

2006 TRANSMISSION

Shift Lock Control - Equinox & Torrent

SCHEMATIC AND ROUTING DIAGRAMS

AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL SCHEMATICS

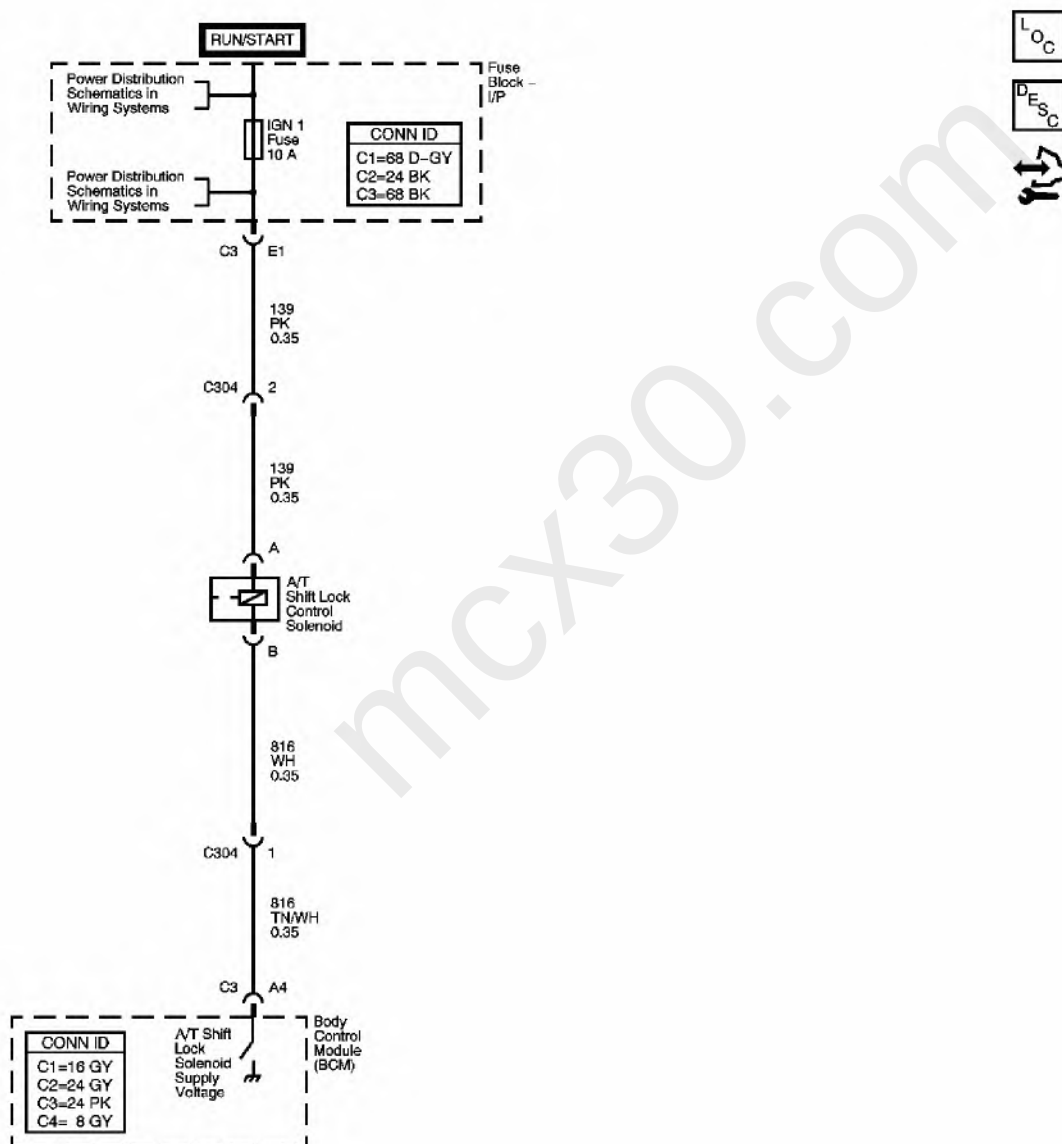


Fig. 1: Automatic Transmission Shift Lock Control Schematics
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL COMPONENT VIEWS

