

ACCESSORIES & EQUIPMENT

Cruise Control - CTS Sedan

SCHEMATIC WIRING DIAGRAMS

CRUISE CONTROL WIRING SCHEMATICS

Cruise Control System

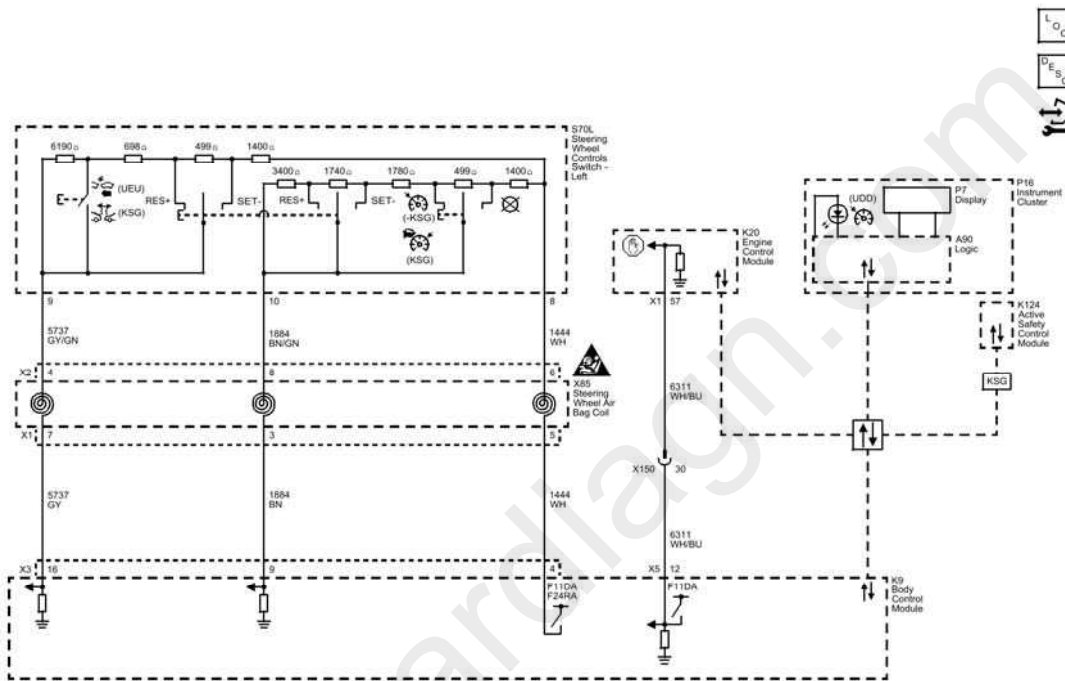


Fig. 1: Cruise Control System

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3623, B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592,	DTC B3623 08 Steering Wheel Controls Distance Sensing Cruise Control Gap Up/Down Signal Circuit - Signal Invalid DTC B3623 61 Steering Wheel Controls Distance Sensing Cruise Control Gap Up/Down Signal Circuit - Stuck

<u>P0593, or P155A-P155C</u>	DTC B3794 08 Cruise Control Function Request Circuit Performance - Signal Invalid DTC B3794 61 Cruise Control Function Request Circuit - Stuck DTC P0564 Cruise Control Multifunction Switch 1 Circuit DTC P0565 Cruise Control On/Off Switch Circuit DTC P0567 Cruise Control Resume/Acceleration Switch 1 Circuit DTC P0568 Cruise Control Set/Coast Switch 1 Circuit DTC P056C Cruise Control Cancel Switch Circuit DTC P0580 Cruise Control Multifunction Switch Circuit Low Voltage DTC P0581 Cruise Control Multifunction Switch Circuit High Voltage DTC P0589 Cruise Control Multifunction Switch 2 Circuit DTC P0592 Cruise Control Multifunction Switch 2 Circuit Low Voltage DTC P0593 Cruise Control Multifunction Switch 2 Circuit High Voltage DTC P155A Cruise Control Switch State Undetermined DTC P155B Cruise Control Set/Coast Switch 2 Circuit DTC P155C Cruise Control Resume/Acceleration Switch 2 Circuit
<u>DTC P0572 or P0573</u>	DTC P0572 Brake Switch Circuit 1 Low Voltage DTC P0573 Brake Switch Circuit 1 High Voltage
<u>DTC P0575</u>	DTC P0575 Cruise Control Switch Signal Message Counter Incorrect
<u>DTC P0703</u>	DTC P0703 Brake Switch Signal Message Counter Incorrect
<u>DTC P1553</u>	DTC P1553 Distance Sensing Cruise Control Signal Message Counter Incorrect

DTC B3623, B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, OR P155A-P155C: CRUISE CONTROL MULTIFUNCTION SWITCH/CRUISE CONTROL FUNCTION REQUEST CIRCUIT

Diagnostic Instructions

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

DTC Descriptors

DTC B3623 08

Steering Wheel Controls Distance Sensing Cruise Control Gap Up/Down Signal Circuit - Signal Invalid

DTC B3623 61

Steering Wheel Controls Distance Sensing Cruise Control Gap Up/Down Signal Circuit - Stuck

