

2006 TRANSMISSION Shift Lock Control - HHR

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AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL SCHEMATICS

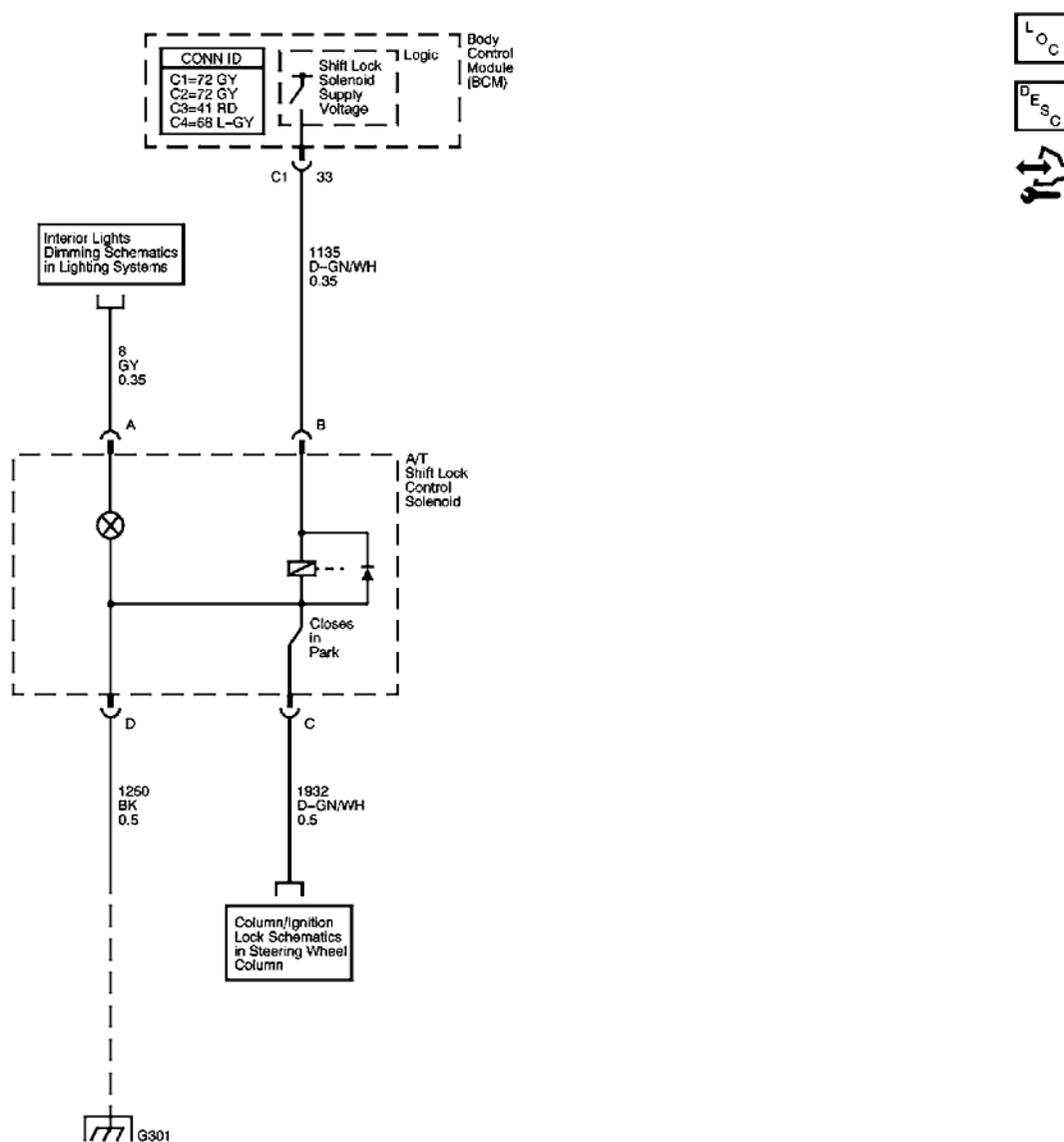


Fig. 1: A/T Shift Lock Control Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL COMPONENT VIEWS

