Steering Wheel and Column Electrical Components

DTC Charts

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).

BCM DTC Chart

DTC	Description	Action
B108A:01	Start Button: General Electrical Failure	GO to Pinpoint Test F
B108A:24	Start Button: Signal Stuck High	GO to Pinpoint Test F
B108A:9E	Start Button: Stuck On	GO to Pinpoint Test F
B1142:29	Ignition Status 1: Signal Invalid	• For vehicles equipped with a conventional ignition switch, GO to Pinpoint Test C • For vehicles equipped with a push button ignition switch,GO to Pinpoint Test F
B1240:11	Start Button Mode Indicator: Circuit Short to Ground	GO to Pinpoint Test H
B1240:15	Start Button Mode Indicator: Circuit Short to Battery or Open	• If the ignition mode indicator is inoperative, GO to Pinpoint Test G • If the ignition mode indicator is always on, GO to Pinpoint Test H
B130F:12	Run Accessory Control: Circuit Short to Battery	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B130F:14	Run Accessory Control: Circuit Short to Ground or Open	REFER to: Wipers and Washers (501-16 Wipers and Washers) .

B1310:12	Run/Start Control: Circuit Short to Battery	• For vehicles equipped with a conventional ignition switch, GO to Pinpoint Test C • For vehicles equipped with a push button ignition switch, GO to Pinpoint Test F
B1310:14	Run/Start Control: Circuit Short to Ground or Open	• For vehicles equipped with a conventional ignition switch, GO to Pinpoint Test C • For vehicles equipped with a push button ignition switch, GO to Pinpoint Test F
B1472:12	Ignition Key Removal Inhibit: Circuit Short To Battery	GO to Pinpoint Test E
B1472:14	Ignition Key Removal Inhibit: Circuit Short To Ground or Open	GO to Pinpoint Test E
U300A:01	Ignition Switch: General Electrical Failure	GO to Pinpoint Test K
All other Diagnostic Trouble Codes (DTCs)	-	REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules) .

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).

SCCM DTC Chart

DTC	Description	Action
B1007:09	High-Beam Headlamp Switch: Component Failure	REFER to: Headlamps (417-01 Exterior Lighting) .
B1008:09	Wiper Mode Switch: Component Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B1051:09	Front Washer Switch: Component Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B10AD:02	Rain Sensor: General Signal Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B10AD:08	Rain Sensor: Bus Signal/Message Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers) .

B10AD:49	Rain Sensor: Internal Electronic Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B10AD:55	Rain Sensor: Not Configured	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B1131:02	Wiper motor module: General Signal Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B1131:08	Wiper motor module: Bus Signal/Message Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B1131:11	Wiper motor module: Circuit Short To Ground	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B1131:49	Wiper motor module: Internal Electronic Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B1131:55	Wiper motor module: Not Configured	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B1131:9A	Wiper motor module: Component or System Operating Conditions	REFER to: Wipers and Washers (501-16 Wipers and Washers) .
B11D9:16	Vehicle Battery: Circuit Voltage Below Threshold	GO to Pinpoint Test I
B11D9:17	Vehicle Battery: Circuit Voltage Above Threshold	GO to Pinpoint Test J
B1298:09	Steering Column Adjust Up Switch: Component Failure	REFER to: Steering Column (211-04 Steering Column) .
B1299:09	Steering Column Adjust Down Switch: Component Failure	REFER to: Steering Column (211-04 Steering Column) .
B12A1:09	Steering Column Adjust Out Switch: Component Failure	REFER to: Steering Column (211-04 Steering Column) .
B12F7:09	Single Wipe Switch: Component Failure	REFER to: Wipers and Washers (501-16 Wipers and Washers, Diagnosis and Testing).
B12A2:09	Steering Column Adjust In Switch: Component Failure	REFER to: Steering Column (211-04 Steering Column) .
B137F:09	Steering Wheel Left Switch Pack: Component Failure	REFER to: Cruise Control (419-03 Cruise Control) . REFER to: Cruise Control (419-03 Cruise Control - Vehicles With: Adaptive Cruise Control) .
B137F:11	Steering Wheel Left Switch Pack: Circuit Short to Ground	REFER to: Cruise Control (419-03 Cruise Control) . REFER to: Cruise Control (419-03 Cruise Control - Vehicles With: Adaptive Cruise Control) .

B137F:17	Steering Wheel Left Switch Pack: Circuit Voltage Above Threshold	REFER to: Cruise Control (419-03 Cruise Control) . REFER to: Cruise Control (419-03 Cruise Control - Vehicles With: Adaptive Cruise Control) .
B1380:09	Steering Wheel Right Switch Pack: Component Failure	Refer to the appropriate section in Group 415 for the procedure.
B1380:11	Steering Wheel Right Switch Pack: Circuit Short to Ground	Refer to the appropriate section in Group 415 for the procedure.
B1380:17	Steering Wheel Right Switch Pack: Circuit Voltage Above Threshold	Refer to the appropriate section in Group 415 for the procedure.
B13A6:09	Lane Departure Warning Switch Input: Component Failure	REFER to: Lane Keeping System - Overview (419-07 Lane Keeping System, Description and Operation).
B1D36:09	Turn Indicator Switch: Component Failure	REFER to: Turn Signal and Hazard Lamps (417-01 Exterior Lighting) .
U2100:00	Initial Configuration Not Complete: No Sub Type Information	Check vehicle service history for recent service actions related to this module. This DTC will set due to incomplete or improper PMI procedures. If there have been recent service actions with this module, REPEAT/CARRY OUT the PMI procedure as directed by the diagnostic scan tool. If there have been no recent service actions, INSTALL a new module to correct the failure to retain configuration data.
U2101:00	Control Module Configuration Incompatible: No Sub Type Information	This DTC sets if the steering wheel switches do not match the switch function configuration data in the SCCM. CHECK the parts catalog and CONFIRM that the correct SCCM and steering wheel control switches are installed in the vehicle. INSTALL the correct components, as necessary.
U3000:49	Control Module: Internal Electronic Failure	INSTALL a new SCCM . REFER to: Steering Column Control Module (SCCM) (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

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).

HSWM DTC Chart

DTC	Description	Action
B135C:11	Heater Element: Circuit Short to Ground	GO to Pinpoint Test M
B135C:15	Heater Element: Circuit Short to Battery or Open	GO to Pinpoint Test M
U0100:00	Lost Communication With ECM/PCM "A": No Sub Type Operation	GO to Pinpoint Test N
U0140:00	Lost Communication With Body Control Module: No Sub Type Operation	GO to Pinpoint Test O

U0256:00	Lost Communication With Front Controls Interface Module "A": No Sub Type Operation	GO to Pinpoint Test P
U1000:00	Solid State Driver Protection Active - Driver Disabled: No Sub Type Operation	The HSWM has temporarily disabled an output because an excessive current draw exists (such as a short to ground). The HSWM cannot enable the output until the cause of the short is corrected. ADDRESS all other Diagnostic Trouble Codes (DTCs) first. After the cause of the concern is corrected, CLEAR the Diagnostic Trouble Codes (DTCs). REPEAT the self-test.
U2100:00	Initial Configuration Not Complete: No Sub Type Operation	This DTC sets due to incomplete or improper PMI procedures. CARRY OUT the PMI procedure as directed by the diagnostic scan tool. Use As-Built data when carrying out PMI for this DTC .
U210A:11	Temperature Sensor: Circuit Short to Ground	GO to Pinpoint Test Q
U210A:15	Temperature Sensor: Circuit Short to Battery or Open	GO to Pinpoint Test Q
U3000:49	Control Module: Internal Electronic Failure	INSTALL a new HSWM. REFER to: Heated Steering Wheel Module (HSWM) (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

Symptom Charts

Symptom Chart: Ignition Switch - Conventional

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).

Symptom Chart

Condition	Possible Causes	Actions
No power in all ignition switch positions	• Refer to Pinpoint Test	• GO to Pinpoint Test A
No power in ACC	• Refer to Pinpoint Test	• GO to Pinpoint Test B
No power in ON	• Refer to Pinpoint Test	• GO to Pinpoint Test C
No power in START	• Refer to Pinpoint Test	• DIAGNOSE the no-start condition. Refer to the appropriate section in Group 303 for the procedure.

Key not detected displays in the message center	• Refer to Pinpoint Test	• REFER to: Passive Anti-Theft System (PATS) (419-01B Passive Anti-Theft System (PATS), Diagnosis and Testing).
The ignition key cannot be returned to the OFF position	• Refer to Pinpoint Test	• GO to Pinpoint Test D
The ignition key can be turned to the OFF position when the selector lever is not in PARK	• Refer to Pinpoint Test	• GO to Pinpoint Test E
The ignition lock cylinder is difficult to turn	• Refer to Pinpoint Test	• REFER to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).

