

HVAC - Manual

cardiagn.com

Diagnostic Information and Procedures

cardiagn.com

1. HVAC
2. HVAC - MANUAL
3. DIAGNOSTIC INFORMATION AND PROCEDURES
- 4.

DTC P0537 or P0538

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

DTC Descriptors

DTC P0537

Air Conditioning (A/C) Evaporator Temperature Sensor Circuit Low Voltage

DTC P0538

Air Conditioning (A/C) Evaporator Temperature Sensor Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P0537	P0538	P0538*	â€”
Low Reference	â€”	P0538	P0538*	â€”

* Internal ECM or sensor damage may occur if the circuit is shorted to B+.

Typical Scan Tool Data

AC Evaporator Temp. Sensor (Without FX3)

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: Engine running in Closed Loop, A/C off.			
Parameter Normal Range: Varies with ambient temperature			
Signal	142.5Â°C (288.5Â°F)	48Â°C (54.4Â°F)	48Â°C (54.4Â°F)*
Low Reference	â€”	48Â°C (54.4Â°F)	48Â°C (54.4Â°F)*

* Internal ECM or sensor damage may occur if the current is shorted to B+.

AC Evaporator Temp. Sensor (FX3)

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: Engine running in Closed Loop, A/C off.			
Parameter Normal Range: Varies with ambient temperature			
Signal	215Â°C (419Â°F)	40Â°C (40Â°F)	40Â°C (40Â°F)
Low Reference	â€”	40Â°C (40Â°F)	40Â°C (40Â°F)

Internal ECM or sensor damage may occur if the current is shorted to B+.

Circuit Description

When the refrigerant temperature of the evaporator drops below a certain temperature, the evaporator cores get stuck with frost or ice, reducing the airflow, lowering the cooling capacity. The thermistor is a sensor which is used to prevent from frosting or icing. The thermistor is installed on the evaporator.

Conditions for Running the DTC

P0537 or P0538 (Without FX3)

- The engine coolant temperature is greater than 60Â°C (140Â°F).
- The DTC runs continuously when the above conditions are met.

P0537 or P0538 (FX3)

- DTC P0562 or P0563 is not set.
- The engine is running for greater than 10s.
- The DTC runs continuously when the above conditions are met.

Conditions for Setting the DTC

P0537 (Without FX3)

The ECM detects that the AC evaporator temperature sensor signal voltage is less than 0.0293V.

P0538 (Without FX3)

The ECM detects that the AC evaporator temperature sensor signal voltage is greater than 4.9022V.

P0537 (FX3)

The ECM detects that the AC evaporator temperature sensor signal voltage is less than 0.1V.

P0538 (FX3)

The ECM detects that AC evaporator temperature sensor signal voltage is greater than 4.9V.

Action Taken When the DTC Sets

DTC P0537 and P0538 are Type C DTCs.

Conditions for Clearing the DTC

DTC P0537 and P0538 are Type C DTCs.

Reference Information

Schematic Reference

[HVAC Schematics](#)

Connector End View Reference

[Master Electrical Component List](#)

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. Engine running, verify that the DTC P0537 or P0538 is not set.
2.
 - If any of the DTCs are set, perform Circuit/System Testing.

3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B39 A/C Evaporator Temperature Sensor.
2. Ignition OFF, test for less than 5 Ω between the low reference circuit terminal $\text{\textcircled{2}}$ and ground.
3.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K20 ECM.
4. Ignition ON, verify the scan tool A/C evaporator temperature sensor parameter is less than below value.
5.
 - 47 $^{\circ}\text{C}$ (52.6 $^{\circ}\text{F}$) (Without FX3)
 - 39 $^{\circ}\text{C}$ (38.2 $^{\circ}\text{F}$) (With FX3)
6.
 - If greater than the specified range, test the signal circuit for a short to ground. If the circuit tests normal, replace the K20 ECM.
7. Note:

If the fuse in the jumper wire opens, the signal circuit is shorted to a voltage and the sensor may be damaged.
8. Connect a 1A fused jumper wire between the signal circuit terminal $\text{\textcircled{1}}$ and the low reference circuit terminal $\text{\textcircled{2}}$. Verify the scan tool A/C evaporator temperature sensor parameter is greater than below value.
9.
 - 141.5 $^{\circ}\text{C}$ (286.7 $^{\circ}\text{F}$) (Without FX3)
 - 214 $^{\circ}\text{C}$ (417.2 $^{\circ}\text{F}$) (FX3)
10.
 - If less than the specified range, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the K20 ECM.
11. If all circuits test normal, test or replace the B39 A/C Evaporator Temperature Sensor.

Repair Instructions

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

- [Air Conditioning Evaporator Air Temperature Sensor Replacement](#)
- [Control Module References](#) for ECM replacement, setup and programming

1. HVAC
2. HVAC - MANUAL
3. DIAGNOSTIC INFORMATION AND PROCEDURES
- 4.

DTC P0537 or P0538 (LKY)

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

DTC Descriptors

DTC P0537

Air Conditioning (A/C) Evaporator Temperature Sensor Circuit Low Voltage

DTC P0538

Air Conditioning (A/C) Evaporator Temperature Sensor Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P0537	P0538	P0538*	â€”
Low Reference	â€”	P0538	P0538*	â€”

* Internal ECM or sensor damage may occur if the circuit is shorted to B+.

Typical Scan Tool Data

A/C Evaporator Temp. Sensor

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: Engine running in Closed Loop, A/C off.			
Parameter Normal Range: Varies with ambient temperature			
Signal	142.5Â°C (288.5Â°F)	âˆ’48Â°C (âˆ’54.4Â°F)	âˆ’48Â°C (âˆ’54.4Â°F)*
Low Reference	â€”	âˆ’48Â°C (âˆ’54.4Â°F)	âˆ’48Â°C (âˆ’54.4Â°F)*

* Internal ECM or sensor damage may occur if the circuit is shorted to B+.

Circuit Description

When the refrigerant temperature of the evaporator drops below certain temperature, the evaporator cores get stuck with frost or ice, reducing the airflow, lowering the cooling capacity. The thermistor is a sensor which is used to prevent from frosting or icing. The thermistor is installed on the evaporator.

Conditions for Running the DTC

- The engine coolant temperature is greater than 60Â°C (140Â°F).
- The DTC runs continuously when the above conditions are met.

