

TRANSMISSION

Shift Lock Control - CTS Sedan

SCHEMATIC WIRING DIAGRAMS

SHIFT LOCK CONTROL WIRING SCHEMATICS

Shift Lock Control System

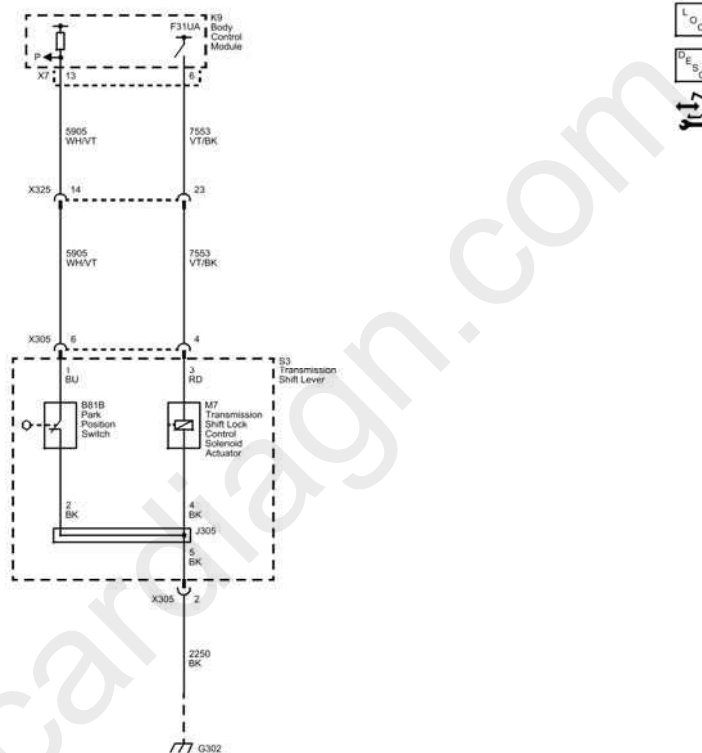


Fig. 1: Shift Lock Control System

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B270A	DTC B270A Park Lock Solenoid Control Circuit

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
F31UA (BCM 7) Fuse B+	1	1	-	-
Control	B270A 02	B270A 04	B270A 04	-
Ground	-	B270A 04	-	-
1. Transmission Control Lever Malfunction				

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

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

B270A 04

The body control module detects an open or short to voltage 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

- **Shift Lock Control Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

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.
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, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Ignition OFF, reconnect the X5 harness connector at the K9 Body Control Module.
4. 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.
5. Test for less than 10 ohms between the ground circuit terminal 2 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
6. Ignition ON, connect a test lamp between the control circuit terminal 4 and the ground circuit terminal 2.
7. 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 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms
4. Ignition ON.
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.
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 mModule.

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

8. Test or replace the S3 Transmission Shift Lever.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S3 Transmission Shift Lever.
2. Verify the M7 Transmission Shift Lock Control Solenoid Actuator activates by using a 3 A fused jumper to add B + to terminal 4, and ground to terminal 2 of the S3 Transmission Shift Lever connector.
 - **If the M7 Transmission Shift Lock Control Solenoid does not activate.**

Replace the S3 Transmission Shift Lever.

- **If the M7 Transmission Shift Lock Control Solenoid does activate.**

3. All OK

Repair Instructions

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

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

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 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
F31UA (BCM 7) Fuse B+	1	1	-	-
Control	B270A 02	B270A 04	B270A 04	-
Ground	-	B270A 04	-	-
1. Transmission Control Lever Malfunction				

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.

Reference Information

Schematic Reference

- **Shift Lock Control Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

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.
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, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 3 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Ignition OFF, reconnect the X5 harness connector at the K9 Body Control Module.
4. 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.
5. Test for less than 10 ohms between the ground circuit terminal 2 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
6. Connect a test lamp between the control circuit terminal 4 and ground.
7. 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 X7 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 ohms in the control circuit end to end.

- If 2 ohms or greater, repair the open/high resistance in the circuit.
- If less than 2 ohms, replace the K9 Body Control Module.
- **If the test lamp is always ON**
- 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
- 2. Test for less than 1 V between the control circuit terminal 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**
- 8. Test or replace the S3 Transmission Shift Lever.

Component Testing

1. Disconnect the harness connector at the S3 Transmission Shift Lever.
2. Verify the M7 Transmission Shift Lock Control Solenoid Actuator activates by using a 3 A fused jumper to add B + to terminal 4, and ground to terminal 2 of the S3 Transmission Shift Lever connector.
 - **If the M7 Transmission Shift Lock Control Solenoid Actuator does not activate.**

Replace the S3 Transmission Shift Lever.

 - **If the M7 Transmission Shift Lock Control Solenoid Actuator does activate.**
3. All OK

Repair Instructions

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

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

DESCRIPTION AND OPERATION

AUTOMATIC TRANSMISSION SHIFT LOCK CONTROL DESCRIPTION AND OPERATION

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

- The automatic transmission park lock solenoid (serviced as the automatic transmission shift lock actuator), is located within the floor shift control assembly.
- The body control module, which controls the voltage supply circuit of the park lock control solenoid.
- The engine control module.

The body control module controls the voltage to the park lock control solenoid through the park lock control

solenoid controlled voltage circuit. The following conditions must be met before the body control module will supply voltage to the park lock solenoid:

- The ignition is in the ON position.
- The engine control module sends an input via GMLAN serial data to the body control module indicating the transmission is in the PARK position.
- The body control module determines the brake pedal is applied according the brake pedal position.

Since the park lock control solenoid is permanently grounded, the body control module supplies voltage to the automatic transmission park lock control solenoid, unlocking the park lever allowing the driver to move the park lever out of the PARK position as the solenoid energizes. When the brake pedal is not applied, the body control module turns the control voltage output of the park lock control solenoid OFF, de-energizing the park lock control solenoid. The de-energized solenoid mechanically locks the park lever in the PARK position.

cardiagn.com