DTC B3794 08

Cruise Control Function Request Circuit Performance - Signal Invalid

DTC B3794 61

Cruise Control Function Request Circuit - Stuck

DTC P0564

Cruise Control Multifunction Switch 1 Circuit

DTC P0565

Cruise Control On/Off Switch Circuit

DTC P0567

Cruise Control Resume/Acceleration Switch 1 Circuit

DTC P0568

Cruise Control Set/Coast Switch 1 Circuit

DTC P056C

Cruise Control Cancel Switch Circuit

DTC P0580

Cruise Control Multifunction Switch Circuit Low Voltage

DTC P0581

Cruise Control Multifunction Switch Circuit High Voltage

DTC P0589

Cruise Control Multifunction Switch 2 Circuit

DTC P0592

Cruise Control Multifunction Switch 2 Circuit Low Voltage

DTC P0593

Cruise Control Multifunction Switch 2 Circuit High Voltage

DTC P155A

Cruise Control Switch State Undetermined

DTC P155B

Cruise Control Set/Coast Switch 2 Circuit

DTC P155C

Cruise Control Resume/Acceleration Switch 2 Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
12 Volt Reference-Switch Terminal 8	1	1	-	-
Cruise Control Set/Coast/Resume/Accelerate Switch 1 Signal- Switch Terminal 10	P0580	P0564, P0580	B3794 08, P0564, P0567, P0568, P0581	B3794 61, P0564
Adaptive Cruise Control Gap Up/Down Switch 2 Signal-Switch Terminal 9	P0592	P0592	P0593	P0589
1. Cruise Control Malfunction				

Circuit/System Description

Cruise Control Switch Primary Circuit 1

The cruise control switch 1 signal is an input to the body control module (BCM). The BCM monitors the cruise control on/off, speed limiter on/off, set/coast, resume/accelerate and cancel switches via the cruise control switch signal circuit in order to detect when the driver has requested to perform a cruise control function. The BCM detects a specific voltage signal on the cruise control switch signal circuit when a switch is applied. The engine control module (ECM) receives the requested cruise control switch function from the BCM via a serial data message.

Cruise Control Switch Secondary Circuit 2

The cruise control secondary switch 2 signal is an input to the body control module (BCM). The BCM monitors the speed increase high and speed decrease high switches via the cruise control secondary switch signal circuit in order to detect when the driver has requested to perform a cruise control function. The BCM detects a specific voltage signal on the cruise control secondary switch signal circuit when a switch is applied. The engine control module (ECM) receives the requested cruise control secondary switch function from the BCM via a serial data message.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B3794 08

The BCM detects an invalid voltage signal on the cruise control switch signal circuit for 1 second.

B3794 61

Stuck switch for either Resume/Accel or Set/Coast button for 60 seconds.

P0564, P0565, P0567, P0568, P056C

- The BCM detects an invalid voltage signal on the cruise control switch signal circuit for greater than 2 seconds and sends a serial data message to the ECM. The ECM sets these DTCs when the message is received.
- The ECM runs this diagnostic continuously.

P0580, P0581

- The ECM detects an invalid voltage signal on the cruise control switch signal circuit.
- The ECM runs this diagnostic continuously.

P0589, P0592, P0593

- The ECM detects an invalid voltage signal on the cruise control switch 2 signal circuit.
- The ECM runs this diagnostic continuously.

P155A

The ECM is unable to determine the state of the cruise control switch.

P155B, P155C

- The ECM sets these DTCs when the associated cruise switch is active for greater than an allowed duration.
- The ECM runs this diagnostic continuously.

Actions Taken When the DTC Sets

B3794

- The malfunction indicator lamp (MIL) will not illuminate.
- The cruise control system is disabled.

P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, P155A, P155B, P155C

DTCs P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, P155A, P155B, P155C are type C DTCs.

Conditions for Clearing the DTC

B3794

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, P155A, P155B, P155C

DTCs P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, P155A, P155B, P155C are type C DTCs.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE:

- An open ignition circuit or fuse before the control module will cause communication DTCs or power mode mismatch DTCs to set against or in the control module. This failure mode will be diagnosed in the no communications diagnostic procedure or power mode mismatch.
- This test assumes the ignition circuit has a driver that will open under a high current condition before the fuse opens.

- **The driver can open under normal conditions such as battery run down protection or a retained accessory power mode.**

1. Ignition OFF, disconnect the harness connector at the S70L Steering Wheel Controls Switch - Left, ignition ON.
2. Verify a test lamp illuminates between the ignition circuit terminal 8 and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, test or replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Test for less than 1 V between the signal circuit terminals listed below:
 - Signal circuit terminal 9
 - Signal circuit terminal 10
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If less than 1 V**
4. Ignition OFF.
5. Test for greater than 100 ohms between the signal circuit terminals listed below and ground:
 - Signal circuit terminal 9
 - Signal circuit terminal 10
 - **If 100 ohms or less**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If greater than 100 ohms**
6. Ignition ON.
7. Test for B+ between the ignition circuit terminal 8 and the control circuit terminals listed below:
 - Signal circuit terminal 9
 - Signal circuit terminal 10

- **If less than B+**

1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
2. Test for less than 10 ohms in the signal circuit end to end.
 - If 10 ohms or greater, repair the open/high resistance in the signal circuit.
 - If less than 10 ohms, replace the K9 Body Control Module.

- **If B+**

8. Test or replace the S70L Steering Wheel Controls Switch - Left.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Cruise Control Switch Replacement**
- **Control Module References** for body control module replacement, programming, and setup.