Conditions for Setting the DTC

P0537

The ECM detects that the A/C evaporator temperature sensor signal voltage is less than 0.03 V.

P0538

The ECM detects that the A/C evaporator temperature sensor signal voltage is greater than 4.96 V.

Action Taken When the DTC Sets

DTC P0537 and P0538 are Type C DTCs.

Conditions for Clearing the DTC

DTC P0537 and P0538 are Type C DTCs.

Reference Information

Schematic Reference

[HVAC Schematics](#)

Connector End View Reference

[Master Electrical Component List](#)

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. Engine running, verify that the DTC P0537 or P0538 is not set.
2.
 - If any of the DTCs are set, perform Circuit/System Testing.
3. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the B39 A/C Evaporator Temperature Sensor.
2. Ignition OFF, test for less than 5 Ω between the low reference circuit terminal 2 and ground.
3.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K20 ECM.
4. Ignition ON, verify the scan tool A/C evaporator temperature sensor parameter is less than 47 $^{\circ}$ C (52.6 $^{\circ}$ F).
5.
 - If greater than the specified range, test the signal circuit for a short to ground. If the circuit tests normal, replace the K20 ECM.
6. Note:

If the fuse in the jumper wire opens, the signal circuit is shorted to a voltage and the sensor may be damaged.
7. Connect a 1A fused jumper wire between the signal circuit terminal 1 and the low reference circuit terminal 2. Verify the scan tool A/C evaporator temperature sensor parameter is greater than 141.5 $^{\circ}$ C (286.7 $^{\circ}$ F).

8.
 - If less than the specified range, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K20 ECM.
9. If all circuits test normal, test or replace the B39 A/C Evaporator Temperature Sensor.

Repair Instructions

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

- [Air Conditioning Evaporator Air Temperature Sensor Replacement](#)
- [Control Module References](#) for ECM replacement, setup, and programming

cardiagn.com

1. HVAC
2. HVAC - MANUAL
3. DIAGNOSTIC INFORMATION AND PROCEDURES
- 4.

DTC P0646 or P0647

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

DTC Descriptors

DTC P0646

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

DTC P0647

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	P0646	P0647	P0647	â€”
Control	P0646	P0647	P0647	â€”

Circuit/System Description

The engine control module (ECM) controls the A/C compressor clutch based on an A/C request message from the HVAC control module. The ECM monitors the A/C refrigerant pressure sensor and if pressure is within a specified range, will engage the A/C compressor by grounding the A/C compressor clutch relay control circuit.

B+ is applied to the A/C relay in the RUN/START position and with the A/C compressor clutch relay control circuit grounded by the ECM, current flows through the coil side of the A/C relay. With current flowing through the coil side of the relay, a magnetic field is created which pulls the switch side of the relay closed, sending current to the A/C compressor clutch, allowing the A/C compressor to be engaged.

Conditions for Running the DTC

P0646 (Without FX3)

- The engine is running.
- The DTC runs continuously when the above conditions are met.

P0647 (Without FX3)

- The engine is running.
- The A/C relay is commanded ON.
- The DTC runs continuously when the above conditions are met.

P0646 or P0647 (FX3)

- DTC P0562 or P0563 is not set.
- The engine is running.
- The ignition voltage is between 11â€”16V.
- The DTC runs continuously when the above conditions are met.

Conditions for Setting the DTC

P0646

The ECM detects a short to ground or an open/high resistance on the AC clutch relay control circuit.

P0647

The ECM detects a short to voltage on the AC clutch relay control circuit.

Action Taken When the DTC Sets

DTC P0646 and P0647 are Type C DTCs.

Conditions for Clearing the DTC

DTC P0646 and P0647 are Type C DTCs.

Reference Information

Schematic Reference

[HVAC Schematics](#)

Connector End View Reference

[Master Electrical Component List](#)

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

Engine running, command the A/C Relay On and OFF with a scan tool. The Q2 A/C Compressor Clutch should engage and disengage.

Circuit/System Testing

1. Ignition OFF, disconnect the KR29 A/C Compressor Clutch Relay.
2. Ignition ON, verify a test lamp illuminates between the relay coil B+ circuit terminal 85 and ground.
3.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Ignition OFF, connect a test lamp between the relay coil B+ circuit terminal 85 and the relay control circuit terminal 86.
5. Ignition ON, command the A/C relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
6.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K20 ECM.

- If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K20 ECM.

7. If all circuits test normal, test or replace the KR29 A/C Compressor Clutch Relay.

Component Testing

1. Ignition OFF, disconnect the KR29 A/C Compressor Clutch Relay.
2. Test for 70â€“110â€“ of resistance between terminalsâ€“85 and 86.
3.
 - If not within the specified range, replace the KR29 A/C Compressor Clutch Relay.
4. Test for infinite resistance between the following terminals:
5.
 - 30 and 86
 - 30 and 87
 - 30 and 85
 - 85 and 87
6.
 - If not within the specified range, replace the KR29 A/C Compressor Clutch Relay.
7. Install a 20A fused jumper wire between terminalâ€“85 and B+. Install a jumper wire between relay terminalâ€“86 and ground. Test for less than 2â€“ between terminalâ€“30 and 87.
8.
 - If greater than the specified range, replace the KR29 A/C Compressor Clutch Relay.

Repair Instructions

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

[Control Module References](#) for ECM replacement, setup, and programming.

1. HVAC
2. HVAC - MANUAL
3. DIAGNOSTIC INFORMATION AND PROCEDURES
- 4.

DTC P0646 or P0647 (LKY)

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

DTC Descriptors

DTC P0646

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

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
Ignition	P0646	P0647	P0647	â€”
Control	P0646	P0647	P0647	â€”

Circuit/System Description

The engine control module (ECM) controls the A/C compressor clutch based on an A/C request message from the HVAC control module. The ECM engages the A/C compressor by grounding the A/C compressor clutch relay control circuit.

Ignition voltage is applied to the A/C relay in the RUN/START position and with the A/C compressor clutch relay control circuit grounded by the ECM, current flows through the coil side of the A/C relay. With current flowing through the coil side of the relay, a magnetic field is created which pulls the switch side of the relay closed, sending current to the A/C compressor clutch, allowing the A/C compressor to be engaged.

Conditions for Running the DTC

- The battery voltage is between 10â€“16 V.
- The DTC runs continuously when the above conditions are met.