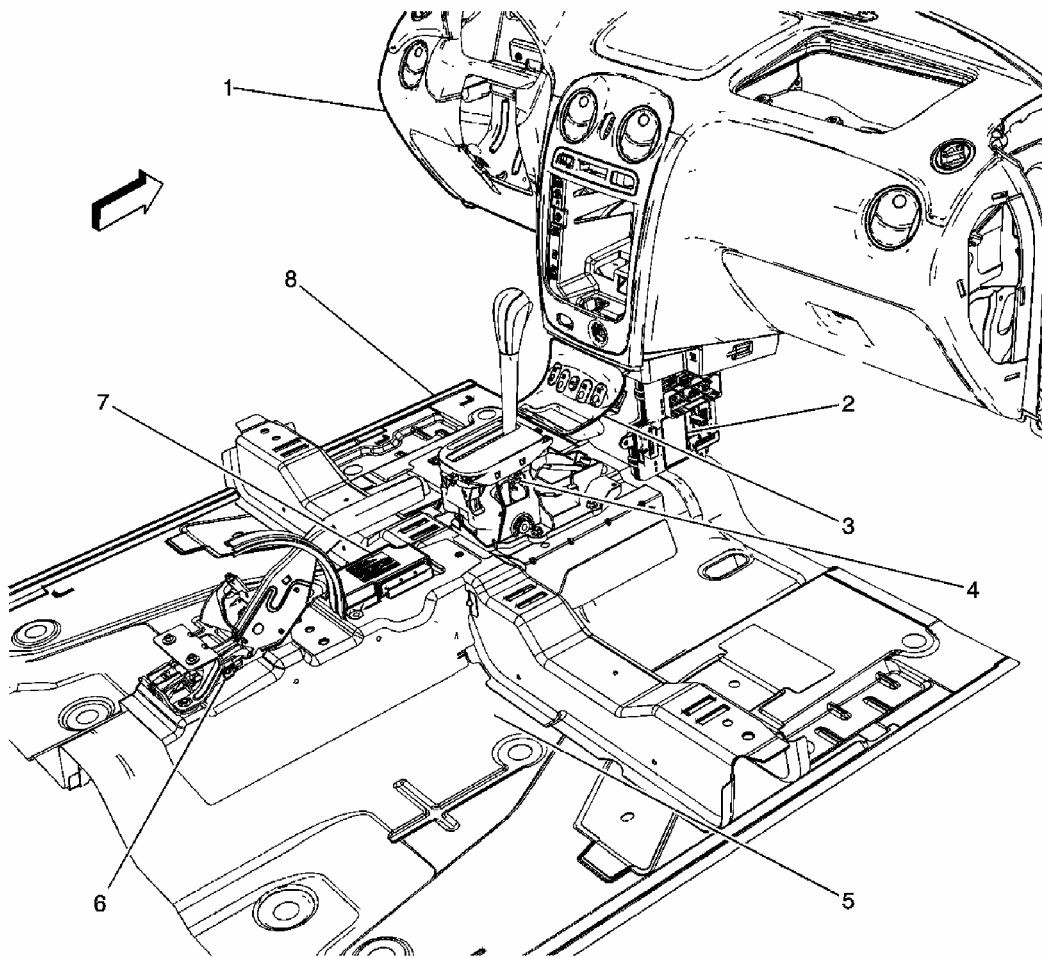


Fig. 2: Center Console Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	I/P Trim
2	Body Control Module (BCM)
3	Master Window Switch
4	A/T Shift Lock Control Solenoid (MN5)
5	Floor Panel
6	Park Brake Switch
7	Inflatable Restraint Sensing and Diagnostic Module (SDM)
8	Floor Panel

AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL CONNECTOR END VIEWS

A/T Shift Lock Control Solenoid

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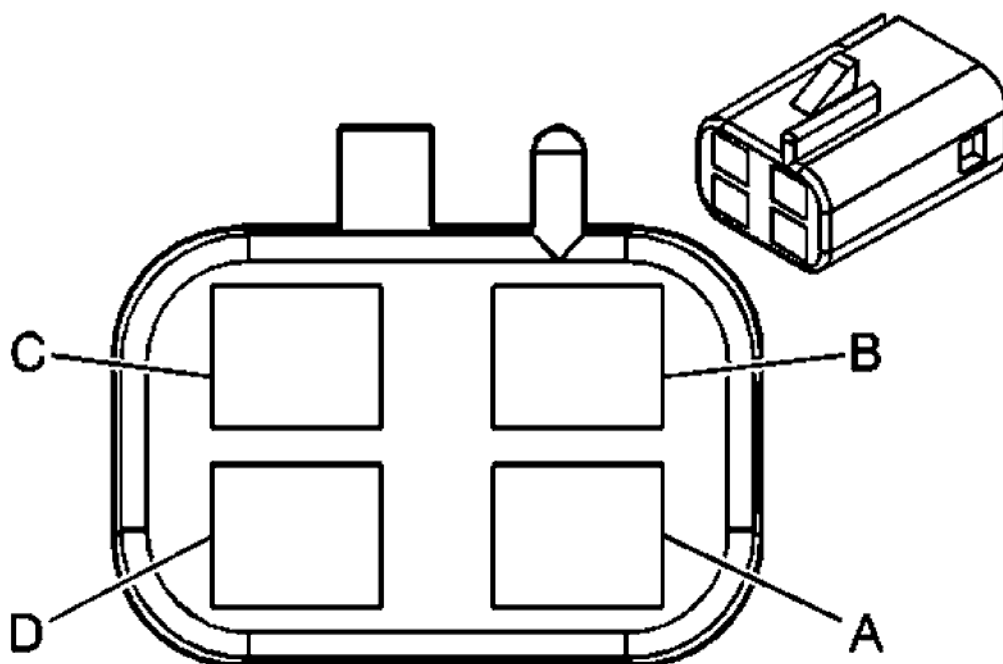


Fig. 3: Seat Connectors End Views
Courtesy of GENERAL MOTORS CORP.

Automatic Transmission Shift Lock Control Connector End Views

Connector Part Information

- OEM: 12047785
- Service: 12102900
- Description: 4-Way F M/P 150 (BK)

Terminal Part Information

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

A/T Shift Lock Control Solenoid

Pin	Wire Color	Circuit No.	Function
A	GY	8	Instrument Panel Lamp Supply Voltage (1)

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B	D-GN/WH	1135	Brake Transmission Shift Interlock Solenoid Supply Voltage
C	D-GN/WH	1932	Shift Select Switch Park Signal
D	BK	1250	Ground

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - AUTOMATIC TRANSMISSION SHIFT LOCK 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 OUTPUT CONTROLS

Body Control Module (BCM)

Scan Tool Output Control	Additional Menu Selection(s)	Description
Brake To Shift Control	Special Functions- Output Control	Command supplies battery voltage to the A/T shift lock control circuit ON or OFF.

SCAN TOOL DATA LIST

Body Control Module (BCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON, with the Engine OFF. Transmission shift lever in the PARK position.			
Battery Voltage Signal	BCM Data, Power Mode	0-15 volts	14 volts
Shift Lock Solenoid Command	BCM Data, Chassis Data	Lock/Unlock	Lock

SCAN TOOL DATA DEFINITIONS

Body Control Module (BCM)

Battery Voltage Signal

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Display indicates battery voltage. Measured in volts.

Shift Lock Solenoid Command

Displays the status of the shift lock control solenoid. Unlock indicates the shift lock control solenoid has no voltage applied. Lock indicates the shift lock control solenoid has voltage applied.

DTC B2705

Circuit Description

The body control module (BCM) controls the automatic transmission shift lock control solenoid by providing a battery positive voltage to the solenoid. The BCM utilizes a smart driver to control the voltage supply circuit to the automatic transmission shift lock control solenoid. The smart driver monitors the voltage and current flow of the control circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2705 Gearshift Unlock Circuit

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

DTC B2705

DTC Symptom	DTC Symptom Descriptor
02	Short to Ground
05	Short to Battery or Open

Conditions for Running the DTC

- The ignition switch is in the ON position.
- The brake pedal is pressed.
- The transmission is in the PARK position.

Conditions for Setting the DTC

B2705 02

Sets if there is a short to ground in the automatic transmission shift lock control solenoid control circuit.

B2705 05

Sets if there is an open or short to voltage in the automatic transmission shift lock control solenoid control circuit.

Action Taken When the DTC Sets

- The BCM will not attempt to enable the voltage supply circuit of the automatic transmission shift lock control solenoid until the next key cycle.
- The BCM stores DTC B2705 in memory.

Conditions for Clearing the DTC

- A current DTC B2705 will clear when the malfunction is no longer present and the ignition switch is cycled.
- All BCM history codes will clear after 100 ignition cycles with no current codes active during the 100 ignition cycles.
- A scan tool may be used to clear the DTC.