DTC P0572 OR P0573: BRAKE SWITCH CIRCUIT VOLTAGE

Diagnostic Instructions

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

DTC Descriptors

DTC P0572

Brake Switch Circuit 1 Low Voltage

DTC P0573

Brake Switch Circuit 1 High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Stop Lamp Switch Signal	C0297 02, P0572	P0572	P0573	P0572, P0573

Circuit/System Description

The stop lamp switch signal circuit is a B+ input from the body control module (BCM) to the engine control module (ECM). The ECM monitors the stop lamp switch circuit to detect when the brake pedal has been applied. The BCM monitors the brake pedal position sensor to determine when the brake pedal is applied. When

the brake pedal is applied, the BCM supplies B+ on the stop lamp switch signal circuit and also sends a serial data message to the ECM indicating that the brake pedal has been applied.

Conditions for Running the DTC

- The engine is running.
- Battery voltage is greater than 11.5 V.
- Brakes applied.

Conditions for Setting the DTC

P0572

This DTC will set when the ECM detects a short to ground or an open on the discrete brake signal circuit when the serial data message from the BCM indicates the brakes are applied. This diagnostic will run when the serial data message and the voltage signal on the brake switch signal circuit do not match for 8 out of 10 times, and the condition is present for greater than 2 s.

P0573

This DTC will set when the ECM detects a short to voltage on the discrete brake signal circuit when the serial data message from the BCM indicates the brakes are not applied. This diagnostic will run when the serial data message and the voltage signal on the brake switch signal circuit do not match for 8 out of 10 times, and the condition is present for greater than 2 s.

Actions Taken When the DTC Sets

- The malfunction indicator lamp (MIL) will not illuminate.
- The cruise control system is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K20 Engine Control Module, ignition ON.
2. Connect a test lamp between the signal circuit terminal 57 and ground.
3. Verify the test lamp turns ON and OFF when pressing and releasing the brake pedal.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If not infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance.
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
4. Replace the K20 Engine Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for BCM or ECM replacement, programming, and setup.

DTC P0575: CRUISE CONTROL SWITCH SIGNAL MESSAGE COUNTER INCORRECT

Diagnostic Instructions

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

DTC Descriptor

DTC P0575

Cruise Control Switch Signal Message Counter Incorrect

Circuit/System Description

When a cruise control function switch is activated, the body control module (BCM) detects a predetermined voltage. The BCM sends a serial data message to the engine control module (ECM) indicating the function that has been requested.

Conditions for Running the DTC

- The ignition is ON.
- The vehicle speed is greater than 40 km/h (25 MPH) and the cruise control is engaged.

Conditions for Setting the DTC

- The ECM receives an invalid cruise control switch status serial data message from the BCM.
- This diagnostic runs continuously.

Actions Taken When the DTC Sets

DTC P0575 is a type C DTC.

Conditions for Clearing the DTC

DTC P0575 is a type C DTC.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that no DTCs are set, except DTC P0575.
 - **If any other DTC is set, except DTC P0575**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If only DTC P0575 is set**
3. Replace the K9 Body Control Module.
 4. Verify DTC P0575 does not set when operating the vehicle within the Conditions for Running the DTC.
 - **If the DTC sets**

Replace the K20 Engine Control Module.

- **If the DTC does not set**
5. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for BCM or ECM replacement, programming, and setup.

DTC P0703: BRAKE SWITCH SIGNAL MESSAGE COUNTER INCORRECT

Diagnostic Instructions

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

DTC Descriptor

DTC P0703

Brake Switch Signal Message Counter Incorrect

Circuit/System Description

The body control module (BCM) monitors the brake pedal position sensor. When the brake pedal is applied, the BCM detects a predetermined voltage signal. The BCM sends a serial data message to the engine control module (ECM) indicating the status of the stop lamps.

Conditions for Running the DTC

The engine is ON.

Conditions for Setting the DTC

- The ECM receives an invalid brake pedal status serial data message from the BCM.
- This diagnostic runs continuously.

Actions Taken When the DTC Sets

- The malfunction indicator lamp (MIL) will not illuminate.
- The cruise control system is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that no DTCs are set, except DTC P0703.
 - **If any other DTC is set, except DTC P0703**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If only DTC P0703 is set**
3. Replace the K9 Body Control Module.
 4. Verify DTC P0703 does not set when operating the vehicle within the conditions for running the DTC.
 - **If the DTC sets**

Replace the K20 Engine Control Module.

- **If the DTC does not set**
5. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for BCM or ECM replacement, programming, and setup.

DTC P1553: DISTANCE SENSING CRUISE CONTROL SIGNAL MESSAGE COUNTER INCORRECT

Diagnostic Instructions

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

DTC Descriptor

DTC P1553

Distance Sensing Cruise Control Signal Message Counter Incorrect

Circuit/System Description

The engine control module (ECM) detects a serial communication failure associated with the adaptive cruise control axle torque request.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

- The ECM detects a serial communication failure associated with the adaptive cruise control axle torque request.
- This diagnostic runs continuously.

Actions Taken When the DTC Sets

- The malfunction indicator lamp (MIL) will not illuminate.
- The cruise control system is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

Diagnostic Aid

Both DTCs P1553 and P15F6 can be set by the ECM against the distance sensing cruise control module if the battery voltage drops below 9 volts during a cranking condition. This is a result of the internal microprocessor in the distance sensing cruise control module resetting when subjected to a low voltage condition during cranking. Under this condition, the rolling count signal transmitted to the ECM for the distance sensing cruise control module freezes while the microprocessor is resetting. As a result of the rolling count signal freezing, the ECM may set DTCs P1553 and P15F6 and transition to history within 5 seconds. No driver information center (DIC) service messages or tell-tales will be displayed.