Symptom Chart: Ignition Switch - Push Button

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).

Symptom Chart

Condition	Possible Causes	Actions
No power in ON	• Refer to Pinpoint Test	• GO to Pinpoint Test F
Key not detected displays in the message center	• Refer to Pinpoint Test	• REFER to: Passive Anti-Theft System (PATS) (419-01C Passive Anti-Theft System (PATS) - Vehicles With: Keyless Vehicle System, Diagnosis and Testing).
The ignition mode indicator is inoperative	• Refer to Pinpoint Test	• GO to Pinpoint Test G
The ignition mode indicator is always on	• Refer to Pinpoint Test	• GO to Pinpoint Test H

Symptom Chart: Heated Steering Wheel

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).

Symptom Chart

Condition	Possible Causes	Actions
The heated steering wheel is inoperative or does not operate correctly	• Refer to Pinpoint Test	• GO to Pinpoint Test L

Pinpoint Tests

No Power in All Ignition Switch Positions - Conventional Ignition Switch

Refer to Wiring Diagrams Cell 13 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

Possible Causes

- Fuse
- Wiring, terminals or connectors
- Ignition switch
- BCM

Visual Inspection and Diagnostic Pre-checks

- Inspect the battery and battery cables
- Inspect the BCM fuse 18 (5A)

PINPOINT TEST A : NO POWER IN ALL IGNITION SWITCH POSITIONS - CONVENTIONAL IGNITION SWITCH

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.
A1 CHECK THE VEHICLE BATTERY

- Carry out the Battery Condition Test.
  REFER to: Battery (414-01 Battery, Mounting and Cables, Diagnosis and Testing).

Is the battery OK?

Yes	GO to A2
No	CORRECT the battery condition.

A2 CHECK FOR VOLTAGE TO THE IGNITION SWITCH

- Ignition OFF.
- Disconnect Ignition Switch C250.

Is the voltage greater than 11 volts?

Yes	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	VERIFY the BCM fuse 18 (5A) is OK. If OK, GO to A3 If not OK, REFER to the Wiring Diagrams manual to identify the possible cause of the circuit short.

A3 CHECK THE IGNITION SWITCH VOLTAGE SUPPLY CIRCUIT FOR AN OPEN

- Disconnect BCM C2280A.

Is the resistance less than 3 ohms?

Yes	GO to A4
No	REPAIR the circuit.

A4 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Disconnect and inspect all BCM 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 the BCM connectors and all other previously 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	  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.

No Power in ACC - Conventional Ignition Switch

Refer to Wiring Diagrams Cell 13 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

Possible Causes

- Wiring, terminals or connectors
- Ignition switch
- BCM

PINPOINT TEST B : NO POWER IN ACC - CONVENTIONAL IGNITION SWITCH

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.
B1 CHECK FOR BCM (BODY CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE) U300A:01

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

Is DTC U300A:01 present?

Yes	GO to Pinpoint Test K
No	GO to B2

B2 CHECK FOR VOLTAGE TO THE BCM (BODY CONTROL MODULE) WITH THE IGNITION SWITCH IN THE ACC POSITION

- Ignition OFF.
- Disconnect BCM C2280B.
- Accessory ON.

Is the voltage greater than 11 volts?

Yes	GO to B4
No	GO to B3

B3 CHECK THE IGNITION ACC CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect Ignition Switch C250.

Is the resistance less than 3 ohms?

Yes	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	REPAIR the circuit.

B4 CHECK FOR VOLTAGE TO THE BCM (BODY CONTROL MODULE) WITH THE IGNITION SWITCH IN THE ON POSITION

- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to B5
No	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

B5 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all BCM 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 the BCM 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	  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.

No Power in ON - Conventional Ignition Switch

Refer to Wiring Diagrams Cell 13 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

BCM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1142:29	Ignition Status 1: Signal Invalid	Sets when the BCM does not receive a valid ignition signal during a BCM self-test.
B1310:12	Run/Start Control: Circuit Short to Battery	Sets when the BCM detects a short to voltage from the BJB run/start relay control circuit. When set, the control side of the run/start relay is disabled via the Field Effect Transistor (FET). Once the condition that caused the DTC to set is repaired, the BCM must pass a self-test in order for the DTC to clear and the system to resume normal operation.
B1310:14	Run/Start Control: Circuit Short to Ground or Open	The BCM continuously monitors the BJB RUN/START relay control circuit. This DTC is set if the BCM detects an open or a short to ground on the BJB RUN/START relay control circuit. When this DTC sets, the BCM disables the control side of the RUN/START relay FET. Once the condition that caused the DTC to set is repaired, the BCM must pass a self-test in order for the DTC to clear and the system to resume normal operation.

Possible Causes

- Network concern
- Wiring, terminals or connectors
- Ignition switch
- BCM

Visual Inspection and Diagnostic Pre-checks

- Inspect the BCM fuse 18 (5A)

PINPOINT TEST C : NO POWER IN ON - CONVENTIONAL IGNITION SWITCH

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.
C1 CARRY OUT A NETWORK TEST

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

Does the BCM and the IPC pass the network test?

Yes	GO to C2
No	REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

C2 CHECK FOR BCM (BODY CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE) U300A:01

- Using a diagnostic scan tool, carry out the BCM self-test.

Is DTC U300A:01 present?

Yes	GO to Pinpoint Test K
No	GO to C3

C3 CHECK FOR BCM (BODY CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE) B1310:12 OR B1310:14

- Using a diagnostic scan tool, carry out the BCM self-test.

Is DTC B1310:12 or B1310:14 present?

Yes	GO to C7
No	GO to C4

C4 CHECK FOR VOLTAGE TO THE BCM (BODY CONTROL MODULE) WITH THE IGNITION SWITCH IN THE ON POSITION

- Ignition OFF.
- Disconnect BCM C2280B.
- Ignition ON.

Is the voltage greater than 11 volts?

Yes	GO to C7
No	VERIFY BCM fuse 18 (5A) is OK. If OK, GO to C5 If not OK, REFER to the Wiring Diagrams manual to identify the possible cause of the circuit short.

C5 CHECK THE IGNITION ON-DESIGNATED INPUT CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect Ignition Switch C250.

Is the resistance less than 3 ohms?

Yes	REPAIR the circuit.
No	GO to C6

C6 CHECK THE IGNITION ON-DESIGNATED INPUT CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect Ignition Switch C250.

Is the resistance less than 3 ohms?

Yes	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	REPAIR the circuit.

C7 CARRY OUT A NETWORK TEST

- Using a diagnostic scan tool, perform the network test.

Do the IPC and the BCM pass the network test?

Yes	GO to C8
No	DIAGNOSE an intermittent network concern. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

C8 CHECK THE BJB (BATTERY JUNCTION BOX) RUN/START RELAY COIL CONTROL CIRCUIT FOR A SHORT TO VOLTAGE

- Disconnect BJB C1035C.
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C1035C-8		Ground

Is the voltage greater than 11 volts?

Yes	GO to C9
No	GO to C10

C9 ISOLATE THE BJB (BATTERY JUNCTION BOX) RUN/START RELAY COIL CONTROL CIRCUIT SHORT TO VOLTAGE

- Disconnect BCM C2280F.
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C2280F-25		Ground

Is the voltage greater than 11 volts?

Yes	REPAIR the circuit.
No	INSTALL a new BJB.

C10 CHECK THE BJB (BATTERY JUNCTION BOX) RUN/START RELAY COIL CONTROL CIRCUIT FOR AN OPEN

- Ignition OFF.
- Disconnect BCM C2280F.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C2280F-25	Ω	C1035C-8

Is the resistance less than 3 ohms?

Yes	GO to C11
No	REPAIR the circuit.

C11 CHECK THE RUN/START RELAY CONTROL CIRCUIT FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to C12
No	REPAIR the circuit.

C12 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Disconnect and inspect all BCM 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 the BCM connectors and all other previously 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	  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.

The Ignition Key Cannot Be Returned to the OFF Position

Refer to Wiring Diagrams Cell 37 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

Possible Causes

- Wiring, terminals or connectors
- Ignition switch
- Ignition lock cylinder
- Selector lever assembly (floor shifter)
- Brake shift interlock actuator (column shifter)

PINPOINT TEST D : THE IGNITION KEY CANNOT BE RETURNED TO THE OFF POSITION

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.
D1 CHECK FOR AN ENERGIZED KEY REMOVAL INHIBIT SOLENOID

- Disconnect BCM fuse 18 (5A).
- Attempt to turn the ignition lock cylinder to the ON position and then back to the OFF-LOCK position and remove the key.

Can the ignition lock cylinder be turned to the OFF-LOCK position and the key removed?