Conditions for Setting the DTC

P0646

The ECM detects a short to ground or an open/high resistance on the A/C clutch relay control circuit.

P0647

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

Action Taken When the DTC Sets

DTC P0646 and DTC P0647 are Type C DTCs.

Conditions for Clearing the DTC

DTC P0646 and DTC P0647 are Type C DTCs.

Reference Information

Schematic Reference

[HVAC Schematics](#)

Connector End View Reference

[Master Electrical Component List](#)

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

Engine running, command the A/C Relay On and OFF with a scan tool. The Q2 A/C Compressor Clutch should engage and disengage.

Circuit/System Testing

1. Ignition OFF, disconnect the KR29 A/C Compressor Clutch Relay.
2. Ignition ON, verify a test lamp illuminates between the relay coil ignition circuit terminalâ€%85 and ground.
3.
 - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance.
4. Ignition OFF, connect a test lamp between the relay coil ignition circuit terminalâ€%85 and the relay control circuit terminalâ€%86.
5. Ignition ON, command the A/C relay ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
6.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K20 ECM.
 - If the test lamp is always OFF, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K20 ECM.
7. If all circuits test normal, test or replace the KR29 A/C Compressor Clutch Relay.

Component Testing

1. Ignition OFF, disconnect the KR29 A/C Compressor Clutch Relay.
2. Test for 70â€%110â€%85 between terminalsâ€%85 and 86.
3.
 - If not within the specified range, replace the KR29 A/C Compressor Clutch Relay.
4. Test for infinite resistance between the following terminals:
5.
 - 30 and 86

- 30 and 87
- 30 and 85
- 85 and 87

6.

- If not the specified range, replace the KR29 A/C Compressor Clutch Relay.

7. Install a 20A fused jumper wire between relay terminal 85 and B+. Install a jumper wire between relay terminal 86 and ground. Test for less than 2 Ω between relay terminal 30 and 87.

8.

- If greater than the specified range, replace the KR29 A/C Compressor Clutch Relay.

Repair Instructions

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

[Control Module References](#) for ECM replacement, setup, and programming

cardiagn.com

1. HVAC
2. HVAC - MANUAL
3. DIAGNOSTIC INFORMATION AND PROCEDURES
- 4.

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 Symptom Tables in order to verify that all of the following are true:
2.
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
3. Review the system operation in order to familiarize yourself with the system functions. Refer to [Manual HVAC Description and Operation](#).

Visual/Physical Inspection

1. Inspect for aftermarket devices which could affect the operation of the HVAC System. Refer to [Checking Aftermarket Accessories](#).
2. Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
3. Verify the A/C compressor clutch turns freely and is not seized.
4. The following conditions may cause window fogging:
5.
 - Wet carpet or mats
 - High humidity
 - Interior water leak
 - Blocked A/C evaporator drain tube
 - Maximum passenger capacity
 - Blocked body pressure relief valves
6. Inspect the air distribution system for causes of reduced air flow:
7.
 - 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 a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- [Air Conditioning Compressor Malfunction](#)
- [Blower Motor Malfunction](#)

1. HVAC
2. HVAC - MANUAL
3. DIAGNOSTIC INFORMATION AND PROCEDURES
- 4.

Air Conditioning Compressor Malfunction

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Relay Coil B+	P0646	P0647	P0647	â€”
Relay Switch Ignition	2	2	â€”	â€”
Relay Control	P0646	P0647	P0647	â€”
Clutch Control	2	2	1	â€”
A/C Compressor Clutch Ground	â€”	2	2	â€”
1. A/C Clutch Always Engaged				
2. A/C Clutch Inoperative				

Circuit Description

When the A/C switch is pressed, the HVAC control assembly sends a message to the Engine control module (ECM) for an A/C request. This input will request the ECM to ground the A/C compressor clutch relay control circuit, which will switch the A/C clutch relay. With the relay contacts closed, battery voltage is supplied to the A/C compressor clutch assembly.

Diagnostic Aids

The following conditions must be met in order for the ECM to turn on the compressor clutch:

- Battery voltage is between 9â€”18%volts.
- Engine coolant temperature (ECT) is less than 112Â°C (234Â°F).
- Engine speed is less than 5,376%RPM.
- Engine speed is more than 768% RPM.
- A/C high side pressure is between 3136â€”196%kPa (455â€”28%psi).
- Throttle position is less than 100%percent.
- Evaporator temperature is greater than 4Â°C (39Â°F).
- ECM does not detect excessive torque load.
- ECM does not detect insufficient idle quality.

Reference Information

Schematic Reference

[HVAC Schematics](#)

Connector End View Reference

[Master Electrical Component List](#)

Description and Operation

Electrical Information Reference

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

Scan Tool Reference

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

Circuit/System Testing

1. Ignition OFF, disconnect the KR29 A/C COMP relay.
2. Ignition ON, verify that a test lamp does not illuminate between the control circuit terminal 86 and ground.
3.
 - If the test lamp illuminates, test the control circuit for a short to voltage.
4. Verify that a test lamp illuminates between the ignition circuit terminal 85 and ground.
5.
 - If the test lamp does not illuminate, test the ignition circuit for a short to ground or a open/high resistance. If the circuit tests normal and ignition circuit fuse is open, test all components connected to the ignition circuit and replace as necessary.
6. Verify that a test lamp illuminates between the relay B+ circuit terminal 30 and ground.
7.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and B+ circuit fuse is open, replace the KR29 A/C Clutch Relay.
8. Disconnect the harness connector at the Q2 A/C Compressor Clutch.
9. Test for less than 1 Ω between the ground circuit terminal A and ground.
10.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
11. Connect the harness connector at the Q2 A/C Compressor Clutch.
12. Connect a 10A fused jumper wire between the B+ circuit terminal 30 and control circuit terminal 87. Verify the A/C compressor clutch is activated.
13.
 - If the A/C clutch does not activate, test the control circuit for an open/high resistance. If the circuit tests normal, test or replace the Q2 A/C Compressor Clutch.
14. Connect a test lamp between the ignition circuit terminal 85 and the control circuit terminal 86.
15. Command the A/C Relay output function ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
16.
 - If the test lamp is always ON, test the control circuit for a short to ground. If the circuit tests normal, replace the K20 Engine Control Module.
17.
 - If the test lamp is always OFF, test the control circuit for a short to voltage, or an open/high resistance. If the circuit tests normal,

replace the K20 Engine Control Module.

