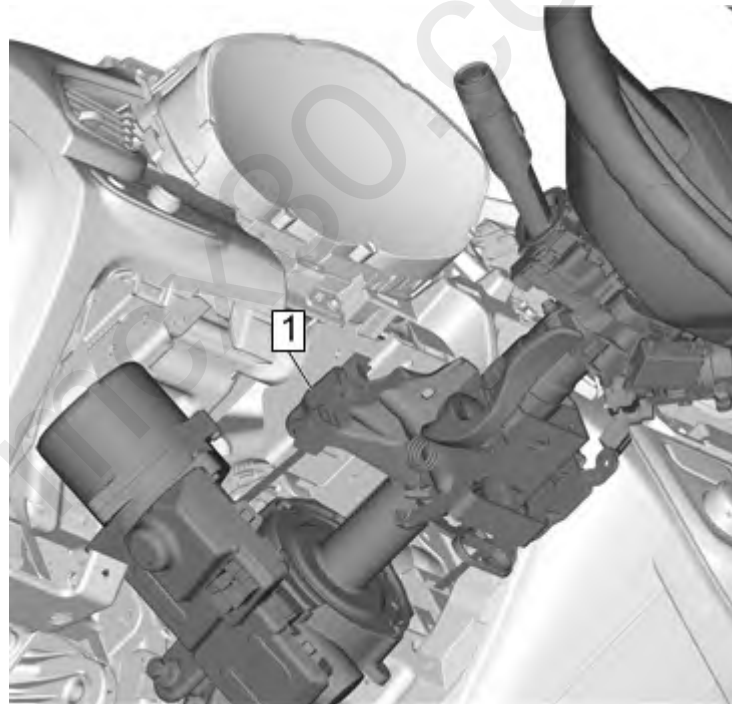


Fig. 127: Steering Column Assembly

Courtesy of GENERAL MOTORS COMPANY

CAUTION:

Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

17. Remove the steering column assembly (1) from the vehicle.
18. Transfer components as necessary.
19. If replacing the steering column, copy the match marks from the OLD steering column to the NEW steering column.

Installation Procedure

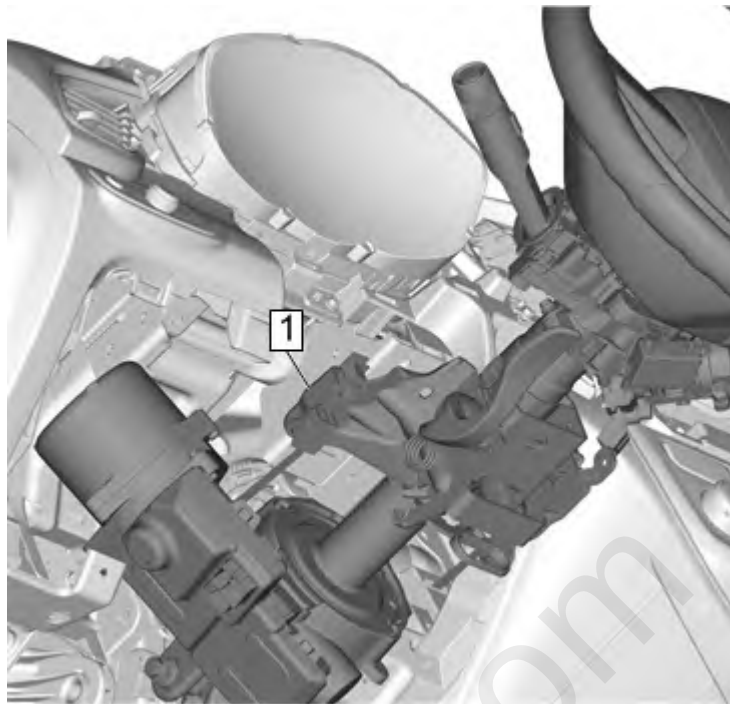


Fig. 128: Steering Column Assembly.

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do NOT allow the wiring harness to be pinched between the motor/module assembly and the steering column during installation. A pinched harness will cause diagnostic trouble codes to be set and may require replacement of the steering column.

1. Position the steering column assembly (1) in the vehicle.
2. Support the steering column.

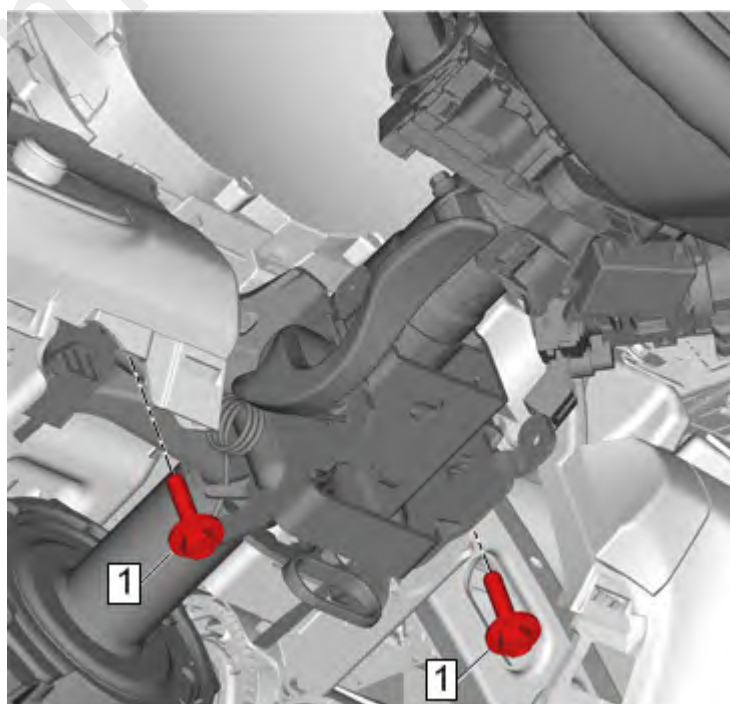


Fig. 129: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

3. Install, but do not tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

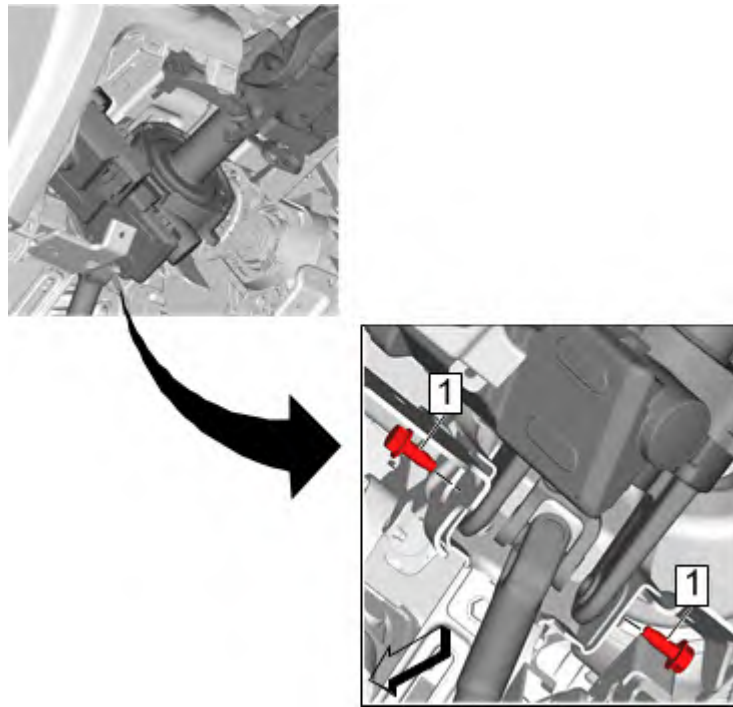


Fig. 130: Steering Column Lower Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

WARNING: In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

- Tighten the steering column lower fasteners before you tighten the steering column upper fasteners. Failure to do this can damage the steering column.
- Tighten the steering column fasteners to the specified torque. Overtightening the upper steering column fasteners could affect the steering column collapse.

CAUTION: Ensure all fasteners are securely seated before applying needed torque. Failure to do so may result in component damage or malfunctioning of steering column.

