

2006 ACCESSORIES & EQUIPMENT

Cruise Control - Impala

SCHEMATIC AND ROUTING DIAGRAMS

CRUISE CONTROL SCHEMATIC ICONS

Cruise Control Schematic Icons

Icon	Icon Definition
	CAUTION: When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Refer to <u>SIR DISABLING AND ENABLING ZONES</u> . Failure to observe the correct procedure could cause deployment of the SIR components, personal injury, or unnecessary SIR system repairs.

CRUISE CONTROL SCHEMATICS

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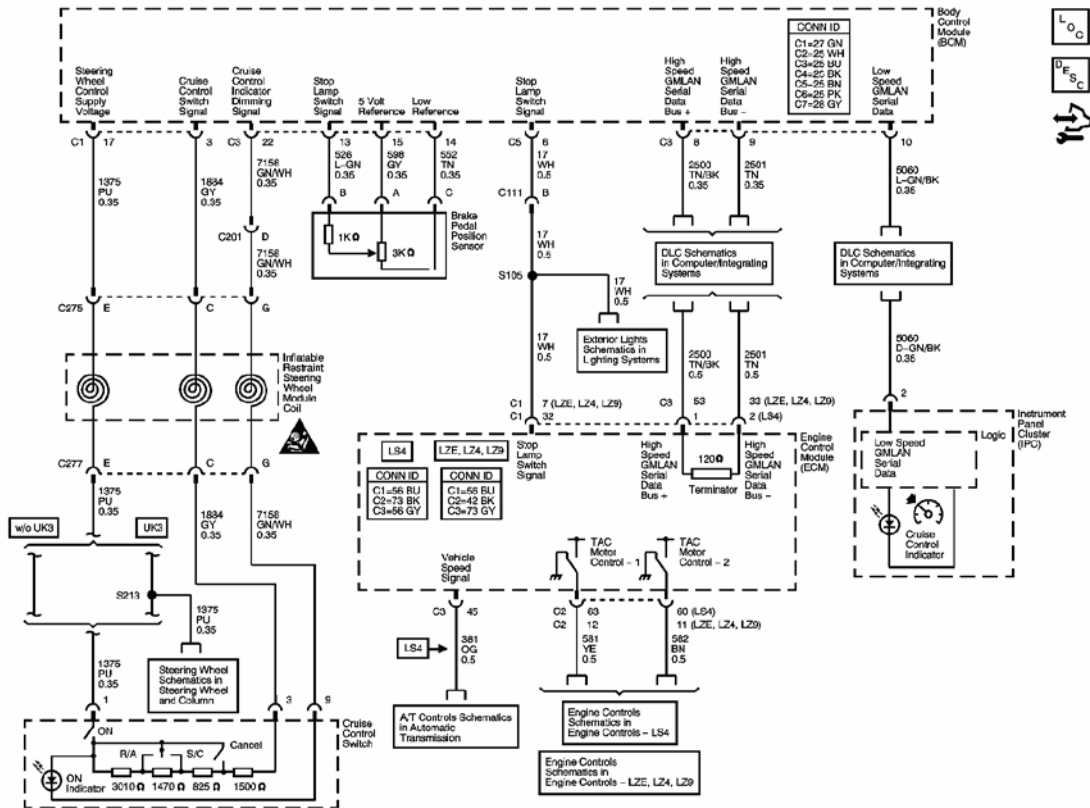


Fig. 1: Cruise Control Schematics - Wiring Diagram
 Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