Yes	GO to D3
No	GO to D2

D2 CHECK THE IGNITION SWITCH FOR MECHANICAL DAMAGE

- Remove the ignition switch.
  REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
- Attempt to turn the ignition lock cylinder to the OFF-LOCK position and remove the ignition key.

Does the ignition lock cylinder turn to the OFF-LOCK position and can the key be removed?

Yes	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	INSTALL a new ignition lock cylinder. REFER to: Ignition Lock Cylinder (501-14 Handles, Locks, Latches and Entry Systems, Removal and Installation).

D3 CHECK THE KEY REMOVAL INHIBIT SOLENOID CIRCUIT FOR A SHORT TO GROUND

NOTE: *The following pinpoint test step uses a test lamp to simulate normal circuit loads. Use only a Rotunda Test Lamp (SGT27000) or 250- 300mA incandescent bulb test lamp. To avoid connector terminal damage, use the Rotunda Flex Probe kit for the test lamp probe connection to the vehicle. Do not use the test lamp probe directly on any connector.*

- Connect BCM fuse 18 (5A).
- Select PARK.
- Disconnect Ignition Switch C250.

Does the test lamp illuminate?

Yes	GO to D4

No	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

D4 CHECK THE KEY REMOVAL INHIBIT SOLENOID CIRCUIT FOR A SHORT TO GROUND

NOTE: *The following pinpoint test step uses a test lamp to simulate normal circuit loads. Use only a Rotunda Test Lamp (SGT27000) or 250- 300mA incandescent bulb test lamp. To avoid connector terminal damage, use the Rotunda Flex Probe kit for the test lamp probe connection to the vehicle. Do not use the test lamp probe directly on any connector.*

- Disconnect Selector Lever Assembly C3245 (floor shifter).
- Disconnect Brake Shift Interlock Actuator C2008 (column shifter).

Does the test lamp illuminate?

Yes	REPAIR the circuit.
No	GO to D5

D5 ADJUST THE SELECTOR LEVER CABLE

- Connect Selector Lever Assembly C3245 (floor shifter).
- Connect Brake Shift Interlock Actuator C2008 (column shifter).
- Carry out the selector lever adjustment procedure.
  REFER to: Selector Lever Cable Adjustment - Vehicles With: Column Shift (307-05 Automatic Transmission External Controls) .
  REFER to: Selector Lever Cable Adjustment - Vehicles With: Floor Shift (307-05 Automatic Transmission External Controls) .
- Attempt to turn the ignition lock cylinder to the OFF-LOCK position and remove the ignition key.

Does the ignition lock cylinder turn to the OFF-LOCK position and can the key be removed?

Yes	The system is operating correctly at this time. The selector lever cable was out of adjustment.
No	INSTALL a new selector lever assembly (floor shifter) or brake shift interlock actuator (column shifter). REFER to: Brake Shift Interlock Actuator - Vehicles With: Column Shift (307-05 Automatic Transmission External Controls, Removal and Installation). REFER to: Selector Lever Assembly - Vehicles With: Floor Shift (307-05 Automatic Transmission External Controls, Removal and Installation).

The Ignition Key Can Be Turned to the OFF Position When the Selector Lever is Not in PARK

Refer to Wiring Diagrams Cell 37 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

BCM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1472:12	Ignition Key Removal Inhibit: Circuit Short To Battery	Sets when the BCM detects a short to voltage from the key removal inhibit solenoid control circuit.
B1472:14	Ignition Key Removal Inhibit: Circuit Short To Ground or Open	Sets when the BCM detects an open from the key removal inhibit solenoid control circuit.

Possible Causes

- Wiring, terminals or connectors
- Ignition switch
- Selector lever assembly (floor shifter)
- Brake shift interlock actuator (column shifter)
- BCM

PINPOINT TEST E : THE IGNITION KEY CAN BE TURNED TO THE OFF POSITION WHEN THE SELECTOR LEVER IS NOT IN PARK

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.
NOTE: *The following Pinpoint Test uses a test lamp to simulate normal circuit loads. Use only a Rotunda Test Lamp (SGT27000) or 250- 300mA incandescent bulb test lamp. To avoid connector terminal damage, use the Rotunda Flex Probe kit for the test lamp probe connection to the vehicle. Do not use the test lamp probe directly on any connector.*
E1 CHECK THE KEY INHIBIT SOLENOID CIRCUIT FOR GROUND

- Ignition OFF.
- Disconnect Ignition Switch C250.
- Set the park brake.
- Select NEUTRAL.

Is the test lamp illuminated?

Yes	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	GO to E2

E2 CHECK THE KEY INHIBIT SOLENOID CIRCUIT FOR AN OPEN

- Disconnect Selector Lever Assembly C3245 (floor shifter).
- Disconnect Brake Shift Interlock Actuator C2008 (column shifter).
- Measure:

  Click to display connectors

  Column Shifter

Positive Lead	Measurement / Action	Negative Lead
C250-3	Ω	C2008-3

Is the resistance less than 3 ohms?

Yes	For vehicles equipped with a column shifter, GO to E3 For vehicles equipped with a floor shifter, GO to E4
No	REPAIR the circuit.

E3 CHECK THE BRAKE SHIFT INTERLOCK ACTUATOR GROUND CIRCUIT FOR AN OPEN

- Remove the fused jumper wire.

Does the test lamp illuminate with the fused jumper wire connected?

Yes	INSTALL a new brake shift interlock actuator. REFER to: Brake Shift Interlock Actuator - Vehicles With: Column Shift (307-05 Automatic Transmission External Controls, Removal and Installation).
No	REPAIR the circuit.

E4 BYPASS THE SELECTOR LEVER

- Remove the fused jumper wire.

Does the test lamp illuminate with the fused jumper wire connected?

Yes	INSTALL a new selector lever assembly. REFER to: Selector Lever Assembly - Vehicles With: Floor Shift (307-05 Automatic Transmission External Controls, Removal and Installation).
No	GO to E5

E5 CHECK THE KEY INHIBIT SOLENOID CIRCUIT FOR A SHORT TO VOLTAGE

Does the test lamp illuminate?

Yes	REPAIR the circuit.
No	GO to E6

E6 CHECK THE BCM (BODY CONTROL MODULE) KEY INHIBIT GROUND CONTROLLED CIRCUIT FOR A SHORT TO VOLTAGE

- Connect Ignition Switch C250.
- Ignition ON.
- Disconnect BCM C2280B.

Does the test lamp illuminate?

Yes	REPAIR the circuit.
No	GO to E7

E7 CHECK THE BCM (BODY CONTROL MODULE) KEY INHIBIT GROUND CONTROLLED CIRCUIT FOR AN OPEN

- Connect BCM C2280B.
- Ignition OFF.
- Disconnect BCM C2280B.

Is the resistance less than 3 ohms?

Yes	GO to E8
No	REPAIR the circuit.

E8 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Disconnect and inspect all BCM 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 the BCM connectors and all other previously 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	  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.

No Power in ON - Push Button Ignition Switch

Refer to Wiring Diagrams Cell 13 for schematic and connector information.

Refer to Wiring Diagrams Cell 20 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

BCM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B108A:01	Start Button: General Electrical Failure	Sets continuous when the BCM detects a mismatch between the switch input circuits, one indicates closed and one indicates open.
B108A:24	Start Button: Signal Stuck High	Sets continuous when the BCM detects a fault on one of the ignition switch input circuits for 10 seconds or longer.
B108A:9E	Start Button: Stuck On	Sets continuous when the BCM detects only one switch input circuit indicating open when the start button is released.
B1142:29	Ignition Status 1: Signal Invalid	Sets during the on-demand self-test when the BCM detects a fault from one of the ignition switch input circuits.
B1310:12	Run/Start Control: Circuit Short to Battery	Sets when the BCM detects a short to voltage from the BJB run/start relay control circuit. When set, the control side of the run/start relay is disabled via the Field Effect Transistor (FET). Once the condition that caused the DTC to set is repaired, the BCM must pass a self-test in order for the DTC to clear and the system to resume normal operation.

B1310:14	Run/Start Control: Circuit Short to Ground or Open	The BCM continuously monitors the BJB RUN/START relay control circuit. This DTC is set if the BCM detects an open or a short to ground on the BJB RUN/START relay control circuit. When this DTC sets, the BCM disables the control side of the RUN/START relay FET. Once the condition that caused the DTC to set is repaired, the BCM must pass a self-test in order for the DTC to clear and the system to resume normal operation.

Possible Causes

- Battery voltage concern
- Fuse
- Wiring, terminals or connectors
- PATS concern
- Push button ignition switch
- BCM

Visual Inspection and Diagnostic Pre-checks

- Inspect the battery and battery cables.
- Inspect the BCM fuse 18 (5A)

No Power in ON - Push Button Ignition Switch

Refer to Wiring Diagrams Cell 20 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

Possible Causes

- Wiring, terminals or connectors
- Push button ignition switch
- BCM

PINPOINT TEST F : NO POWER IN ON - PUSH BUTTON IGNITION SWITCH

NOTICE: Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.
F1 CHECK THE VEHICLE BATTERY

- Carry out the Battery Condition Test.
  REFER to: Battery (414-01 Battery, Mounting and Cables, Diagnosis and Testing).

