

2017 HVAC

HVAC - Manual - 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)
Air Inlet Valve Actuator Bolt (Temperature)	1.5 N.m (13 lb in)
Air Inlet Valve Actuator Bolt (Recirculation)	1.2 N.m (11 lb in)
Heater and Air Conditioning Control Bracket Bolt	2.5 N.m (22 lb in)
Heater and Air Conditioning Control Screw	1.0 N.m (9 lb in)
Heater and Air Conditioning Evaporator and Blower Module Bracket Bolt	1.5 N.m (13 lb in)
Heater and Air Conditioning Mode Control Cam Bolt	2.0 N.m (18 lb in)
Mode Control Cable Retaining Screw	2.0 N.m (18 lb in)
Mode Control Cam Actuator Bolt	1.5 N.m (13 lb in)
Temperature Control Cable Retaining Screw	2.0 N.m (18 lb in)

SCHEMATIC WIRING DIAGRAMS

HVAC WIRING SCHEMATICS (BUICK WITH C67 OR C4P)

Power, Ground, and Blower Motor (Buick)

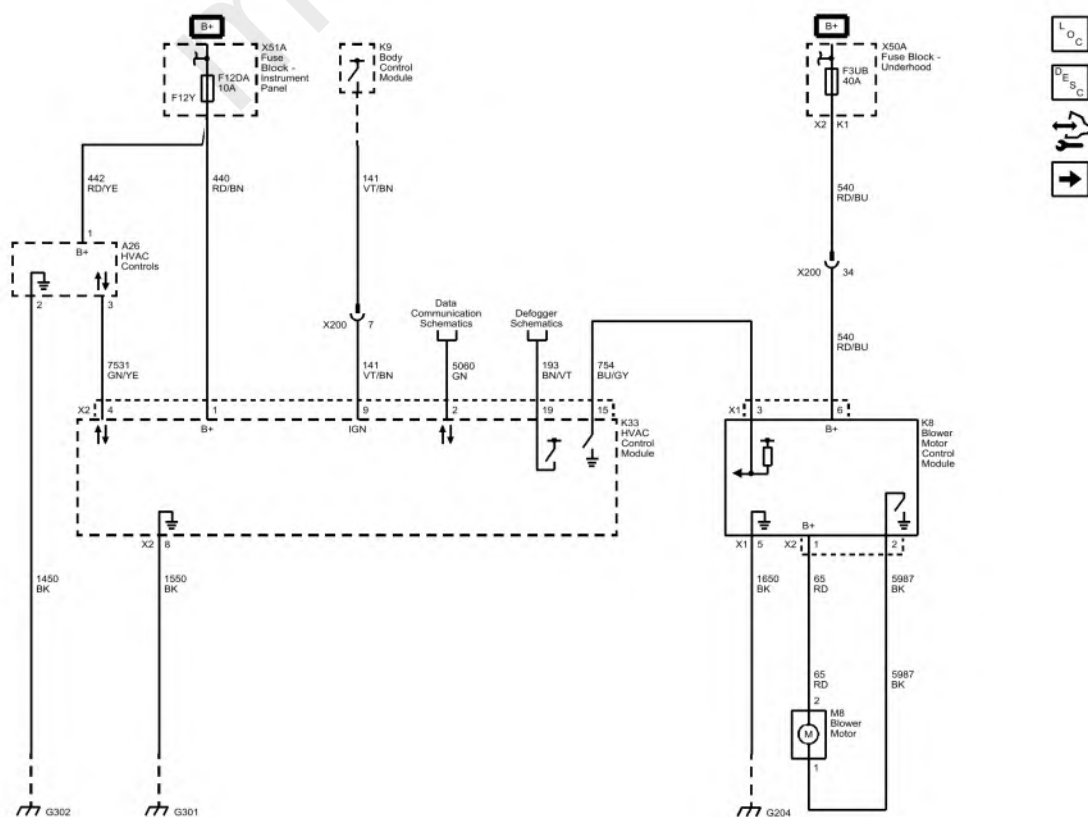


Fig. 1: Power, Ground, and Blower Motor (Buick)
Courtesy of GENERAL MOTORS COMPANY

Mode and Temperature Control Actuators (Buick)

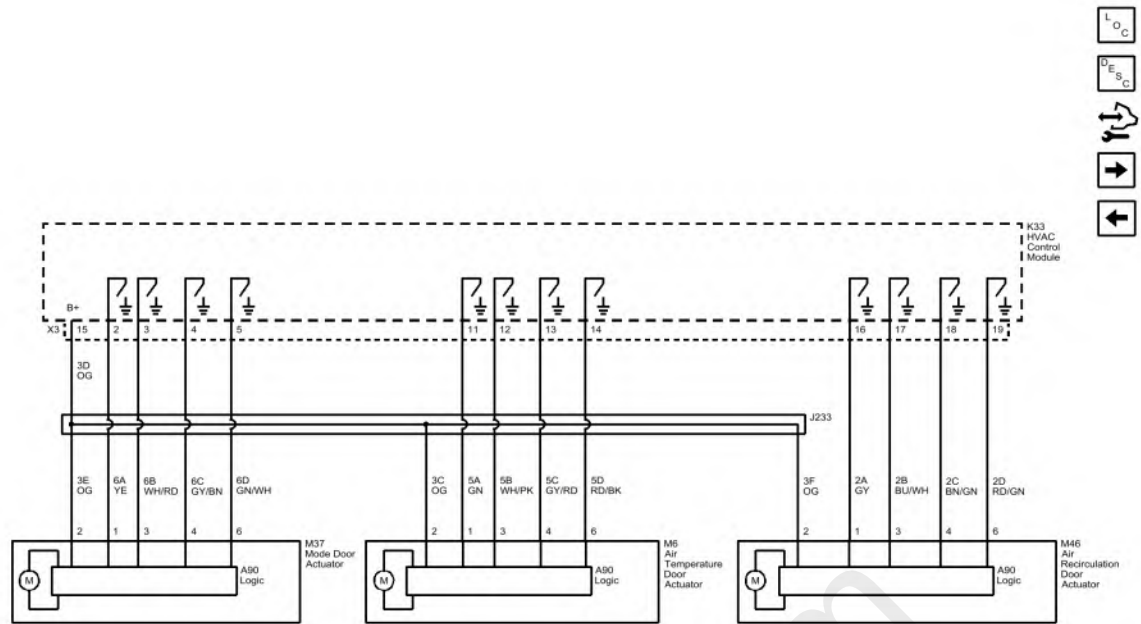


Fig. 2: Mode and Temperature Control Actuators (Buick)
Courtesy of GENERAL MOTORS COMPANY

Temperature Sensors, Pressure Sensor, and Compressor Controls (Buick)

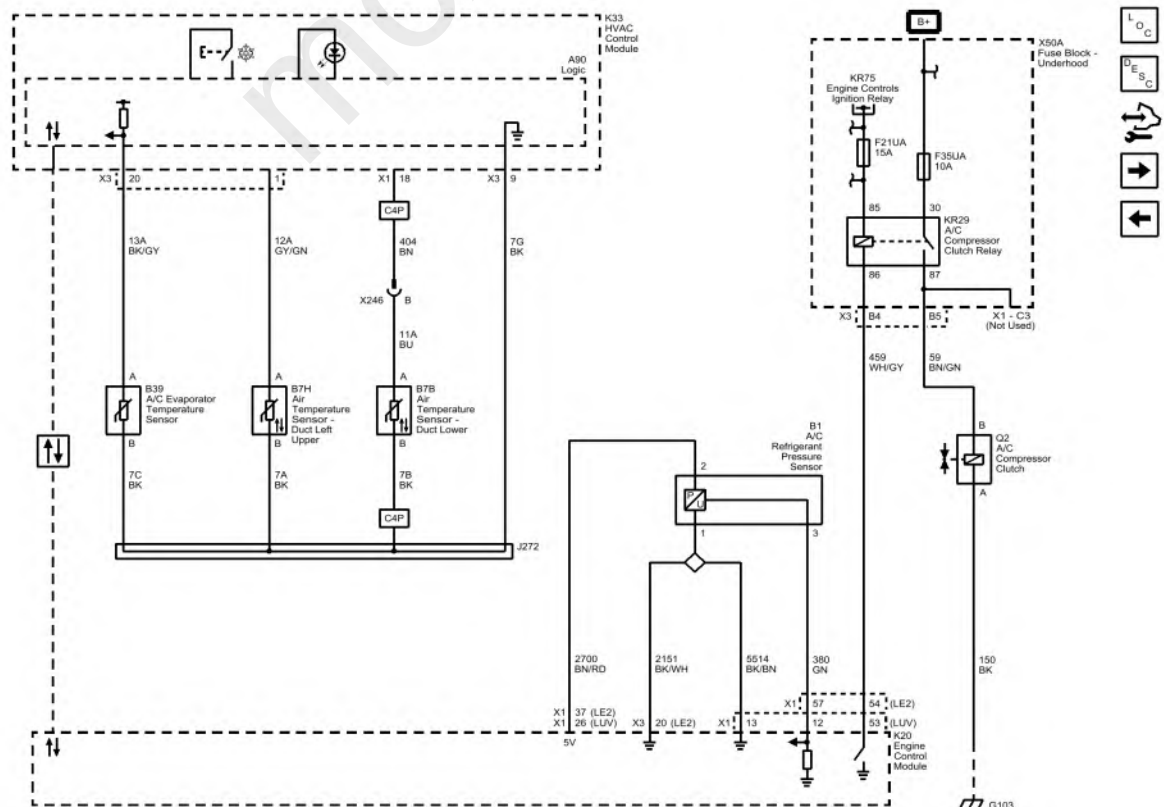


Fig. 3: Temperature Sensors, Pressure Sensors, and Compressor Controls (Buick)
Courtesy of GENERAL MOTORS COMPANY

Sunload Sensor and Windshield Temperature Sensor (Buick with C4P)

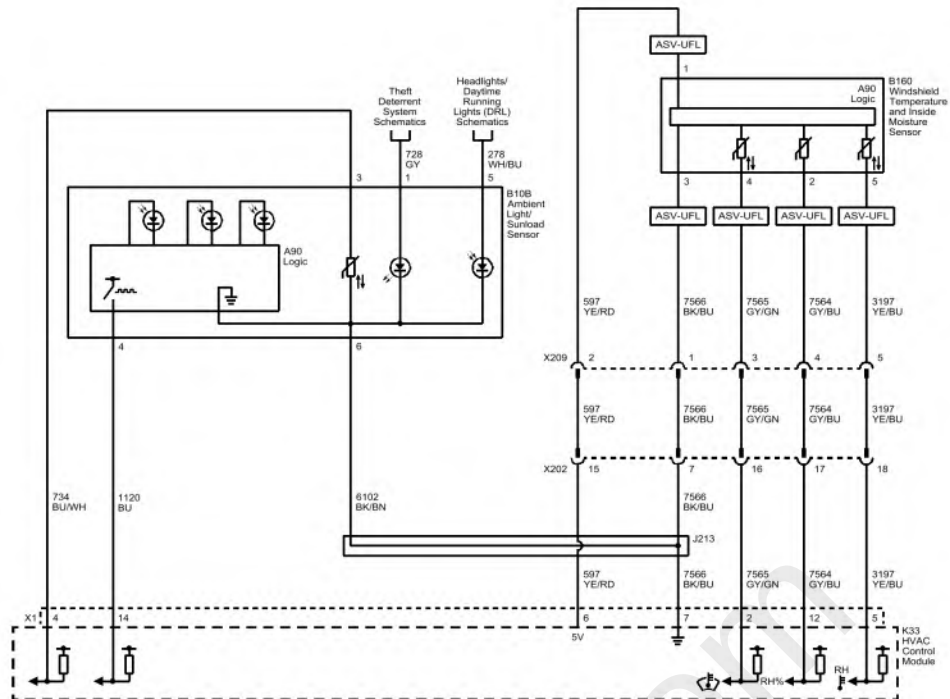


Fig. 4: Sunload Sensor and Windshield Temperature Sensor (Buick with C4P)
Courtesy of GENERAL MOTORS COMPANY

Auxiliary Heater Coolant Pump (Buick with LE2)

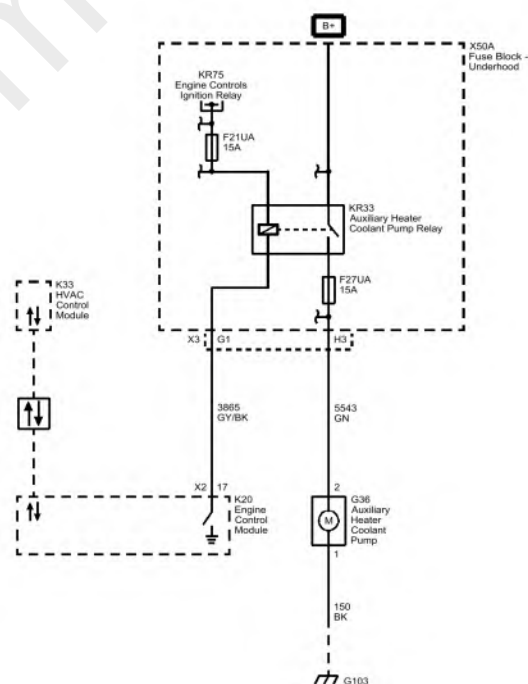


Fig. 5: Auxiliary Heater Coolant Pump (Buick with LE2).
Courtesy of GENERAL MOTORS COMPANY

Auxiliary Heater (Buick with C32)

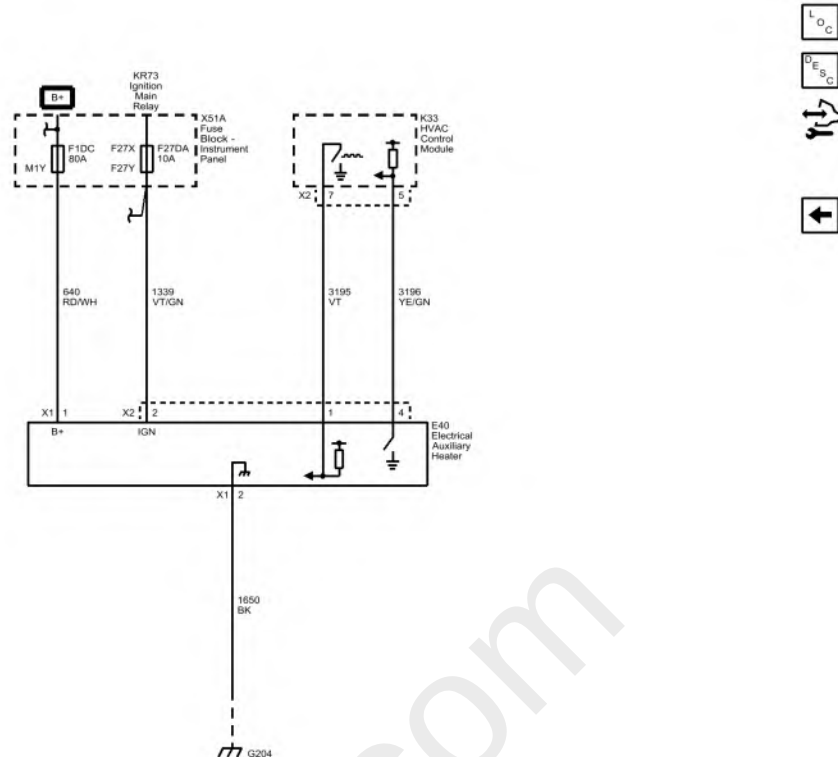


Fig. 6: Auxiliary Heater (Buick with C32).
Courtesy of GENERAL MOTORS COMPANY

HVAC WIRING SCHEMATICS (CHEVROLET WITH C41 OR C60)

Power, Ground, Blower Motor, and Air Inlet Actuator (Chevrolet)

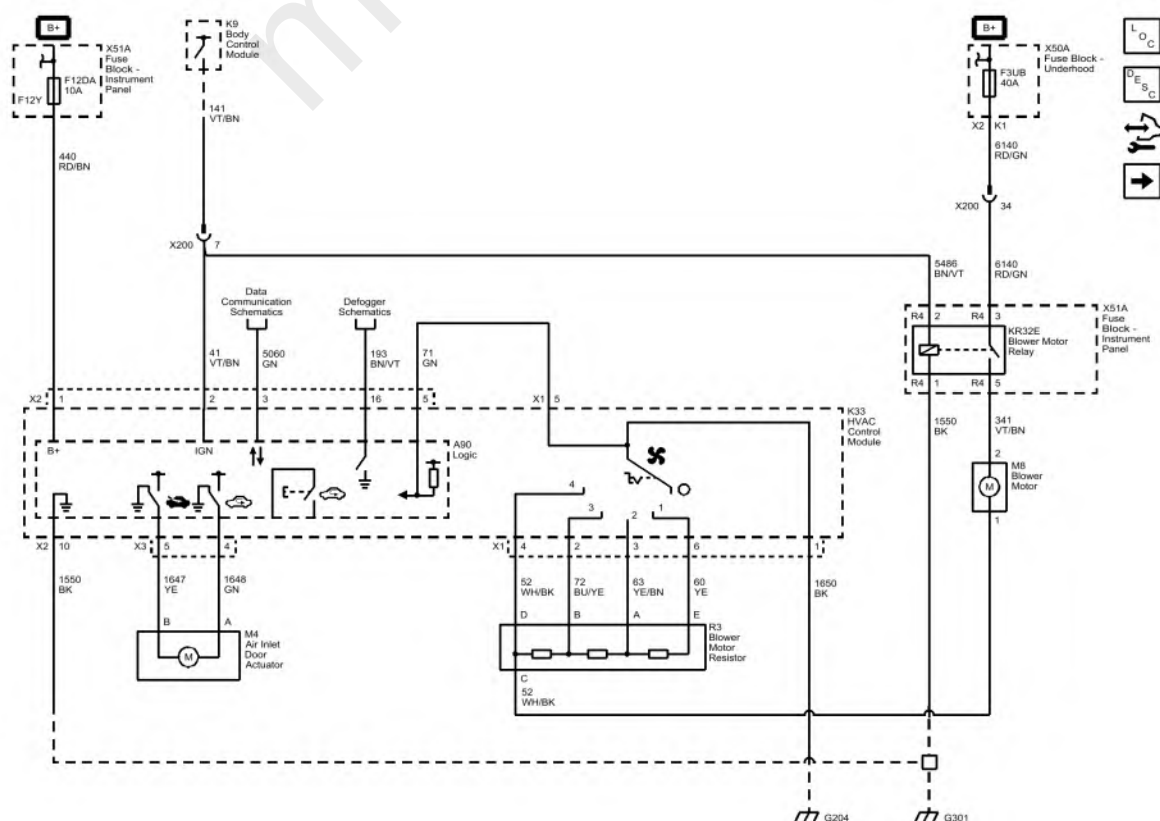


Fig. 7: Power, Ground, Blower Motor, and Air Inlet Actuator (Chevrolet)
Courtesy of GENERAL MOTORS COMPANY

Compressor Controls (Chevrolet with C60)

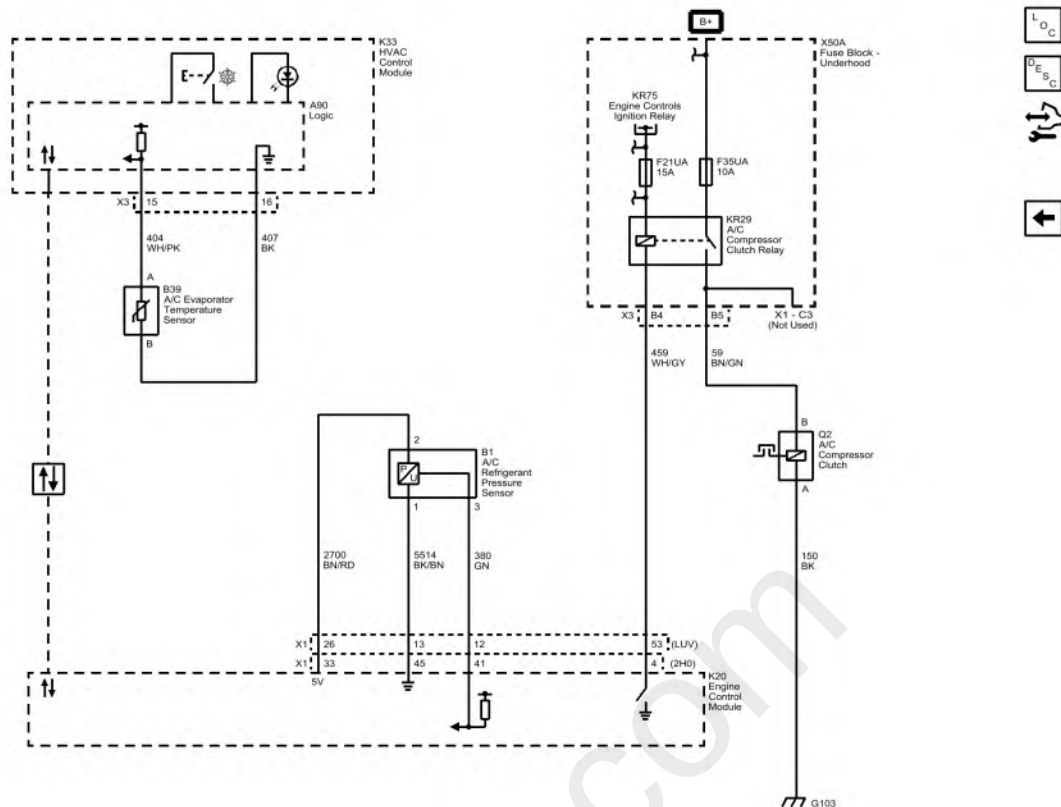


Fig. 8: Compressor Controls (Chevrolet with C60)
Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

HVAC COMPONENT REPLACEMENT REFERENCE (C67)

Component	Repair Instruction
A26 HVAC Controls	Heater and Air Conditioning User Interface Control Replacement (C67)
B1 A/C Refrigerant Pressure Sensor	Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (2H0) , Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LUV) , Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LE2)
B39 A/C Evaporator Temperature Sensor	Air Conditioning Evaporator Temperature Sensor Replacement (CJ2 C60 C67 LHD Evaporator Core) , Air Conditioning Evaporator Temperature Sensor Replacement (Upper Left Duct) , Air Conditioning Evaporator Temperature Sensor Replacement (Upper Right Duct) , Air Conditioning Evaporator Temperature Sensor Replacement (Left Lower Duct) , Air Conditioning Evaporator Temperature Sensor Replacement (Right Lower Duct)
K33 HVAC Control Module	Heater and Air Conditioning Remote Control Replacement (C67)
K8 Blower Motor Control Module	Blower Motor Control Module Replacement (With RPO C67 CJ2)
M46 Air Recirculation Door Actuator	Air Inlet Valve Actuator Replacement (Recirculation)
M46 Mode Door Actuator	Mode Control Cam Actuator Replacement (C67)

Component	Repair Instruction
M6 Air Temperature Door Actuator	Air Inlet Valve Actuator Replacement - Left Side (Temperature)
M8 Blower Motor	Blower Motor Replacement
Q2 A/C Compressor Clutch	Air Conditioning Clutch Assembly Replacement (LUV) Air Conditioning Clutch Assembly Replacement (2H0) Air Conditioning Clutch Assembly Replacement (LE2)

HVAC COMPONENT REPLACEMENT REFERENCE (C60)

Component	Repair Instruction
B1 A/C Refrigerant Pressure Sensor	Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (2H0) Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LUV) Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement (LE2)
B39 A/C Evaporator Temperature Sensor	Air Conditioning Evaporator Temperature Sensor Replacement (CJ2 C60 C67 LHD Evaporator Core) Air Conditioning Evaporator Temperature Sensor Replacement (Upper Left Duct) Air Conditioning Evaporator Temperature Sensor Replacement (Upper Right Duct) Air Conditioning Evaporator Temperature Sensor Replacement (Left Lower Duct) Air Conditioning Evaporator Temperature Sensor Replacement (Right Lower Duct)
K33 HVAC Control Module	Heater and Air Conditioning Control with Cable Control Replacement (C60)
M4 Air Inlet Door Actuator	Air Inlet Valve Actuator Replacement (Recirculation)
M8 Blower Motor	Blower Motor Replacement
Q2 A/C Compressor Clutch	Air Conditioning Clutch Assembly Replacement (LUV) Air Conditioning Clutch Assembly Replacement (2H0) Air Conditioning Clutch Assembly Replacement (LE2)
R3 Blower Motor Resistor	Blower Motor Control Module Replacement (With RPO C67 CJ2)

HVAC COMPONENT REPLACEMENT REFERENCE (C41)

Component	Repair Instruction
K33 HVAC Control Module	Heater and Air Conditioning Control with Cable Control Replacement (C60)
M4 Air Inlet Actuator	Air Inlet Valve Actuator Replacement (Recirculation)
M8 Blower Motor	Blower Motor Replacement
R3 Blower Motor Resistor	Blower Motor Control Module Replacement (With RPO C67 CJ2)

DTC B0193: FRONT BLOWER MOTOR SPEED 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 B0193 01

Front Blower Motor Speed Circuit Short to Battery

DTC B0193 06

Front Blower Motor Speed Circuit Low Voltage/Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Blower Motor Control Module B+	B0193 06	B0193 06	-	-
Blower Motor B+	B0193 06	1	-	-
Blower Motor Control Module Control	B0193 06	B0193 06	B0193 01	-
Blower Motor Control	2	1	1	-
Blower Motor Control Module Ground	-	1	-	-
1. Blower Motor Inoperative 2. Blower Motor Always ON				

Circuit/System Description

The blower motor control module is an interface between the HVAC control module and the blower motor. The blower motor control module has 5 circuits: a B+ input, ground, a control circuit from the HVAC control module, a B+ output to the blower motor, and a low side pulse width modulation (PWM) output. The HVAC control module provides a low side (PWM) signal to the blower motor control module in order to request the blower motor speed. The blower motor control module grounds the blower motor using a low side PWM signal in order to vary the blower motor speed.

Conditions for Running the DTC

- Ignition ON.
- The HVAC control module is ON.

Conditions for Setting the DTC

B0193 01

The voltage at the HVAC control module output to the blower motor control module is always high.

B0193 06

The voltage at the HVAC control module output to the blower motor control module is always low or fluctuating.

Action Taken When the DTC Sets

The blower motor is inoperative.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Diagnostic Aids

Inspect the motor shaft for rust or other foreign material which may prohibit proper motor operation.

If the motor operates properly please reinstall it and check for Preliminary Information or Technical Service Bulletins.

Reference Information

Schematic Reference

HVAC Schematics (Buick with C67 or C4P)**HVAC Schematics (Chevrolet with C41 or C60)**

Connector End View Reference

Description and Operation

Manual HVAC 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 and all vehicle systems OFF, disconnect the X1 harness connector at the K8 Blower Motor Control Module. It may take up to 10 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 5 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. Verify a test lamp illuminates between the B+ circuit terminal 6 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 B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , 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 terminal 6 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Disconnect the X2 harness connector at the K8 Blower Motor Control Module and disconnect the harness connector at the M8 Blower Motor.
 4. Test for infinite resistance between the M8 Blower Motor B+ circuit terminal 2 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, test or replace the M8 Blower Motor.
 - **If the test lamp illuminates**
4. Ignition ON. Test for less than 1 V between the control circuit terminal 3 and ground.
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module. Ignition ON.
 2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K33 HVAC Control Module
 - **If less than 1 V**

5. Ignition OFF and all vehicle systems OFF, disconnect the X2 harness connector at the K33 HVAC Control Module. It may take up to 10 min for all vehicle systems to power down.

6. Test for infinite resistance between the control circuit terminal 15 and ground.

- **If less than infinite resistance**

Repair the short to ground on the circuit.

- **If infinite resistance**

7. 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**

NOTE: Verify the ignition is OFF before connecting the blower motor control module or incorrect test results may occur.

8. Ignition OFF, connect all harness connectors. Ignition ON.

9. While backprobing terminal 3 X1 at the K8 Blower Motor Control Module, test for greater than 1 V between the control circuit and ground.

- **If less than 1 V**

Replace the K8 Blower Motor Control Module

- **If 1 V or greater**

10. Verify the voltage decreases and increases while using the controls to change the blower speed selection.

- **If the voltage does not decrease and increase as the blower speed selection is changed**

Replace the K33 HVAC Control Module

- **If the voltage decreases and increases as the blower speed selection is changed**

11. Ignition OFF, disconnect the harness connector at the M8 Blower Motor, ignition ON and blower ON.

12. Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.

- **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the X2 harness connector at the K8 Blower Motor Control Module.

2. 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 K8 Blower Motor Control Module.

- **If the test lamp illuminates**

13. Connect a test lamp between control circuit terminal 1 and B+ circuit terminal 2.

14. Verify the test lamp becomes progressively brighter as the blower speed is increased and progressively dimmer as the blower speed is decreased.

- **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the X2 harness connector at the K8 Blower Motor Control Module, ignition ON.

2. Test for less than 1 V between the control circuit terminal 1 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V

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 K8 Blower Motor Control Module.

- **If the test lamp illuminates, but does not change in brightness**

1. Ignition OFF, disconnect the X2 harness connector at the K8 Blower Motor Control Module.
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K8 Blower Motor Control Module.

- **If the test lamp changes in brightness as the blower speed is changed**

15. Test or replace the M8 Blower Motor.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C67\)](#)[HVAC Component Replacement Reference \(C60\)](#)[HVAC Component Replacement Reference \(C41\)](#)
- Refer to [Control Module References](#) for control module replacement, programming and setup

DTC B0223: RECIRCULATE POSITION COMMAND 1 CIRCUIT (C60)

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 B0223 01

Recirculate Position Command 1 Circuit Short to Battery

DTC B0223 02

Recirculate Position Command 1 Circuit Short to Ground

DTC B0223 04

Recirculate Position Command 1 Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control - Terminal A	B0223 01	B0223 04	B0223 02	-
Control - Terminal B	B0223 01	B0223 04	B0223 02	-

Circuit/System Description

The air inlet actuator is a 2-wire bi-directional electric motor. There are two control circuits that enable the actuator to operate. The control circuits use either a ground or 12 V value to coordinate the actuator movement. When the actuator is at rest, both control circuits have a value of approximately 0 V. In order to move the actuator, the HVAC control module grounds one of the control circuits while providing the other with 12 V. The HVAC control module reverses the polarity of the control circuits to move the actuator in the opposite direction.

Conditions for Running the DTC

Ignition ON

Conditions for Setting the DTC

B0223 01

The HVAC control module detects a short to battery in either air inlet control circuit.

B0223 02

The HVAC control module detects a short to ground in either air inlet control circuit.

B0223 04

The HVAC control module detects an open in an either inlet control circuit.

Action Taken When the DTC Sets

The air inlet door will be inoperative.

Reference Information

Schematic Reference

HVAC Schematics (Chevrolet with C41 or C60)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX (TRAX)

Description and Operation

Manual HVAC 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 the M4 Air Inlet Door Actuator moves between the RECIRCULATE and FRESH AIR positions within 10 s when pressing the recirculation switch.
 - **If the M4 Air Inlet Door Actuator does not move between the RECIRCULATE and FRESH AIR positions**

Refer to Circuit/System Testing.
 - **If the M4 Air Inlet Door Actuator moves between the RECIRCULATE and FRESH AIR positions**
3. Verify the M4 Air Inlet Door Actuator returns to its previous position within 10 s when pressing the recirculation switch.
 - **If the M4 Air Inlet Door Actuator does not return to its previous position**

Refer to Circuit/System Testing.
 - **If the M4 Air Inlet Door Actuator does return to its previous position**
4. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the M4 Air Inlet Door Actuator.

2. Connect a test lamp between control circuit terminal A and control circuit terminal B, ignition ON.
3. Verify the test lamp turns ON for approximately 10 s when commanding the Air Recirculation Mode Switch On and Off with a scan tool.
 - **If the test lamp does not turn ON and OFF during either of the commands**
 1. Ignition OFF, remove the test lamp and disconnect the X3 harness connector at the K33 HVAC Control Module, ignition ON.
 2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 4. Test for infinite resistance between the control circuits.
 - If less than infinite resistance, repair the short on the circuit.
 - If infinite resistance
 5. Test for less than 2 Ω in each 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 K33 HVAC Control Module.
 - **If the test lamp turns ON and OFF during each of the commands**
4. Test or replace the M4 Air Inlet Door Actuator.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C60\)](#).
- Refer to [Control Module References](#) for HVAC control module replacement, programming and setup

DTC B0223, B0233, B023A, OR B0408: RECIRCULATE POSITION COMMAND 1 CIRCUIT/AIR FLOW CONTROL CIRCUIT/HVAC ACTUATORS SUPPLY VOLTAGE/MAIN TEMPERATURE CONTROL CIRCUIT (C67)

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 B0223 01

Recirculate Position Command 1 Circuit Short to Battery

DTC B0223 06

Recirculate Position Command 1 Circuit Low Voltage/Open

DTC B0233 01

Air Flow Control Circuit Short to Battery

DTC B0233 06

Air Flow Control Circuit Low Voltage/Open

DTC B023A 02

DTC B0408 01

Main Temperature Control Circuit Short to Battery

DTC B0408 06

Main Temperature Control Circuit Low Voltage/Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Stepper Motors 12 V Reference	B023A 02, B0223 06, B0233 06, B0408 06,	B0223 06, B0233 06, B0408 06,	-	-
Recirculation Actuator Control 1	B0223 06	B0223 06	B0223 01	1
Recirculation Actuator Control 2	B0223 06	B0223 06	B0223 01	1
Recirculation Actuator Control 3	B0223 06	B0223 06	B0223 01	1
Recirculation Actuator Control 4	B0223 06	B0223 06	B0223 01	1
Air Temperature Actuator Control 1	B0408 06	B0408 06	B0408 01	1
Air Temperature Actuator Control 2	B0408 06	B0408 06	B0408 01	1
Air Temperature Actuator Control 3	B0408 06	B0408 06	B0408 01	1
Air Temperature Actuator Control 4	B0408 06	B0408 06	B0408 01	1
Mode Actuator Control 1	B0233 06	B0233 06	B0233 01	1
Mode Actuator Control 2	B0233 06	B0233 06	B0233 01	1
Mode Actuator Control 3	B0233 06	B0233 06	B0233 01	1
Mode Actuator Control 4	B0233 06	B0233 06	B0233 01	1
1. HVAC Malfunction				

Circuit/System Description

Stepper motors are used for temperature regulation, air distribution control, and recirculation door control.

With the switches, buttons, and dials on the HVAC controls, air temperature door position, mode door position, and recirculation door position can be selected. The selected values are passed to the HVAC control module via serial data. The HVAC control module supplies a switched 12 V control voltage to the stepper motors and energizes the 4 stepper motor coils with a pulsed ground signal. The stepper motors move the appropriate doors to the requested positions.

Conditions for Running the DTC

- Ignition ON.
- The HVAC control module is ON.

Conditions for Setting the DTC**B023A 02**

The stepper motors supply output is shorted to ground.

B0223 01, B0233 01, B023A 01, or B0408 01

At least one control circuits of the appropriate stepper motor is shorted to voltage when motor starts moving. Faults are not detected when motor is already running or target position is already reached.

B0223 06, B0233 06, B0233 06, or B0408 06

At least one control circuits of the appropriate stepper motor is shorted to ground or open when motor starts moving. Faults are not detected when motor is already running or target position is already reached.

Action Taken When the DTC Sets

B023A 02

- The affected output will be switched off for hardware protection.
- All stepper motors are deactivated.

B0223, B0233, B023A, or 0408

- The affected output will be switched off for hardware protection.
- The affected stepper motor is deactivated.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Reference Information

Schematic Reference

HVAC Schematics (Buick with C67 or C4P)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX (ENCORE)

Description and Operation

Manual HVAC 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. Perform the **Actuator Recalibration (C67)** procedure.
2. Verify the concern or DTC has been corrected.
 - **If the concern or DTC has not been corrected**
 1. Verify DTC B023A is not set.
 - If DTC B023A is set, refer to Circuit/System Testing - DTC B023A.
 - If DTC B023A is not set, refer to Circuit/System Testing - DTC B0223, B022A, B0233, or B0408.
 - **If the concern or DTC has been corrected**

3. All OK.

Circuit/System Testing

DTC B023A

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the components listed below. It may take up to 2 min for all vehicle systems to power down.
 - M37 Mode Door Actuator
 - M46 Air Recirculation Door Actuator
 - M6 Air Temperature Door Actuator
2. Disconnect the harness connector at the K33 HVAC Control Module.
3. Test for infinite resistance between the K33 HVAC Control Module 12 V reference circuit terminal 15 and ground.
 - **If less than infinite resistance**

Repair the short to ground on the circuit.
 - **If infinite resistance**
4. Ignition ON.
5. Test for less than 1 V between the K33 HVAC Control Module 12 V reference circuit terminal 15 and ground.
 - **If 1 V or greater**

Repair the short to voltage on the circuit.
 - **If less than 1 V**
6. Connect the harness connector at the K33 HVAC Control Module, ignition ON.
7. Clear all DTCs.
8. Verify DTC B023A is not set.
 - **If the DTC is set.**

Replace the K33 HVAC Control Module.
 - **If the DTC is not set.**
9. Verify DTC B023A does not set after connecting each of the components listed below one at a time and operating them through their full range.
 - M37 Mode Door Actuator
 - M46 Air Recirculation Door Actuator
 - M6 Air Temperature Door Actuator
 - **If the DTC sets after connecting one of the components**

Replace the component that was connected immediately before the DTC set.
 - **If the DTC does not set**
10. All OK.

DTC B0223, B022A, B0233, or B0408

1. Ignition OFF, disconnect the harness connector at the appropriate door actuator, ignition ON.
2. Verify a test lamp flashes when connected between the 12 V reference circuit terminal 2 and ground.
 - **If the test lamp does not flash**
 1. Ignition OFF, remove the test lamp and disconnect the harness connector at the K33 HVAC Control Module.
 2. Test for less than 2 Ω in the 12 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.

- If less than 2 Ω , replace the K33 HVAC Control Module.
 - **If the test lamp flashes**
3. Connect a test lamp between each control circuit listed below and B+.
 - Control Circuit - terminal 1
 - Control Circuit - terminal 3
 - Control Circuit - terminal 4
 - Control Circuit - terminal 6
 4. Command the appropriate door actuator in both directions.
 5. Verify the test lamp turns ON and then OFF during at least one of the directional commands.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp and disconnect the harness connector at the K33 HVAC Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K33 HVAC Control Module.
 - **If the test lamp is always OFF**
 1. Ignition OFF, remove the test lamp and disconnect the harness connector at the K33 HVAC Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Ignition OFF
 4. 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 K33 HVAC Control Module.
 - **If the test lamp turns ON and then OFF**
 6. Replace the door actuator.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C67\)](#).
- Refer to [Control Module References](#) for HVAC control module replacement, programming and setup

DTC B3933: AIR CONDITIONING EVAPORATOR TEMPERATURE SENSOR 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 B3933 02

Air Conditioning Evaporator Temperature Sensor Circuit Short to Ground

DTC B3933 05

Air Conditioning Evaporator Temperature Sensor Circuit High Voltage/Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Evaporator Air Temperature Sensor Signal	B3933 02	B3933 05	B3933 05	1
Low Reference	-	B3933 05	-	-
1. Air Temperature Malfunction				

Circuit/System Description

The evaporator air temperature sensor is a 2-wire negative temperature coefficient thermistor which operates using signal and low reference circuits. As the air temperature surrounding the sensor increases, the sensor resistance decreases. The sensor is capable of reading temperatures ranging from -40 to +80Å, Å°C (-40 to +176Å, Å°F), with a signal voltage between 0-5 V. If the HVAC control module detects a malfunctioning sensor the software uses a default air temperature value. The default action ensures that the HVAC system can adjust the inside air temperature near the desired temperature until the condition is corrected.

Conditions for Running the DTC

- Ignition ON.
- The HVAC control module is ON.

Conditions for Setting the DTC

The HVAC control module detects the sensor signal out of range. The signal voltage is less than 0.1 V or greater than 4.9 V for more than 50 ms.

Action Taken When the DTC Sets

The system operates using a default value.

Conditions for Clearing the DTC

The sensor signal is within specified range between 0.1-4.9 V.

Reference Information

Schematic Reference

HVAC Schematics (Buick with C67 or C4P)**HVAC Schematics (Chevrolet with C41 or C60)**

Connector End View Reference

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

Description and Operation

Manual HVAC 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 and all vehicle systems OFF, disconnect the harness connector at the B39 A/C Evaporator Temperature Sensor. It may take up to 10 min for all vehicle systems to power down.

