

Climate Control System - Raptor, Vehicles With: Electronic Manual Temperature Control (EMTC)

DTC Chart: Front Controls Interface Module (FCIM) - Electronic Manual Temperature Control (EMTC)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

Network Diagnostic Trouble Codes (DTCs) (U-codes) are often a result of intermittent concerns such as damaged wiring or low battery voltage occurrences. Additionally, vehicle repair procedures, such as module reprogramming, often set network Diagnostic Trouble Codes (DTCs). Replacing a module to resolve a network DTC is unlikely to resolve the concern. To prevent repeat network DTC concerns, inspect all network wiring, especially connectors. Test the vehicle battery.

REFER to: [Battery](#) (414-01 Battery, Mounting and Cables, Diagnosis and Testing).

NOTE: Some PCM Diagnostic Trouble Codes (DTCs) may inhibit A/C operation. If any PCM Diagnostic Trouble Codes (DTCs) are retrieved, diagnose those first. Refer to the DTC Chart: PCM.

FCIM - Electronic Manual Temperature Control (EMTC) DTC CHART

DTC	Description	Action
B105A:12	Cabin Temperature Sensor Fan: Circuit Short To Battery	GO to Pinpoint Test P
B105A:14	Cabin Temperature Sensor Fan: Circuit Short To Ground or Open	GO to Pinpoint Test P

B1081:07	Left Temperature Damper Motor: Mechanical Failure	INSPECT for a binding or damaged linkage or door. REPAIR as necessary. If no condition is found, INSTALL a new temperature door actuator. REFER to: Temperature Door Actuator (412-00 Climate Control System - General Information, Removal and Installation).
B1081:11	Left Temperature Damper Motor: Circuit Short To Ground	GO to Pinpoint Test I
B1081:12	Left Temperature Damper Motor: Circuit Short To Battery	GO to Pinpoint Test I
B1081:13	Left Temperature Damper Motor: Circuit Open	GO to Pinpoint Test I
B1083:07	Recirculation Damper Motor: Mechanical Failure	INSPECT for a binding or damaged linkage or door. REPAIR as necessary. If no condition is found, INSTALL a new air inlet door actuator. REFER to: Air Inlet Door Actuator (412-00 Climate Control System - General Information, Removal and Installation).
B1083:11	Recirculation Damper Motor: Circuit Short To Ground	GO to Pinpoint Test D
B1083:12	Recirculation Damper Motor: Circuit Short To Battery	GO to Pinpoint Test D
B1083:13	Recirculation Damper Motor: Circuit Open	GO to Pinpoint Test D
B1086:07	Air Distribution Damper Motor: Mechanical Failure	INSPECT for a binding or damaged linkage or door. REPAIR as necessary. If no condition is found, INSTALL a new air distribution door actuator. REFER to: Air Distribution Door Actuator (412-00 Climate Control System - General Information, Removal and Installation).

B1086:11	Air Distribution Damper Motor: Circuit Short To Ground	GO to Pinpoint Test E
B1086:12	Air Distribution Damper Motor: Circuit Short To Battery	GO to Pinpoint Test E
B1086:13	Air Distribution Damper Motor: Circuit Open	GO to Pinpoint Test E
B10AF:11	Blower Fan Relay: Circuit Short To Ground	GO to Pinpoint Test J
B10AF:15	Blower Fan Relay: Circuit Short To Battery or Open	- For an inoperative blower motor, GO to Pinpoint Test J - For all other blower motor symptoms, GO to Pinpoint Test K
B10B5:11	Left Panel Air Discharge Temperature: Circuit Short To Ground	GO to Pinpoint Test Q
B10B5:15	Left Panel Air Discharge Temperature: Circuit Short To Battery or Open	GO to Pinpoint Test Q
B10B6:11	Left Floor Air Discharge Temperature: Circuit Short To Ground	GO to Pinpoint Test Q
B10B6:15	Left Floor Air Discharge Temperature: Circuit Short To Battery or Open	GO to Pinpoint Test Q
B10B8:63	Push Buttons: Circuit / Component Protection Time-Out	This DTC sets when the buttons are held too long. ATTEMPT to clean buttons. CLEAR the Diagnostic Trouble Codes (DTCs) and REPEAT the self-test. If the DTC returns,  Click here to access Guided Routine (FCIM).
B10B9:12	Blower Control: Circuit Short To Battery	GO to Pinpoint Test J

B10B9:14	Blower Control: Circuit Short To Ground or Open	- For an inoperative blower motor, GO to Pinpoint Test J - For all other blower motor symptoms, GO to Pinpoint Test K
B11E5:12	Left HVAC Damper Position Sensor: Circuit Short To Battery	GO to Pinpoint Test I
B11E5:14	Left HVAC Damper Position Sensor: Circuit Short To Ground or Open	GO to Pinpoint Test I
B11E7:12	Air Distribution Damper Position Sensor: Circuit Short To Battery	GO to Pinpoint Test E
B11E7:14	Air Distribution Damper Position Sensor: Circuit Short To Ground or Open	GO to Pinpoint Test E
B11F0:12	Air Intake Damper Position Sensor: Circuit Short To Battery	GO to Pinpoint Test D
B11F0:14	Air Intake Damper Position Sensor: Circuit Short To Ground or Open	GO to Pinpoint Test D
B1A61:11	Cabin Temperature Sensor: Circuit Short To Ground	GO to Pinpoint Test P
B1A61:15	Cabin Temperature Sensor: Circuit Short To Battery or Open	GO to Pinpoint Test P
B1A69:12	Humidity Sensor: Circuit Short To Battery	GO to Pinpoint Test P
B1A69:14	Humidity Sensor: Circuit Short To Ground or Open	GO to Pinpoint Test P
B1B71:11	Evaporator Temperature Sensor: Circuit Short To Ground	GO to Pinpoint Test L

B1B71:15	Evaporator Temperature Sensor: Circuit Short To Battery or Open	GO to Pinpoint Test L
C1B14:11	Sensor Supply Voltage A: Circuit Short To Ground	GO to Pinpoint Test M
C1B14:12	Sensor Supply Voltage A: Circuit Short To Battery	GO to Pinpoint Test M
All Other FCIM Diagnostic Trouble Codes (DTCs) not listed in this chart	—	Refer to the appropriate section in Group 415 for the procedure.

DTC Chart: Powertrain Control Module (PCM)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

NOTE: Some PCM Diagnostic Trouble Codes (DTCs) may inhibit A/C operation. If any PCM Diagnostic Trouble Codes (DTCs) are retrieved, diagnose those first. Refer to the DTC Chart: PCM.

Powertrain Control Module (PCM) DTC Chart

DTC	Description	Action
P0532	A/C Refrigerant Pressure Sensor “A” Circuit Low	GO to Pinpoint Test A
P0533	A/C Refrigerant Pressure Sensor “A” Circuit High	GO to Pinpoint Test A
P0645	A/C Clutch Relay Control Circuit	GO to Pinpoint Test B
P06A0	Variable A/C Compressor Control Circuit	GO to Pinpoint Test R

P1464	A/C Demand Out Of Self Test Range	If the HVAC selector was not powered off, POWER the HVAC off, CLEAR the Diagnostic Trouble Codes (DTCs) and REPEAT the self-test. If the DTC returns, GO to Pinpoint Test H
P193E	A/C Clutch Request Signal	GO to Pinpoint Test N
P2600	Coolant Pump "A" Control Circuit/Open	GO to Pinpoint Test O
P2601	Coolant Pump "A" Control Circuit Performance/Stuck Off	GO to Pinpoint Test O
P2602	Coolant Pump "A" Control Circuit Low	GO to Pinpoint Test O
P2603	Coolant Pump "A" Control Circuit High	GO to Pinpoint Test O
All Other PCM Diagnostic Trouble Codes (DTCs)	—	REFER to: Electronic Engine Controls (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Diagnosis and Testing).

Symptom Chart(s)

Symptom Chart: Climate Control - Electronic Manual Temperature Control (EMTC)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

NOTE: Some PCM Diagnostic Trouble Codes (DTCs) may inhibit A/C operation. If any PCM Diagnostic Trouble Codes (DTCs) are retrieved, diagnose those first. Refer to the DTC Chart: PCM.

Symptom Chart

Condition	Possible Sources	Actions

A module does not communicate with the diagnostic scan tool	• Fuse(s) • Wiring, terminals or connectors • FCIM	REFER to: Communications Network (418-00 Module Communications Network) .
Externally Controlled Variable Displacement Compressor (EVDC) poor performance/ does not operate correctly	Refer to the Pinpoint Test	GO to Pinpoint Test R
Unable To Duplicate The Customer Concern And No Diagnostic Trouble Codes (DTCs) Present	Refer to Pinpoint Test	GO to Pinpoint Test C
Reduced outlet airflow	Plugged cabin air filter	INSPECT the cabin air filter. REFER to: Cabin Air Filter (412-00 Climate Control System - General Information, Removal and Installation). If OK, DIAGNOSE for low refrigerant charge, A/C always commanded on or blower motor not operating correctly.
	Improper refrigerant level	CARRY OUT the refrigerant system tests. Refer to the appropriate Refrigerant System Tests procedure in Group 412. If OK, DIAGNOSE for a temperature door actuator not operating correctly. If refrigerant charge is OK, GO to Pinpoint Test H
	Blower motor	GO to Pinpoint Test K
The air inlet door is inoperative	Refer to Pinpoint Test	GO to Pinpoint Test D
Incorrect or erratic direction of airflow from outlets	Refer to Pinpoint Test	GO to Pinpoint Test E

Insufficient, erratic or no heat	Refer to Pinpoint Test	GO to Pinpoint Test F
Insufficient heat in Auto Start-Stop mode only	Refer to Pinpoint Test	GO to Pinpoint Test O
The A/C is inoperative	Refer to Pinpoint Test	GO to Pinpoint Test G
The A/C is always on — A/C mode always commanded ON	Refer to Pinpoint Test	GO to Pinpoint Test H
Temperature control is inoperative/does not operate correctly	Refer to Pinpoint Test	GO to Pinpoint Test I
The blower motor is inoperative	Refer to Pinpoint Test	GO to Pinpoint Test J
The blower motor does not operate correctly	Refer to Pinpoint Test	GO to Pinpoint Test K
Insufficient A/C cooling	Improper refrigerant level	CARRY OUT the refrigerant system tests. Refer to the appropriate Refrigerant System Tests procedure in Group 412. If OK, DIAGNOSE for a temperature door actuator not operating correctly. If OK, DIAGNOSE for a temperature door actuator not operating correctly.
	Temperature door actuator	GO to Pinpoint Test I
A/C pressure relief valve discharging	A/C pressure relief valve	- CHECK the high side system pressure. If the pressure is below the A/C pressure relief valve open pressure, 3,447-4,137 kPa (500-600 psi), INSTALL a new A/C Compressor. - REFER to: Air Conditioning (A/C) Compressor - 3.5L EcoBoost (272kW/370PS) (412-00 Climate Control System - General Information) .