Is the battery OK?

Yes	If DTC B108A:01, B108A:24, B108A:9E or B1142:29 is present, GO to F4 Otherwise, GO to F2
No	CORRECT the battery condition.

F2 CHECK FOR BCM (BODY CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE) B1310:12 OR B1310:14

- Using a diagnostic scan tool, carry out the BCM self-test.

Is DTC B1310:12 or B1310:14 present?

Yes	GO to F19
No	GO to F3

F3 CHECK FOR IGNITION ON MODE

- Press and release the START/STOP button while monitoring the ignition mode indicator at the top of the button.

Does the ignition mode indicator flash on and off continuously?

Yes	GO to F19
No	GO to F4

F4 CHECK FOR A PATS (PASSIVE ANTI-THEFT SYSTEM) CONCERN

- Press the START/STOP button while monitoring the message center.

Does No key detected display in the message center?

Yes	REFER to: Passive Anti-Theft System (PATS) (419-01B Passive Anti-Theft System (PATS), Diagnosis and Testing).
No	GO to F5

F5 CHECK THE IGNITION SWITCH 1 (START_STOP_1) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, view the BCM Parameter Identification (PIDs).
- Monitor the BCM PID START_STOP_1 while pressing and releasing the START/STOP button.

Does the PID change state when the START/STOP button is pressed and released?

Yes	GO to F13
No	VERIFY BCM fuse 18 (5A) is OK. If OK, GO to F6 If not OK, REFER to the Wiring Diagrams manual to identify the possible causes of the circuit short.

F6 CHECK THE START/STOP 1 INPUT CIRCUIT FOR A SHORT TO VOLTAGE

- Disconnect BCM C2280B.
- Disconnect BCM C2280A.
- PCM B connector.
- Disconnect Push Button Ignition Switch C2195.

Is any voltage present?

Yes	REPAIR the circuit.
No	GO to F7

F7 CHECK THE START/STOP 1 INPUT CIRCUIT FOR A SHORT TO THE START/STOP 2 INPUT CIRCUIT

Is the resistance greater than 10,000 ohms?

Yes	GO to F8
No	REPAIR the circuit.

F8 CHECK THE START/STOP 1 INPUT CIRCUIT FOR A SHORT TO GROUND

Is the resistance greater than 10,000 ohms?

Yes	GO to F9
No	REPAIR the circuit.

F9 BYPASS THE PUSH BUTTON IGNITION SWITCH WHILE MONITORING THE IGNITION SWITCH 1 (START_STOP_1) PID (PARAMETER IDENTIFICATION)

- Connect BCM C2280B.
- Using a diagnostic scan tool, view the BCM Parameter Identification (PIDs).
- Monitor the BCM PID START_STOP_1.
- Remove the fused jumper wire.

Does the PID indicate the START/STOP button is pressed with the fused jumper wire connected?

Yes	INSTALL a new push button ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	GO to F10

F10 CHECK FOR VOLTAGE TO THE IGNITION SWITCH

Is the voltage greater than 11 volts?

Yes	GO to F12
No	GO to F11

F11 CHECK THE IGNITION SWITCH VOLTAGE SUPPLY CIRCUIT FOR AN OPEN

- Disconnect BCM C2280A.

Is the resistance less than 3 ohms?

Yes	GO to F25
No	REPAIR the circuit.

F12 CHECK THE BCM (BODY CONTROL MODULE) START/STOP 1 INPUT CIRCUIT FOR AN OPEN

- Disconnect BCM C2280B.

Is the resistance less than 3 ohms?

Yes	GO to F25
No	REPAIR the circuit.

F13 CHECK THE IGNITION SWITCH 2 (START_STOP_2) PID (PARAMETER IDENTIFICATION)

- Using a diagnostic scan tool, view the BCM Parameter Identification (PIDs).
- Monitor the BCM PID START_STOP_2 while pressing and releasing the START/STOP button.

Does the PID change state when the START/STOP button is pressed and released?

Yes	GO to F25
No	GO to F14

F14 CHECK THE BCM (BODY CONTROL MODULE) START/STOP 2 INPUT CIRCUIT FOR A SHORT TO VOLTAGE

Is there any voltage present?

Yes	REPAIR the circuit.
No	GO to F15

F15 CHECK THE BCM (BODY CONTROL MODULE) START/STOP 2 INPUT CIRCUIT FOR A SHORT TO GROUND

- Disconnect BCM C2280B.
- Disconnect Push Button Ignition Switch C2195.

Is the resistance greater than 10,000 ohms?

Yes	GO to F16
No	REPAIR the circuit.

F16 BYPASS THE PUSH BUTTON IGNITION SWITCH WHILE MONITORING THE IGNITION SWITCH 2 (START_STOP_2) PID (PARAMETER IDENTIFICATION)

- Connect BCM C2280B.
- Using a diagnostic scan tool, view the BCM Parameter Identification (PIDs).
- Monitor the BCM PID START_STOP_2.
- Remove the fused jumper wire.

Does the PID indicate the START/STOP button is pressed with the fused jumper wire connected?

Yes	GO to F17
No	GO to F18

F17 CHECK THE IGNITION SWITCH GROUND CIRCUIT FOR AN OPEN

Is the voltage greater than 11 volts?

Yes	INSTALL a new push button ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	REPAIR the circuit.

F18 CHECK THE BCM (BODY CONTROL MODULE) START/STOP 2 INPUT CIRCUIT FOR AN OPEN

- Disconnect BCM C2280B.

Is the resistance less than 3 ohms?

Yes	GO to F25
No	REPAIR the circuit.

F19 CARRY OUT A NETWORK TEST

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

Does the IPC and the BCM pass the network test?

Yes	VERIFY the BCM fuse 18 (5A) is OK. If OK, GO to F20 If not OK, REFER to the Wiring Diagrams manual to identify the possible cause of the circuit short.
No	REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

F20 CHECK FOR AN INTERMITTENT COMMUNICATION CONCERN

- Using a diagnostic scan tool, retrieve the Continuous Mode Diagnostic Trouble Codes (CMDTCs) from all modules.

Are multiple communication Diagnostic Trouble Codes (DTCs) set in multiple modules?

Yes	DIAGNOSE an intermittent network concern. REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).
No	If DTC B1310:12 is present, GO to F24Otherwise, GO to F21

F21 CHECK THE RUN/START RELAY CONTROL CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect negative battery cable.
- Disconnect BCM C2280F.

Is the resistance greater than 10,000 ohms?

Yes	GO to F25
No	GO to F22

F22 ISOLATE THE RUN/START RELAY CONTROL CIRCUIT SHORT TO GROUND

- Disconnect BJB C1035C.

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new BJB.
No	REPAIR the circuit.

F23 CHECK THE RUN/START RELAY CONTROL CIRCUIT FOR AN OPEN

- Disconnect BJB C1035C.

Is the resistance less than 3 ohms?

Yes	GO to F25
No	REPAIR the circuit.

F24 CHECK THE RUN/START RELAY CONTROL CIRCUIT FOR A SHORT TO VOLTAGE

- Disconnect BCM C2280F.
- Disconnect BJB C1035C.

Is any voltage present?

Yes	REPAIR the circuit.
No	INSTALL a new BJB

F25 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Disconnect and inspect all BCM 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 the BCM connectors and all other previously 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	  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.

The Ignition Mode Indicator Is Inoperative

Refer to Wiring Diagrams Cell 20 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

BCM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1240:11	Start Button Mode Indicator: Circuit Short to Ground	Sets when the BCM detects a short to ground from the ignition mode status indicator circuit.
B1240:15	Start Button Mode Indicator: Circuit Short to Battery or Open	Sets when the BCM detects an open from the ignition mode status indicator circuit.

Possible Causes

- Wiring, terminals or connectors
- Push button ignition switch
- BCM

PINPOINT TEST G : THE IGNITION MODE INDICATOR IS INOPERATIVE

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

G1 CHECK FOR VOLTAGE TO THE IGNITION MODE INDICATOR

- Start the engine.
- Disconnect Push Button Ignition Switch C2195.

Is the voltage greater than 11 volts?

Yes	GO to G4
No	GO to G2

G2 CHECK THE IGNITION MODE INDICATOR VOLTAGE CIRCUIT FOR A SHORT TO GROUND

- Connect Push Button Ignition Switch C2195.
- Ignition OFF.
- Disconnect Push Button Ignition Switch C2195.
- Disconnect BCM C2280B.