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

4. Install and tighten Steering Column Lower Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)

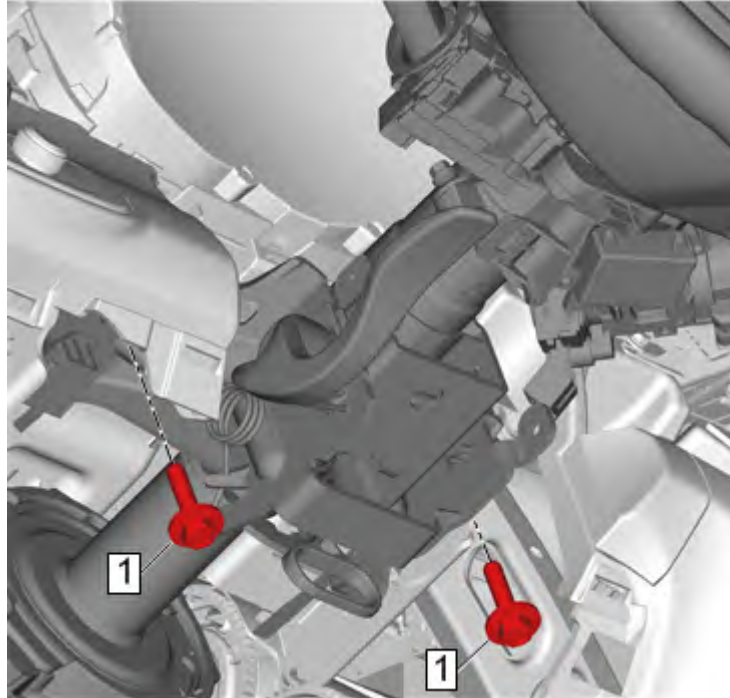


Fig. 131: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

5. Tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)
6. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
7. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

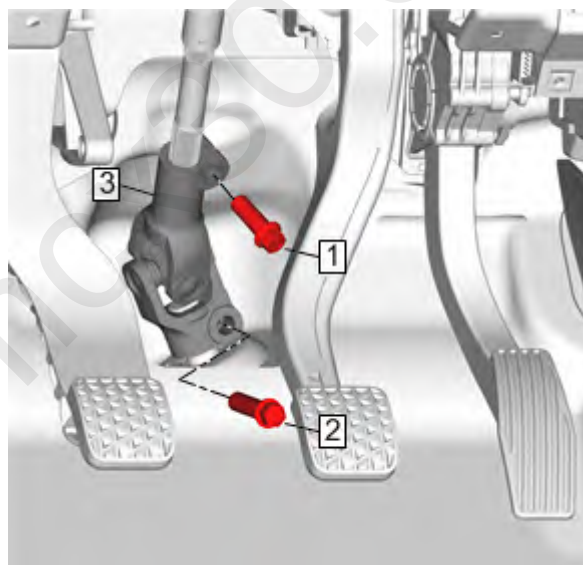


Fig. 132: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
9. Install and tighten Intermediate Steering Shaft Lower Bolt (2) to 49 N.m (36 lb ft)
10. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)
11. Connect any electrical connectors as necessary.
12. Install Instrument Panel Knee Bolster Outer Bracket. Refer to [Instrument Panel Knee Bolster Outer Bracket Replacement](#)
13. Install Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#)
14. Install Instrument Panel Lower Airbag - Driver Side. Refer to [Instrument Panel Lower Airbag Replacement - Driver Side \(AYF\)](#)

15. Install Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Chevrolet, Without BTM\)](#).
16. Enable the SIR System. Refer to [SIR Disabling and Enabling](#)
17. Program the power steering control module. Refer to [Control Module References](#)
18. Center the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#)

STEERING COLUMN REPLACEMENT (CHEVROLET, MEXICO, NJ1, WITHOUT BTM, WITHOUT N06)

Removal Procedure

1. If equipped, deactivate the steering column lock control module using the following procedure:
 1. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the ACCESSORY mode and unlock the steering column for 5 minutes.
 2. Turn the steering wheel to verify the steering column is NOT locked.
 3. Remove the fuse for the steering column lock control module. The fuse is found in the instrument panel fuse block and is labeled ESCL. Refer to [Electrical Center Identification Views \(Chevrolet\)](#).
 4. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the OFF mode and leave the steering column unlocked as long as the electrical connectors are disconnected.

WARNING: Refer to [SIR Warning](#) .

WARNING: Refer to [SIR Inflator Module Handling and Storage Warning](#) .

2. Disable the SIR system. Refer to [SIR Disabling and Enabling](#)
3. Remove Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Chevrolet, Without BTM\)](#).

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

4. With the steering wheel in the straight ahead position, LOCK the steering column.
5. Remove Instrument Panel Knee Bolster. Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#).
6. Remove Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#).
7. Disconnect any electrical connectors as necessary.
8. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

9. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

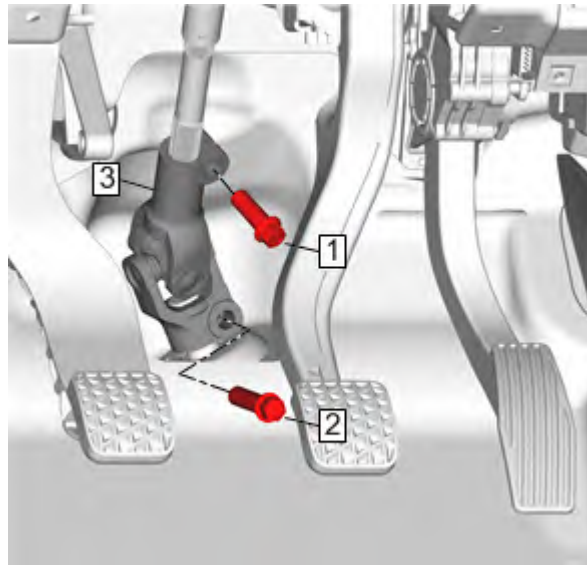


Fig. 133: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

10. Remove Intermediate Steering Shaft Middle Bolt (1)
11. Remove Intermediate Steering Shaft Lower Bolt (2)

NOTE: If the intermediate steering shaft lower universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slots as necessary.

12. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.

CAUTION: Do not support the steering column by only the lower or upper support bracket. Damage to the column lower bearing adapter could result.

13. Support the steering column.

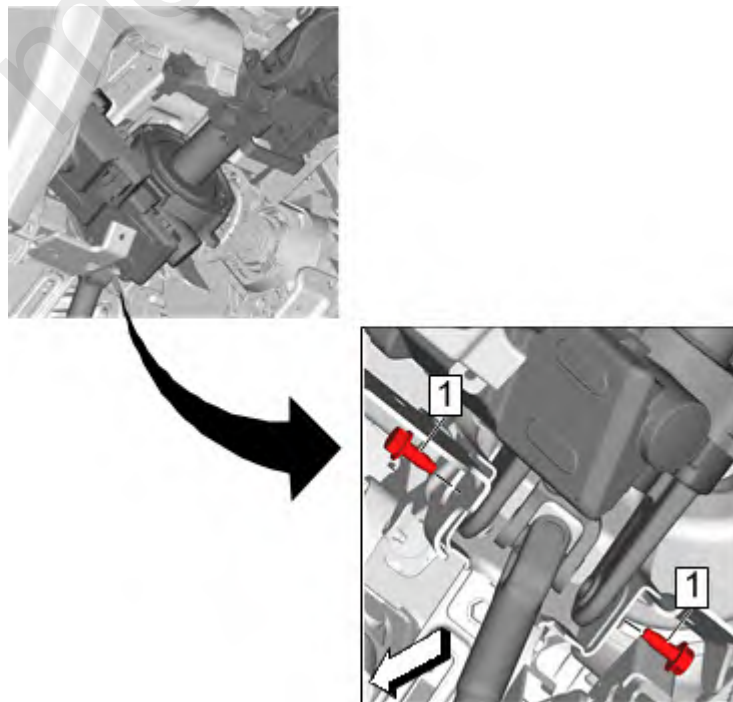


Fig. 134: Steering Column Lower Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