CRUISE CONTROL COMPONENT VIEWS

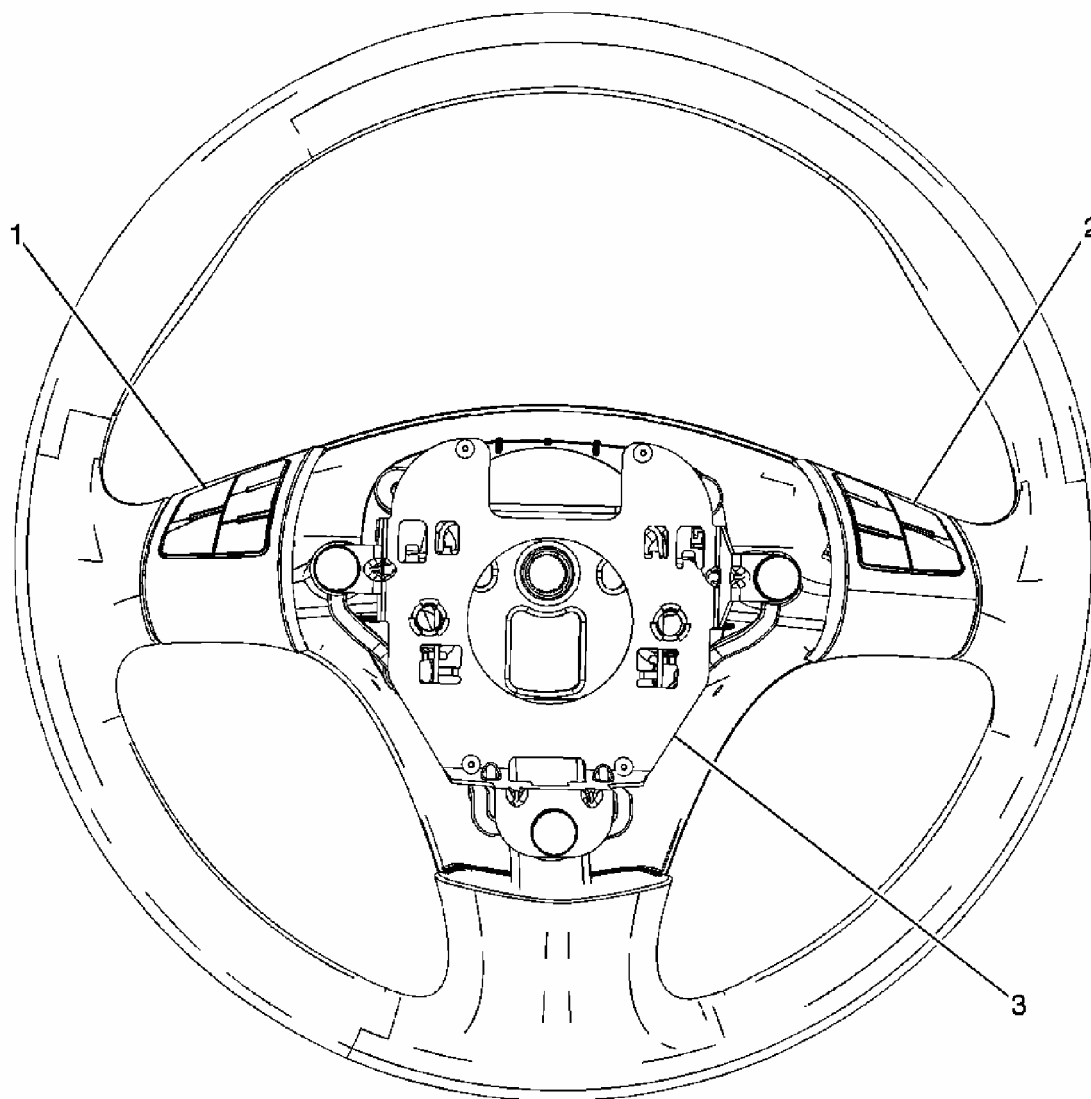


Fig. 2: Steering Wheel Components
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Steering Wheel Controls - Left
2	Steering Wheel Controls - Right
3	Horn Switch

CRUISE CONTROL CONNECTOR END VIEWS

Cruise Control Switch

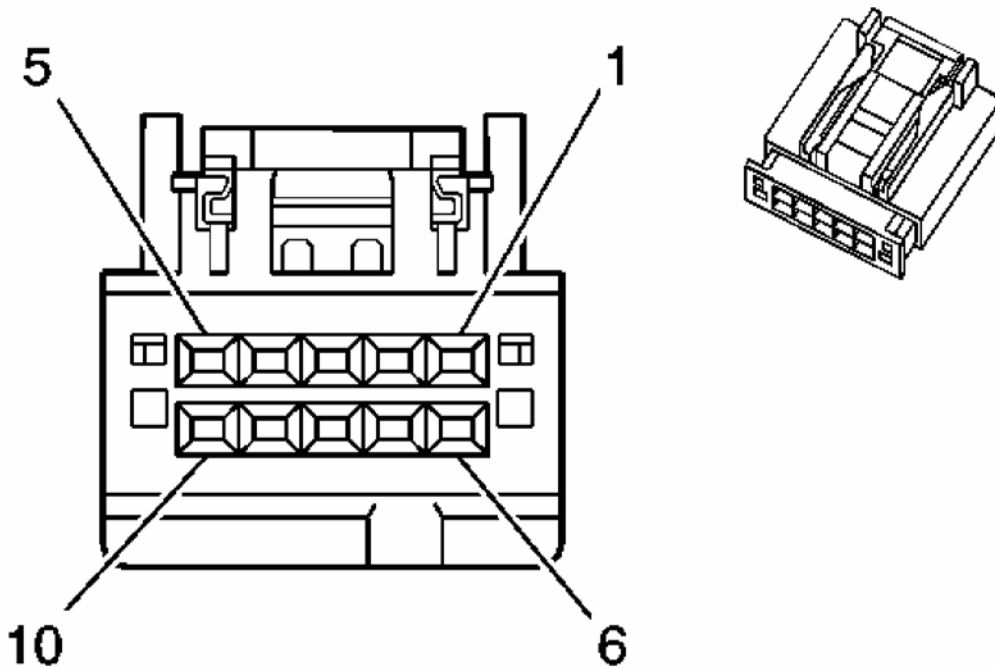


Fig. 3: Cruise Control Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Cruise Control Connector End Views