Is the resistance greater than 10,000 ohms?

Yes	GO to G3
No	REPAIR the circuit.

G3 CHECK THE IGNITION MODE INDICATOR VOLTAGE CIRCUIT FOR AN OPEN

Is the resistance less than 3 ohms?

Yes	GO to G5
No	REPAIR the circuit.

G4 CHECK THE IGNITION MODE INDICATOR GROUND CIRCUIT FOR AN OPEN

Is the voltage greater than 11 volts?

Yes	INSTALL a new push button ignition switch. REFER to: Ignition Switch - Vehicles With: Keyless Vehicle System (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	REPAIR the circuit.

G5 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Disconnect and inspect all BCM 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 the BCM connectors and all other previously 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	  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.

The Ignition Mode Indicator Is Always On

Refer to Wiring Diagrams Cell 20 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

BCM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B1240:15	Start Button Mode Indicator: Circuit Short to Battery or Open	Sets when the BCM detects a short to voltage from the ignition mode status indicator circuit.

Possible Causes

- Wiring, terminals or connectors
- Push button ignition switch

- BCM

PINPOINT TEST H : THE IGNITION MODE INDICATOR IS ALWAYS ON

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

H1 ISOLATE THE BCM (BODY CONTROL MODULE)

- Ignition ON.
- Disconnect BCM C2280B.
- Observe the ignition mode indicator.

Does the ignition mode indicator continue to illuminate?

Yes	GO to H2
No	GO to H3

H2 CHECK THE IGNITION MODE INDICATOR CIRCUIT FOR A SHORT TO VOLTAGE

- Disconnect Push Button Ignition Switch C2195.

Is any voltage present?

Yes	REPAIR the circuit.
No	INSTALL a new ignition switch. REFER to: Ignition Switch - Vehicles With: Keyless Vehicle System (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

H3 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all BCM 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 the BCM connectors and all other previously 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	  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.

B11D9:16

Refer to Wiring Diagrams Cell 13 for schematic and connector information.

Normal Operation and Fault Conditions

The SCCM continuously monitors input voltage for correct operation. If voltage outside of defined limits is detected by the SCCM, the applicable DTC sets. DTC B11D9:16 can set if the vehicle battery has been discharged. The vehicle battery may become discharged due to excessive load(s) on the charging system from aftermarket accessories or if the vehicle has been left unattended with the accessories on.

SCCM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B11D9:16	Vehicle Battery: Circuit Below Threshold	Sets in continuous memory if the SCCM detects battery voltage below 8 volts on the battery voltage supply circuit.

Possible Causes

- Battery
- Wiring, terminals or connectors
- Fuse
- Charging system
- SCCM

Visual Inspection and Diagnostic Pre-checks

- Make sure the vehicle battery terminals and cables are free of any corrosion and other contaminates.
- Make sure the vehicle battery terminals are tightened to their correct torque specifications.

PINPOINT TEST I : B11D9:16

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

I1 CHECK FOR SCCM (STEERING COLUMN CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Ignition ON.
- Using a diagnostic scan tool, carry out the SCCM self-test.
- Using a diagnostic scan tool, clear the SCCM Diagnostic Trouble Codes (DTCs).
- Using a diagnostic scan tool, carry out the SCCM self-test.

Is DTC B11D9:16 still present?

Yes	GO to I2
No	The system is operating normally at this time. The DTC may have been set previously during battery charging or while jump starting the vehicle.

I2 CHECK FOR CHARGING SYSTEM DIAGNOSTIC TROUBLE CODES (DTCS) IN THE PCM (POWERTRAIN CONTROL MODULE)

- Using a diagnostic scan tool, carry out the PCM KOEO and KOER self-tests.

Are any charging system Diagnostic Trouble Codes (DTCs) present in the PCM?

Yes	DIAGNOSE the charging system Diagnostic Trouble Codes (DTCs). Refer to the appropriate section in Group 414 for the procedure.
No	GO to I3

I3 CHECK THE BATTERY CONDITION AND STATE OF CHARGE

- Ignition OFF.
- Carry out the Battery Condition Test.
  REFER to: Battery (414-01 Battery, Mounting and Cables, Diagnosis and Testing).

Is the battery OK?

Yes	GO to I4
No	CHARGE the battery and REPEAT the battery condition test. If the battery does not pass the battery condition test, INSTALL a new battery. REFER to: Battery (414-01 Battery, Mounting and Cables, Removal and Installation).

I4 CHECK THE SCCM (STEERING COLUMN CONTROL MODULE) VOLTAGE SUPPLY CIRCUIT FOR HIGH RESISTANCE

- Measure and record the battery voltage.
- Disconnect SCCM C226.

Is the voltage within 0.2 volt of the recorded battery voltage?

Yes	GO to I5
No	REPAIR the circuit.

I5 CHECK THE SCCM (STEERING COLUMN CONTROL MODULE) GROUND CIRCUIT FOR HIGH RESISTANCE

- Disconnect the negative battery cable.
  REFER to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables) .

Is the resistance less than 3 ohms?

Yes	CONNECT the battery negative cable. GO to I6
No	REPAIR the circuit. CONNECT the battery negative cable.

I6 CHECK FOR CORRECT SCCM (STEERING COLUMN CONTROL MODULE) OPERATION

- Disconnect and inspect the SCCM 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 the SCCM connectors and all other previously 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	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 SCCM. REFER to: Steering Column Control Module (SCCM) (211-05 Steering Wheel and Column Electrical Components, 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.

B11D9:17

Refer to Wiring Diagrams Cell 13 for schematic and connector information.

Normal Operation and Fault Conditions

The SCCM continuously monitors input voltage for correct operation. If voltage outside of defined limits is detected by the SCCM, the applicable DTC sets. DTC B11D9:17 can set if the vehicle has been recently jump started or the vehicle battery has been recently charged.

SCCM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
B11D9:17	Vehicle Battery: Circuit Above Threshold	Sets in continuous memory if the SCCM detects battery voltage above 19 volts on the battery voltage supply circuit.

Possible Causes

- Wiring, terminals or connectors
- Charging system
- SCCM

PINPOINT TEST J : B11D9:17

J1 CHECK FOR HIGH BATTERY VOLTAGE AND/OR CHARGING SYSTEM DTC (DIAGNOSTIC TROUBLE CODE) IN THE PCM (POWERTRAIN CONTROL MODULE)

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

Are any voltage and/or charging system Diagnostic Trouble Codes (DTCs) present?

Yes	DIAGNOSE the charging system. Refer to the appropriate section in Group 414 for the procedure.
No	GO to J2

J2 CHECK THE BATTERY VOLTAGE

- Turn off all interior/exterior lights and accessories.
- Start and run the engine at approximately 2,000 rpm for 3 minutes while monitoring the battery voltage.

Does the battery voltage rise to 16.5 volts or higher?

Yes	DIAGNOSE the charging system. Refer to the appropriate section in Group 414 for the procedure.
No	GO to J3

J3 RECHECK FOR SCCM (STEERING COLUMN CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE) B11D9:17

- Using a diagnostic scan tool, carry out the SCCM self-test.
- Using a diagnostic scan tool, clear the SCCM Diagnostic Trouble Codes (DTCs) and repeat the self-test.

Is DTC B11D9:17 still present?

Yes	GO to J4
No	The system is operating normally at this time. The DTC may have been set previously during battery charging or while jump starting the vehicle.

J4 CHECK FOR CORRECT SCCM (STEERING COLUMN CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect the SCCM 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 the SCCM connectors and all other previously 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	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 SCCM. REFER to: Steering Column Control Module (SCCM) (211-05 Steering Wheel and Column Electrical Components, 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.

U300A:01

Refer to Wiring Diagrams Cell 13 for schematic and connector information.

Normal Operation and Fault Conditions

REFER to: Steering Wheel and Column Electrical Components - System Operation and Component Description (211-05 Steering Wheel and Column Electrical Components, Description and Operation).

BCM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U300A:01	Ignition Switch: General Electrical Failure	Sets when the BCM detects an invalid combination from the ignition switch input circuits, such as a voltage signal only from the ON-designated circuit, a voltage signal only from the START-designated circuit or a voltage signal from ACC and START-designated circuits at the same time.

Possible Causes

- Wiring, terminals or connectors
- Ignition switch
- BCM

PINPOINT TEST K : U300A:01

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

K1 CHECK FOR IGNITION SWITCH CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect BCM C2280B.
- Disconnect BCM C2280A.

Is any voltage present?

Yes	REPAIR the circuit in question.
No	GO to K2

K2 CHECK THE BCM (BODY CONTROL MODULE) IGNITION SWITCH INPUT CIRCUITS FOR VOLTAGE

- Ignition ON.

Are the voltages greater than 11 volts?