	High system pressure	CHECK the high side system pressure. If the system pressure is above the A/C pressure relief valve open pressure 3,447-4,137 kPa (500-600 psi), REPAIR the A/C system for a restriction.
Climate control does not operate only when remote start is used	• IPC information display settings • Non-Ford approved remote start system installed	• VERIFY Remote Start - Message Center Set To Auto, or Remote Start - Message Center Set To Last User Settings. REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) . • VERIFY module communications network operation. DIAGNOSE Diagnostic Trouble Codes (DTCs) if present.

Symptom Chart: Noise, Vibration, and Harshness (NVH)

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.
 REFER to: [Diagnostic Methods](#) (100-00 General Information, Description and Operation).

NOTE: *Some PCM Diagnostic Trouble Codes (DTCs) may inhibit A/C operation. If any PCM Diagnostic Trouble Codes (DTCs) are retrieved, diagnose those first. Refer to the DTC Chart: PCM.*

Symptom Chart

Condition	Possible Sources	Actions

Noisy A/C compressor	A/C compressor bearing worn	- INSPECT the A/C compressor bearing for roughness. If bearing roughness is found, INSTALL a new A/C Compressor. - REFER to: Air Conditioning (A/C) Compressor - 3.5L EcoBoost (272kW/370PS) (412-00 Climate Control System - General Information) .
Excessive hissing from the plenum when the A/C is on	Incorrect A/C refrigerant level	CHECK the A/C refrigerant level. CARRY OUT the refrigerant system tests. Refer to the appropriate Refrigerant System Tests procedure in Group 412.

Pinpoint Test(s)

P0532, P0533

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal operation and Fault Conditions

The A/C pressure transducer receives a ground from the PCM. A 5-volt reference voltage is supplied to the A/C pressure transducer from the PCM. The A/C pressure transducer then sends a voltage to the PCM to indicate the A/C pressure.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0532	A/C Refrigerant Pressure Sensor "A" Circuit Low	This DTC sets if the feedback voltage is less than 0.26 volt for at least 2 seconds and the ambient air temperature is greater than 0°C (32°F).

P0533	A/C Refrigerant Pressure Sensor "A" Circuit High	This DTC sets if the feedback voltage is greater than 4.95 volts for at least 2 seconds and the ambient air temperature is greater than 0°C (32°F).
-------	--	---

Possible Sources

- Wiring, terminals or connectors
- A/C pressure transducer
- PCM

Visual Inspection and Diagnostic Pre-checks

- Inspect for loose or corroded PCM and A/C pressure transducer connections.

PINPOINT TEST A : P0532, P0533

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.	
A1 COMPARE THE PCM (POWERTRAIN CONTROL MODULE) PRESSURE SENSOR (ACP_PRESS) PID (PARAMETER IDENTIFICATION) WITH THE MANIFOLD GAUGE SET READINGS	
• Allow the A/C system to stabilize to the outside ambient temperature. • Ignition ON. • Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs). • With the manifold gauge set connected, compare the pressure readings of the manifold gauge set and the PCM ACP_PRESS PID.	
Are the pressure values of the manifold gauge set and the ACP_PRESS PCM PID within $\pm$ 103 kPa (15 psi)?	
Yes	IGNORE the Diagnostic Trouble Codes (DTCs). REFER to the Symptom Chart in this section.
No	GO to A2

A2 CHECK THE A/C (AIR CONDITIONING) PRESSURE SENSOR CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect PCM 3.5L EcoBoost C1915B.
- Disconnect generator current sensor C1645.
- Disconnect Turbocharger Boost Pressure Air Cooler Temperature (TCBP/CACT) sensor C1588 (if equipped).
- Disconnect A/C pressure transducer C1260.
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to A3

A3 CHECK THE A/C (AIR CONDITIONING) PRESSURE SENSOR CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.

Are the resistances greater than 10,000 ohms?

Yes	GO to A4
No	REPAIR the circuit.

A4 CHECK THE A/C (AIR CONDITIONING) PRESSURE SENSOR CIRCUITS FOR AN OPEN

- Measure:

Click to display connectors

3.5L EcoBoost

Positive Lead	Measurement / Action	Negative Lead
C1260-1	Ω	C1915B-30
C1260-2		C1915B-52
C1260-3		C1915B-5

Are the resistances less than 3 ohms?

Yes	GO to A5
No	REPAIR the circuit.

A5 CHECK THE A/C (AIR CONDITIONING) PRESSURE SENSOR CIRCUITS FOR A SHORT TOGETHER

Are the resistances greater than 10,000 ohms?

Yes	INSTALL a new A/C pressure transducer. REFER to: Air Conditioning (A/C) Pressure Transducer (412-00 Climate Control System - General Information, Removal and Installation). TEST the system for normal operation. If the concern is still present, GO to A6
No	REPAIR the circuits.

A6 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all PCM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

P0645

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

Voltage is provided to the A/C clutch relay. When A/C is requested and A/C line pressures allow, a ground is provided to the A/C clutch relay coil from the PCM, energizing the A/C clutch relay.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0645	A/C Clutch Relay Control Circuit	This DTC sets when the PCM grounds the relay circuit and more voltage than expected is detected on the relay circuit. This DTC also sets when the relay circuit is off and no voltage is detected on the relay circuit. The PCM expects to detect voltage coming through the relay coil to the relay circuit when it is not grounding it.

Possible Sources

- Wiring, terminals or connectors
- A/C clutch relay
- PCM

Visual Inspection and Diagnostic Pre-checks

- Inspect BJB fuses 44 (10A) and 97 (10A).

PINPOINT TEST B : P0645

NOTICE: Use the correct probe adapter(s) from the Flex Probe Kit when taking measurements. Failure to use the correct probe adapter(s) may damage the connector.

B1 CHECK THE VOLTAGE TO THE A/C (AIR CONDITIONING) CLUTCH RELAY VOLTAGE SUPPLY CIRCUITS

- Ignition OFF.
- Disconnect A/C clutch relay.
- Ignition ON.
- Measure:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
A/C clutch relay socket 1		Ground
A/C clutch relay socket 3		Ground

Are the voltages greater than 11 volts?

Yes	GO to B2
No	VERIFY BJB fuses 44 (10A) and 97 (10A) are OK. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short. If OK, REPAIR the circuit.

B2 CHECK THE A/C (AIR CONDITIONING) CLUTCH RELAY

- Carry out the component test on the A/C clutch relay.
Refer to Wiring Diagrams Cell 149 for schematic and connector information.

Did the relay pass the component test?

Yes	GO to B3
No	INSTALL a new A/C clutch relay.

B3 CHECK THE A/C (AIR CONDITIONING) CLUTCH RELAY CONTROL CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect A/C clutch relay.
- Disconnect PCM 3.5L EcoBoost C1915B.
- Ignition ON.
- Measure:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
A/C clutch relay socket 2		Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to B4

B4 CHECK THE A/C (AIR CONDITIONING) CLUTCH RELAY CONTROL CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Measure:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
A/C clutch relay socket 2	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to B5
No	REPAIR the circuit.

B5 CHECK THE A/C (AIR CONDITIONING) CLUTCH RELAY CONTROL CIRCUIT FOR AN OPEN

- Measure:

Click to display connectors

3.5L EcoBoost

Positive Lead	Measurement / Action	Negative Lead
A/C clutch relay socket 2	Ω	C1915B-2

Is the resistance less than 3 ohms?

Yes	GO to B6
No	REPAIR the circuit.

B6 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all PCM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

Unable To Duplicate The Customer Concern And No Diagnostic Trouble Codes (DTCs) Present

This diagnostic procedure tests the functions of the HVAC system and identifies the correct HVAC symptom pinpoint test.

Normal Operation and Fault Conditions

System Operation

REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) .

**PINPOINT TEST C : UNABLE TO DUPLICATE THE CUSTOMER CONCERN AND NO
DIAGNOSTIC TROUBLE CODES (DTCS) PRESENT**

**C1 CHECK THE PCM (POWERTRAIN CONTROL MODULE) FOR DIAGNOSTIC
TROUBLE CODES (DTCS)**

- Ignition ON.
- Using a diagnostic scan tool, perform PCM self-test.

Are any climate control related Diagnostic Trouble Codes (DTCs) present?

Yes	REFER to the PCM DTC chart in this section.
No	GO to C2

**C2 CHECK THE FCIM (FRONT CONTROLS INTERFACE MODULE) FOR
DIAGNOSTIC TROUBLE CODES (DTCS)**

- Ignition ON.
- Using a diagnostic scan tool, perform FCIM self-test.

Are any Diagnostic Trouble Codes (DTCs) present?

Yes	REFER to the FCIM DTC chart in this section.
No	GO to C3

C3 CHECK THE BLOWER MOTOR OPERATION

- Ignition ON.
- Select panel mode.
- Observe blower motor operation and select each blower motor speed.

Does the blower motor operate in all ranges?

Yes	GO to C4
No	If the blower motor does not operate in any setting, GO to Pinpoint Test J If the blower motor does not correctly change speeds or shut off, GO to Pinpoint Test K

C4 CHECK AIRFLOW OPERATION

- Select the highest blower motor setting.
- While observing the airflow, select each of the airflow positions (panel, panel/floor, floor, floor/defrost, defrost).

Is the airflow directed to the correct outlets?

Yes	GO to C5
No	GO to Pinpoint Test E

C5 VERIFY TEMPERATURE CONTROL OPERATION

- Start the vehicle and allow it to reach normal operating temperature.
- With the A/C off, select panel mode.
- Change the temperature setting from the coldest to the warmest and back to the coldest.

Does the temperature change between very warm to cool?

Yes	GO to C6
No	If the temperature does not get very warm, GO to Pinpoint Test F If the temperature does not change at all, GO to Pinpoint Test I

C6 VERIFY THE AIR CONDITIONING COMPRESSOR DOES NOT ENGAGE WITH A/C (AIR CONDITIONING) OFF

- With the engine running and the A/C off, select panel mode.
- Select the coldest temperature setting.

Is the outlet temperature close to ambient air temperature?

Yes	GO to C7
No	If the temperature is warmer than ambient air temperature, GO to Pinpoint Test I If the outlet temperature is significantly colder than ambient air temperature and the A/C compressor clutch is engaged, GO to Pinpoint Test H

C7 VERIFY THE A/C (AIR CONDITIONING) COMPRESSOR IS OPERATIONAL IN THE A/C (AIR CONDITIONING) MODE

- Make sure the ambient air temperature is above 0°C (32°F).
- With the engine running, select panel mode.
- Press the A/C button (indicator on).

Is the A/C compressor operational when the panel and A/C button (indicator on) is pressed?

Yes	GO to C8
No	GO to Pinpoint Test G

C8 CHECK THE RECIRCULATED AIR OPERATION

- With the engine running, press the recirculated air button (indicator off).
- Select panel mode.
- Select the highest blower motor setting.
- Observe airflow noise.
- Press the recirculated air button (indicator on).

Does the airflow noise increase when the recirculated air mode is selected (indicator on)?

Yes	GO to C9
No	GO to Pinpoint Test D

C9 CHECK THE FCIM (FRONT CONTROLS INTERFACE MODULE) LEFT DISCHARGE FLOOR TEMPERATURE (LDFTEMP) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, view the FCIM Parameter Identifications (PIDs).
- Monitor the LDFTEMP PID.

Is the temperature coming out of the driver footwell vent similar to the PID?

