

2017 TRANSMISSION

Shift Lock Control - CT6

SCHEMATIC WIRING DIAGRAMS

SHIFT LOCK CONTROL WIRING SCHEMATICS

Shift Lock Control

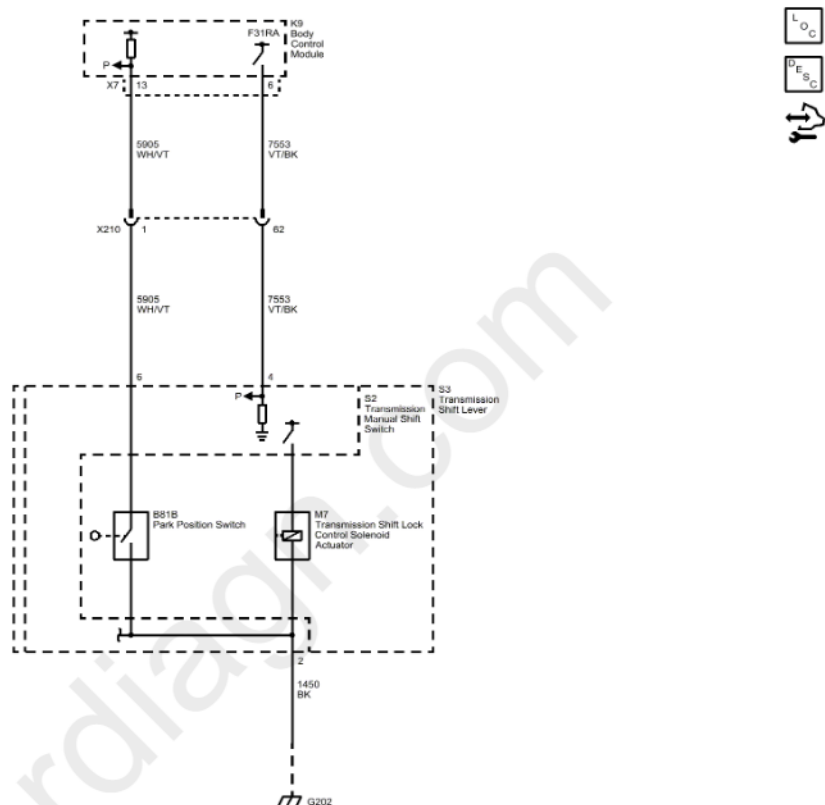


Fig. 1: Shift Lock Control

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B270A: PARK LOCK SOLENOID CONTROL CIRCUIT

Diagnostic Instructions

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

DTC Descriptor

DTC B270A

Park Lock Solenoid Control Circuit

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuse B+	1	1	-	-
Control	B270A 02, 1	1	2	-
Ground	-	1	-	-

1. Transmission shift lever will not move from PARK with the brake pedal applied.
2. Transmission shift lever will move from PARK without the brake pedal applied.

Circuit/System Description

The body control module controls the transmission shift lock control solenoid actuator by providing a battery positive voltage to the solenoid when the brake pedal is applied. The body control monitors the voltage and current flow of the control circuit.

Conditions for Running the DTC

- Ignition ON / Vehicle in Service Mode.
- Brake pedal is applied.
- Transmission is in the PARK position.
- DTC runs continuously once the above conditions are met.

Conditions for Setting the DTC

B270A 02

The body control module detects a short to ground in the transmission shift lock control solenoid actuator control circuit for 1 s.

Action Taken When the DTC Sets

The body control module will not attempt to enable the voltage supply circuit of the transmission shift lock control solenoid actuator until the next key cycle.

Conditions for Clearing the DTC

- A current DTC will clear when the malfunction is no longer present and the ignition switch is cycled.
- A history DTC will clear after 100 ignition cycles with no current DTC active during the 100 ignition cycles.

Reference Information

Schematic Reference

- [Body Control System Schematics](#)
- [Shift Lock Control Schematics](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Transmission Shift Lock Control Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)

- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition On/Vehicle in Service Mode.
2. Verify the scan tool Brake Transmission Shift Interlock Solenoid Actuator Command parameter changes from Inactive to Active when the brake pedal is applied.
 - **If the parameter does not change**
Refer to [Stop Lamps Malfunction](#)
 - **If the parameter changes**
3. Verify the S3 Transmission Shift Lever moves out of the PARK position when the brake pedal is applied.
 - **If the S3 Transmission Shift Lever does not move out of the PARK position**
Refer to Circuit/System Testing.
 - **If the S3 Transmission Shift Lever does move out of the PARK position**
All OK.