Reference Information

Schematic Reference

- **Cruise Control Schematics**
- **Object Detection Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Do not replace the K14 Distance Sensing Cruise Control Module or K20 Engine Control Module if DTC P1553 or P15F6 are stored as history DTCs. This is a known issue that has no impact to system function and does not require any additional repair, programming or module replacement.

1. Ignition ON.
2. Verify that no DTCs are set, except DTC P1553.
 - **If any other DTC is set, except DTC P1553**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If only DTC P1553 is set**
3. Replace the K14 Distance Sensing Cruise Control Module.
4. Verify DTC P1553 does not set when operating the vehicle within the conditions for running the DTC.
 - **If the DTC sets**

Replace the K20 Engine Control Module.

- **If the DTC does not set**
5. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for distance sensing cruise control module or ECM replacement, programming, and setup

SYMPTOMS - CRUISE CONTROL

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

1. Before using the symptom diagnostic table, perform the **Diagnostic System Check - Vehicle** in order to verify the following conditions:
 - There are no DTCs set.
 - The module can communicate via the serial data.
2. Review the system operation in order to understand the system functions. Refer to **Cruise Control Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which can affect the operation of the Cruise Control System. Refer to **Checking Aftermarket Accessories**.
- Inspect the accessible system components or the visible system components for obvious damage or for obvious conditions which can cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections**.

Symptom List

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

- **Cruise Control Indicator Malfunction**
- **Cruise Control Malfunction**

CRUISE CONTROL INDICATOR MALFUNCTION

Diagnostic Instructions

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

Circuit/System Description

The instrument cluster illuminates the cruise control engaged indicator based on serial data messages received from the engine control module (ECM). The indicator is commanded ON when the cruise control system is controlling vehicle speed, and turned OFF with the system disengaged.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the cruise control indicator turns ON and OFF when commanding the All Indicators ON and OFF with a scan tool.
 - **If the indicator does not turn ON and OFF**

Replace the P16 Instrument Cluster.
 - **If the indicator turns ON and OFF**
3. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for instrument cluster replacement, programming and setup.

CRUISE CONTROL MALFUNCTION

Diagnostic Instructions

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

DTC Descriptors

DTC B3623 08

Steering Wheel Controls Distance Sensing Cruise Control Gap Up/Down Signal Circuit - Signal Invalid

DTC B3623 61

Steering Wheel Controls Distance Sensing Cruise Control Gap Up/Down Signal Circuit - Stuck

DTC B3794 08

Cruise Control Function Request Circuit Performance - Signal Invalid

DTC B3794 61

Cruise Control Function Request Circuit - Stuck

DTC P0564

Cruise Control Multifunction Switch 1 Circuit

DTC P0565

Cruise Control On/Off Switch Circuit

DTC P0567

Cruise Control Resume/Acceleration Switch 1 Circuit

DTC P0568

Cruise Control Set/Coast Switch 1 Circuit

DTC P056C

Cruise Control Cancel Switch Circuit

DTC P0580

Cruise Control Multifunction Switch Circuit Low Voltage

DTC P0581

Cruise Control Multifunction Switch Circuit High Voltage

DTC P0589

Cruise Control Multifunction Switch 2 Circuit

DTC P0592

Cruise Control Multifunction Switch 2 Circuit Low Voltage

DTC P0593

Cruise Control Multifunction Switch 2 Circuit High Voltage

DTC P155A

Cruise Control Switch State Undetermined

DTC P155B

Cruise Control Set/Coast Switch 2 Circuit

DTC P155C

Cruise Control Resume/Acceleration Switch 2 Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
12 Volt Reference-Switch Terminal 8	1	1	-	-
Cruise Control Set/Coast/Resume/Accelerate Switch 1 Signal- Switch Terminal 10	P0580	P0564, P0580	B3794 08, P0564, P0567, P0568, P0581	B3794 61, P0564
Adaptive Cruise Control Gap Up/Down Switch 2 Signal-Switch Terminal 9	P0592	P0592	P0593	P0589
1. Cruise Control Malfunction				

Circuit/System Description**Cruise Control Switch Primary Circuit 1**

The cruise control switch 1 signal is an input to the body control module (BCM). The BCM monitors the cruise

control on/off, speed limiter on/off, set/coast, resume/accelerate and cancel switches via the cruise control switch signal circuit in order to detect when the driver has requested to perform a cruise control function. The BCM detects a specific voltage signal on the cruise control switch signal circuit when a switch is applied. The engine control module (ECM) receives the requested cruise control switch function from the BCM via a serial data message.

Cruise Control Switch Secondary Circuit 2

The cruise control secondary switch 2 signal is an input to the body control module (BCM). The BCM monitors the speed increase high and speed decrease high switches via the cruise control secondary switch signal circuit in order to detect when the driver has requested to perform a cruise control function. The BCM detects a specific voltage signal on the cruise control secondary switch signal circuit when a switch is applied. The engine control module (ECM) receives the requested cruise control secondary switch function from the BCM via a serial data message.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B3794 08

The BCM detects an invalid voltage signal on the cruise control switch signal circuit for 1 second.

B3794 61

Stuck switch for either Resume/Accel or Set/Coast button for 60 seconds.

P0564, P0565, P0567, P0568, P056C

- The BCM detects an invalid voltage signal on the cruise control switch signal circuit for greater than 2 seconds and sends a serial data message to the ECM. The ECM sets these DTCs when the message is received.
- The ECM runs this diagnostic continuously.