Yes	GO to C10
No	GO to Pinpoint Test Q

C10 CHECK THE FCIM (FRONT CONTROLS INTERFACE MODULE) LEFT DISCHARGE PANEL TEMPERATURE (LDPT) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, view the FCIM Parameter Identifications (PIDs).
- Monitor the LDPT PID.

Is the temperature coming out of the driver side register similar to the PID?

Yes	GO to C11
No	GO to Pinpoint Test Q

C11 CHECK THE FCIM (FRONT CONTROLS INTERFACE MODULE) INTERIOR TEMPERATURE SENSOR (INT_TEMP) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, view the FCIM Parameter Identifications (PIDs).
- Monitor the INT_TEMP PID.

Is the air temperature at the cabin temperature sensor similar to the PID?

Yes	The system is operating correctly.
No	GO to Pinpoint Test P

The Air Inlet Door Is Inoperative

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

To rotate the air inlet door actuator, the FCIM supplies voltage and ground to the air inlet door actuator through the door actuator motor circuits. To reverse the air inlet door actuator rotation, the FCIM reverses the voltage and ground circuits. The air inlet door actuator feedback resistors are supplied a ground from the FCIM by the air inlet door actuator return circuits and a 5-volt reference voltage on the air inlet door actuator reference circuits. The FCIM uses the actuator feedback resistor wiper arm position and the voltage on the air distribution door actuator feedback circuits to determine the air inlet door actuator position.

During an actuator calibration cycle, the FCIM drives the air inlet door until the door reaches both internal stops in the FCIM case. If the air inlet door is temporarily obstructed or binding during a calibration cycle, the FCIM may interpret this as the actual end of travel for the door. When this condition occurs and the FCIM commands the actuator to its end of travel, the air intake may not be from the expected source.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1083:11	Recirculation Damper Motor: Circuit Short To Ground	This DTC sets when the module senses lower than expected voltage on an actuator motor circuit when voltage is applied to drive the motor, indicating a short to ground. The motor can move only in one direction.
B1083:12	Recirculation Damper Motor: Circuit Short To Battery	This DTC sets when the module senses higher than expected voltage on the actuator motor circuit when ground is applied to drive the motor, indicating a short to voltage. The motor can move only in one direction.

B1083:13	Recirculation Damper Motor: Circuit Open	This DTC sets when the module senses no voltage on the actuator motor circuit when ground is applied to drive the motor, indicating an open circuit. The motor cannot move.
B11F0:12	Air Intake Damper Position Sensor: Circuit Short to Battery	This DTC sets when the module senses greater than 5 volts on the actuator feedback circuit, indicating a short to voltage.
B11F0:14	Air Intake Damper Position Sensor: Circuit Short to Ground or Open	This DTC sets when the module senses less than 1 volt on the actuator feedback circuit, indicating an open circuit or a short to ground.

Possible Sources

- Wiring, terminals or connectors
- Air inlet door actuator
- Air inlet door binding or stuck
- FCIM

PINPOINT TEST D : THE AIR INLET DOOR IS INOPERATIVE

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

D1 CHECK THE AIR INLET DOOR ACTUATOR CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect FCIM C2402A.
- Ignition ON.

Is there any voltage present?

Yes	REPAIR the circuit.
No	GO to D2

D2 CHECK THE AIR INLET DOOR ACTUATOR CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.

Are the resistances greater than 10,000 ohms?

Yes	GO to D3
No	REPAIR the circuit.

D3 CHECK THE AIR INLET DOOR ACTUATOR CIRCUITS FOR AN OPEN

- Disconnect In-vehicle temperature and humidity sensor C2247.
- Disconnect Temperature door actuator C2091.
- Disconnect Air distribution door actuator C236.
- Disconnect Air inlet door actuator C289.

Are the resistances less than 3 ohms?

Yes	GO to D4
No	REPAIR the circuit.

D4 CHECK THE AIR INLET DOOR ACTUATOR CIRCUITS FOR A SHORT TOGETHER

Are the resistances greater than 10,000 ohms?

Yes	INSTALL a new air inlet door actuator. REFER to: Air Inlet Door Actuator (412-00 Climate Control System - General Information, Removal and Installation). TEST the system for normal operation. If the concern is still present, GO to D5
No	REPAIR the circuit.

D5 CHECK FOR CORRECT FRONT CONTROLS INTERFACE MODULE OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

Incorrect Or Erratic Direction Of Airflow From Outlets

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

To rotate the air distribution door actuator, the FCIM supplies voltage and ground to the air distribution door actuator through the door actuator motor circuits. To reverse the air distribution door actuator rotation, the FCIM reverses the voltage and ground circuits. The air distribution door actuator feedback resistors are supplied a ground from the FCIM by the air distribution door actuator return circuits and a 5-volt reference voltage on the air distribution door actuator reference circuits. The FCIM uses the actuator feedback resistor wiper arm position and the voltage on the air distribution door actuator feedback circuits to determine the air distribution door actuator position.

During an actuator calibration cycle, the FCIM drives the air distribution door until the door reaches both internal stops in the FCIM case. If the air distribution door is temporarily obstructed or binding during a calibration cycle, the FCIM may interpret this as the actual end of travel for the door. When this condition occurs and the FCIM commands the actuator to its end of travel, the airflow may not be from the expected outlets.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1086:11	Air Distribution Damper Motor: Circuit Short to Ground	This DTC sets when the module senses lower than expected voltage on an actuator motor circuit when voltage is applied to drive the motor, indicating a short to ground. The motor can move only in one direction.
B1086:12	Air Distribution Damper Motor: Circuit Short to Battery	This DTC sets when the module senses higher than expected voltage on the actuator motor circuit when ground is applied to drive the motor, indicating a short to voltage. The motor can move only in one direction.

B1086:13	Air Distribution Damper Motor: Circuit Open	This DTC sets when the module senses no voltage on the actuator motor circuit when ground is applied to drive the motor, indicating an open circuit. The motor cannot move.
B11E7:12	Air Distribution Damper Position Sensor: Circuit Short to Battery	This DTC sets when the module senses greater than 5 volts on the actuator feedback circuit, indicating a short to voltage.
B11E7:14	Air Distribution Damper Position Sensor: Circuit Short to Ground or Open	This DTC sets when the module senses less than 1 volt on the actuator feedback circuit, indicating an open circuit or a short to ground.

Possible Sources

- Wiring, terminals or connectors
- Air distribution door actuator
- Air distribution door binding or stuck
- FCIM

PINPOINT TEST E : INCORRECT OR ERRATIC DIRECTION OF AIRFLOW FROM OUTLETS

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

E1 CHECK THE AIR DISTRIBUTION DOOR ACTUATOR CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect FCIM C2402A.
- Disconnect Air distribution door actuator C236.
- Ignition ON.

Is there any voltage present?

Yes	REPAIR the circuit.
No	GO to E2

E2 CHECK THE AIR DISTRIBUTION DOOR ACTUATOR CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.

Are the resistances greater than 10,000 ohms?

Yes	GO to E3
No	REPAIR the circuit.

E3 CHECK THE AIR DISTRIBUTION DOOR ACTUATOR CIRCUITS FOR AN OPEN

- Ignition OFF.

Are the resistances less than 3 ohms?

Yes	GO to E4
No	REPAIR the circuit.

E4 CHECK THE AIR DISTRIBUTION DOOR ACTUATOR CIRCUITS FOR A SHORT TOGETHER

- Disconnect Temperature door actuator C2091.
- Disconnect Air inlet door actuator C289.
- Disconnect In-vehicle temperature and humidity sensor C2247.

Are the resistances greater than 10,000 ohms?

Yes	INSTALL a new air distribution door actuator, REFER to: Air Distribution Door Actuator (412-00 Climate Control System - General Information, Removal and Installation). TEST the system for normal operation. If the concern is still present, GO to E5
No	REPAIR the circuit.

E5 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

Insufficient, Erratic Or No Heat

Normal Operation and Fault Conditions

When the engine is at operating temperature hot coolant flows from the coolant pump through the heater core and back to the coolant pump. Correct coolant temperatures are critical for good heater performance.

Possible Sources

- Low engine coolant level
- Missing or broken engine coolant hose check valve or incorrect orientation of check valve (3.5L only)
- Temperature door actuator(s)
- Temperature door actuator(s) binding or stuck
- Plugged or partially plugged heater core

Visual Inspection and Diagnostic Pre-checks

- Inspect for low engine coolant level.

PINPOINT TEST F : INSUFFICIENT, ERRATIC OR NO HEAT

NOTE: Restriction of air flow through the radiator or Air Conditioning (A/C) condenser by an external obstruction such as leaves or cardboard can cause erratic operation.

NOTE: Missing or broken engine coolant hose check valve or incorrect orientation of check valve (if equipped) can cause poor heater performance at idle.

F1 CHECK FOR CORRECT ENGINE COOLANT LEVEL

- Ignition OFF.
- Visually check the engine coolant level in the degas bottle.

Is the engine coolant at the correct level as indicated on the engine coolant recovery reservoir?

Yes	GO to F2
No	DIAGNOSE the engine for loss of coolant. Refer to the appropriate section in Group 303 for the procedure.

F2 CHECK THE ENGINE COOLANT VENT HOSE CHECK VALVE 3.5L ECOBOOST (GTDI)

NOTICE: Do not apply more than 96 kPa (14 psi) compressed air to the vent hose check valve, or the valve may be damaged.

- Remove the upper radiator hose.
- Using a light, look inside the end of the vent hose that connects to the degas bottle. A check valve should be installed approximately 100 mm (3.94 in) from the end of the hose.
- Using hose pinch pliers, clamp the upper radiator hose near the degas bottle hose connection on the side of the upper radiator hose that leads to the radiator.
- **NOTE:** Use shop towels to seal the end of the upper radiator hose where regulated compressed air is applied.

Using regulated compressed air, confirm air flows freely from the upper radiator hose end to the degas bottle end.

- Using regulated compressed air, confirm air does not flow from the degas bottle end to the upper radiator hose end.

Is the check valve installed in the vent hose and does air flow through in one direction and not the other?

Yes	GO to F3
------------	--------------------------

No	INSTALL a new upper radiator hose. Refer to the appropriate section in Group 303 for the procedure.
-----------	---

F3 CHECK FOR COOLANT FLOW TO THE HEATER CORE

- Run the engine until it reaches normal operating temperature. Select the floor position on the HVAC controls. Set the temperature control to full warm and the blower to the lowest setting.
- Increase engine speed to 3,500 RPM and hold for 30 seconds.
- Allow the engine to idle for 30 seconds.
- Using a suitable temperature measuring device, check the heater core inlet hose to see if it is hot.

Is the heater core inlet hose temperature above 66°C (150°F)?

Yes	GO to F4
No	DIAGNOSE the engine does not reach normal operating temperature. Refer to the appropriate section in Group 303 for the procedure.

F4 CHECK FOR A PLUGGED OR RESTRICTED HEATER CORE

- Using a suitable temperature measuring device, measure the heater core outlet hose temperature.

Is the heater core outlet hose temperature similar to the inlet hose temperature (within approximately 6-17°C [10-30°F])?