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S3 Transmission Shift Lever. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Ignition On/Vehicle in Service Mode., connect a test lamp between the control circuit terminal 4 and the ground circuit terminal 2.
4. Verify the test lamp turns On and Off when commanding the Brake Transmission Shift Interlock Solenoid Actuator Active and Inactive with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω
4. Ignition On/Vehicle in Service Mode.
5. Verify a test lamp illuminates between each B+ and ignition circuit terminal at the control module harness connector.
 - If the test lamp does not illuminate, repair the circuit or fuse as necessary.
 - If the test lamp illuminates at each B+ and ignition circuit, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module, Ignition On/Vehicle in Service Mode.
2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the S3 Transmission Shift Lever.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S3 Transmission Shift Lever.
2. Install a 3 A fused jumper wire between the control terminal 4 and 12 V. Momentarily install a jumper wire between the ground terminal 2 and ground.
3. Verify the M7 Transmission Shift Lock Control Solenoid Actuator turns on and off/clicks, etc.
 - **If the M7 Transmission Shift Lock Control Solenoid Actuator does not turn on and off/clicks, etc.**

Replace the S3 Transmission Shift Lever.

- **If the M7 Transmission Shift Lock Control Solenoid Actuator does turn on and off/clicks, etc.**

4. All OK.

Repair Instructions

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

- **Transmission Control Replacement**
- **Control Module References** for control module replacement, programming and setup.

DTC B270B: PARK LOCK SOLENOID ACTUATOR SHIFT CONTROL CIRCUIT SHORT TO GROUND

Diagnostic Instructions

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

DTC Descriptors

DTC B270B 02

Park Lock Solenoid Actuator Shift Control Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuse B+	1	1	-	-
Control	B270B 02, 1	1	2	-
Ground	-	1	-	-
1. Transmission shift lever will not move from PARK with the brake pedal applied. 2. Transmission shift lever will move from PARK without the brake pedal applied.				

Circuit/System Description

The body control module controls the automatic transmission park lock shift control solenoid by providing a battery positive voltage to the solenoid. The automatic transmission park lock shift control solenoid is only used to reduce solenoid noise from the park lock control solenoid. The body control module utilizes a smart driver to control the voltage supply circuit to the automatic transmission park lock shift control solenoid. The smart driver monitors the voltage and current flow of the control circuit. There is a mechanical override in the transmission shift lever, that can release the shifter from the "Park" position when power is not available.

Conditions for Running the DTC

- Ignition ON / Vehicle in Service Mode.
- Brake pedal is applied.
- Transmission is in the PARK position.
- DTC runs continuously once the above conditions are met.

Conditions for Setting the DTC

B270B 02

The body control module detects a short to ground in the automatic transmission park lock control solenoid control circuit for 1 s.

Action Taken When the DTC Sets

The body control module will not attempt to enable the voltage supply circuit of the automatic transmission park lock control solenoid until the next key cycle.

Conditions for Clearing the DTC

- A current DTC B270B will clear when the malfunction is no longer present and the ignition switch is cycled.
- A history DTC will clear after 100 ignition cycles with no current DTC active during the 100 ignition cycles.

Reference Information

Schematic Reference

- [Body Control System Schematics](#)
- [Shift Lock Control Schematics](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Transmission Shift Lock Control Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition On/Vehicle in Service Mode.

2. Verify the scan tool Brake Transmission Shift Interlock Solenoid Actuator Command parameter changes from Inactive to Active when the brake pedal is applied.

- **If the Brake Transmission Shift Interlock Solenoid Actuator Command does not change**

Refer to [Stop Lamps Malfunction](#)

- **If the Brake Transmission Shift Interlock Solenoid Actuator Command changes**

3. Verify the S3 Transmission Shift Lever moves out of the PARK position when the brake pedal is applied.

- **If the S3 Transmission Shift Lever does not move out of the PARK position**

Refer to Circuit/System Testing.

- **If the S3 Transmission Shift Lever does move out of the PARK position**

All OK.

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S3 Transmission Shift Lever. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the ground circuit terminal 2 and ground.

- **If 10 Ω or greater**

1. Ignition OFF.

2. Test for less than 2 Ω in the ground circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , repair the open/high resistance in the ground connection.

