2007 TRANSMISSION

Shift Lock Control - Outlook

SCHEMATIC AND ROUTING DIAGRAMS

SHIFT LOCK CONTROL SCHEMATICS

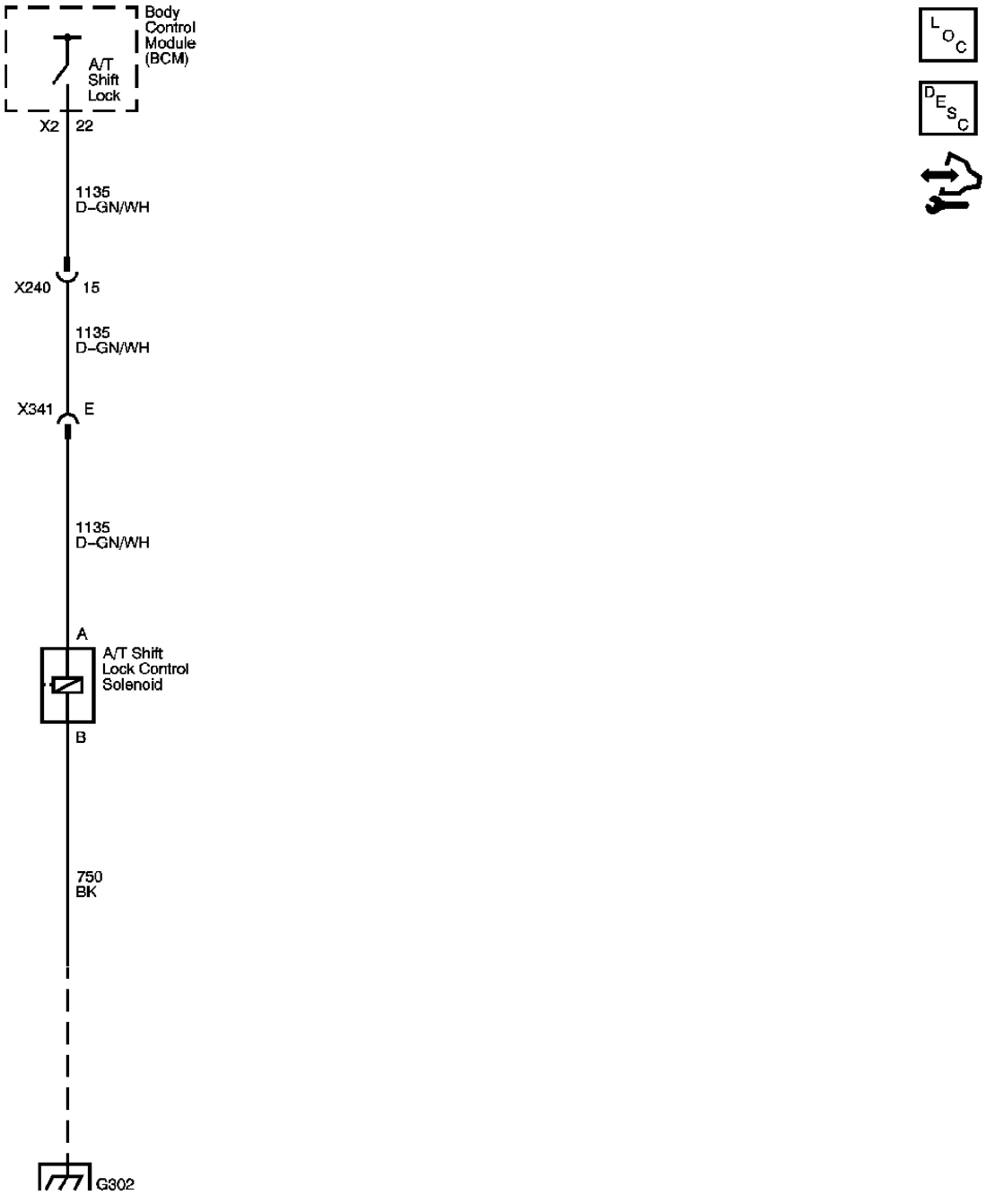

Fig. 1: Shift Lock Control - Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