Connector Part Information

- 30700-1100
- Service:
- 10-Way F Molex 30700 Series (GY)

Terminal Part Information

- Terminal/Tray:
- Core/Insulation Crimp:
- Release Tool/Test Probe:

Cruise Control Switch

Pin	Wire Color	Circuit No.	Function
1	PU	1375	Steering Wheel Control Supply Voltage
2	-	-	Not Used

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3	GY	1884	Cruise Control Switch Signal
4-5	-	-	Not Used
6	PU/WH	7005	LED Dimming Supply
7	-	-	Not Used
8	BK	1450	Ground
9	GN/WH	7158	Cruise Control Indicator Dimming Signal
10	-	-	Not Used

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3794	Cruise Control Function Request Circuit
DTC P0575	Cruise Control Switch Signal Circuit
DTC P0703	Brake Switch Circuit 2

DIAGNOSTIC STARTING POINT - CRUISE CONTROL

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** in Vehicle DTC Information. The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

SCAN TOOL DATA LIST

The scan tool data lists contain all of the cruise control related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The data list column indicates the location of the parameter within the scan tool menu selections.

Use the scan tool data lists as directed by a diagnostic table or in order to supplement the diagnostic procedures. Begin all of the diagnostic procedures with **Diagnostic System Check - Vehicle**.

Use the scan tool data lists only after the following is determined:

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- There is no published DTC procedure nor published symptom procedure for the customer concern.
- The DTC or symptom procedure indicated by the Diagnostic System Check does not resolve the customer concern.

The typical data values are obtained from a properly operating vehicle under the conditions specified in the first row of the scan tool data list table. Comparison of the parameter values from the suspect vehicle with the typical data values may reveal the source of the customer concern.

Engine Control Module (ECM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Ignition ON/Engine Idling at Normal Operating Temperature/Vehicle is in Park or Neutral/Cruise On/Off Switch is Turned Off			
APP Indicated Angle	Cruise Control Data	Percent	0
Cruise Cancel Switch	Cruise Control Data	On/Off	Off
Cruise Control Active	Cruise Control Data	Yes/No	No
Cruise Disengage (1 - 8) History	Cruise Control Data	Last reason for cruise control disengagement	Varies
Cruise On/Off Switch	Cruise Control Data	On/Off	Off
Cruise Resume/Accel. Switch	Cruise Control Data	On/Off	Off
Cruise Set/Coast Switch	Cruise Control Data	On/Off	Off
Engine Load	Cruise Control Data	Percent	0
Engine Run Time	Cruise Control Data	Hr: Min: Sec	Varies
Engine Speed	Cruise Control Data	RPM	Varies
Ignition 1 Signal	Cruise Control Data	Volts	12 to 16 Volts
Reduced Engine Power (5.3L)	Cruise Control Data	Active/Inactive	Inactive
TP Desired Angle	Cruise Control	Percent	Varies

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	Data		
TP Indicated Angle	Cruise Control Data	Percent	%
Vehicle Speed Sensor	Cruise Control Data	km/h (mph)	0 km/h (0 mph)

SCAN TOOL DATA DEFINITIONS (DISENGAGE HISTORY)

One of the following conditions must be present in order for a disengagement parameter to appear:

- The Cruise Control System is active and disengagement is requested.
- The engagement of the Cruise Control System is requested while a fault is present.

Accel Rate

The engine control module (ECM) detects that the vehicle acceleration is greater than the calibrated cruise control threshold.

APP Override

The ECM detects that the accelerator pedal overrides the set vehicle speed for approximately 60 seconds.

Brake

The ECM detects that the stop lamps have been activated according to the brake pedal position (BPP) sensor / stop lamp switch input from the platform module. Also, the brake pedal being applied according to the brake fluid pressure sensor input can also set this disengagement reason with vehicles equipped with the vehicle stability enhancement system (VSES).

BPP Data

The ECM detects an invalid brake pedal apply serial data message from the platform module.

BPP DTC

The ECM detects that DTC P0703 is active.

Cancel

The ECM detects that the cruise control cancel switch has been activated.

Clutch

The ECM detects that the clutch pedal switch has been activated.

Coast Disengage

When the ECM detects that the cruise set/coast signal is active and the throttle blade fully closes the cruise control system will disengage until the ECM detects that the set/coast signal is inactive. The cruise control system will then engage and set with the new vehicle speed.

Coast Speed Low

The ECM detects that the Set/Coast switch is activated until the vehicle speed is below 37 km/h (23 mph).

Cruise S/W

The ECM detects that a cruise control software execution error is present.

Cruise Sw Data

A fault in the serial data circuit from the cruise control switch to the platform module is detected.

Cruise Sw. Off

The ECM detects that the cruise On/Off switch was turned to OFF when the cruise control system was enabled.

D WHL Spd Low

The ECM detects the driven wheels are at a slower speed than the non-driven wheels.

D WHL Spd Hi

The ECM detects the driven wheels are at a faster speed than the non-driven wheels.