Yes	GO to K4
No	GO to K3

K3 CHECK THE IGNITION SWITCH CIRCUITS FOR AN OPEN

- Ignition OFF.

Are the resistances less than 3 ohms?

Yes	INSTALL a new ignition switch. REFER to: Ignition Switch (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	REPAIR the circuit in question.

K4 CHECK FOR CORRECT BCM (BODY CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all BCM 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 the BCM connectors and all other previously 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	  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.

The Heated Steering Wheel Is Inoperative Or Does Not Operate Correctly

Refer to Wiring Diagrams Cell 128 for schematic and connector information.

Normal Operation and Fault Conditions

When steering wheel heat is requested, the HSWM uses a sensor in the steering wheel (integral to the steering wheel) to maintain the heated steering wheel temperature. The resistance of the sensor rises as the temperature falls and the resistance falls as the temperature rises. The resistance can vary from 3,384 ohms at 50°C (122°F) to 34,699 ohms at 0°C (32°F). The HSWM supplies a reference voltage and ground to the temperature sensor and monitors the voltage drop from the temperature sensor for controlling current flow to the heating element. The HSWM is designed to remain on, heating the steering wheel and maintaining temperature until switched OFF using the FDIM or the ignition is turned OFF.

NOTE: On all vehicles, slow heating between the 10 o'clock and 2 o'clock steering wheel hand positions is considered normal.

Possible Causes

- Wiring, terminals or connectors
- Steering wheel
- Clockspring
- HSWM

PINPOINT TEST L : THE HEATED STEERING WHEEL 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.

L1 CHECK FOR COMMUNICATION TO THE HSWM (HEATED STEERING WHEEL MODULE)

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

Does the HSWM pass the network test?

Yes	GO to L2
No	REFER to: Communications Network (418-00 Module Communications Network) .

L2 CHECK FOR HSWM (HEATED STEERING WHEEL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the HSWM self-test.

Are any Diagnostic Trouble Codes (DTCs) present?

Yes	REFER to the HSWM DTC Chart in this section.
No	GO to L3

L3 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR AND CIRCUIT RESISTANCE

- Ignition OFF.
- Disconnect HSWM C2406.
- Compare the recorded measurement value with the table shown.

Ambient Temperature	Resistance
0-10°C (32-50°F)	18,754-34,699 ohms
10-20°C (50-68°F)	11,831-21,046 ohms
20-25°C (68-77°F)	9,500-13,149 ohms
25-30°C (77-86°F)	7,632-10,500 ohms
30-35°C (86-95°F)	6,173-8,482 ohms
35-40°C (95-104°F)	5,024-6,889 ohms
40-50°C (104-122°F)	3,384-5,630 ohms

Is the resistance within the specified value for the current temperature of the steering wheel?

Yes	GO to L6
No	GO to L4

L4 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR CIRCUITS RESISTANCE TO THE CLOCKSPRING

- Remove the steering column shrouds to access the clockspring connectors.
  REFER to: Steering Column Shrouds (501-05 Interior Trim and Ornamentation, Removal and Installation).
- Disconnect C218A.

Are the resistances less than 3 ohms?

Yes	GO to L5
No	REPAIR the circuit in question.

L5 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR RESISTANCE

- Remove the driver airbag.
  REFER to: Driver Airbag (501-20B Supplemental Restraint System, Removal and Installation).
- Disconnect Clockspring C218B.
- Compare the recorded measurement value with the table shown.

Ambient Temperature	Resistance
0-10°C (32-50°F)	18,754-34,699 ohms
10-20°C (50-68°F)	11,831-21,046 ohms
20-25°C (68-77°F)	9,500-13,149 ohms
25-30°C (77-86°F)	7,632-10,500 ohms
30-35°C (86-95°F)	6,173-8,482 ohms
35-40°C (95-104°F)	5,024-6,889 ohms
40-50°C (104-122°F)	3,384-5,630 ohms

Is the resistance within the specified value for the current temperature of the steering wheel?

Yes	INSTALL a new clockspring. REFER to: Clockspring (501-20B Supplemental Restraint System, Removal and Installation).
No	INSTALL a new steering wheel. REFER to: Steering Wheel (211-04 Steering Column, Removal and Installation).

L6 CHECK FOR CORRECT HSWM (HEATED STEERING WHEEL MODULE) OPERATION

- Disconnect and inspect the HSWM connector.
- Inspect for the following and repair as necessary:
  - 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 HSWM connector and all other previously 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	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 HSWM. REFER to: Heated Steering Wheel Module (HSWM) (211-05 Steering Wheel and Column Electrical Components, 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.

B135C:11, B135C:15

Refer to Wiring Diagrams Cell 128 for schematic and connector information.

Normal Operation and Fault Conditions

When steering wheel heat is requested, the HSWM applies voltage and ground to the steering wheel heating element (integral to the steering wheel). The steering wheel heating element draws between 1 and 10 amps of current depending on steering wheel temperature. The HSWM uses a sensor in the steering wheel (integral to the steering wheel) to maintain the heated steering wheel temperature. The HSWM is designed to remain on, heating the steering wheel and maintaining temperature until switched OFF using the FDIM or the ignition is turned OFF.

HSWM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions

B135C:11	Heater Element: Circuit Short to Ground	Sets when the heated steering wheel is commanded on and the HSWM senses current greater than 10 amps from the steering wheel heating element output circuit, indicating a short to ground or when the steering wheel heating element output Field Effect Transistor (FET) in the HSWM has a thermal failure. When this fault sets, the steering wheel heating element output is disabled until the ignition is cycled.
B135C:15	Heater Element: Circuit Short to Battery or Open	Sets when the heated steering wheel is commanded on and the module senses current less than 1 amp from the steering wheel heating element output circuit. This indicates a short to voltage, an open circuit or an open in the heating element. When this fault sets, the steering wheel heating element output is disabled until the ignition is cycled.

Possible Causes

- Wiring, terminals or connectors
- Steering wheel
- Clockspring
- HSWM

PINPOINT TEST M : B135C:11, B135C:15

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 HSWM (HEATED STEERING WHEEL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Ignition OFF.
- Review the retrieved Diagnostic Trouble Codes (DTCs) from the HSWM self-test.

Is DTC B135C:11 present?

Yes	GO to M2
No	GO to M8

M2 CHECK THE HEATER ELEMENT VOLTAGE CIRCUIT FOR A SHORT TO GROUND

- Disconnect HSWM C2406.

Is the resistance greater than 10,000 ohms?

Yes	GO to M5
No	GO to M3

M3 CHECK THE HEATER ELEMENT VOLTAGE CIRCUIT TO THE CLOCKSPRING FOR A SHORT TO GROUND

- Remove the steering column shrouds to access the clockspring connectors.
  REFER to: Steering Column Shrouds (501-05 Interior Trim and Ornamentation, Removal and Installation).

- Disconnect Clockspring C218C.

Is the resistance greater than 10,000 ohms?

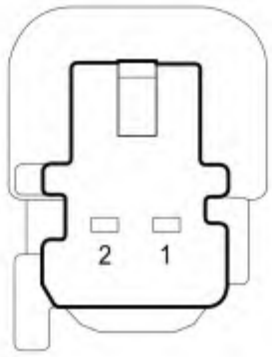
Yes	GO to M4
No	REPAIR the circuit.

M4 CHECK THE HEATER ELEMENT FOR A SHORT TO GROUND

- Remove the driver airbag.
  REFER to: Driver Airbag (501-20B Supplemental Restraint System, Removal and Installation).

- Disconnect Clockspring C218E.

- On the steering wheel side, measure:

Positive Lead	Measurement / Action	Negative Lead
 E175306 C218E, pin 1 (steering wheel side)		Ground

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new clockspring. REFER to: Clockspring (501-20B Supplemental Restraint System, Removal and Installation). Using a diagnostic scan tool, CLEAR the HSWM Diagnostic Trouble Codes (DTCs) and CARRY OUT the HSWM self-test. If DTC B135C:11 returns, INSTALL a new SCCM. REFER to: Steering Column Control Module (SCCM) (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	INSTALL a new steering wheel. REFER to: Steering Wheel (211-04 Steering Column, Removal and Installation).

M5 CHECK THE HEATER ELEMENT AND RETURN CIRCUIT RESISTANCE

Is the resistance between 1.6 and 3.1 ohms?

Yes	GO to M12
No	GO to M6

M6 CHECK THE HEATER ELEMENT CIRCUITS FOR A SHORT TOGETHER

- Remove the steering column shrouds to access the clockspring connectors.
  REFER to: Steering Column Shrouds (501-05 Interior Trim and Ornamentation, Removal and Installation).