SHIFT LOCK CONTROL COMPONENT VIEWS

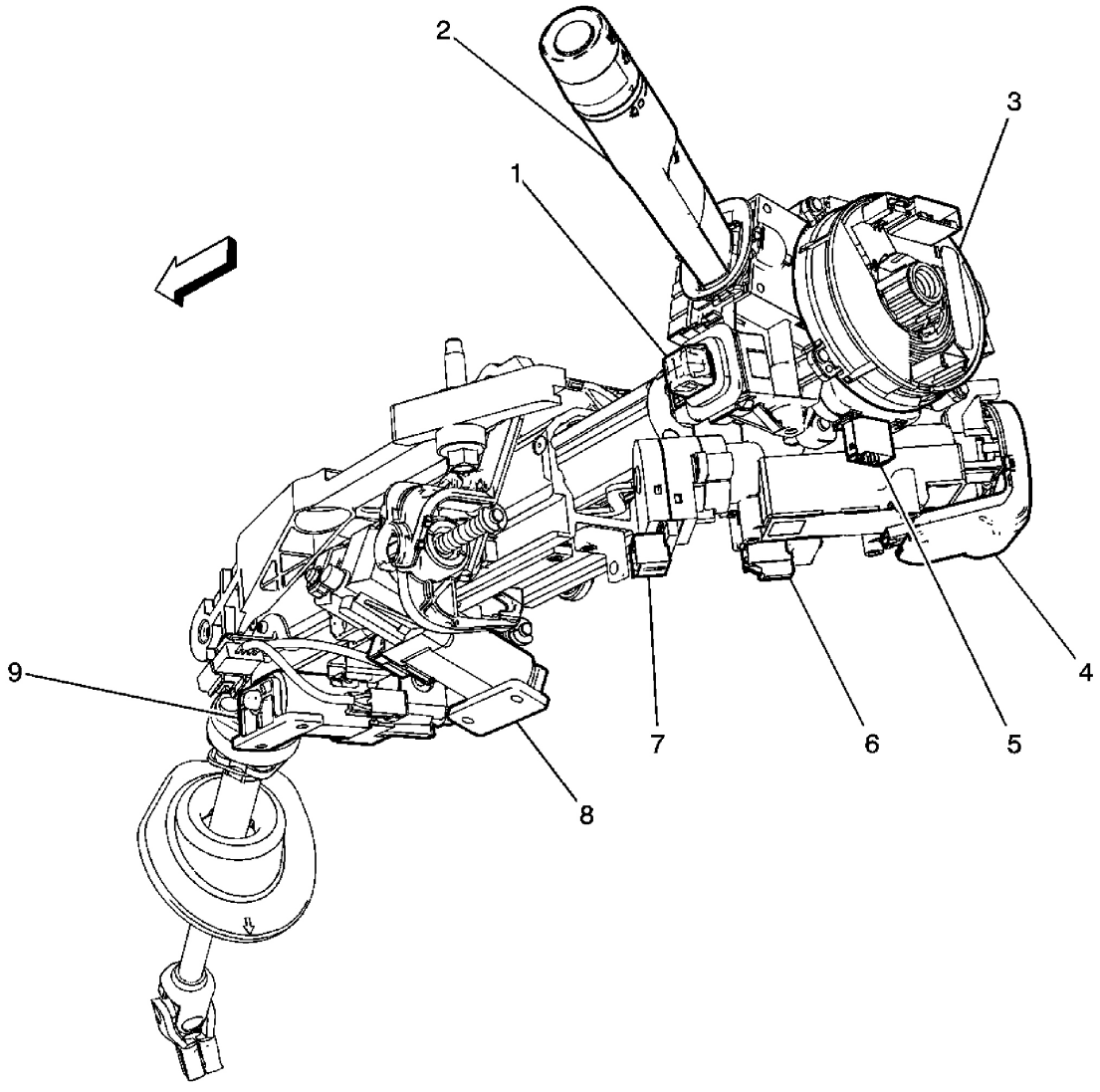

Fig. 2: Identifying Steering Column Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Tilt/Telescope Switch (N38)
2	Turn Signal/Multifunction Switch
3	Inflatable Restraint Steering Wheel Module Coil
4	Theft Deterrent Control Module
5	Steering Wheel Speed Position Sensor
6	Ignition Lock Cylinder Control Actuator