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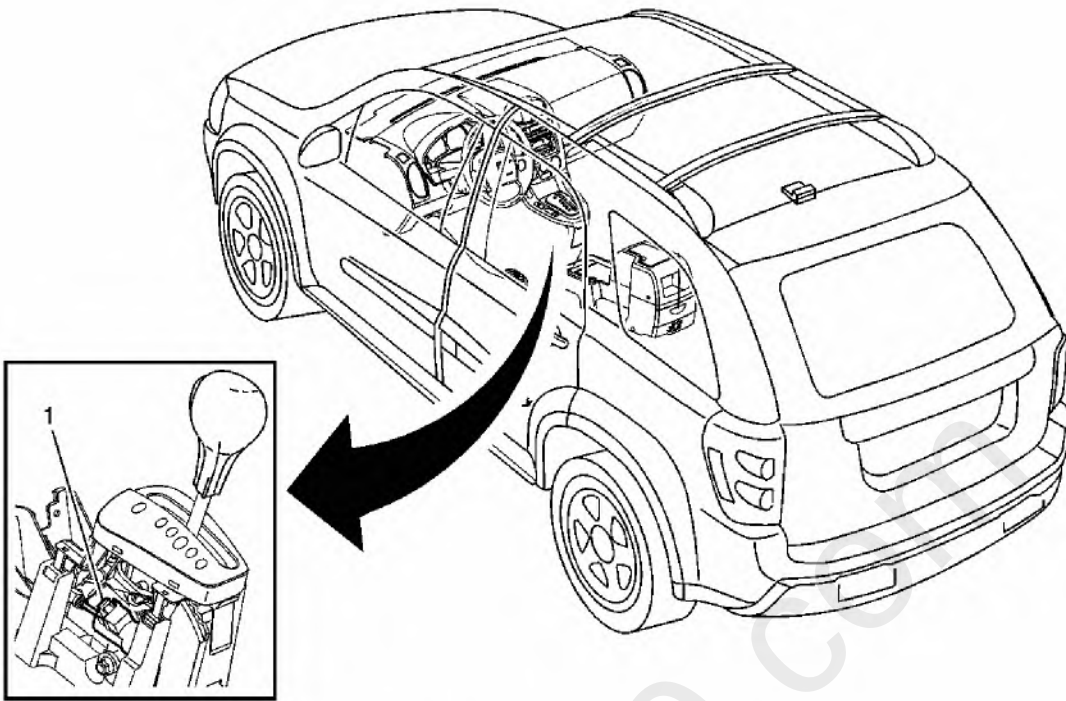


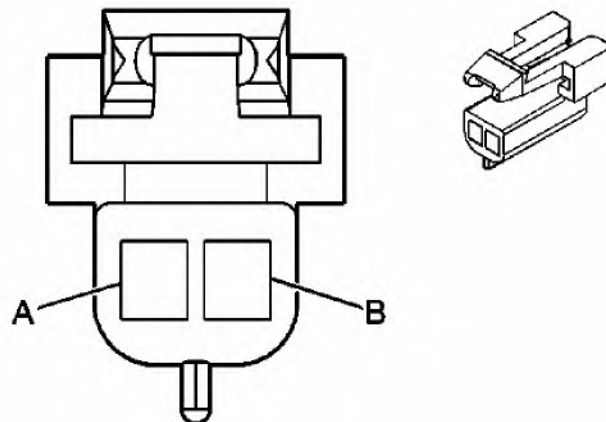
Fig. 2: A/T Shift Lock Controls Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	A/T Shift Lock Control Solenoid

AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL CONNECTOR END VIEWS

A/T Shift Lock Solenoid



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Connector Part Information		• OEM: 12052832 • Service: 12101825 • 2-Way F Metri-Pack 150 Series (BK)	
Pin	Wire Color	Circuit No.	Function
A	PK	139	Ignition 1 Voltage
B	WH	816	A/T Shift Lock Solenoid Supply Voltage

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B2707	Gearshift Unlock Circuit Low
DTC B2708	Gearshift Unlock Circuit High

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 Relay	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			Typical Data
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Parameter	Data List	Units Displayed	Value
Operating Conditions: Ignition ON, with the engine OFF. Transmission shift lever in the PARK position.			
Battery 1	BCM, Switch Inputs	Volts	12 Volts
TR Sw.	BCM, Switch Inputs	Reverse, Intermediate, Drive, Park, Neutral, Low	Park
Shifter Unlock Fdbk	BCM, Accessory	Low/High	Low

Powertrain Control Module (PCM)

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.			
Brake Switch	Transmission Data	Released/Applied	Released

SCAN TOOL DATA DEFINITIONS**Body Control Module (BCM)****Battery 1**

The scan tool displays 0 - 20 volts. The scan tool displays the voltage as received on the battery positive voltage circuit of the body control module (BCM).

TR Sw.

The scan tool displays Reverse, Intermediate, Drive, Park, Neutral and Low. The scan tool displays the position of the transaxle switch.

Shifter Unlock Fdbk

The scan tool displays Low/High. The scan tool displays Low when the mechanical lock is engaged preventing an inadvertent shift out of the PARK position. The scan tool displays High when the BCM opens the controlled ground circuit of the shift lock control solenoid.

Powertrain Control Module (PCM)**Brake Switch**

The scan tool displays Released/Applied. The scan tool displays the status of the brake

switch.

DTC B2707**Circuit Description**

The body control module (BCM) controls the automatic transmission shift lock control solenoid by providing a controlled ground to the automatic transmission shift lock control solenoid. The BCM utilizes a smart driver to monitor the voltage and current flow of the automatic transmission shift lock control solenoid control circuit. DTC B2707 will set when the BCM detects a short to ground when the solenoid is in the OFF state.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2707 Gearshift Unlock Circuit Low

Conditions for Running the DTC

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

Conditions for Setting the DTC

The BCM detects the shift lock control solenoid control circuit is grounded for a minimum of 1 second.

Action Taken When the DTC Sets

The BCM disables shift lock control solenoid operation until the next key cycle.

Conditions for Clearing the DTC

- A current DTC B2707 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

- If the A/T shift lock control circuit is shorted to ground, the automatic transmission shift lock control solenoid will be energized. The shift lever will not shift out of PARK position with the brake pedal depressed.
- Perform the tests while wiggling the wires and connectors. This may often cause an

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intermittent malfunction to appear. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

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.

4: Tests for ground at the control circuit of the automatic transmission shift lock control solenoid.

DTC B2707

Step	Action	Yes	No
Schematic Reference: <u>Body Control System Schematics</u> in Computer/Integrating Systems Connector End View Reference: <u>Computer/Integrating Systems Connector End Views</u> in Computer/Integrating Systems			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
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 Relay output control parameter 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 in Wiring Systems	Go to Step 3
3	1. Turn OFF the ignition. 2. Connect a test lamp between the automatic transmission shift lock control solenoid voltage supply circuit at the connector of the automatic transmission shift lock control solenoid connector and a good ground.		