18. If all circuits test normal, test or replace the KR29 A/C clutch relay.

Repair Instructions

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

- [Air Conditioning Compressor Replacement](#)
- [Control Module References](#) ECM replacement, setup, and programming

Related Part Information

Part Name	Catalog Name	Part Code
Air Conditioning Compressor	COMPRESSOR KIT,A/C	0049Z
Air Conditioning Compressor	COMPRESSOR,A/C	0050A
Air Conditioning Compressor	COMPRESSOR,A/C(W/O CLU)	0051A
Air Conditioning Compressor	COMPRESSOR,A/C	0052A
Air Conditioning Compressor	COMPRESSOR,A/C (W/O CLU)	0053A
Air Conditioning Compressor	COMPRESSOR,A/C	SJ141

1. HVAC
2. HVAC - MANUAL
3. DIAGNOSTIC INFORMATION AND PROCEDURES
- 4.

Blower Motor Malfunction

Diagnostic Instructions

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

Circuit/System Description

The blower motor switch assembly applies voltage 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 at each speed:

- Low speed 3 resistors
- Medium1 speed 2 resistors
- Medium2 speed 1 resistor

When the operator requests high speed, the blower switch applies voltage to the high speed blower control circuit, directly to the blower motor.

Reference Information

Schematic Reference

[HVAC Schematics](#)

Connector End View Reference

[Master Electrical Component List](#)

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

Place the blower switch in Low, Medium1, Medium2, and High speed positions. The blower motor should operate in each speed position.

- If the blower motor does not function properly in each speed position, refer to [Blower Motor Malfunction](#).

Circuit/System Testing

Blower Malfunction

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

2. Ignition ON, while cycling the blower switch between each speed position, verify a test lamp illuminates between the appropriate control circuit terminal listed below and ground:
3.
 - Low â€” Terminalâ€”2
 - Mediumâ€”1 â€” Terminalâ€”4
 - Mediumâ€”2 â€” Terminalâ€”1
4.
 - If the test lamp does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the Heater and Air Conditioning Control.
5. Reconnect the R3 HVAC Blower Resistor and disconnect the M8 HVAC Blower Motor. Verify a test lamp illuminates between the control circuit terminalâ€”2 and ground when switched to each speed position.
6.
 - If the test lamp does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the R3 Blower Resistor.
7.
 - If the test lamp does illuminate, test the blower motor ground circuit for a short to open/high resistance. If the circuit tests normal, replace the M8 Blower Motor.

Repair Instructions

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

- [Heater and Air Conditioning Control Replacement](#)
- [Blower Motor Replacement](#)
- [Blower Motor Resistor Replacement](#)

Repair Instructions

cardiagn.com

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

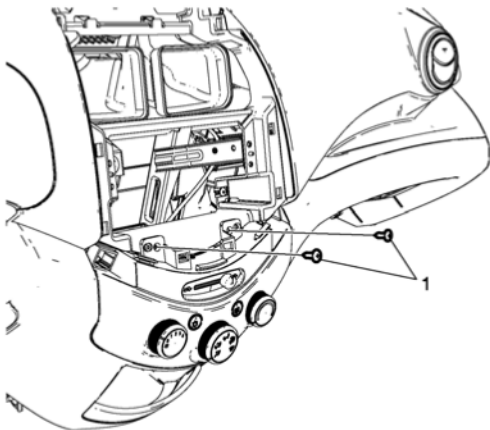
Heater and Air Conditioning Control with Cable Control Replacement

Removal Procedure

1. Warning:

Refer to [Battery Disconnect Warning](#).

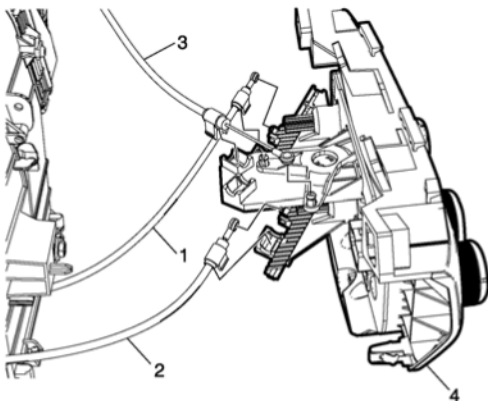
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
3. Remove the instrument panel (I/P) compartment. Refer to [Instrument Panel Compartment Replacement](#).
4. Remove the radio. [Radio Replacement](#).



5.

[Click here for full size](#)

6. Remove the heater and air conditioning (A/C) control screwsâ€”(1).



7.

[Click here for full size](#)

8. Remove the heater and A/C control (4) by pulling it out to provide clearance for the removal of the cables.

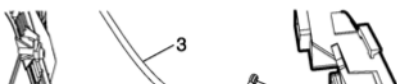
9. Note:

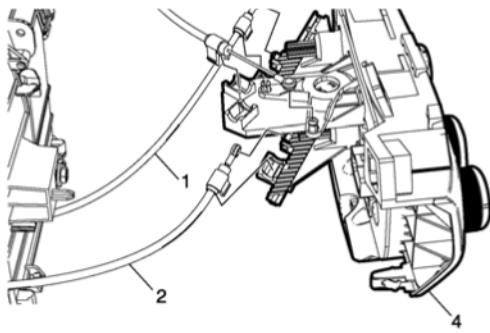
Note the location of the cables to facilitate their reinstallation.

10. Disconnect the temperature control cable (1), mode control cable (2) and air inlet control cable (3).

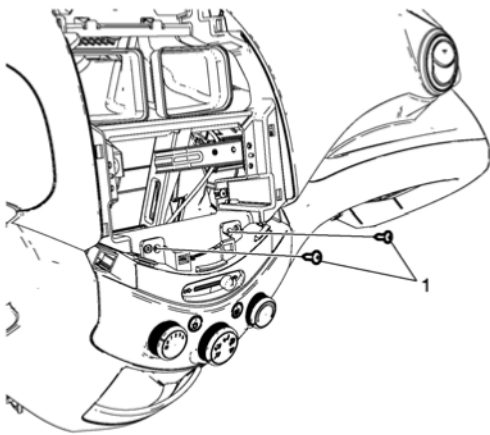
11. Disconnect the electrical connectors.