7	Ignition Switch
8	Tilt Motor
9	Telescope Actuator

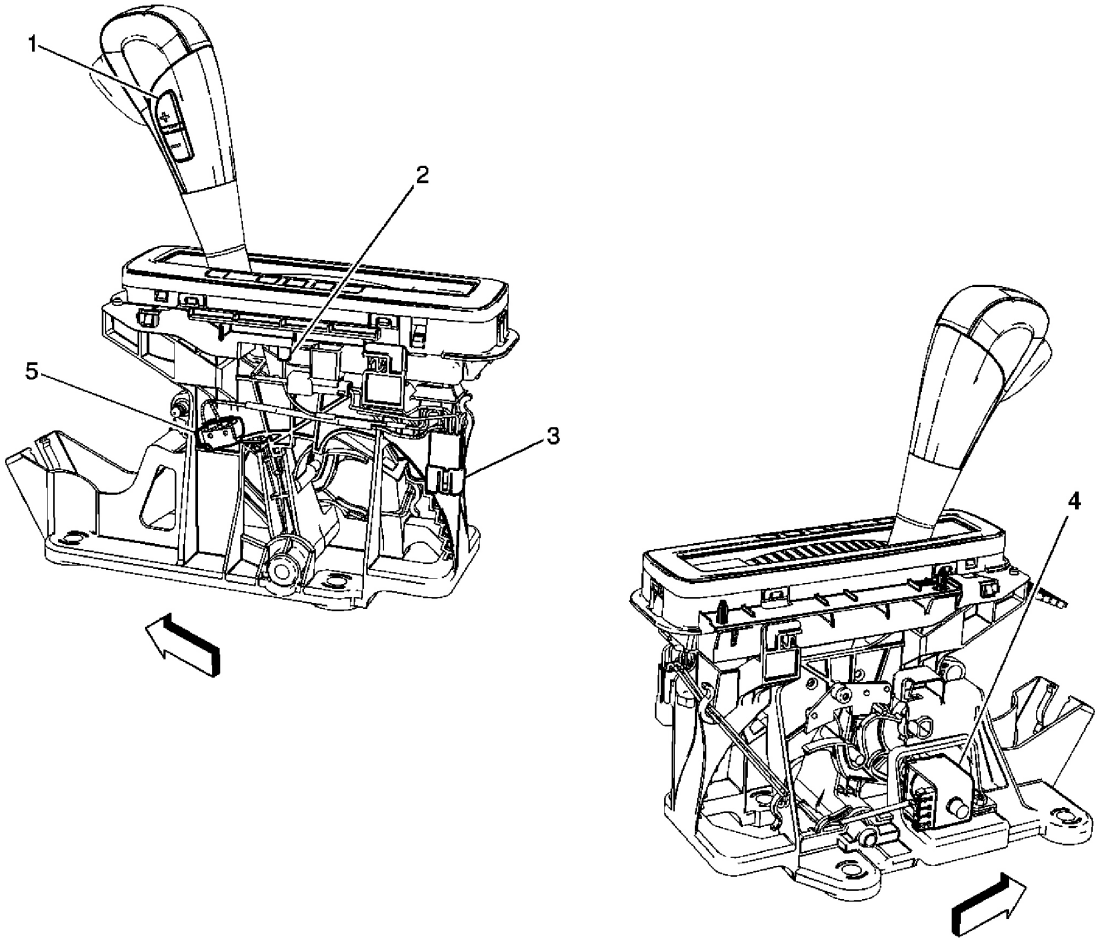

Fig. 3: Identifying Shifter Assembly
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Driver Shift Request Switch
2	PRNDL Lamp
3	X341
4	A/T Shift Lock Control Solenoid
5	Shift Lever Switch