Diagnostic Aids

- If the automatic transmission shift lock control circuit is shorted to ground, the automatic transmission shift lock control solenoid will be inoperative. The vehicle will shift out of PARK without pressing the brake pedal.
- Perform the tests while wiggling the wires and connectors. This may often cause an intermittent malfunction to appear. Refer to **Testing for Intermittent Conditions and Poor Connections**.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

- 2:** Listen for an audible click when the automatic transmission shift lock control solenoid operates. Command both the ON and OFF states. Repeat the commands as necessary.
- 3:** This step tests for a good ground at the ground circuit of the automatic transmission shift lock control solenoid.
- 4:** This step verifies that the BCM is providing battery voltage to the automatic transmission shift lock control solenoid.
- 5:** This step tests if battery voltage is constantly being applied to the automatic transmission shift lock control solenoid.

DTC B2705

Step	Action	Yes	No
Schematic Reference: <u>Automatic Transmission Shift Lock Control Schematics</u> Connector End View Reference: <u>Automatic Transmission Shift Lock Control</u>			

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Connector End Views

1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With a scan tool, command the brake to shift control output control ON and OFF. Does the automatic transmission shift lock control solenoid turn ON and OFF with each command?	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the automatic transmission shift lock control solenoid. 3. Connect a test lamp between the shift lock control solenoid ground circuit at the connector of the shift lock control solenoid and battery positive voltage. Does the test lamp illuminate?	Go to Step 4	Go to Step 10
4	1. Turn OFF the ignition. 2. Connect a test lamp between the shift lock solenoid control circuit and the shift lock solenoid ground circuit at the connector of the shift lock control solenoid. 3. With a scan tool, command the shift lock control solenoid ON and OFF several times. Does the test lamp turn ON and OFF with each command?	Go to Step 8	Go to Step 5
5	Does the test lamp remain illuminated?	Go to Step 6	Go to Step 7
6	Test the control circuit of the automatic transmission shift lock control solenoid for a short to battery voltage. Refer to Circuit Testing and Wiring Repairs .		

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	Did you find and correct the condition?	Go to Step 13	Go to Step 9
7	Test the control circuit of the automatic transmission shift lock control solenoid for an open or short to ground. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 9
8	Inspect for poor connections at the harness connector of the automatic transmission shift lock control solenoid. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 11
9	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 13	Go to Step 12
10	Repair the open in the automatic transmission shift lock control ground circuit. Refer to Circuit Testing and Wiring Repairs . Did you complete the repair?	Go to Step 13	-
11	Replace the automatic transmission shift lock control solenoid. Refer Floor Shift Control Replacement . Did you complete the replacement?	Go to Step 13	-
12	Replace the BCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	Go to Step 13	-
13	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

SYMPTOMS - AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL

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

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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 **Automatic Transmission Shift Lock Control Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the automatic transmission shift lock control. 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 a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Shift Lever Does Not Move with Brake Pedal Depressed**
- **Shift Lever Can Be Moved without Brake Pedal Depressed**

SHIFT LEVER DOES NOT MOVE WITH BRAKE PEDAL DEPRESSED

Shift Lever Does Not Move with Brake Pedal Depressed

Step	Action	Yes	No
Schematic Reference: Automatic Transmission Shift Lock Control Schematics Connector End View Reference: Automatic Transmission Shift Lock Control Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle
	1. Turn ON the ignition, with the engine OFF. 2. Apply the parking brake and block the wheels.	Go to Testing for	

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2	- Press and hold the brake pedal. - Attempt to move the shift lever out of the PARK position. Does the shift lever move out of the PARK position?	<u>Intermittent Conditions and Poor Connections</u>	Go to Step 3
3	- Turn OFF the ignition. - Install a scan tool. - Turn ON the ignition, with the engine OFF. - Press and release the brake pedal several times while observing the Shift Lock Solenoid Command parameter in the body control module (BCM) output data list. Does the scan tool display Unlock and Lock status?	Go to Step 4	Go to Step 6
4	- Turn OFF the ignition. - Disconnect the electrical connector of the automatic transmission shift lock control solenoid. - Turn ON the ignition, with the engine OFF. - Press and hold the brake pedal. - Attempt to move the shift lever out of the PARK position. Does the shift lever move out of the PARK position?	Go to Step 5	Go to Step 7
5	Test the control circuit of the automatic transmission shift lock control solenoid for a short to battery positive voltage. Refer to <u>Circuit Testing and Wiring Repairs</u> . Did you find and correct the condition?	Go to Step 11	Go to Step 8
6	Press and release the brake pedal several times while observing the Stoplamp Pedal Switch parameter in the engine control module (ECM) data list. Does the Scan tool display Applied and Released status of the input parameter?	Go to Step 8	Go to Stop Lamps Inoperative