Installation Procedure





1. [Click here for full size](#)
2. Connect the electrical connectors.
3. Connect the temperature control cable(1), mode control cable(2) and air inlet control cable(3).
4. Install the heater and A/C control(4) by gently inserting the heater and A/C control into the proper position on the I/P.



5. [Click here for full size](#)
6. Caution:
- Refer to [Fastener Caution](#).
7. Install the heater and A/C control screws (1) and tighten to 2.5 N-m (23 lb-in).
8. Install the radio. Refer to [Radio Replacement](#).
9. Install the I/P compartment. Refer to [Instrument Panel Compartment Replacement](#).
10. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

Related Part Information

Part Name	Catalog Name	Part Code
Heater and Air Conditioning Control	CONTROL PKG,HTR & A/C	0224Y
Heater and Air Conditioning Control	CONTROL,HTR & A/C	0224Z
Heater and Air Conditioning Control	CONTROL,HTR & A/C	0225A
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/AM RDO)	0225B

Part Name	Catalog Name	Part Code
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/AM RDO & CLK)	0225C
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/AM/FM STEREO RDO)	0225D
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/ AM/FM STEREO RDO & CLK)	0225E
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/AM/FM STEREO RDO & CLK & T/PLYR)	0225F
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/T/PLYR)	0225G
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/R/WDO DEFG SW)	0225H
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/ R/SEAT HTR & CUSH VENT FAN)	0225J
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/ D/SEAT & P/SEAT HTR)	0225L
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/ F/SEAT HTR & CUSH VENT FAN)	0225M
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/ F/SEAT CUSH VENT FAN)	0225N
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/ AUX A/C)	0225P
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/ HTD MIR SW)	0225R
Heater and Air Conditioning Control	CONTROL,HTR & A/C (W/D/SEAT & P/SEAT HTR & AUX A/C	0226R
Heater and Air Conditioning Control with Cable Control	CONTROL,HTR & A/C (W/CABLE CONT)	0645A

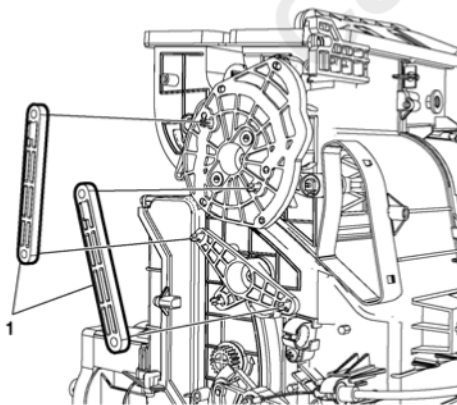
cardiagn.com

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

Mode Valve Link Replacement

Removal Procedure

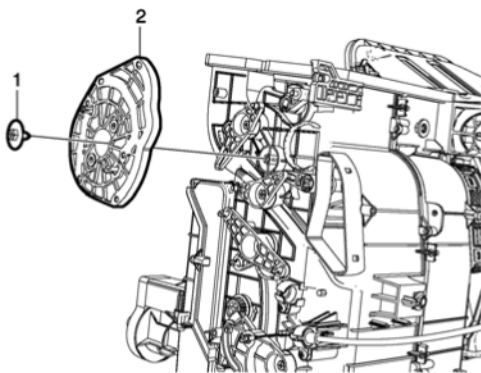
1. Remove the left side floor air outlet duct. Refer to [Floor Air Outlet Duct Replacement - Left Side](#).
2. Disconnect the mode control cable from the air conditioning (A/C) evaporator and blower module assembly. Refer to [Mode Control Cable Replacement](#).
3. Disconnect the stop lamp switch connector.



4.

[Click here for full size](#)

5. Remove the mode valve leversâ€™(1).



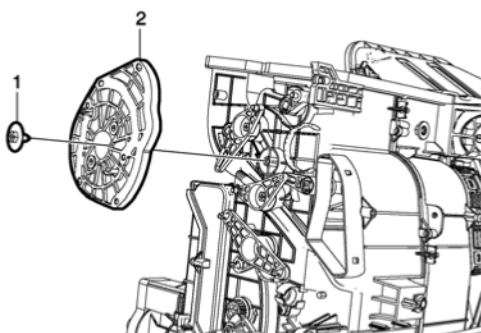
6.

[Click here for full size](#)

7. Remove the mode valve link screw(1).

8. Remove the mode valve link(2).

Installation Procedure





1.

[Click here for full size](#)

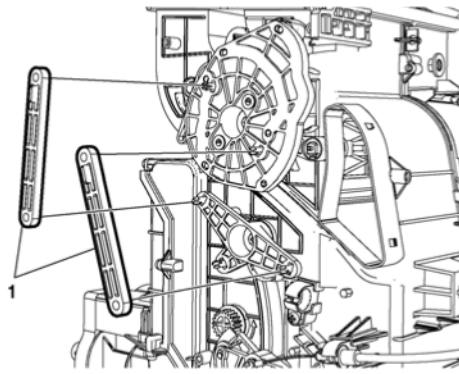
2. Install the mode valve link (2).

3. Caution:

Refer to [Fastener Caution](#).

4. Install the mode valve link screw (1) and tighten to 1.2 N-m (11 lb-in).





5. [Click here for full size](#)
6. Install the mode valve lever(1).
7. Connect the stop lamp switch connector.
8. Connect the mode control cable to the A/C evaporator and blower module assembly. Refer to [Mode Control Cable Replacement](#).
9. Install the left side floor air outlet duct. Refer to [Floor Air Outlet Duct Replacement - Left Side](#).