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	3. Turn ON the ignition, with the engine OFF. Does the test lamp illuminate?	Go to Step 4	Go to Step 8
4	1. Turn OFF the ignition. 2. Disconnect the automatic transmission shift lock control solenoid. 3. Connect a test lamp between the shift lock solenoid control circuit at the connector of the automatic transmission shift lock solenoid and battery positive voltage. 4. Turn ON the ignition, with the engine OFF. 5. With a scan tool, command the Brake to Shift Relay output control parameter ON and OFF several times. Does the test lamp illuminate ON and OFF with each command?	Go to Step 6	Go to Step 5
5	Test the control circuit of the automatic transmission shift lock control solenoid for an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 11	Go to Step 7
6	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 in Wiring Systems. Did you find and correct the condition?	Go to Step 11	Go to Step 9
7	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 in Wiring Systems. Did you find and correct the condition?	Go to Step 11	Go to Step 10
8	Repair the open or short to ground in the automatic transmission shift lock control solenoid voltage supply circuit. Refer to Circuit Testing and Wiring Repairs in		

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	Wiring Systems. Did you complete the repair?	Go to Step 11	-
9	Replace the automatic transmission shift lock control solenoid. Refer to Shift Lock Solenoid/Switch Assembly Replacement . Did you complete the replacement?	Go to Step 11	-
10	IMPORTANT: Perform the setup procedure for the BCM. Replace the BCM. Refer to Control Module References in Computer/Integrating Systems 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

DTC B2708**Circuit Description**

The body control module (BCM) controls the automatic transmission shift lock control solenoid by providing a controlled ground to the automatic transmission shift lock control solenoid. The BCM utilizes a smart driver to monitor the voltage and current flow of the automatic transmission shift lock control solenoid control circuit. DTC B2708 will set when the BCM detects a short to voltage when the automatic transmission shift lock control solenoid is active.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2708 Gearshift Unlock Circuit High

Conditions for Running the DTC

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

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Conditions for Setting the DTC

The BCM detects a short to voltage at the control circuit driver of the automatic transmission shift lock control solenoid for a minimum of 1 second.

Action Taken When the DTC Sets

- The BCM disables shift lock control solenoid operation until the next key cycle.
- The security light, service light and malfunction indicator lamp (MIL) lamp are always ON with the ignition OFF.

Conditions for Clearing the DTC

- A current DTC B2708 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

- If the A/T shift lock control circuit is shorted to battery positive voltage, the automatic transmission shift lock control solenoid will be unlocked. The vehicle will shift out of PARK without depressing 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** in Wiring Systems.

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: Tests the control circuit of the automatic transmission shift lock control solenoid.

DTC B2708

Step	Action	Yes	No
Schematic Reference: <u>Body Control System Schematics</u> in Computer/Integrating Systems			
Connector End View Reference: <u>Computer/Integrating Systems Connector End Views</u> in Computer/Integrating Systems			
	Did you perform the Diagnostic System Check - Vehicle?		Go to <u>Diagnostic System Check</u> -

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1		Go to Step 2	Vehicle in Vehicle DTC Information
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 Relay output control parameter 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 in Wiring Systems	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 solenoid control circuit at the connector of the automatic transmission shift lock solenoid and battery voltage. 4. Turn ON the ignition, with the engine OFF. 5. With a scan tool, command the Brake to Shift Relay output control parameter 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 automatic transmission shift lock control solenoid for a short to battery voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 6
5	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 in Wiring Systems.		

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	Did you find and correct the condition?	Go to Step 9	Go to Step 7
6	Inspect for poor connections at the harness connector of the body control module (BCM). Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 9	Go to Step 8
7	Replace the automatic transmission shift lock control solenoid. Refer to <u>Shift Lock Solenoid/Switch Assembly Replacement</u> . Did you complete the replacement?	Go to Step 9	-
8	IMPORTANT: Perform the setup procedure for the BCM. Replace the BCM. Refer to <u>Control Module References</u> in Computer/Integrating Systems for replacement, setup and programming. Did you complete the replacement?	Go to Step 9	-
9	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: 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 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

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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: Computer/Integrating Systems Connector End Views in Computer/Integrating Systems DEFINITION: Transmission shift lever will not moved out of the PARK position with the ignition ON and the brake pedal pressed.			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Turn ON the ignition, with the engine OFF. 2. Press and hold the brake pedal. 3. 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 in Wiring Systems	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 hold the brake pedal. 5. With a scan tool, command the Brake to Shift Relay output control parameter On.		