14. Remove Steering Column Lower Support Bracket Bolts (1) (Qty: 2)

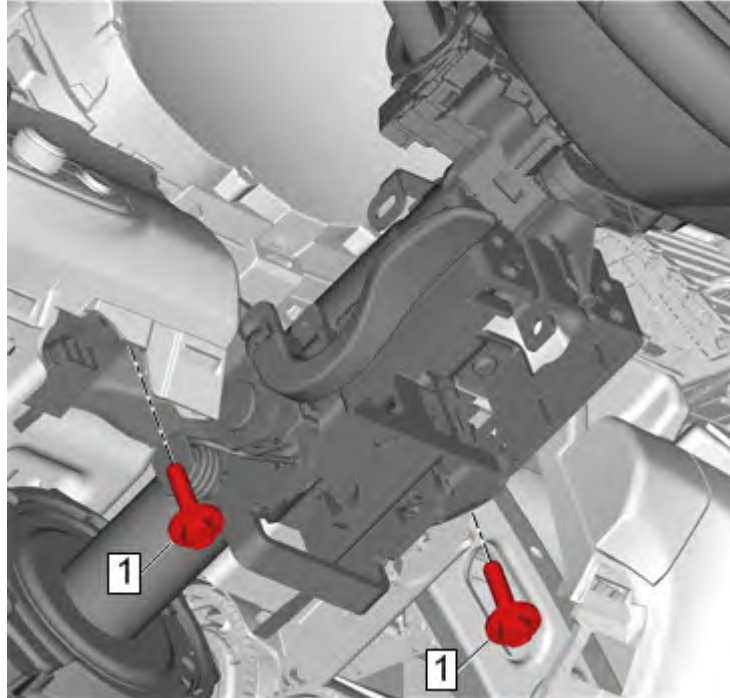


Fig. 135: Steering Column Upper Support Bracket Bolts
 Courtesy of GENERAL MOTORS COMPANY

15. Remove Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

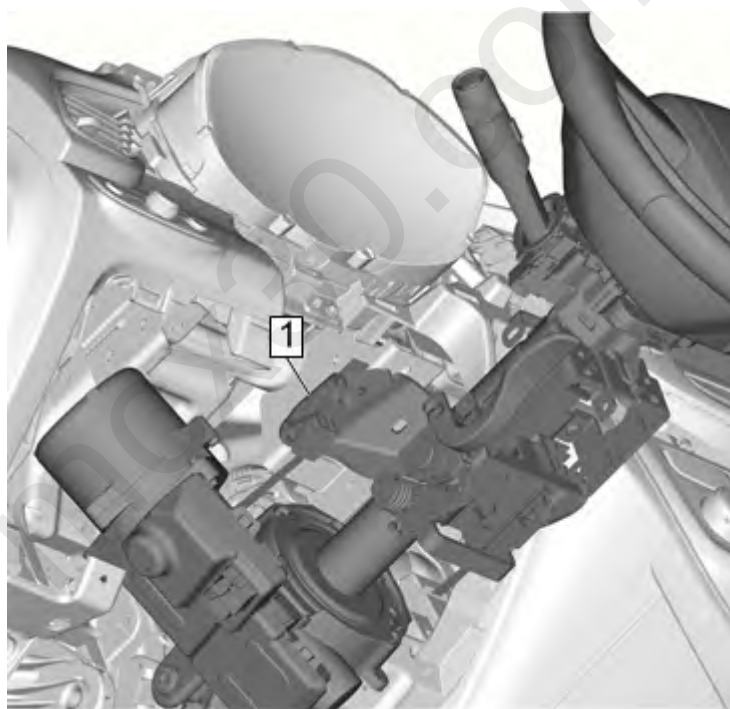


Fig. 136: Steering Column Assembly
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

16. Remove the steering column assembly (1) from the vehicle.
17. Transfer components as necessary.

18. If replacing the steering column, copy the match marks from the OLD steering column to the NEW steering column.

Installation Procedure

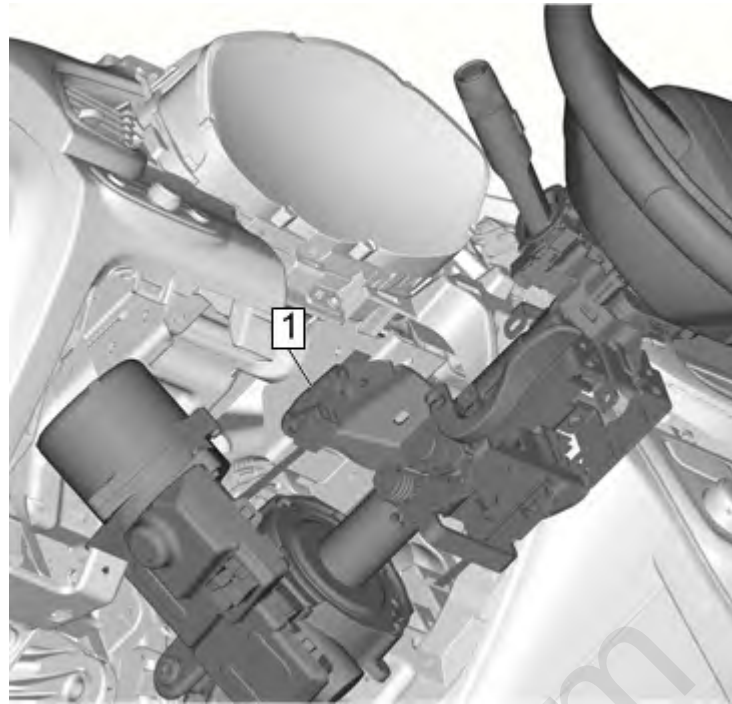


Fig. 137: Steering Column Assembly.
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Do NOT allow the wiring harness to be pinched between the motor/module assembly and the steering column during installation. A pinched harness will cause diagnostic trouble codes to be set and may require replacement of the steering column.

1. Position the steering column assembly (1) in the vehicle.
2. Support the steering column.

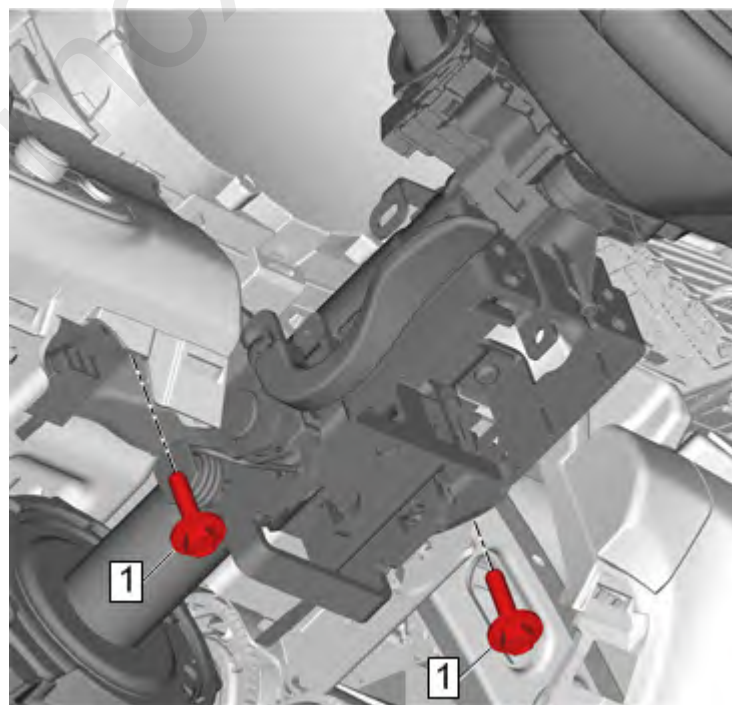


Fig. 138: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Install, but do NOT tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