Related Part Information

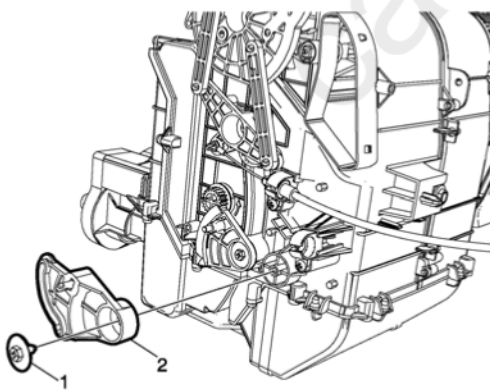
Part Name	Catalog Name	Part Code
Mode Valve Link	LINK,MODE VLV	X0081
Mode Valve Link	LINK,MODE VLV	X0130
Mode Valve Link	LINK KIT,MODE VLV	X0165

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

Temperature Valve Link Replacement

Removal Procedure

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

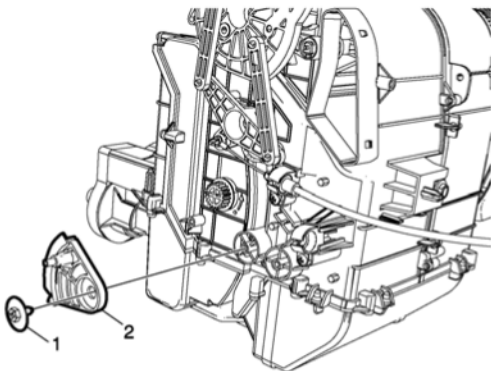


3.

[Click here for full size](#)

4. Remove the temperature cable link screw(1).

5. Remove the temperature cable link(2).



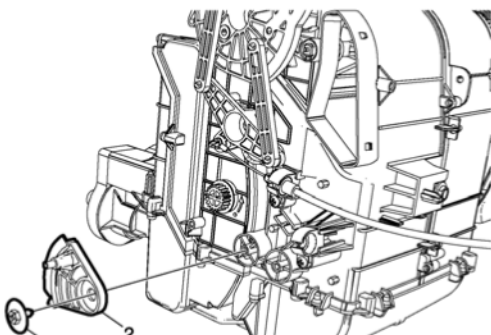
6.

[Click here for full size](#)

7. Remove the temperature valve link screw(1).

8. Remove the temperature valve link(2).

Installation Procedure





1.

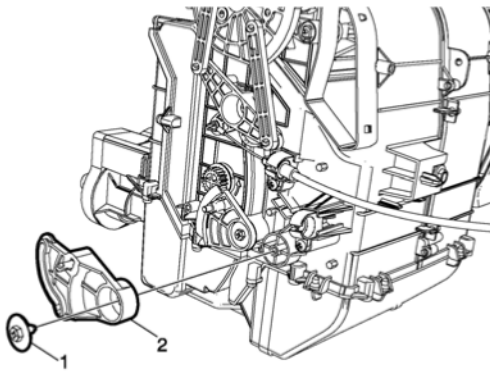
[Click here for full size](#)

2. Install the temperature valve link (2).

3. Caution:

Refer to [Fastener Caution](#).

4. Install the temperature valve link screw (1) and tighten to 1.2 N-m (11 lb-in).



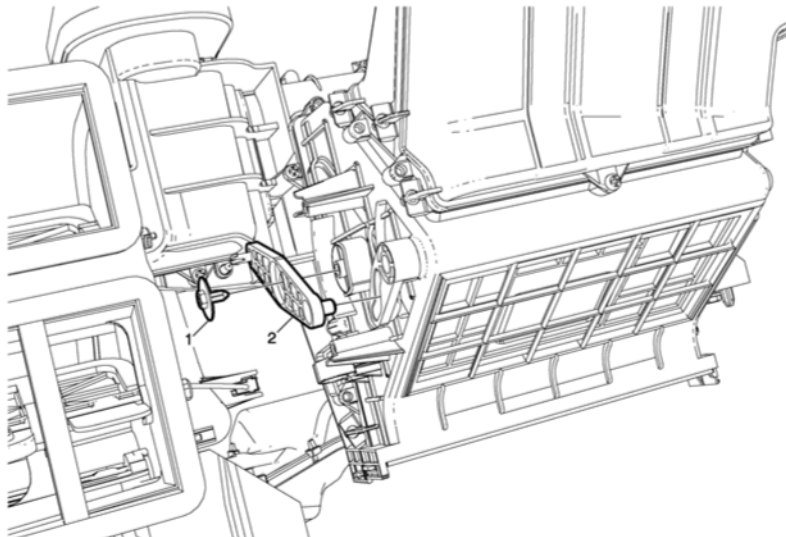
5. [Click here for full size](#)
6. Install the temperature cable link (2).
7. Install the temperature cable link screw (1) and tighten to 1.2 N-m (11 lb-in).
8. Connect the temperature control cable to the A/C evaporator and blower module assembly. Refer to [Temperature Control Cable Replacement](#).
9. Install the steering column opening filler. Refer to [Steering Column Opening Filler Replacement](#).

Related Part Information

Part Name	Catalog Name	Part Code
Temperature Valve Link	LINK KIT,TEMP VLV	1374Y
Temperature Valve Link	LINK,TEMP VLV	1374Z
Temperature Valve Link	LINK,TEMP VLV	1375A

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

Air Inlet Valve Link Replacement





cardiagn.com

[Click here for full size](#)

Callout	Component Name
Preliminary Procedure 1. Remove the right side floor air outlet duct. Refer to Floor Air Outlet Duct Replacement - Right Side. 2. Disconnect the air inlet control cable from the air conditioning (A/C) evaporator and blower module assembly. Refer to Air Conditioning Evaporator Hose Replacement.	
1	Air Inlet Valve Link Screw (Qty: 1) Caution: Refer to Fastener Caution. Tighten 1.2 N-m (11 lb-in)
2	Air Inlet Valve Link

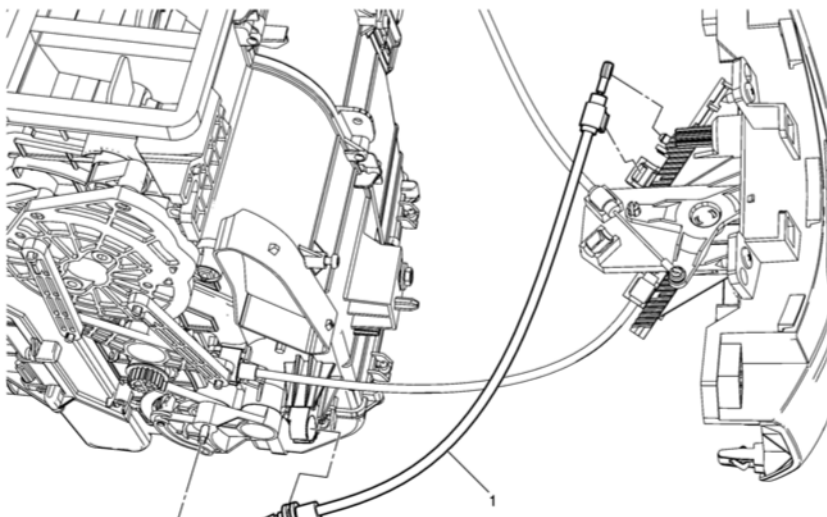
Related Part Information

Part Name	Catalog Name	Part Code
Air Inlet Valve Link	LINK,AIR INL VLV	X0079
Air Inlet Valve Link	LINK KIT,AIR INL VLV	X0166

cardiagn.com

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

Temperature Control Cable Replacement





cardiagn.com

[Click here for full size](#)