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	6. Attempt to move the shift lever out of the PARK position. Does the shift lever move out of the PARK position?	Go to Step 4	Go to Step 6
4	1. With the scan tool, observe the Brake Switch parameter in the powertrain control module (PCM) data display list. 2. Press and release the brake pedal several times while observing the scan tool. Does the brake input display Applied and Released with the brake pedal operation?	Go to Step 5	Go to Diagnostic Starting Point - Lighting Systems in Lighting Systems
5	With the scan tool observe the TR Sw. parameter in the body control module (BCM) data list. Does the scan tool indicate PARK position?	Go to Step 9	Go to Scan Tool Data List in Engine Controls - 3.4L
6	1. Turn OFF the ignition. 2. Disconnect the harness connector of the automatic transmission shift lock control 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 7	Go to Step 8
7	Test the controlled ground circuit of the automatic transmission shift lock control solenoid for a short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 12	Go to Step 9
8	Inspect for poor connections as the harness connector of the automatic transmission shift lock control solenoid. Refer to Testing for Intermittent Conditions and Poor		

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	Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 12	Go to Step 10
9	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 12	Go to Step 11
10	Replace the automatic transmission shift lock control solenoid. Refer to Shift Lock Solenoid/Switch Assembly Replacement . Did you complete the replacement?	Go to Step 12	-
11	Replace the BCM. Refer to Control Module References in Computer/Integrating Systems for replacement, setup and programming. Did you complete the replacement?	Go to Step 12	-
12	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to Step 3

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: Computer/Integrating Systems Connector End Views in Computer/Integrating Systems DEFINITION: Transmission shift lever does not lock in the PARK position with the ignition ON and the brake pedal not depressed.			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Apply the parking brake and block the wheels. 2. Turn ON the ignition, with the engine OFF. 3. Attempt to move the shift lever out of the PARK position without pressing		Go to Testing for Intermittent

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	the brake pedal. Does the shift lever move out of the PARK position?	Go to Step 3	Conditions and Poor Connections in Wiring Systems
3	1. Turn OFF the ignition. 2. Install a scan tool. 3. Turn ON the ignition, with the engine OFF. 4. Ensure the brake pedal is not depressed. 5. With a scan tool, observe the Shifter Unlock Fdbk parameter in the body control module (BCM) data list. Does the scan tool display a LOW status for the brake to shift parameter?	Go to Step 5	Go to Step 4
4	With a scan tool, observe the Brake Switch parameter in the powertrain control module (PCM) data list. Does the scan tool display a Released status?	Go to Step 9	Go to Diagnostic Starting Point - Lighting Systems in Lighting Systems
5	1. Turn OFF the ignition. 2. Connect a test lamp between the automatic transmission shift lock control solenoid voltage supply circuit at the connector of the automatic transmission shift lock control solenoid and a good ground. 3. Turn ON the ignition, with the engine OFF. Does the test lamp illuminate?	Go to Step 6	Go to Step 10
	1. Turn OFF the ignition. 2. Connect a test lamp between the automatic transmission shift lock control solenoid voltage supply circuit and the control circuit of the automatic transmission shift lock control solenoid at the connector of the automatic transmission shift lock control		

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6	solenoid. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool, command the Brake to Shift Relay output control parameter ON and OFF. Does the test lamp turn ON and OFF with each command?	Go to Step 8	Go to Step 7
7	Test the controlled ground circuit of the automatic transmission shift lock control solenoid for an open or short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. 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 in Wiring Systems. 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 BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 13	Go to Step 12
10	Repair the open or short to ground in the automatic transmission shift lock control solenoid voltage supply circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 13	-
11	Replace the automatic transmission shift lock control solenoid. Refer to Shift Lock Solenoid/Switch Assembly Replacement. Did you complete the replacement?	Go to Step 13	-
12	IMPORTANT: Perform the setup procedure for the BCM. Replace the BCM. Refer to Control Module References in Computer/integrating		