NOTE: **The scan tool must be disconnected from the vehicle before performing the next test.**

2. Test for less than 10 Ω between the low reference circuit terminal B and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the K33 HVAC Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K33 HVAC Control Module.
 - **If less than 10 Ω**
3. Test for 4.8-5.2 V between the signal circuit terminal A and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the harness connector at the K33 HVAC Control Module.
 2. Test for infinite resistance between the signal circuit 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 end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K33 HVAC Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF, disconnect the harness connector at the K33 HVAC Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K33 HVAC Control Module.
 - **If between 4.8-5.2 V**
4. Test or replace the B39 A/C Evaporator Temperature Sensor.
5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.
6. Verify the DTC does not set.
 - **If the DTC sets**

Replace the K33 HVAC Control Module.
 - **If the DTC does not set**
7. All OK

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C67\)](#)[HVAC Component Replacement Reference \(C60\)](#)[HVAC Component Replacement Reference \(C41\)](#)
- Refer to [Control Module References](#) for HVAC control module replacement, programming and setup

DTC P0532 OR P0533: AIR CONDITIONING (A/C) REFRIGERANT PRESSURE SENSOR CIRCUIT LOW/HIGH VOLTAGE

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 the diagnostic category.

DTC Descriptors

DTC P0532

Air Conditioning (A/C) Refrigerant Pressure Sensor Circuit Low Voltage

DTC P0533

Air Conditioning (A/C) Refrigerant Pressure Sensor Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	P0532, P0641	P0532	P0533	-
Signal	P0532	P0532	P0533	-
Low Reference	-	P0533	-	-

Circuit/System Description

The engine control module (ECM) monitors the high side refrigerant pressure through the A/C refrigerant pressure sensor. The ECM supplies a 5 V reference and a low reference to the sensor. Changes in the A/C refrigerant pressure cause the sensor signal to the ECM to vary. When the pressure is high, the signal voltage is high. When the pressure is low, the signal voltage is low. The ECM may use this information to turn the cooling fans on as well as to monitor clutch engagement.

Conditions for Running the DTC

- Engine is running.
- Any of the conditions for setting the DTC are met for 15 s.
- Battery voltage is between 11-18 V.

Conditions for Setting the DTC

P0532

The ECM detects that the A/C pressure is less than 1 psi (0.25 V).

P0533

The ECM detects that the A/C pressure is more than 428 psi (4.92 V).

Action Taken When the DTC Sets

- The A/C compressor is disabled.
- The ECM will illuminate the malfunction indicator lamp (MIL).

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Diagnostic Aids

A malfunction within the refrigerant system causing high pressure can cause this DTC to set.

Reference Information

Schematic Reference

[HVAC Schematics \(Buick with C67 or C4P\)](#)[HVAC Schematics \(Chevrolet with C41 or C60\)](#)

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

Description and Operation

Manual HVAC Description and Operation

Electrical Information Reference

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON
2. Verify the scan tool ECM A/C High Side Pressure Sensor parameter is between 6.8 kPa (1 psi) and 2950 kPa (428 psi).
 - **If not between 6.8 kPa (1 psi) and 2950 kPa (428 psi)**
Refer to Circuit/System Testing
 - **If between 6.8 kPa (1 psi) and 2950 kPa (428 psi)**
3. All OK

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B1 A/C Refrigerant Pressure Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 1 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the K20 Engine Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K20 Engine Control Module.
 - **If less than 10 Ω**
3. Ignition ON.
4. Test for 4.8-5.2 V between the 5 V reference circuit terminal 2 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the harness connector at the K20 Engine Control Module.
 2. Test for infinite resistance between the 5 V reference circuit 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 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K20 Engine Control Module.

- **If greater than 5.2 V**
 1. Ignition OFF, disconnect the harness connector at the K20 Engine Control Module, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K20 Engine Control Module.
 - **If between 4.8-5.2 V**
- 5. Verify the scan tool ECM A/C High Side Pressure Sensor parameter is less than .25 V.
 - **If .25 V or greater**
 1. Ignition OFF, disconnect the harness connector at the K20 Engine Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K20 Engine Control Module.
 - **If less than .25 V**
- 6. Install a 3 A fused jumper wire between the signal circuit terminal 3 and the 5 V reference circuit terminal 2.
- 7. Verify the scan tool ECM A/C High Side Pressure Sensor parameter is greater than 4.8 V.
 - **If 4.8 V or less**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K20 Engine Control Module.
 2. Test for infinite resistance between the signal circuit 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 end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K20 Engine Control Module.
 - **If greater than 4.8 V**
- 8. Test or replace the B1 A/C Refrigerant Pressure Sensor.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C67\)](#)[HVAC Component Replacement Reference \(C60\)](#)[HVAC Component Replacement Reference \(C41\)](#)
- Refer to [Control Module References](#) for engine control module replacement, programming and setup

DTC P0645, P0646, OR P0647: AIR CONDITIONING (A/C) COMPRESSOR CLUTCH RELAY CONTROL 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 P0645

Air Conditioning (A/C) Compressor Clutch Relay Control Circuit

DTC P0646

DTC P0647

Air Conditioning (A/C) Compressor Clutch Relay Control Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
A/C Clutch Relay Coil Ignition	1	P0645	-	-
A/C Clutch Relay Switch B+	1	1	-	-
A/C Clutch Relay Coil Control	1	1	-	-
A/C Clutch Relay Switch Control	P0646	P0645	P0647	-
Component Ground	-	1	-	-
1. A/C Compressor Inoperative				

Circuit/System Description

When the A/C switch is pressed, the HVAC control module sends a serial data message to the engine control module (ECM) indicating the A/C request. In response to this message, the ECM grounds the A/C compressor clutch relay control circuit energizing the A/C compressor clutch relay. With the relay contacts closed, battery voltage is applied through the A/C compressor clutch control circuit activating the A/C compressor clutch.

Conditions for Running the DTC

- The ignition voltage is between 11-18 volts.
- The engine speed is greater than 600 RPM.
- An A/C request is made.

Conditions for Setting the DTC**P0645 or P0646**

The ECM detects a short to ground or an open at the A/C compressor clutch relay control circuit.

P0647

The ECM detects a short to voltage at the A/C compressor clutch relay control circuit.

Action Taken When the DTC Sets**P0645 or P0646**

The A/C compressor is inoperative or always active.

P0647

The A/C compressor is inoperative.

Conditions for Clearing the DTC

A history DTC clears after 40 consecutive warm-up cycles have occurred without a malfunction.

Reference Information

Schematic Reference

HVAC Schematics (Buick with C67 or C4P)HVAC Schematics (Chevrolet with C41 or C60)

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

Description and Operation

[Manual HVAC Description and Operation](#)

Electrical Information Reference

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

DTC Type Reference

[Powertrain Diagnostic Trouble Code \(DTC\) Type Definitions](#)

Scan Tool Reference

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

[Circuit/System Testing](#)

1. Ignition OFF, and all vehicle systems OFF. Disconnect the harness connector at the Q2 A/C Compressor Clutch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the Q2 A/C Compressor Clutch ground circuit terminal A 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. Connect a test lamp between the control circuit terminal B and ground, ignition ON.
4. Verify the test lamp does not turn ON and OFF when commanding the Q2 A/C Compressor Clutch On and Off with a scan tool.
 - **If the test lamp turns ON and OFF**

Test or replace the Q2 A/C Compressor Clutch.
 - **If the test lamp does not turn ON and OFF**
5. Ignition OFF, connect the harness connector at the Q2 A/C Compressor Clutch. Disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
6. Verify the Q2 A/C Compressor Clutch is not activated.
 - **If the Q2 A/C Compressor Clutch is activated**
 1. Ignition OFF, disconnect the harness connector at the Q2 A/C Compressor Clutch, ignition ON.
 2. Test for less than 1 V between the control circuit terminal B and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the Q2 A/C Compressor Clutch.
 - **If the Q2 A/C Compressor Clutch is not activated**
7. Connect a 10 A fused jumper wire between the control circuit terminal B5 and B+.
8. Verify the Q2 A/C Compressor Clutch activates.
 - **If the Q2 A/C Compressor Clutch does not activate**

1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the Q2 A/C Compressor Clutch, ignition ON.
2. Test for infinite resistance between the control circuit 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 , test or replace the Q2 A/C Compressor Clutch.
 - **If the Q2 A/C Compressor Clutch activates**
9. Ignition OFF, connect the X3 harness connector at the X50A Fuse Block - Underhood and disconnect the harness connector at the K20 Engine Control Module, ignition ON.
10. Verify the Q2 A/C Compressor Clutch is not activated.
 - **If the Q2 A/C Compressor Clutch is activated**
 1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the X3 X50A Fuse Block - Underhood control circuit terminal B4 and ground.
 - If less than Infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, test or replace the X50A Fuse Block - Underhood.
 - **If the Q2 A/C Compressor Clutch is not activated**
11. Connect a 3 A fused jumper wire between the K20 Engine Control Module control circuit terminal for the KR29 A/C Compressor Clutch Relay and ground.
12. Verify the Q2 A/C Compressor Clutch activates.
 - **If the Q2 A/C Compressor Clutch does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the X3 X50A Fuse Block - Underhood control circuit terminal B4 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 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 , test or replace the X50A Fuse Block - Underhood.
 - **If the Q2 A/C Compressor Clutch activates**
13. Replace the K20 Engine Control Module.

Component Testing

Compressor Clutch Test

1. Ignition OFF, disconnect the Q2 A/C Compressor Clutch.
2. Test for 3.9 - 4.3 Ω between terminal A and terminal B.
 - **If not between 3.9 - 4.3 Ω**

Replace the Q2 A/C Compressor Clutch.
 - **If between 3.9 - 4.3 Ω**
3. Test for infinite resistance between terminal A and ground.
 - **If less than infinite resistance**

Replace the Q2 A/C Compressor Clutch.
 - **If infinite resistance**
4. All OK.

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

- Refer to [HVAC Component Replacement Reference \(C67\)](#)[HVAC Component Replacement Reference \(C60\)](#)[HVAC Component Replacement Reference \(C41\)](#)
- Refer to [Front Compartment Fuse Block Replacement](#)
- Refer to [Control Module References](#) for engine control module replacement, programming and setup

SYMPTOMS - HVAC SYSTEMS - MANUAL

NOTE: The following steps must be completed before using the symptom tables:

1. Perform the [Diagnostic System Check - Vehicle](#) before using the HVAC System Malfunction procedure in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to [Manual HVAC Description and Operation](#).

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the HVAC System. Refer to [Checking Aftermarket Accessories](#).
- Inspect the easily accessible or visible system components for obvious damage or conditions which may cause the symptom.
- Verify the A/C compressor turns freely and is not seized.
- Verify that the customer is using the correct key to enable personalization and is not inadvertently activating auxiliary HVAC controls.
- The A/C compressor will not operate in cold outside air temperatures.
- The following conditions may cause window fogging:
 - Wet carpet or mats
 - High humidity
 - Interior water leak
 - Blocked A/C evaporator drain tube
 - Maximum passenger capacity
 - Blocked body pressure relief valves
- Inspect the air distribution system for causes of reduced air flow:
 - Obstructed or dirty passenger compartment air filter, if equipped
 - Blocked or damaged air inlet or outlet vents

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to [Testing for Intermittent Conditions and Poor Connections](#).

Symptom List

Refer to [HVAC System Malfunction \(C60\)](#)[HVAC System Malfunction \(C67\)](#)[HVAC System Malfunction \(C41\)](#) in order to diagnose the symptom:

HVAC SYSTEM MALFUNCTION (C60)

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 Aids

Check the following mechanical fault sources:

- Air distribution box
- Air distribution hoses/air distribution ducts
- Mode and temperature door cables

Reference Information

Schematic Reference

[HVAC Schematics \(Chevrolet with C41 or C60\)](#)

Connector End View Reference

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

Description and Operation

[Manual HVAC 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

NOTE: Check for bulletins before proceeding.

1. Ignition ON.
2. Verify every applicable scan tool Switch parameter changes when pressing the appropriate switch on the A26 HVAC Controls.
 - **If any parameter does not change**
Replace the A26 HVAC Controls.
 - **If all parameters change**
3. Verify the blower motor operates properly with the blower motor switch in each speed position.
 - **If the blower motor does not operate in each speed position**
Refer to [Blower Motor Malfunction \(C41, C60\)](#).
 - **If the blower motor operates properly in each speed position**
4. Verify the air inlet door works properly when commanded.
 - **If the air inlet door does not work properly**
Refer to [DTC B0223 \(C60\)](#).
 - **If the air inlet door does work properly**
5. Install the appropriate ACR Air Conditioning Service Center, ignition ON.

6. Verify the high side pressure reading on the Air Conditioning Service Center is within 10% of the scan tool ECM A/C High Side Pressure Sensor parameter.

- **If the reading is not within 10%**

Refer to [DTC P0532 or P0533](#).

- **If the reading is within 10%**

7. Verify the ECM A/C High Side Pressure Sensor parameter is between 269-2929 kPa (39-425 PSI).

- **If the reading is not between 269-2929 kPa (39-425 PSI)**

Refer to [Air Conditioning \(A/C\) System Performance Test](#)

- **If the reading is between 269-2929 kPa (39-425 PSI)**

8. Verify the scan tool HVAC A/C Evaporator Temperature Sensor parameter listed is within 10% of ambient temperature.

- **If not within 10% of ambient temperature**

Refer to [DTC B3933](#).

- **If within 10% of ambient temperature**

9. Verify the A/C compressor clutch engages and disengages when commanding the ECM A/C Compressor Clutch Relay On and Off with a scan tool.

- **If the A/C compressor does not engage**

Refer to [DTC P0645, P0646, or P0647](#)

- **If the A/C compressor does engage**

10. Engine ON, A/C system ON.

11. Verify cool air flows from the ducts with the temperature control in the coldest position.

- **If the air is not cool**

1. Verify the Q2 A/C Compressor Clutch is engaged.

- If the Q2 A/C Compressor Clutch is not engaged, refer to [Air Conditioning Compressor Malfunction \(C60\)](#).
- If the Q2 A/C Compressor Clutch is engaged, refer to [Air Conditioning \(A/C\) System Performance Test](#).

- **If the air is cool**

12. Verify warm air flows from the ducts with the temperature control in the warmest position.

- **If the air is not warm**

Refer to [Heating Performance Diagnostic](#).

- **If the air is warm**

13. All OK.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C60\)](#).
- Refer to [Control Module References](#) for control module replacement, programming and setup

HVAC SYSTEM MALFUNCTION (C67)

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 Aids

Check the following mechanical fault sources:

- Air distribution box
- Air distribution hoses/air distribution ducts

Reference Information

Schematic Reference

HVAC Schematics (Buick with C67 or C4P)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX (ENCORE)

Description and Operation

Manual HVAC 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

Special Tools

J43600 ACR Air Conditioning Service Center

Circuit/System Verification

NOTE: Check for bulletins before proceeding.

1. Ignition ON.
2. Verify every applicable scan tool Switch parameter changes when pressing the appropriate switch on the A26 HVAC Controls.
 - **If any parameter does not change**
Replace the A26 HVAC Controls.
 - **If all parameters change**
3. Verify the blower motor operates properly with the blower motor switch in each speed position.
 - **If the blower motor does not operate in each speed position**
Refer to **DTC B0193**.
 - **If the blower motor operates properly in each speed position**
4. Verify the HVAC doors listed below move when pressing the appropriate switch.
 - Temperature
 - Mode
 - Recirculation
 - **If any HVAC door does not move**
Refer to **DTC B0223, B0233, B023A, or B0408 (C67)**.

- **If all HVAC doors move**

5. Install the J43600 ACR Air Conditioning Service Center, ignition ON.

6. Verify the high side pressure reading on the Air Conditioning Service Center is within 10% of the scan tool ECM A/C High Side Pressure Sensor parameter.

- **If the reading is not within 10%**

Refer to [DTC P0532 or P0533](#).

- **If the reading is within 10%**

7. Verify the HVAC A/C High Side Pressure Sensor parameter is between 269-2929 kPa (39-425 PSI).

- **If the reading is not between 269-2929 kPa (39-425 PSI)**

Refer to [Air Conditioning \(A/C\) System Performance Test](#)

- **If the reading is between 269-2929 kPa (39-425 PSI)**

8. Verify the scan tool HVAC A/C Evaporator Temperature Sensor parameter listed is within 10% of ambient temperature.

- **If not within 10% of ambient temperature**

Refer to [DTC B3933](#).

- **If within 10% of ambient temperature**

9. Verify the A/C compressor clutch engages and disengages when commanding the ECM A/C Compressor Clutch Relay On and Off with a scan tool.

- **If the A/C compressor does not engage**

Refer to [DTC P0645, P0646, or P0647](#)

- **If the A/C compressor does engage**

10. Engine ON, A/C system ON

11. Verify cool air flows from the ducts with the temperature control in the coldest position.

- **If the air is not cool**

1. Verify the Q2 A/C Compressor Clutch is engaged.

- If the Q2 A/C Compressor Clutch is not engaged, refer to [Air Conditioning Compressor Malfunction \(C67\)](#).
- If the Q2 A/C Compressor Clutch is engaged, refer to [Air Conditioning \(A/C\) System Performance Test](#) .

- **If the air is cool**

12. Verify warm air flows from the ducts with the temperature control in the warmest position.

- **If the air is not warm**

Refer to [Heating Performance Diagnostic](#) .

- **If the air is warm**

13. All OK.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C67\)](#)
- Refer to [Control Module References](#) for HVAC control module replacement, programming and setup

HVAC SYSTEM MALFUNCTION (C41)

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 Aids

Check the following mechanical fault sources:

- Air distribution box
- Air distribution hoses/air distribution ducts
- Mode and temperature door cables

Reference Information

Schematic Reference

[HVAC Schematics \(Chevrolet with C41 or C60\)](#)

Connector End View Reference

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

Description and Operation

[Manual HVAC 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

NOTE: Check for bulletins before proceeding.

1. Ignition ON.
2. Verify the blower motor operates properly with the blower motor switch in each speed position.
 - **If the blower motor does not operate in each speed position**
Refer to [Blower Motor Malfunction \(C41, C60\) Blower Motor Malfunction \(C67\)](#).
 - **If the blower motor operates properly in each speed position**
3. Verify warm air flows from the ducts with the temperature control in the warmest position.
 - **If the air is not warm**
Refer to [Heating Performance Diagnostic](#).
 - **If the air is warm**
4. All OK.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C41\)](#).

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

AIR CONDITIONING COMPRESSOR MALFUNCTION (C67)

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.

Circuit/System Description

The A/C compressor uses a conventional belt driven magnetic clutch to engage and mechanically turn the compressor. When the A/C switch is pressed, the HVAC control module sends an A/C request message to the ECM via serial data. If specific criteria is met, the ECM then grounds the A/C compressor clutch relay control circuit, which will switch the A/C compressor clutch relay. With the relay contacts closed, battery voltage is supplied to the permanently grounded A/C compressor clutch. The A/C compressor clutch will then be activated.

Diagnostic Aids

The following conditions must be met in order to turn on the A/C compressor:

- Battery voltage is between 9-18 V.
- Engine coolant temperature is less than 124 Å , $\text{Å}^{\circ}\text{C}$ (255 Å , $\text{Å}^{\circ}\text{F}$).
- Engine speed is greater than 600 RPM.
- Engine speed is less than 5,500 RPM.
- A/C high side pressure is between 269-2,929 kPa (39-425 PSI).
- Throttle position is less than 100%.
- Evaporator temperature is greater than 3 Å , $\text{Å}^{\circ}\text{C}$ (38 Å , $\text{Å}^{\circ}\text{F}$).
- ECM does not detect excessive torque load.
- ECM does not detect insufficient idle quality.
- The ambient temperature is above 1 Å , $\text{Å}^{\circ}\text{C}$ (34 Å , $\text{Å}^{\circ}\text{F}$).
- Blower motor must be in any other position than off.
- A/C switch is depressed.

Reference Information

Schematic Reference

HVAC Schematics (Buick with C67 or C4P)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX (ENCORE)

Description and Operation

Manual HVAC Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Circuit/System Verification

NOTE: Refer to [HVAC System Malfunction \(C67\)](#) before performing this procedure

1. Ignition ON, press and release the A/C Switch.
2. Verify the scan tool HVAC A/C Switch parameter changes between Active and Inactive.
 - **If the parameter does not change**

Replace the A26 HVAC Controls.
 - **If the parameter changes**
3. Set A/C system to coolest setting with blower ON.
4. Press and release the A/C switch several times.
5. Verify the scan tool ECM A/C Request Signal parameter changes between Active and Inactive.
 - **If the parameter does not change**

Replace the K33 HVAC Control Module.
 - **If the parameter changes**
6. Verify the A/C compressor clutch engages when commanding the ECM A/C Relay output function On and Off with a scan tool.
 - **If the A/C compressor clutch does not engage**

Refer to [DTC P0645, P0646, or P0647](#)
 - **If the A/C compressor clutch engages**
7. All OK.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C67\)](#).
- Refer to [Control Module References](#) for HVAC control module replacement, programming and setup

AIR CONDITIONING COMPRESSOR MALFUNCTION (C60)

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
Blower Feedback Signal	1	-	-	-
1. A/C Compressor Inoperative				

Circuit/System Description

The A/C compressor uses a conventional belt driven magnetic clutch to engage and mechanically turn the compressor. When the A/C switch is pressed, the HVAC control module sends an A/C request message to the ECM via serial data. If specific criteria are met, the ECM then grounds the A/C compressor clutch relay control circuit, which will switch the A/C compressor clutch relay. With the

relay contacts closed, battery voltage is supplied to the permanently grounded A/C compressor clutch. The A/C compressor clutch will then be activated.

Diagnostic Aids

The following conditions must be met in order to turn on the A/C compressor:

- Battery voltage is between 9-18 V.
- Engine coolant temperature is less than 124°C (255°F).
- Engine speed is greater than 600 RPM.
- Engine speed is less than 5,500 RPM.
- A/C high side pressure is between 269-2,929 kPa (39-425 PSI).
- Throttle position is less than 100%.
- Evaporator temperature is greater than 3°C (38°F).
- ECM does not detect excessive torque load.
- ECM does not detect insufficient idle quality.
- The ambient temperature is above 1°C (34°F).
- Blower motor must be in any other position than off.
- A/C switch is depressed.

Reference Information

Schematic Reference

HVAC Schematics (Chevrolet with C41 or C60)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX (TRAX)

Description and Operation

Manual HVAC 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

NOTE: Refer to [HVAC System Malfunction \(C60\)](#) before performing this procedure

1. Ignition ON, press and release the A/C switch several times.
2. Verify the HVAC control module scan tool A/C Switch parameter changes between Active and Inactive.
 - **If the parameter does not change**
Replace the K33 HVAC Control Module.
 - **If the parameter changes**
3. Set A/C system to coolest setting with blower ON.

4. Press and release the A/C switch several times.
5. Verify the ECM scan tool A/C Request Signal parameter changes between YES and NO.

- **If the parameter does not change**

Refer Circuit/System Testing

- **If the parameter changes**

6. Verify the A/C compressor clutch engages when commanding the ECM A/C Relay output function On and Off with a scan tool.

- **If the A/C compressor clutch does not engage**

Refer to [DTC P0645, P0646, or P0647](#)

- **If the A/C compressor clutch engages**

7. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K33 HVAC Control Module.
2. Install a 3 A jumper wire between the signal circuit terminal 5 and ground, A/C switch depressed.
3. Verify the scan tool ECM A/C Request Signal parameter changes between YES and NO.

- **If the parameter does not change**

1. Ignition OFF, remove the jumper wire and disconnect the X2 harness connector at the K33 HVAC Control Module.

2. Test for infinite resistance between the control circuit 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 K33 HVAC Control Module.

- **If the parameter changes**

4. Replace the K33 HVAC Control Module.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C60\)](#)
- Refer to [Control Module References](#) for HVAC control module replacement, programming and setup

BLOWER MOTOR MALFUNCTION (C41, C60)

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
Relay Coil Control	2	2	-	-
Relay Switch B+	2	2	-	-
Relay Coil Ground	-	2	-	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Blower Motor Voltage Control	2	2	-	-
Blower Motor Ground Control	1	2	-	-
Speed 4 Control	1	3	-	-
Speed 3 Control	1	3	-	-
Speed 2 Control	1	3	-	-
Speed 1 Control	1	3	-	-
Switch Ground	-	2	-	-
1. Unwanted Blower Operation 2. Blower Inoperative 3. Blower Speed Inoperative				

Circuit/System Description

The blower motor is supplied voltage any time the ignition is on via a relay controlled by the body control module.

The blower motor switch applies ground to the blower motor control circuit that corresponds to the selected blower speed. The resistors and the blower motor are in a series circuit. The following list represents the number of resistors in series with the blower motor per particular speed request:

- Low speed, 3 resistors
- Medium 1 speed, 2 resistors
- Medium 2 speed, 1 resistors

When blower switch is in the Hi speed position, ground is applied directly to the blower motor through the blower switch.

Diagnostic Aids

Prior to motor replacement connect a direct independent B+ and ground to verify operation.

Inspect the motor shaft for rust or other foreign material which may prohibit proper motor operation.

If the motor operates properly please reinstall it, check for Preliminary Information or Technical Service Bulletins.

Reference Information

Schematic Reference

HVAC Schematics (Chevrolet with C41 or C60)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX (TRAX)

Description and Operation

Manual HVAC Description and Operation

Electrical Information Reference

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

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON
2. Verify the blower motor operates in all speed positions.
 - **If the blower motor does not operate in any speed position**
Refer to Blower Motor Circuit Test
 - **If the blower motor operates in one or more, but not all speed positions**
Refer to Blower Motor Switch Circuit Test
 - **If the blower motor is always ON**
Refer to Blower Motor Always ON Circuit Test
 - **If the blower motor operates correctly in all speed positions**
3. All OK.

Circuit/System Testing

Blower Motor Circuit Test

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the R3 Blower Motor Resistor. It may take up to 10 min for all vehicle systems to power down.
2. Place the blower motor switch in the high speed position.
3. Test for less than 10 Ω between the control circuit terminal D and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the X1 harness connector at the K33 HVAC Control Module.
 2. Test for greater than 2 Ω between the ground circuit terminal 1 and ground.
 - If less than 2 Ω , replace the K33 HVAC Control Module.
 - If greater than 2 Ω
 3. 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**
4. Ignition OFF, connect the harness connector at the R3 Blower Motor Resistor and disconnect the harness connector at the M8 Blower Motor.
5. Test for less than 10 Ω between the control circuit terminal 1 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the R3 Blower Motor Resistor.
 2. 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 , test or replace the R3 Blower Motor Resistor.
 - **If less than 10 Ω**
6. Ignition OFF, disconnect the KR32E Blower Motor Relay.
7. Test for less than 10 Ω between the ground circuit terminal R4-1 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**

8. Ignition ON.

9. Verify a test lamp illuminates between the B+ circuit terminal R4-3 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 B+ circuit end to end.

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

3. Test for infinite resistance between the M8 Blower Motor control circuit terminal 2 and ground.

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

4. Test the KR32E Blower Motor Relay, refer to Component Testing.

- If the relay tests OK, test or replace the M8 Blower Motor.
- If the relay does not test OK, replace the KR32E Blower Motor Relay.

- **If the test lamp illuminates**

10. Verify a test lamp illuminates between the control circuit terminal R4-2 and the ground circuit terminal R4-1.

- **If the test lamp does not illuminate**

Repair the open/high resistance in the control circuit.

- **If the test lamp illuminates**

11. Connect the harness connector at the M8 Blower Motor.

12. Install a 40 A fused jumper wire between the B+ circuit terminal R4-3 and the control circuit terminal R4-5, ignition ON.

13. Verify the M8 Blower Motor operates.

- **If the M8 Blower Motor does not operate**

1. Ignition OFF, remove the jumper wire and disconnect the harness connector at the M8 Blower Motor.

2. 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 , test or replace the M8 Blower Motor.

- **If the M8 Blower Motor operates**

14. Refer to [Testing for Intermittent Conditions and Poor Connections](#) .

Blower Motor Switch Circuit Test

1. Ignition OFF, disconnect the harness connector at the R3 Blower Motor Resistor.

2. Test for less than 10 Ω between each control circuit terminal listed below and ground with the blower switch in the appropriate position.

- Blower speed 1 terminal E
- Blower speed 2 terminal A
- Blower speed 3 terminal B
- Blower speed 4 terminal D

- **If 10 Ω or greater**

1. Ignition OFF, disconnect the X1 harness connector at the K33 HVAC Control Module.
2. Test for less than $2\ \Omega$ in the control circuit end to end.
 - If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - If less than $2\ \Omega$, replace the K33 HVAC Control Module.
- **If less than $10\ \Omega$**
3. Test or replace the R3 Blower Motor Resistor.

Blower Motor Always ON Circuit Test

1. Ignition OFF, disconnect the harness connector at the R3 Blower Motor Resistor.
2. Place the blower motor switch in the OFF position.
3. Test for infinite resistance between each control circuit terminal listed below and ground:
 - Blower speed 1 terminal E
 - Blower speed 2 terminal A
 - Blower speed 3 terminal B
 - Blower speed 4 terminal D
 - **If less than infinite resistance**
 1. Disconnect the X1 harness connector at the K33 HVAC Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K33 HVAC Control Module.
 - **If infinite resistance**
4. Ignition OFF, disconnect the harness connector at the M8 blower motor.
5. Test for infinite resistance between the control circuit terminal 1 and ground.
 - **If less than infinite resistance**

Repair the short to ground on the circuit
 - **If infinite resistance**
6. Refer to [Testing for Intermittent Conditions and Poor Connections](#) .

Component Testing

Relay Test

1. Ignition OFF, disconnect the KR32E Blower Motor Relay.
2. Test for 60-180 Ω between terminals 85 and 86.
 - **If not between 60-180 Ω**

Replace the KR32E Blower Motor Relay.
 - **If between 60-180 Ω**
3. Test for infinite resistance between the terminals listed below:
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
 - **If less than infinite resistance**

Replace the KR32E Blower Motor Relay.
 - **If infinite resistance**
4. Install a 3 A fused jumper wire between relay terminal 86 and 12 V. Install a jumper wire between relay terminal 85 and ground.
5. Test for less than $2\ \Omega$ between terminals 30 and 87.

- **If 2 Ω or greater**

Replace the KR32E Blower Motor Relay.

- **If less than 2 Ω**

6. All OK

Blower Switch

1. Ignition OFF, disconnect the X1 harness connector at the K33 HVAC Control Module.
2. Test for infinite resistance between the ground terminal 1 and each control terminal with the blower switch in the OFF position.

- **If less than infinite resistance**

Replace the K33 HVAC Control Module.

- **If infinite resistance**

3. Test for less than 2 Ω between the ground terminal 1 and each control terminal with the switch in the appropriate position.

- **If 2 Ω or greater**

Replace the K33 HVAC Control Module.

- **If less than 2 Ω**

4. All OK.

Blower Motor Resistor

1. Ignition OFF, disconnect the harness connector at the R3 Blower Motor Resistor.
2. Test for 2.7-3.3 Ω between terminal C and terminal E.

- **If not between 2.7-3.3 Ω**

Replace the R3 Blower Motor Resistor.

- **If between 2.7-3.3 Ω**

3. Test for 1.62-1.98 Ω between terminal C and terminal A.

- **If not between 1.62-1.98 Ω**

Replace the R3 Blower Motor Resistor.

- **If between 1.62-1.98 Ω**

4. Test for 0.72-0.88 Ω between terminal C and terminal B.

- **If not between 0.72-0.88 Ω**

Replace the R3 Blower Motor Resistor.

- **If between 0.72-0.88 Ω**

5. Test for 0.36-0.44 Ω between terminal C and terminal D.

- **If not between 0.36-0.44 Ω**

Replace the R3 Blower Motor Resistor.

- **If between 0.36-0.44 Ω**

6. All OK.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C60\)](#) [HVAC Component Replacement Reference \(C41\)](#).
- Refer to [Control Module References](#) for HVAC control module replacement, programming and setup

BLOWER MOTOR MALFUNCTION (C67)

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 Aids

Check the following mechanical fault sources:

- Air distribution box
- Air distribution hoses/air distribution ducts

Reference Information

Schematic Reference

[HVAC Schematics \(Buick with C67 or C4P\)](#).

Connector End View Reference

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

Description and Operation

[Manual HVAC 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

NOTE: Check for bulletins before proceeding.

1. Ignition ON.
2. While moving the blower motor switch through each speed setting, verify the Blower Motor Switch parameter indicates the correct position for each setting.
 - **If the parameter does not change, or indicates the incorrect position**

Replace the A26 HVAC Controls.
 - **If the parameter changes and indicates the correct position for each setting**
3. Verify the blower motor operates properly with the blower motor switch in each speed position.
 - **If the blower motor does not operate in each speed position**

Refer to [DTC B0193](#).

- If the blower motor operates properly in each speed position

4. All OK.

Repair Instructions

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

- Refer to [HVAC Component Replacement Reference \(C67\)](#).
- Refer to [Control Module References](#) for control module replacement, programming and setup

ACTUATOR RECALIBRATION (C67)

Preferred Method (with Scan Tool)

NOTE: Do not operate any HVAC controls while the HVAC control module is calibrating as this may interrupt the process. If interrupted, improper HVAC performance will result.

1. Using a scan tool, perform the HVAC Actuators Learn in the HVAC Control Module.
2. Follow the scan tool directions to complete the procedure.
3. Operate the system and verify that no DTCs have set as current DTCs.
4. If DTC B101E 4B is set after attempting the actuator recalibration procedure, perform the following:
 1. Verify which actuator does not have a scan tool learn status parameter status of complete.
 2. Verify the unlearned actuator is physically rotating - A common cause of DTC B101E 4B is an actuator that is electrically OK but fails to physically rotate (e.g. stripped gears).
 3. If the unlearned actuator is not physically rotating, replace the actuator, otherwise replace the HVAC control module.

Alternate Method (without Scan Tool)

NOTE: Do not operate any HVAC controls while the HVAC control module is calibrating as this may interrupt the process. If interrupted, improper HVAC performance will result.

1. Ignition OFF/Vehicle OFF.
2. Remove the HVAC control module fuse for a minimum of 10 s.
3. Install the HVAC control module fuse.
4. Start the vehicle.
5. Wait 40 s for the HVAC control module to self-calibrate.

REPAIR INSTRUCTIONS

WIRE TO WIRE REPAIR - HVAC

Special Tools

- EL-38125-10 Splice Sleeve Crimping Tool
- J-38125-5A Ultra Torch Special Tool
- J-38125-8 Splice Sleeve Crimping Tool

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.

CAUTION: If the SIR/SRS wiring, connector, or terminal is damaged, the affected wiring harness must be replaced. Do not attempt to repair the wiring, connector, or terminals. Any attempt to repair the wires, connectors, or terminals could result in performance problems of the SIR/SRS System. Operations on restraint systems must only be performed by trained and qualified personnel.

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: Use only DuraSeal splice sleeves. Other splice sleeves may not protect the splice from moisture or provide a good electrical connection.

Use DuraSeal splice sleeves to form a one-to-one splice on all types of insulation except Tefzel and coaxial. 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 Color	Crimp Tool Nest Color		Wire Gauge mm ² / (American Wire Gauge (AWG))
	3 Crimp Nests	4 Crimp Nests	
Salmon (Yellow-Pink)	Red (1) or Red/Green (1)	Red (2)	0.5-0.8/(18-20)
Blue	Blue (2)	Blue (3)	1.0-2.0/(14-16)
Yellow	Yellow (3)	Yellow (4)	3.0-5.0/(10-12)

NOTE: Perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. 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. Extra wire length may be needed 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.
 - When the wire size is not known, 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.

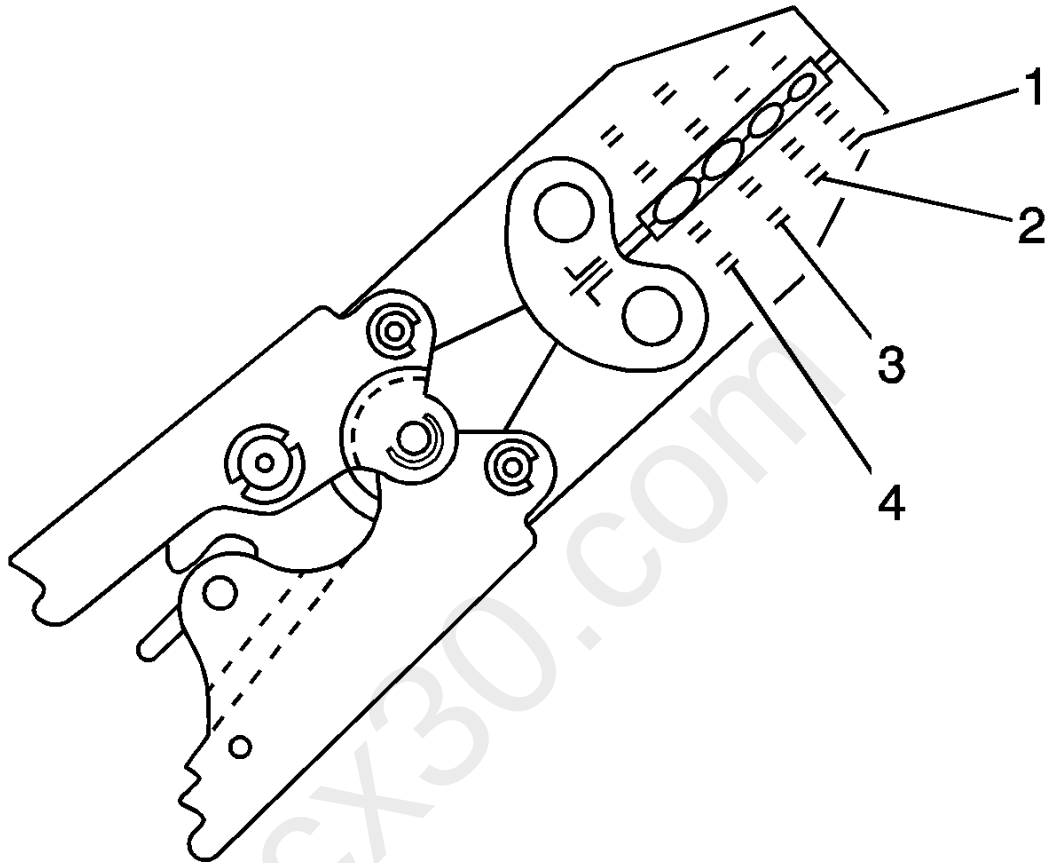


Fig. 9: Splice Sleeve Crimping Tool With 4 Crimp Nests
Courtesy of GENERAL MOTORS COMPANY

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.

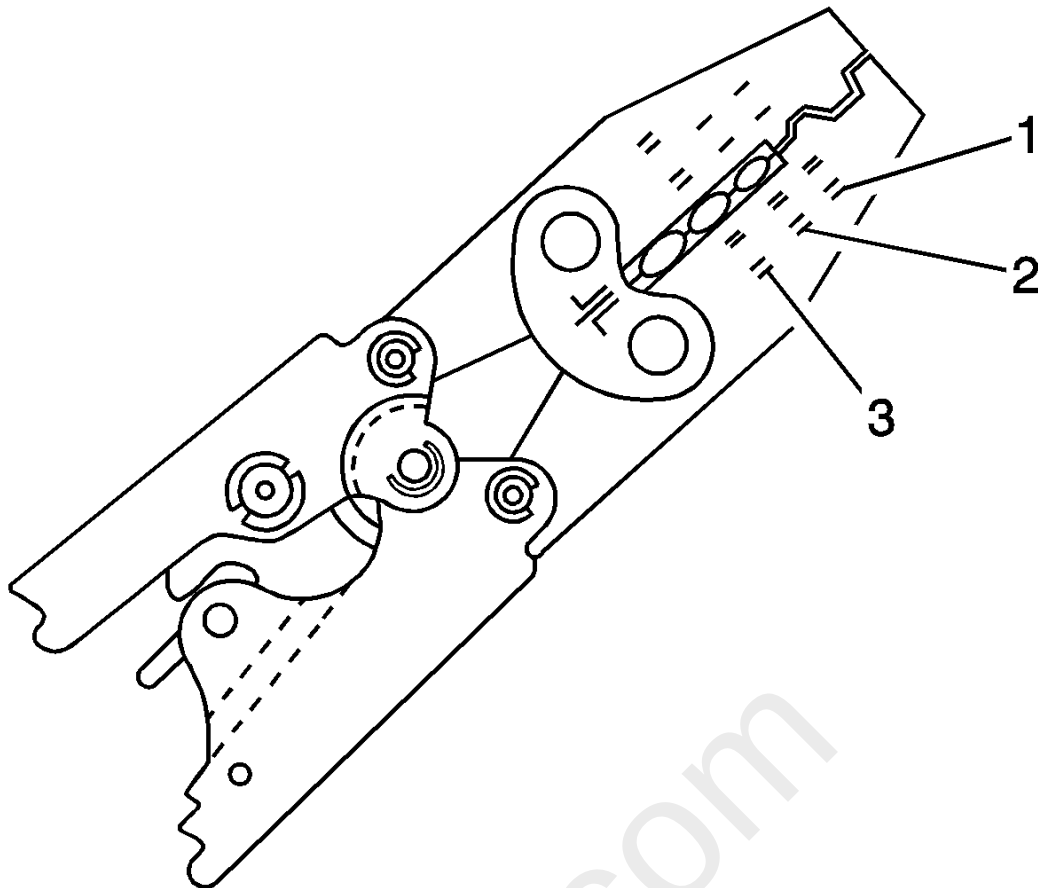


Fig. 10: Splice Sleeve Crimping Tool With 3 Crimp Nests
Courtesy of GENERAL MOTORS COMPANY

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).