P0580, P0581

- The ECM detects an invalid voltage signal on the cruise control switch signal circuit.
- The ECM runs this diagnostic continuously.

P0589, P0592, P0593

- The ECM detects an invalid voltage signal on the cruise control switch 2 signal circuit.
- The ECM runs this diagnostic continuously.

P155A

The ECM is unable to determine the state of the cruise control switch.

P155B, P155C

- The ECM sets these DTCs when the associated cruise switch is active for greater than an allowed duration.
- The ECM runs this diagnostic continuously.

Actions Taken When the DTC Sets

B3794

- The malfunction indicator lamp (MIL) will not illuminate.
- The cruise control system is disabled.

P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, P155A, P155B, P155C

DTCs P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, P155A, P155B, P155C are type C DTCs.

Conditions for Clearing the DTC

B3794

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear after 40 malfunction-free ignition cycles have occurred.

P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, P155A, P155B, P155C

DTCs P0564, P0565, P0567, P0568, P056C, P0580, P0581, P0589, P0592, P0593, P155A, P155B, P155C are type C DTCs.

Reference Information

Schematic Reference

Cruise Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Cruise Control Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE:

- An open ignition circuit or fuse before the control module will cause communication DTCs or power mode mismatch DTCs to set against or in the control module. This failure mode will be diagnosed in the no communications diagnostic procedure or power mode mismatch.
- This test assumes the ignition circuit has a driver that will open under a high current condition before the fuse opens.
- The driver can open under normal conditions such as battery run down protection or a retained accessory power mode.

1. Ignition OFF, disconnect the harness connector at the S70L Steering Wheel Controls Switch - Left, ignition ON.
2. Verify a test lamp illuminates between the ignition circuit terminal 8 and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, test or replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Test for less than 1 V between the signal circuit terminals listed below:
 - Signal circuit terminal 9
 - Signal circuit terminal 10
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

- **If less than 1 V**
- 4. Ignition OFF.
- 5. Test for greater than 100 ohms between the signal circuit terminals listed below and ground:
 - Signal circuit terminal 9
 - Signal circuit terminal 10
 - **If 100 ohms or less**
 - 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 - 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If greater than 100 ohms**
- 6. Ignition ON.
- 7. Test for B+ between the ignition circuit terminal 8 and the control circuit terminals listed below:
 - Signal circuit terminal 9
 - Signal circuit terminal 10
 - **If less than B+**
 - 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 - 2. Test for less than 10 ohms in the signal circuit end to end.
 - If 10 ohms or greater, repair the open/high resistance in the signal circuit.
 - If less than 10 ohms, replace the K9 Body Control Module.
 - **If B+**
- 8. Test or replace the S70L Steering Wheel Controls Switch - Left.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Cruise Control Switch Replacement**
- **Control Module References** for body control module replacement, programming, and setup.

REPAIR INSTRUCTIONS

CRUISE CONTROL SWITCH REPLACEMENT

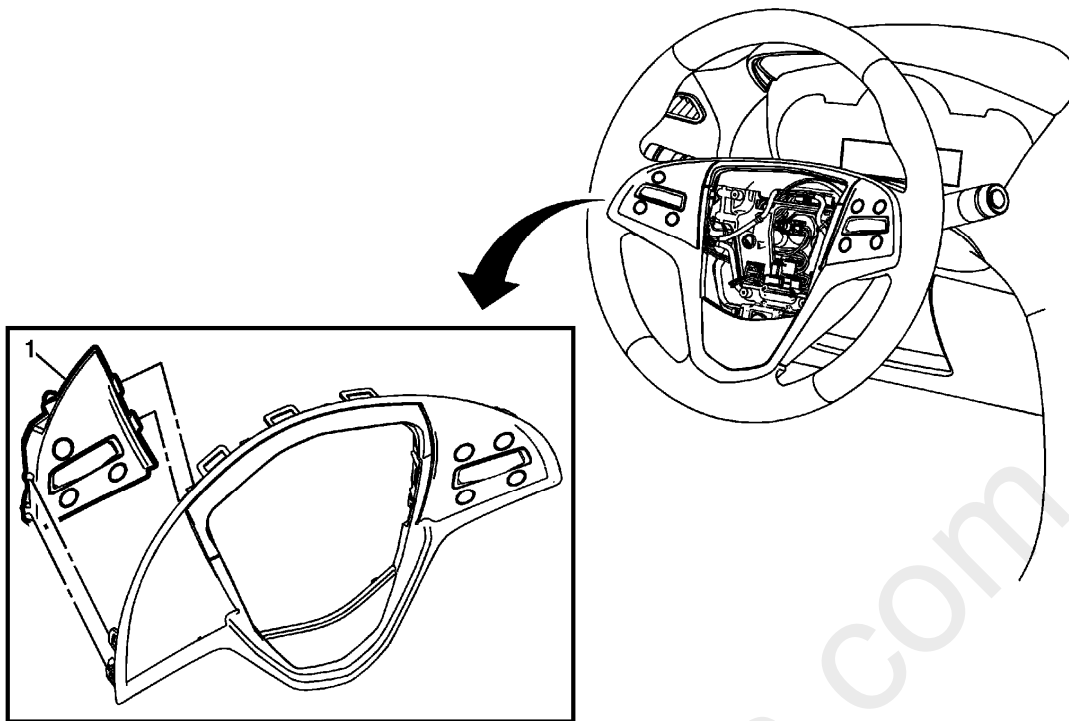


Fig. 2: Cruise Control Switch
 Courtesy of GENERAL MOTORS COMPANY

Cruise Control Switch Replacement

Callout	Component Name
Preliminary Procedures	
1. Remove the steering wheel airbag. Refer to <u>Steering Wheel Airbag Replacement</u> . 2. Remove the steering wheel spoke cover. Refer to <u>Steering Wheel Spoke Cover Replacement</u> .	
1	Cruise Control Switch Procedure Use the appropriate tool to depress the tabs and release the switch from the cover.