Decel Rate

The ECM detects that the vehicle deceleration is greater than the calibrated cruise control threshold.

DLC Override

The ECM detects that a DLC override has occurred.

DTC Set

The ECM detects that a DTC has been set which affects the cruise control operation.

ECM Inhibit

The ECM detects a RAM corruption associated to the cruise control system.

ECT Overtemp

The ECM detects the engine temperature is above the calibrated threshold.

Engine Run Time

The ECM detects that the cruise control system has been requested and the engine run time counter is not active.

Engine Speed

The ECM detects that the engine speed is less than or greater than a calibrated RPM.

First Gear

While the cruise control system is active, the ECM detects that the transmission is in Drive 1.

High Speed

The ECM detects that the vehicle speed is greater than the calibrated amount.

High Voltage

The ECM detects that the ignition voltage is above 16 volts.

Illegal Mode

The ECM detects that the acceleration mode is active without the activation of the Accel. switch.

Lost Fwd Gear

The ECM detects that transmission is in Neutral, Reverse or Park.

Low Speed

The ECM detects that the vehicle speed is less than 37 km/h (23 mph) while the cruise

control system was enabled.

Low Voltage

The ECM detects that the ignition voltage is below 9 volts.

Memory DTC

The ECM detects an internal memory fault.

MPH Limit

The ECM detects the vehicle is over speed and that the fuel shutoff has been activated.

None

This parameter is displayed when a new ECM has been installed.

Over Set Speed

The ECM detects the current vehicle speed is greater than the set vehicle speed by more than a calibrated amount.

Park Brake

ECM detects the park brake switch is active.

Pedal Initialize

The ECM detects that a stop lamp pedal activation had not occurred before the cruise control system was requested.

PTO Active

The ECM detects power take off is active.

RPM Limit

The ECM detects the engine is over speed and that the fuel shutoff has been activated.

S/C On - Speed High

The ECM detects the Set/Coast switch is briefly applied while the current vehicle speed is greater than the set vehicle speed by more than a calibrated amount.

Simul SC/RA Sw

The ECM detects that the Set/Coast switch and the Resume/Accel switch are active at the same time.

Sw Invalid

The ECM detects the analog cruise control switch input is out of the normal voltage range.

TAC Inhibit

The ECM detects a fault within the throttle actuator control (TAC) system.

TCS

The ECM detects that the traction control system had been activated. It is also possible that a tire with low air pressure can also set this disengagement reason.

Trans. DTC

The ECM detects a transmission gear fault.

Under Set Speed

The ECM detects that the vehicle speed is less than the cruise memory speed by more than a calibrated amount.

VSES

The ECM detects that the vehicle stability enhancement system had been activated.

SCAN TOOL DATA DEFINITIONS (CRUISE CONTROL)

The Scan Tool Data Definitions contains a brief description of all cruise control related parameters available on the scan tool.

APP Indicated Angle

This parameter displays the angle of the accelerator pedal as calculated by the control module using the signals from the accelerator pedal position sensors. The accelerator pedal position (APP) indicated angle is a range of values indicating a low percentage when the accelerator pedal is not depressed to a high percentage when the accelerator pedal is fully depressed.

Cruise Cancel Switch

The scan tool displays On or Off. This is the state of the cruise cancel switch as

detected by the ECM.

Cruise Control Active

The scan tool displays Yes or No. The engine control module (ECM) determines the current status of cruise control operation. An active cruise control system is displayed as Yes.

Cruise Disengage (1-8) History

The scan tool displays the last 8 reasons why the cruise control system was disengaged. Refer to the Scan Tool Data Definitions (Disengaged History) for descriptions.

Cruise On/Off Switch

The scan tool displays On or Off. The ECM monitors the cruise control set/coast and resume/accelerate switch signal circuit. A closed switch is displayed as On.

Cruise Resume/Accel. Switch

The scan tool displays On or Off. The ECM monitors the cruise control set/coast and resume/accelerate switch signal circuit. A closed switch is displayed as On. The cruise control On/Off switch must be switched On in order to correctly view the Cruise Resume/Accel. Switch parameter.

Cruise Set/Coast Switch

The scan tool displays On or Off. The ECM monitors the cruise control set/coast and resume/accelerate switch signal circuit. A closed switch is displayed as On. The cruise control On/Off switch must be switched On in order to correctly view the Cruise Set/Coast Switch parameter.

Engine Load

Scan tool range 0-100 percent. Engine load is calculated by the ECM from the engine speed and mass air flow (MAF) sensor readings. Engine load should increase with an increase in RPM or air flow.

Engine Run Time

Scan tool range 00:00:00-99:99:99 Hrs:Min:Sec. Indicates the time elapsed since the engine was started. If the engine is stopped, ENGINE RUN TIME will be reset to 00:00:00.

Engine Speed

The scan tool displays 0 to 9,999 RPM. The ECM monitors the CKP signal circuit in order to determine the engine RPM.