Yes	DIAGNOSE for a temperature door actuator not operating correctly. GO to Pinpoint Test I
No	INSTALL a new heater core. REFER to: Heater Core (412-00 Climate Control System - General Information, Removal and Installation).

The A/C Is Inoperative

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

Control System Logic

REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) .

Possible Sources

- Wiring, terminals or connectors
- A/C system discharged or low refrigerant charge
- Network concerns
- A/C pressure transducer
- Evaporator temperature sensor
- Electric cooling fan
- Intake Air Temperature (IAT) or other temperature sensors
- Active grille shutters (if equipped)
- A/C compressor clutch air gap
- A/C compressor clutch field coil
- A/C clutch relay
- FCIM

Visual Inspection and Diagnostic Pre-checks

- Inspect BJB fuses 44 (10A) and 97 (10A).

PINPOINT TEST G : THE A/C (AIR CONDITIONING) IS INOPERATIVE

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

NOTE: Some PCM Diagnostic Trouble Codes (DTCs) may inhibit A/C operation. If any PCM Diagnostic Trouble Codes (DTCs) are retrieved, diagnose those first. Refer to the DTC Chart: PCM.

G1 CHECK THE A/C (AIR CONDITIONING) SYSTEM PRESSURE

- Ignition OFF.
- With the appropriate manifold gauge set connected, check the A/C system pressure.

Is the A/C system pressure above 290 kPa (42 psi)?

Yes	GO to G2
No	CHECK the A/C system for leaks. REFER to: Electronic Leak Detection - Vehicles With: R1234YF Refrigerant (412-00 Climate Control System - General Information, General Procedures). REFER to: Fluorescent Dye Leak Detection - Vehicles With: R1234YF Refrigerant (412-00 Climate Control System - General Information, General Procedures). After the leak is repaired, RECHARGE the A/C system. REFER to: Air Conditioning (A/C) System Recovery, Evacuation and Charging - Vehicles With: R1234YF Refrigerant (412-00 Climate Control System - General Information, General Procedures).

G2 CHECK THE COMMUNICATION NETWORK

- Ignition ON.
- Using a diagnostic scan tool, carry out the network test.

Do the FCIM and the PCM pass the network test?

Yes	GO to G3
No	DIAGNOSE the FCIM or PCM does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network) .

G3 CHECK THE PCM (POWERTRAIN CONTROL MODULE) A/C (AIR CONDITIONING) PRESSURE SENSOR (ACP_PRESS) PID (PARAMETER IDENTIFICATION)

- Ignition ON.
- Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs).
- With the manifold gauge set connected, compare the pressure readings of the manifold gauge set and the PCM ACP_PRESS PID.

Are the pressure values of the manifold gauge set and the ACP_PRESS PCM PID within $\pm$ 103 kPa (15 psi)?

Yes	GO to G4
No	DIAGNOSE the A/C pressure transducer. GO to Pinpoint Test A

G4 ELECTRIC COOLING FAN FUNCTIONAL CHECK

- Ignition ON.
- Using a diagnostic scan tool, carry out the PCM KOEO self-test.

Does the electric cooling fan operate during the KOEO self-test?

Yes	GO to G5
No	DIAGNOSE the electric cooling fan operation. REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual, Section 3 Symptom Charts.

G5 COMPARE THE PCM (POWERTRAIN CONTROL MODULE) INTAKE AIR TEMPERATURE (IAT) PID (PARAMETER IDENTIFICATION) AND THE OTHER TEMPERATURE SENSOR READINGS TO THE PCM (POWERTRAIN CONTROL MODULE) AMBIENT AIR TEMPERATURE (AAT) PID (PARAMETER IDENTIFICATION)

NOTE: Compare multiple engine sensor readings to the ambient temperature to determine sensors are reading correctly. A faulty sensor can cause the PCM to disable the A/C with or without a DTC.

- Allow the vehicle exterior and interior to stabilize to ambient temperature. This can take a soak period of at least 6 hours.
- Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs).
- Monitor the AAT, CACT, CHT, ECT, IAT, IAT2, MAF, MAPT, TCB and TCIPIT Parameter Identifications (PIDs) (as applicable).

Are the temperature values similar (typically within 18°C (32.4°F))?

Yes	GO to G6
No	DIAGNOSE the suspect temperature sensor. REFER to Section 413-01 for Ambient Air Temperature (AAT) sensor or Outside Air Temperature Display concerns. For all other temperature sensor concerns, REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual.

G6 COMPARE THE FCIM (FRONT CONTROLS INTERFACE MODULE) EVAPORATOR TEMPERATURE (EVAP_TEMP) PID (PARAMETER IDENTIFICATION) TO THE PCM (POWERTRAIN CONTROL MODULE) AMBIENT AIR TEMPERATURE (AAT) PID (PARAMETER IDENTIFICATION)

- Ignition OFF.
- Allow the vehicle exterior and interior to stabilize to ambient temperature.
- Ignition ON.
- Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs).
- Monitor and record the PCM AAT PID.
- Using a diagnostic scan tool, view the FCIM Parameter Identifications (PIDs).
- Monitor and record the FCIM (EVAP_TEMP) PID.

Are the temperature values similar (typically within 18°C (32.4°F))?

Yes	If equipped with the active grille shutter system, GO to G7 If not equipped with the active grille shutter system, GO to G8
No	DIAGNOSE the evaporator temperature sensor. GO to Pinpoint Test L

G7 VERIFY THE GRILLE SHUTTER OPERATION USING THE PCM (POWERTRAIN CONTROL MODULE) GRILL SHUTTER A POSITION - COMMANDED (GRILL_A_CMD) PID (PARAMETER IDENTIFICATION)

- Start the engine and allow it to idle for at least 30 seconds to allow for the grille shutter calibration to complete.
- Using a diagnostic scan tool, view PCM PID.
- Using a diagnostic scan tool, select the PCM PID GRILL_A_CMD and command the grille shutter from 100% (open) to 0% (closed) while observing the grille shutter operation from the front of the vehicle.

Does the grille shutter fully open and close when commanded by the scan tool?

Yes	GO to G8
No	DIAGNOSE the active grille shutter is inoperative or does not operate correctly. REFER to: Active Grille Shutter (501-02 Front End Body Panels) .

G8 CHECK THE FCIM (FRONT CONTROLS INTERFACE MODULE) A/C (AIR CONDITIONING) SWITCH (CC_SW_AC) PID (PARAMETER IDENTIFICATION) WITH THE A/C (AIR CONDITIONING) ON

- Using a diagnostic scan tool, view FCIM Parameter Identifications (PIDs).
- Monitor the CC_SW_AC PID.
- On the HVAC controls, select PANEL and then press the A/C button (indicator on).

Does the PID display Active or On when the A/C button is pressed?

Yes	GO to G9
No	GO to G17

G9 CHECK THE PCM (POWERTRAIN CONTROL MODULE) A/C (AIR CONDITIONING) REQUEST SIGNAL (AC_REQ) PID (PARAMETER IDENTIFICATION) WITH THE A/C (AIR CONDITIONING) ON

- Start the engine.
- Using a diagnostic scan tool, monitor the PCM AC_REQ PID.
- On the HVAC controls, select PANEL and then press the A/C button (indicator on).

Does the PID display Yes when the button is pressed?

Yes	GO to G11
No	GO to G10

G10 RESET THE AMBIENT AIR TEMPERATURE (AAT) SENSOR

- On the HVAC controls, press the A/C and Recirc buttons simultaneously, then release both. Within 2 seconds press A/C button again.
- Start the engine.
- On the HVAC controls, set the temperature to full cold, select PANEL and select the A/C button (indicator on).

Does the A/C compressor turn on?

Yes	RETEST the A/C system for normal operation. CARRY OUT the refrigerant system tests. Refer to the appropriate Refrigerant System Tests procedure in Group 412.
No	GO to G11

G11 CHECK THE PCM (POWERTRAIN CONTROL MODULE) A/C (AIR CONDITIONING) COMPRESSOR COMMANDED STATE (ACC_CMD) PID (PARAMETER IDENTIFICATION) WITH THE A/C (AIR CONDITIONING) COMMANDED ON

- Using a diagnostic scan tool, activate the PCM ACC_CMD PID.

Does the A/C compressor turn on?

Yes	GO to G18
No	GO to G12

G12 CHECK THE VOLTAGE TO THE A/C (AIR CONDITIONING) CLUTCH RELAY

- Ignition OFF.
- Disconnect the A/C clutch relay.
- Ignition ON.
- Measure:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
A/C clutch relay socket 1		Ground
A/C clutch relay socket 3		Ground

Are the voltages greater than 11 volts?

Yes	GO to G13
No	VERIFY BJB fuses 44 (10A) and 97 (10A) are OK. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short. If OK, REPAIR the circuit.

G13 BYPASS THE A/C (AIR CONDITIONING) CLUTCH RELAY

- Ignition OFF.
- Connect a fused jumper wire:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
A/C clutch relay socket 3		A/C clutch relay socket 5

- Ignition ON.

Does the A/C compressor clutch engage?

Yes	REMOVE the fused jumper wire. INSTALL a new A/C clutch relay.
No	LEAVE the fused jumper wire installed. GO to G14

G14 CHECK THE A/C (AIR CONDITIONING) COMPRESSOR CLUTCH FIELD COIL VOLTAGE SUPPLY CIRCUIT FOR AN OPEN

- Disconnect A/C compressor clutch field coil C100.

Is the voltage greater than 11 volts?

Yes	REMOVE the fused jumper wire. GO to G15
No	REMOVE the fused jumper wire. REPAIR the circuit.

G15 CHECK THE A/C (AIR CONDITIONING) COMPRESSOR CLUTCH FIELD COIL GROUND CIRCUIT FOR AN OPEN

- Ignition OFF.

Is the resistance less than 3 ohms?

Yes	GO to G16
No	REPAIR the circuit.

G16 CHECK THE A/C (AIR CONDITIONING) COMPRESSOR CLUTCH AIR GAP

- Measure the A/C compressor clutch air gap at 3 equally spaced locations between the clutch hub and the A/C compressor clutch pulley.
REFER to: Air Conditioning (A/C) Clutch Air Gap Adjustment (412-00 Climate Control System - General Information) .

Is the A/C compressor clutch air gap greater than 0.6 mm (0.0236 in)?

Yes	ADJUST the A/C compressor clutch air gap. REFER to: Air Conditioning (A/C) Clutch Air Gap Adjustment (412-00 Climate Control System - General Information, General Procedures).
No	INSTALL a new A/C compressor clutch field coil. REFER to: Air Conditioning (A/C) Clutch and Air Conditioning (A/C) Clutch Field Coil (412-00 Climate Control System - General Information, General Procedures).

G17 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

G18 CHECK FOR AN INPUT DISABLING THE A/C (AIR CONDITIONING) CLUTCH RELAY

NOTE: The PCM strategy may disable the A/C compressor operation. If the A/C compressor clutch can be commanded on using IDS PCM Parameter Identifications (PIDs) Active Commands, PCM replacement will not resolve the condition.