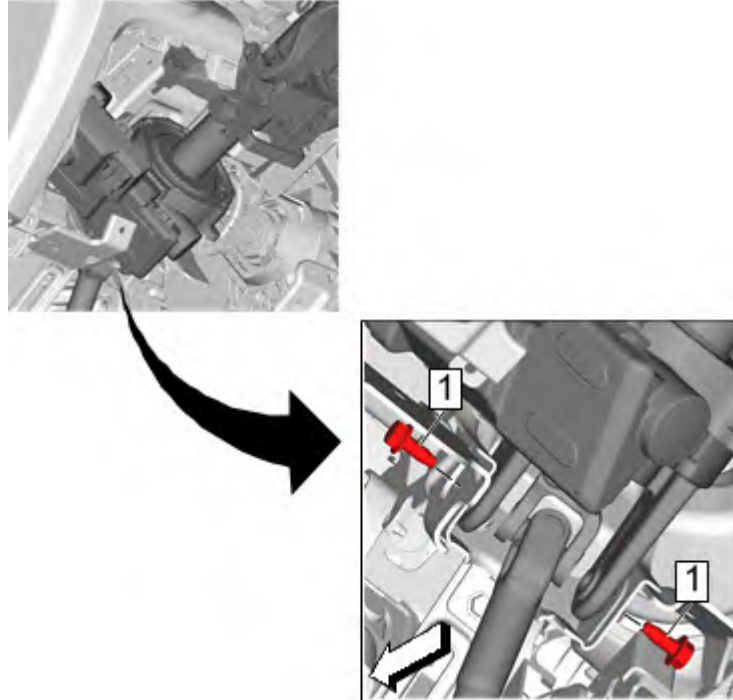


Fig. 139: Steering Column Lower Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

WARNING: In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

- Tighten the steering column lower fasteners before you tighten the steering column upper fasteners. Failure to do this can damage the steering column.
- Tighten the steering column fasteners to the specified torque. Overtightening the upper steering column fasteners could affect the steering column collapse.

CAUTION: Ensure all fasteners are securely seated before applying needed torque. Failure to do so may result in component damage or malfunctioning of steering column.

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

4. Install and tighten Steering Column Lower Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)

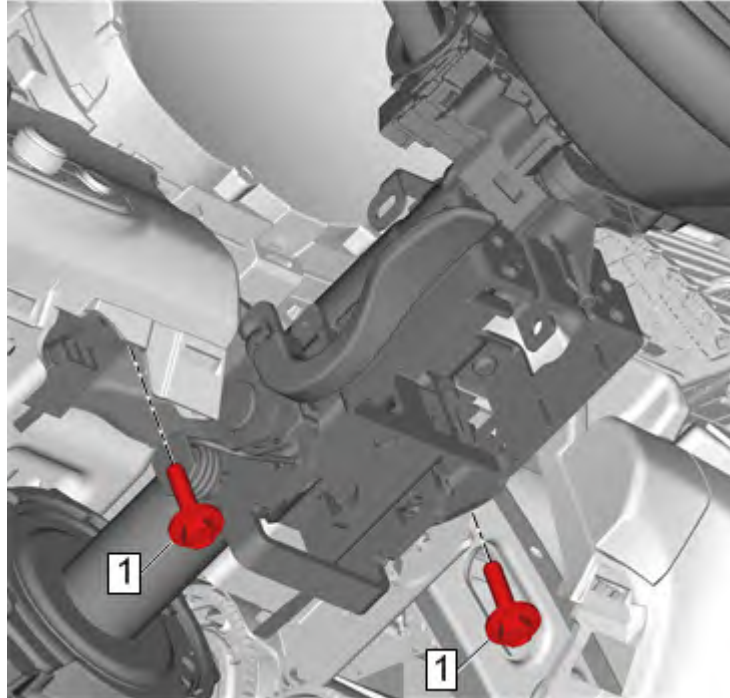


Fig. 140: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

5. Tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)
6. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
7. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

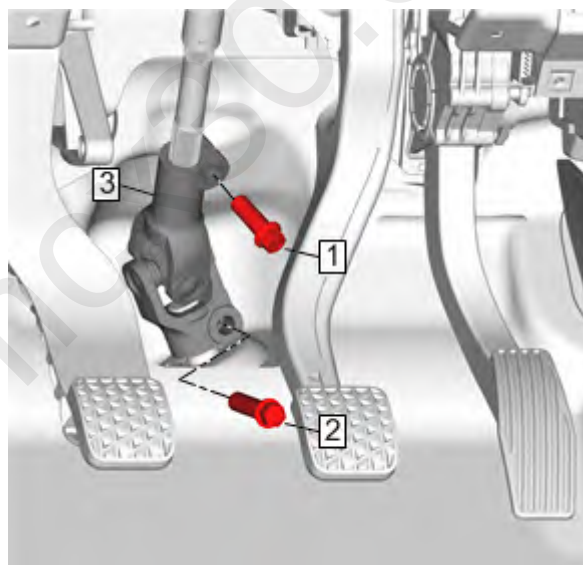


Fig. 141: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
9. Install and tighten Intermediate Steering Shaft Lower Bolt (2) to 49 N.m (36 lb ft)
10. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)
11. Connect any electrical connectors as necessary.
12. Install Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#)
13. Install Instrument Panel Knee Bolster. Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#)
14. Install Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Chevrolet, Without BTM\)](#)
15. Enable the SIR System. Refer to [SIR Disabling and Enabling](#)

16. Program the power steering control module. Refer to [Control Module References](#)
17. Center the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#)

STEERING COLUMN REPLACEMENT (MEXICO, N40)

Removal Procedure

1. If equipped, deactivate the steering column lock control module using the following procedure:
 1. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the ACCESSORY mode and unlock the steering column for 5 minutes.
 2. Turn the steering wheel to verify the steering column is NOT locked.
 3. Remove the fuse for the steering column lock control module. The fuse is found in the instrument panel fuse block and is labeled ESCL. Refer to [Electrical Center Identification Views \(Buick\)](#), [Electrical Center Identification Views \(Chevrolet\)](#).
 4. With foot OFF the brake pedal and the shift lever in the PARK position, press the ignition and start switch once. This will place the ignition system in the OFF mode and leave the steering column unlocked as long as the electrical connectors are disconnected.

WARNING: Refer to [SIR Warning](#) .

WARNING: Refer to [SIR Inflator Module Handling and Storage Warning](#) .

2. Disable the SIR system. Refer to [SIR Disabling and Enabling](#)
3. Remove Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Buick, With BTM\)](#), [Steering Column Lower Trim Cover Replacement \(Chevrolet, With BTM\)](#), [Steering Column Lower Trim Cover Replacement \(Chevrolet, Without BTM\)](#).

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

4. With the steering wheel in the straight ahead position, LOCK the steering column.
5. Remove Instrument Panel Knee Bolster. Refer to [Instrument Panel Knee Bolster Replacement \(Buick\)](#), [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#).
6. Remove Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#), [Floor Front Air Outlet Duct Replacement - Left Side \(Buick\)](#).
7. Disconnect any electrical connectors as necessary.
8. Place match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.
9. Place match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.

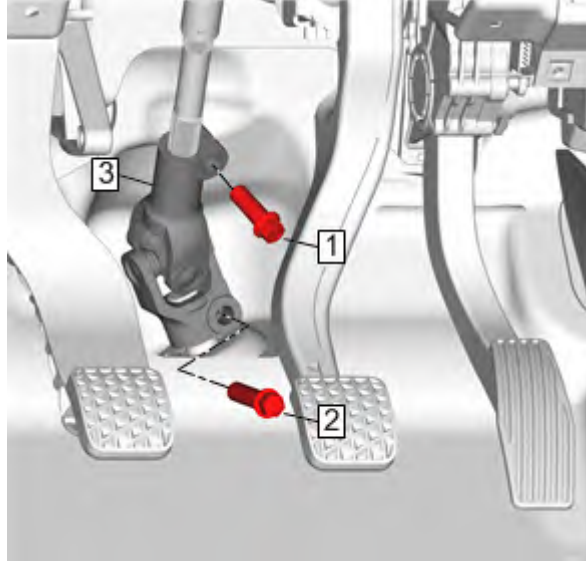


Fig. 142: Intermediate Steering Shaft Lower Universal Joint And Bolts
Courtesy of GENERAL MOTORS COMPANY

10. Remove Intermediate Steering Shaft Middle Bolt (1)
11. Remove Intermediate Steering Shaft Lower Bolt (2)

NOTE: If the intermediate steering shaft lower universal joint is difficult to separate, insert a wide blade flat screw driver and tap with a hammer to open up the slots as necessary.