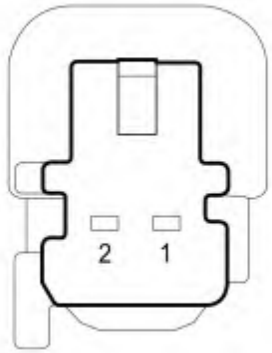
- Disconnect Clockspring C218C.

Is the resistance greater than 10,000 ohms?

Yes	GO to M7
No	REPAIR the circuits.

M7 CHECK THE HEATER ELEMENT FOR AN INTERNAL SHORT

- Remove the driver airbag.
  REFER to: Driver Airbag (501-20B Supplemental Restraint System, Removal and Installation).
- Disconnect Clockspring C218E.
- On the steering wheel side, measure:

Positive Lead	Measurement / Action	Negative Lead
 E175306 C218E, pin 1 (steering wheel side)		C218E, pin 2 (steering wheel side)

Is the resistance between 1.6 and 3.1 ohms?

Yes	INSTALL a new clockspring. REFER to: Clockspring (501-20B Supplemental Restraint System, Removal and Installation). Using a diagnostic scan tool, CLEAR the HSWM Diagnostic Trouble Codes (DTCs) and CARRY OUT the HSWM self-test. If DTC B135C:11 returns, INSTALL a new SCCM. REFER to: Steering Column Control Module (SCCM) (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	INSTALL a new steering wheel. REFER to: Steering Wheel (211-04 Steering Column, Removal and Installation).

M8 CHECK THE HEATER ELEMENT VOLTAGE AND GROUND CIRCUIT FOR A SHORT TO VOLTAGE

- Remove the steering column shrouds to access the clockspring connectors.
  REFER to: Steering Column Shrouds (501-05 Interior Trim and Ornamentation, Removal and Installation).
- Disconnect HSWM C2406.
- Disconnect Clockspring C218C.
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit in question.
No	GO to M9

M9 CHECK THE HEATER ELEMENT AND CIRCUIT RESISTANCE

- Ignition OFF.
- Connect Clockspring C218C.

Is the resistance between 1.6 and 3.1 ohms?

Yes	GO to M12
No	GO to M10

M10 CHECK THE HEATER ELEMENT CIRCUITS FOR AN OPEN

- Disconnect Clockspring C218C.

Are the resistances less than 3 ohms?

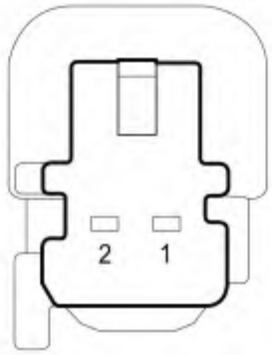
Yes	GO to M11
No	REPAIR the circuit in question.

M11 CHECK THE HEATER ELEMENT RESISTANCE

- Remove the driver airbag.
  REFER to: Driver Airbag (501-20B Supplemental Restraint System, Removal and Installation).

- Disconnect Clockspring C218E.

- On the steering wheel side, measure:

Positive Lead	Measurement / Action	Negative Lead
 E175306 C218E, pin 1 (steering wheel side)		

		C218E, pin 2 (steering wheel side)

Is the resistance between 1.6 and 3.1 ohms?

Yes	INSTALL a new clockspring. REFER to: Clockspring (501-20B Supplemental Restraint System, Removal and Installation). Using a diagnostic scan tool, CLEAR the HSWM Diagnostic Trouble Codes (DTCs) and CARRY OUT the HSWM self-test. If DTC B135C:11 returns, INSTALL a new SCCM. REFER to: Steering Column Control Module (SCCM) (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).
No	INSTALL a new steering wheel. REFER to: Steering Wheel (211-04 Steering Column, Removal and Installation).

M12 CHECK FOR CORRECT HSWM (HEATED STEERING WHEEL MODULE) OPERATION

- Disconnect and inspect the HSWM connector.
- Inspect for the following and repair as necessary:
  - 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 HSWM connector and all other previously 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	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 HSWM. REFER to: Heated Steering Wheel Module (HSWM) (211-05 Steering Wheel and Column Electrical Components, 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.

U0100:00

Normal Operation and Fault Conditions

The HSWM communicates with the PCM over the CAN through the GWM. If the HSWM does not receive messages from the PCM, no noticeable symptom may be present.

HSWM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0100:00	Lost Communication With ECM/PCM "A": No Sub Type Information	Sets when the HSWM does not receive an expected message from the PCM for more than 5 seconds.

Possible Causes

- Network communication concern
- PCM
- HSWM

PINPOINT TEST N : U0100:00

N1 VERIFY THE CONCERN

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

Is an observable symptom present?

Yes	GO to N2
No	The system is operating normally 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.

Does the PCM and the GWM pass the network test?

Yes	GO to N3
No	REFER to: Communications Network (418-00 Module Communications Network) .

N3 RETRIEVE THE RECORDED DIAGNOSTIC TROUBLE CODES (DTCS) FROM THE PCM (POWERTRAIN CONTROL MODULE) SELF-TESTS

- Using a diagnostic scan tool, carry out the PCM KOEO and KOER self-tests.

Are any voltage system related Diagnostic Trouble Codes (DTCs) recorded?

Yes	Refer to the appropriate section in Group 303 for the procedure.
No	GO to N4

N4 RECHECK THE HSWM (HEATED STEERING WHEEL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during PMI or PMI may not have been carried out*

- Using a diagnostic scan tool, clear all HSWM Diagnostic Trouble Codes (DTCs).
- Wait 10 seconds.
- Using a diagnostic scan tool, carry out the HSWM self-test.

Is DTC U0100:00 still present?

Yes	GO to N5
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.

N5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0100 SET IN OTHER MODULES

- Using a diagnostic scan tool, clear all Diagnostic Trouble Codes (DTCs) in all modules.
- Ignition OFF.
- Ignition ON.
- Wait 30 seconds.
- Using a diagnostic scan tool, retrieve all Continuous Mode Diagnostic Trouble Codes (CMDTCs).

Is DTC U0100 set in other modules?

Yes	INSTALL a new PCM. Refer to the appropriate section in Group 303 for the procedure.

No	INSTALL a new HSWM. REFER to: Heated Steering Wheel Module (HSWM) (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

U0140:00

Normal Operation and Fault Conditions

The HSWM communicates with the BCM over the CAN. If the HSWM does not receive messages from the BCM, no noticeable symptom may be present.

HSWM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0140:00	Lost Communication With Body Control Module: No Sub Type Information	Sets when the HSWM does not receive an expected message from the BCM for more than 5 seconds.

Possible Causes

- Network communication concern
- HSWM
- BCM

PINPOINT TEST O : U0140:00

O1 VERIFY THE CONCERN

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

Is an observable symptom present?

Yes	GO to O2
No	The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

O2 CHECK THE COMMUNICATION NETWORK

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

Does the BCM pass the network test?

Yes	GO to O3
No	REFER to: Communications Network (418-00 Module Communications Network) .

O3 CHECK FOR BCM (BODY CONTROL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the BCM self-test.

Are any voltage system related Diagnostic Trouble Codes (DTCs) recorded?

Yes	REFER to: Body Control Module (BCM) (419-10 Multifunction Electronic Modules) .
No	GO to O4

O4 RECHECK THE HSWM (HEATED STEERING WHEEL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during PMI or PMI may not have been carried out*

- Using a diagnostic scan tool, clear all HSWM Diagnostic Trouble Codes (DTCs).
- Wait 10 seconds.
- Using a diagnostic scan tool, carry out the HSWM self-test.

Is DTC U0140:00 still present?

Yes	GO to O5
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.

O5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0140 SET IN OTHER MODULES

- Using a diagnostic scan tool, clear all Diagnostic Trouble Codes (DTCs) in all modules.
- Ignition OFF.
- Ignition ON.
- Wait 30 seconds.
- Using a diagnostic scan tool, retrieve all Continuous Mode Diagnostic Trouble Codes (CMDTCs).

Is DTC U0100 set in other modules?

Yes	  Click here to access Guided Routine (BCM).
No	INSTALL a new HSWM. REFER to: Heated Steering Wheel Module (HSWM) (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

U0256:00

Normal Operation and Fault Conditions

The HSWM communicates with the FCIM over the CAN . If the HSWM does not receive messages from the FCIM, the heated steering wheel function can be inoperative.

HSWM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U0256:00	Lost Communication With Front Controls Interface Module "A": No Sub Type Information	Sets when the HSWM does not receive an expected message from the FCIM for more than 5 seconds.

Possible Causes

- Network communication concern
- FCIM
- HSWM

PINPOINT TEST P : U0256:00

P1 VERIFY THE CONCERN

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

Is an observable symptom present?

Yes	GO to P2
No	The system is operating normally at this time. The DTC may have been set due to high network traffic or an intermittent fault condition.

P2 CHECK THE COMMUNICATION NETWORK

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

Does the FCIM pass the network test?