- **If less than 10 Ω**

3. Ignition On/Vehicle in Service Mode., connect a test lamp between the control circuit terminal 4 and the ground circuit terminal 2.

4. Verify the test lamp turns ON and OFF when commanding the Brake Transmission Shift Interlock Solenoid Actuator ON and OFF with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.

2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the control circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω

4. Ignition On/Vehicle in Service Mode.

5. Verify a test lamp illuminates between each B+ and ignition circuit terminal at the control module harness connector.

- If the test lamp does not illuminate, repair the circuit or fuse as necessary.
- If the test lamp illuminates at each B+ and ignition circuit, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module, Ignition On/Vehicle in Service Mode.

2. Test for less than 1 V between the control circuit and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K9 Body Control Module.

- If the test lamp turns ON and OFF

5. Test or replace the S3 Transmission Shift Lever.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S3 Transmission Shift Lever.
2. Install a 3A fused jumper wire between the control terminal 4 and 12 V. Momentarily install a jumper wire between the ground terminal 2 and ground.
3. Verify the M7 Transmission Shift Lock Control Solenoid Actuator turns on and off/clicks, etc.
 - **If the M7 Transmission Shift Lock Control Solenoid Actuator does not turn on and off/clicks, etc.**

Replace the S3 Transmission Shift Lever.

- **If the M7 Transmission Shift Lock Control Solenoid Actuator does turn on and off/clicks, etc.**

4. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Transmission Control Replacement](#)
- [Control Module References](#) for control module replacement, programming and setup.

SYMPTOMS - AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL

NOTE: 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 in order to diagnose the symptom:

[Transmission Control Lever Malfunction](#)

TRANSMISSION CONTROL LEVER MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuse B+	1	1	-	-
Control	B270A 02, B270B 02, 1	1	2	-
Ground	-	1	-	-
1. Transmission shift lever will not move from PARK with the brake pedal applied. 2. Transmission shift lever will move from PARK without the brake pedal applied.				

Circuit/System Description

The body control module (BCM) controls the transmission shift lock control solenoid actuator by providing a battery positive voltage to the solenoid when the brake pedal is applied. The BCM monitors the voltage and current flow of the control circuit.

Reference Information

Schematic Reference

- [Body Control System Schematics](#)
- [Shift Lock Control Schematics](#)

Connector End View Reference

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- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition On/Vehicle in Service Mode.
2. Verify the scan tool Brake Transmission Shift Interlock Solenoid Actuator Command parameter changes from Inactive to Active when the brake pedal is applied.
 - **If the Brake Transmission Shift Interlock Solenoid Actuator Command does not change**

Refer to [Stop Lamps Malfunction](#) .
 - **If the Brake Transmission Shift Interlock Solenoid Actuator Command changes**
3. Verify the S3 Transmission Shift Lever moves out of the PARK position when the brake pedal is applied.
 - **If the S3 transmission shift lever does not move out of the PARK position**

Refer to Circuit/System Testing.

- **If the S3 Transmission Shift Lever does move out of the PARK position**

All OK.

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close drivers door, disconnect the harness connector at the S3 Transmission Shift Lever. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Ignition On/Vehicle in Service Mode., connect a test lamp between the control circuit terminal 4 and the ground circuit terminal 2.
4. Verify the test lamp turns ON and OFF when commanding the Brake Transmission Shift Interlock Solenoid Actuator ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω
 4. Ignition On/Vehicle in Service Mode.
 5. Verify a test lamp illuminates between each B+ and ignition circuit terminal at the control module harness connector.
 - If the test lamp does not illuminate, repair the circuit or fuse as necessary.
 - If the test lamp illuminates at each B+ and ignition circuit, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the harness connector at the K9 body control module, Ignition On/Vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the S3 Transmission Shift Lever.

Component Testing

1. Install a 10 A fused jumper wire between the control terminal 4 and 12 V. Momentarily install a jumper wire between the ground terminal 2 and ground.
2. Verify the solenoid turns on and off/clicks, etc.
 - **If the solenoid does not turn on and off/clicks, etc.**

Replace the S3 Transmission Shift Lever.
 - **If the solenoid does turn on and off/clicks, etc.**
3. All OK.

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

- **Transmission Control Replacement**
- **Control Module References** for control module replacement, programming and setup.

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)
- The Body Control Module (BCM)
- The Engine Control Module (ECM)

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 stop lamp 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