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	Systems for replacement, setup and programming. Did you complete the replacement?	Go to Step 13	-
13	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

REPAIR INSTRUCTIONS

SHIFT LOCK SOLENOID/SWITCH ASSEMBLY REPLACEMENT

Removal Procedure

1. Remove the shift control assembly. Refer to **Shift Control Replacement** .

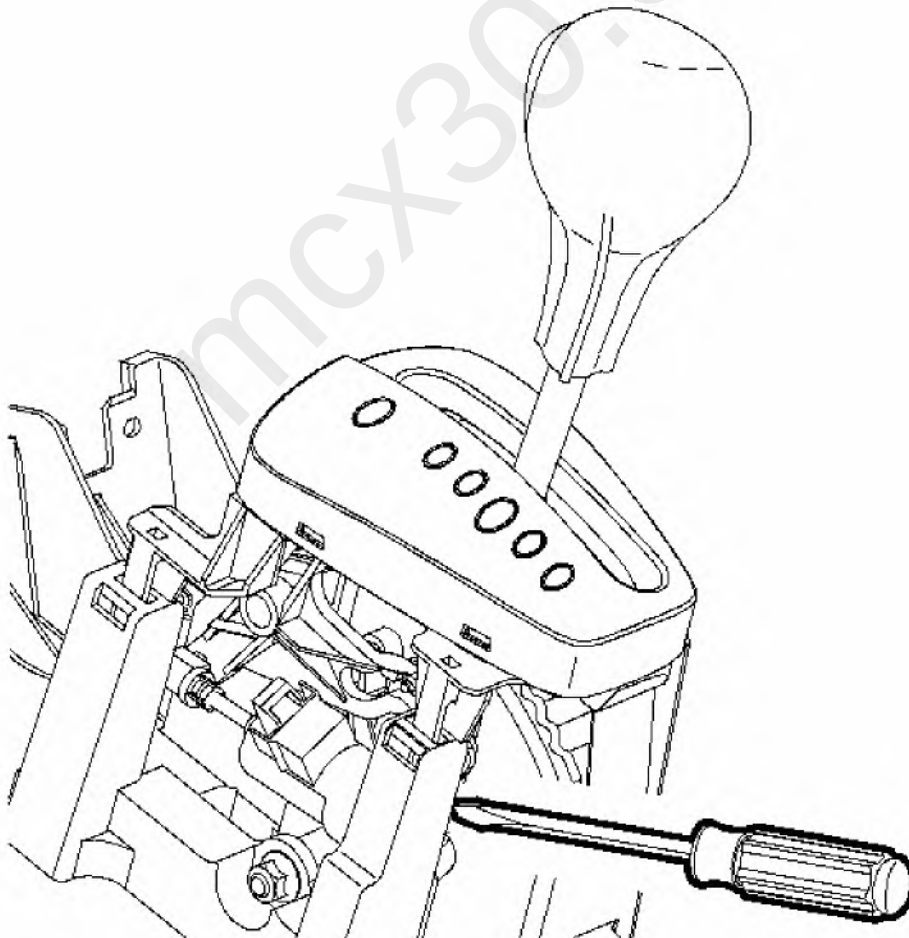


Fig. 3: Disconnecting The Plastic Retainers At Solenoid Base And Park Brake Lever Using A Screwdriver

Courtesy of GENERAL MOTORS CORP.

2. Disconnect the brake transaxle shift interlock (BTSI) solenoid harness connector.
3. Using a screwdriver, disconnect the plastic retainers at solenoid base and at the park lock lever.
4. Remove the solenoid from the shift control assembly.