- Diagnose the PCM not energizing the A/C clutch relay using the suggestions in the table below. Refer to the reference value information in Section 6 of the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

A/C Clutch Engagement is inhibited because strategy has not yet detected hardware that indicates vehicle is equipped with A/C

A/C Clutch Engagement is inhibited because the strategy is operating in Ignition System Failure Mode
A/C Clutch Engagement is inhibited because the (ECU) received a Request to Command the A/C Off
A/C Clutch Engagement is inhibited because the engine has not yet reached a stable running mode after starting
A/C Clutch Engagement is inhibited because the A/C Discharge (Head) Pressure is Too High
A/C Clutch Engagement is inhibited because the Engine Coolant Temperature is Too High
A/C Clutch Engagement is inhibited to Prevent Frost and Ice Build Up on the Evaporator
A/C Clutch Engagement is inhibited to Prevent an Engine Stall during a Low Engine Speed condition
A/C Clutch Engagement is inhibited to Protect the Compressor from a Compressor Over-speed condition
A/C Clutch Engagement is inhibited to temporarily make more power available when Accelerator Pedal is Fully Depressed
A/C Clutch Engagement is inhibited because Low A/C Refrigerant Charge has been detected
A/C Clutch Engagement is inhibited to Protect the Compressor from Operating at Too Low of an Ambient Temperature
A/C Clutch Engagement is inhibited due to Missing Climate Control Message
A/C Clutch Engagement is inhibited because the strategy is operating in Failsafe Cooling Mode
A/C Clutch Engagement is inhibited to Protect the Clutch from Damage because the Compressor Load and Speed are Too High
A/C Clutch Engagement is inhibited by the off portion of the A/C Cycling Strategy invoked to manage High Engine Temperature
A/C Clutch Engagement is inhibited due to Low Battery State of Charge
A/C Clutch Engagement is inhibited to Protect the Variable Displacement Compressor from Operating at Too Low of a Temperature
A/C Clutch Engagement is inhibited to improve Brake Booster Vacuum
A/C Clutch Engagement is inhibited because Evaporator Temperature is sufficiently low and compressor was at minimum displacement

A/C Clutch Engagement is inhibited (Disabled) because the Evaporator Temperature is sufficiently below the target temperature

A/C Clutch Engagement is inhibited to satisfy A/C Clutch minimum off time

A/C Clutch Engagement is inhibited Due to Request from Torque Control Strategy (to Temporarily Make More Power Available)

A/C Clutch Engagement is inhibited to Prevent Engine Stalling

A/C Clutch Engagement is inhibited Due to Request to Disable A/C from Stop-Start Strategy

A/C Clutch Engagement is inhibited (Delayed) to make Power Available for Power Steering

A/C Clutch Engagement Is Inhibited Due To State Of Auxiliary A/C Disable (Typically A Pressure Or Temperature) Switch 1 input

A/C Clutch Engagement is inhibited due to state of auxiliary A/C Disable (Typically a Pressure or Temperature) Switch 2 input

Are any of the conditions described above not within normal parameters?

Yes	DIAGNOSE the condition found to be disabling the A/C clutch relay. REFER to the appropriate Workshop Manual (WSM) section or the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
No	The A/C compressor clutch can be commanded on using the IDS PCM Active command PID. The A/C inoperative concern may be caused by an intermittent condition due to a component or module connection, wiring or pin issue. ADDRESS the root cause of any connector or pin issues. CHECK the vehicle service history for recent service actions that have replaced modules. This condition may be due to incomplete or incorrect PMI procedures.

The A/C Is Always On - A/C Mode Always Commanded On

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

Control System Logic

REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) .

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P1464	A/C Demand Out Of Self Test Range	This DTC sets when the PCM senses an A/C request during a PCM self-test.

Possible Sources

- A/C clutch relay
- Wiring, terminals or connectors
- A/C pressure transducer
- FCIM
- PCM

PINPOINT TEST H : THE A/C (AIR CONDITIONING) IS ALWAYS ON - A/C (AIR CONDITIONING) MODE ALWAYS COMMANDED ON

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

H1 RECHECK THE PCM (POWERTRAIN CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Ignition ON.
- Make sure the HVAC control module is powered off.
- Using a diagnostic scan tool, clear the PCM Diagnostic Trouble Codes (DTCs).
- Using a diagnostic scan tool, carry out the PCM KOEO self-test.

Does DTC P1464 return?

Yes	GO to H2
No	IGNORE the DTC and CONTINUE diagnosing other Diagnostic Trouble Codes (DTCs) or symptoms. GO to the DTC Chart: PCM or Symptom Chart – Climate Control in this section.

H2 CHECK THE A/C (AIR CONDITIONING) CLUTCH RELAY

- Carry out the component test on the A/C clutch relay.
Refer to Wiring Diagrams Cell 149 for schematic and connector information.

Did the relay pass the component test?

Yes	GO to H3
No	INSTALL a new A/C clutch relay.

H3 CHECK THE A/C (AIR CONDITIONING) COMPRESSOR CLUTCH FIELD COIL VOLTAGE SUPPLY CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect A/C compressor clutch field coil C100.
- Disconnect the A/C clutch relay.
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to H4

H4 COMPARE THE FCIM (FRONT CONTROLS INTERFACE MODULE) EVAPORATOR TEMPERATURE (EVAP_TEMP) PID (PARAMETER IDENTIFICATION) TO THE PCM (POWERTRAIN CONTROL MODULE) AMBIENT AIR TEMPERATURE (AAT) PID (PARAMETER IDENTIFICATION)

- Ignition OFF.
- Allow the vehicle exterior and interior to stabilize to ambient temperature.
- Ignition ON.
- Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs).
- Monitor and record the PCM AAT PID.
- Using a diagnostic scan tool, view the FCIM Parameter Identifications (PIDs).
- Monitor and record the FCIM (EVAP_TEMP) PID.

Are the temperature values similar (typically within 18°C (32.4°F))?

Yes	GO to H5
No	DIAGNOSE the evaporator temperature sensor. GO to Pinpoint Test L

H5 CHECK THE FCIM (FRONT CONTROLS INTERFACE MODULE) A/C (AIR CONDITIONING) SWITCH STATUS (CC_SW_AC) PID (PARAMETER IDENTIFICATION)

- Ignition ON.
- Using a diagnostic scan tool, view FCIM Parameter Identifications (PIDs).
- Monitor the CC_SW_AC PID.
- Select panel mode, press and release the A/C button (indicator off) on the FCIM controls.

Does the PID display Active when pressed and Inactive when released?

Yes	GO to H6
No	GO to H9

H6 CHECK THE A/C (AIR CONDITIONING) PRESSURE SENSOR (ACP_PRESS) PARAMETER IDENTIFICATION (PID)

- Using a diagnostic scan tool, view the PCM Parameter Identification (PIDs).
- With a manifold gauge set connected, compare the pressure readings of the manifold gauge set and the PCM Parameter Identification (PID) ACP_PRESS.

Are the pressure values of the manifold gauge set and the ACP_PRESS PCM PID within $\pm$ 103 kPa (15) psi?

Yes	GO to H7
No	DIAGNOSE the A/C pressure transducer. GO to Pinpoint Test A

H7 CHECK THE PCM (POWERTRAIN CONTROL MODULE) A/C (AIR CONDITIONING) REQUEST SIGNAL (AC_REQ) PID (PARAMETER IDENTIFICATION) WITH THE A/C (AIR CONDITIONING) OFF

- Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs).
- Monitor the AC_REQ PID.
- While in panel mode, release the A/C button (indicator off) on the FCIM controls.

Does the PID display No?

Yes	GO to H10
No	GO to H8

H8 CHECK THE PCM (POWERTRAIN CONTROL MODULE) A/C (AIR CONDITIONING) REQUEST SIGNAL (AC_REQ) PID (PARAMETER IDENTIFICATION) WITH FCIM (FRONT CONTROLS INTERFACE MODULE) DISCONNECTED

- Ignition OFF.
- Disconnect FCIM C2402A.
- Ignition ON.
- Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs).
- Monitor the AC_REQ PID.

Does the PID display No?

Yes	GO to H10
No	GO to H9

H9 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

H10 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM connectors.
- Repair:
 - corrosion (replace connector or terminals – clean module pins)
 - damaged or bent pins – replace terminals/pins
 - pushed-out pins – replace pins as necessary
- Reconnect all PCM connectors. Make sure they seat and latch correctly.
- Operate the system and verify the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

The Temperature Control Is Inoperative Or Does Not Operate Correctly

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

Temperature Door Actuator,
REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC)
(412-00 Climate Control System - General Information) .

During an actuator calibration cycle, the FCIM drives the temperature door until the door reaches both internal stops in the HVAC case. If the temperature door is temporarily obstructed or binding during a calibration cycle, the module may interpret this as the actual end of travel for the door. When this condition occurs and the module commands the actuator to its end of travel, the airflow may not be the expected temperature.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1081:11	Left Temperature Damper Motor: Circuit Short To Ground	This DTC sets when the module senses lower than expected voltage on an actuator motor circuit when voltage is applied to drive the motor, indicating a short to ground. The motor can move only in one direction.
B1081:12	Left Temperature Damper Motor: Circuit Short To Battery	This DTC sets when the module senses higher than expected voltage on the actuator motor circuit when ground is applied to drive the motor, indicating a short to voltage. The motor can move only in one direction.
B1081:13	Left Temperature Damper Motor: Open Circuit	This DTC sets when the module senses no voltage on the actuator motor circuit when ground is applied to drive the motor, indicating an open circuit. The motor cannot move.

B11E5:12	Left HVAC Damper Position Sensor: Circuit Short to Battery	This DTC sets when the module senses greater than 5 volts on the actuator feedback circuit, indicating a short to voltage.
B11E5:14	Left HVAC Damper Position Sensor: Circuit Short to Ground or Open	This DTC sets when the module senses less than 1 volt on the actuator feedback circuit, indicating an open circuit or a short to ground.

Possible Sources

- Wiring, terminals or connectors
- Temperature door actuator
- FCIM

PINPOINT TEST I : THE TEMPERATURE CONTROL IS INOPERATIVE OR DOES NOT OPERATE CORRECTLY

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

I1 CHECK THE TEMPERATURE DOOR ACTUATOR CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect FCIM C2402A.
- Disconnect Temperature door actuator C2091.
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to I2

I2 CHECK THE TEMPERATURE DOOR ACTUATOR CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.

Are the resistances greater than 10,000 ohms?

Yes	GO to I3
No	REPAIR the circuit.

I3 CHECK THE TEMPERATURE DOOR ACTUATOR CIRCUITS FOR AN OPEN

Are the resistances less than 3 ohms?

Yes	GO to I4
No	REPAIR the circuit.

I4 CHECK THE TEMPERATURE DOOR ACTUATOR CIRCUITS FOR A SHORT TOGETHER

- Disconnect In-vehicle temperature and humidity sensor C2247.
- Disconnect Air inlet door actuator C289.
- Disconnect Air distribution door actuator C236.

Are the resistances greater than 10,000 ohms?

Yes	INSTALL a new temperature door actuator. REFER to: Temperature Door Actuator (412-00 Climate Control System - General Information, Removal and Installation). TEST the system for normal operation. If the concern is still present, GO to I5
No	REPAIR the circuit.