Ignition 1 Signal

The scan tool displays 6 volts to 18 volts. The ECM monitors the Ignition 1 signal circuit in order to determine the system voltage.

Reduced Engine Power

The scan tool displays Active or Inactive. When the ECM detects that malfunction in the TAC System exists, the scan tool displays Active.

TP Desired Angle

This parameter indicates the TP angle commanded by the control module. The scan tool will display a low value at idle, and a high value at wide open throttle (WOT).

TP Indicated Angle

This parameter displays the angle of the throttle position (TP) in percent. This information is calculated by the control module using the signals from the throttle position sensors. The scan tool will display a low percentage when the throttle plates are closed. The scan tool will display a high percentage when the throttle plates are fully open.

Vehicle Speed Sensor

The scan tool displays 0 to 150 km/h (93.2 mph). The ECM monitors the vehicle speed sensor signal circuit in order to calculate the vehicle speed for display.

DTC B3794

Circuit Description

The cruise control switch is an input to the body control module (BCM). The BCM monitors the cruise control set/coast and resume/accelerate 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 set/coast and resume/accelerate switch signal circuit when a switch is applied.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B3794

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Cruise Control Function Request Circuit

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to.

DTC B3794

DTC Symptom	DTC Symptom Descriptor
08	Signal Invalid
61	Actuator Stuck

Conditions for Running the DTC

- The cruise switch is ON.
- The ignition is ON.

Conditions for Setting the DTC

- The BCM detects an invalid voltage signal on the cruise control + RES switch and - SET switch signal circuit.
- The above condition is present for 0.5 second.

Action Taken When the DTC Sets

- The BCM stores the DTC information into memory when the diagnostic runs and fails.
- The malfunction indicator lamp (MIL) will not illuminate.
- The Cruise Control System is disabled.

Conditions for Clearing the DTC

- The DTC becomes history when the fault is no longer present.
- A History DTC clears after 100 malfunction-free ignition cycles.
- The BCM receives a clear code command from the scan tool.

Diagnostic Aids

For an intermittent, refer to **Testing for Intermittent Conditions and Poor Connections** .

DTC B3794

Step	Action	Values	Yes	No
Schematic Reference: Cruise Control Schematics Connector End View Reference: Master Electrical Component List				
1	Did you perform the Diagnostic System Check - Vehicle?	-		Go to <u>Diagnostic System</u>

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			Go to Step 2	<u>Check - Vehicle</u>
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, observe the Cruise Control Switch parameter in the Body and Accessories body control module (BCM) Data list. Does the Cruise Control Switch parameter display Error?	-	Go to Step 3	Go to Step 4
3	1. Turn OFF the ignition. 2. Disconnect C1 of the multifunction switch. 3. Turn ON the ignition, with the engine OFF. 4. With the scan tool, observe the Cruise Control Switch parameter in the Body and Accessories BCM Data list. Does the Cruise Control Switch parameter display Error?	-	Go to Step 9	Go to Step 11
4	1. Turn the cruise control On/Off control switch ON. 2. With the scan tool, observe the Cruise Control Switch parameter in the Body and Accessories BCM Data list. Does the Cruise Control Switch parameter display Error?	-	Go to Step 7	Go to Step 5
5	1. Activate the cruise control set/coast switch. 2. With the scan tool, observe the Cruise Control Switch parameter in the Body and Accessories BCM Data list. Does the Cruise Control Switch	-	Go to Step	

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	parameter display Error?		7	Go to Step 6
6	1. Activate the cruise control resume/accel switch. 2. With the scan tool, observe the Cruise Control Switch parameter in the Body and Accessories BCM Data list. Does the Cruise Control Switch parameter display Error?	-	Go to Step 7	Go to Diagnostic Aids
7	IMPORTANT: The cruise control on/off switch must be turned ON in order to correctly view the set/coast switch resistance values with the DMM. 1. Turn OFF the ignition. 2. With a DMM, measure the resistance of the cruise control switch between the ignition 1 voltage circuit and the cruise control set/coast and resume/accelerate switch signal circuit. 3. Individually activate and hold the cruise control function switches while measuring the resistance value of each cruise control function switch. Do the cruise control function switch resistance values measure between the specified values?	Off = O.L. On = 7.8 K-8.6 K Resume = 2.7 K-3.0 K Set = 1.2 K-1.3 K	Go to Step 8	Go to Step 11
8	Test the ignition 1 voltage circuit for a high resistance. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	-	Go to Step 15	Go to Step 10
9	Test the cruise control set/coast and resume/accel switch signal circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	-	Go to Step 15	Go to Step 12
	Test the cruise control set/coast and			

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10	resume/accel switch signal circuit for a high resistance. Refer to Circuit Testing and Wiring Repairs . Did you complete the repair?	-	Go to Step 15	Go to Step 12
11	Inspect for poor connections at C1 of the multifunction switch. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	-	Go to Step 15	Go to Step 13
12	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	-	Go to Step 15	Go to Step 14
13	Replace the cruise control switch. Refer to Multifunction, Turn Signal Switch Replacement . Did you complete the replacement?	-	Go to Step 15	-
14	Replace the BCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 15	-
15	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC. Does the DTC reset?	-	Go to Step 2	System OK

DTC P0575

Circuit Description

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

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC P0575 Cruise Control Switch Signal Circuit

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Conditions for Running the DTC

The engine is ON.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

- The Cruise Control System is disabled.
- The ECM stores the DTC information into memory when the diagnostic runs and fails.
- The malfunction indicator lamp (MIL) will not illuminate.
- The ECM records the operating conditions at the time the diagnostic fails. The ECM stores this information in the Failure Records.
- All cruise control function switches are set to OFF.