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7	Inspect for poor connections at the harness connector of the automatic transmission shift lock control solenoid. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 11	Go to Step 9
8	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 11	Go to Step 10
9	Replace the automatic transmission shift lock control solenoid. Refer to Floor Shift Control Replacement . Did you complete the replacement?	Go to Step 11	-
10	Replace the BCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	Go to Step 11	-
11	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC, as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

SHIFT LEVER CAN BE MOVED WITHOUT BRAKE PEDAL DEPRESSED**Shift Lever Can Be Moved without Brake Pedal Depressed**

Step	Action	Yes	No
Schematic Reference: Automatic Transmission Shift Lock Control Schematics Connector End View Reference: Automatic Transmission Shift Lock Control Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle
	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With a scan tool, command the Brake to		

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2	Shift Control output control ON and OFF. Does the automatic transmission shift lock control solenoid turn ON and OFF with each command?	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the automatic transmission shift lock control solenoid. 3. Connect a test lamp between the shift lock control solenoid ground circuit at the connector of the shift lock control solenoid and battery positive voltage. 4. Turn ON the ignition, with the engine OFF. Does the test lamp illuminate?	Go to Step 4	Go to Step 10
4	1. Turn OFF the ignition. 2. Connect a test lamp between the shift lock solenoid control circuit and the shift lock solenoid ground circuit at the connector of the shift lock control solenoid. 3. With a scan tool, command the shift lock control solenoid ON and OFF several times. Does the test lamp turn ON and OFF with each command?	Go to Step 8	Go to Step 5
5	Does the test lamp remain illuminated?	Go to Step 6	Go to Step 7
6	Test the control circuit of the automatic transmission shift lock control solenoid for a short to battery voltage. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 9
7	Test the control circuit of the automatic transmission shift lock control solenoid for an open or short to ground. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 9
	Inspect for poor connections at the harness		

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8	connector of the automatic transmission shift lock control solenoid. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 11
9	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 13	Go to Step 12
10	Repair the open in the automatic transmission shift lock control ground circuit. Refer to Circuit Testing and Wiring Repairs . Did you complete the repair?	Go to Step 13	-
11	Replace the automatic transmission shift lock control solenoid. Refer Floor Shift Control Replacement . Did you complete the replacement?	Go to Step 13	-
12	Replace the BCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	Go to Step 13	-
13	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

DESCRIPTION AND OPERATION**AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL DESCRIPTION AND OPERATION**

The automatic transmission shift lock control system is a safety device that prevents an inadvertent shift out of PARK when the engine is running. The driver must press the brake pedal before moving the shift lever out of the PARK position. The system consists of the following components:

- The automatic transmission shift lock control solenoid
- The body control module (BCM)
- The engine control module (ECM)

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The BCM controls the voltage to the shift lock control solenoid through the shift lock control solenoid controlled voltage circuit. The following conditions must be met before the BCM will supply voltage to the shift lock control solenoid:

- The ignition is in the ON position
- The ECM sends an input via GMLAN serial data to the BCM when the transmission control module (TCM) indicates the transmission is in the PARK position
- The BCM receives a brake applied input from the brake light switch

Since the shift lock control solenoid is permanently grounded, the BCM supplies voltage to the automatic transmission shift lock control solenoid, releasing the mechanical lock on the shift lever as the solenoid energizes. The energized solenoid allows the driver to move the shift lever out of the PARK position. When the brake pedal is not applied, the BCM turns the control voltage output of the shift lock control solenoid OFF, de-energizing the shift lock control solenoid. When the transmission is in the PARK position, the de-energized shift lock control solenoid will prevent shifting as the lever is mechanically locked in the PARK position. During remote start operation the BCM will de-energize the automatic transmission shift lock control circuit, locking the shift lever in the PARK position.