I5 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

The Blower Motor Is Inoperative

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

Voltage is supplied to the blower motor relay switched contact from the BJB. Ground to the blower motor relay coil is a dedicated circuit. When the blower motor relay coil receives power from the FCIM, the relay coil is energized and voltage is delivered to the blower motor control module. Power and ground for the blower motor is provided by the blower motor control module. The FCIM sends a PWM signal to the blower motor control module to control the blower motor speed.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B10AF:11	Blower Fan Relay: Circuit Short To Ground	This DTC sets when the module senses low voltage on the blower motor relay coil voltage circuit when the module is energizing the circuit. The blower motor relay is permanently inactive.
B10AF:15	Blower Fan Relay: Circuit Short To Battery or Open	This DTC sets when the module senses greater than expected voltage on the blower motor relay coil voltage circuit, indicating an open circuit or a short to voltage. The blower motor relay is inactive when circuit is open; the blower motor relay is on all the time when shorted to battery.
B10B9:12	Blower Control: Circuit Short To Battery	This DTC sets when the module senses high voltage on the blower motor control PWM circuit, indicating a short directly to voltage. The blower motor is inoperative.
B10B9:14	Blower Control: Circuit Short To Ground or Open	This DTC sets when the module senses no voltage on the blower motor control PWM circuit, indicating a short directly to ground or an open circuit. The blower motor runs at full speed if the circuit is shorted to ground. The blower motor is inoperative if the circuit is open.

Possible Sources

- Wiring, terminals or connectors
- Fuse
- Blower motor relay
- Blower motor control module
- FCIM

Visual Inspection and Diagnostic Pre-checks

- Inspect BJB fuse 60 (40A).

PINPOINT TEST J : THE BLOWER MOTOR IS INOPERATIVE

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

J1 CHECK THE BLOWER MOTOR RELAY

- Ignition OFF.
- Disconnect Blower motor relay.
- Carry out the component test on the blower motor relay.
Refer to Wiring Diagrams Cell 149 for schematic and connector information.

Did the relay pass the component test?

Yes	GO to J2
No	INSTALL a new blower motor relay.

J2 CHECK THE BLOWER MOTOR RELAY SWITCH CONTACT SUPPLY VOLTAGE

- Ignition ON.
- Measure:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
Blower motor relay socket 3		Ground

Is the voltage greater than 11 volts?

Yes	GO to J3
------------	--------------------------

No	VERIFY BJB fuse 60 (40A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.
-----------	---

J3 CHECK THE BLOWER MOTOR RELAY COIL GROUND CIRCUIT FOR AN OPEN

- Ignition OFF.
- Measure:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
Blower motor relay socket 2	Ω	Ground

Is the resistance less than 3 ohms?

Yes	GO to J4
No	REPAIR the circuit.

J4 CHECK THE BLOWER MOTOR RELAY COIL CONTROL CIRCUIT FOR A SHORT TO GROUND

- Disconnect FCIM C2402A.
- Measure:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
Blower motor relay socket 1	Ω	Ground

Is the resistance greater than 10,000 ohms?

Yes	GO to J5
No	REPAIR the circuit.

J5 CHECK THE BLOWER MOTOR RELAY COIL CONTROL CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to J6
------------	--------------------------

No	REPAIR the circuit.
-----------	---------------------

J6 CHECK THE BLOWER MOTOR CONTROL MODULE CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect Blower motor control module C297.

Is any voltage present?

Yes	REPAIR the circuit.
------------	---------------------

No	GO to J7
-----------	--------------------------

J7 CHECK THE BLOWER MOTOR CONTROL MODULE CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.

Are the resistances greater than 10,000 ohms?

Yes	GO to J8
------------	--------------------------

No	REPAIR the circuit.
-----------	---------------------

J8 CHECK THE BLOWER MOTOR CONTROL MODULE CIRCUITS FOR AN OPEN

Are the resistances less than 3 ohms?

Yes	GO to J9
No	REPAIR the circuit.

J9 CHECK THE BLOWER MOTOR CONTROL MODULE CIRCUITS FOR A SHORT TOGETHER

Are the resistances greater than 10,000 ohms?

Yes	INSTALL a new blower motor control module. REFER to: Blower Motor Control Module (412-00 Climate Control System - General Information, Removal and Installation). TEST the system for normal operation. If the concern is still present, GO to J10
No	REPAIR the circuits.

J10 CHECK FOR CORRECT FRONT CONTROLS INTERFACE MODULE (FCIM) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

The Blower Motor Does Not Operate Correctly

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

Voltage is supplied to the blower motor relay switched contact from the BJB. Ground to the blower motor relay coil is a dedicated circuit. When the blower motor relay coil receives power from the FCIM, the relay coil is energized and voltage is delivered to the blower motor control module. Power and ground for the blower motor is provided by the blower motor control module. The FCIM sends a PWM signal to the blower motor control module to control the blower motor speed.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B10AF:15	Blower Fan Relay: Circuit Short To Battery or Open	This DTC sets when the module senses greater than expected voltage on the blower motor relay coil voltage circuit, indicating an open circuit or a short to voltage. The blower motor relay is inactive when circuit is open; the blower motor relay is on all the time when shorted to battery.

B10B9:14	Blower Control: Circuit Short To Ground or Open	This DTC sets when the module senses no voltage on the blower motor control PWM circuit, indicating a short directly to ground or an open circuit. The blower motor runs at full speed if the circuit is shorted to ground. The blower motor is inoperative if the circuit is open.
----------	---	---

Possible Sources

- Wiring, terminals or connectors
- Blower motor relay
- Blower motor control module
- FCIM

PINPOINT TEST K : THE BLOWER MOTOR DOES NOT OPERATE CORRECTLY

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

K1 VERIFY THE BLOWER MOTOR OPERATION

- Ignition ON.
- Select panel on the HVAC controls and, starting with LO, operate the blower motor in all settings. Observe the blower motor operation in each setting.

Does the blower motor operate at any setting?

Yes	GO to K2
No	GO to Pinpoint Test J.

K2 CHECK THE BLOWER MOTOR CONTROL MODULE PWM (PULSE WIDTH MODULATION) CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect Blower motor control module C297.
- Disconnect FCIM C2402A.
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to K3

K3 CHECK THE BLOWER MOTOR CONTROL MODULE PWM (PULSE WIDTH MODULATION) CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.

Is the resistance greater than 10,000 ohms?

Yes	GO to K4
No	REPAIR the circuit.

K4 CHECK THE BLOWER MOTOR RELAY COIL CONTROL CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect Blower motor relay.
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to K5

K5 CHECK THE BLOWER MOTOR OPERATION WITH THE BLOWER MOTOR RELAY DISCONNECTED

- Ignition OFF.
- Connect Blower motor control module C297.
- Connect FCIM C2402A.
- Ignition ON.
- Operate the HVAC system and determine if the concern is still present.

Does the fan still operate all the time?

Yes	REPAIR the blower motor control module voltage circuit CH402 (YE/GN) for a short to voltage.
No	GO to K6

K6 CHECK FOR CORRECT BLOWER MOTOR CONTROL MODULE OPERATION

- Ignition OFF.
- Disconnect and inspect the blower motor control module connector.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect the blower motor control module connector. Make sure it seats and latches correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	INSTALL a new blower motor control module. REFER to: Blower Motor Control Module (412-00 Climate Control System - General Information, Removal and Installation). TEST the system for normal operation. If the concern is still present, GO to K7
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

K7 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

B1B71:11, B1B71:15

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

Evaporator Temperature Sensor,
REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) .

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1B71:11	Evaporator Temperature Sensor: Circuit Short To Ground	The module senses excessive voltage drop on the sensor reference voltage circuit, indicating a short directly to ground. The module defaults to calculated evaporator temperature and the compressor is shut off.

B1B71:15	Evaporator Temperature Sensor: Circuit Short To Battery or Open	The module senses no voltage drop on the sensor reference voltage circuit, indicating a short directly to voltage or an open circuit. The module defaults to calculated evaporator temperature and the compressor is shut off.
----------	---	--

Possible Sources

- Wiring, terminals or connectors
- Evaporator temperature sensor
- FCIM

PINPOINT TEST L : B1B71:11, B1B71:15

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.	
L1 CHECK THE EVAPORATOR TEMPERATURE SENSOR CIRCUITS FOR A SHORT TO VOLTAGE	
• Ignition OFF. • Disconnect FCIM C2402A. • Disconnect evaporator temperature sensor C296. • Ignition ON.	
Is any voltage present?	
Yes	REPAIR the circuit in question.
No	GO to L2
L2 CHECK THE EVAPORATOR TEMPERATURE SENSOR CIRCUITS FOR A SHORT TO GROUND	

- Ignition OFF.

Are the resistances greater than 10,000 ohms?

Yes	GO to L3
No	REPAIR the circuit in question.

L3 CHECK THE EVAPORATOR TEMPERATURE SENSOR CIRCUITS FOR AN OPEN

Are the resistances less than 3 ohms?

Yes	GO to L4
No	REPAIR the circuit in question.

L4 CHECK THE EVAPORATOR TEMPERATURE SENSOR CIRCUITS FOR A SHORT TOGETHER

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new evaporator temperature sensor. REFER to: Evaporator Temperature Sensor (412-00 Climate Control System - General Information, Removal and Installation). TEST the system for normal operation. If the concern is still present, GO to L5
No	REPAIR the circuits.

L5 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

C1B14:11, C1B14:12

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

A 5-volt reference voltage and ground is supplied to the climate control sensors and actuators from the FCIM.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
C1B14:11	Sensor Supply Voltage A: Circuit Short to Ground	This DTC sets when the module senses less than 5 volts on the sensor reference voltage circuit, indicating a short to ground.
C1B14:12	Sensor Supply Voltage A: Circuit Short to Battery	This DTC sets when the module senses greater than 5 volts on the sensor reference voltage circuit, indicating a short to voltage.

Possible Sources

- Wiring, terminals or connectors
- FCIM

PINPOINT TEST M : C1B14:11, C1B14:12

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

M1 CHECK THE FCIM (FRONT CONTROLS INTERFACE MODULE) DTCS

- Ignition ON.
- Using a diagnostic scan tool, perform FCIM self-test.

Is DTC C1B14:11 present?

Yes	GO to M2
No	GO to M5

M2 CHECK THE REFERENCE VOLTAGE CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect FCIM C2402A.

Is the resistance greater than 10,000 ohms?

Yes	GO to M3
No	REPAIR the circuit.

M3 CHECK THE REFERENCE VOLTAGE CIRCUIT AND THE SIGNAL RETURN CIRCUIT FOR A SHORT TOGETHER

- Ignition OFF.

Is the resistance greater than 200 ohms?

Yes	GO to M6
No	GO to M4

M4 CHECK THE A/C (AIR CONDITIONING) COMPONENTS

- While measuring the resistance, disconnect the following components one at a time, in order. Stop disconnecting components if the measured resistance rises above 200 ohms.
 - In-vehicle temperature and humidity sensor C2247
 - Air distribution door actuator C236
 - Temperature door actuator C2091
 - Air inlet door actuator C289

Did the resistance rise above 200 ohms?

Yes	INSTALL a new sensor or actuator (the last one to be disconnected). Refer to the appropriate section in Group 412 for the procedure. When installing an actuator, CONNECT the actuator electrical connector before the FCIM. This allows the actuator to be calibrated when the FCIM is connected.
No	REPAIR the circuit.