DESCRIPTION AND OPERATION

CRUISE CONTROL DESCRIPTION AND OPERATION

Cruise control is a speed control system that maintains a desired vehicle speed under normal driving conditions at speeds above 40.2 km/h (25 mph). Steep grades may cause variations in the selected vehicle speeds.

The following are the main components of the Cruise Control System:

- The accelerator pedal
- The brake pedal position (BPP) sensor

- The body control module (BCM)
- The cruise on/off switch
- The cruise control cancel switch
- The + RES switch (equivalent to resume/accel switch)
- The Increase High Switch
- The - SET switch (equivalent to set/coast switch)
- The Decrease High Switch
- The engine control module (ECM)
- The throttle actuator control (TAC) motor
- The vehicle speed sensor

The body control module (BCM) monitors the signal circuit of the cruise control switches, which are located on the steering wheel. The BCM relays the cruise control switch status to the engine control module (ECM) via the serial data circuit. The ECM uses the status of the cruise control switch to determine when to capture and maintain the vehicle speed. The ECM monitors the vehicle speed signal circuit in order to determine the desired vehicle speed.

Voltage is supplied to the cruise control switch via the steering wheel control switch reference voltage circuit supplied by the BCM. The cruise control function switches are arranged in a resistive ladder design, with each cruise control function switch having a different resistance value. The BCM detects a specific voltage value that is associated with the cruise control function switch being activated. The BCM sends a serial data message to the ECM indicating that the on/off switch is active. Similarly, when the normally open + RES switch or the normally open - SET switch are pressed, the switch closes and the BCM detects the predetermined voltage signal on the cruise control resume/accel and set/coast switch signal circuit. The BCM sends a serial data message to the ECM indicating that the + RES switch or the - SET switch is active. The + RES switch or the - SET switch will remain inactive when the BCM has not received the predetermined voltage signal from the on/off switch. Applications that include the Decrease High and Increase High switches have a second resistive ladder that is connected to a separate BCM input. However, each switch being applied will have a unique resistance and voltage, similar to the primary cruise switches.

Cruise Control Engaged

The Cruise Control System will engage and adjust vehicle speeds, based on the activation of the following cruise control switches, which are located on the steering wheel:

- On/Off
- + RES
- - SET
- Increase High
- Decrease High

To engage the Cruise Control System, ensure that the vehicle speed is above 40.2 km/h (25 mph), turn the cruise On/Off switch ON and momentarily press the - SET switch. The ECM will engage the Cruise Control System and record the vehicle speed. The ECM sends a serial data message to the instrument panel cluster

(IPC) in order to illuminate the Cruise Engaged indicator in the IPC. Refer to the vehicle owner's manual for the location and operation of the cruise control On/Off indicators and driver information center (DIC) messages.

After cruise is engaged, cruise control set speed can be modified by using any of the four switches listed above (- SET, Decrease High, - RES, and Increase High). The - Set switch is the first position in the downward direction when applying the switch. The Decrease High switch is the second position in the downward direction when applying the switch. The - RES switch is the first position in the upward direction when applying the switch. The Increase High switch is the second position in the upward direction when applying the switch.

Pressing the accelerator pedal while the Cruise Control System is engaged, allows the driver to override the Cruise Control System in order to accelerate the vehicle beyond the current set vehicle speed. When the accelerator pedal is released, the vehicle will decelerate and resume the current set vehicle speed.

When cruise control is engaged and maintaining a set speed, if the vehicle speed exceeds the set speed due to downhill conditions, the brakes may be applied to maintain the set speed. Disengagement of cruise control will cause any braking activity to be terminated.

The driver can also override the current set vehicle speed via the - SET switch and the + RES switch. When the Cruise Control System is engaged, pressing and holding the - SET switch will allow the vehicle to decelerate from the current set vehicle speed without deactivating the Cruise Control System. The ECM may command automatic braking to achieve the desired deceleration. When the - SET switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, pressing and holding the Decrease High switch will allow the vehicle to decelerate at a greater deceleration rate than provided by the - SET switch from the current set vehicle speed without deactivating the Cruise Control System. When the Decrease High switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. Again, the ECM may command automatic braking to achieve the desired deceleration. When the Cruise Control System is engaged, momentarily pressing the - SET switch will allow the vehicle to decelerate at 1.6 km/h (1 mph) increments for each time that the - SET is momentarily pressed, with a minimum vehicle speed of 38 km/h (24 mph). When the Cruise Control System is engaged, momentarily pressing the Decrease High switch will allow the vehicle to decelerate at 5 km/h (5 mph) increments for each time that the Decrease High is momentarily pressed, with a minimum vehicle speed of 38 km/hr (24 mph). The brakes may be applied to achieve the desired deceleration to achieve the new set speed.