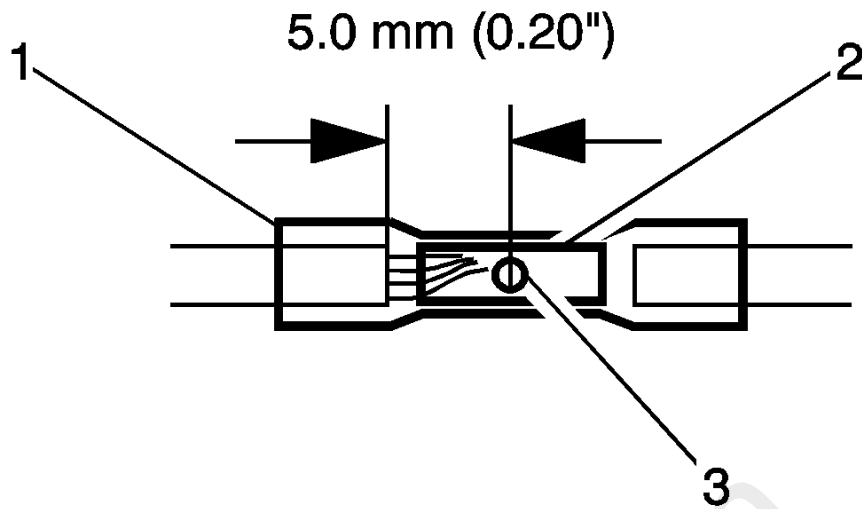


Fig. 11: Identifying DuraSeal Splice Sleeve
Courtesy of GENERAL MOTORS COMPANY

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. 12: 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.
11. Tightly close the handles of the crimp tool until the crimper handles open when released.

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



Fig. 13: 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.

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 - HVAC

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:

- Wiring broken inside the insulation
- Poor connection between the male and female terminal at a connector
- 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 micrometer can cause fretting. To put this in perspective, a sheet of paper is about 100 micrometer 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. 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 harness that is too close routed 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.

HEATER AND AIR CONDITIONING USER INTERFACE CONTROL REPLACEMENT (C67)

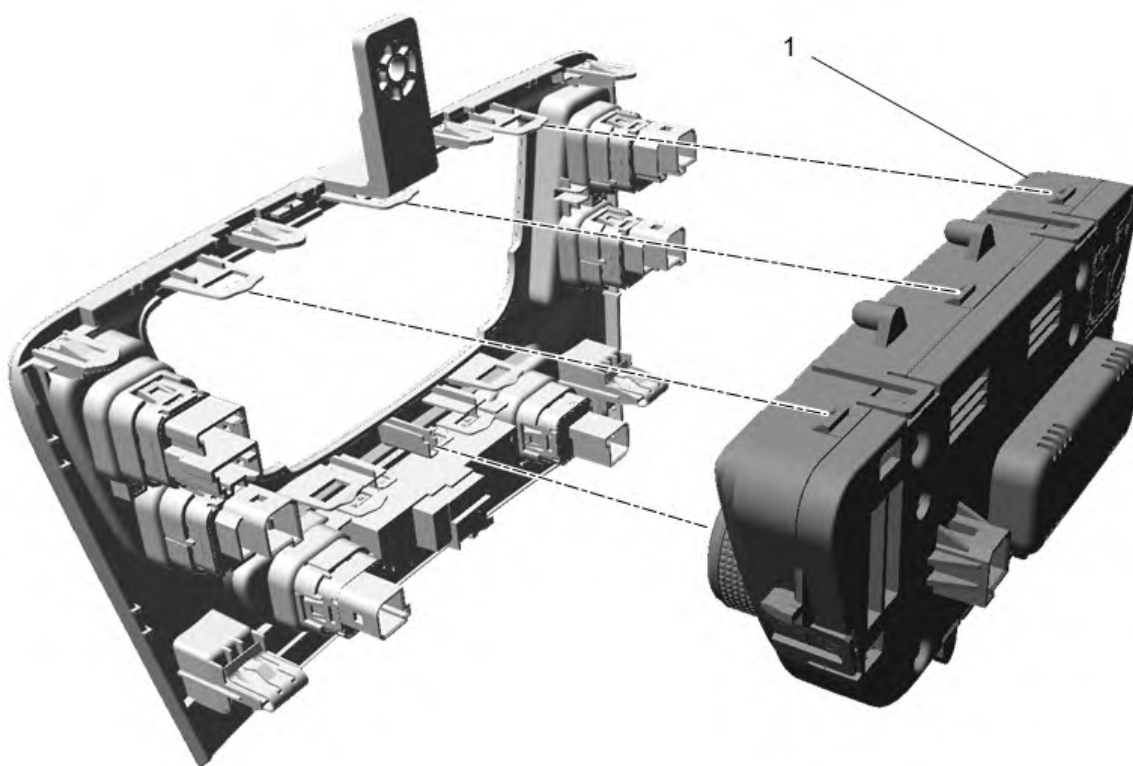


Fig. 14: Heater and Air Conditioning User Interface Control (C67).

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Instrument Panel Accessory Bezel. Refer to Instrument Panel Accessory Bezel Replacement (Buick) .	
1	Heater and Air Conditioning User Interface Control Procedure Un-latch the heater and air conditioning user interface control from the instrument panel accessory bezel.

HEATER AND AIR CONDITIONING REMOTE CONTROL REPLACEMENT (C67)



Fig. 15: Heater and Air Conditioning Remote Control (C67).
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Disconnect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection (without KL9), Battery Negative Cable Disconnection and Connection (with KL9). 2. Remove Heater and Air Conditioning User Interface Control. Refer to Heater and Air Conditioning User Interface Control Replacement	
1	Heater and Air Conditioning Remote Control NOTE: When reconnecting the heater and air conditioning remote module, the BROWN J2 connector must be connected last. Once all the parts are all in place, check and clear all DTCs in the heater and air conditioning remote control. Procedure 1. Un-latch the heater and air conditioning remote control from the Instrument panel and maneuver out from Instrument panel. 2. Connect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection (without KL9), Battery Negative Cable Disconnection and Connection (with KL9). 3. Perform the necessary programming and setup procedure: Control Module References 4. Clear the DTCs from the heater and air conditioning remote control module. 5. Perform the actuator calibration procedure. Refer to Actuator Recalibration (C67).

HEATER AND AIR CONDITIONING CONTROL WITH CABLE CONTROL REPLACEMENT (C60)

Removal Procedure

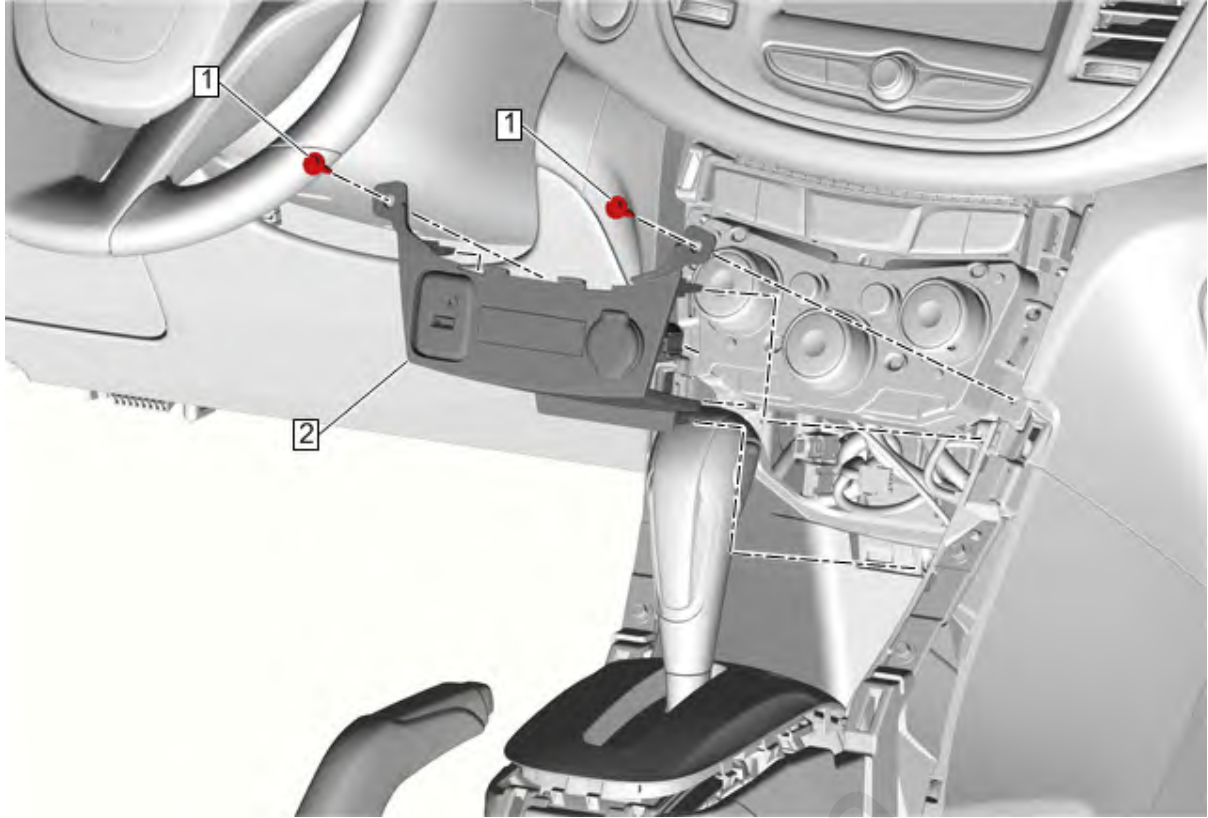


Fig. 16: Front Floor Lower Console (Chevrolet)
 Courtesy of GENERAL MOTORS COMPANY

1. Remove Front Floor Lower Console (2). Refer to [Front Floor Lower Console Replacement \(Chevrolet\)](#)



Fig. 17: Heater and Air Conditioning Control Bracket And Bolts
 Courtesy of GENERAL MOTORS COMPANY

2. Remove Heater and Air Conditioning Control Bracket Bolts (1) (Qty: 2)
3. Remove Heater and Air Conditioning Control Bracket (2)
4. Remove Temperature Control Cable @ Heater and Air Conditioning Control with Cable Control
5. Remove Mode Control Cable @ Heater and Air Conditioning Control with Cable Control
6. Disconnect the electrical connector.

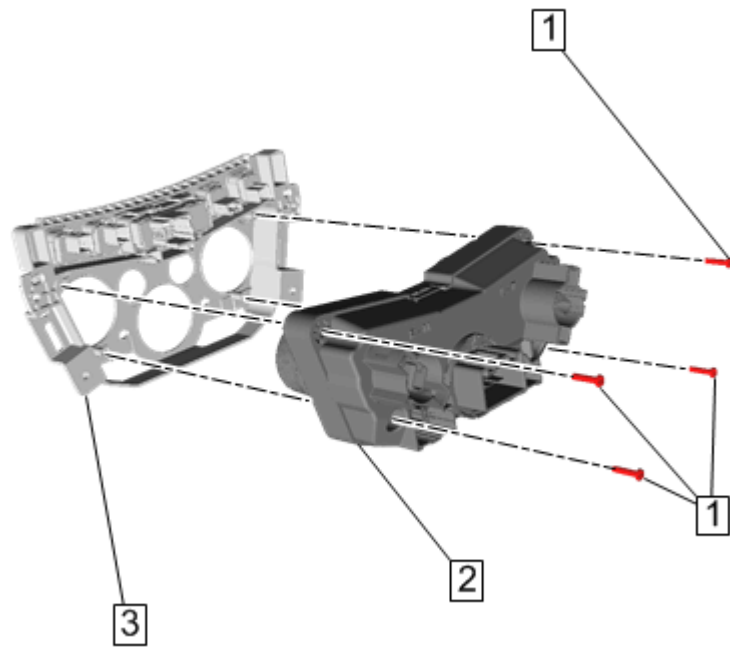


Fig. 18: Heater And Air Conditioning Control With Cable Control, Screws And Bracket
 Courtesy of GENERAL MOTORS COMPANY

7. Remove Heater and Air Conditioning Control Screws (1) (Qty: 4)
8. Remove Heater and Air Conditioning Control with Cable Control (2) @ Heater and Air Conditioning Control Bracket (3)

Installation Procedure

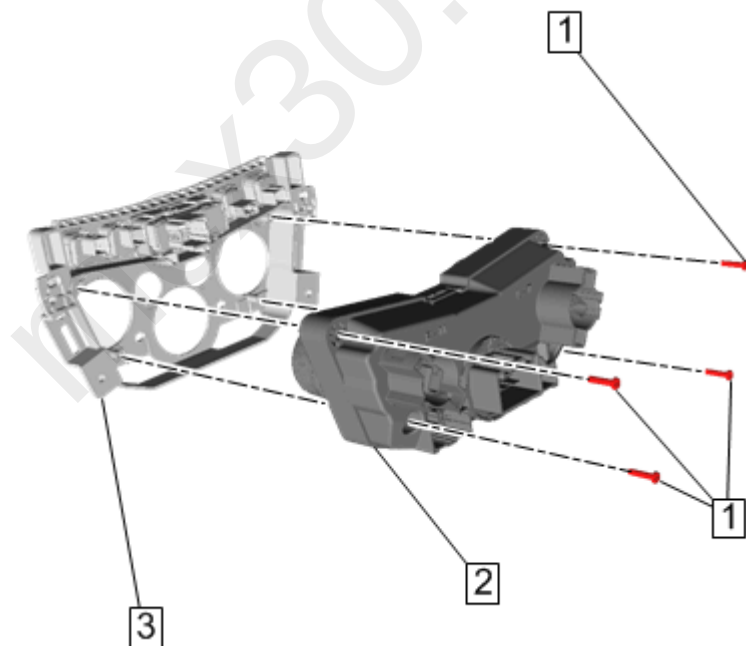


Fig. 19: Heater And Air Conditioning Control With Cable Control, Screws And Bracket
 Courtesy of GENERAL MOTORS COMPANY

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

1. Install Heater and Air Conditioning Control with Cable Control (2) @ Heater and Air Conditioning Control Bracket (3)
2. Install and tighten Heater and Air Conditioning Control Screws (1) (Qty: 4) to 1.0 N.m (9 lb in)



Fig. 20: Heater and Air Conditioning Control Bracket And Bolts
 Courtesy of GENERAL MOTORS COMPANY

3. Connect the electrical connector.
4. Install Mode Control Cable @ Heater and Air Conditioning Control with Cable Control
5. Install Temperature Control Cable @ Heater and Air Conditioning Control with Cable Control
6. Install Heater and Air Conditioning Control Bracket (2)
7. Install and tighten Heater and Air Conditioning Control Bracket Bolts (1) (Qty: 2) to 2.5 N.m (22 lb in).

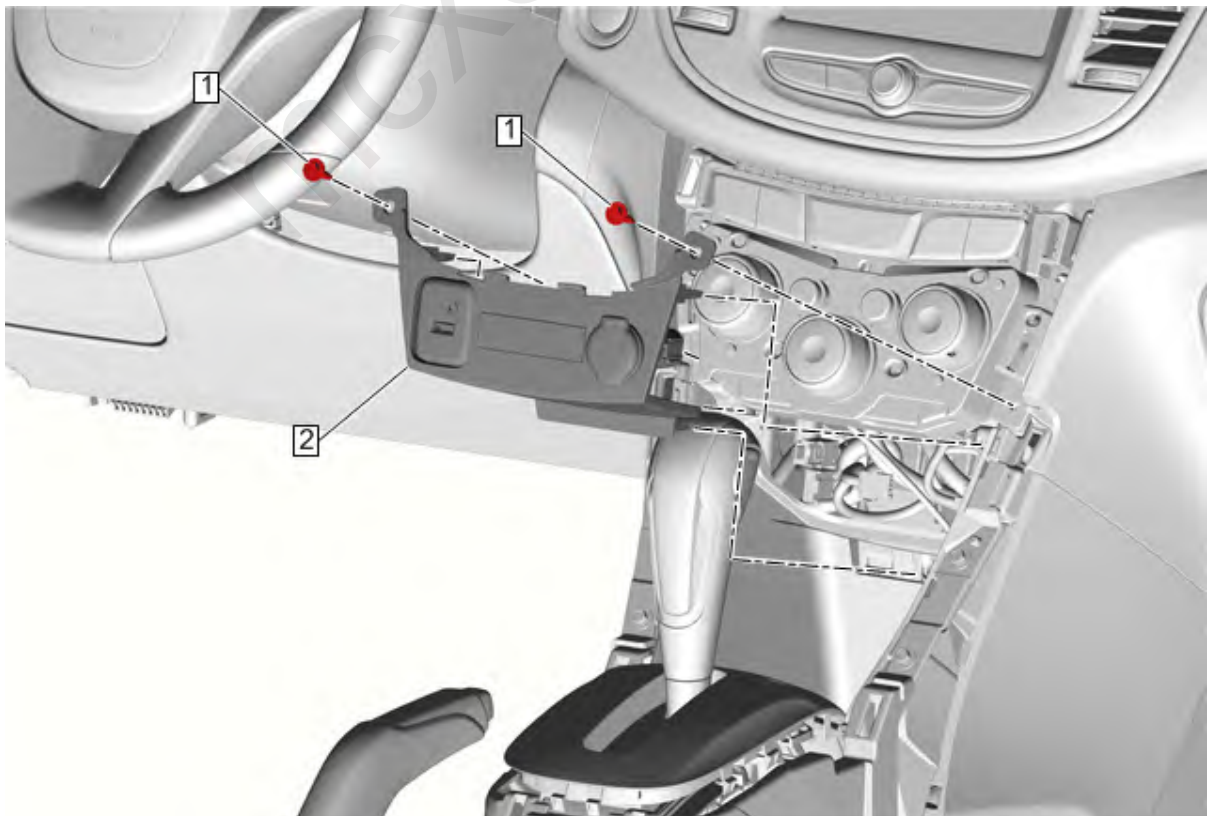


Fig. 21: Front Floor Lower Console (Chevrolet)
 Courtesy of GENERAL MOTORS COMPANY

8. Install Front Floor Lower Console (2). Refer to [Front Floor Lower Console Replacement \(Chevrolet\)](#)

TEMPERATURE CONTROL CABLE REPLACEMENT (C60)

Removal Procedure

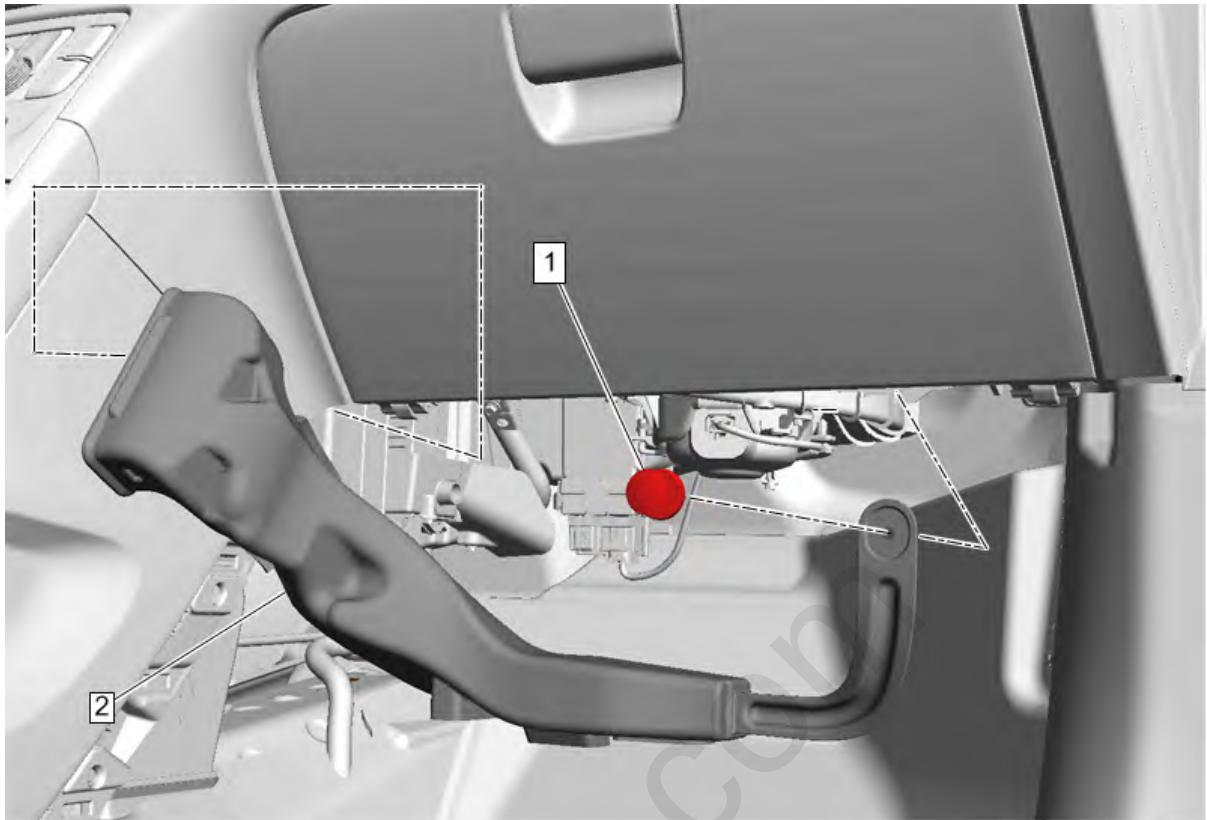
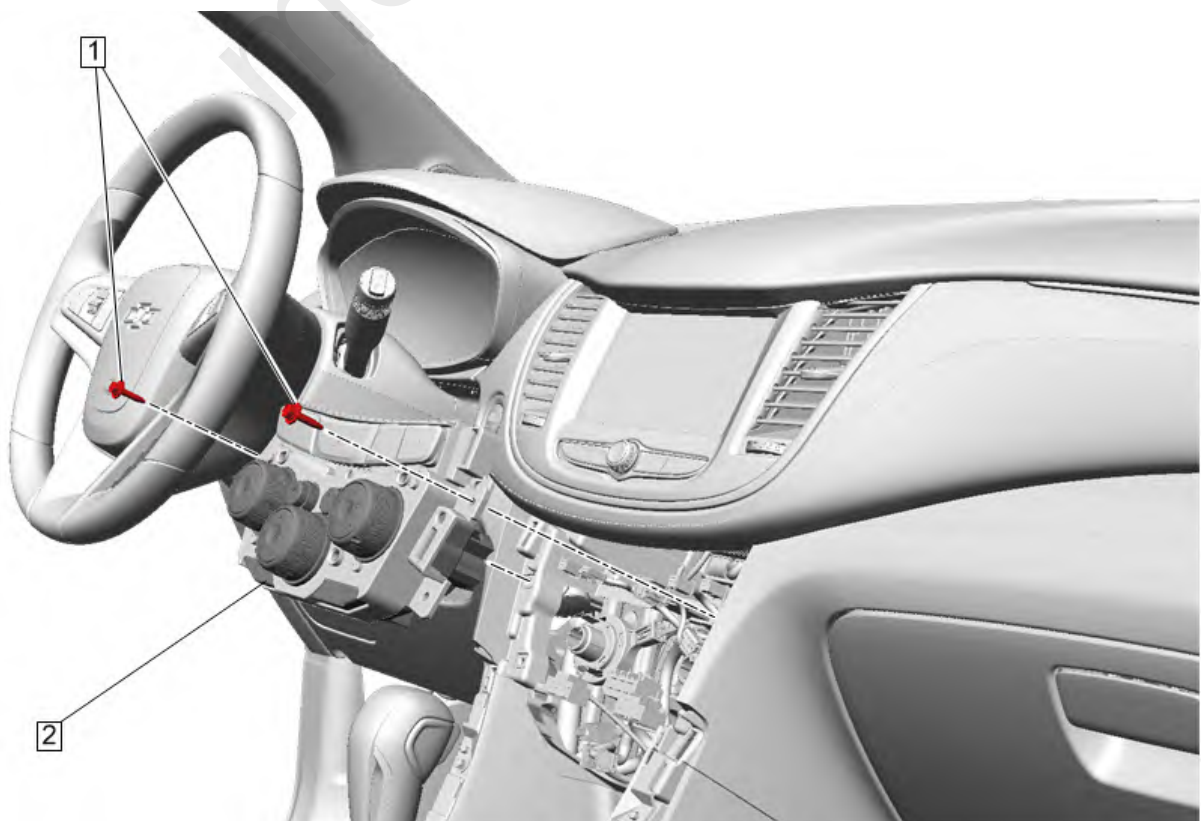


Fig. 22: Floor Front Air Outlet Duct - Right Side
Courtesy of GENERAL MOTORS COMPANY

1. Remove Floor Air Outlet Duct - Right (2). Refer to [Floor Front Air Outlet Duct Replacement - Right Side](#)
2. Remove Instrument Panel Compartment. Refer to [Instrument Panel Compartment Replacement](#)



3. Remove Heater and Air Conditioning Control with Cable Control (2). Refer to **Heater and Air Conditioning Control with Cable Control Replacement (C60)**.

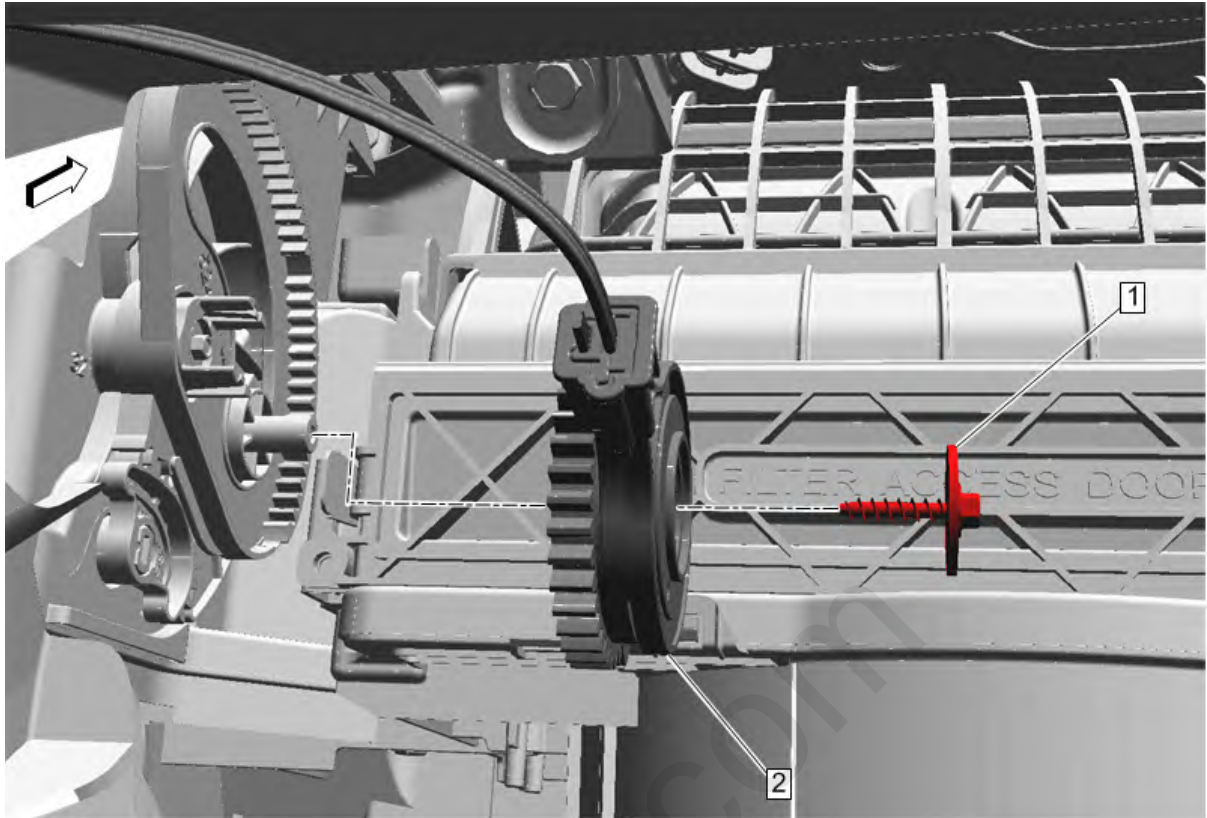


Fig. 24: Temperature Control Cable And Temperature Valve Gear
Courtesy of GENERAL MOTORS COMPANY

4. Remove the temperature control cable retaining screw (1) and the temperature control cable (2) from the heater and air conditioning evaporator and blower module.

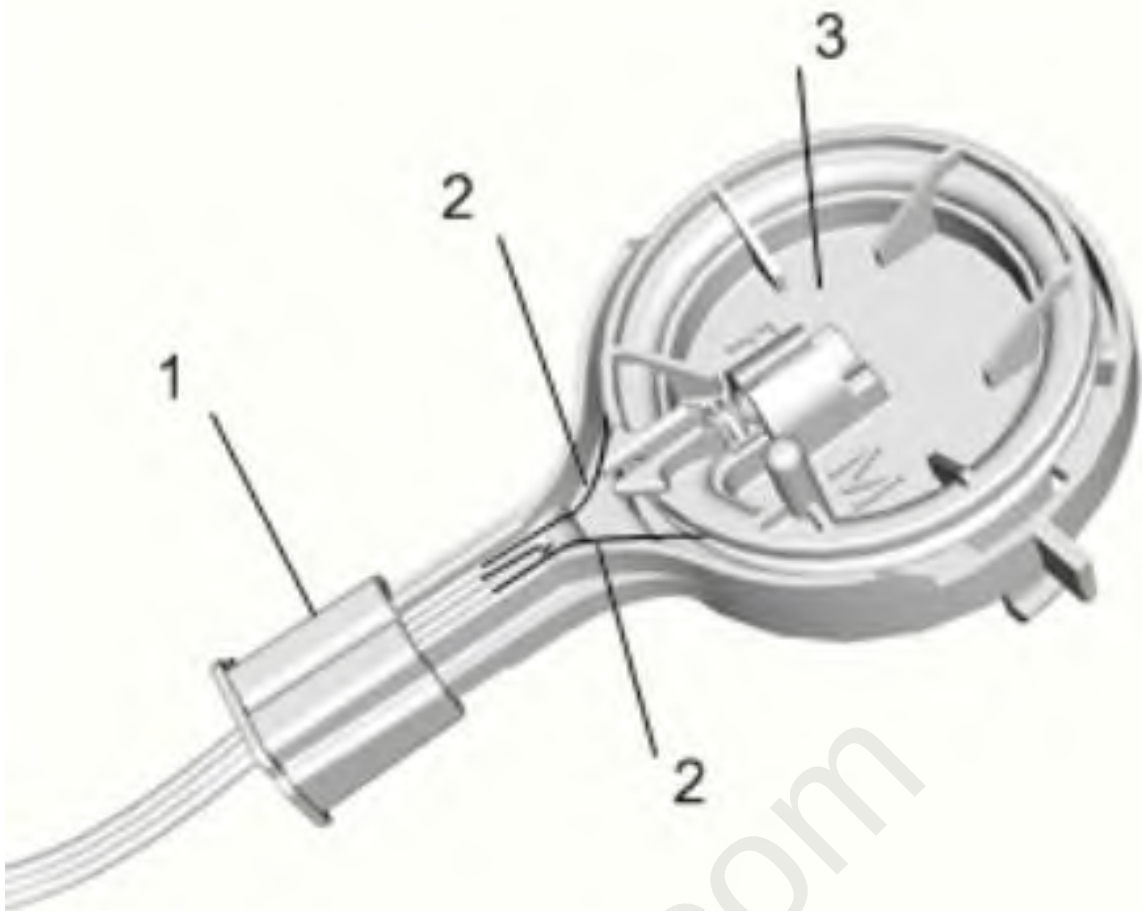


Fig. 25: Identifying Temperature Control Cable Pulley, Cable Retainer And Wire
Courtesy of GENERAL MOTORS COMPANY

NOTE: When replacing the temperature control cable, perform step 5, 6, and 7 in order to remove the temperature control cable without the removal of the instrument panel tie bar.

5. Remove the temperature control cable pulley (3) from heater and air conditioning control side cable end and release the cable retainer (1).
6. Remove the wire (2) from the temperature control cable pulley groove (3).

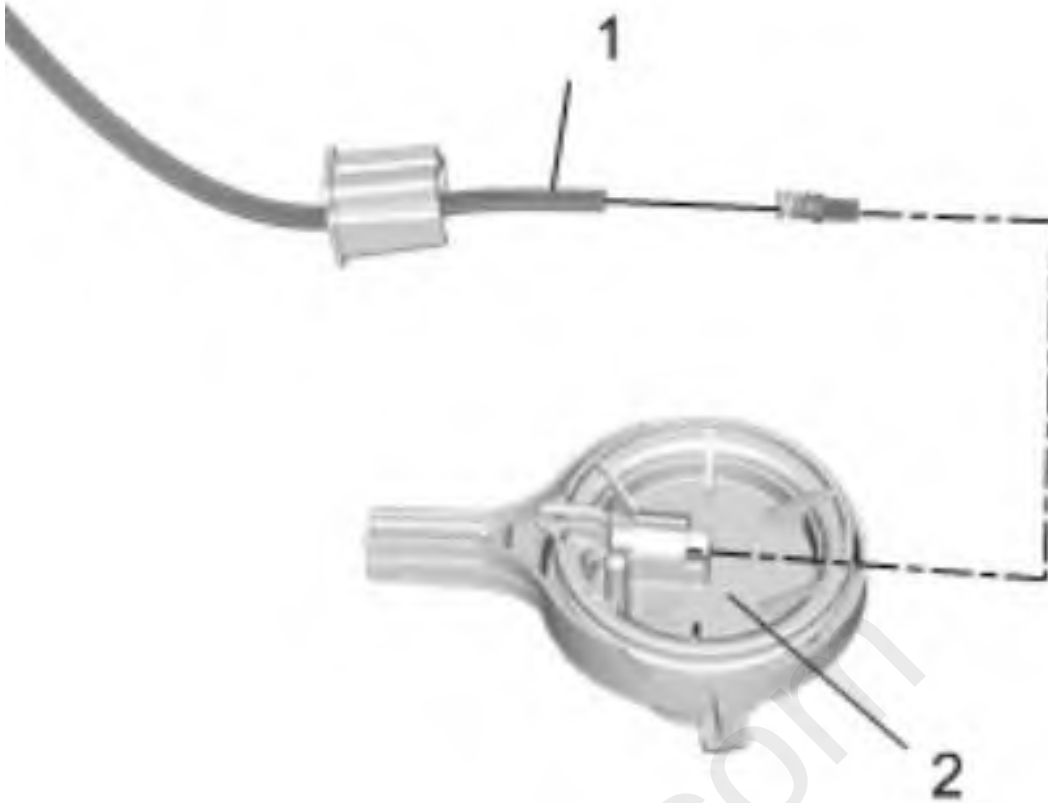


Fig. 26: Identifying Temperature Control Cable And Pulley.
Courtesy of GENERAL MOTORS COMPANY

7. Move the temperature control cable barrel (3) forward out of the pulley (2) detent, and slip the cable out of the detent to remove the temperature control cable assembly (1) from the pulley (2).
8. Maneuver the temperature control cable out from behind the tie bar and the instrument panel.

Installation Procedure

1. Route the temperature control cable behind the instrument panel and the tie bar.

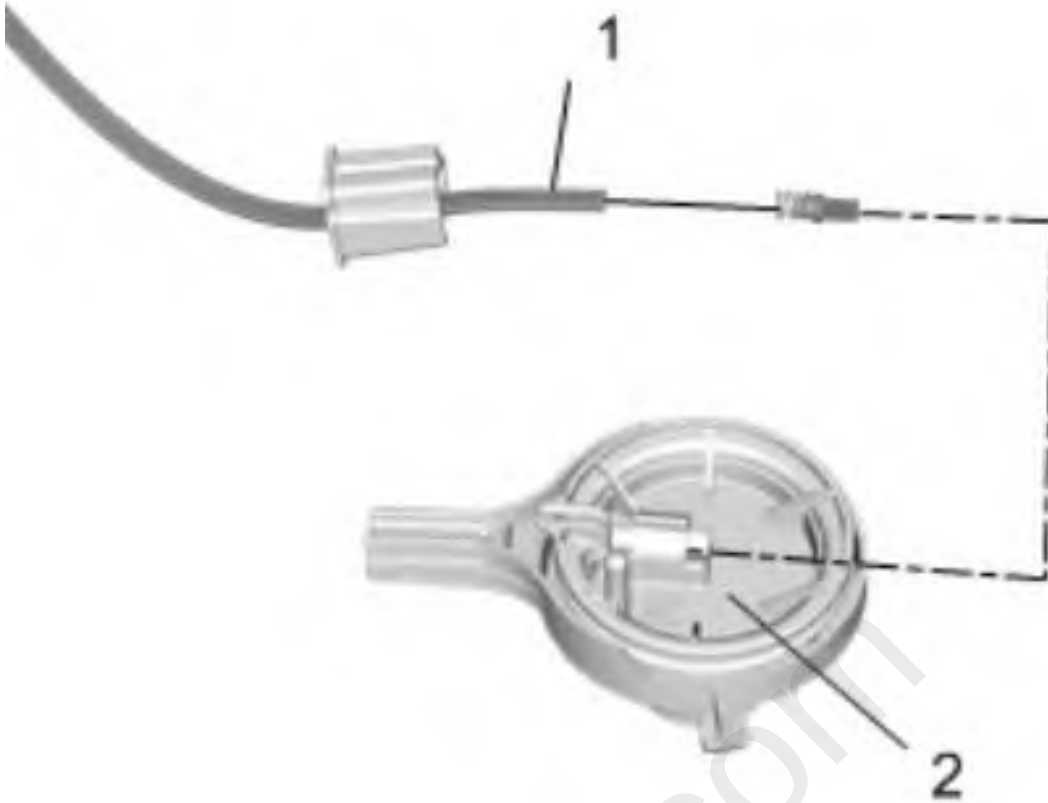


Fig. 27: Identifying Temperature Control Cable And Pulley.

Courtesy of GENERAL MOTORS COMPANY

NOTE: When installing the temperature control cable, do not twist the cable wire.

2. Insert the cable into the detent, move the cable barrel (3) back into the detent to secure the cable to the pulley, (2) to install the temperature control cable assembly (1) to the pulley.

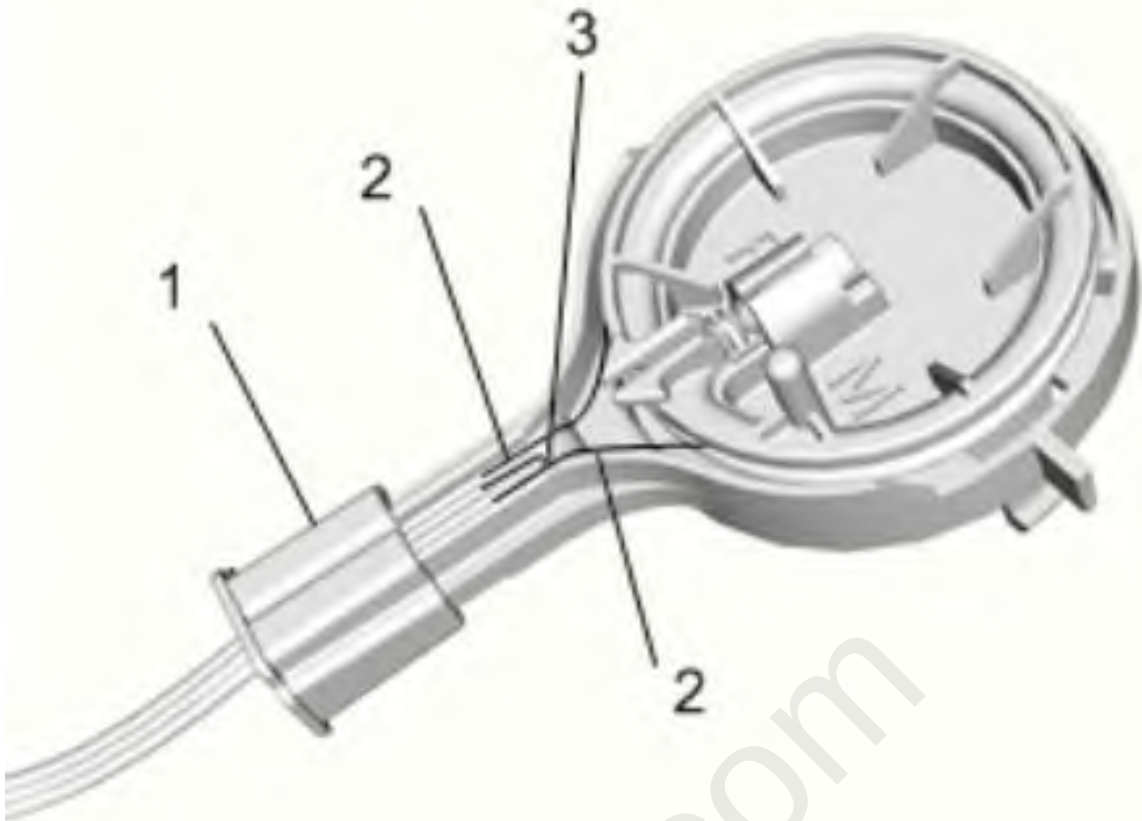


Fig. 28: Routing Wire Around Temperature Control Cable Pulley Groove
Courtesy of GENERAL MOTORS COMPANY

3. Route the wire (2) around the temperature control cable pulley groove.
4. Insert the center wire (3) in the hole of pulley.