12. Remove the intermediate steering shaft lower universal joint (3) from the vehicle.

CAUTION: Do not support the steering column by only the lower or upper support bracket. Damage to the column lower bearing adapter could result.

13. Support the steering column.

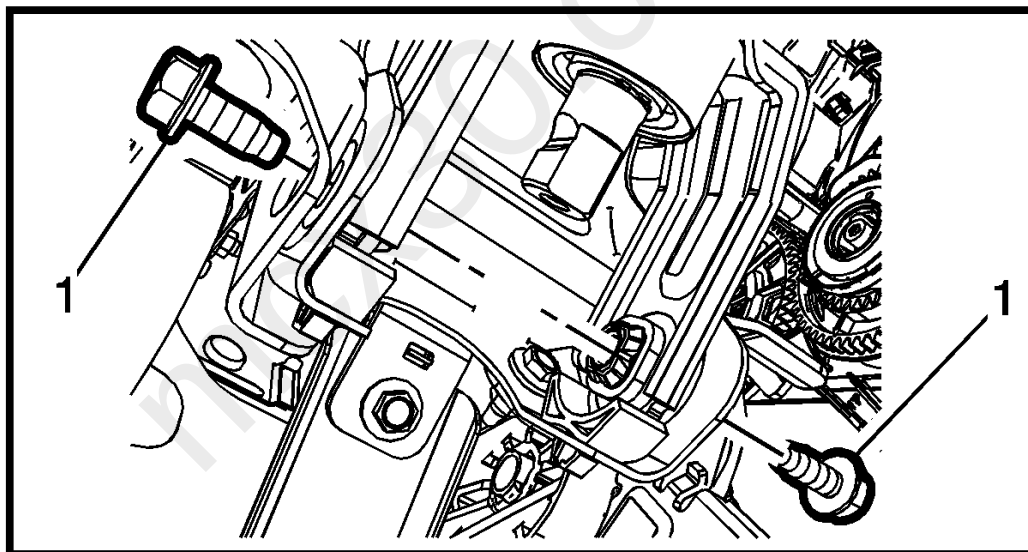
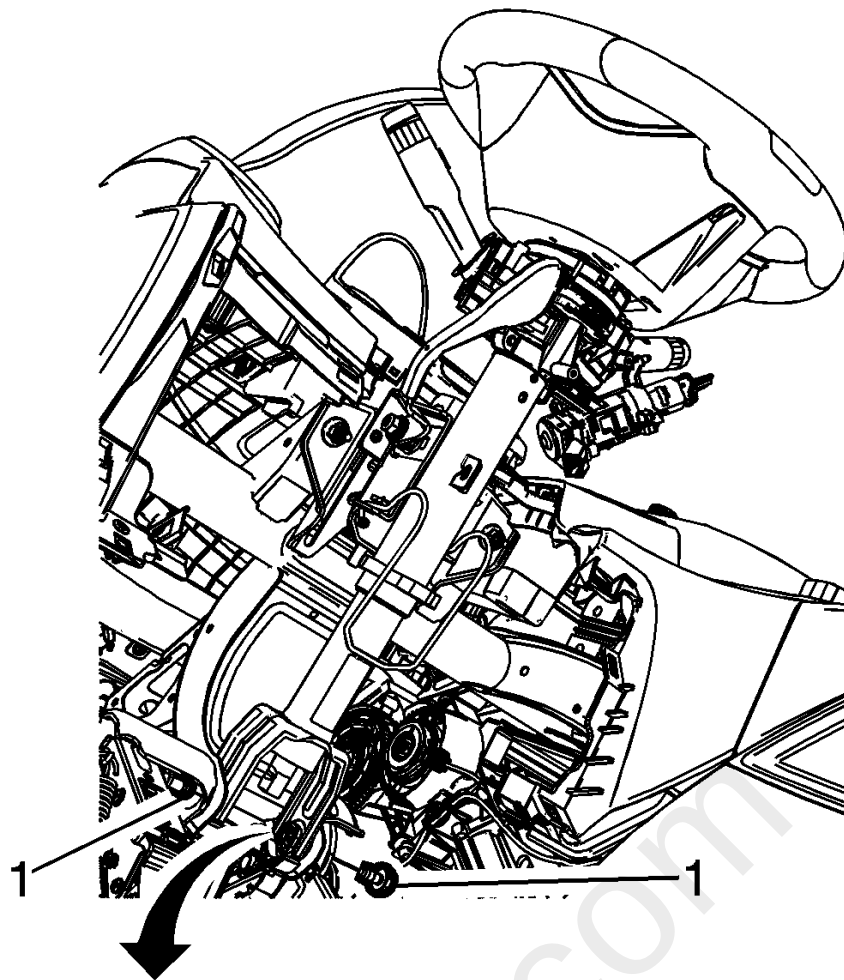


Fig. 143: Steering Column Lower Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

14. Remove Steering Column Lower Support Bracket Bolts (1) (Qty: 2)

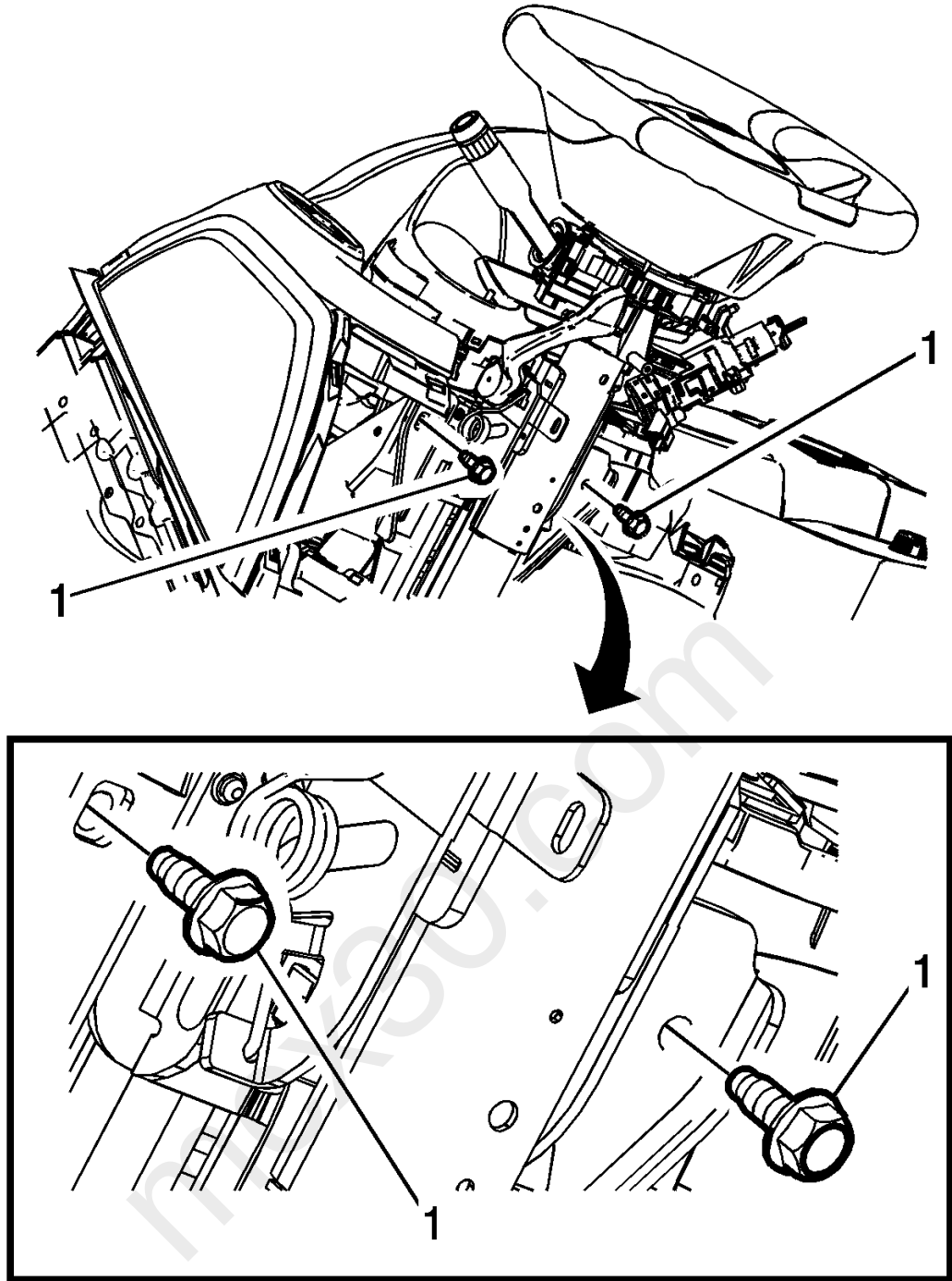


Fig. 144: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

15. Remove Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

CAUTION:

Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

16. Remove the steering column assembly from the vehicle.

17. Transfer components as necessary.

18. If replacing the steering column, copy the match marks from the OLD steering column to the NEW steering column.

Installation Procedure

1. Position the steering column assembly in the vehicle.
2. Support the steering column.

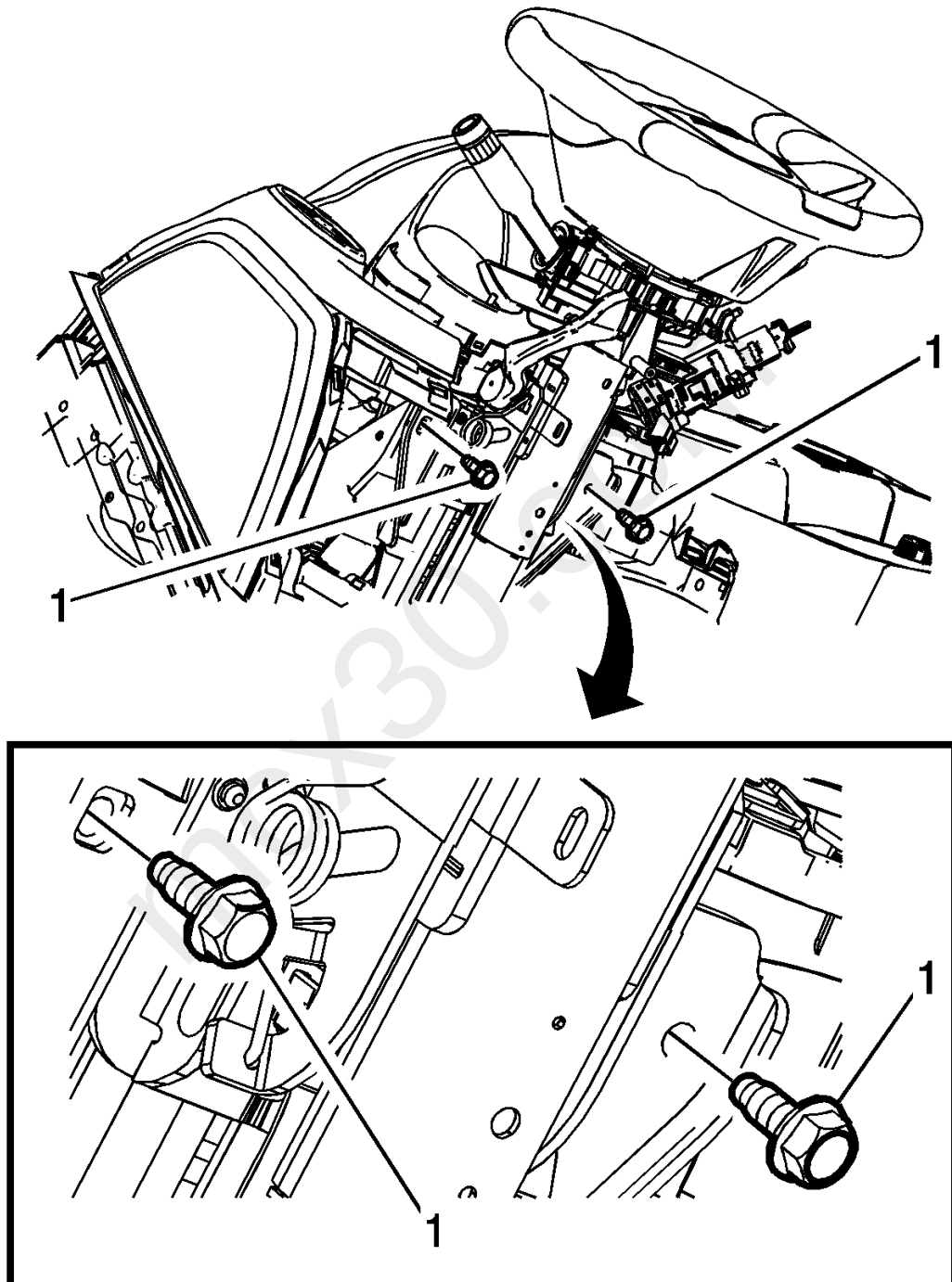


Fig. 145: Steering Column Upper Support Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Install, but do not tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2)

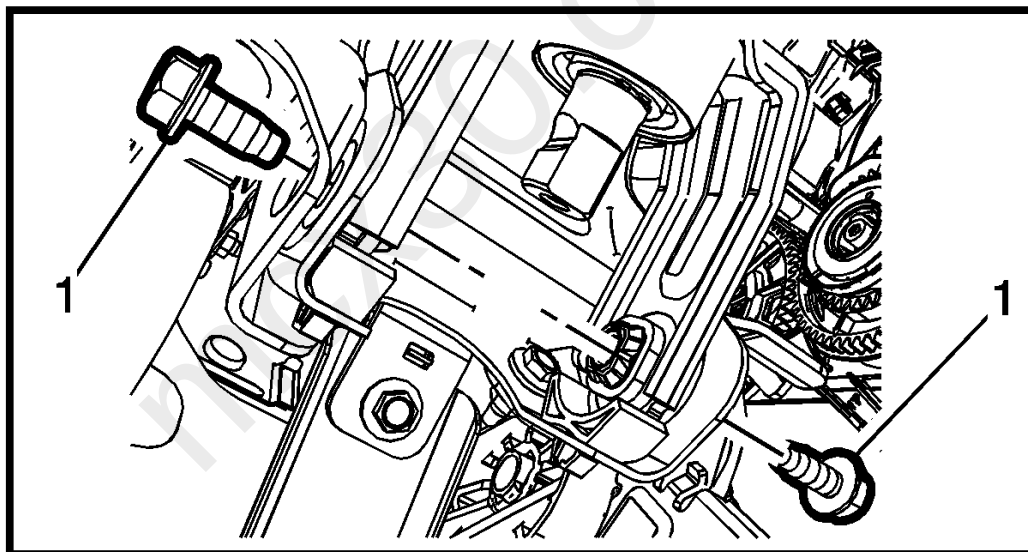
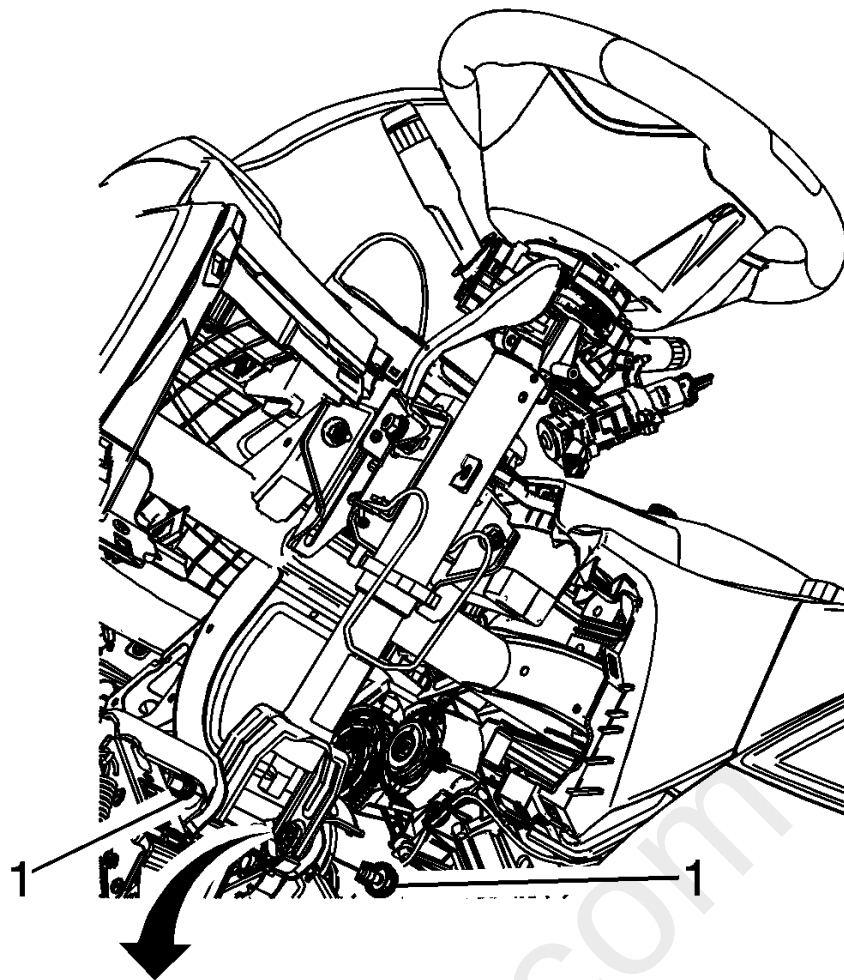