Pressing and holding the + RES switch, when the Cruise Control System is engaged, will allow the vehicle to accelerate to a greater vehicle speed than the current set vehicle speed. When the + RES switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, pressing and holding the Increase High switch will allow the vehicle to accelerate at a greater acceleration rate than provided by the - RES switch from the current set vehicle speed without deactivating the Cruise Control System. When the Increase High switch is released, the ECM will record the vehicle speed and maintain the vehicle speed as the new set vehicle speed. When the Cruise Control System is engaged, momentarily pressing the + RES switch will allow the vehicle to accelerate at 1.6 km/h (1 mph) increments for each time that the + RES switch is momentarily pressed. When the Cruise Control System is engaged, momentarily pressing the Increase High switch will allow the vehicle to accelerate at 5 km/hr (5 mph) increments for each time that the Increase High switch is momentarily pressed. Momentarily activating the + RES switch will recall the previous vehicle speed, after the cruise control system has been disengaged by pressing the brake pedal, or CANCEL switch.

Cruise Control Disengaged

The engine control module (ECM) disengages the cruise control operation based on the signals from the following switches:

- The brake pedal position (BPP) sensor
- The On/Off switch
- The cruise control cancel switch

The Cruise Control System will disengage when the brake pedal is applied. The body control module (BCM) monitors the BPP sensor via the BPP sensor signal circuit as the voltage signal increases while the pedal reaches the fully applied position. The ECM monitors the BPP signal through a discrete input and a serial data message signal from the BCM indicating the brake status. When either signal indicates the brake pedal is applied, the ECM will disengage the cruise control system.

The Cruise Control System will also disengage when the cruise control on/off switch is switched OFF, or the cruise control cancel switch is activated. The body control module (BCM) determines when the cruise control cancel switch is activated. When the normally open cancel switch is closed, the BCM detects the predetermined voltage signal on the cruise control function switch circuit. The vehicle speed stored in the memory of the engine control module will be erased when the cruise control On/Off switch is turned OFF, or the ignition switch is turned OFF. The BCM sends a serial data message to the ECM in order to disengage the cruise control system. When the Cruise Control System has been disengaged, the ECM sends a serial message to the instrument panel cluster (IPC) in order to turn OFF the Cruise Engaged indicator.

Every time the Cruise Control System is disengaged, the ECM will keep track of the reason for system disengagement. The last 8 disengagement reasons will be recorded within the ECM memory. The scan tool will display the last 8 Cruise Disengage History parameters, in which one out of approximately 50 possible reasons will be displayed in each of these 8 parameters. For the disengagement reason to be displayed within the scan tool parameter the Cruise Control System is active and disengagement is requested.

When engagement of the system is requested but an engagement inhibit is present, the most recent inhibit reason is recorded in the ECM memory. The scan tool will display the most recent inhibit reason, in which one out of approximately 50 possible reasons will be displayed.

Cruise Control Inhibited

The engine control module (ECM) inhibits the cruise control operation when any of the following conditions exist:

- The ECM has not detected a brake pedal activation from the body control module (BCM) this ignition cycle.
- A Cruise Control System DTC has been set.
- The vehicle speed is less than 38.6 km/h (24 mph).
- The vehicle speed is too high.
- The vehicle is in PARK, REVERSE, NEUTRAL, or 1st gear.
- The engine RPM is low.
- The engine RPM is high.

- The system voltage is not between 9 volts and 16 volts.
- The Antilock Brake System (ABS)/Traction Control System (TCS) is active for more than 0.5 seconds.

Cruise Control Inhibit Reasons

This is a general list of inhibit reasons. Not every inhibit reason is applicable to all vehicles. Refer to the scan tool inhibit reason list for the last 8 reasons that have been recorded during the current key cycle.

Scan Tool Name	Description	Long Description
BRAKE	Brake pedal apply	Brake Pedal was applied.
PEDAL INITIALIZE	Brake before cruise	The brake pedal has not been seen as applied prior to driver request to engage cruise with set switch. A brake pedal apply must be seen before allowing cruise engagement during each key cycle. On a vehicle equipped with a manual transmission, a clutch pedal apply may satisfy the brake pedal apply criteria.
CANCEL	Cancel switch active	Cancel Switch was depressed.
CLUTCH	Clutch switch active	Clutch Pedal was applied.
COAST DISENGAGE	Coast disengage	Cruise control is in coast mode with the Set/Coast switch depressed and is requesting no throttle
COAST SPEED LOW	Coast below low speed inhibit	Set / Coast switch was depressed. Vehicle slowed below minimum cruise operating speed.
TAC INHIBIT	ETC prevents cruise operation	Electronic Throttle Control has detected a failure in the throttle control hardware
ACCEL RATE	High acceleration	Vehicle acceleration rate is too high.
DECEL RATE	High deceleration	Vehicle deceleration rate is too high.
HIGH SPEED	Vehicle speed exceeds high speed threshold	Vehicle speed has exceeded maximum cruise operating speed
ILLEGAL MODE	Illegal cruise mode	Cruise control mode is incorrect based on switch states.
LOW SPEED	Vehicle speed drops below low speed threshold	Vehicle speed dropped below the cruise control minimum operating speed. May be due to hilly terrain and low vehicle speed. Manual transmission gear selection and engine torque may contribute to this disengagement reason.
NONE	None	This disengagement reason may be displayed after a dead battery repair or