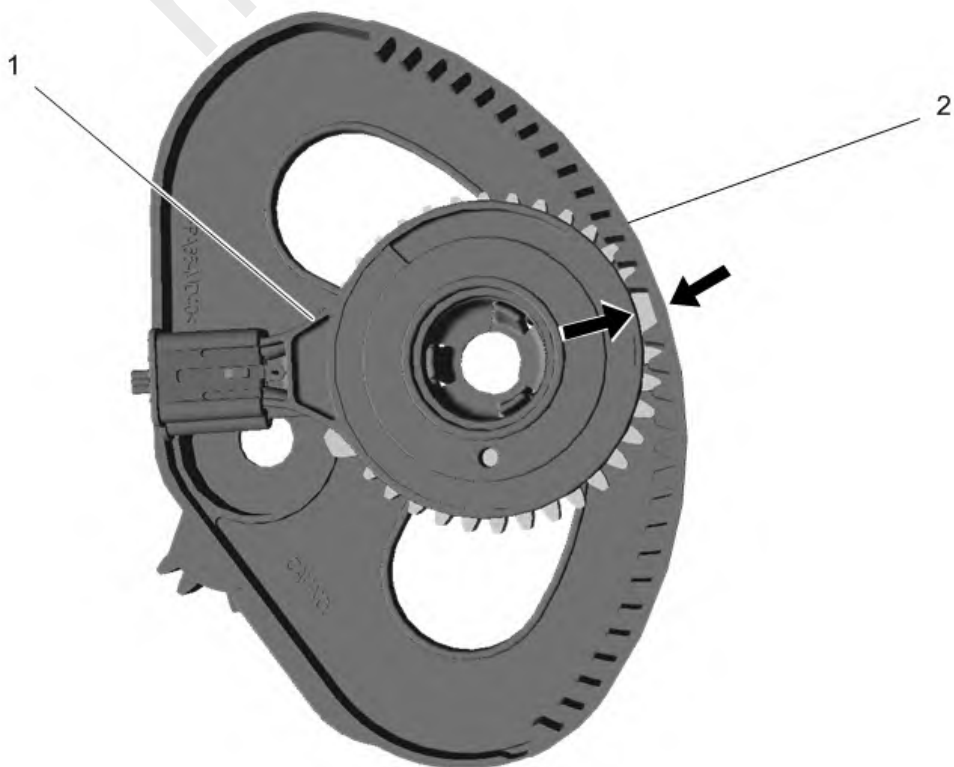


Fig. 29: Temperature Valve Gear And Temperature Control Cable Gear
Courtesy of GENERAL MOTORS COMPANY

5. Upon re-assembly index the temperature valve gear (1) large female tooth to temperature control cable gear (2) large male tooth as indicated by the arrows for proper alignment.

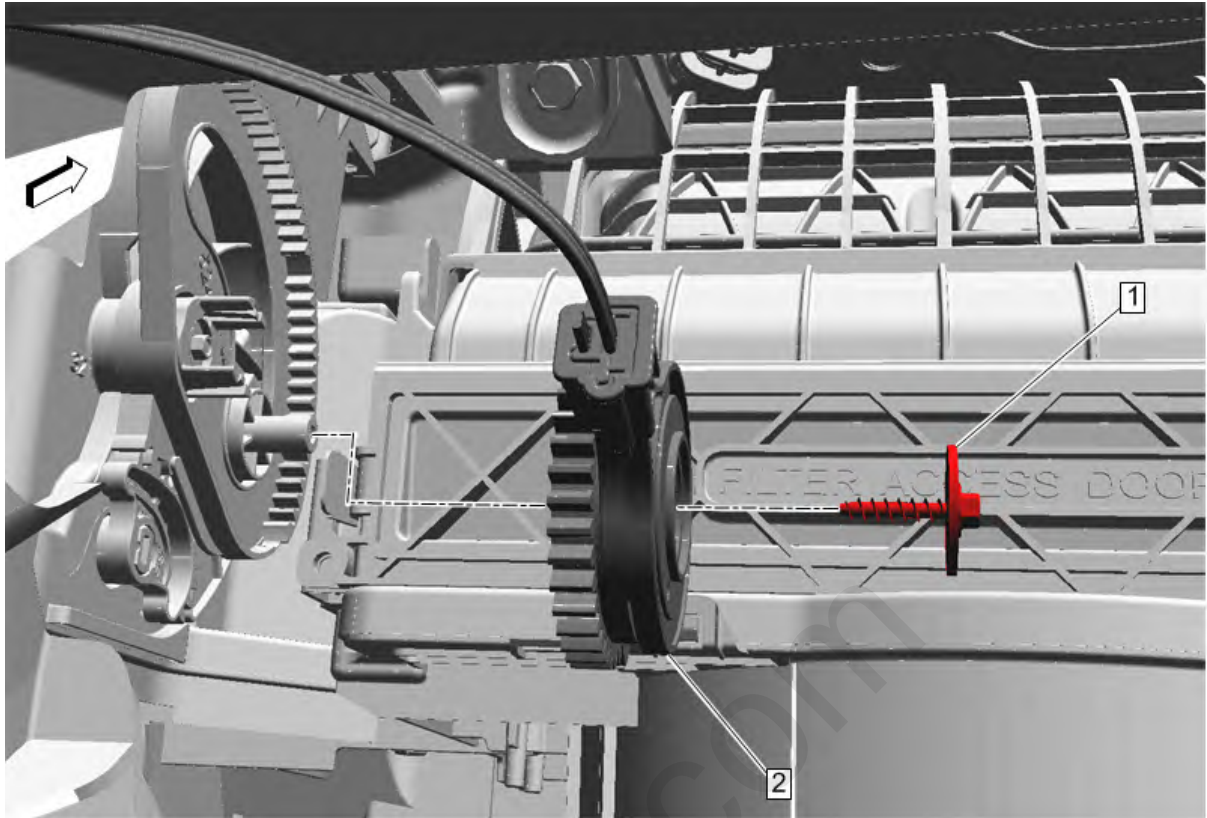


Fig. 30: Temperature Control Cable And Temperature Valve Gear
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution**.

6. Install the temperature control cable retaining screw (1) and the temperature control cable (2) onto the heater and air conditioning evaporator and blower module and tighten the screw to 2 N.m (18 lb in).

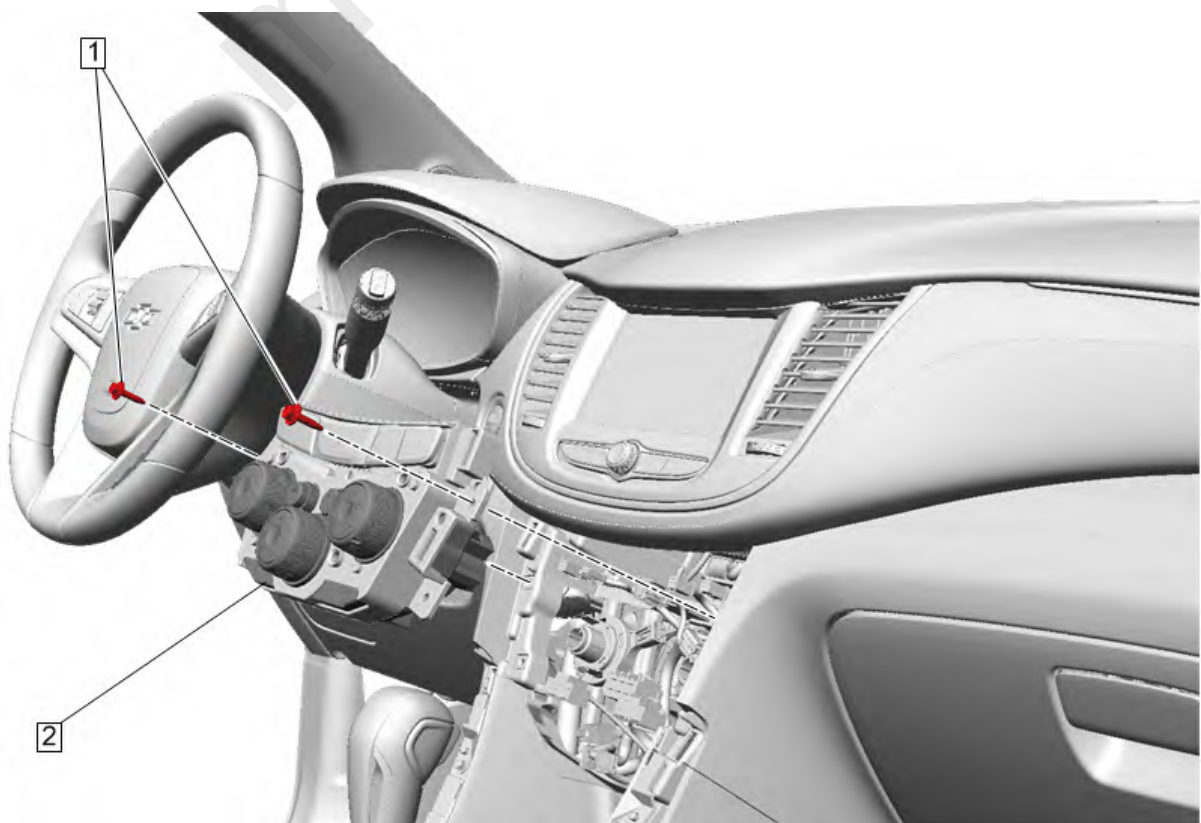


Fig. 31: Heater and Air Conditioning Control Bracket And Bolts
Courtesy of GENERAL MOTORS COMPANY

7. Install Heater and Air Conditioning Control with Cable Control (2). Refer to **Heater and Air Conditioning Control with Cable Control Replacement (C60)**.
8. Install Instrument Panel Compartment. Refer to **Instrument Panel Compartment Replacement**

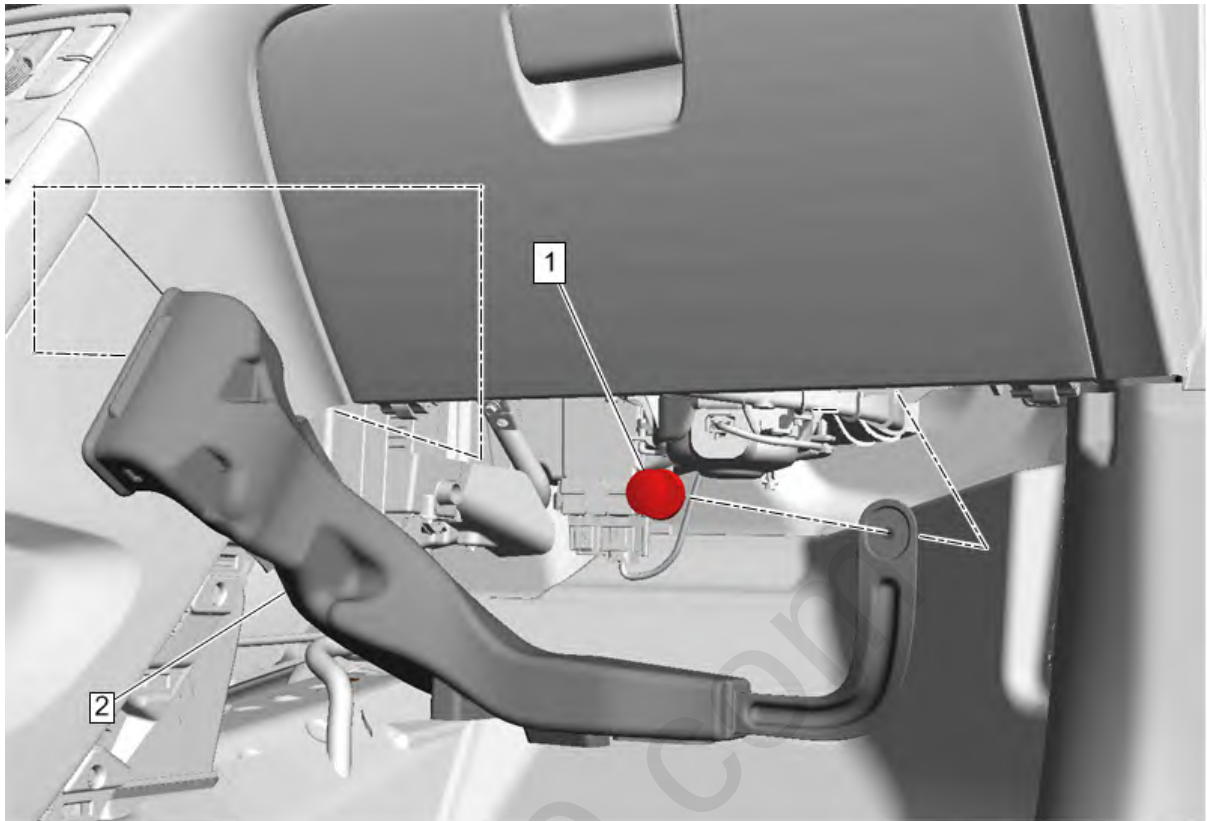


Fig. 32: Floor Front Air Outlet Duct - Right Side
Courtesy of GENERAL MOTORS COMPANY

9. Install Floor Air Outlet Duct - Right (2). Refer to **Floor Front Air Outlet Duct Replacement - Right Side**

MODE CONTROL CABLE REPLACEMENT (C60)

Removal Procedure

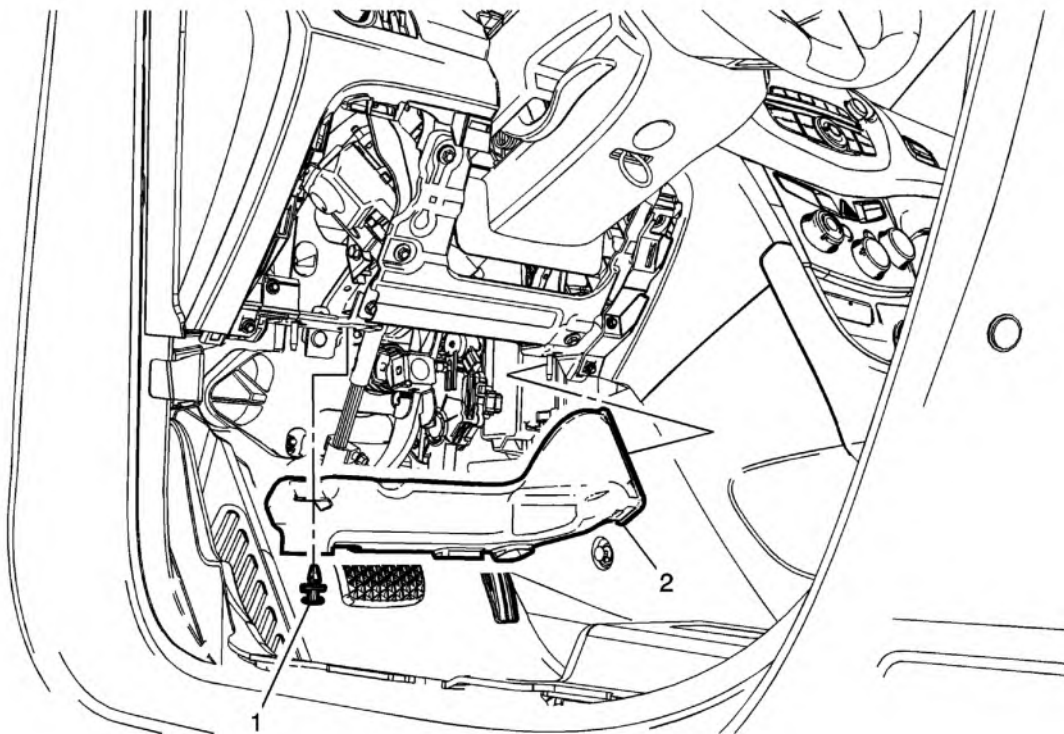


Fig. 33: Floor Front Air Outlet Duct - Left Side (Trax)

Courtesy of GENERAL MOTORS COMPANY

1. Remove Floor Air Outlet Duct (2). Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#).

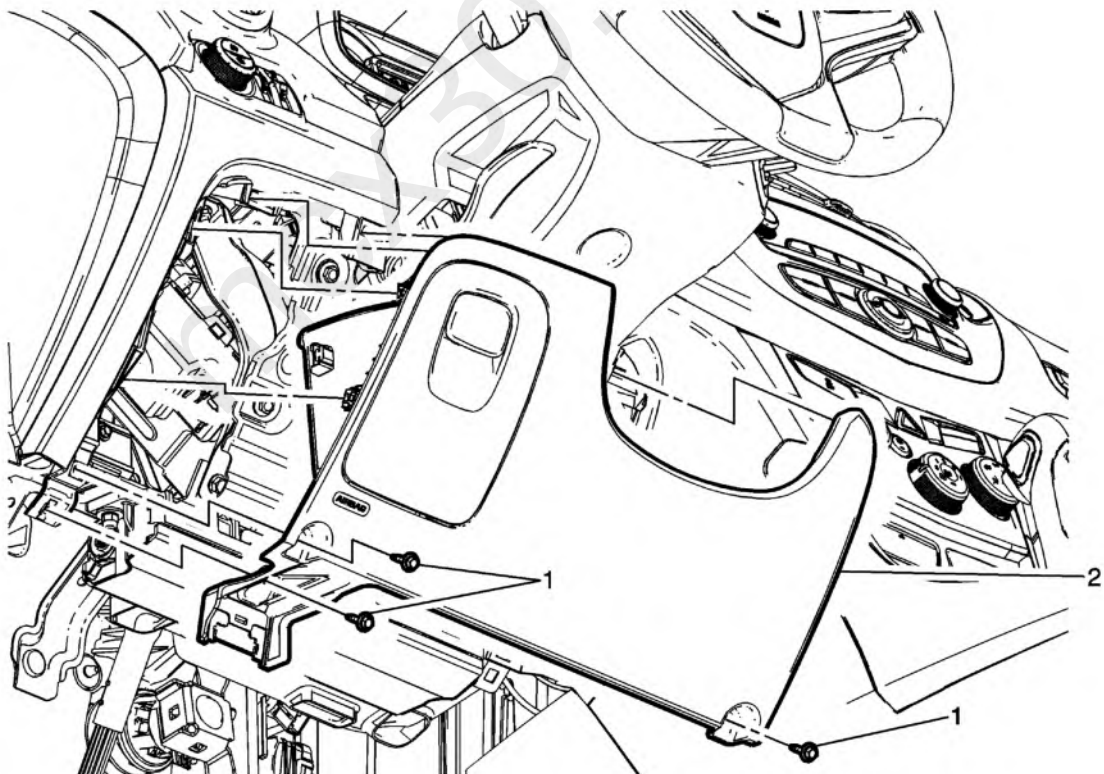


Fig. 34: Instrument Panel Knee Bolster (Trax)

Courtesy of GENERAL MOTORS COMPANY

2. Remove Instrument Panel Knee Bolster (2). Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#).



Fig. 35: Heater and Air Conditioning Control Bracket And Bolts
 Courtesy of GENERAL MOTORS COMPANY

3. Remove Heater and Air Conditioning Control with Cable Control (2). Refer to [Heater and Air Conditioning Control with Cable Control Replacement \(C60\)](#).

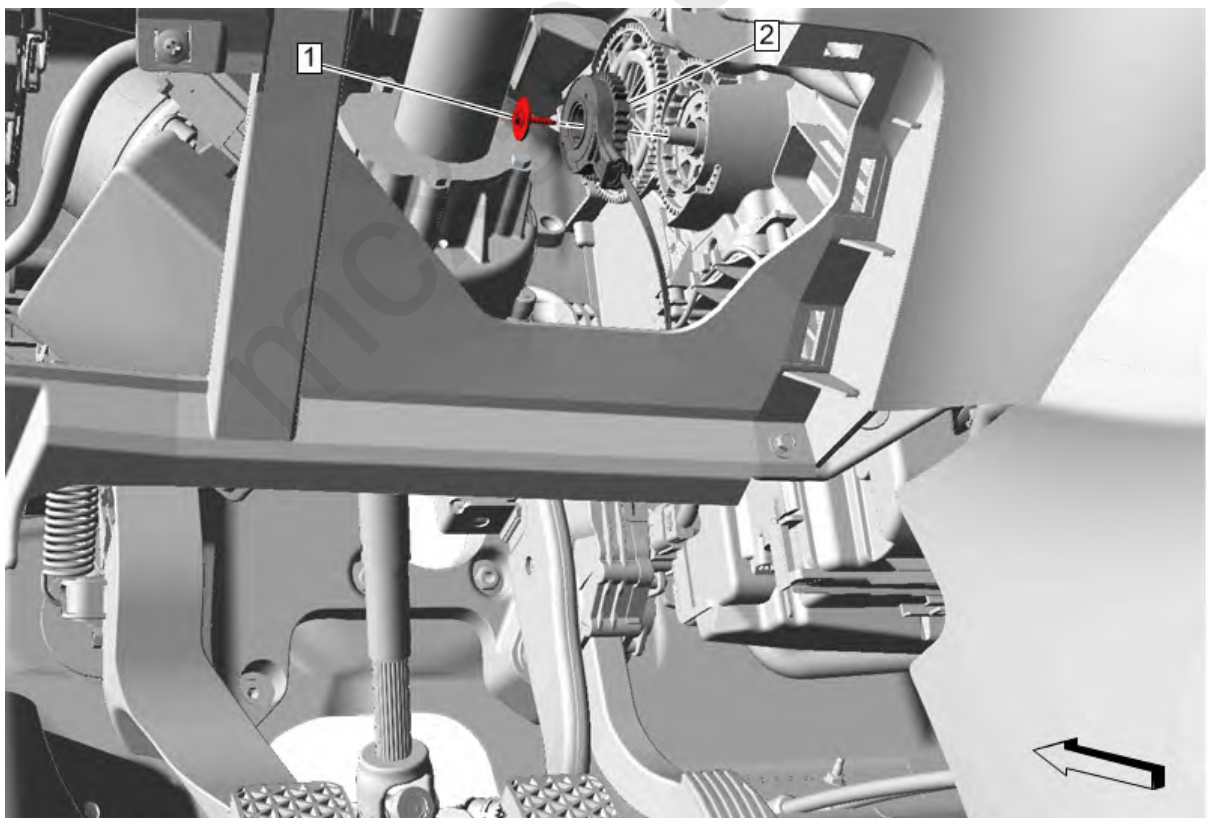


Fig. 36: Mode Control Cable And Retaining Screw
 Courtesy of GENERAL MOTORS COMPANY

4. Remove the mode control cable retaining screw (1) and the mode control cable (2) from the heater and air conditioning evaporator and blower module.

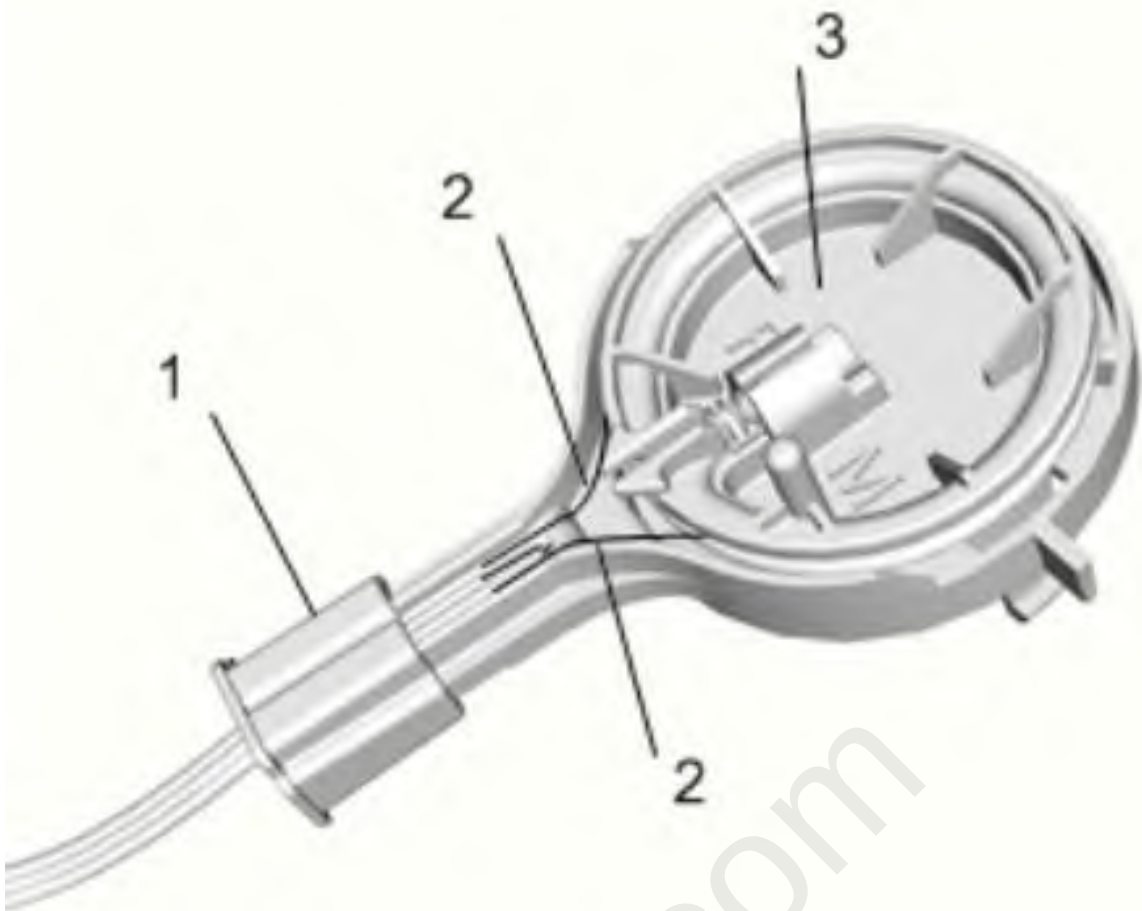


Fig. 37: Identifying Temperature Control Cable Pulley, Cable Retainer And Wire
Courtesy of GENERAL MOTORS COMPANY

NOTE: When replacing the mode control cable, perform step 5, 6, and 7 in order to remove the mode control cable without the removal of the instrument panel tie bar.

5. Remove the mode control cable pulley (3) from heater and air conditioning evaporator and blower module control side cable end, and release the cable retainer (1).
6. Remove the wire (2) from the mode control cable pulley groove (3).

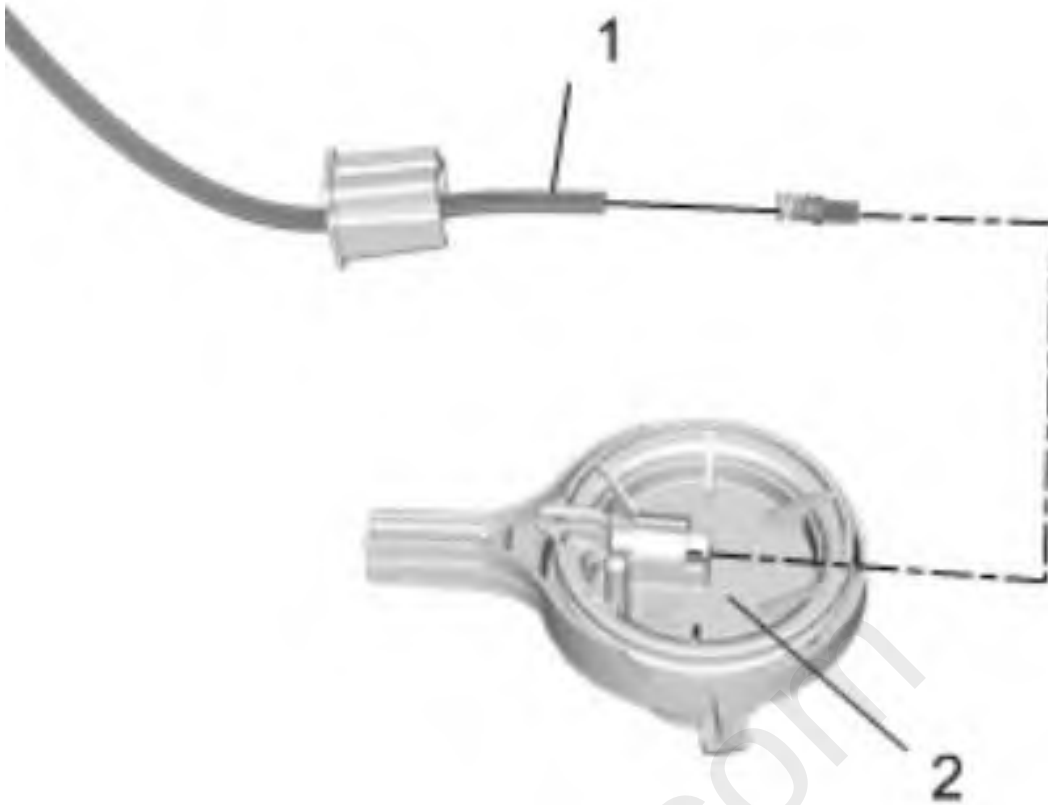
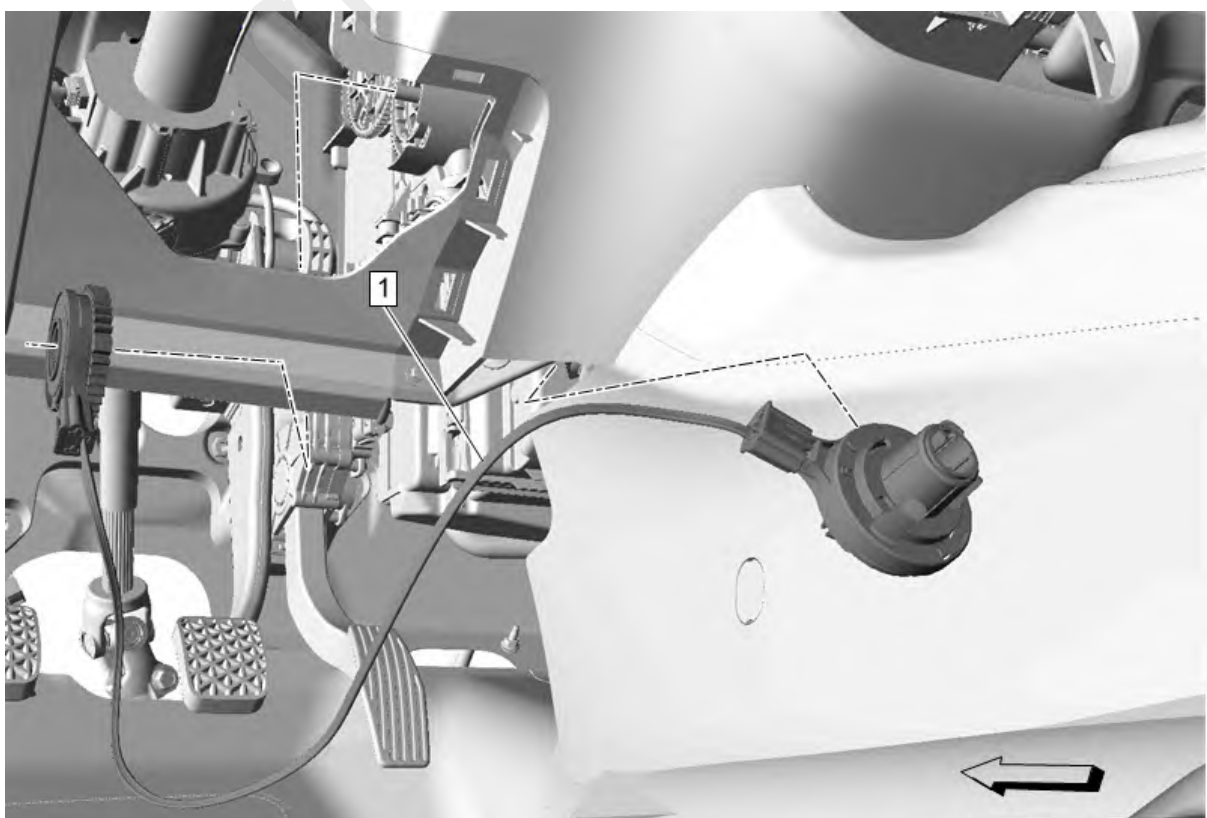


Fig. 38: Identifying Temperature Control Cable And Pulley.
 Courtesy of GENERAL MOTORS COMPANY

7. Move the mode control cable barrel (3) forward out of the pulley (2) detent, and slip the cable out of the detent to remove the mode control cable assembly (1) from the pulley (2).



8. Maneuver the mode control cable (1) out from behind the tie bar and the instrument panel.

Installation Procedure

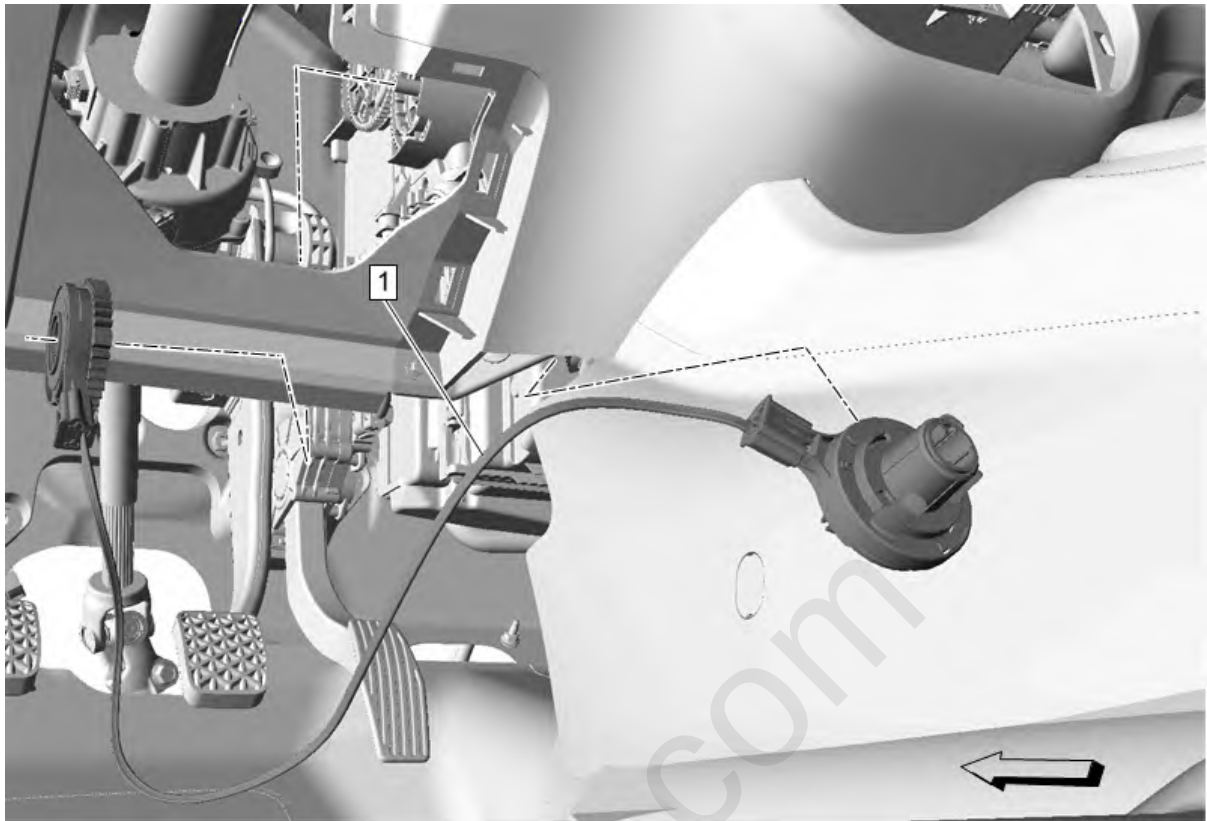


Fig. 40: Mode Control Cable
Courtesy of GENERAL MOTORS COMPANY

1. Route the mode control cable (1) behind the instrument panel and the tie bar.

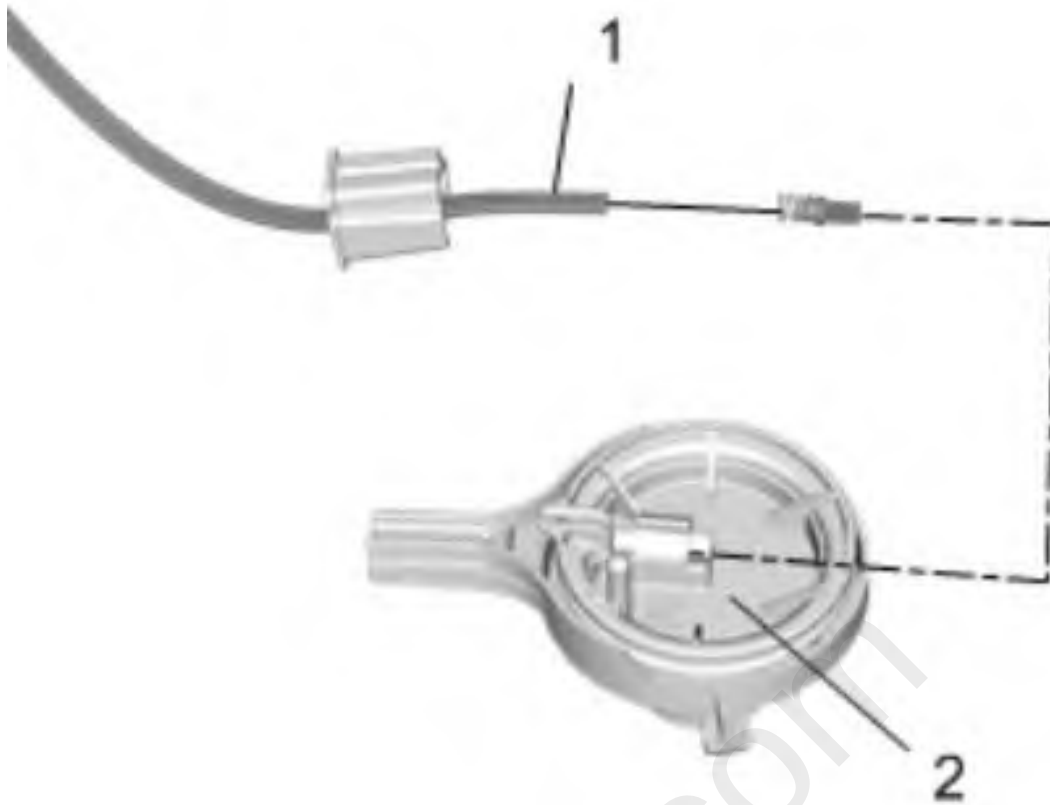


Fig. 41: Identifying Temperature Control Cable And Pulley.

Courtesy of GENERAL MOTORS COMPANY

NOTE: When installing the mode control cable, do not twist the cable wire.

2. Insert the cable into the detent, move the cable barrel (3) back into the detent to secure the cable to the pulley, (2) to install the mode control cable assembly (1) to the pulley.