SHIFT LOCK CONTROL CONNECTOR END VIEWS

A/T Shift Lock Control Solenoid

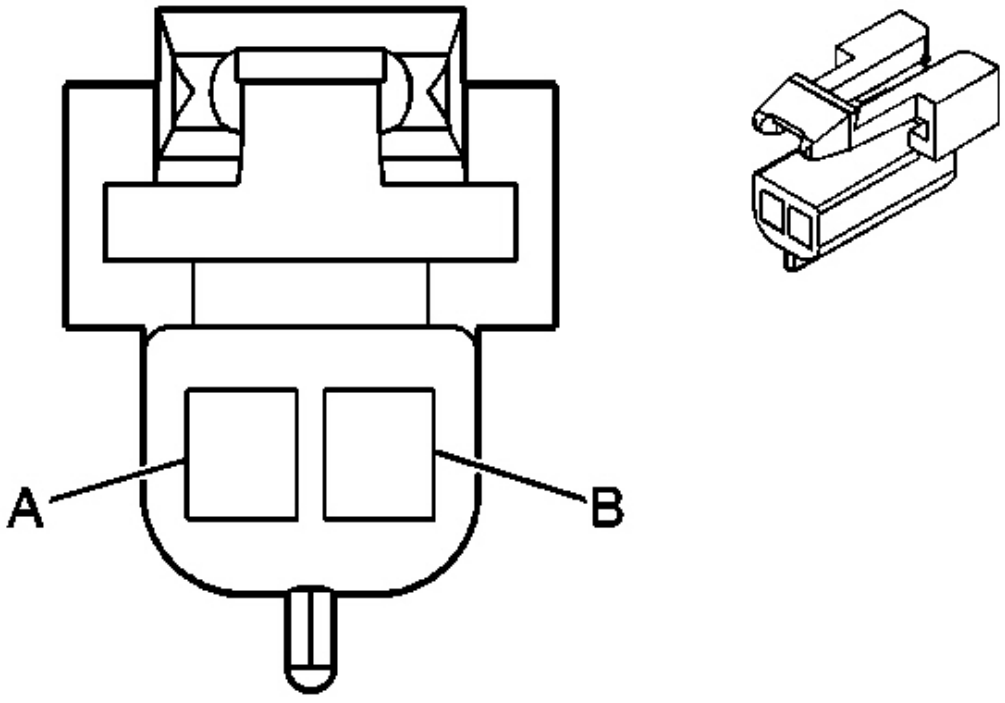

Fig. 4: A/T Shift Lock Control Solenoid Connector End View
Courtesy of GENERAL MOTORS CORP.

Shift Lock Control Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit

- Release Tool/Test Probe: See Terminal Repair Kit

A/T Shift Lock Control Solenoid Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.35 D-GN/WH	1135	A/T Shift Lock Control
B	0.35 BK	750	Ground

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** . 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

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection(s)	Description
Shift Lock Solenoid	Special Functions-Output Control/Miscellaneous Test	The BCM controls the voltage to the automatic transmission shift lock control solenoid ON or OFF for 5 seconds.

SCAN TOOL DATA LIST

Body Control Module

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.			
Shift Lock Solenoid Command	Data/Outputs	ON/OFF	ON

Brake Applied Output Signal	Data/Outputs	ON/OFF	OFF
Shifter Unlock Command	Data/Outputs	ON/OFF	OFF

Engine Control Module (ECM)

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.			
Ignition Voltage	Transmission Data	Volts	0-25v
IMS A/B/C/P	Transmission Data	Park, Park/Reverse, Reverse, Reverse/Neutral, Neutral, Neutral/Drive 4, Drive 4, Drive 4/Drive 3, Drive 3, Drive 3/Drive 2, Drive 2, Drive 2/Drive 1, Drive 1, Invalid, Open	Park
TCC Brake Switch	Transmission Data	ON/OFF	OFF

SCAN TOOL DATA DEFINITIONS

Body Control Module (BCM)

Battery Voltage

Display indicates battery voltage. Measured in volts.

Brake Applied Output Signal

Displays ON/OFF status of the brake pedal switch.

Ignition 1 Signal

Display indicates ON when the ignition 1 input circuit of the module receives a battery signal from the ignition switch.

Remote Start

Display indicates the current status of the remote start request.

Shift Lock Solenoid Command

Displays indicate OFF when the brake switch is depressed.

Shifter Unlock Command

Displays indicates ON when the brake switch is depressed.

Engine Control Module (ECM)

Current Gear

Displays current gear position of the transmission.

TCC Brake Switch

Displays ON or OFF status of the TCC Brake switch.

TR Sw. A/B/C/P

Displays LOW or HI for the state of each of the 4 inputs from the IMS. LOW displayed indicates a low voltage signal (0 volts) being monitored at the ECM. HI displayed indicates a high voltage signal (B+) being monitored at the ECM.

DTC B2705

Circuit Description

The body control module (BCM) controls the shift lock solenoid by providing battery voltage to the shift lock control solenoid. The BCM utilizes a smart driver to control the voltage supplied to the shift lock 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

Conditions for Running the DTC

- The ignition switch is in the ON position.
- The brake pedal is depressed.

- The transmission the PARK position.

Conditions for Setting the DTC

The BCM output driver detects an open or short in the output control circuit.

Action Taken When the DTC Sets

The BCM disables the output control until the next ignition cycle.

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.