		module replacement.
CRUISE SW. OFF	On/Off switch in Off state	Cruise On/Off switch turned Off
OVER SET SPEED	Over schedule	Vehicle speed has exceeded driver selected set speed by more than an allowable amount. This may occur while driving down a significant grade or driver overriding cruise while performing a passing maneuver.
S/C ON SPEED HI	Over schedule tap-down	Set/Coast switch selected, vehicle speed is above set speed and does not decrease. May be due to traveling down hill
ECM INHIBIT	PCM/ECM inhibit (RAM corruption)	ECM internal communication error
SIMUL S/C-R/A	SET and RESUME switches simultaneously active	Set/Coast and Resume Accelerate switches pressed simultaneously
TCS	Traction control active	Traction Control was Active
UNDER SET SPEED	Under schedule	Vehicle speed is below cruise control set speed by more than an allowable amount
DLC OVERRIDE	ALDL	Scan Tool plugged into ALDL connector
MEMORY DTC	Memory Failure	Control module memory failure detected.
ENG RUN TIME	Engine run time not elapsed	Engine has not been running long enough, typically five seconds.
ENGINE SPEED	Engine speed too low or too high	Engine RPM too low (near stall) or too high (near engine RPM fuel shutoff).
DTC SET	Malfunction in PCM/ECM (DTC active)	DTC is active or in history that inhibits cruise control operation.
RPM LIMIT	Injectors Disabled (Engine overspeed fuel cut-off active)	Engine RPM limiter active with fuel cut off active.
FIRST GEAR	1st Gear	Transmission is engaged in 1st gear
APP OVERRIDE	Pedal greater than cruise (override)	Driver has overridden cruise control set speed with accelerator pedal for greater than an allowable time.
LOW VOLTAGE	Voltage below low voltage threshold	Ignition Voltage Low at ECM (typically 9 volts)
LOST FWD GEAR	Transmission in neutral. Reverse or park	Gear selector not in forward gear
MPH LIMIT	MPH Limited Fuel (Vehicle overspeed fuel cut-off active)	Vehicle overspeed protection active with fuel cut off active
SW. INVALID	Analog cruise switch input out of range	Cruise switch voltage signal in invalid range
	Voltage above high voltage	Ignition Voltage High at ECM

HIGH VOLTAGE	threshold	(typically 18 volts)
D WHL SPD LOW	Un-driven Whl speed Greater	Non Driven wheel speed greater than driven wheel speed
D WHL SPD HI	Driven Whl Spd Greater (wheel slip detection)	Driven wheel speed greater than Non Driven wheel speed (slip detection)
CRUISE S/W	Sequence of completion checks	Cruise control software execution error has occurred.
CRUISE SW DATA	Serial data fault (Cruise switch serial communication fault)	Cruise switch serial data fault is active or communication has been lost with module sending cruise switch states
ECT OVERTEMP	Engine metal overtemp active	Engine over temperature. Overheated.
VSES	Vehicle stability active	Vehicle Stability Control was active
AXLE RANGE	Rear Axle Low	Rear axle in low range
TRANS DTC	Trans Gear Fault	Transmission DTC is active or in history that inhibits cruise control operation
BPP DATA	DTC P0703 active or maximum time elapsed without receiving valid Brake Pedal Position signal.	Serial data fault is active or communication has been lost with module sending brake pedal apply state
BPP DTC	Brake Pedal Position signal invalid	Brake Pedal Apply Circuit fault has been detected.
PARK BRAKE	Park Brake Switch signal Active	Parking Brake Applied
ACC INHIBIT	Adaptive Cruise Control Inhibited	Adaptive Cruise Control Inhibited
ACC BRAKE INOP	Adaptive Cruise Control Automatic Braking Failed	Adaptive Cruise Control Automatic Braking Inoperative
ACC OPTION	Adaptive Cruise Control option mismatch	Cruise control type (adaptive cruise or conventional cruise) mismatched between ECM and BCM.
ACC DATA	Serial data fault for Adaptive Cruise Control Throttle Control and Brake Control signals sent by Adaptive Cruise Control module	Adaptive Cruise Control Module serial data fault is active or communication has been lost between ACC module and ECM.
PTO ACTIVE	Power Take Off Active	Power Take Off is active.
ECM RESET	ECM Running Reset	ECM Running Reset occurred
Ram DTC	Processor Integrity Fault (Ram corruption)	ECM software error has occurred
BPP Not Learned	Brake Apply Sensor Home Position Not Learned	Brake Pedal Position Sensor Released Position Not Learned.
Accel Time	Rate Limiting Fault	Cruise torque request rate limiting active too long
4WD Low	4WD Low	Transfer case in low range
M/T Gear Changed	Manual transmission out of gear with no clutch pedal apply	Manual transmission shifted to Neutral without clutch pedal being applied.
	Brake Pedal Driver Applied	A Brake Pedal Apply has been detected

Brk Ped Press	Pressure Detected	based on brake pedal pressure as measured by the EBCM.
SL/W Sys On	Speed Limiter / Warning On/Off switch turned on	Driver has turned on the Speed Limiter/Warning on/off switch. Cruise is disabled / inhibited and cruise on/off switch will be set to OFF.
Calc Eng Torque	Calculated Torque	Engine torque calculation is incorrect.
Cruise Brk Inop	Brake System Malfunction	EBCM has detected a failure that does not allow automatic braking to be performed.
Auto Brk Data	Automatic Braking Engine Torque Request Signal Communication Malfunction	ECM to EBCM serial data fault is active or communication has been lost between ECM and EBCM.