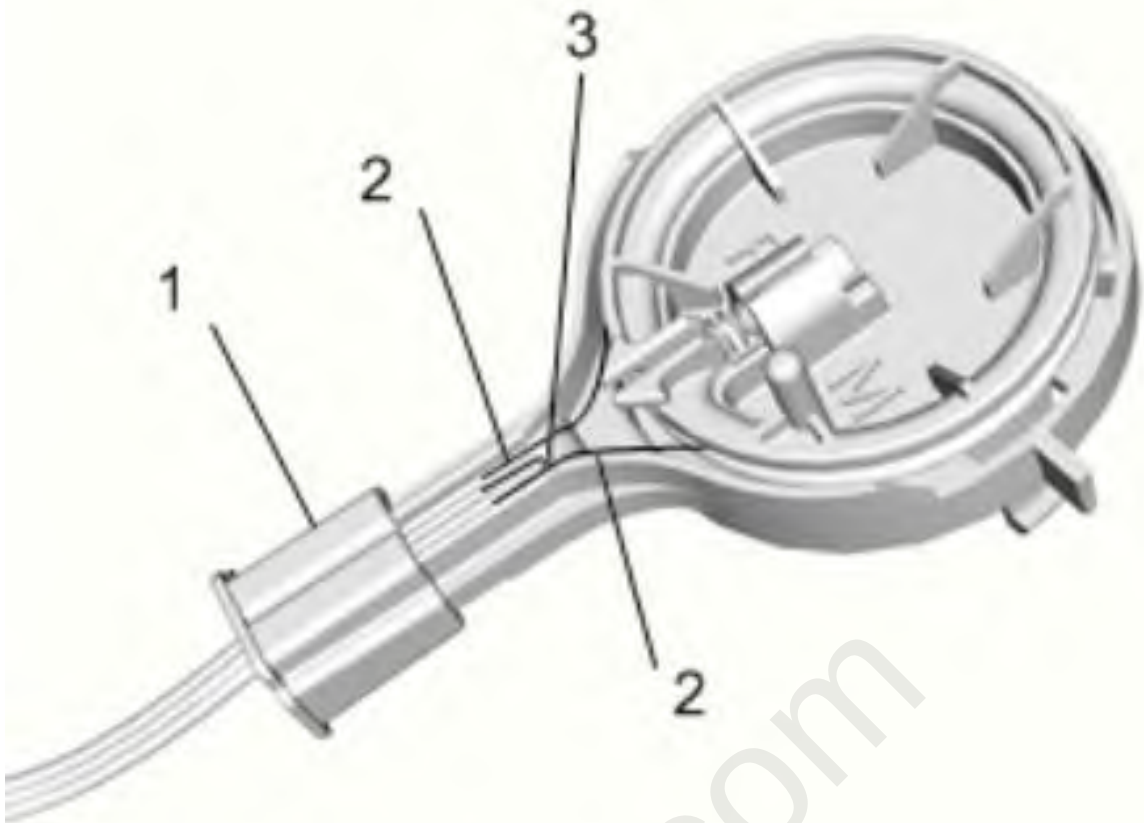
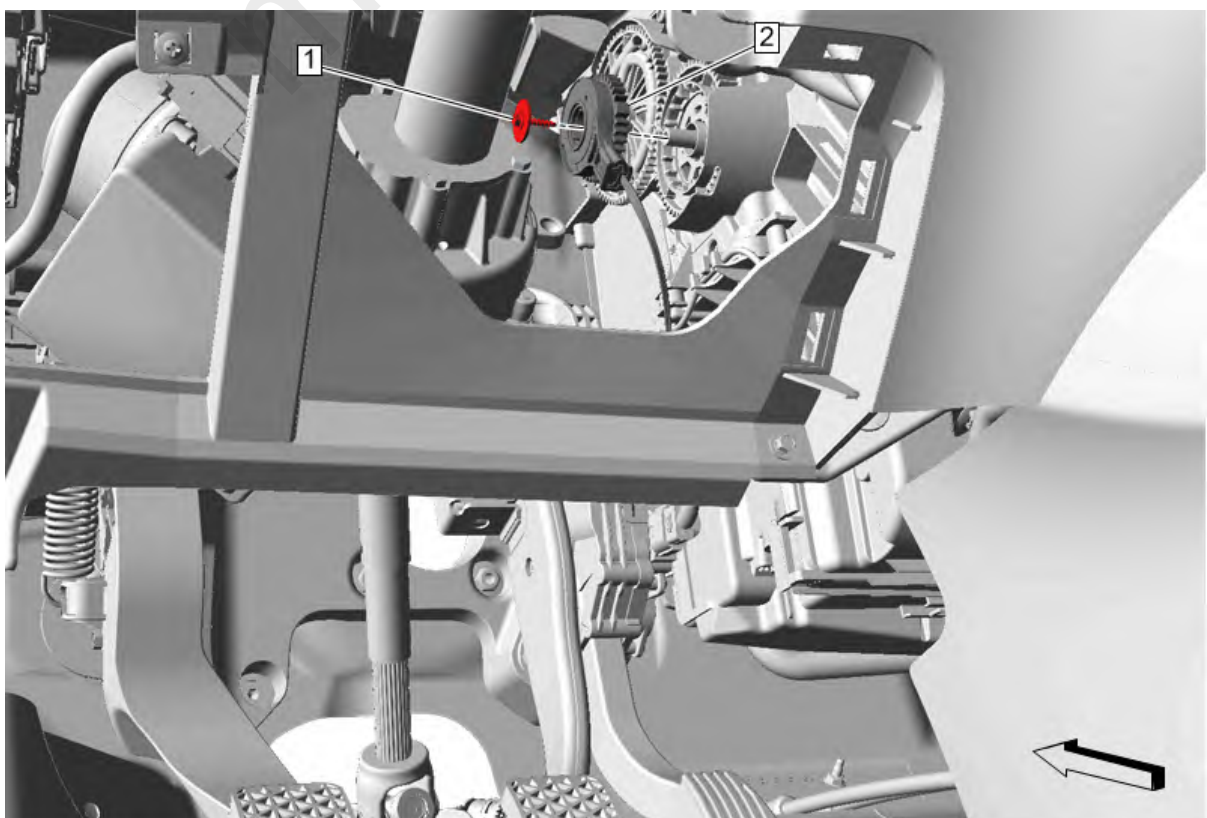


Fig. 42: Routing Wire Around Temperature Control Cable Pulley Groove
Courtesy of GENERAL MOTORS COMPANY

3. Route the wire (2) around the mode control cable pulley groove.
4. Insert the center wire (3) into the hole of pulley.



CAUTION: Refer to **Fastener Caution** .

5. Install the mode control cable retaining screw (1) and the mode control cable (2) onto the heater and air conditioning evaporator and blower module and tighten the screw to 2 N.m (18 lb in).

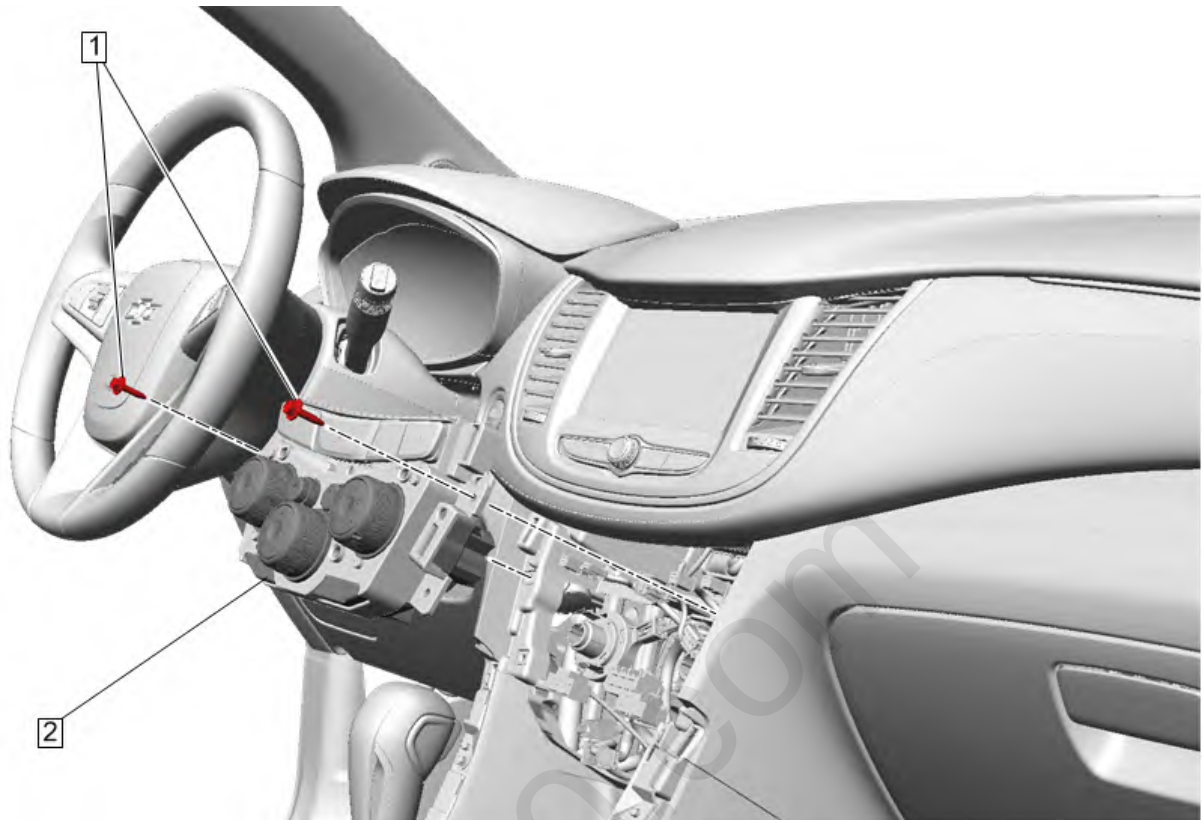


Fig. 44: Heater and Air Conditioning Control Bracket And Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Install Heater and Air Conditioning Control with Cable Control (2). Refer to **Heater and Air Conditioning Control with Cable Control Replacement (C60)**.

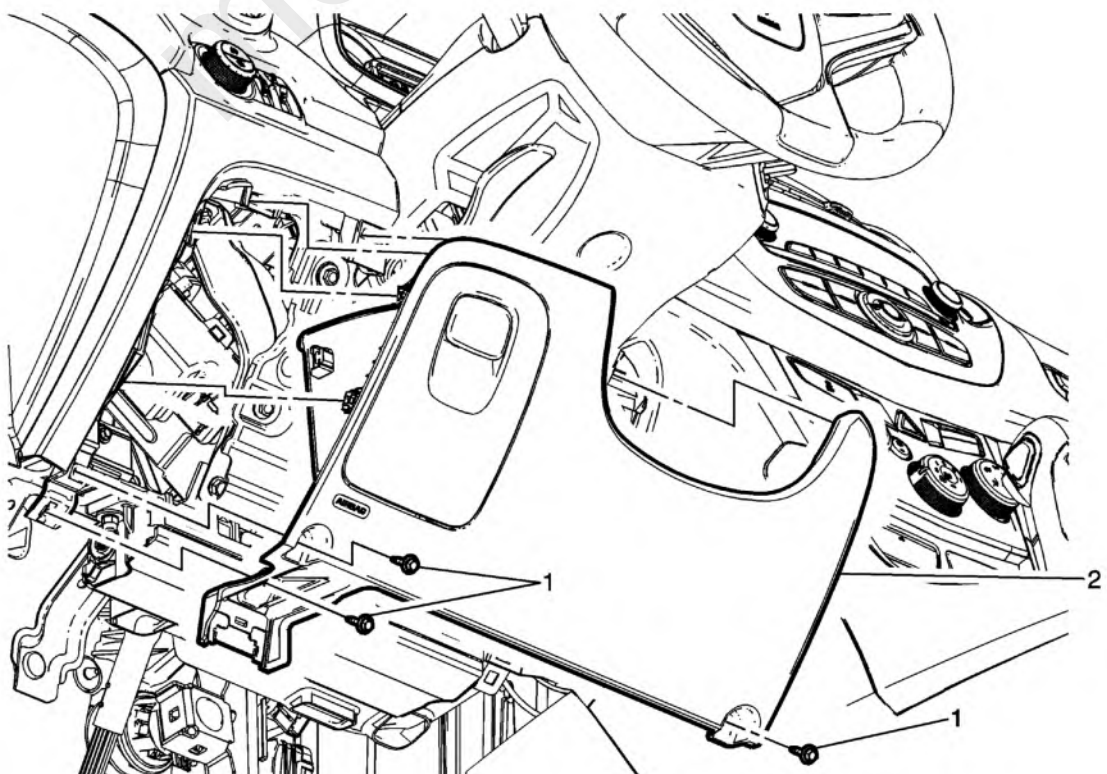


Fig. 45: Instrument Panel Knee Bolster (Trax)
Courtesy of GENERAL MOTORS COMPANY

7. Install Instrument Panel Knee Bolster (2). Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#).

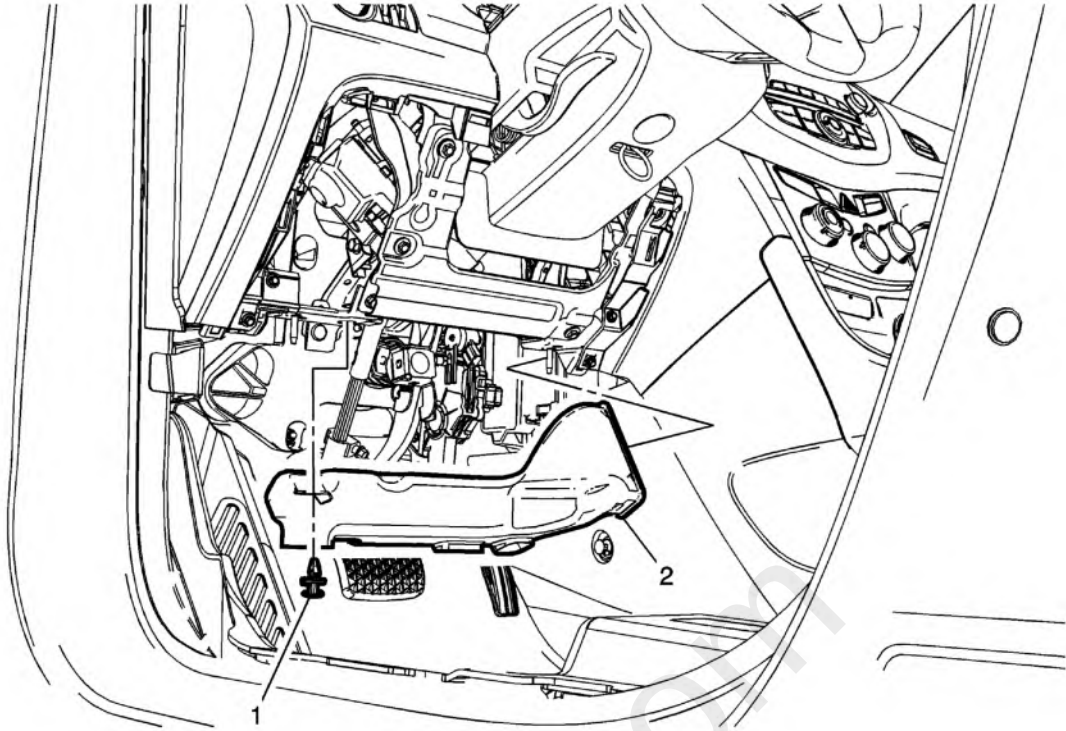


Fig. 46: Floor Front Air Outlet Duct - Left Side (Trax)
Courtesy of GENERAL MOTORS COMPANY

8. Install Floor Air Outlet Duct (2). Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#).

MODE VALVE LEVER REPLACEMENT (C60)

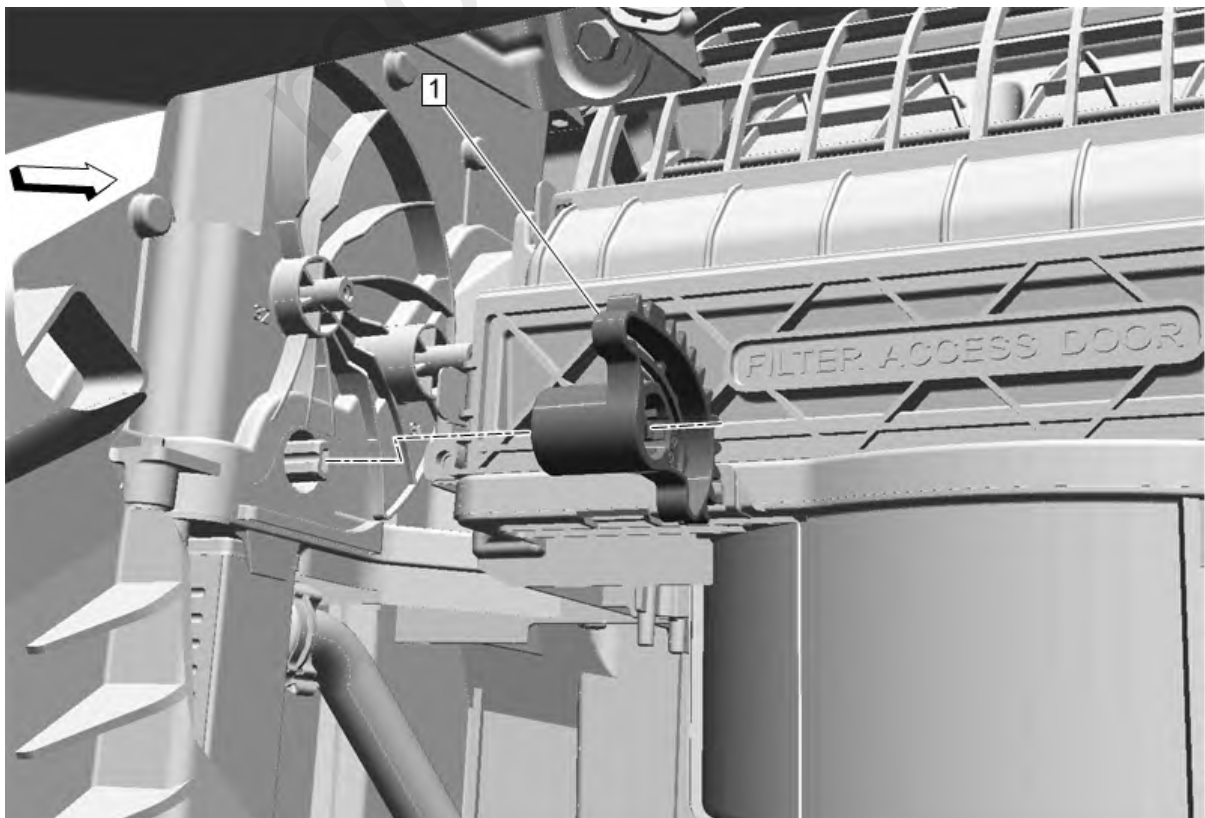


Fig. 47: Mode Valve Lever (C60).
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Temperature Valve Gear. Refer to Temperature Valve Gear Replacement (C60)	
1	Mode Valve Lever Procedure Use the appropriate tool to release the detent to remove the mode valve lever.

AIR INLET VALVE ACTUATOR REPLACEMENT - LEFT SIDE (TEMPERATURE)

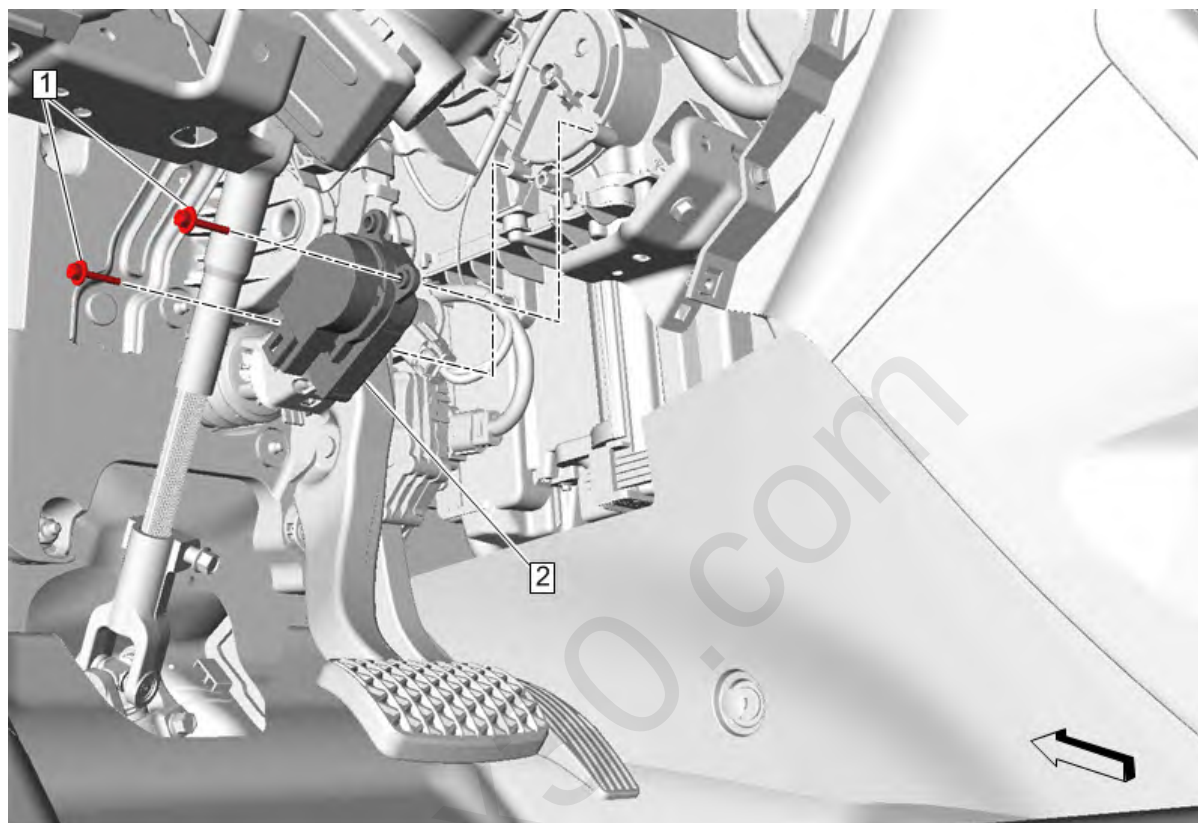


Fig. 48: Air Inlet Valve Actuator - Left Side
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. 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) . 2. Remove Instrument Panel Knee Bolster. Refer to Instrument Panel Knee Bolster Replacement (Buick) , Instrument Panel Knee Bolster Replacement (Chevrolet) .	
1	Air Inlet Valve Actuator Bolt (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 1.5 N.m (13 lb in)

Callout	Component Name
2	Air Inlet Valve Actuator - Left Side Procedure 1. Disconnect the electrical connector. 2. Clear the DTCs from the heater and air conditioning remote control module. 3. Perform the actuator calibration procedure. Refer to Actuator Recalibration (C67).

MODE CONTROL CAM REPLACEMENT (C67)

Removal Procedure

1. Disconnect the battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection \(without KL9\)](#), [Battery Negative Cable Disconnection and Connection \(with KL9\)](#).
2. Remove Steering Column Assembly. 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 \(Mexico, N40\)](#).

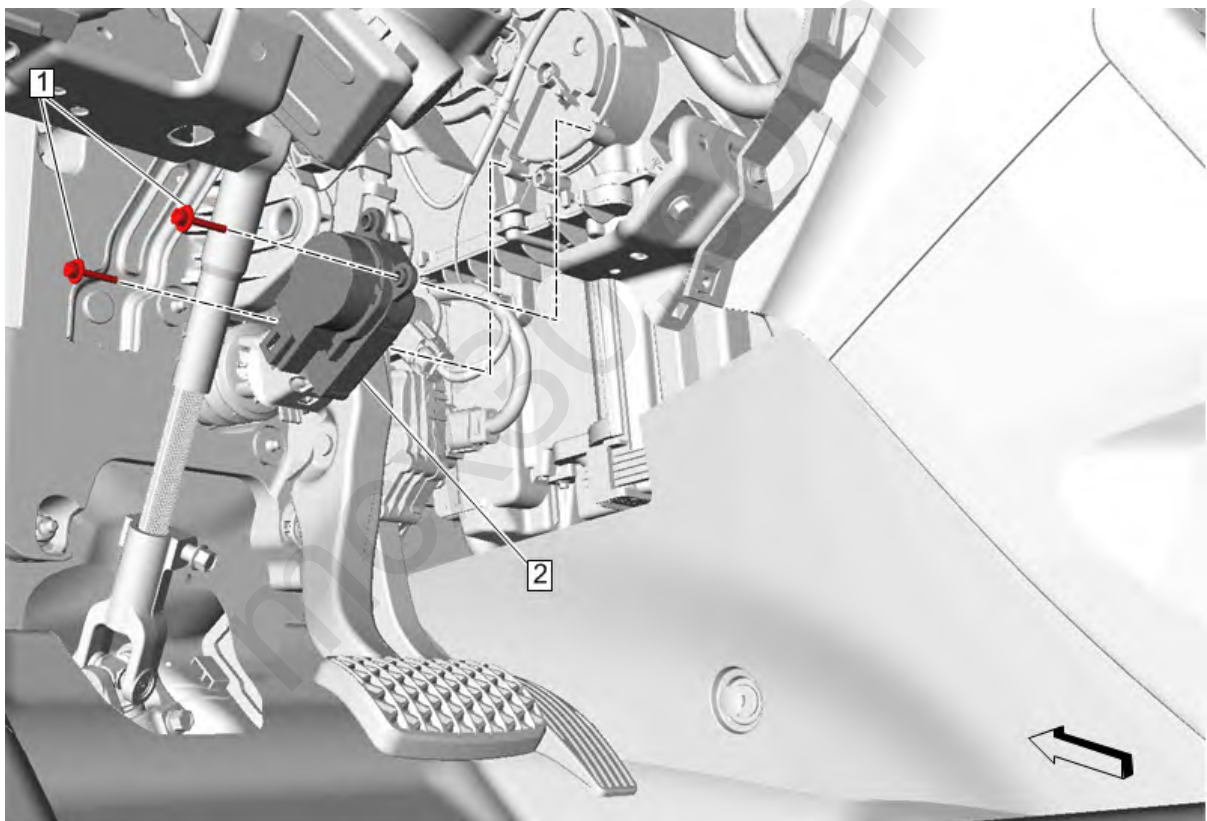


Fig. 49: Air Inlet Valve Actuator - Left Side

Courtesy of GENERAL MOTORS COMPANY

3. Remove Air Inlet Valve Actuator (2) - Left Side. Refer to [Air Inlet Valve Actuator Replacement - Left Side \(With CJ2\)](#).

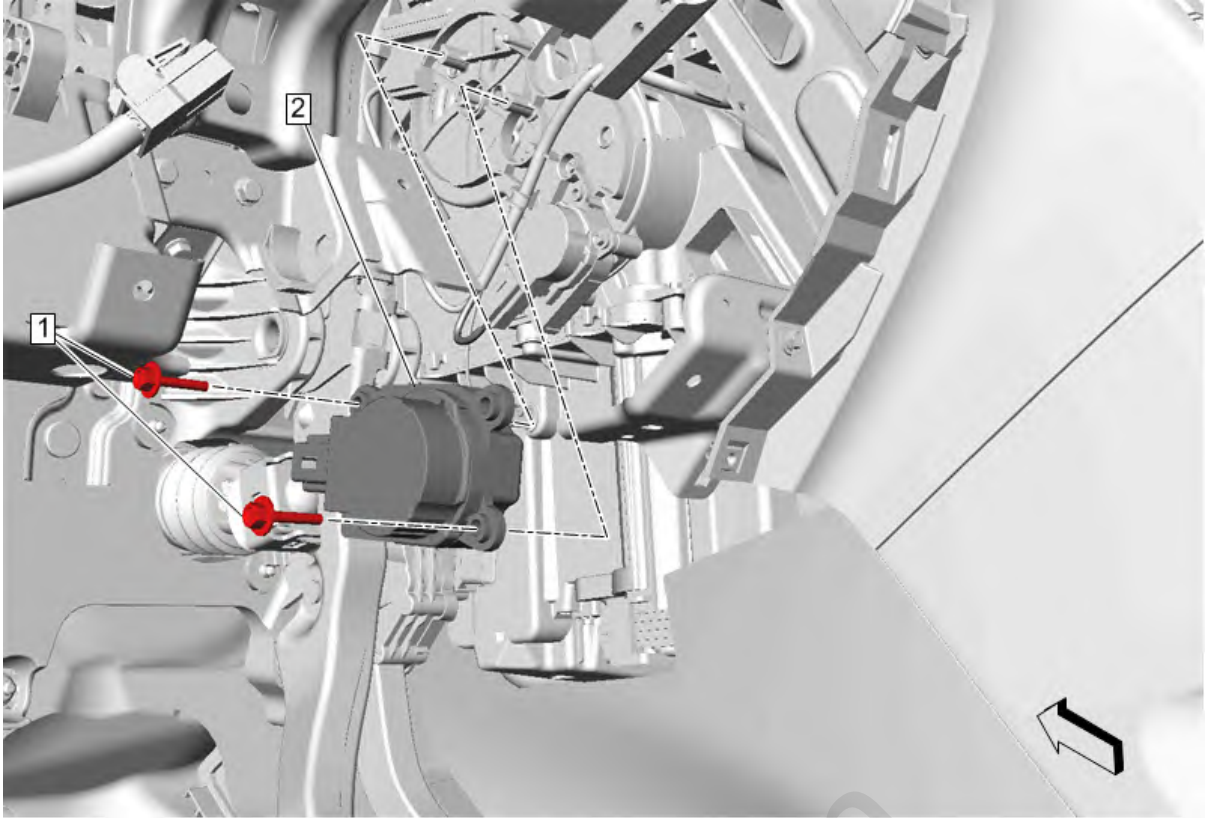


Fig. 50: Mode Control Cam Actuator And Bolts
 Courtesy of GENERAL MOTORS COMPANY

4. Remove Mode Control Cam Actuator Bolts (1) (Qty: 2)
5. Remove Mode Control Cam Actuator (2)
6. Disconnect the electrical connector.

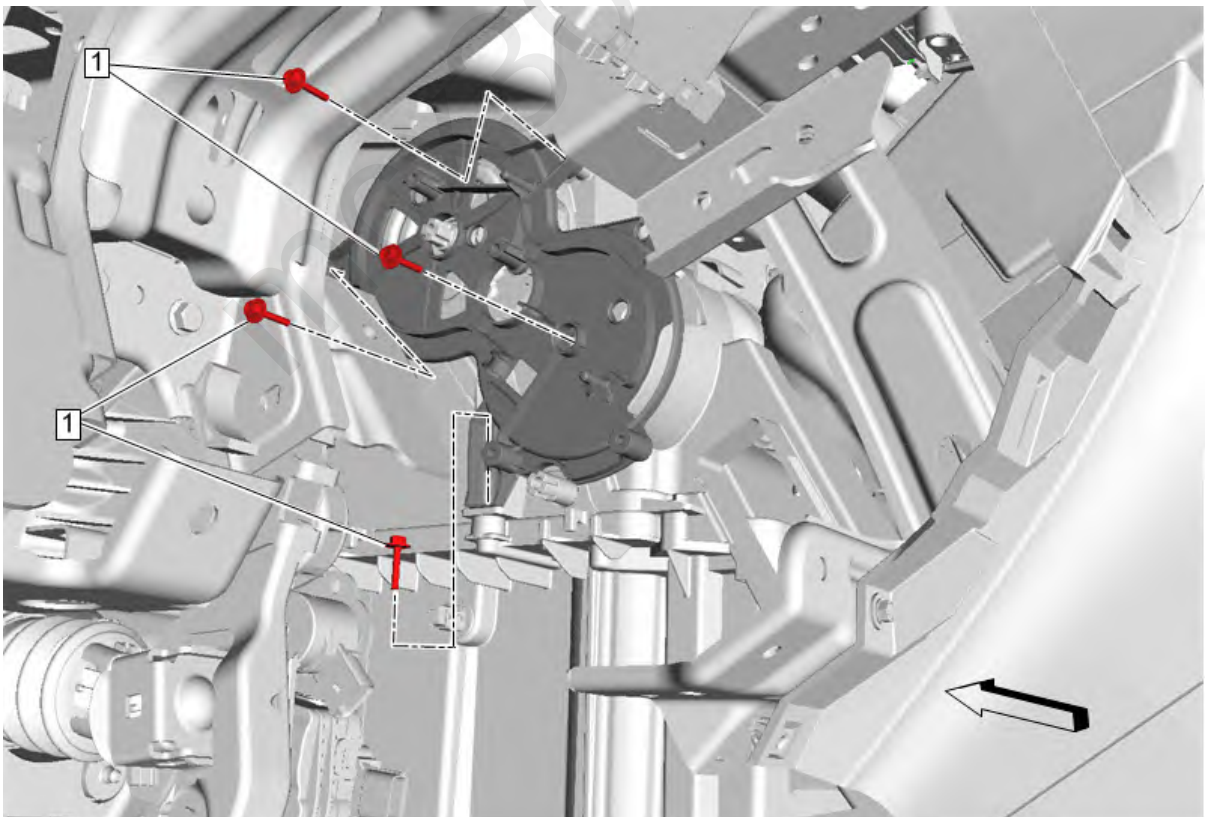


Fig. 51: Heater and Air Conditioning Evaporator and Blower Module Bracket Bolts
 Courtesy of GENERAL MOTORS COMPANY

7. Remove Heater and Air Conditioning Evaporator and Blower Module Bracket Bolts (1) (Qty: 4)

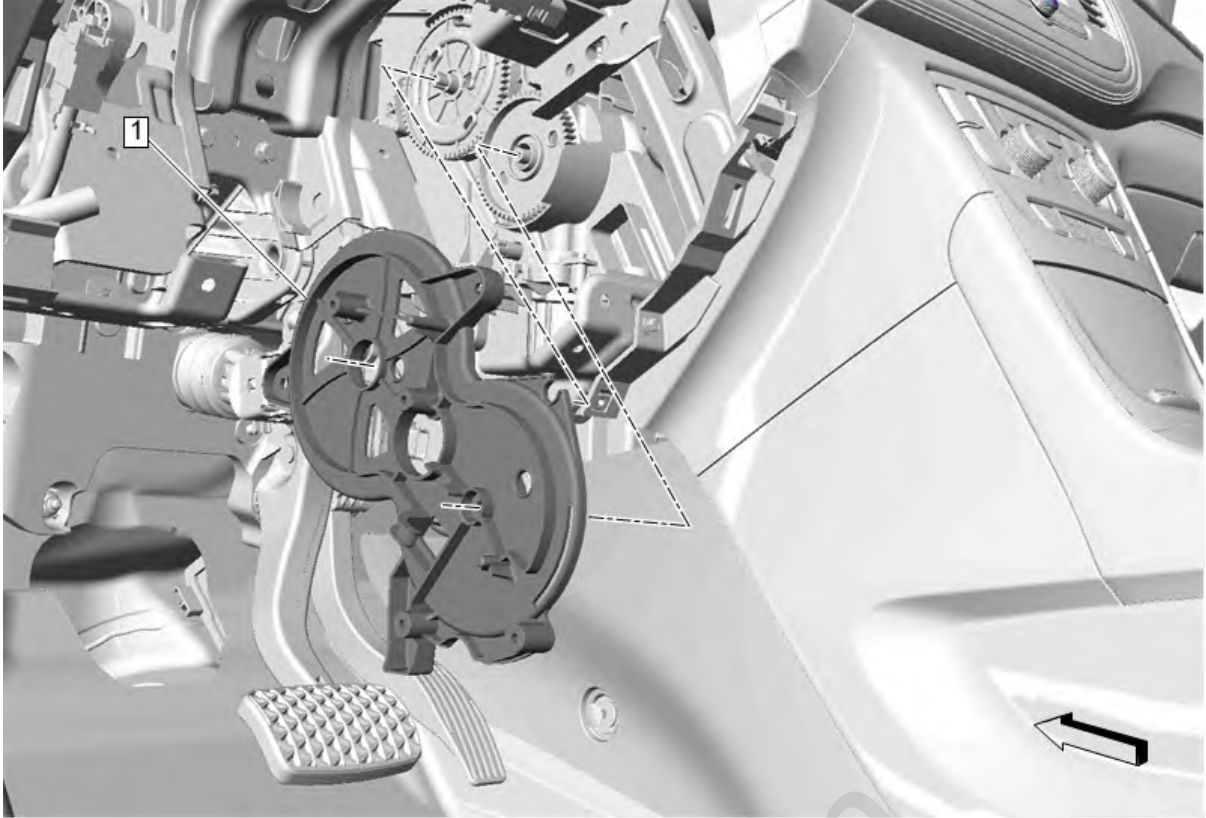


Fig. 52: Heater and Air Conditioning Evaporator and Blower Module Bracket
 Courtesy of GENERAL MOTORS COMPANY

8. Remove Heater and Air Conditioning Evaporator and Blower Module Bracket (1)

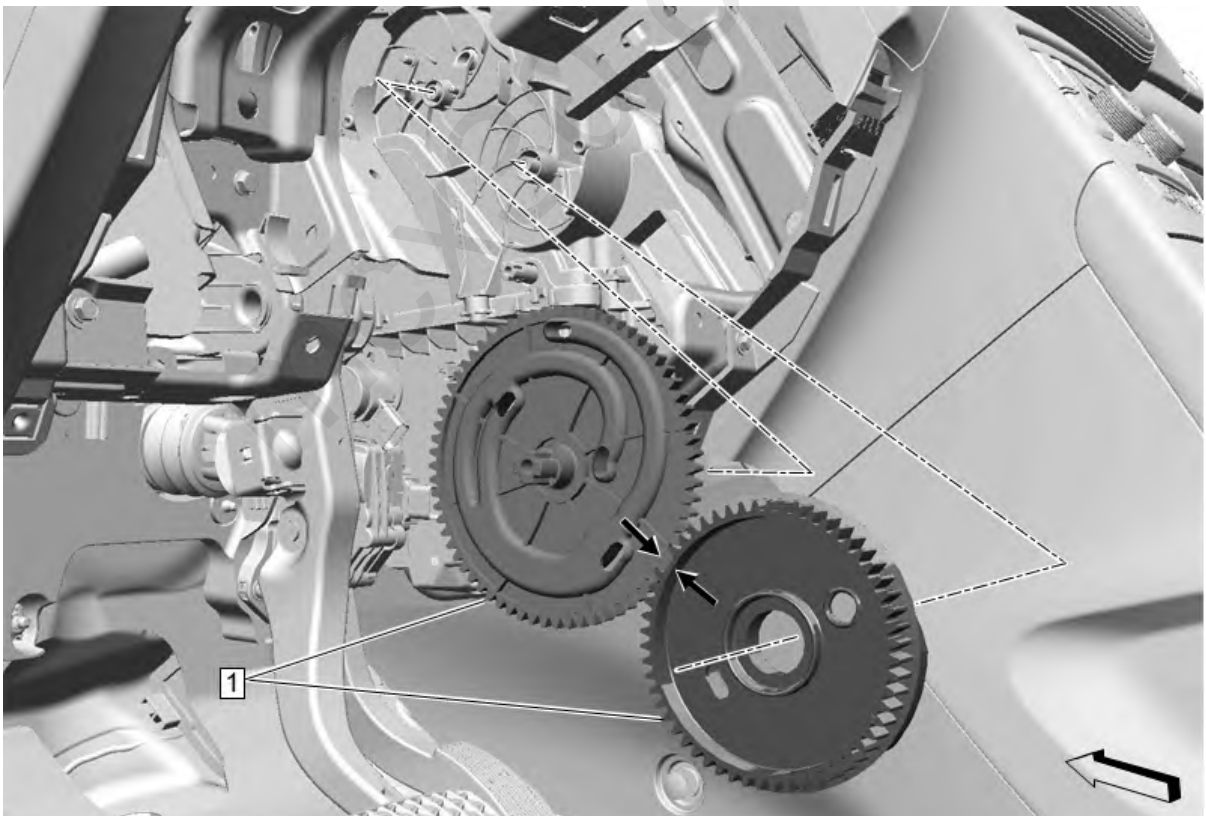


Fig. 53: Heater and Air Conditioning Mode Control Cams
 Courtesy of GENERAL MOTORS COMPANY

9. Remove Heater and Air Conditioning Mode Control Cams (1) (Qty: 2)

Installation Procedure

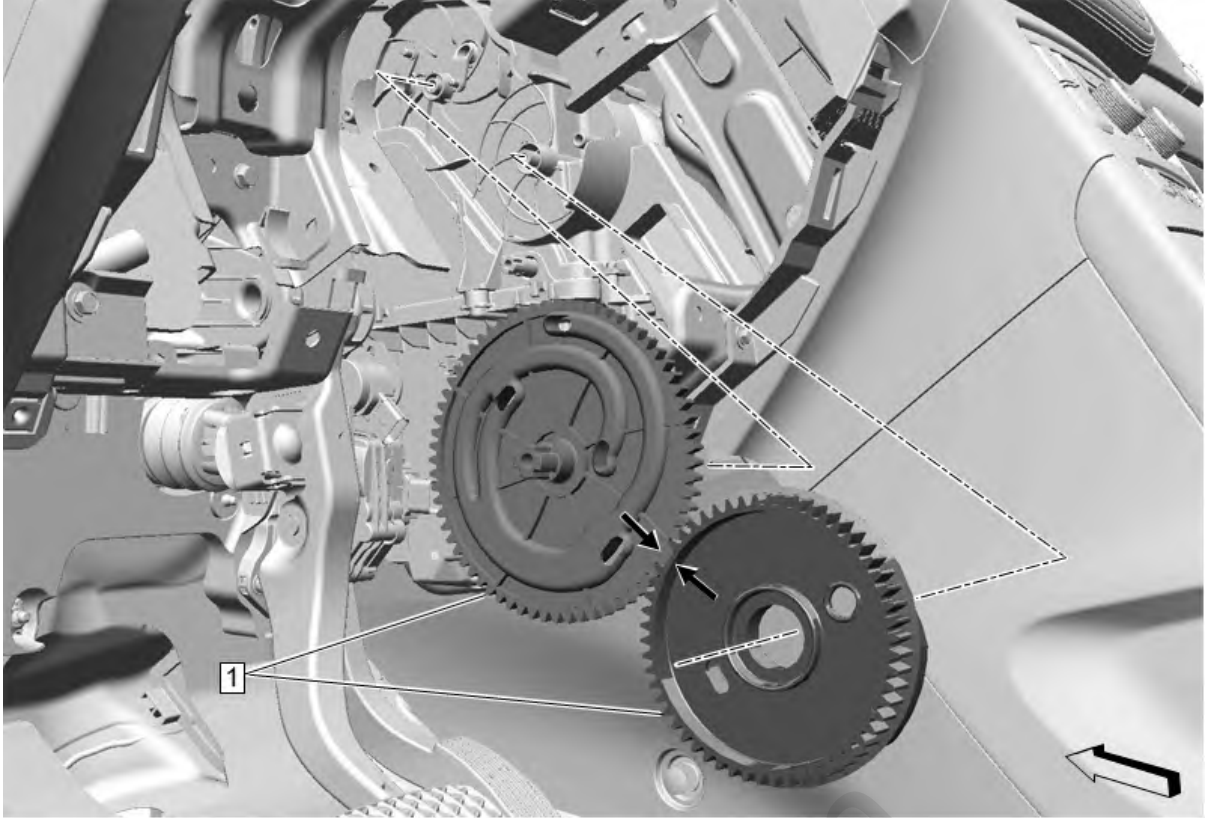


Fig. 54: Heater and Air Conditioning Mode Control Cams

Courtesy of GENERAL MOTORS COMPANY

NOTE: Index the wider male heater and air conditioning mode control cam gear tooth, to the wider female heater and air conditioning mode control cam gear tooth indicated by the arrows.