Conditions for Clearing the DTC

- A last test failed, or the current DTC, clears when the diagnostic runs and does not fail.
- A history DTC clears after 40 consecutive warm-up cycles, if failures are not reported by this or any other emission related diagnostic.
- Use the scan tool in order to clear the DTC.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the BCM. If stored only as a history DTC and not retrieved as a current DTC, do not replace the BCM.
- If this DTC is retrieved as both a current and history DTC, replace the BCM.

DTC P0575

Step	Action	Yes	No
Schematic Reference: Cruise Control Schematics Connector End View Reference: Computer/Integrating Systems Connector End Views in Computer/Integrating Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle
2	Is DTC P0575 current in the engine control module (ECM)?	Go to Step 3	Go to Diagnostic Aids

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3	Replace the body control module (BCM). Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	Go to Step 4	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC. Does the DTC reset?	Go to Step 2	System OK

DTC P0703

Circuit 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 GMLAN serial data message to the engine control module (ECM) indicating the status of the stop lamps.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC P0703 Brake Switch Circuit 2

Conditions for Running the DTC

The engine is ON.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

- The Cruise Control System is disabled.
- The ECM stores the DTC information into memory when the diagnostic runs and fails.
- The malfunction indicator lamp (MIL) will not illuminate.
- The ECM records the operating conditions at the time the diagnostic fails. The ECM stores this information in the Failure Records.

Conditions for Clearing the DTC

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- A last test failed, or the current DTC, clears when the diagnostic runs and does not fail.
- A history DTC clears after 40 consecutive warm-up cycles, if failures are not reported by this or any other emission related diagnostic.
- Use the scan tool in order to clear the DTC.

Diagnostic Aids

- Repair any brake system related DTCs before performing this diagnostic.
- If an BCM has been replaced, the brake pedal position (BPP) sensor must be calibrated. Refer to **Brake Pedal Position Sensor Calibration** .
- This DTC may be stored as a history DTC without affecting the operation of the BCM. If stored only as a history DTC and not retrieved as a current DTC, do not replace the BCM.
- If this DTC is retrieved as both a current and a history DTC, replace the BCM.
- For an intermittent condition, refer to **Testing for Intermittent Conditions and Poor Connections** .

Test Description

The numbers below refer to the step numbers located in the diagnostic table.

2: This step is performed in order to confirm that DTC P0703 is current within the ECM.

3: This step is performed in order to correct a BPP sensor that must be calibrated, possibly due to a BCM replacement or for a BPP sensor that is out of adjustment.

DTC P0703

Step	Action	Yes	No
Schematic Reference: <u>Cruise Control Schematics</u> Connector End View Reference: <u>Cruise Control Connector End Views</u> or <u>Computer/Integrating Systems Connector End Views</u>			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	Is DTC P0703 current in the engine control module (ECM)?	Go to Step 3	Go to Diagnostic Aids
3	1. Perform the brake pedal position (BPP) sensor calibration procedure. Refer to <u>Brake Pedal Position Sensor Calibration</u> . 2. Use the scan tool in order to clear the		

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	DTCs. 3. Operate the vehicle within the Conditions for Running the DTC.		
	Does the DTC reset?	Go to Step 4	System OK
4	Inspect for poor connections at the harness connector of the body control module (BCM). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 6	Go to Step 5
5	Replace the BCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	Go to Step 6	-
6	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC. Does the DTC reset?	Go to Step 2	System OK

SYMPTOMS - CRUISE CONTROL

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

1. Perform the **Diagnostic System Check - Vehicle** in Vehicle DTC Information, before using the Symptom Tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Cruise Control Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Cruise Control System. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could 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** in Wiring Systems.

Symptom List

Refer to **Cruise Control Inoperative/Malfunctioning**.

CRUISE CONTROL SWITCH INDICATOR INOPERATIVE

Diagnostic Aids

- Repair any brake system related DTCs before performing this diagnostic.
- If a BCM has been replaced, the brake pedal position (BPP) sensor must be calibrated. Refer to **Brake Pedal Position Sensor Calibration** .
- For an intermittent condition, refer to **Testing for Intermittent Conditions and Poor Connections** .