Fig. 146: Steering Column Lower Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

WARNING:

In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

- Tighten the steering column lower fasteners before you tighten the steering column upper fasteners. Failure to do this can damage the steering column.
- Tighten the steering column fasteners to the specified torque. Overtightening the upper steering column fasteners could affect the steering column collapse.

CAUTION:

Ensure all fasteners are securely seated before applying needed torque. Failure to do so may result in component damage or

malfunctioning of steering column.

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

4. Install and tighten Steering Column Lower Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)

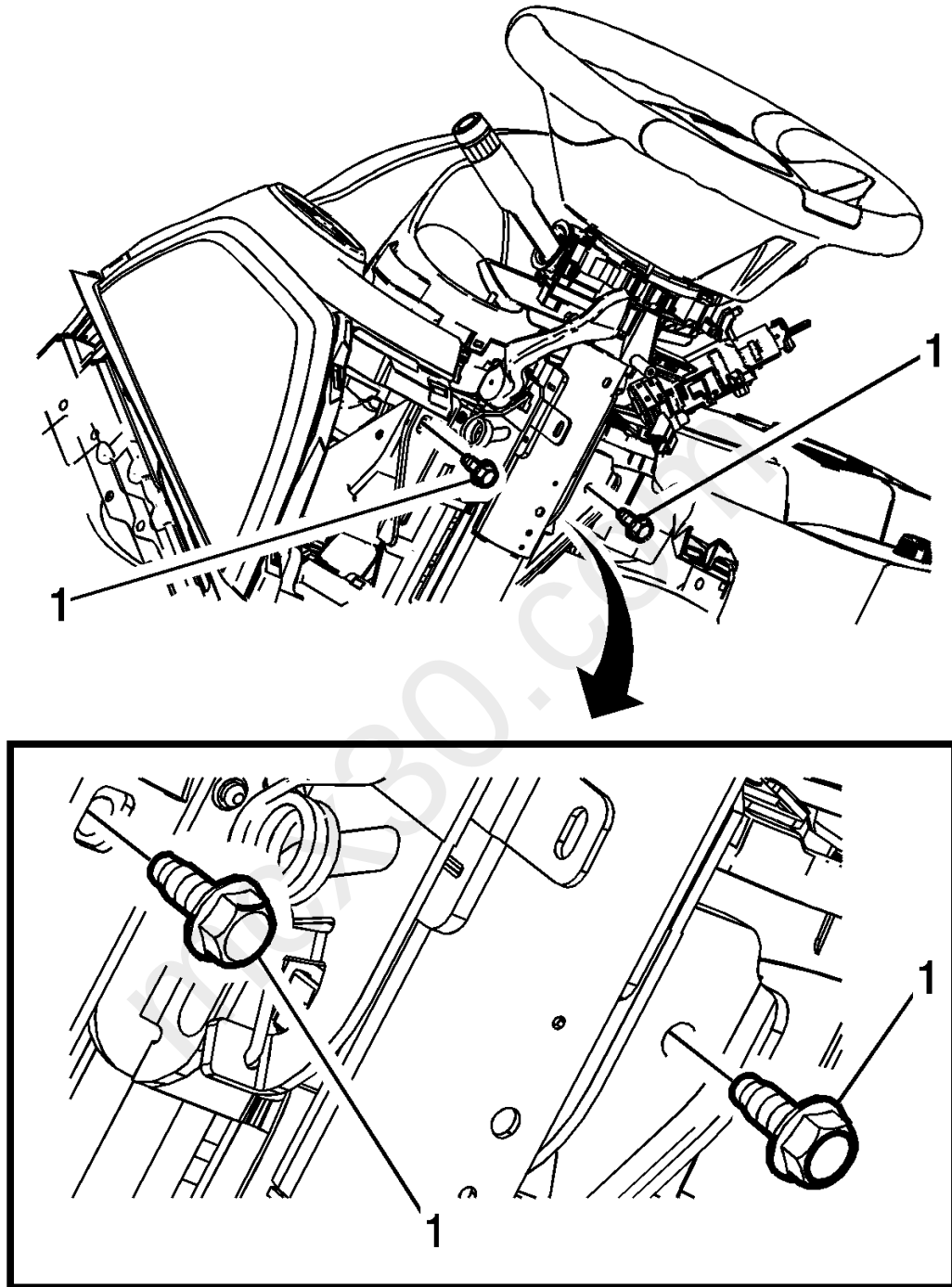


Fig. 147: Steering Column Upper Support Bracket Bolts

Courtesy of GENERAL MOTORS COMPANY

5. Tighten Steering Column Upper Support Bracket Bolts (1) (Qty: 2) to 22 N.m (16 lb ft)
6. Align the match marks on the intermediate steering shaft lower universal joint and the steering gear shaft to aid in installation.
7. Align the match marks on the intermediate steering shaft lower universal joint and the intermediate steering shaft to aid in installation.

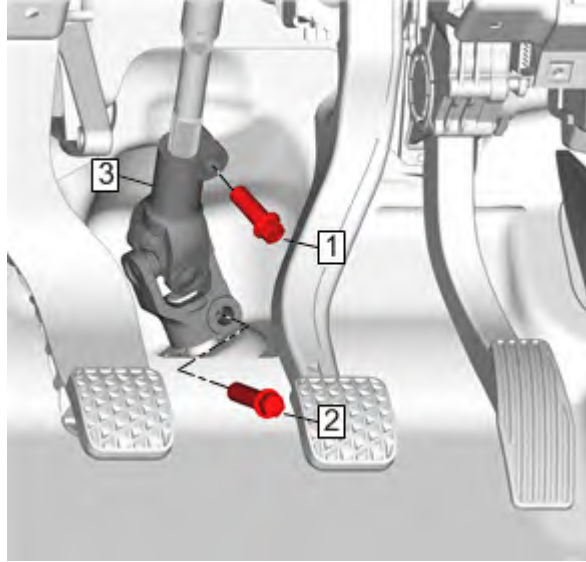


Fig. 148: Intermediate Steering Shaft Lower Universal Joint And Bolts
 Courtesy of GENERAL MOTORS COMPANY