1. Install Heater and Air Conditioning Mode Control Cams (1) (Qty: 2)

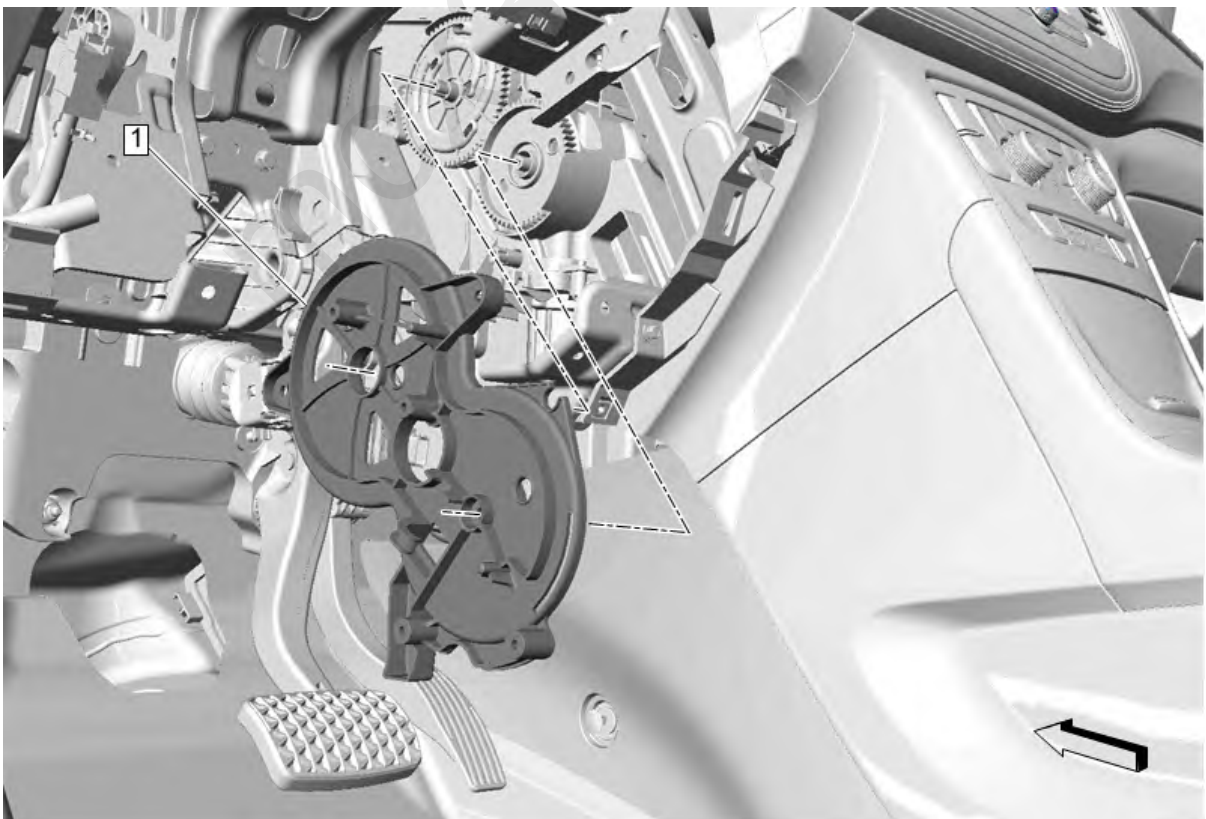


Fig. 55: Heater and Air Conditioning Evaporator and Blower Module Bracket

Courtesy of GENERAL MOTORS COMPANY

2. Install Heater and Air Conditioning Evaporator and Blower Module Bracket (1)

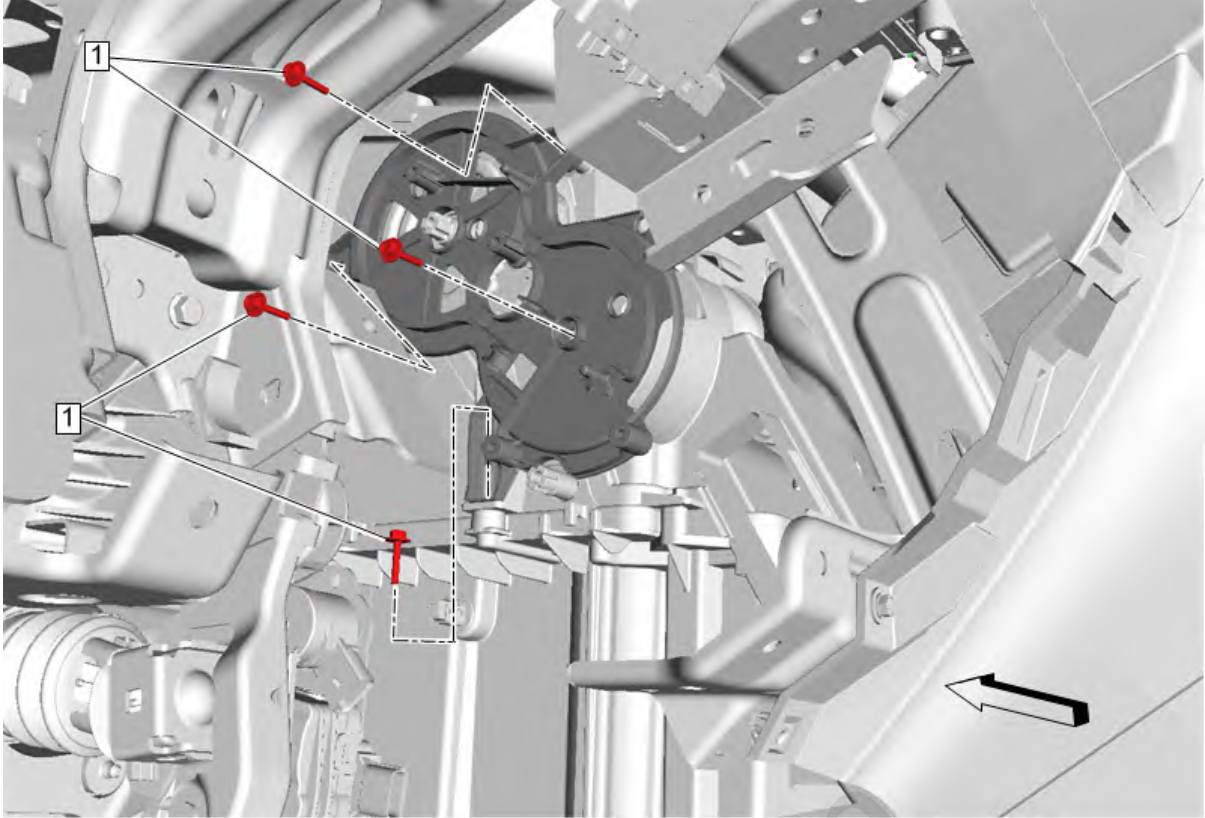


Fig. 56: Heater and Air Conditioning Evaporator and Blower Module Bracket Bolts
 Courtesy of GENERAL MOTORS COMPANY

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

3. Install and tighten Heater and Air Conditioning Evaporator and Blower Module Bracket Bolts (1) (Qty: 4) to 1.5 N.m (13 lb in)

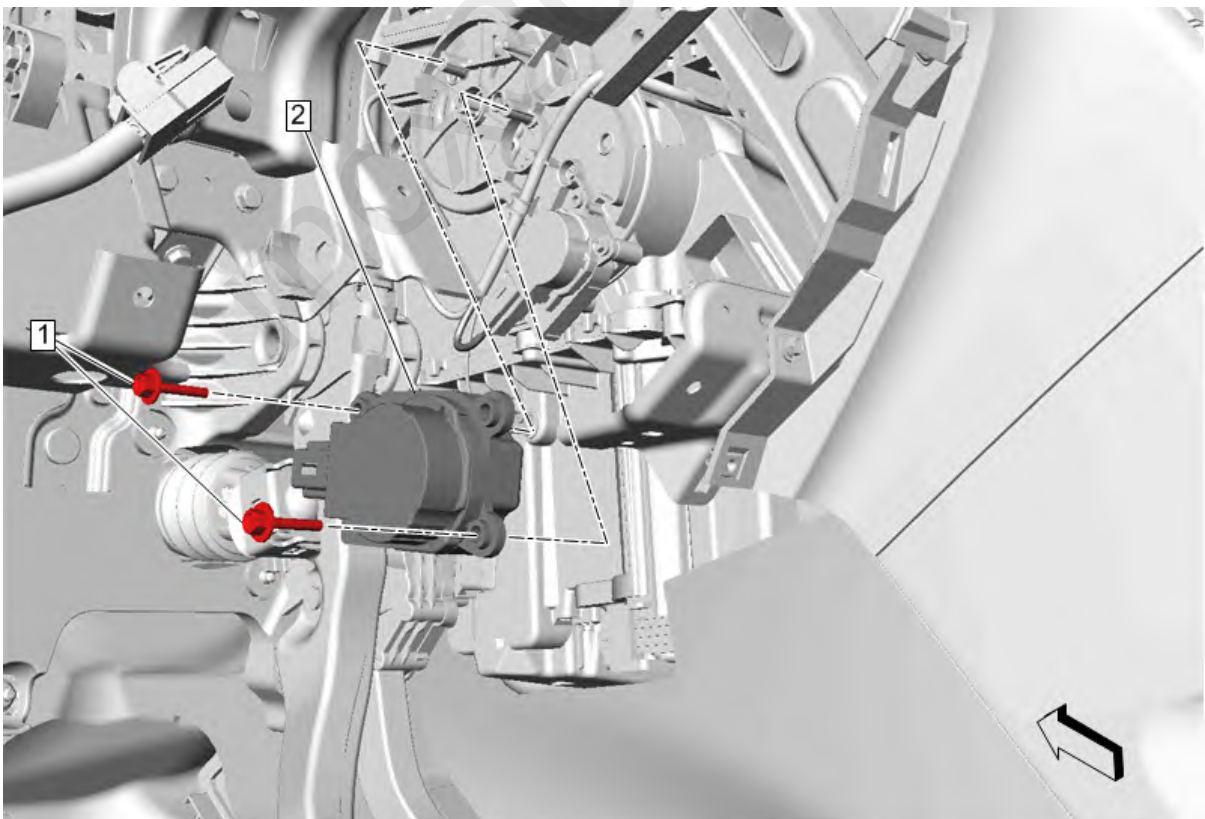


Fig. 57: Mode Control Cam Actuator And Bolts
 Courtesy of GENERAL MOTORS COMPANY

4. Connect the electrical connector.
5. Install Mode Control Cam Actuator (2)
6. Install and tighten Mode Control Cam Actuator Bolts (1) (Qty: 2) to 1.5 N.m (13 lb in)

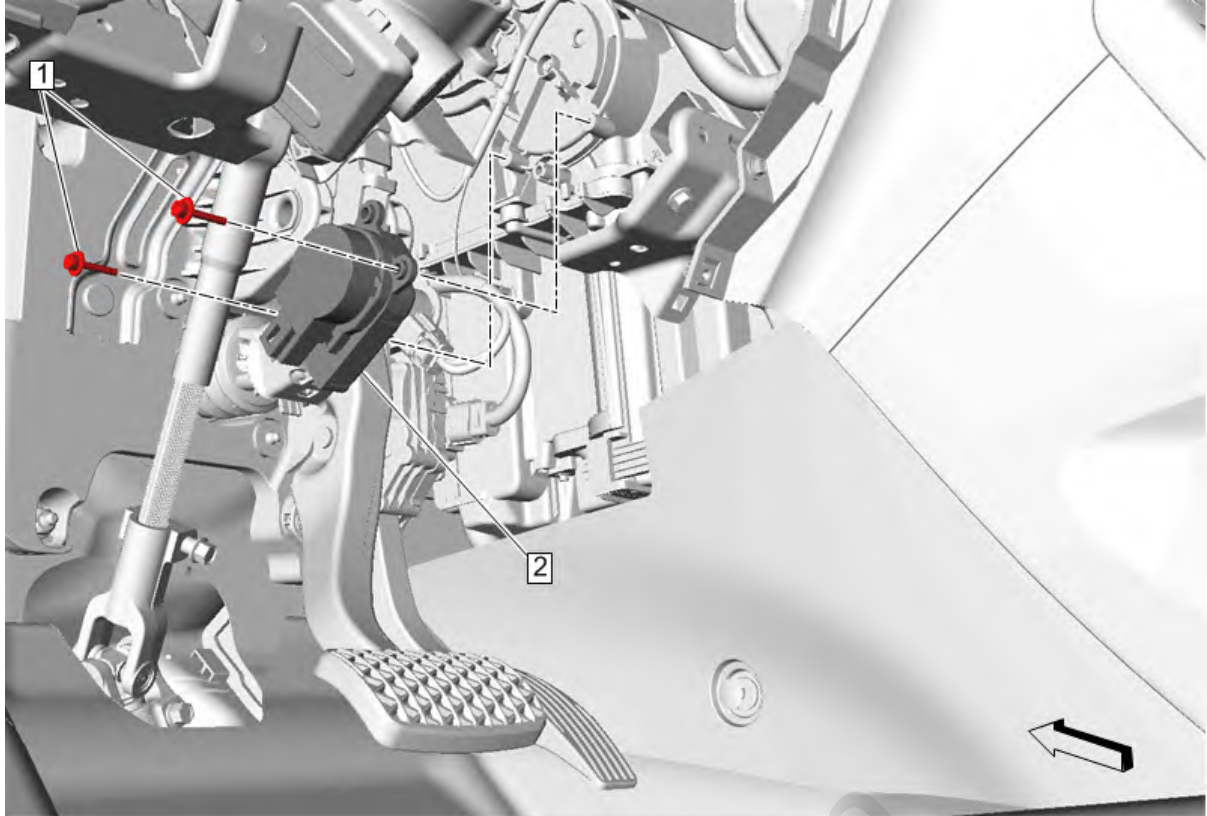


Fig. 58: Air Inlet Valve Actuator - Left Side

Courtesy of GENERAL MOTORS COMPANY

7. Install Air Inlet Valve Actuator (2) - Left Side. Refer to [**Air Inlet Valve Actuator Replacement - Left Side \(With CJ2\)**](#).
8. Install Steering Column Assembly. 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 \(Mexico, N40\)**](#).
9. Connect the battery negative cable. Refer to [**Battery Negative Cable Disconnection and Connection \(without KL9\)**](#), [**Battery Negative Cable Disconnection and Connection \(with KL9\)**](#).
10. Clear the DTCs from the heater and air conditioning remote control module.
11. Perform the actuator calibration procedure. Refer to [**Actuator Recalibration \(C67\)**](#).

MODE CONTROL CAM REPLACEMENT (C60 HEATER CAM)

Removal Procedure

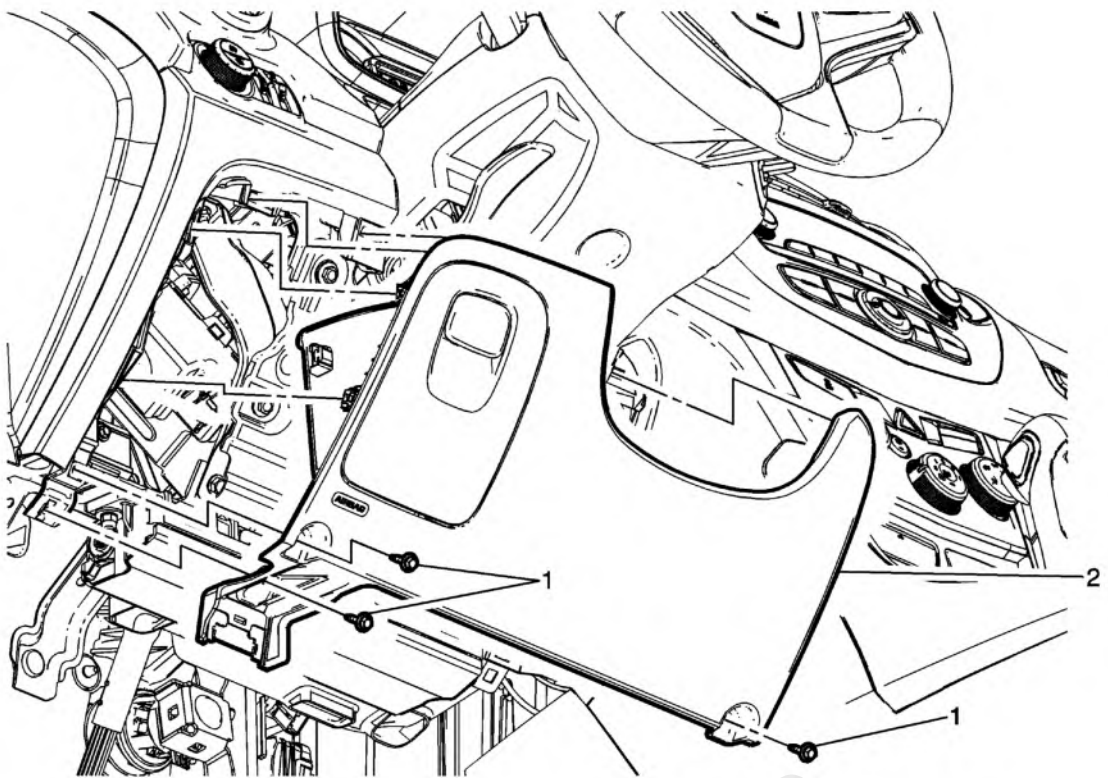


Fig. 59: Instrument Panel Knee Bolster (Trax)
 Courtesy of GENERAL MOTORS COMPANY

1. Remove Instrument Panel Knee Bolster (2). Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#)

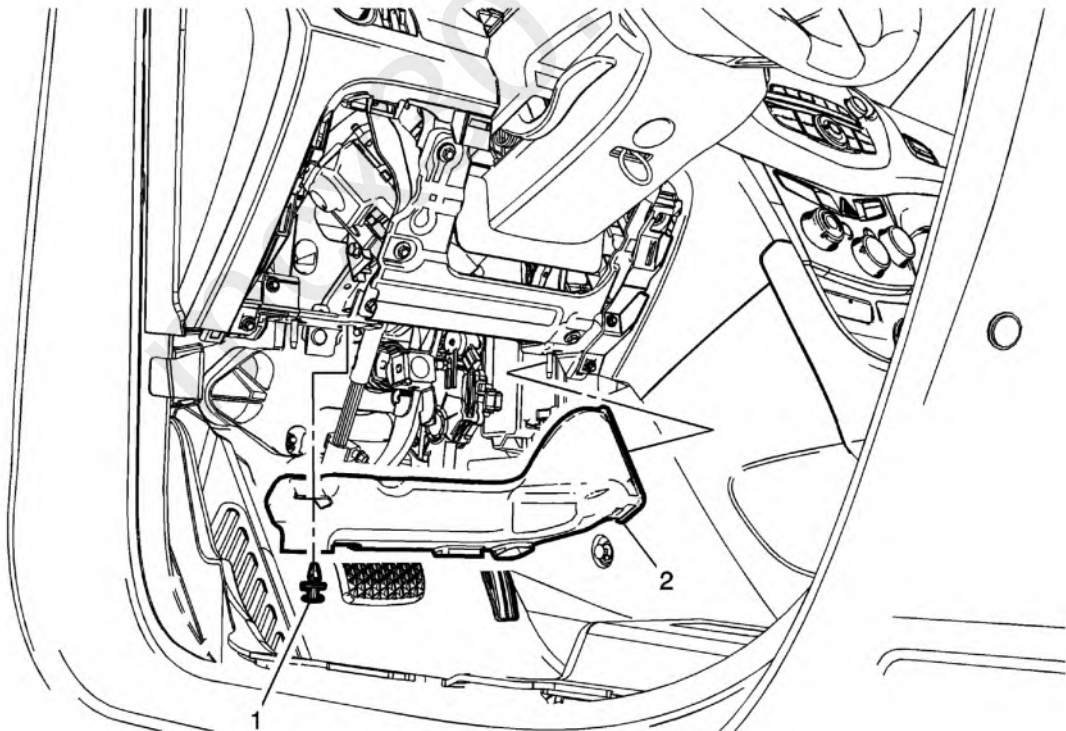


Fig. 60: Floor Front Air Outlet Duct - Left Side (Trax)
 Courtesy of GENERAL MOTORS COMPANY

2. Remove Floor Air Outlet Duct (2) - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#)

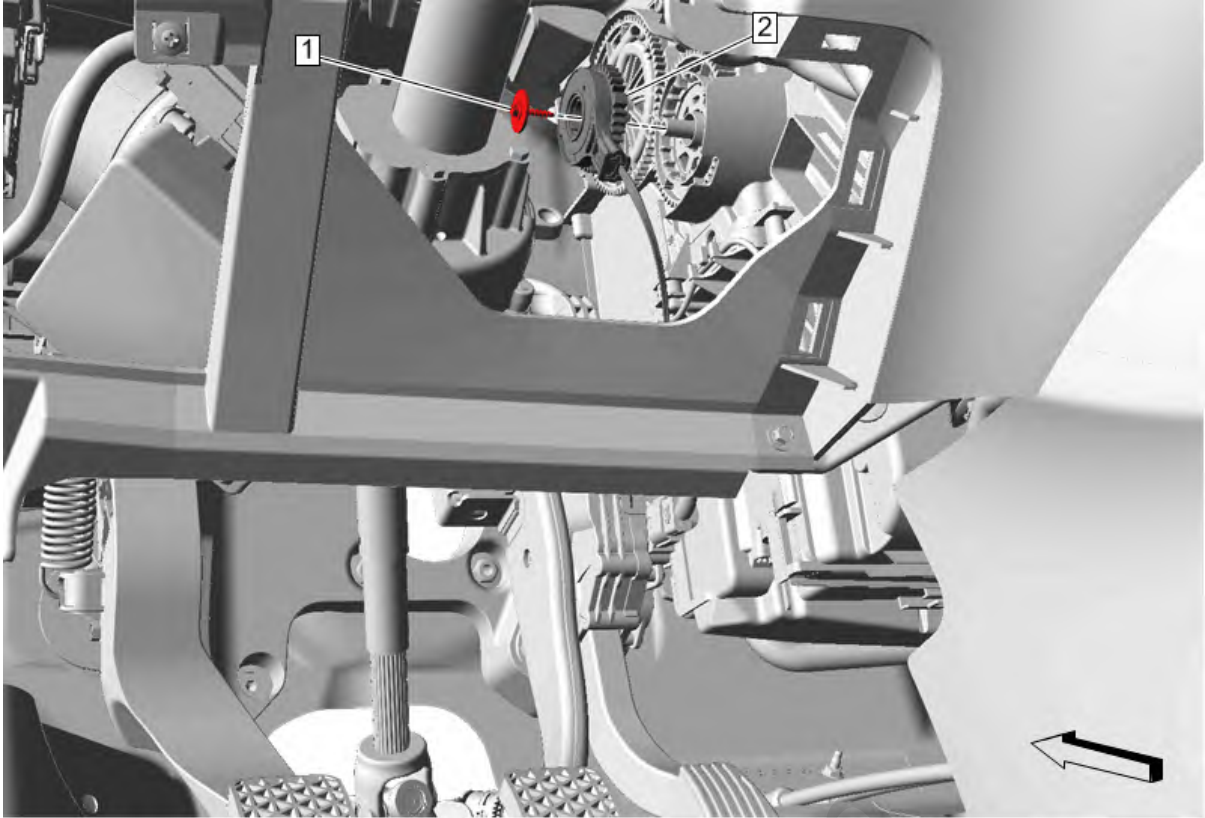


Fig. 61: Mode Control Cable And Retaining Screw
 Courtesy of GENERAL MOTORS COMPANY

3. Remove the mode control cable retaining screw (1) and the mode control cable (2) from the heater and air conditioning evaporator and blower module.

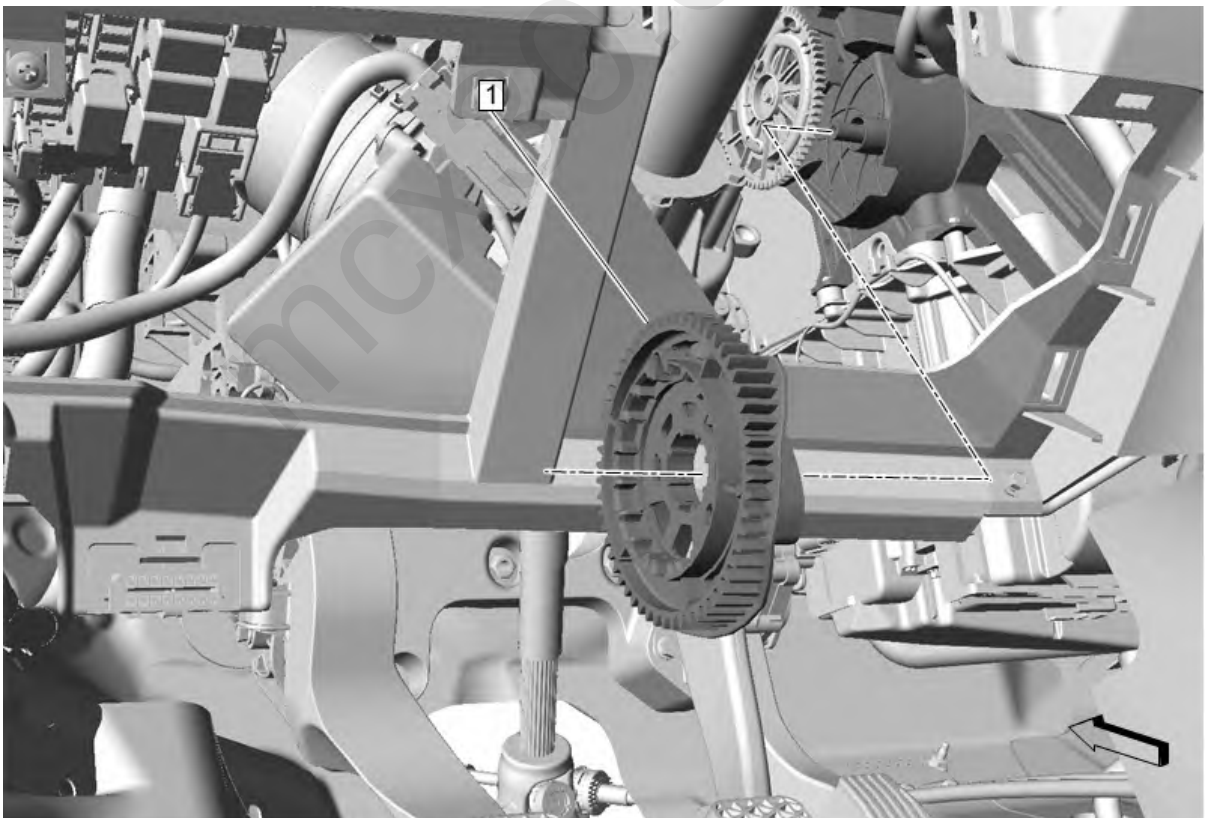


Fig. 62: Heater and Air Conditioning Mode Control Cam - Heater Cam
 Courtesy of GENERAL MOTORS COMPANY

4. Remove Heater and Air Conditioning Mode Control Cam (1) - Heater Cam

Installation Procedure

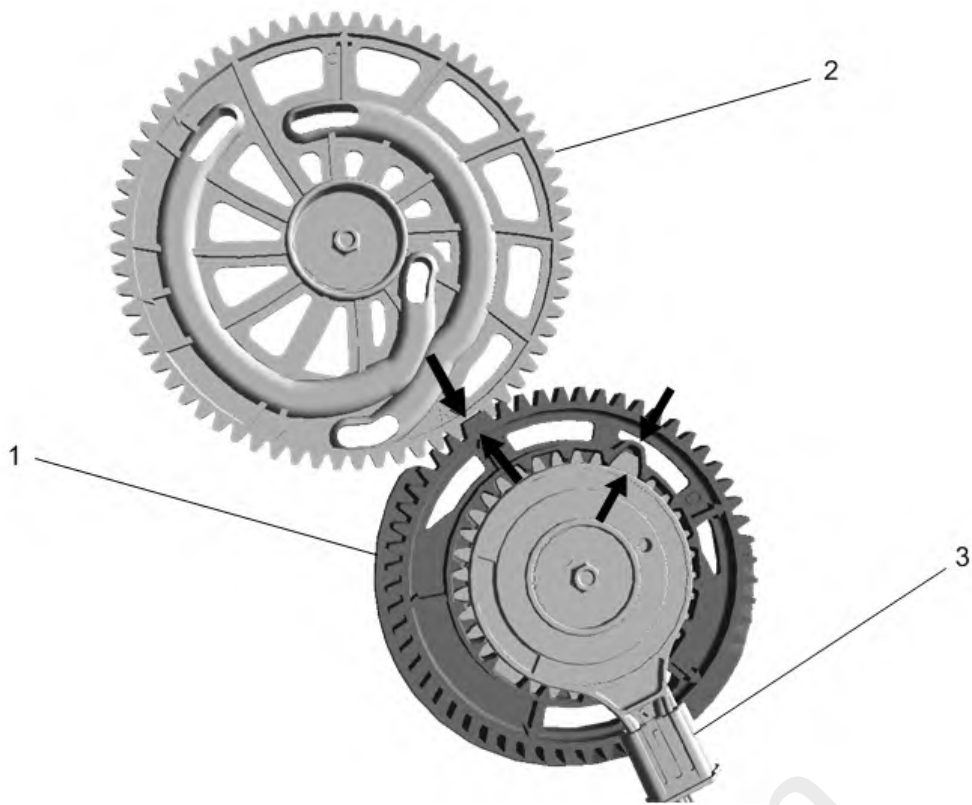


Fig. 63: Indexing Heater Cam, Mode Cam And Mode Control Cable End Gear
 Courtesy of GENERAL MOTORS COMPANY

1. Upon re-assembly index the heater cam (1), the mode cam (2) and the mode control cable end gear (3) large male teeth to the large female teeth as indicated by the arrows for proper alignment.

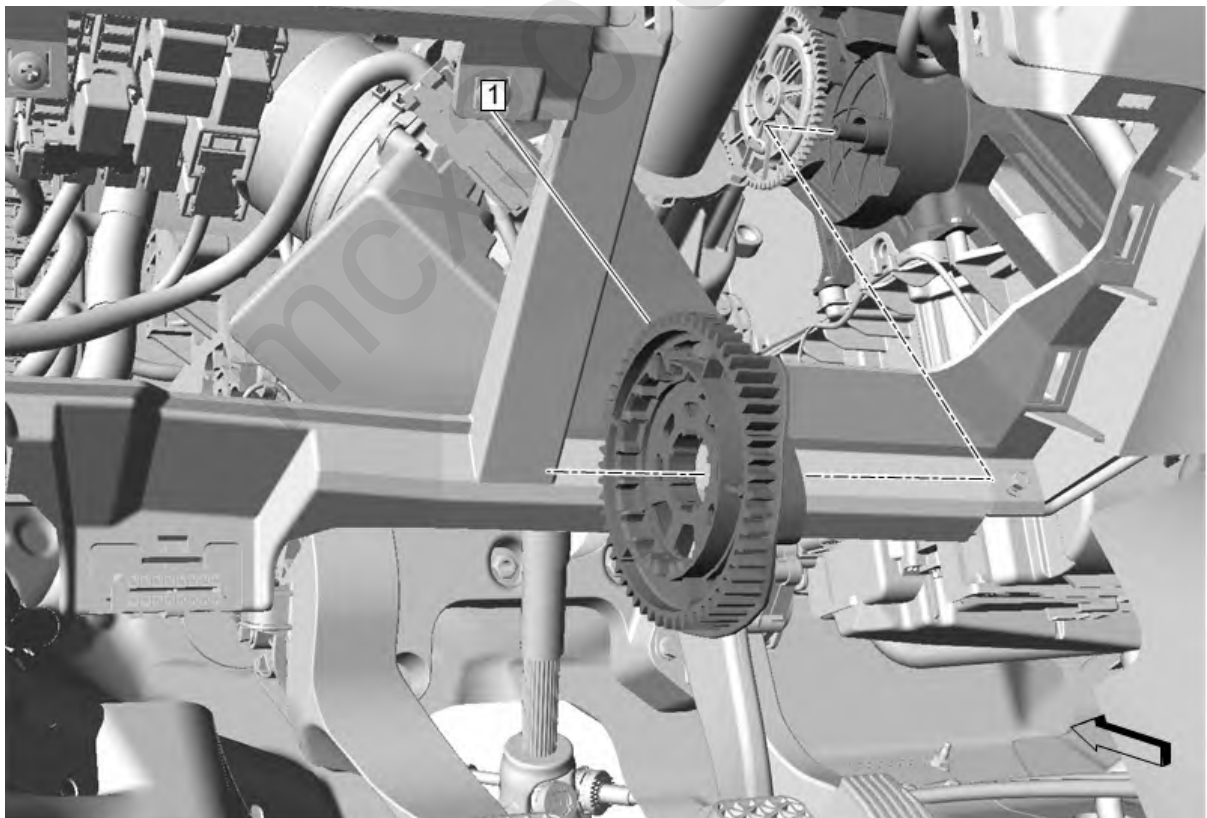


Fig. 64: Heater and Air Conditioning Mode Control Cam - Heater Cam
 Courtesy of GENERAL MOTORS COMPANY

2. Install Heater and Air Conditioning Mode Control Cam (1) - Heater Cam

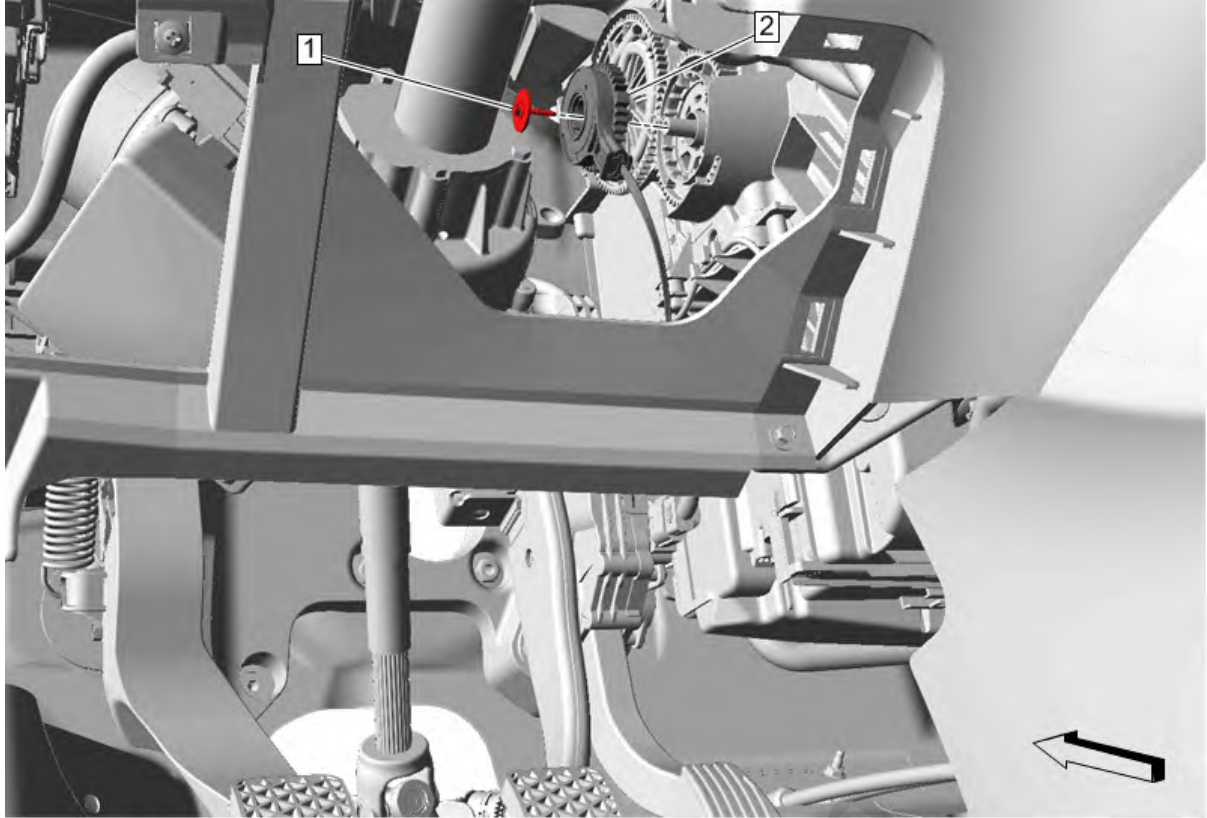


Fig. 65: Mode Control Cable And Retaining Screw
 Courtesy of GENERAL MOTORS COMPANY

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

3. Install the mode control cable retaining screw (1) and the mode control cable (2) onto the heater and air conditioning evaporator and blower module and tighten the screw to 2 N.m (18 lb in).