M5 CHECK THE REFERENCE VOLTAGE CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect FCIM C2402A.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to M6

M6 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

P193E

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

The PCM controls the A/C compressor clutch field coil based on messages received from the BCM over the HS-CAN. When the FCIM determines it is necessary to activate the A/C compressor due to driver request or automatic climate control settings, the FCIM sends a message to the BCM over the MS-CAN, the BCM then sends a message to the PCM to activate the A/C compressor.

An internal failure of the PCM, BCM or FCIM, or a failure in the MS-CAN or HS-CAN, causes the PCM to set a DTC.

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P193E	A/C Clutch Request Signal	This DTC sets when the PCM does not receive the A/C enable request from the BCM.

Possible Sources

- Network concerns
- BCM
- PCM
- FCIM

PINPOINT TEST N : P193E

N1 VERIFY THE CUSTOMER CONCERN

- Ignition ON.
- Verify there is an observable symptom present.

Is an observable symptom present?

Yes	GO to N2
No	The system is operating correctly at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

N2 CHECK THE COMMUNICATION NETWORK

- Using a diagnostic scan tool, carry out the Network Test.

Do the BCM, PCM and the FCIM pass the Network Test?

Yes	GO to N3
No	DIAGNOSE the BCM, PCM or FCIM does not communicate with the diagnostic scan tool. REFER to: Communications Network (418-00 Module Communications Network) .

N3 CHECK THE PCM (POWERTRAIN CONTROL MODULE) A/C (AIR CONDITIONING) REQUEST SIGNAL (AC_REQ) PID (PARAMETER IDENTIFICATION)

- Start the engine.
- Using a diagnostic scan tool, monitor the PCM AC_REQ PID.
- On the HVAC controls, select PANEL mode, then press the A/C button (indicator ON).

Does the AC_REQ PID display YES when the A/C button indicator is illuminated?

Yes	GO to N7
No	GO to N4

N4 CHECK THE FCIM (FRONT CONTROLS INTERFACE MODULE) A/C (AIR CONDITIONING) SWITCH (CC_SW_AC) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, monitor the FCIM CC_SW_AC PID while pressing and releasing the A/C button.

Does the PID display Active when the A/C button indicator is illuminated?

Yes	GO to N6
No	GO to N5

N5 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.

- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,   Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

N6 VERIFY CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all BCM electrical connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all BCM electrical connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW the TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,   Click here to access Guided Routine (BCM).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

N7 VERIFY CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM electrical connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all PCM electrical connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

Insufficient Heat In Auto Start-Stop Mode Only

Refer to Wiring Diagrams Cell 40 for schematic and connector information.

Normal Operation and Fault Conditions

Cabin Heater Coolant Pump,

REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) .

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P2600	Coolant Pump "A" Control Circuit/ Open	This DTC sets when the PCM senses an open circuit to the cabin heater coolant pump.
P2601	Coolant Pump "A" Control Circuit Performance/Stuck Off	• This DTC sets when the PCM senses any of the following conditions: • Dry-run leads to cabin heater coolant pump running without resistance • Over temperature • Over/under voltage • Impeller stall • Impeller speed below minimum speed • Internal error
P2602	Coolant Pump "A" Control Circuit Low	This DTC sets when the PCM senses low voltage on the PWM circuit when commanding it high, indicating a short to ground to the cabin heater coolant pump.
P2603	Coolant Pump "A" Control Circuit High	This DTC sets when the PCM senses low voltage on the PWM circuit when commanding it high, indicating an open circuit to the cabin heater coolant pump.

Possible Causes

- Wiring, terminals or connectors
- Low coolant or air in the coolant system
- Cabin heater coolant pump
- PCM

PINPOINT TEST O : INSUFFICIENT HEAT IN AUTO START-STOP MODE ONLY

O1 CHECK THE CABIN HEATER COOLANT PUMP

NOTE: The engine must be auto-stopped to request the cabin heater coolant pump on. Refer to the Owner's Literature, Unique Driving Characteristics for full auto start-stop enabling/disabling information.

- Start the vehicle and allow engine to reach normal operating temperatures.
- Using the HVAC controls, select panel mode, set temperature to full hot and set blower speed to low.
- Drive the vehicle above 4 km/h (3 mph).
- Stop the vehicle on a level surface.
- Make sure the steering wheel is set to the straight ahead position.
- Keep the transmission selector lever in position D, brake pedal pressed and doors closed.
- Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs).
- Monitor the PCM coolant pump status (COOLPMP_A_STAT) PID for at least 1 minute.

Does the cabin heater coolant pump turn on?

Yes	GO to O6
No	GO to O2

O2 CHECK THE CABIN HEATER COOLANT PUMP CIRCUITS FOR A SHORT TO VOLTAGE

- Disconnect BJB fuse 97 (10A).
- Disconnect PCM 3.5L EcoBoost C1915B.
- Disconnect Cabin heater coolant pump C163.
- Ignition ON.

Is there any voltage present?

Yes	REPAIR the circuit.
No	GO to O3

O3 CHECK THE CABIN HEATER COOLANT PUMP CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.

Are the resistances greater than 10,000 ohms?

Yes	GO to O4
No	REPAIR the circuit.

O4 CHECK THE CABIN HEATER COOLANT PUMP CIRCUITS FOR AN OPEN

3.5L EcoBoost

Positive Lead	Measurement / Action	Negative Lead
C163-3	Ω	C1915B-3

Are the resistances less than 3 ohms?

Yes	GO to O5
------------	--------------------------

No	REPAIR the circuit.
-----------	---------------------

O5 CHECK THE CABIN HEATER COOLANT PUMP CIRCUITS FOR A SHORT TOGETHER

Is the resistance greater than 10,000 ohms?

Yes	GO to O6
------------	--------------------------

No	REPAIR the circuit.
-----------	---------------------

O6 CHECK THE ENGINE COOLANT LEVEL

NOTE: Allow the engine to cool before checking the engine coolant level.

- Visually inspect the engine coolant level at the degas bottle.

Is the engine coolant level within specifications?

Yes	GO to O7
------------	--------------------------

No	REFER to: Engine Cooling (303-03 Engine Cooling - 3.5L EcoBoost (272kW/370PS)) .
-----------	--

O7 CLEAR ALL PCM (POWERTRAIN CONTROL MODULE) DIAGNOSTIC TROUBLE CODES

- Connect all disconnected connectors. Make sure they seat and latch correctly.
- Ignition ON.
- Using a diagnostic scan tool, CLEAR all PCM Diagnostic Trouble Codes (DTCs).
- **NOTE:** *The engine must be auto-stopped to request the cabin heater coolant pump on. Refer to the Owner's Literature for full Auto Start-Stop enabling/disabling.*

Start the vehicle and allow engine to reach normal operating temperatures.

- Using the HVAC controls, select panel mode, set temperature to full hot and set blower speed to low.
- Drive the vehicle above 4 km/h (3 mph).
- Stop the vehicle on a level surface.
- Make sure the steering wheel is set to the straight ahead position.
- Keep the transmission selector lever in position D, brake pedal pressed and doors closed.
- Using a diagnostic scan tool, view PCM Parameter Identifications (PIDs).
- Monitor the PCM coolant pump status (COOLPMP_A_STAT) PID for at least 1 minute.

Does the cabin coolant pump turn on?

Yes	If the cabin coolant pump runs for 10 seconds on and 10 seconds off, PURGE the air from the coolant system. If the cabin coolant pump runs normally, the system is operating correctly at this time. The concern may have been caused by pump connections. ADDRESS the root cause of any connector or pin issues.
No	INSTALL a new cabin heater coolant pump. Refer to the correct procedure in Group 412. TEST the system for normal operation. If the concern is still present, GO to O8

O8 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM connectors.
- Repair:
 - corrosion (replace connector or terminals – clean module pins)
 - damaged or bent pins – replace terminals/pins
 - pushed-out pins – replace pins as necessary
- Reconnect all PCM connectors. Make sure they seat and latch correctly.
- Operate the system and verify the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

B105A:12, B105A:14, B1A61:11, B1A61:15, B1A69:12, B1A69:14

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

In-Vehicle Temperature and Humidity Sensor,

REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) .

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B105A:12	Cabin Temperature Sensor Fan: Circuit Short To Battery	This DTC sets when the module senses higher than expected voltage on the in-vehicle temperature and humidity sensor fan motor circuit. The in-vehicle temperature and humidity sensor fan motor is inactive.
B105A:14	Cabin Temperature Sensor Fan: Circuit Short To Ground or Open	This DTC sets when the module senses no voltage on the in-vehicle temperature and humidity sensor fan motor circuit, indicating an open or a short directly to ground. The in-vehicle temperature and humidity sensor fan motor is active.
B1A61:11	Cabin Temperature Sensor: Circuit Short to Ground	This DTC sets when the module senses lower than expected voltage on the in-vehicle temperature and humidity sensor feedback circuit, indicating a short to ground.
B1A61:15	Cabin Temperature Sensor: Circuit Short to Battery or Open	This DTC sets when the module senses greater than expected voltage on the in-vehicle temperature and humidity sensor feedback circuit, indicating a short to voltage or an open circuit or sensor.
B1A69:12	Humidity Sensor: Circuit Short To Battery	This DTC sets when the module senses greater than expected voltage on the in-vehicle temperature and humidity sensor humidity input circuit, indicating a short to voltage.
B1A69:14	Humidity Sensor: Circuit Short To Ground or Open	This DTC sets when the module senses no voltage on the in-vehicle temperature and humidity sensor humidity input circuit, indicating a short to ground or an open circuit or sensor.

Possible Sources

- Fuse
- Wiring, terminals or connectors
- In-vehicle temperature and humidity sensor
- FCIM

Visual Inspection and Diagnostic Pre-checks

- Make sure the in-vehicle temperature and humidity sensor harness is not chaffed.

PINPOINT TEST P : B105A:12, B105A:14, B1A61:11, B1A61:15, B1A69:12, B1A69:14

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

P1 CHECK THE IN-VEHICLE TEMPERATURE AND HUMIDITY SENSOR CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect FCIM C2402A.
- Disconnect FCIM C2402B.
- Disconnect In-vehicle temperature and humidity sensor C2247.
- Disconnect BCM fuse 21 (5A).
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to P2

P2 CHECK THE IN-VEHICLE TEMPERATURE AND HUMIDITY SENSOR CIRCUITS FOR A SHORT TO GROUND

- Ignition OFF.

Are the resistances greater than 10,000 ohms?

Yes	GO to P3
No	REPAIR the circuit.

P3 CHECK THE IN-VEHICLE TEMPERATURE AND HUMIDITY SENSOR CIRCUITS FOR AN OPEN

Are the resistances less than 3 ohms?

Yes	GO to P4
No	REPAIR the circuit.

P4 CHECK THE IN-VEHICLE TEMPERATURE AND HUMIDITY SENSOR CIRCUITS FOR A SHORT TOGETHER

- Disconnect Temperature door actuator C2091.
- Disconnect Air inlet door actuator C289.
- Disconnect Air distribution door actuator C236.

Are the resistances greater than 10,000 ohms?

Yes	GO to P5
No	REPAIR the circuit.