Installation Procedure

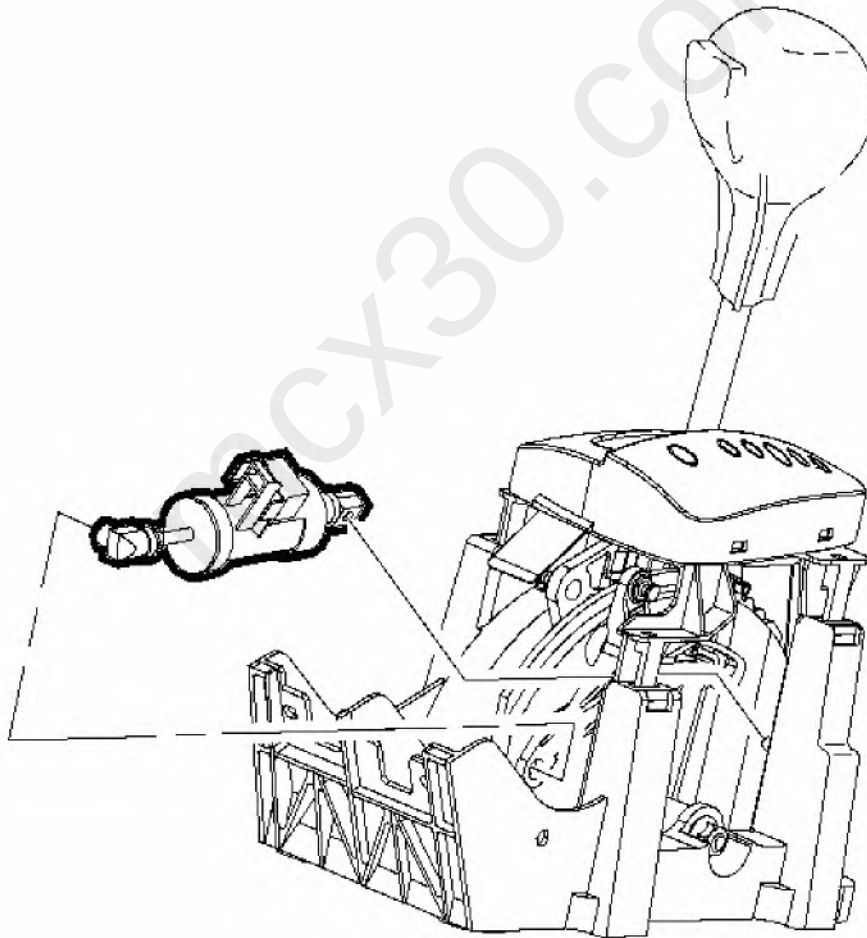


Fig. 4: Brake Transaxle Shift Interlock Solenoid

Courtesy of GENERAL MOTORS CORP.

1. Install the solenoid onto the shift control assembly. Connect the plastic retainers at the

solenoid base and at the park lock lever.

2. Connect the BTSI solenoid harness connector.
3. Install the shift control assembly. Refer to **Shift Control Replacement** .

DESCRIPTION AND OPERATION

AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL DESCRIPTION AND OPERATION

Automatic Transmission Shift Lock Control System

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 powertrain control module (PCM)

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 PCM sends a class 2 message to the BCM indicating the transmission is in the PARK position.
- The BCM determines the brake pedal is not applied according to the stop lamp switch.

When the ignition is in the ON position, the ignition 1 fuse supplies voltage to the automatic transmission shift lock control solenoid as the BCM supplies a ground to the control circuit, mechanically locking the shift lever in the PARK position as the solenoid energizes. When the brake pedal is applied, the BCM turns the ground of the control circuit OFF, de-energizing the shift lock control solenoid. The de-energized solenoid releases the mechanical lock allowing the driver to move the shift lever out of the PARK position. When the transmission is out of the PARK position, the shift lock control solenoid remains de-energized.