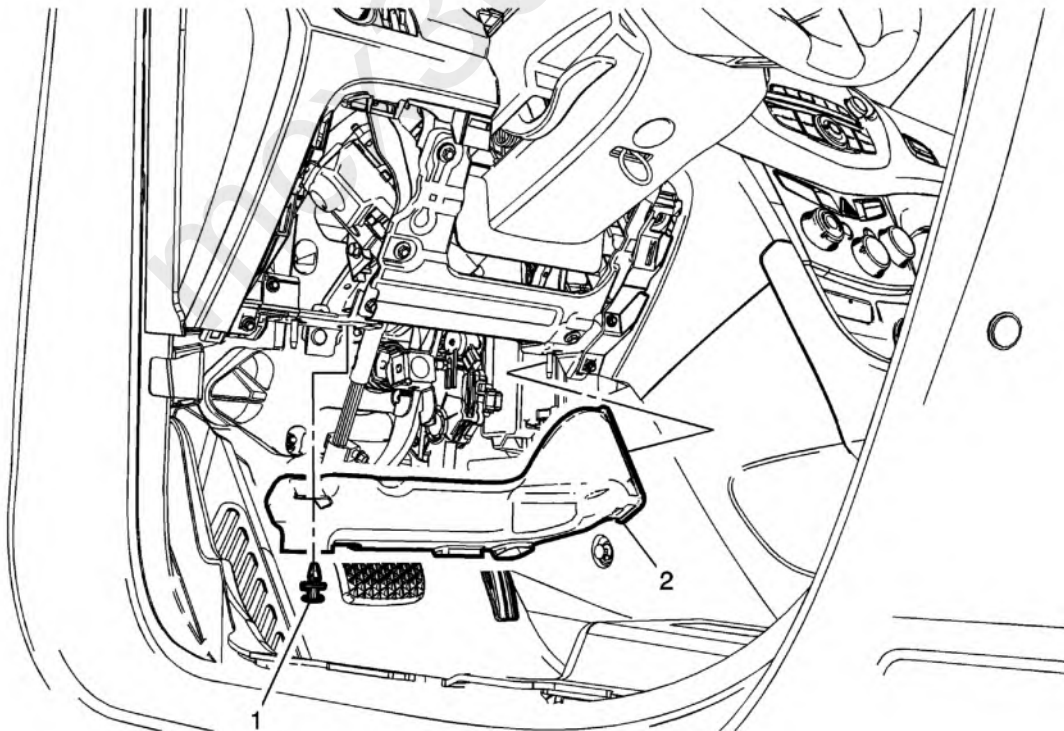


Fig. 66: Floor Front Air Outlet Duct - Left Side (Trax)
 Courtesy of GENERAL MOTORS COMPANY

4. Install Floor Air Outlet Duct (2) - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#).

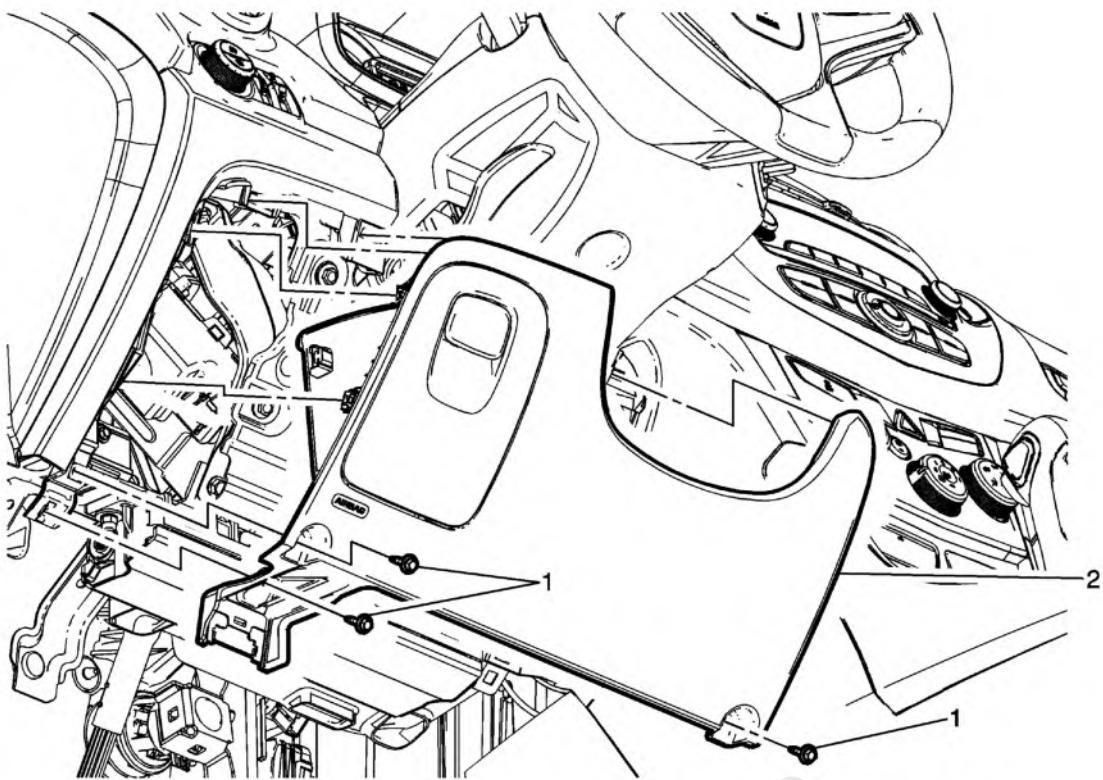


Fig. 67: Instrument Panel Knee Bolster (Trax)
Courtesy of GENERAL MOTORS COMPANY

5. Install Instrument Panel Knee Bolster (2). Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#)

MODE CONTROL CAM REPLACEMENT (C60 MODE CAM)

Removal Procedure

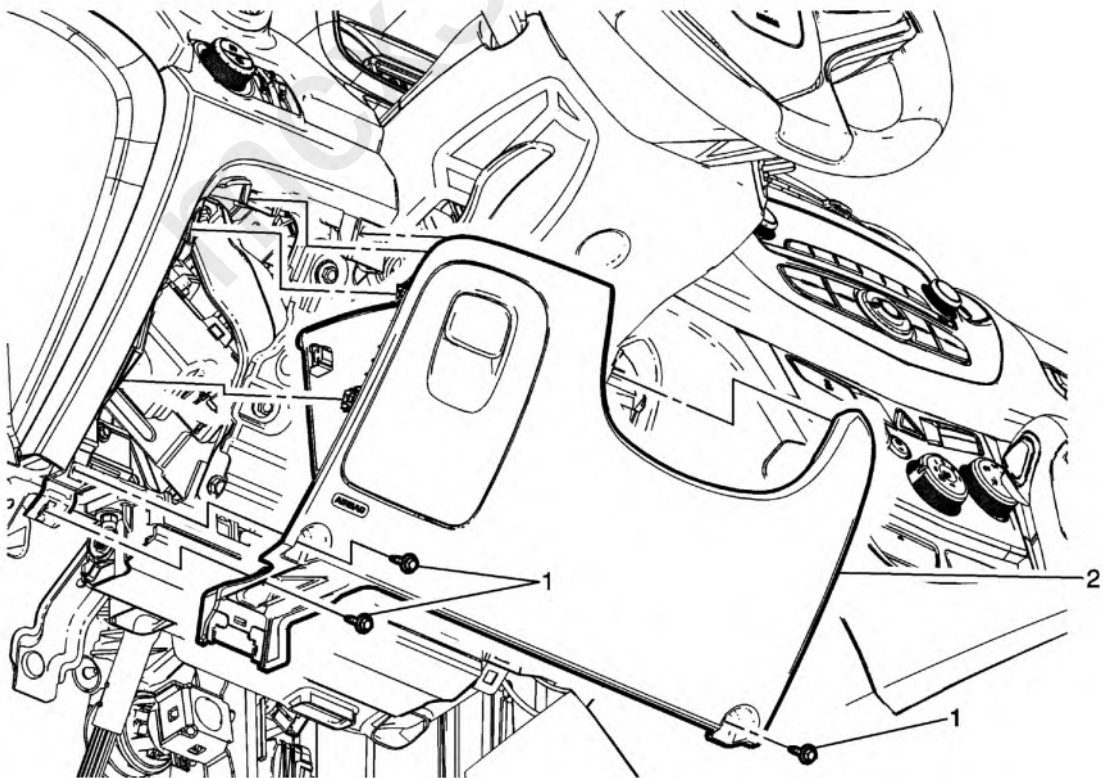


Fig. 68: Instrument Panel Knee Bolster (Trax)
Courtesy of GENERAL MOTORS COMPANY

1. Remove Instrument Panel Knee Bolster (2). Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#)

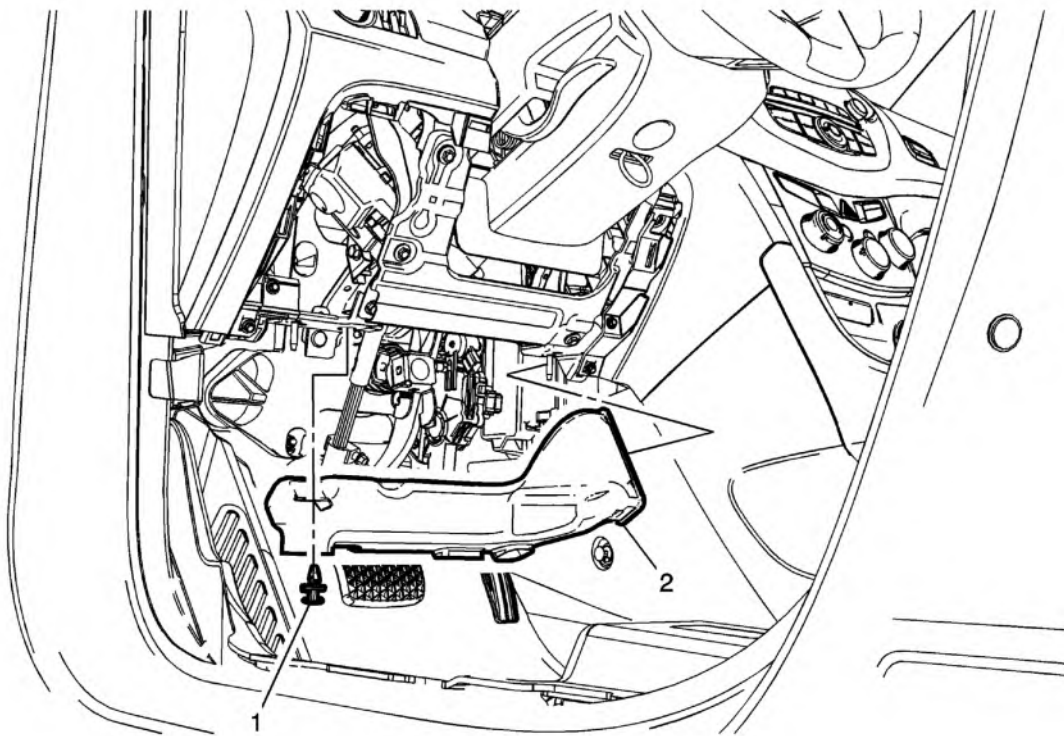


Fig. 69: Floor Front Air Outlet Duct - Left Side (Trax)

Courtesy of GENERAL MOTORS COMPANY

2. Remove Floor Air Outlet Duct (2) - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#).

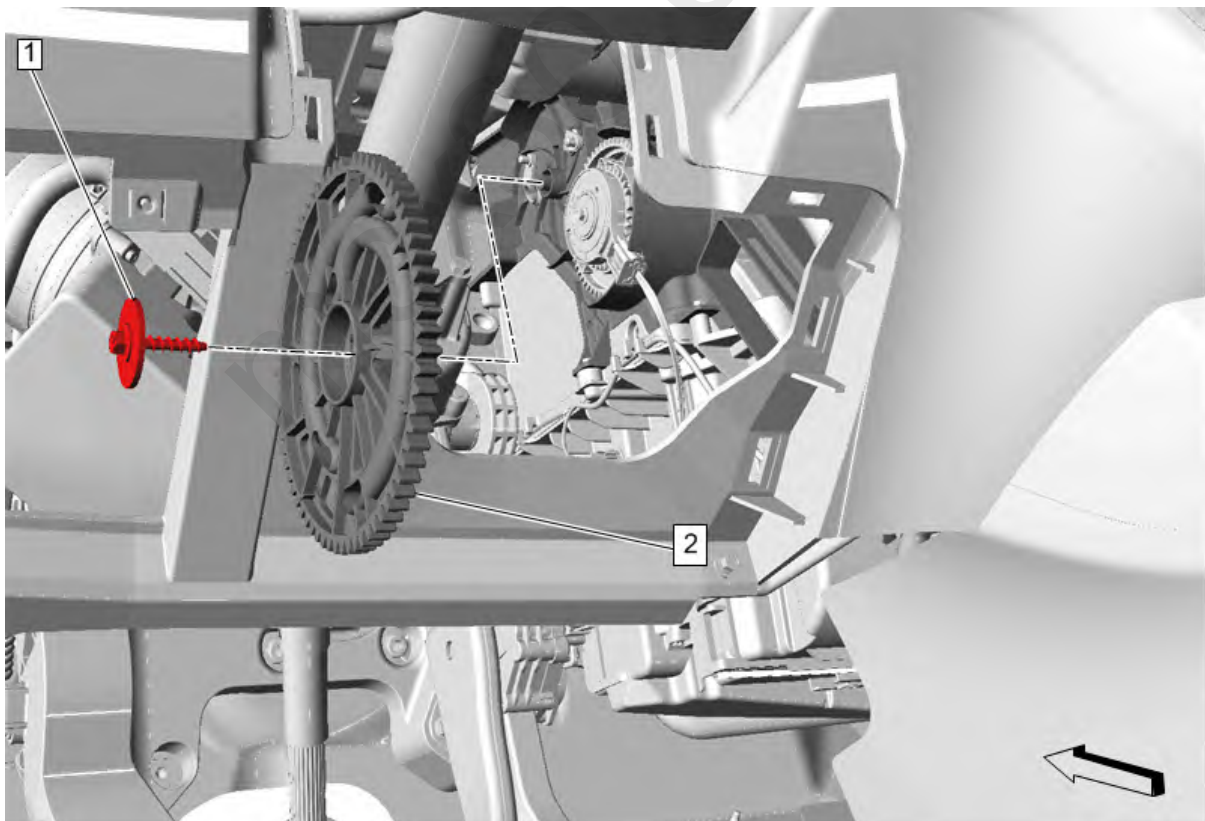


Fig. 70: Heater And Air Conditioning Mode Control Cam - Mode Cam And Bolt

Courtesy of GENERAL MOTORS COMPANY

3. Remove Heater and Air Conditioning Mode Control Cam Bolt (1)
4. Remove Heater and Air Conditioning Mode Control Cam (2) - Mode Cam

Installation Procedure

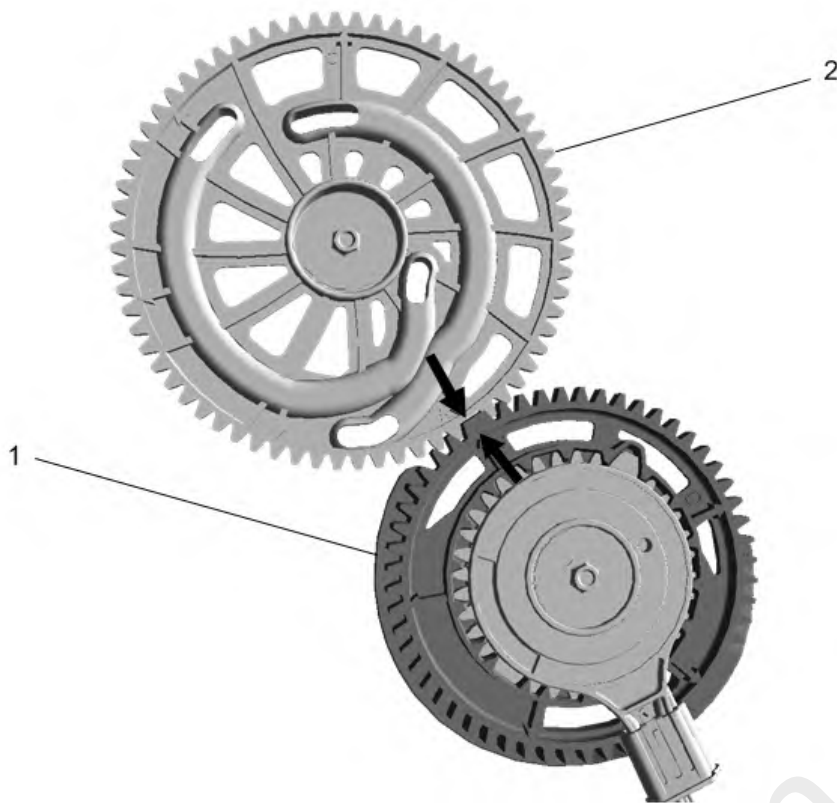


Fig. 71: Indexing Heater Cam And Mode Cam
 Courtesy of GENERAL MOTORS COMPANY

1. Upon re-assembly index the heater cam (1), and the mode cam (2) large male teeth to the large female teeth as indicated by the arrows for proper alignment.

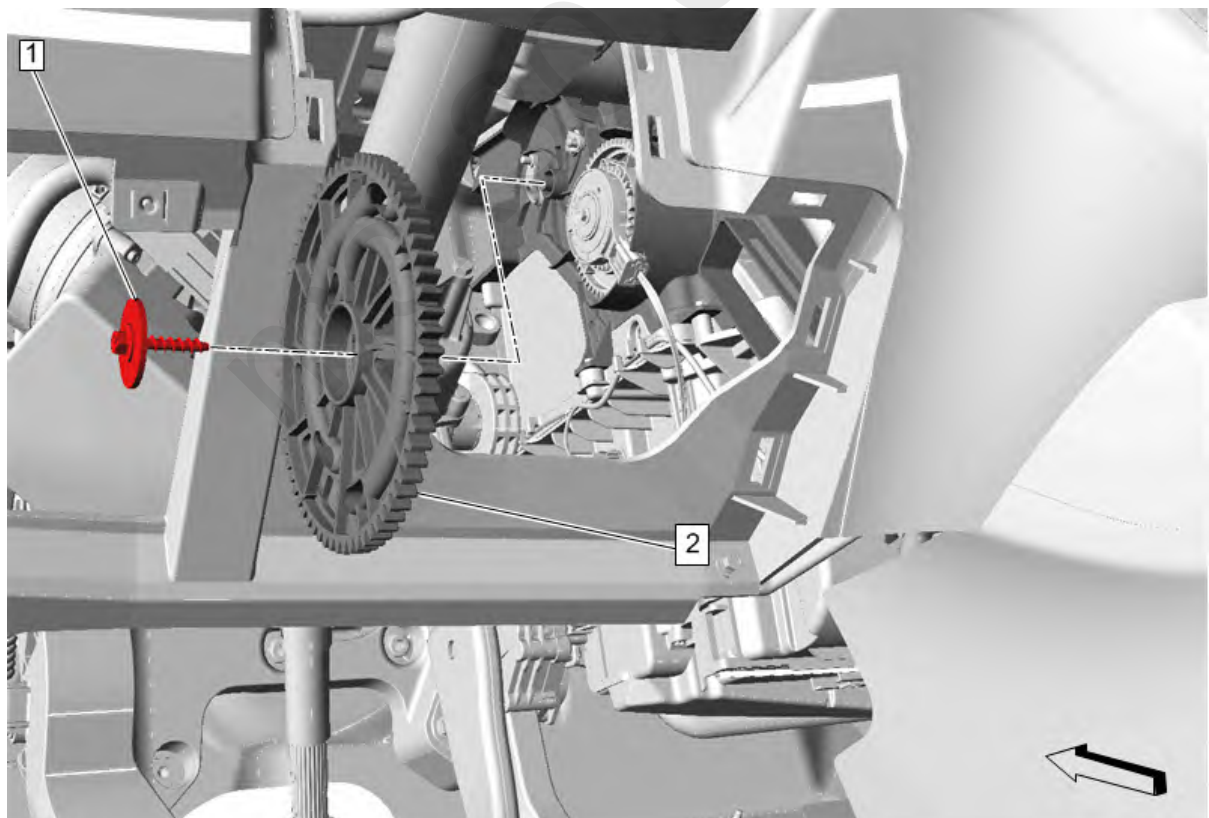


Fig. 72: Heater And Air Conditioning Mode Control Cam - Mode Cam And Bolt
 Courtesy of GENERAL MOTORS COMPANY

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

2. Install Heater and Air Conditioning Mode Control Cam (2) - Mode Cam
3. Install and tighten Heater and Air Conditioning Mode Control Cam Bolt (1) to 2 N.m (18 lb in).

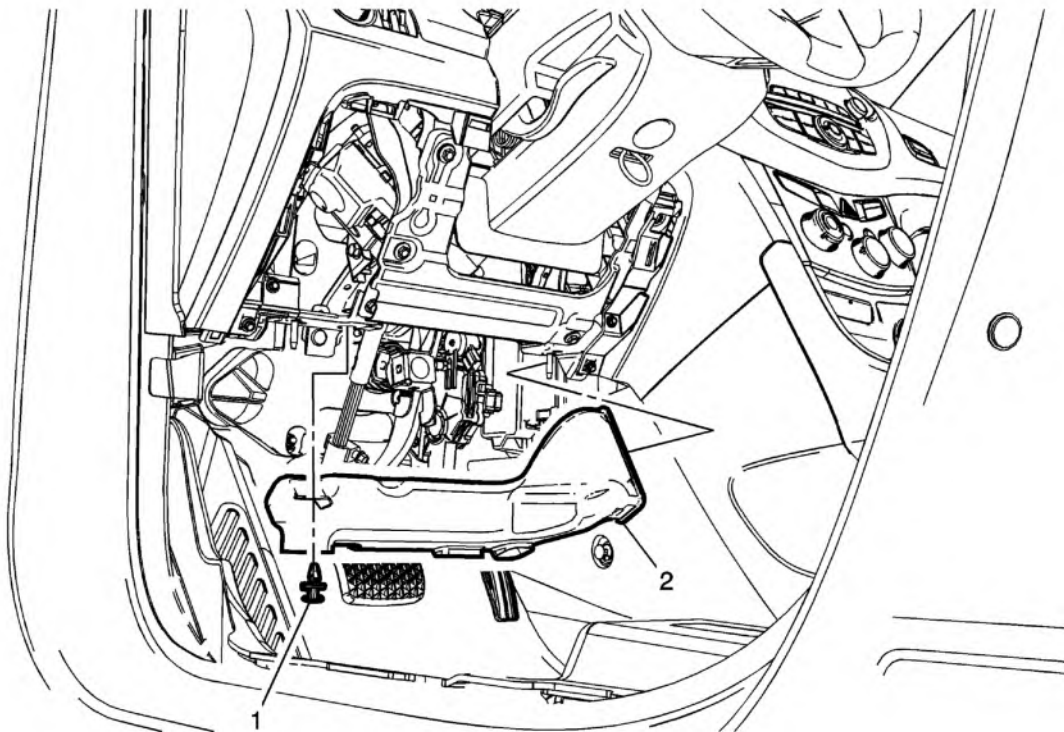


Fig. 73: Floor Front Air Outlet Duct - Left Side (Trax)

Courtesy of GENERAL MOTORS COMPANY

4. Install Floor Air Outlet Duct (2) - Left Side. Refer to [Floor Front Air Outlet Duct Replacement - Left Side \(Chevrolet\)](#).

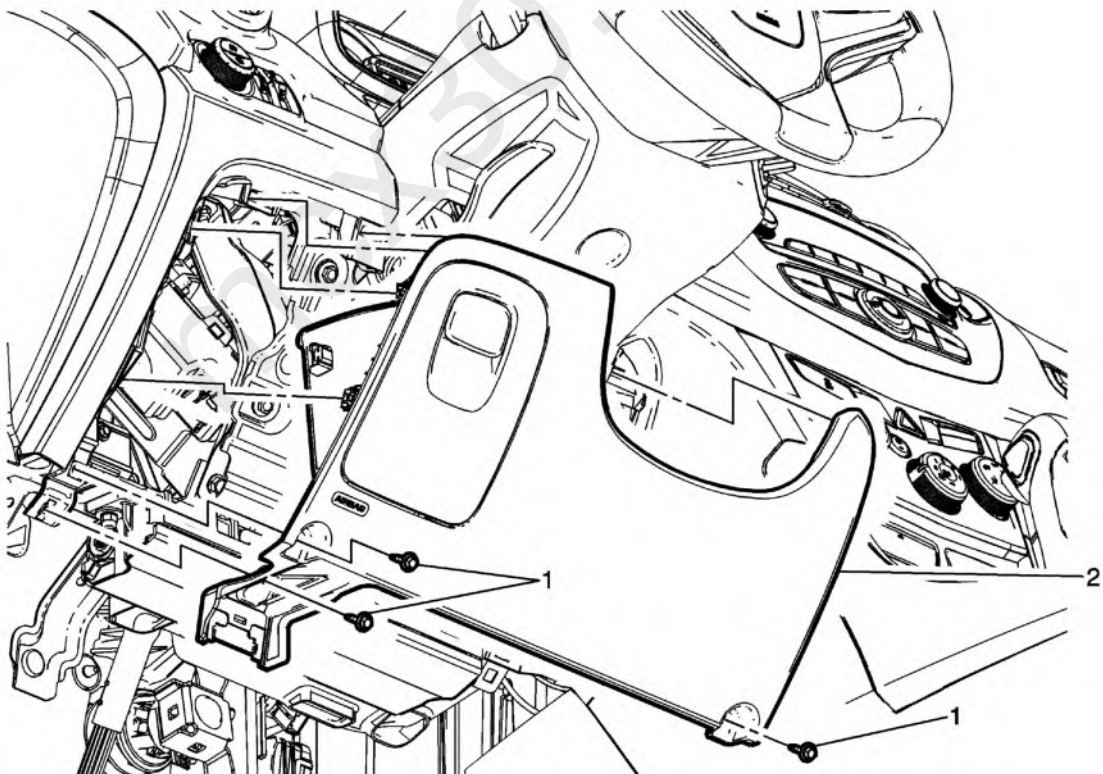


Fig. 74: Instrument Panel Knee Bolster (Trax)

Courtesy of GENERAL MOTORS COMPANY

5. Install Instrument Panel Knee Bolster (2). Refer to [Instrument Panel Knee Bolster Replacement \(Chevrolet\)](#).

MODE CONTROL CAM ALIGNMENT (C67)

Alignment Procedure

NOTE: The HVAC module must be removed to accurately set the mode cam gear timing. Failure to do so may result in poor HVAC performance, and damage to the HVAC module.

1. Remove the heater and air conditioning evaporator and blower module assembly (HVAC). Refer to [Heater and Air Conditioning Evaporator and Blower Module Removal and Installation](#).
2. Remove the mode control cam. Refer to [Mode Control Cam Replacement \(C67\)](#).
3. Inspect the mode valve levers and internal vent valve operation prior to installing the new mode control cam assembly.
4. Replace the components affecting the proper operation of the vent valves.

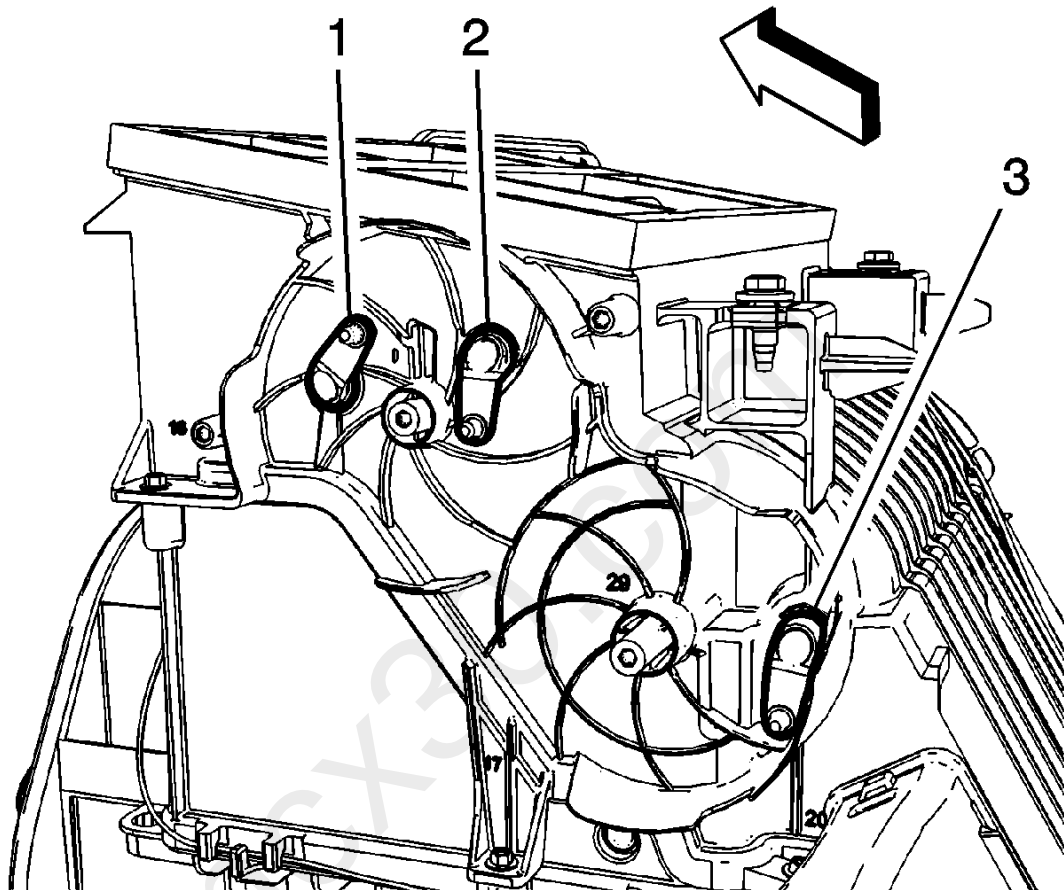


Fig. 75: Identifying Defrost Valve Lever, Vent Valve Lever And Heater Valve Lever
Courtesy of GENERAL MOTORS COMPANY

5. Rotate the defrost valve lever (1), vent valve lever (2), and heater valve lever (3) to the position as shown.
6. Using a small brush, apply a lithium based lubricant to the channels of the heater cam, and the mode cam where the levers travel.

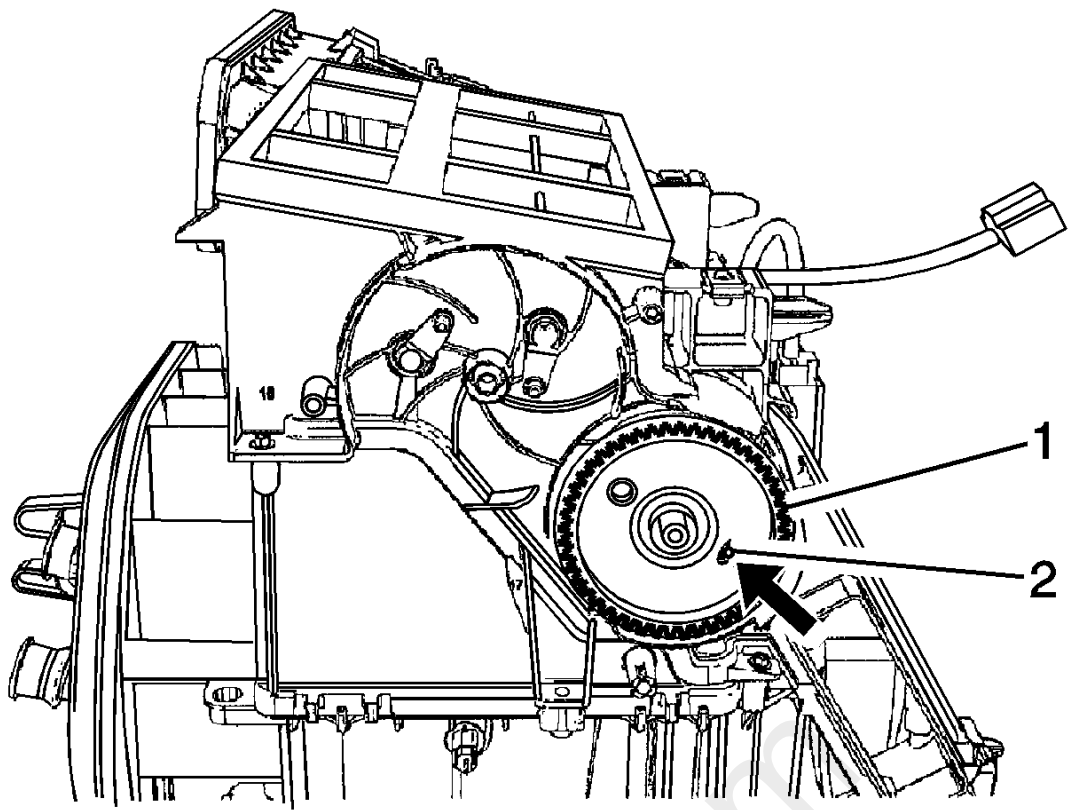


Fig. 76: Heater Cam And Heater Valve Lever Pin

Courtesy of GENERAL MOTORS COMPANY

7. Install the heater cam (1) aligning the channel on the back side of the heater cam with the heater valve lever pin (2).
8. Inspect the heater valve lever pin (2) is visible in the heater cam (1) inspection window indicated by the arrow.

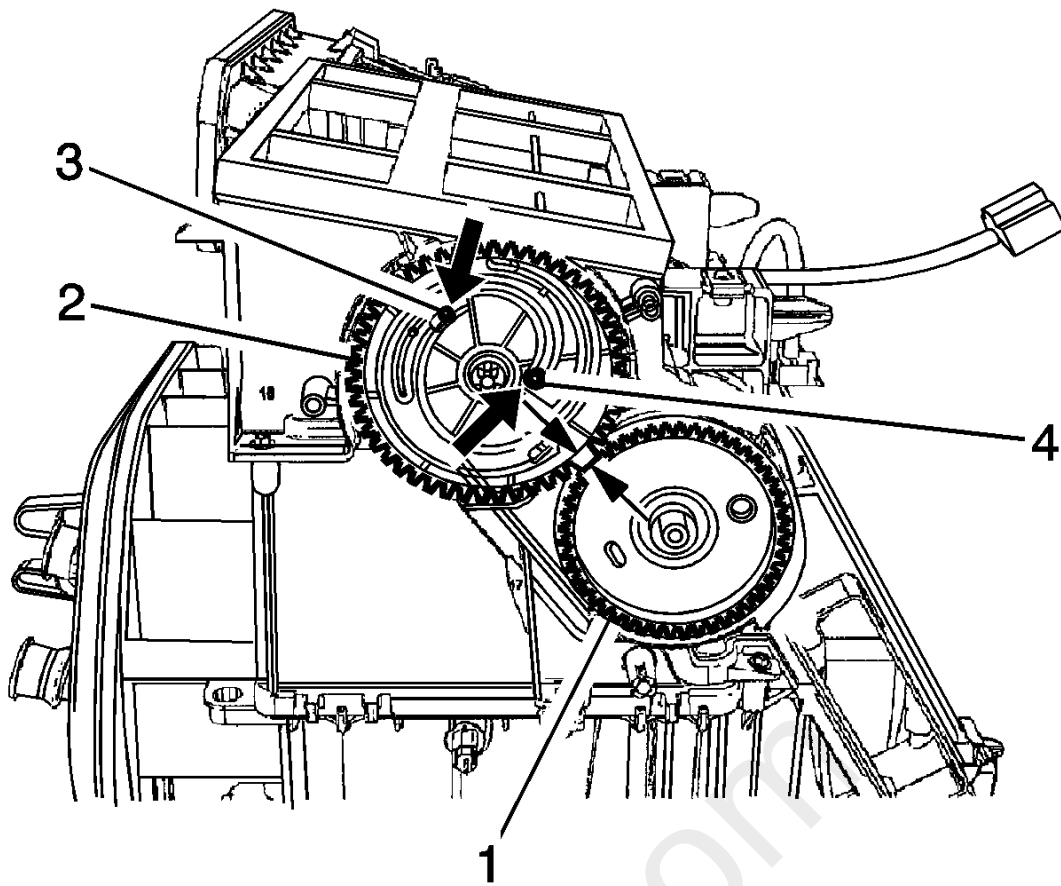


Fig. 77: Heater Cam, Mode Cam, Defroster Valve Lever Pin And Vent Valve Lever Pin
 Courtesy of GENERAL MOTORS COMPANY

NOTE: If the heater cam and mode cam are not aligned correctly, the mode operation will not function properly.

9. Rotate the heater cam (1) counter clockwise, position the larger heater cam female tooth gear as indicated by the arrow.
10. Install the mode cam (2) aligning the larger male tooth with the heater cam (1) larger female tooth indicated by the arrows, while aligning the channels on the back side of the mode cam (2) with the defroster valve lever pin (3), and the vent valve lever pin (4). The pins should be visible through the inspection windows.
11. Verify that the large male tooth on the mode control cam (2) is aligned with the large female tooth on the heater cam (1).
12. Re-install the heater and air conditioning evaporator and blower module assembly (HVAC). Refer to [Heater and Air Conditioning Evaporator and Blower Module Removal and Installation](#) .
13. Verify for proper operation of the HVAC system.

MODE CONTROL CAM ALIGNMENT (C60)

Alignment Procedure

1. Remove Heater and Air Conditioning Evaporator and Blower Module. Refer to [Heater and Air Conditioning Evaporator and Blower Module Removal and Installation](#)
2. Remove Mode Control Cam. Refer to [Mode Control Cam Replacement \(C60 Mode Cam\)](#).

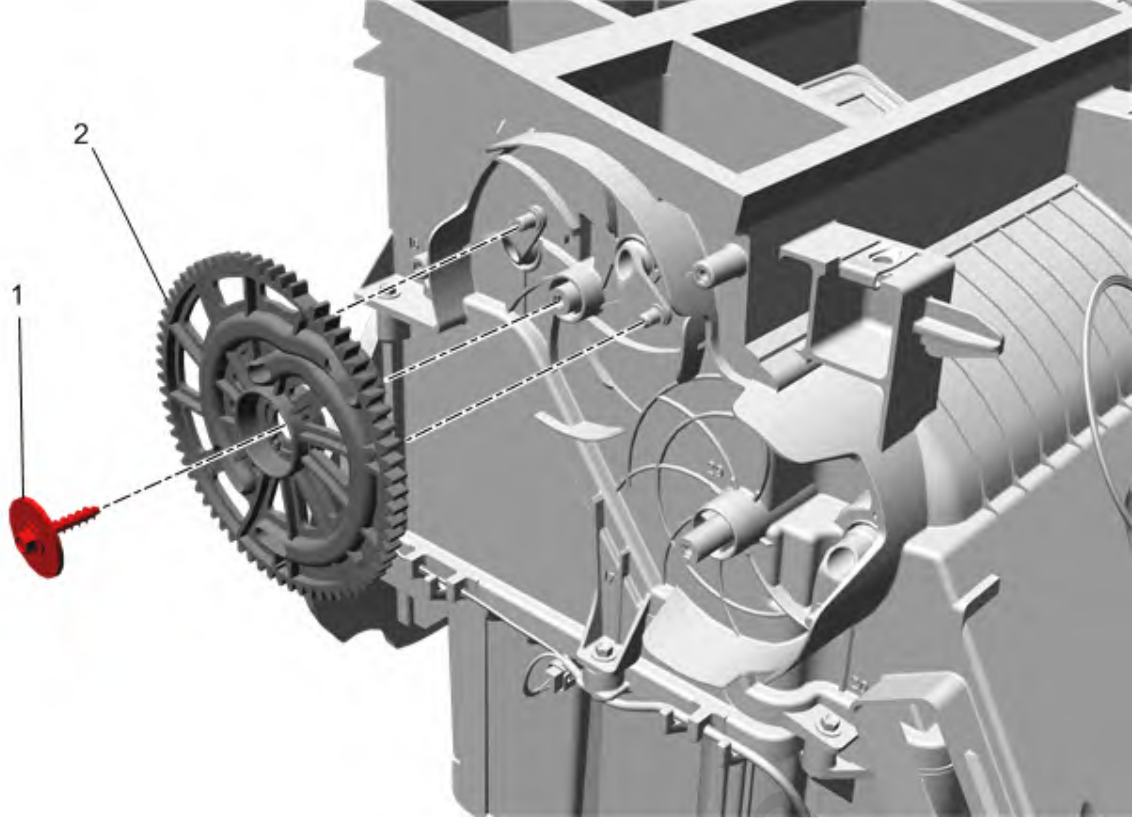


Fig. 78: Mode Cam Screw And Mode Cam
Courtesy of GENERAL MOTORS COMPANY

3. Remove the mode cam screw (1) and the mode cam (2) from the heater and air conditioning evaporator and blower module.
4. Inspect the mode valve levers and internal vent valve operation prior to installing the new mode control cam.
5. Replace the components affecting the proper operation of the vent valves.