Cruise Control Switch Indicator Inoperative

Step	Action	Yes	No
Schematic Reference: Cruise Control Schematics			
Connector End View Reference: Cruise Control Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	1. Turn the ignition OFF. 2. Disconnect the cruise control switch. 3. Connect a fused jumper between the voltage signal circuit and the low reference circuit. 4. Turn the ignition ON. 5. With the scan tool, observe the Cruise On/Off Switch parameter in the Engine Control Module Data. Does the Cruise On/Off Switch parameter display On?	Go to Step 5	Go to Step 3
3	Test the voltage signal circuit and the low reference circuit for an open, or for a high resistance. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> . Did you find and correct the condition?	Go to Step 7	Go to Step 4
	Inspect for poor connections at the harness		

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4	connector of the body control module (BCM). Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> . Did you find and correct the condition?	Go to Step 7	Go to Step 6
5	Replace the cruise control switch. Refer to <u>Multifunction, Turn Signal Switch Replacement</u> . Did you complete the replacement?	Go to Step 7	-
6	Replace the BCM. Refer to <u>Control Module References</u> for replacement, setup, and programming. Did you complete the replacement?	Go to Step 7	-
7	Operate the system in order to verify the repair. Does the system operate properly?	System OK	Go to Step 2

CRUISE CONTROL INOPERATIVE/MALFUNCTIONING

Diagnostic Aids

In order to avoid misdiagnosis, inspect for the following:

- Ensure that the following cruise control switches are not stuck in the engaged position:
 - On/Off switch
 - Set/Coast switch
 - Resume/Accel switch
- Proper operation of the brake lamps - Refer to **Exterior Lighting Systems Description and Operation** .

For an intermittent condition, refer to **Testing for Intermittent Conditions and Poor Connections** .

Conditions for Enabling Cruise Control

- The vehicle speed is greater than 40 km/h (25 mph).
- The vehicle is not in PARK, REVERSE, NEUTRAL, or 1st gear.
- The system voltage is within 9-16 volts.
- The park brake is not applied.

Test Description

The number below refers to the step number on the diagnostic table.

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6: This step tests the ignition 1 voltage circuit for an open, for a short to ground, or for a high resistance.

Cruise Control Inoperative/Malfunctioning

Step	Action	Values	Yes	No
Schematic Reference: Cruise Control Schematics Connector End View Reference: Master Electrical Component List				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, observe the Cruise Control Switch parameter in the Body and Accessories body control module (BCM) Data list. Does the Cruise Control Switch parameter display Off?	-	Go to Step 3	Go to Step 7
3	1. Turn the cruise control On/Off switch ON. 2. With the scan tool, observe the Cruise Control Switch parameter. Does the Cruise Control Switch parameter display On?	-	Go to Step 4	Go to Step 6
4	1. Turn the cruise control on/off switch ON. 2. With the scan tool, observe the Cruise Control Switch parameter. 3. Press and hold the cruise control set/coast button. Does the Cruise Control Switch parameter display Set?	-	Go to Step 5	Go to Step 8
	1. With the scan tool, observe the Cruise Control Switch parameter.			

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5	2. Press and hold the resume/accel switch. Does the Cruise Control Switch parameter Display Resume?	-	Go to Diagnostic Aids	Go to Step 8
6	1. Turn OFF the ignition. 2. Disconnect C1. 3. Turn ON the ignition, with the engine OFF. 4. Connect a test lamp between the ignition 1 voltage circuit and a good ground. Does the test lamp illuminate?	-	Go to Step 8	Go to Step 13
7	IMPORTANT: The cruise control on/off switch must be turned ON in order to correctly view the set/coast switch resistance values with the DMM. 1. Turn OFF the ignition. 2. Disconnect C1. 3. With a DMM, measure the resistance of the cruise control switch between the ignition 1 voltage circuit and the cruise control set/coast and resume/accelerate switch signal circuit. 4. Individually activate and hold the cruise control function switches while measuring the resistance value of each cruise control function switch. Do the cruise control function switch resistance values measure between the specified values?	Off = O.L. On = 7.8 K-8.6 K Resume = 2.7 K-3.0 K Set = 1.2 K-1.3 K	Go to Step 10	Go to Step 11
	IMPORTANT: The cruise control on/off switch must be turned ON in order to correctly view the set/coast switch resistance values with the DMM.			

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8	1. Turn OFF the ignition. 2. Disconnect C1. 3. With a DMM, measure the resistance of the cruise control switch between the ignition 1 voltage circuit and the cruise control set/coast and resume/accelerate switch signal circuit. 4. Individually activate and hold the cruise control function switches while measuring the resistance value of each cruise control function switch. Do the cruise control function switch resistance values measure between the specified values?	Off = O.L. On = 7.8 K-8.6 K Resume = 2.7 K-3.0 K Set = 1.2 K-1.3 K	Go to Step 9	Go to Step 11
9	Test the cruise control set/coast and resume/accel switch signal circuit for the following: • High resistance • Open • Short to ground • Short to voltage Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	-	Go to Step 16	Go to Step 12
10	Test the cruise control set/coast and resume/accel switch signal circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	-	Go to Step 16	Go to Step 12
	Inspect for poor connections at the harness connector of the cruise control switch. Refer to Testing for Intermittent Conditions and Poor			