Diagnostic Aids

- Use a scan tool to verify there are no brake pedal position sensor and/or transmission internal mode switch (IMS) DTCs set that could cause the BCM not to provide battery voltage to the shift lock control solenoid.
- If the automatic transmission shift lock solenoid control circuit is shorted to battery positive voltage, the shift lock solenoid will be inoperative. The vehicle will shift out of PARK without depressing the brake pedal, with Floor Shift.
- 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 shift lock solenoid operates. Command both the Active and Inactive states. Repeat the commands as necessary.

3: This step tests for battery voltage at the control circuit of the shift lock solenoid.

4: This step tests for an open or short to ground at the control circuit of the shift lock solenoid.

5: This step tests for an open at the ground circuit of the shift lock solenoid.

DTC B2705

Step	Action	Yes	No
Schematic Reference: Shift Lock Control Schematics			
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 shift lock solenoid output control ON and OFF. 4. With a scan tool, observe the shift lock solenoid command parameter in the body control module (BCM) data list. Does the shift lock solenoid command display 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 shift lock solenoid. 3. Connect a test lamp between the shift lock solenoid control circuit at the connector of the shift lock solenoid and a good ground. 4. Turn ON the ignition, with the engine OFF. 5. With a scan tool, command the shift lock solenoid output control ON and OFF several times. Does the test lamp illuminate ON and OFF with each command?	Go to **Step 5**	Go to **Step 4**
4	Test the control circuit of the shift lock 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 10**	Go to **Step 7**
5	Test the shift lock solenoid ground circuit for an open. Refer to **Circuit Testing** and **Wiring Repairs** . Did you find and correct the condition?	Go to **Step 10**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the shift lock solenoid. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** . Did you find and correct the condition?	Go to **Step 10**	Go to **Step 8**
7	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 10**	Go to **Step 9**
8	Replace the shift lock solenoid. Refer to **Automatic Transmission Shift Lock Actuator Replacement** Did you complete the replacement?	Go to **Step 10**	-
9	**IMPORTANT:** **Perform the set up procedures for the BCM.** Replace the BCM. Refer to **Control Module References** for replacement, setup and programming.Did you complete the replacement?	Go to **Step 10**	-
10	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.

1. Perform the **Diagnostic System Check - Vehicle** 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** .
- 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** .

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: Shift Lock Control Schematics			
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 shift lock solenoid 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 solenoid. 3. Connect a test lamp between the shift lock solenoid ground circuit at the connector of the shift lock 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 solenoid output control 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 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 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 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 solenoid 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 solenoid. Refer **Automatic Transmission Shift Lock Actuator Replacement** Did you complete the replacement?	Go to **Step 13**	-
12	**IMPORTANT:** **Perform the set up procedures for the BCM.** Replace the BCM. Refer to **Control Module References** for replacement, setup and programming.Did you complete the replacement?	Go to **Step 13**	-
	1. Use the scan tool in order to clear the DTCs.		

13	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: Shift Lock Control Schematics			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to **Step 2**	Go to **Diagnostic System Check - Vehicle**
2	1. Turn ON the ignition, with the engine OFF. 2. Apply the parking brake and block the wheels. 3. Press and hold the brake pedal. 4. Attempt to move the shift lever out of the PARK position. Does the shift lever move out of the PARK position?	Go to **Testing for Intermittent Conditions and Poor Connections**	Go to **Step 3**
3	1. Turn OFF the ignition. 2. Install a scan tool. 3. Turn ON the ignition, with the engine OFF. 4. Press and release the brake pedal several times while observing the shift lock solenoid command parameter in the body control module (BCM) data list. Does the scan tool display ON and OFF ?	Go to **Step 4**	Go to **Step 6**
	1. Turn OFF the ignition.		

4	2. Disconnect the electrical connector of the automatic transmission shift lock solenoid. 3. Turn ON the ignition, with the engine OFF. 4. Press and hold the brake pedal. 5. 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 solenoid for a short to battery positive voltage. Refer to **Circuit Testing** and **Wiring Repairs** . 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 brake applied output parameter in the body control module (BCM) output data list. Does the Scan tool display ON and OFF?	Go to **Step 8**	Go to **Stop Lamps Inoperative**
7	Inspect for poor connections at the harness connector of the automatic transmission shift lock 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 solenoid. Refer **Automatic Transmission Shift Lock Actuator Replacement**		-

	Did you complete the replacement?	Go to **Step 11**	
10	**IMPORTANT:** **Perform the set up procedures for the BCM.** 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