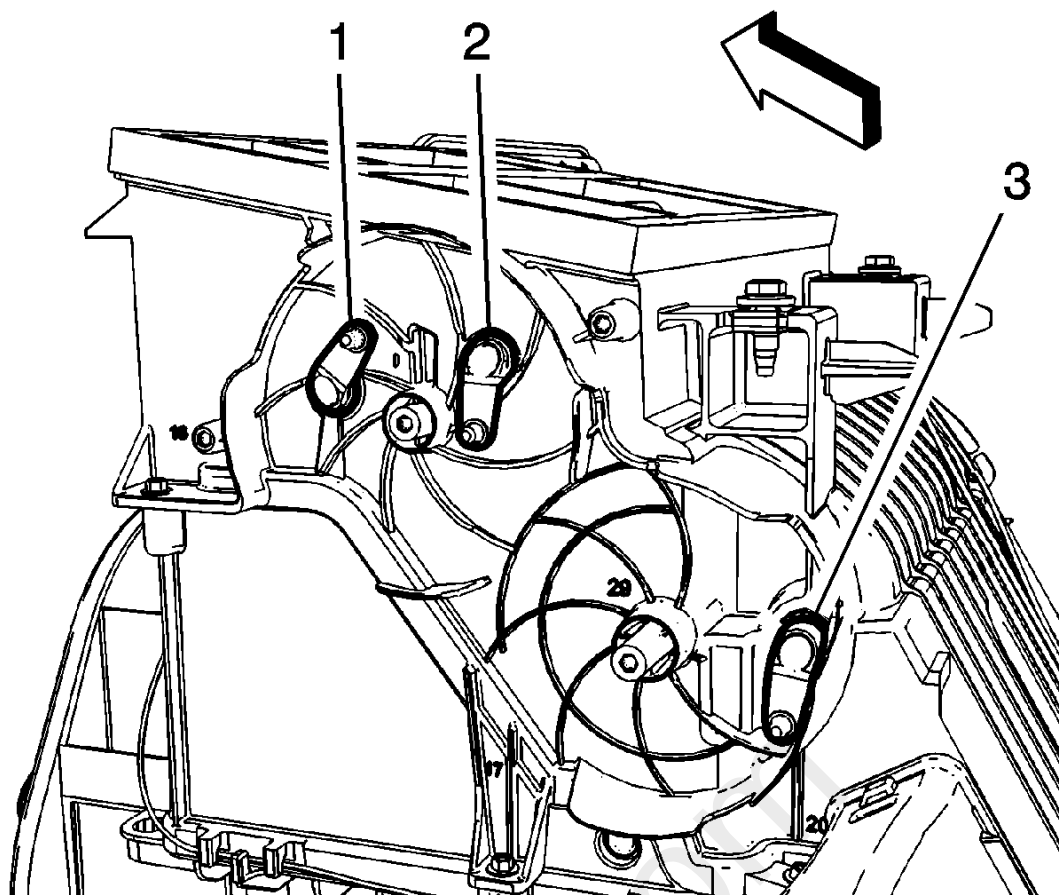


Fig. 79: Identifying Defrost Valve Lever, Vent Valve Lever And Heater Valve Lever
Courtesy of GENERAL MOTORS COMPANY

6. Rotate the defrost valve lever (1), and vent valve lever (2) clockwise, and heater valve lever (3) counter clockwise to the position shown.
7. Using a small brush, apply a lithium based lubricant to the channels of the heater cam, and the mode cam where the levers travel.

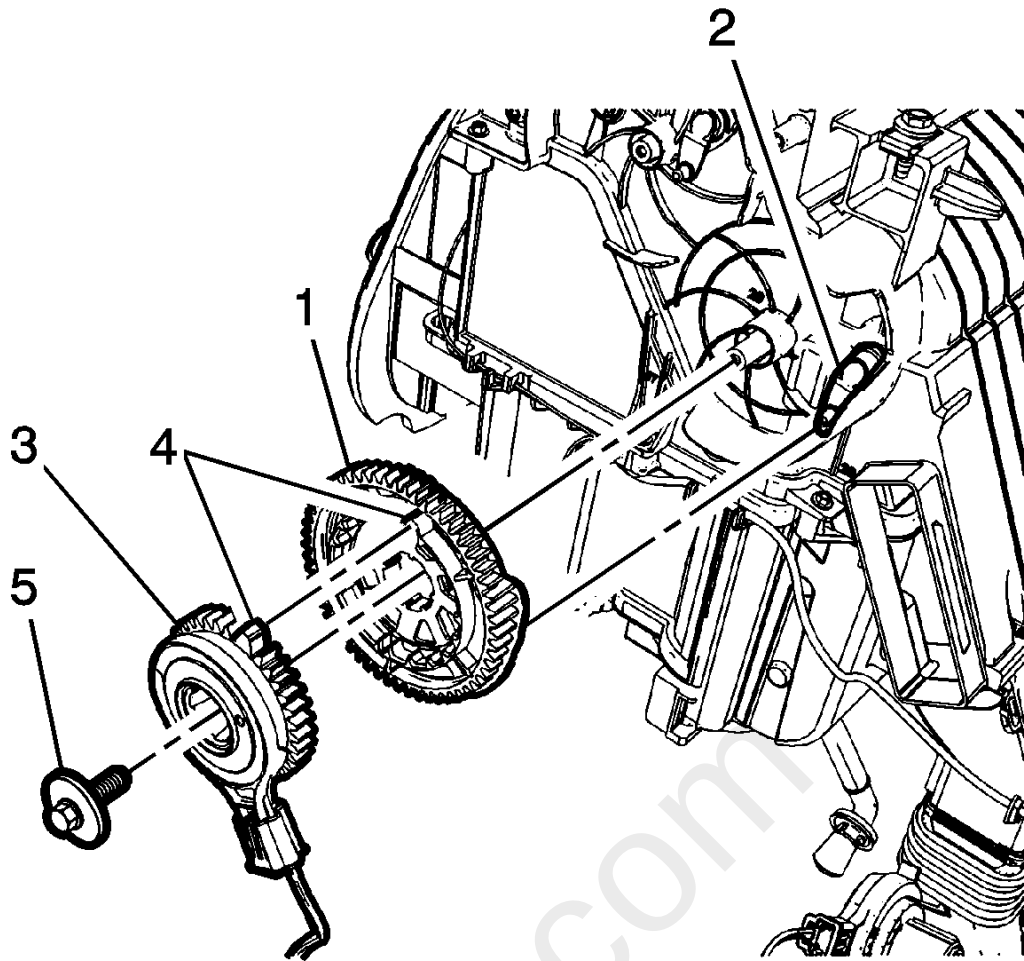


Fig. 80: Identifying Heater Cam, Heater Valve Lever Pin, Mode Control Cable End And Screw

Courtesy of GENERAL MOTORS COMPANY

8. Install the heater cam (1) aligning the channel on the back side heater cam with the heater valve lever pin (2).
9. Install the mode control cable end (3) into the heater cam, aligning the large male tooth gear on the mode control cable end with the larger heater cam female tooth gear as indicated by the arrows (4).

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

10. Install the mode control cable retaining screw (5) and tighten to 2.0 N.m (18 lb in).

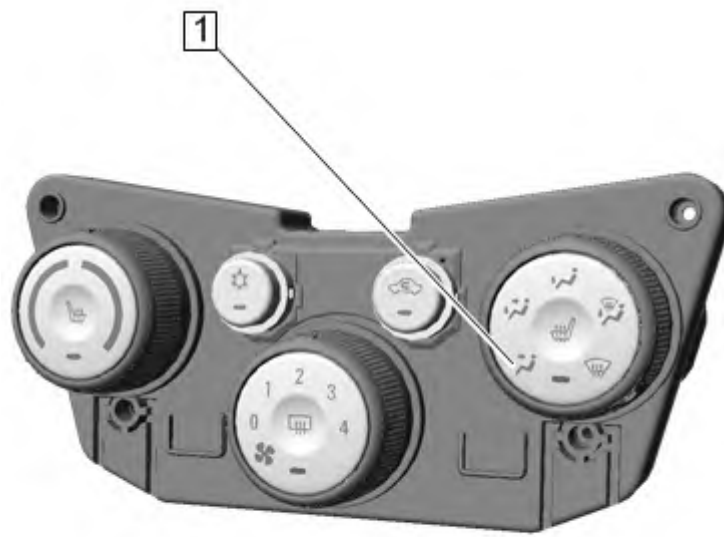


Fig. 81: Control To Vent Mode Position Indicated By Lead Line

Courtesy of GENERAL MOTORS COMPANY

NOTE: If the heater cam is not aligned to heater valve lever pin correctly, the mode control knob will not function properly.

11. Turn the control knob on the heater and air conditioning control to the vent mode position as indicated by the lead line (1).

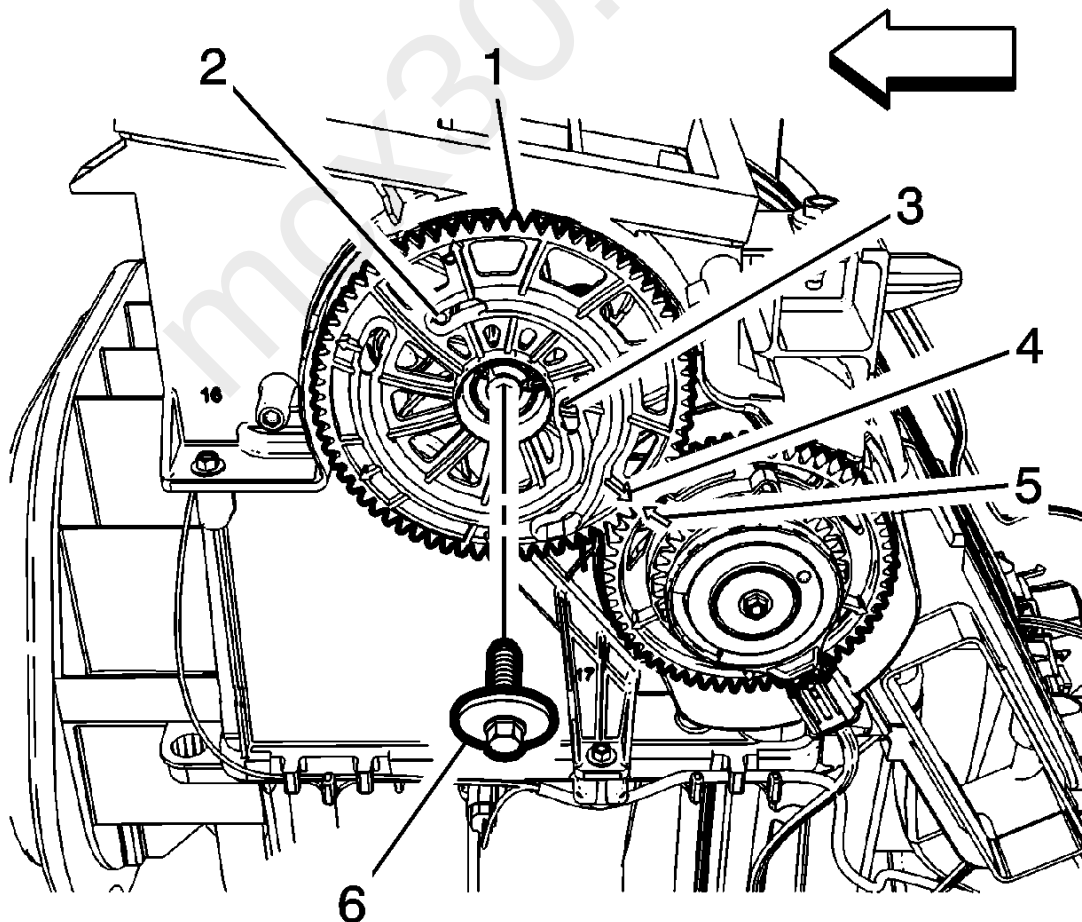


Fig. 82: Mode Cam, Defroster Valve Lever Pin, Vent Valve Lever Pin, Mode Control Cam And Large Male Tooth

12. Install the mode cam (1) aligning the channels on the back side mode cam with the defroster valve lever pin (2), and the vent valve lever pin (3). The pins should be visible through the inspection windows.
13. Verify that the large female tooth on the mode cam (4) is aligned with the large male tooth (5) on the heater cam.
14. Install the heater and air conditioning mode control cam bolt (6) and tighten to 2.0 N.m (18 lb in).

MODE CONTROL CAM ACTUATOR REPLACEMENT (C67)

Removal Procedure

1. Disconnect the battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection \(without KL9\)](#). [Battery Negative Cable Disconnection and Connection \(with KL9\)](#).
2. Remove Steering Column Assembly. 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 \(Mexico, N40\)](#).

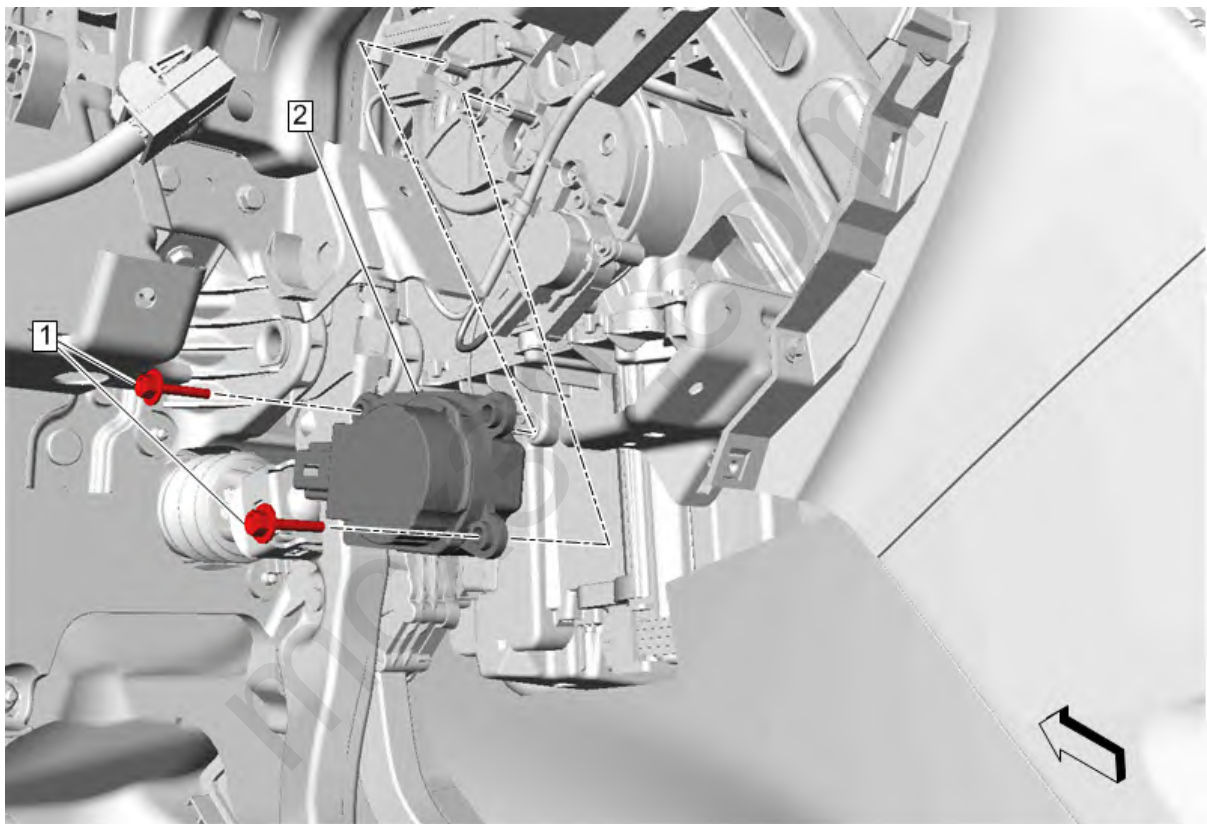


Fig. 83: Mode Control Cam Actuator And Bolts

Courtesy of GENERAL MOTORS COMPANY

3. Remove Mode Control Cam Actuator Bolts (1) (Qty: 2)
4. Remove Mode Control Cam Actuator (2)
5. Disconnect the electrical connector.

Installation Procedure

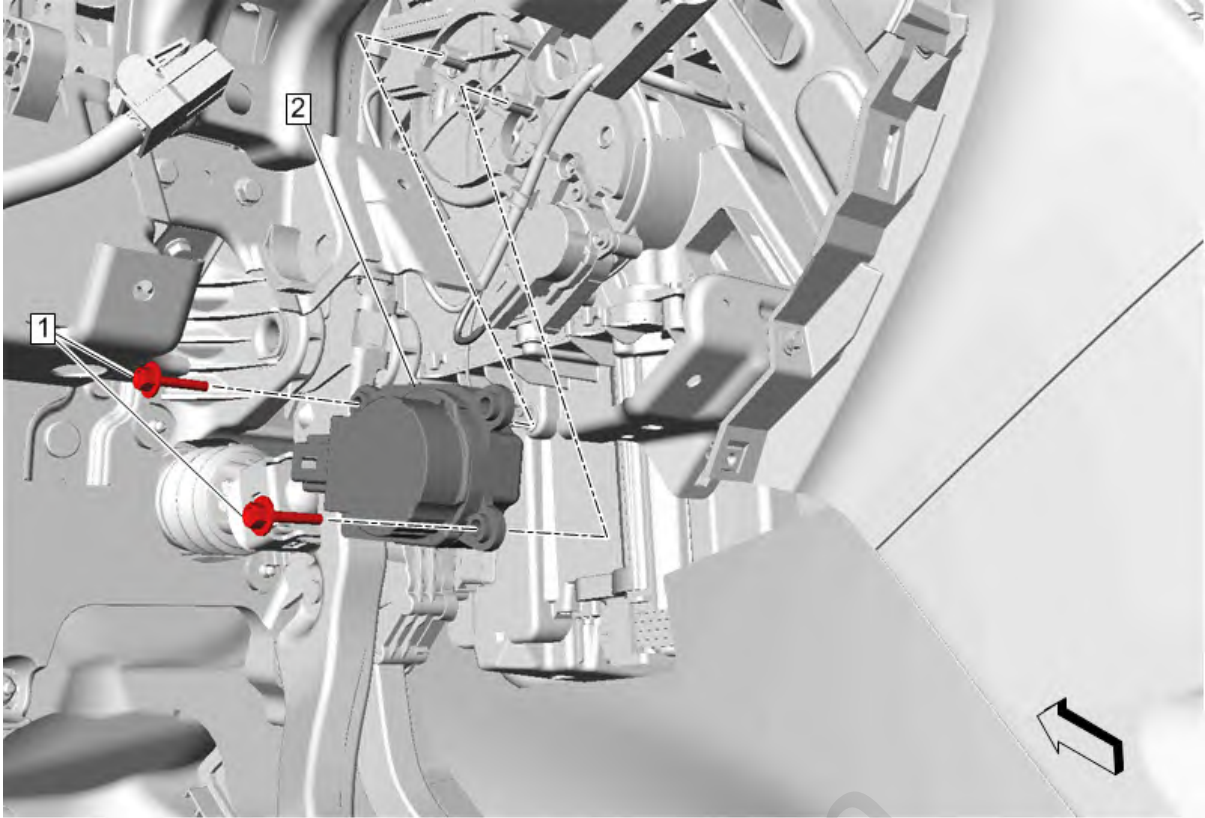


Fig. 84: Mode Control Cam Actuator And Bolts
Courtesy of GENERAL MOTORS COMPANY

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

1. Connect the electrical connector.
2. Install Mode Control Cam Actuator (2)
3. Install and tighten Mode Control Cam Actuator Bolts (1) (Qty: 2) to 1.5 N.m (13 lb in)
4. Install Steering Column Assembly. 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 \(Mexico, N40\)](#).
5. Connect the battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection \(without KL9\)](#), [Battery Negative Cable Disconnection and Connection \(with KL9\)](#).
6. Clear the DTCs from the heater and air conditioning remote control module.
7. Perform the actuator calibration procedure. Refer to [Actuator Recalibration \(C67\)](#).

AIR INLET VALVE ACTUATOR REPLACEMENT (RECIRCULATION)

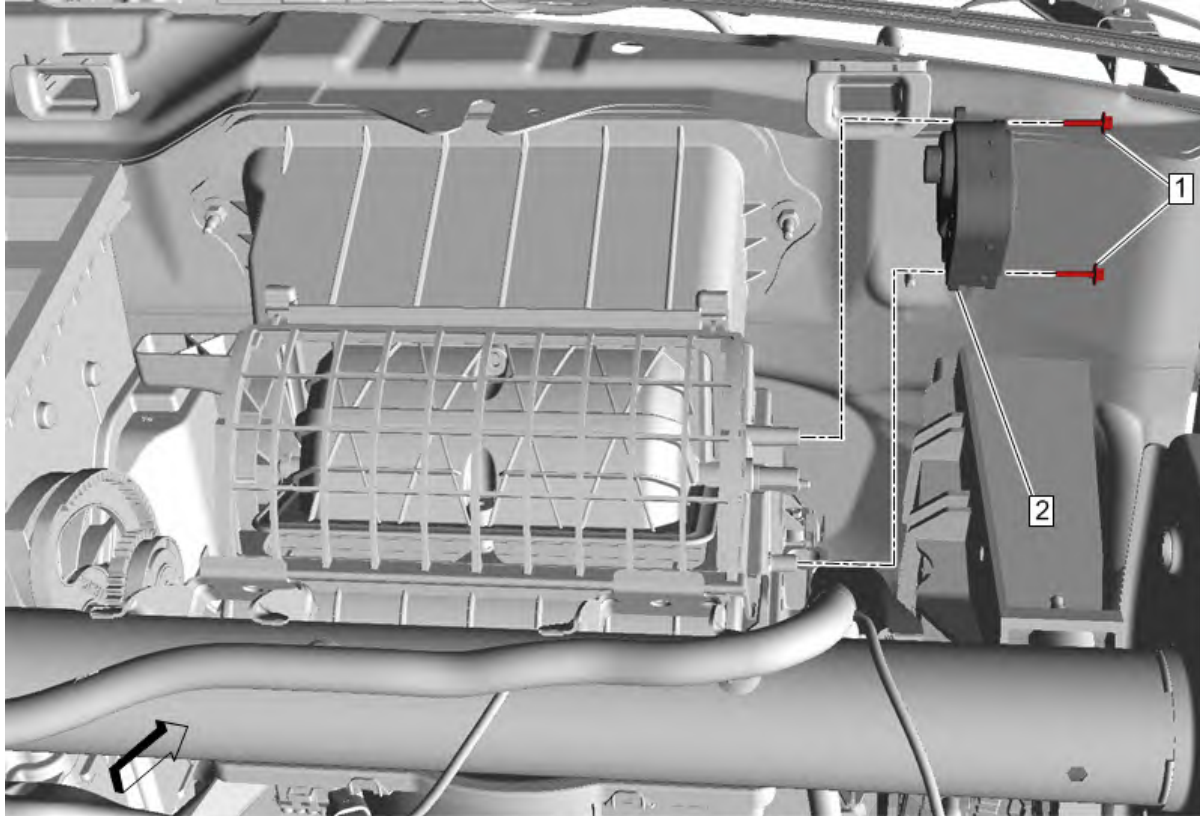


Fig. 85: Air Inlet Valve Actuator (Recirculation)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Instrument Panel Assembly. Refer to Instrument Panel Assembly Replacement (Buick) , Instrument Panel Assembly Replacement (Chevrolet)	
1	Air Inlet Valve Actuator Bolt CAUTION: Refer to Fastener Caution . Tighten 1.2 N.m (11 lb in)
2	Air Inlet Valve Actuator Procedure Disconnect the electrical connector.

HEATER AND AIR CONDITIONING CONTROL WIRING HARNESS REPLACEMENT (C60)

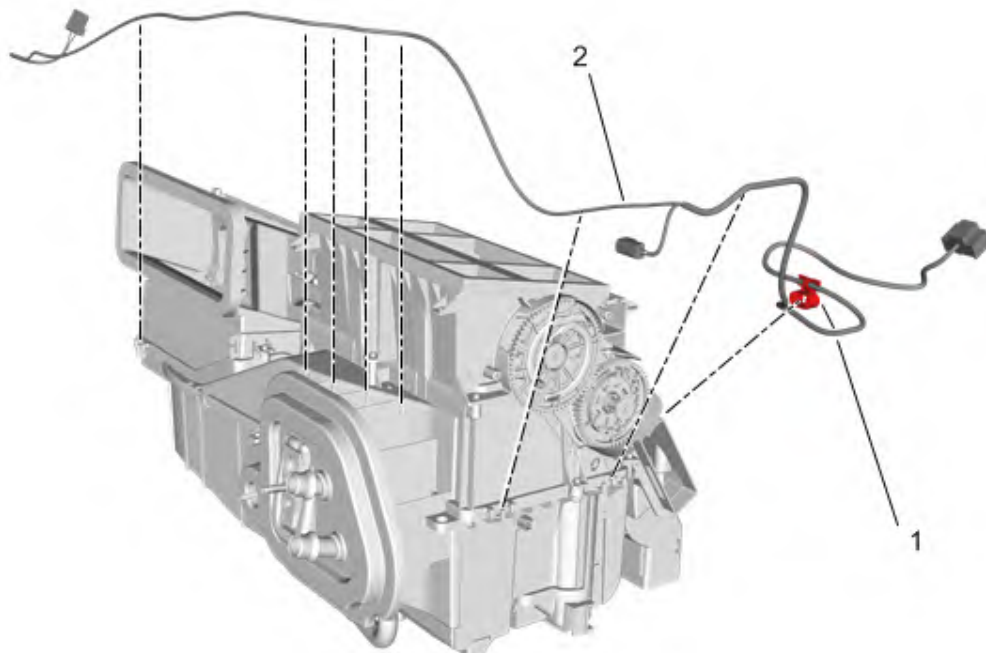


Fig. 86: Heater and Air Conditioning Control Wiring Harness (C60).

Courtesy of GENERAL MOTORS COMPANY

Call out	Component Name
Preliminary Procedure Remove the heater and air conditioning evaporator and blower module assembly. Refer to Heater and Air Conditioning Evaporator and Blower Module Removal and Installation .	
1	Heater and Air Conditioning Control Wiring Harness Retainer
2	Heater and Air Conditioning Control Wiring Harness Procedures 1. Disconnect the evaporator air temperature sensor electrical connector. 2. Disconnect the air inlet valve actuator electrical connector. 3. Remove the heater and air conditioning control wiring harness from the case retainers.

HEATER AND AIR CONDITIONING CONTROL WIRING HARNESS REPLACEMENT (C67)

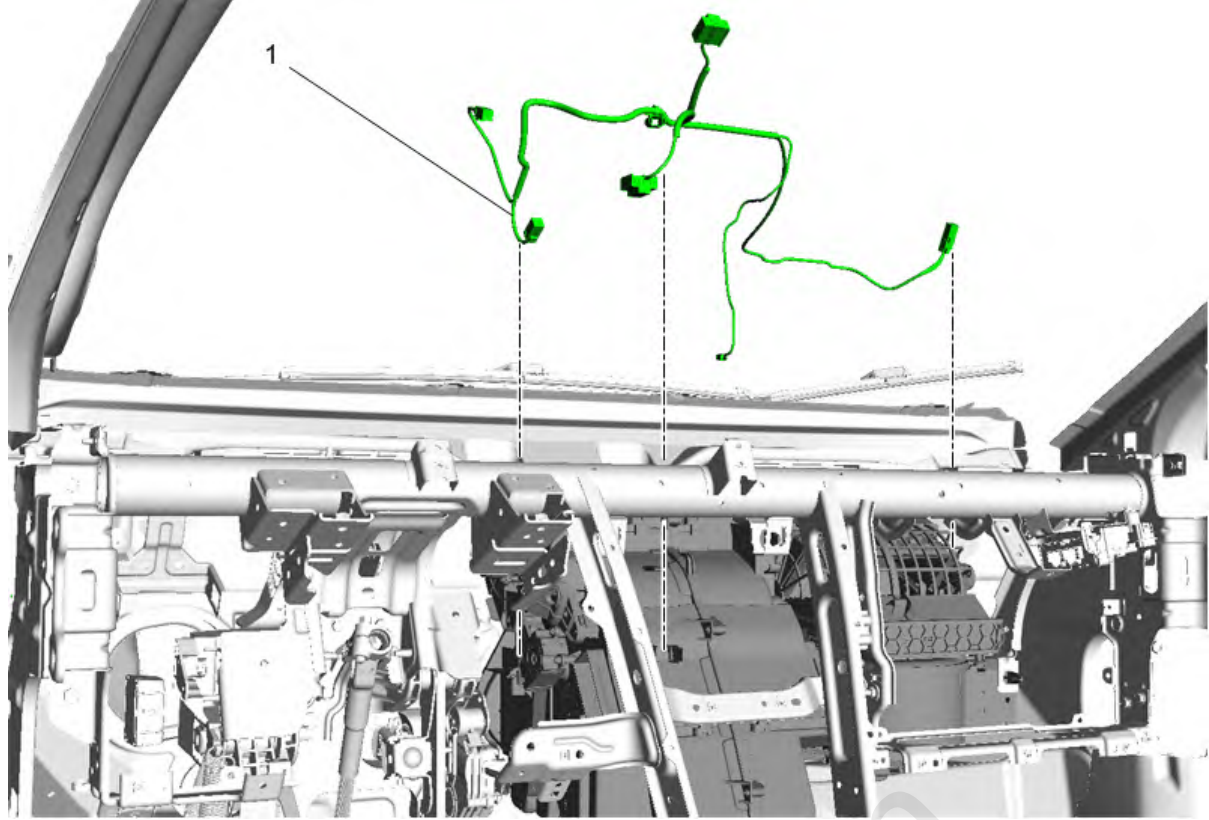


Fig. 87: Heater and Air Conditioning Control Wiring Harness (C67).

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Instrument Panel Assembly. Refer to <u>Instrument Panel Assembly Replacement (Buick)</u>	
1	Air Conditioning Wiring Harness Procedure 1. Disconnect the electrical connectors. 2. Remove the wiring harness.

SUN LOAD TEMPERATURE SENSOR REPLACEMENT

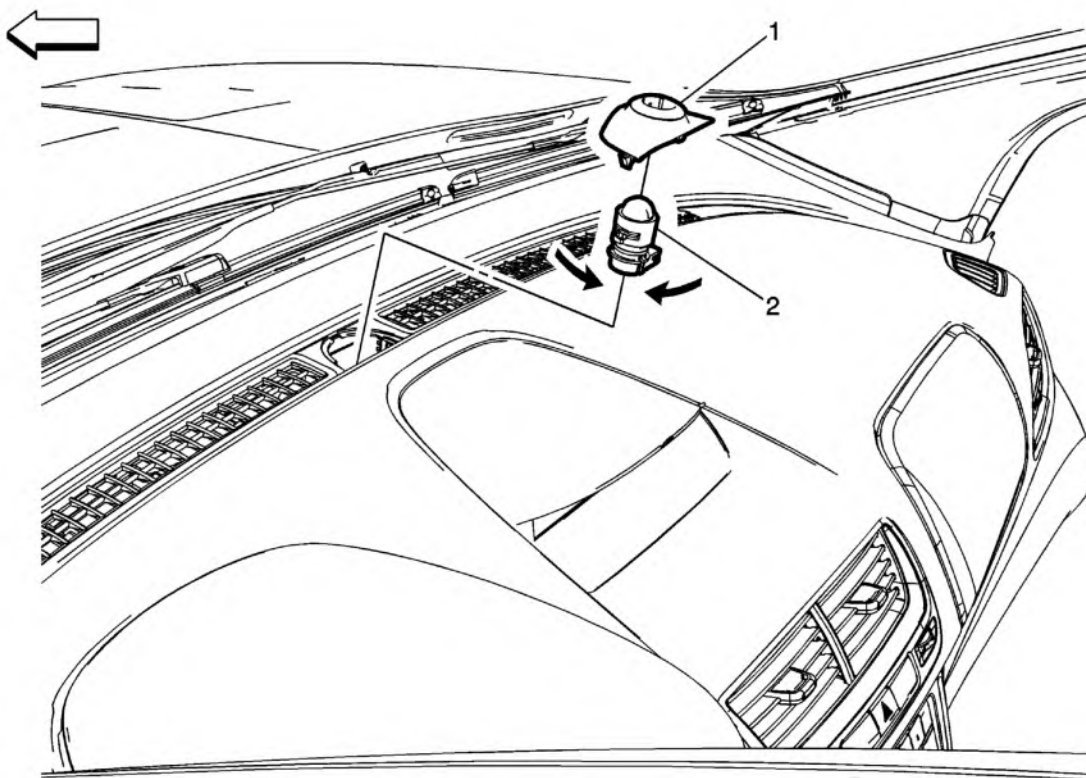


Fig. 88: Sun Load Temperature Sensor
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Sun Load Temperature Sensor Bezel Remove Sun Load Temperature Sensor Bezel. Refer to Sun Load Temperature Sensor Bezel Replacement (Buick) .
2	Sun Load Temperature Sensor Procedures 1. Disconnect the electrical sun load temperature sensor connector. 2. Turn the sun load temperature sensor quarter of a turn clockwise to remove.

SUN LOAD TEMPERATURE SENSOR REPLACEMENT

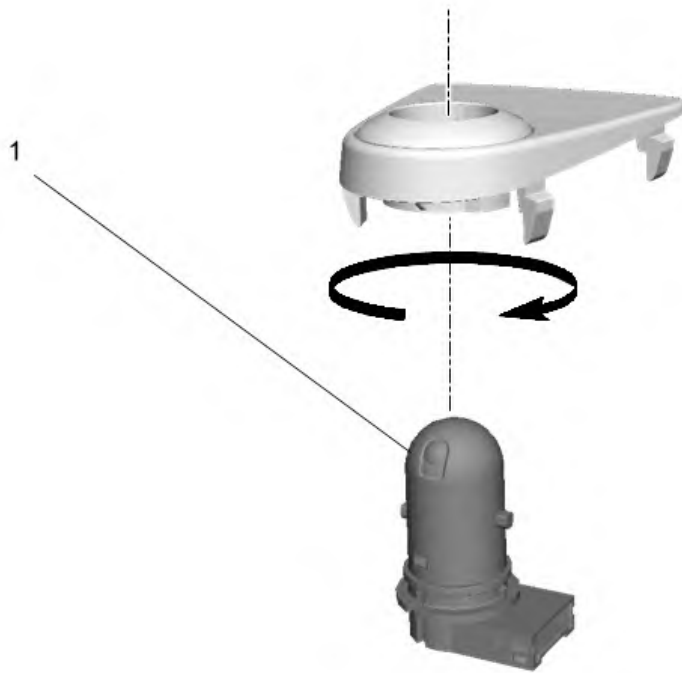


Fig. 89: Sun Load Temperature Sensor
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Sun Load Temperature Sensor Bezel. Refer to Sun Load Temperature Sensor Bezel Replacement (Buick)	
1	Sun Load Temperature and Headlamp Automatic Control Ambient Light Sensor Procedure Turn the sun load temperature and head-lamp automatic control ambient light sensor quarter of turn counter clockwise to remove from the sun load temperature sensor bezel.

SUN LOAD TEMPERATURE AND HEADLAMP AUTOMATIC CONTROL AMBIENT LIGHT SENSOR REPLACEMENT

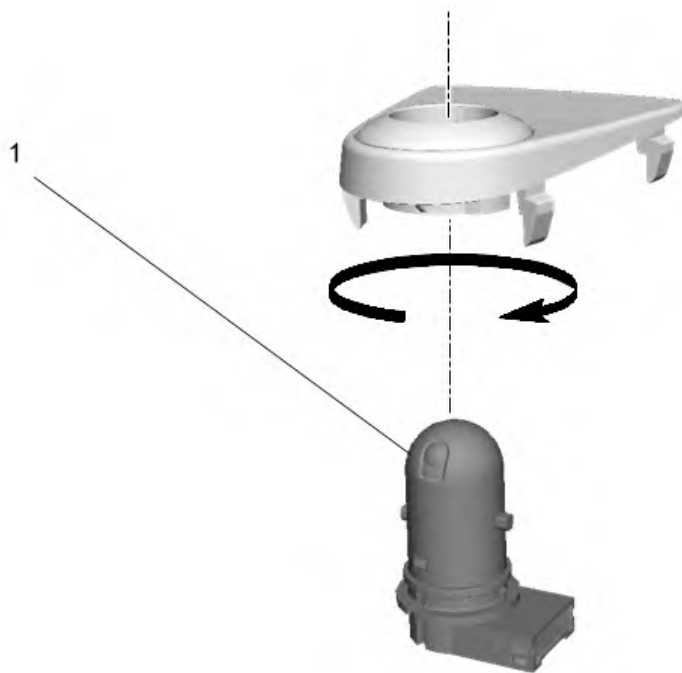


Fig. 90: Sun Load Temperature and Headlamp Automatic Control Ambient Light Sensor
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Callout	Component Name
Preliminary Procedure Remove Sun Load Temperature Sensor Bezel. Refer to Sun Load Temperature Sensor Bezel Replacement (Buick) .	
1	Sun Load Temperature and Headlamp Automatic Control Ambient Light Sensor Procedure Turn the sun load temperature and head-lamp automatic control ambient light sensor quarter of turn counter clockwise to remove from the sun load temperature sensor bezel.

DESCRIPTION AND OPERATION

MANUAL HVAC DESCRIPTION AND OPERATION

The air temperature and the air delivery description and operation are divided into five areas:

- HVAC Control Components
- Air Speed
- Air Delivery
- Heating and A/C Operation
- Recirculation Operation

HVAC Control Components

HVAC Control Assembly

The HVAC control assembly interfaces between the operator and the HVAC system to maintain air temperature and distribution settings. The air temperature and mode doors are controlled by cables. The recirculation actuator is electrically controlled.

The HVAC control module supports the following features:

Feature	Availability
Afterblow	NO

Feature	Availability
Purge	NO
Personalization	NO
Actuator Calibration	NO

Evaporator Temperature Sensor

The evaporator temperature sensor is a two-wire negative temperature co-efficient thermistor. The sensor operates within a temperature range of -40 to +85°C (-40 to +185°F). The sensor is installed at the evaporator and measures its temperature. If the temperature drops under 1°C (34°F), the compressor will be switched off in order to prevent a frozen evaporator.

A/C Refrigerant Pressure Sensor

The engine control module (ECM) monitors the high side refrigerant pressure through the signal circuit of the A/C refrigerant pressure sensor. The ECM supplies a 5V reference and a low reference to the sensor. Changes in the A/C refrigerant pressure cause the sensor signal to the ECM to vary. When the pressure is high, the signal voltage is high. When the pressure is low, the signal voltage is low. When pressure is high, the ECM commands the cooling fans on. When pressure is too high or too low, the ECM will inhibit activation of the A/C compressor.

A/C Compressor

The A/C compressor is belt driven and operates when the magnetic clutch is engaged. When the A/C switch is pressed, an A/C request message to the ECM. If the ECM determines that conditions are acceptable for A/C operation, it will ground the A/C compressor clutch relay control circuit, energizing the A/C compressor clutch relay. With the relay contacts closed, battery voltage is applied to the A/C compressor clutch. The A/C compressor clutch will engage and the compressor will operate.

Blower Motor Control

The blower motor control processor controls the speed of the blower motor by increasing or decreasing the voltage drop on the ground side of the blower motor. The HVAC control module provides a low side pulse width modulation (PWM) signal to the blower motor control processor via the blower motor speed control circuit. As the requested blower speed increases, the HVAC control module increases the amount of time that the speed signal is modulated to ground. As the requested blower speed decreases, the HVAC control module decreases the amount of time that the signal is modulated to ground.

Air Delivery

The HVAC control assembly controls the distribution of air by the use of recirculation actuator and the mechanically controlled mode door. The modes that may be selected are:

- Defrost - Air flow is directed at the windshield
- Defog - Air flow is split between the windshield and floor
- Vent - Air flow is directed to the vents located in the instrument panel
- Bi-Level - Air flow is split between the instrument panel vents and the floor vents
- Floor - Air flow is directed to the floor

The desired air distribution mode can be selected with the air distribution knob at the HVAC control assembly. Depending on the position of the flap, air is distributed through various ducts leading to the outlets in the instrument panel. When the defrost position is selected, the HVAC control assembly will command the recirculation actuator to outside air, reducing window fogging.

Heating and A/C Operation

The purpose of the heating and A/C system is to provide heated or cooled air to the interior of the vehicle. The A/C system will also remove humidity from the interior and reduce windshield fogging. Regardless of the temperature setting, the following can affect the rate that the HVAC system can achieve the desired temperature:

- Recirculation actuator setting

- Difference between inside and desired temperature
- Blower motor speed setting
- Mode setting

When the A/C switch is pressed, an A/C request serial data message to the ECM. If the ECM determines that conditions are acceptable for A/C operation, it will ground the A/C compressor clutch relay control circuit, energizing the A/C compressor clutch relay. With the relay contacts closed, battery voltage is supplied to the A/C compressor clutch. The A/C compressor clutch will engage and the compressor will operate.

The following conditions must be met in order to activate the A/C compressor:

- Battery voltage is between 9-18 V
- Engine coolant temperature is less than 120°C (248 °F)
- Engine speed is greater than 600 RPM
- Engine speed is less than 6200 RPM
- A/C high side pressure is between 220-3100 kPa (32-450 PSI)
- Throttle position is less than 95%
- Evaporator temperature is greater than 3°C (38 °F)
- ECM does not detect an unacceptable torque load
- ECM does not detect insufficient idle quality

The temperature door controls the temperature of the air entering the passenger compartment. Air entering the passenger compartment passes through the heater core and/or the evaporator core. The position of the temperature door determines how much air passes through the heater or evaporator core. As the temperature control is moved to a hotter setting, the temperature door will direct more air through the heater core. As the temperature control is moved to a cooler setting, more air will be passed through the evaporator core.

Recirculation Operation

Recirculation Actuator

The recirculation actuator is a two-wire bi-directional electric motor. There are two control circuits that allow actuator operation. The control circuits use either a 0 or 12 V value to coordinate the actuator movement. When the actuator is at rest, both control circuits have a value of 0 V. To move the actuator, the HVAC control module grounds one of the control circuits while providing the other with 12 V. The HVAC control module reverses the polarity of the control circuits to move the actuator in the opposite direction.