Yes	GO to P3
No	REFER to: Communications Network (418-00 Module Communications Network) .

P3 CHECK FOR FCIM (FRONT CONTROLS INTERFACE MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Using a diagnostic scan tool, carry out the FCIM self-test.

Are any voltage system related Diagnostic Trouble Codes (DTCs) recorded?

Yes	Refer to the appropriate section in Group 415 for the procedure.
No	GO to P4

P4 RECHECK THE HSWM (HEATED STEERING WHEEL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

NOTE: *If new modules were installed prior to the DTC being set, the module configuration may be incorrectly set during PMI or PMI may not have been carried out*

- Using a diagnostic scan tool, clear all HSWM Diagnostic Trouble Codes (DTCs).
- Wait 10 seconds.
- Using a diagnostic scan tool, carry out the HSWM self-test.

Is DTC U0256:00 still present?

Yes	GO to P5
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.

P5 CHECK FOR DTC (DIAGNOSTIC TROUBLE CODE) U0256 SET IN OTHER MODULES

- Using a diagnostic scan tool, clear all Diagnostic Trouble Codes (DTCs) in all modules.
- Ignition OFF.
- Ignition ON.
- Wait 30 seconds.
- Using a diagnostic scan tool, retrieve all Continuous Mode Diagnostic Trouble Codes (CMDTCs).

Is DTC U0100 set in other modules?

Yes	  Click here to access Guided Routine (FCIM).
No	INSTALL a new HSWM. REFER to: Heated Steering Wheel Module (HSWM) (211-05 Steering Wheel and Column Electrical Components, Removal and Installation).

U210A:11, U210A:15

Refer to Wiring Diagrams Cell 128 for schematic and connector information.

Normal Operation and Fault Conditions

When steering wheel heat is requested, the HSWM uses a sensor in the steering wheel (integral to the steering wheel) to maintain the heated steering wheel temperature. The resistance of the sensor rises as the temperature falls and the resistance falls as the temperature rises. The resistance can vary from 3,384 ohms at 50°C (122°F) to 34,699 ohms at 0°C (32°F). The HSWM supplies a reference voltage and ground to the temperature sensor and monitors the voltage drop from the temperature sensor for controlling current flow to the heating element. The HSWM is designed to remain on, heating the steering wheel and maintaining temperature, until switched OFF using the FDIM or the ignition is turned OFF.

HSWM DTC Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
U210A:11	Temperature Sensor: Circuit Short to Ground	Sets when the heated steering wheel is commanded on and the HSWM reads a resistance value less than 627 ohms on the heating element temperature sensor input circuit, indicating a short to ground. When this fault occurs, the steering wheel heating element output is disabled until the ignition is cycled.
U210A:15	Temperature Sensor: Circuit Short to Battery or Open	Sets when the heated steering wheel is commanded on and the HSWM reads a resistance value greater than 670,000 ohms on the heating element temperature sensor reference circuit for greater than 10 minutes. This indicates a short to voltage, an open circuit or an open heating element temperature sensor. When this fault occurs, the steering wheel heating element output is disabled until the ignition is cycled.

Possible Causes

- Wiring, terminals or connectors
- Steering wheel
- Clockspring
- HSWM

PINPOINT TEST Q : U210A:11, U210A:15

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

Q1 CHECK THE HSWM (HEATED STEERING WHEEL MODULE) DIAGNOSTIC TROUBLE CODES (DTCS)

- Ignition OFF.
- Review the Diagnostic Trouble Codes (DTCs) from the HSWM self-test.

Is DTC U210A:11 present?

Yes	GO to Q2
No	GO to Q8

Q2 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR REFERENCE CIRCUIT FOR A SHORT TO GROUND

- Disconnect HSWM C2406.

Is the resistance greater than 10,000 ohms?

Yes	GO to Q5
No	GO to Q3

Q3 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR REFERENCE CIRCUIT TO THE CLOCKSPRING FOR A SHORT TO GROUND

- Depower the SRS.
  REFER to: Supplemental Restraint System (SRS) Depowering (501-20B Supplemental Restraint System, General Procedures).
- Remove the steering column shrouds to access the clockspring connectors.
  REFER to: Steering Column Shrouds (501-05 Interior Trim and Ornamentation, Removal and Installation).
- Disconnect Clockspring C218A.

Is the resistance greater than 10,000 ohms?

Yes	GO to Q4
No	REPAIR the circuit. After the repair, GO to Q12

Q4 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR FOR A SHORT TO GROUND

- Remove the driver airbag.
  REFER to: Driver Airbag (501-20B Supplemental Restraint System, Removal and Installation).
- Disconnect Clockspring C218B.

Is the resistance greater than 10,000 ohms?

Yes	INSTALL a new clockspring. REFER to: Clockspring (501-20B Supplemental Restraint System, Removal and Installation).
No	INSTALL a new steering wheel. REFER to: Steering Wheel (211-04 Steering Column, Removal and Installation).

Q5 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR AND CIRCUIT FOR LOW RESISTANCE

Is the resistance greater than 627 ohms?

Yes	GO to Q13
No	GO to Q6

Q6 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR CIRCUITS FOR A SHORT TOGETHER

- Depower the SRS.
  REFER to: Supplemental Restraint System (SRS) Depowering (501-20B Supplemental Restraint System, General Procedures).
- Remove the steering column shrouds to access the clockspring connectors.
  REFER to: Steering Column Shrouds (501-05 Interior Trim and Ornamentation, Removal and Installation).
- Disconnect Clockspring C218A.

Is the resistance greater than 10,000 ohms?

Yes	GO to Q7
No	REPAIR the circuits. After the repair, GO to Q12

Q7 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR FOR A SHORT

- Remove the driver airbag.
  REFER to: Driver Airbag (501-20B Supplemental Restraint System, Removal and Installation).
- Disconnect Clockspring C218B.

Is the resistance greater than 627 ohms?

Yes	INSTALL a new clockspring. REFER to: Clockspring (501-20B Supplemental Restraint System, Removal and Installation).
No	INSTALL a new steering wheel. REFER to: Steering Wheel (211-04 Steering Column, Removal and Installation).

Q8 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR REFERENCE AND GROUND CIRCUITS FOR A SHORT TO VOLTAGE

- Disconnect HSWM C2406.
- Ignition ON.

Is any voltage present?

Yes	REPAIR the circuit in question.
No	GO to Q9

Q9 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR AND CIRCUIT FOR HIGH RESISTANCE

- Ignition OFF.

Is the resistance less than 670,000 ohms?

Yes	GO to Q13
No	GO to Q10

Q10 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR CIRCUITS FOR AN OPEN

- Depower the SRS.
  REFER to: Supplemental Restraint System (SRS) Depowering (501-20B Supplemental Restraint System, General Procedures).
- Remove the steering column shrouds to access the clockspring connectors.
  REFER to: Steering Column Shrouds (501-05 Interior Trim and Ornamentation, Removal and Installation).
- Disconnect Clockspring C218A.

Are the resistances less than 3 ohms?

Yes	GO to Q11
No	REPAIR the circuit in question. After the repair, GO to Q12

Q11 CHECK THE HEATER ELEMENT TEMPERATURE SENSOR FOR HIGH RESISTANCE

- Remove the driver airbag.
  REFER to: Driver Airbag (501-20B Supplemental Restraint System, Removal and Installation).

- Disconnect Clockspring C218B.

Is the resistance less than 670,000 ohms?

Yes	INSTALL a new clockspring. REFER to: Clockspring (501-20B Supplemental Restraint System, Removal and Installation).
No	INSTALL a new steering wheel. REFER to: Steering Wheel (211-04 Steering Column, Removal and Installation).

Q12 VERIFY THE SRS (SUPPLEMENTAL RESTRAINT SYSTEM) PROVES OUT SUCCESSFULLY

- Depower the SRS.
  REFER to: Supplemental Restraint System (SRS) Depowering (501-20B Supplemental Restraint System, General Procedures).

- Connect Clockspring C218A.

- Repower the SRS.
  REFER to: Supplemental Restraint System (SRS) Repowering (501-20B Supplemental Restraint System, General Procedures).

Did the SRS prove out successfully?

Yes	Repair is complete. RETURN the vehicle to the customer.
No	REFER to: Airbag Supplemental Restraint System (SRS) - Raptor (501-20B Supplemental Restraint System, Diagnosis and Testing).

Q13 CHECK FOR CORRECT HSWM (HEATED STEERING WHEEL MODULE) OPERATION

- Disconnect and inspect the HSWM connector.
- Inspect for the following and repair as necessary:
  - 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 HSWM connector and all other previously 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	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 HSWM. REFER to: Heated Steering Wheel Module (HSWM) (211-05 Steering Wheel and Column Electrical Components, 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.