Callout	Component Name
	Preliminary Procedure 1. Remove the steering column opening filler. Refer to Steering Column Opening Filler Replacement. 2. Disconnect the temperature control cable from the heater and air conditioning (A/C) control. Refer to Heater and Air Conditioning Control with Cable Control Replacement.
1	Temperature Control Cable Procedure 1. Disconnect the cable eyelet from the temperature valve link. 2. Disconnect the temperature control cable from the temperature control cable retainer.

Related Part Information

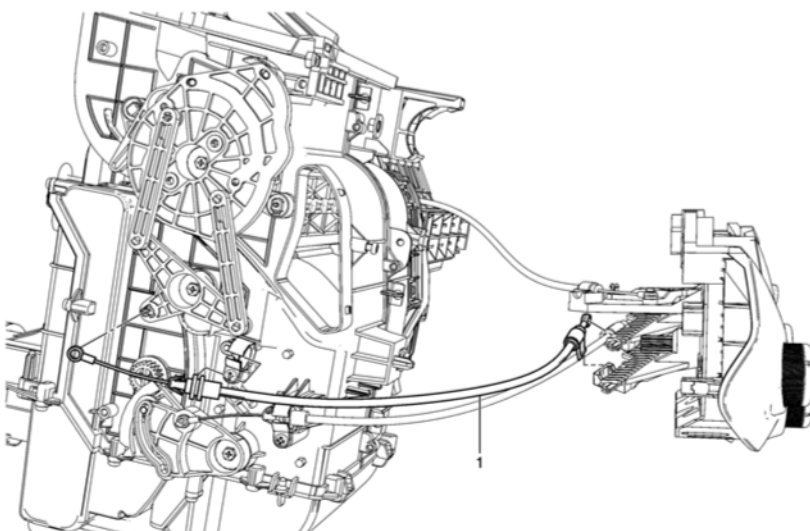
Part Name	Catalog Name	Part Code
-----------	--------------	-----------

Part Name	Catalog Name	Part Code
Temperature Control Cable	CABLE,TEMP CONT	0650A

cardiagn.com

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

Mode Control Cable Replacement





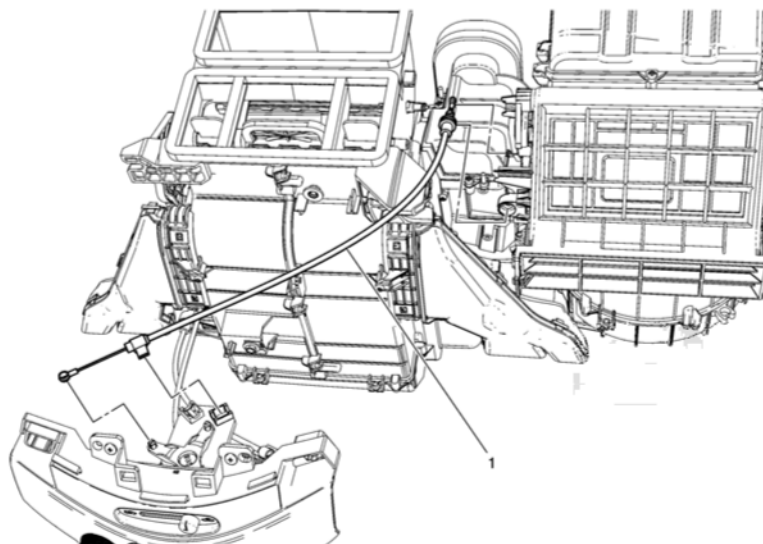
cardiagn.com

[Click here for full size](#)

Callout	Component Name
Preliminary Procedure	
1. Remove the steering column opening filler. Refer to Steering Column Opening Filler Replacement .	
2. Disconnect the mode control cable from the heater and air conditioning (A/C) control. Refer to Heater and Air Conditioning Control with Cable Control Replacement .	
1	Mode Control Cable Procedure 1. Disconnect the cable eyelet from the mode valve link. 2. Disconnect the mode control cable from the mode control cable retainer.

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

Inside Air Recirculating Control Cable Replacement





cardiagn.com

[Click here for full size](#)

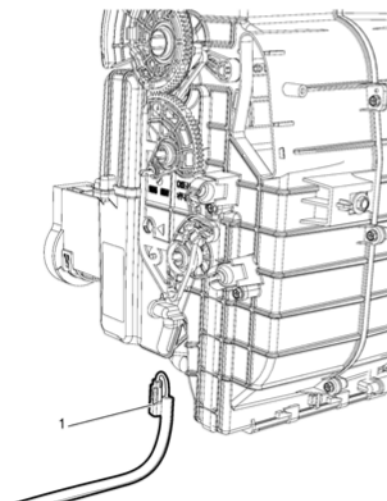
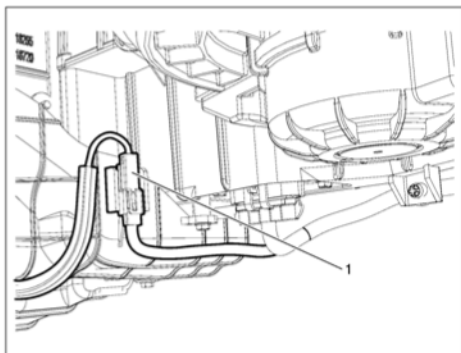
Callout	Component Name
Preliminary Procedure 1. Remove the right side floor air outlet duct. Refer to Floor Air Outlet Duct Replacement - Right Side. 2. Disconnect the air inlet control cable from the heater and air conditioning (A/C) control. Refer to Mode Control Cable Replacement.	
1	Air Inlet Control Cable Procedure 1. Disconnect the cable eyelet from the air inlet valve link. 2. Disconnect the air inlet control cable from the air inlet control cable retainer.