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11	<u>Connections and Connector Repairs</u> . Did you find and correct the condition?	-	Go to Step 16	Go to Step 14
12	Inspect for poor connections at the harness connector of the BCM. Refer to <u>Testing for Intermittent Conditions and Poor Connections and Connector Repairs</u> . Did you find and correct the condition?	-	Go to Step 16	Go to Step 15
13	Repair the following in the ignition 1 voltage circuit: • An open • A high resistance • A short to ground Refer to <u>Circuit Testing and Wiring Repairs</u> . Did you complete the repair?	-	Go to Step 16	-
14	Replace the cruise control switch. Refer to <u>Multifunction, Turn Signal Switch Replacement</u> . Did you complete the replacement?	-	Go to Step 16	-
15	Replace the BCM. Refer to <u>Control Module References</u> for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 16	-
16	Operate the vehicle within the conditions for cruise control operation. Does the cruise control system operate properly?	-	System OK	Go to Step 2

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 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 control switches
- The engine control module (ECM)
- The throttle actuator control (TAC) motor
- The vehicle speed sensor (VSS)

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:

- The on/off switch
- The + RES switch
- The - SET switch

The body control module (BCM) monitors the signal circuit of the cruise control switches. The BCM relays the cruise control switch status to the engine control module (ECM) via the GMLAN 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. The ECM uses the TAC motor in order to maintain the vehicle speed. For further information on the TAC System, refer to **Throttle Actuator Control (TAC) System Description** for the 3.5L engine, to **Throttle Actuator Control (TAC) System Description** for the 3.9L engine, or to **Throttle Actuator Control (TAC) System Description** for the 5.3L engine.

Voltage is supplied to the cruise control switch from the steering wheel control switch reference voltage circuit supplied by the BCM. The cruise control 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. When the normally open cruise control On/Off switch is turned ON, the switch closes and the BCM supplies a ground to the cruise control switch ON indicator circuit as it becomes illuminated. The BCM sends a GMLAN 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 - SET switch and the + RES switch signal circuit. The BCM sends a GMLAN serial data message to the ECM indicating that the + RES switch or the - SET switch is active. To engage the Cruise Control System, ensure that the vehicle speed is above 40.2 km/h (25 mph), and then turn the 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 GMLAN serial data message to the driver information center (DIC) in order to illuminate the CRUISE SET TO ### message. The ECM sends a GMLAN serial data message to the instrument panel cluster (IPC) in order to illuminate the Cruise Engaged indicator in the IPC. The - SET switch and the + RES switch will remain inactive when the BCM has not received the predetermined voltage signal from the On/Off switch. Pressing the accelerator pedal, while the Cruise Control System is engaged, will allow 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. 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. 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, momentarily pressing - SET switch will allow the vehicle to decelerate at 1.6 km/h (1 mph) increments for each time that the - SET switch is momentarily pressed, with a minimum vehicle speed of 37 km/h (23 mph). 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, 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, with the maximum acceleration total of 16 km/h (10 mph) over the current set vehicle speed. Momentarily activating the + RES switch will recall the previous vehicle speed, after the Cruise Control System is disengaged by pressing the brake pedal or by activating the 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 cruise control On/Off switch
- The cruise control cancel switch

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 BCM sends a GMLAN serial data message to the ECM in order to disengage the cruise control system.

The BPP sensor is mounted on the brake pedal bracket. Pressing the brake pedal while the cruise control is engaged will disengage the Cruise Control system. The BCM monitors the BPP sensor signal circuit as the voltage signal increases, while the pedal reaches the fully

applied position. The BCM sends a GMLAN serial data message to the ECM indicating the position of the brake pedal. For more information on the BPP sensor, refer to **Exterior Lighting Systems Description and Operation** and to **Brake Pedal Position Sensor Calibration**.

The Cruise Control System will also disengage when one of the following conditions exist:

- The cruise control On/Off switch is switched OFF.
- The ECM detects that a drive override function has been active for approximately 60 seconds.

When the Cruise Control System has been disengaged, the ECM sends a GMLAN serial data message to the instrument panel cluster (IPC) in order to turn OFF the Cruise Engaged indicator, and to the drive information center (DIC) in order to turn OFF the CRUISE SET TO ### message. The vehicle speed stored in the memory of the ECM will be erased when the cruise control On/Off button is turned OFF, or the ignition switch is turned OFF.

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).
- A Cruise Control System DTC has been set.
- The vehicle speed is less than 40.2 km/h (25 mph).
- The vehicle is in PARK, REVERSE, NEUTRAL, or 1st gear.
- The engine RPM is too low.
- The engine RPM is too high.
- The vehicle speed is too high.
- The system voltage is not between 9-16 volts.
- The Antilock Brake System (ABS)/Traction Control System (TCS) is active for more than 2 seconds.