P5 CHECK FOR CORRECT IN-VEHICLE TEMPERATURE AND HUMIDITY SENSOR OPERATION

- Ignition OFF.
- Inspect the disconnected connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all disconnected connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	INSTALL a new in-vehicle temperature and humidity sensor. REFER to: In-Vehicle Temperature and Humidity Sensor (412-00 Climate Control System - General Information, Removal and Installation). TEST the system for normal operation. If the concern is still present, GO to P6
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

P6 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

Air Discharge Temperature Sensor Circuit Faults

Refer to Wiring Diagrams Cell 54 for schematic and connector information.

Normal Operation and Fault Conditions

The 2 air discharge temperature sensors contain a thermistor. The sensor varies its resistance with the temperature. As the temperature rises, the resistance falls. As the temperature falls, the resistance rises. REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) .

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B10B5:11	Left Panel Air Discharge Temperature: Circuit Short To Ground	This DTC sets when the FCIM senses erratic voltages from the left panel air discharge temperature sensor.
B10B5:15	Left Panel Air Discharge Temperature: Circuit Short To Battery or Open	This DTC sets when the FCIM senses erratic voltages from the left panel air discharge temperature sensor.
B10B6:11	Left Floor Air Discharge Temperature: Circuit Short To Ground	This DTC sets when the FCIM senses erratic voltages from the left floor air discharge temperature sensor.

B10B6:15	Left Floor Air Discharge Temperature: Circuit Short To Battery or Open	This DTC sets when the FCIM senses erratic voltages from the left floor air discharge temperature sensor.
----------	--	---

Possible Sources

- Wiring, terminals or connectors
- Air discharge temperature sensor(s)
- FCIM

PINPOINT TEST Q : AIR DISCHARGE TEMPERATURE SENSOR CIRCUIT FAULTS

Q1 CHECK THE AIR DISCHARGE TEMPERATURE SENSOR OUTPUT VOLTAGE CIRCUIT

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

- Ignition OFF.
- Disconnect the suspect air discharge temperature sensor:
 - Driver side footwell air discharge temperature sensor C2436
 - Driver side register air discharge temperature sensor C2438
- Ignition ON.
- Turn the HVAC system on.
- Measure:

Click to display connectors

Driver side register air discharge temperature sensor

Positive Lead	Measurement / Action	Negative Lead
C2438-1		C2438-2

Is the voltage between 4.7 and 5.1 volts?

Yes	INSTALL a new air discharge temperature sensor. Refer to the appropriate section in Group 412 for the procedure. CLEAR the Diagnostic Trouble Codes (DTCs). REPEAT the self-test. If Diagnostic Trouble Code (DTC) returns, GO to Q9
No	GO to Q2

Q2 CHECK THE AIR DISCHARGE TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect FCIM C2402A.
- Disconnect FCIM C2402B.
- Ignition ON.
- Measure:

Click to display connectors

Driver side register air discharge temperature sensor

Positive Lead	Measurement / Action	Negative Lead
C2438-1		Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to Q3

Q3 CHECK THE AIR DISCHARGE TEMPERATURE SENSOR SIGNAL RETURN CIRCUIT FOR A SHORT TO VOLTAGE

- Measure:

Click to display connectors

Driver side register air discharge temperature sensor

Positive Lead	Measurement / Action	Negative Lead
C2438-2		Ground

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to Q4

Q4 CHECK THE AIR DISCHARGE TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Measure:

Click to display connectors

Driver side register air discharge temperature sensor

Positive Lead	Measurement / Action	Negative Lead
C2438-1	Ω	Ground

Are the resistances greater than 10,000 ohms?

Yes	GO to Q5
No	REPAIR the circuit.

Q5 CHECK THE AIR DISCHARGE TEMPERATURE SENSOR SIGNAL RETURN CIRCUIT FOR A SHORT TO GROUND

- Measure:

Click to display connectors

Driver side register air discharge temperature sensor

Positive Lead	Measurement / Action	Negative Lead
C2438-2	Ω	Ground

Are the resistances greater than 10,000 ohms?

Yes	GO to Q6
No	REPAIR the circuit.

Q6 CHECK THE AIR DISCHARGE TEMPERATURE SENSOR SIGNAL CIRCUIT FOR AN OPEN

- Measure:

Click to display connectors

Driver side register air discharge temperature sensor

Positive Lead	Measurement / Action	Negative Lead
C2438-1	Ω	C2402B-4

Are the resistances less than 3 ohms?

Yes	GO to Q7
-----	--------------------------

No	REPAIR the circuit.
-----------	---------------------

Q7 CHECK THE AIR DISCHARGE TEMPERATURE SENSOR SIGNAL RETURN CIRCUIT FOR AN OPEN

- Measure:

Click to display connectors

Driver side register air discharge temperature sensor

Positive Lead	Measurement / Action	Negative Lead
C2438-2	Ω	C2402A-2

Is the resistance less than 3 ohms?

Yes	GO to Q8
------------	--------------------------

No	REPAIR the circuit.
-----------	---------------------

Q8 CHECK AIR DISCHARGE TEMPERATURE SENSOR SIGNAL CIRCUIT AND THE SIGNAL RETURN FOR A SHORT TO TOGETHER

- Disconnect the driver side footwell air discharge temperature sensor C2436
- Disconnect the driver side register air discharge temperature sensor C2438
- Measure:

Click to display connectors

Driver side register air discharge temperature sensor

Positive Lead	Measurement / Action	Negative Lead
C2438-1	Ω	C2438-2

Are the resistances greater than 10,000 ohms?

Yes	INSTALL a new air discharge temperature sensor. Refer to the appropriate section in Group 412 for the procedure. CLEAR the Diagnostic Trouble Codes (DTCs). REPEAT the self-test. If Diagnostic Trouble Code (DTC) returns, GO to Q9
No	REPAIR the circuit.

Q9 CHECK FOR CORRECT FCIM (FRONT CONTROLS INTERFACE MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all FCIM connectors.
- Repair:
 - corrosion (install new connector or terminals – clean module pins)
 - damaged or bent pins – install new terminals/pins
 - pushed-out pins – install new pins as necessary
- Reconnect all FCIM connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW TSB instructions. If no Technical Service Bulletins (TSBs) address this concern,  Click here to access Guided Routine (FCIM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. ADDRESS the root cause of any connector or pin issues.

P06A0

Refer to Wiring Diagrams Cell 40 for schematic and connector information.

Normal Operation and Fault Conditions

The externally controlled variable displacement compressor is electronically controlled by the PCM. For additional information, refer to externally controlled variable displacement compressor.
REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) (412-00 Climate Control System - General Information) .

DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P06A0	Variable A/C Compressor Control Circuit	This DTC sets when the PCM senses greater than expected voltage on the sensor feedback circuit, indicating a short to voltage or an open circuit or an open sensor.

Possible Sources

- Fuses
- Wiring, terminals or connectors
- A/C compressor
- PCM

Visual Inspection and Diagnostic Pre-checks

- Inspect for loose or corroded PCM and A/C compressor connections.
- Make sure BJB fuse 97 (10A) is OK.

PINPOINT TEST R : P06A0

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may cause damage to the connector.

R1 EXTERNALLY CONTROLLED VARIABLE DISPLACEMENT COMPRESSOR (EVDC) PERFORMANCE CHECK

NOTE: Proper Air Conditioning (A/C) system diagnosis on a vehicle's compressor is dependent on correct refrigerant system charge and tested in ambient temperatures above 21.1°C (70°F).

NOTE: The performance check test is used to determine if the Externally Controlled Variable Displacement Compressor (EVDC) is able to change the displacement by measuring the amperage to the solenoid and monitoring the manifold pressure gauges soon after the air conditioning clutch is engaged.

- Ignition OFF.
- Disconnect BJB fuse 97 (10A).
- Measure:

Click to display connectors

Positive Lead	Measurement / Action	Negative Lead
BJB fuse 97 (10A) cavity, component side		BJB fuse 97 (10A) cavity, component side

- With a manifold gauge set connected, monitor the low side and high side pressures.
- Start the engine. Run the engine until it reaches normal operating temperature.
- Select the floor position on the HVAC controls. Set the temperature control to full warm and the blower to the highest setting. Set the A/C to off. Close all windows and doors. Run for 5 minutes to heat up the climate control housing.
- Monitor the multi meter and the manifold gauges. Select the PANEL position on the HVAC controls. Set the temperature control to full cold and the blower to the highest setting. Set the recirc mode to on. Set the A/C to on.
- Record the highest amperage measurement and the A/C pressures.

Did the amperage initially increase approximately 0.8A, and did the low side pressure decrease and the high side pressure increase and after a few minutes did the amperage and high side pressure decrease and low side pressure increase?

Yes	The Externally Controlled Variable Displacement Compressor (EVDC) is able to change the displacement. CHECK refrigerant charge amount. REFER to: Air Conditioning (A/C) System Recovery, Evacuation and Charging - Vehicles With: R1234YF Refrigerant (412-00 Climate Control System - General Information, General Procedures).
No	GO to R2

R2 CHECK FOR VOLTAGE TO THE A/C (AIR CONDITIONING) COMPRESSOR

- Ignition OFF.
- Connect BJB fuse 97 (10A).
- Disconnect externally controlled variable displacement compressor C1110.
- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to R3
No	VERIFY BJB fuse 97 (10A) is OK. If OK, REPAIR the circuit. If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.

R3 CHECK THE A/C (AIR CONDITIONING) COMPRESSOR DISPLACEMENT CONTROL VALVE CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect PCM 3.5L EcoBoost C1915B.

Is the resistance greater than 10,000 ohms?

Yes	GO to R4
No	REPAIR the circuit.

R4 CHECK THE A/C (AIR CONDITIONING) COMPRESSOR DISPLACEMENT CONTROL VALVE CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to R5

R5 CHECK THE A/C (AIR CONDITIONING) COMPRESSOR DISPLACEMENT CONTROL VALVE CIRCUIT FOR AN OPEN

- Ignition OFF.
- Measure:

Click to display connectors

3.5L EcoBoost

Positive Lead	Measurement / Action	Negative Lead
C1110-2	Ω	C1915B-79

Is the resistance less than 3 ohms?

Yes	INSTALL a new A/C compressor, REFER to: Air Conditioning (A/C) Compressor - 3.5L EcoBoost (272kW/370PS) (412-00 Climate Control System - General Information) . CLEAR the DTC and REPEAT the PCM KOEO self-test. If the DTC returns, GO to R6
No	REPAIR the circuit.

R6 CHECK FOR CORRECT PCM (POWERTRAIN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all PCM electrical connectors (if not previously disconnected).
- Repair:
 - corrosion (install new connector or terminal - clean module pins)
 - damaged or bent pins - install new terminals or pins
 - pushed-out pins - install new pins as necessary
- Connect all PCM electrical connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS for any applicable Technical Service Bulletins (TSBs). If a TSB exists for this concern, DISCONTINUE this test and FOLLOW the TSB instructions. If no Technical Service Bulletins (TSBs) address this concern, INSTALL a new PCM. REFER to: Powertrain Control Module (PCM) (303-14C Electronic Engine Controls - 3.5L EcoBoost (272kW/370PS), Removal and Installation).
No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

mcx30.com