Related Part Information

Part Name	Catalog Name	Part Code
Inside Air Recirculating Control Cable CABLE,I/S AIR RECRG CONT 1055A		

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

Air Conditioning Evaporator Air Temperature Sensor Replacement





cardiagn.com

[Click here for full size](#)

Callout	Component Name
1	Evaporator Air Temperature Sensor Connector Procedure 1. Remove the electrical connector from HVAC module from passenger side. 2. Disconnect the electrical connector.
2	Evaporator Air Temperature Sensor Procedure Rotate the inside air temperature sensor to remove.

Related Part Information

Part Name	Catalog Name	Part Code
Air Conditioning Evaporator Air Temperature Sensor	SENSOR,A/C EVPR AIR TEMP	1660A

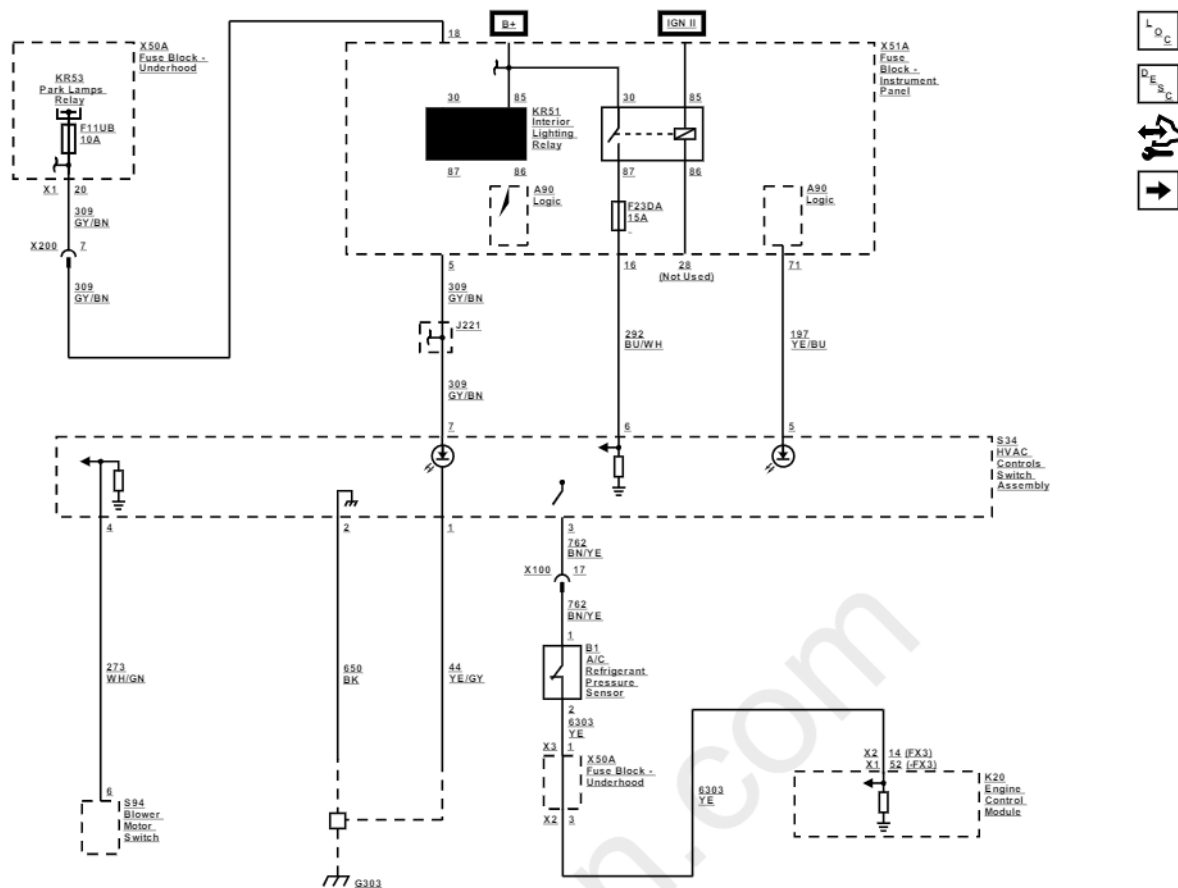
Schematic and Routing Diagrams

cardiagn.com

HVAC Schematics

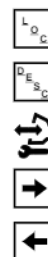
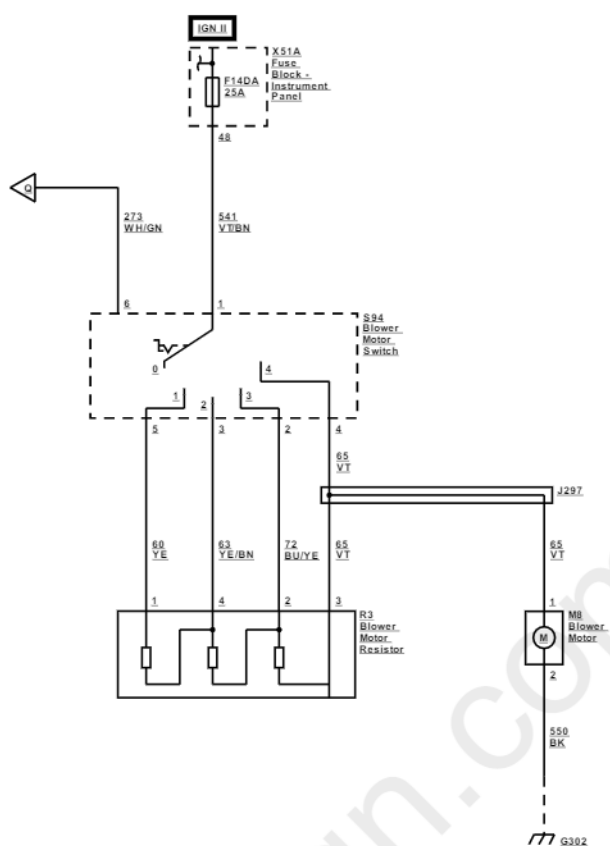
cardiagn.com

[Click here for full size](#)



Blower Controls

[Di](#)



[Click here for full size](#)

$$\frac{\ddot{D}}{D} \gg \frac{\dot{D}}{D}$$


[Click here for full size](#)