8. Position the intermediate steering shaft lower universal joint (3) in the vehicle.
9. Install and tighten Intermediate Steering Shaft Lower Bolt (1) to 49 N.m (36 lb ft)
10. Install and tighten Intermediate Steering Shaft Middle Bolt (1) to 49 N.m (36 lb ft)
11. Connect any electrical connectors as necessary.
12. Install Floor Front Air Outlet Duct - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#), [Floor Front Air Outlet Duct Replacement - Left Side \(Buick\)](#).
13. Install Instrument Panel Knee Bolster. Refer to [Instrument Panel Knee Bolster Replacement \(Buick\)](#), [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#).
14. Install Steering Column Lower Trim Cover. Refer to [Steering Column Lower Trim Cover Replacement \(Buick, With BTM\)](#), [Steering Column Lower Trim Cover Replacement \(Chevrolet, With BTM\)](#), [Steering Column Lower Trim Cover Replacement \(Chevrolet, Without BTM\)](#).
15. Enable the SIR System. Refer to [SIR Disabling and Enabling](#)
16. Center the steering angle sensor. Refer to [Steering Wheel Angle Sensor Centering](#)

STEERING SHAFT REPLACEMENT (N40)

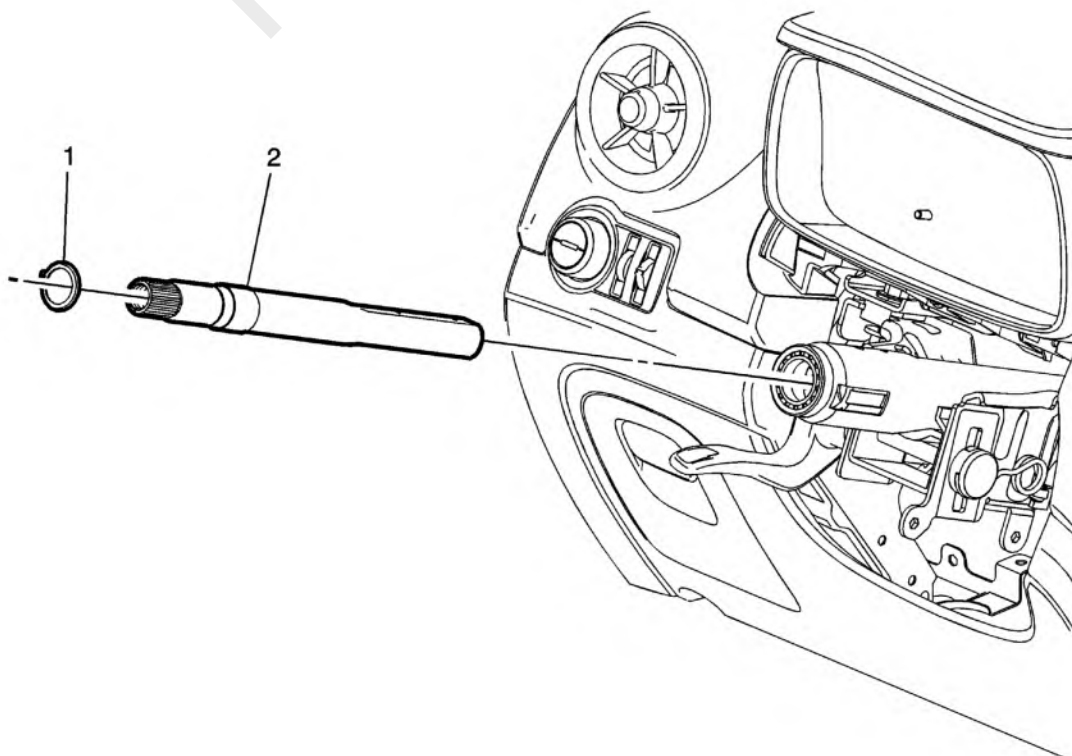


Fig. 149: Steering Shaft (N40).
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Remove the ignition and start switch housing. Refer to Ignition and Start Switch Housing Replacement (Chevrolet) , Ignition and Start Switch Replacement (Buick, With BTM) , Ignition and Start Switch Replacement (Chevrolet, Without BTM) , Ignition and Start Switch Replacement (Chevrolet, With BTM) .	
1	Steering Shaft Retaining Ring
2	Steering Shaft Procedure 1. Note the orientation of the steering wheel alignment mark on the steering shaft before removing. 2. Install the old or new shaft in the proper orientation.

DESCRIPTION AND OPERATION

STEERING WHEEL AND COLUMN DESCRIPTION AND OPERATION

The steering wheel and column has 4 primary functions:

- Vehicle steering
- Vehicle security
- Driver convenience
- Driver safety

Vehicle Steering

The steering wheel is the first link between the driver and the vehicle. The steering wheel is fastened to a steering shaft within the column. At the lower end of the column, the intermediate shaft connects the column to the steering gear.

The steering column can be adjusted vertically and longitudinally

Vehicle Security

Theft deterrent components are mounted and designed into the steering column. The following components allow the column to be locked in order to minimize theft:

- The ignition switch
- The steering column lock
- The ignition cylinder
- The theft deterrent immobilizer module, if equipped

Driver Convenience

The steering wheel and column may also have driver controls attached for convenience and comfort. The following controls may be mounted on the steering wheel or column.

- The turn signal switch
- The headlamp dimmer switch
- The wiper/washer switch
- The horn pad
- The redundant radio/entertainment system controls
- The tilt functions

- The telephone system controls
- The DIC controls
- The cruise control functions
- The automatic transmission manual setting function

Heated Steering Wheel

The heated steering wheel system consists of a heated steering wheel, a heated steering wheel switch, and a steering wheel heat module. The heated steering wheel includes a non-serviceable heating element and temperature sensor, which both are located in the rim of the steering wheel. The heated steering wheel on/off switch is located in the instrumentation panel. The steering wheel heat module is located on the front-side of the steering wheel center hub.

When the on/off switch is depressed, a signal is sent to the heat module to command the heated steering wheel to heat up until either the normal operating temperature reaches the limit of $32^{\circ}\text{C} \pm 2.5^{\circ}\text{C}$ ($90^{\circ}\text{F} \pm 4^{\circ}\text{F}$) or the customer turns it off via the heated steering wheel switch. The built-in temperature sensor provides input to the controller to limit the temperature of the heated wheel to the normal operating temperature. The heated steering wheel system will also cease to operate if the vehicle temperature is at or above 32°C (89.6°F). The heated steering wheel takes approximately 3 to 4 minutes to reach the normal operating temperature and will take longer to heat up if the vehicle temperature is below -20°C (-4°F).

Driver Safety

The steering wheel and column has safety features to protect the driver. The following components may be mounted on or near the steering column:

Energy-Absorbing Steering Column: The energy-absorbing steering column compresses in the event of a front-end collision, which reduces the chance of injury to the driver. The energy-absorbing feature, collapsible steering shaft, and break away mounting features help reduce the injury in the event of an accident.

SIR Coil and Module: For additional information on the operation of the SIR coil and module, refer to [Supplemental Inflatable Restraint System Description and Operation](#).

Electronic Park Lock (EPL)/Ignition Lock Cylinder Control Actuator: If the vehicle is equipped with automatic transmission and a floor mounted console gear shift, it has an ignition lock cylinder control actuator system in the steering column. The ignition lock cylinder control actuator purpose is to prevent the ignition key from being turned to the OFF position when the transmission is in any position other than PARK and the vehicle may still be moving. The column ignition lock system consists of an ignition lock cylinder control actuator, and a park position switch that is located in the automatic transmission shift lock control switch. The ignition lock cylinder control actuator contains a pin that is spring loaded to mechanically prevent the ignition key cylinder from being turned to the lock position when the vehicle transmission is not in the PARK position. If vehicle power is lost, and/or the transmission is not in the PARK position the operator will not be able to turn the ignition key to the lock position and will not be able to remove the ignition key from the column.

Depending on the implementation, logic might be inverted: Key can be removed by power off.

Steering Wheel Angle Sensor: The steering wheel angle sensor is located somewhere along the steering shaft assembly. The sensor measures the position of the steering wheel and the speed at which it is rotated. A signal representing this measurement is provided to the vehicle stability enhancement system (VSES) in the ABS module and to the variable effort steering (VES) system.

The theft deterrent immobilizer module: The immobilizer module is mounted in the steering column lock on cars without Passive Entry Passive Start system (PEPS). Refer to [Theft Systems Description and Operation](#).