REPAIR INSTRUCTIONS

AUTOMATIC TRANSMISSION SHIFT LOCK ACTUATOR REPLACEMENT

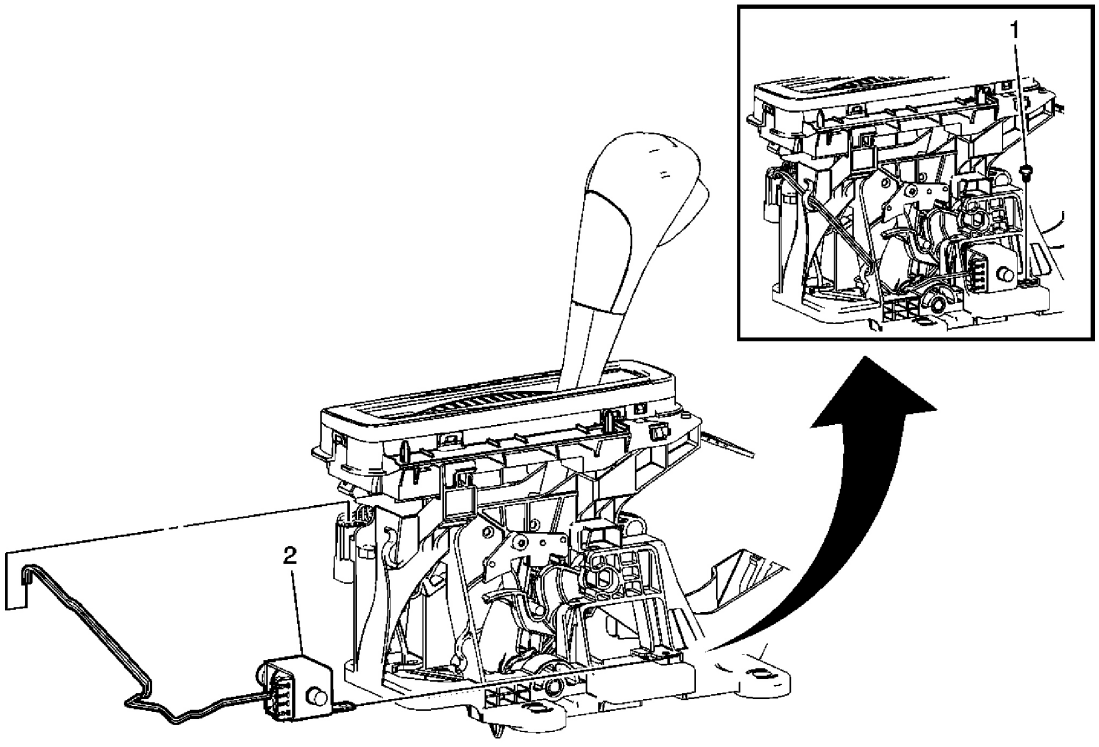

Fig. 5: View Of Automatic Transmission Shift Lock Actuator Components
Courtesy of GENERAL MOTORS CORP.

Automatic Transmission Shift Lock Actuator Replacement

Callout	Component Name
Preliminary Procedures: Remove the automatic transmission control. Refer to **Automatic Transmission Control Replacement** .	
1	Shift Lock Actuator Screw **NOTE:** **Refer to Fastener Notice .** **Tighten:** 4 N.m (35 lb in)
2	Shift Lock Actuator **Procedure:** Shift lock actuator wires must be de-pinned from the electrical connector.

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 solenoid (serviced as the automatic transmission shift lock actuator), as well as the body control module (BCM) and the engine control module (ECM). The shift lock solenoid is located within the floor shift control assembly with vehicles equipped with floor shift.
- The body control module (BCM) controls the voltage supply circuit of the shift lock control solenoid. The following conditions must be before the BCM will supply voltage to the shift lock control solenoid.

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 solenoid:

- The ignition is in the ON position.

- The engine control module (ECM) sends an input via GMLAN serial data to the BCM indicating the transmission is in the PARK position.
- The BCM determines the brake pedal is applied according the brake pedal position.

Since the shift lock control solenoid is permanently grounded, the BCM supplies voltage to the automatic transmission shift lock control solenoid, mechanically unlocking the shift lever allowing the driver to move the shift lever out of the PARK position as the solenoid energizes. 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. The de-energized solenoid mechanically locks the shift lever in the PARK position.

During remote start operation, the BCM will de-energize the shift lock control circuit, locking the shift lever in the PARK position.