

2017 TRANSMISSION

Electronic Transmission Range Select - Bolt EV

SCHEMATIC WIRING DIAGRAMS

ELECTRONIC TRANSMISSION RANGE SELECTOR WIRING SCHEMATICS

Power, Ground and Serial Data

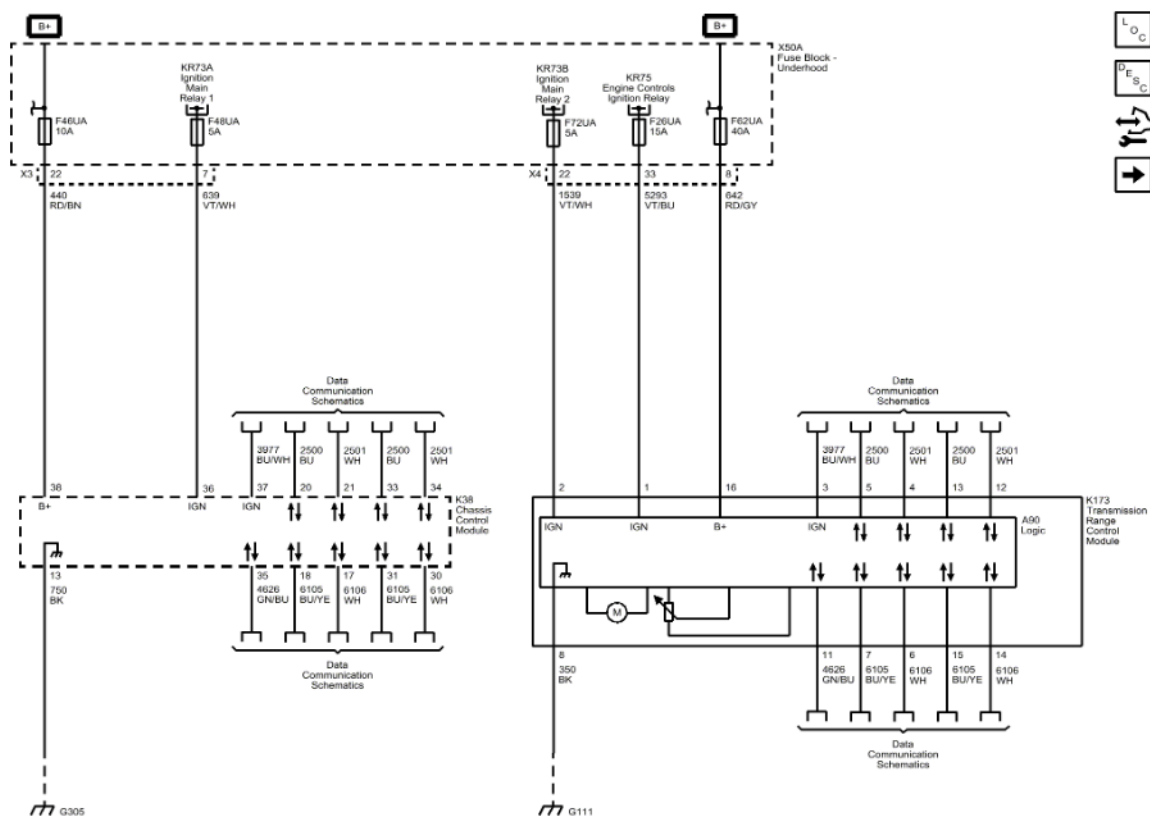


Fig. 1: Power, Ground and Serial Data

Courtesy of GENERAL MOTORS COMPANY

Electronic Shift Lever

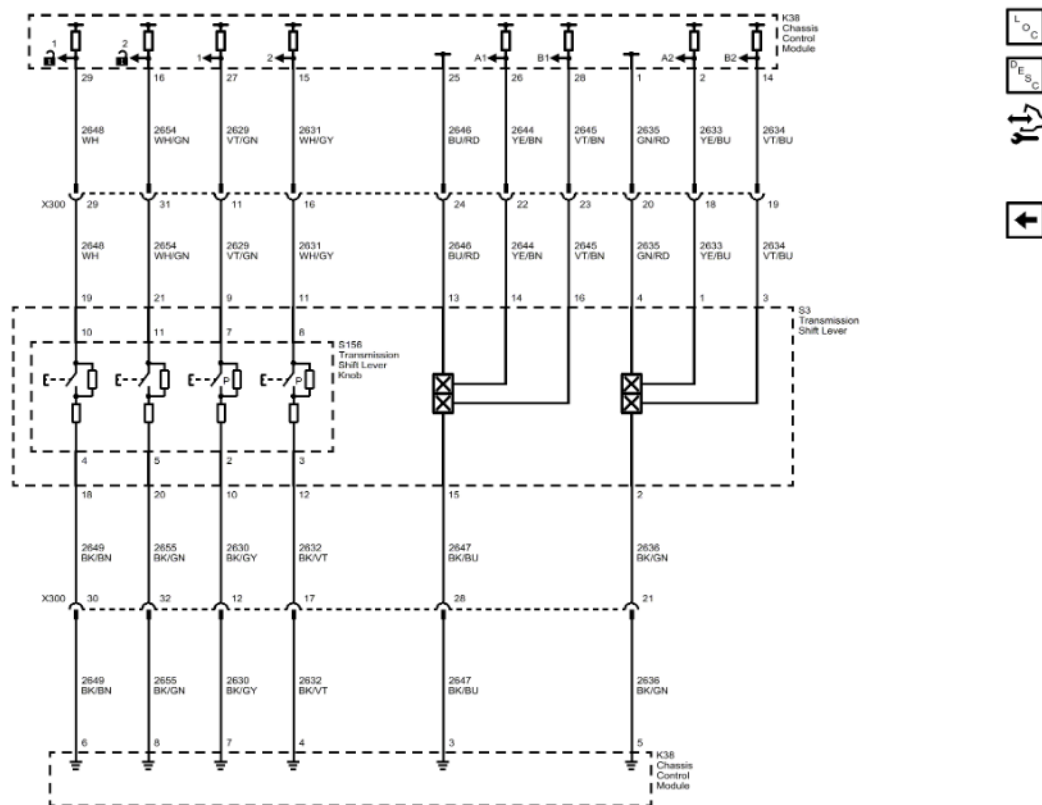


Fig. 2: Electronic Shift Lever

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B2A00: DOOR OPEN SWITCH SIGNAL - DOOR AJAR SWITCH SIGNAL NOT PLAUSIBLE/DRIVER DOOR OPEN SWITCH CIRCUIT NOT PLAUSIBLE

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B2A00 00

Door Open Switch Signal - Door Ajar Switch Signal Not Plausible

DTC B297B 5A

Driver Door Open Switch Circuit Not Plausible

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B2A00 00, B297B 5A	B2A00 00, B297B 5A	B2A00 00, B297B 5A	-
Ground	-	1	-	-
1. Ajar Indicator Inoperative				

Circuit/System Description

The keyless entry control module provides a 12 V signal to the driver door open switch signal circuit. The driver window motor or the driver window switch provides a 12 V signal to the driver door ajar switch signal circuit. The door open switch and the door ajar switch are integral to the driver door latch assembly.

The door open switch and the door ajar switch contacts will be open with the door is fully closed, the door switches within the door latch are designed so that the when the door is ajar, the contact in the door ajar switch closes, the voltage is pulled low and the driver window motor or the driver window switch will then send a serial data message to the body control module indicating that the door is ajar. When the driver door is opened further, the contact in the door open switch will then close providing a ground for the door open signal circuit, the keyless entry control module will then detect that the door is open.

Conditions for Running the DTC

Battery voltage is between 9 - 16 V.

Conditions for Setting the DTC

B2A00 00

- The chassis control module detects the driver door open switch is Active while receiving a serial data message from the body control module that the driver door ajar switch is Inactive.
- The condition must be present for greater than 30 seconds

B297B 5A

- The keyless entry control module detects the driver door open switch is Active while receiving a serial data message from the body control module that the driver door ajar switch is Inactive.
- The condition must be present for greater than 30 seconds

Action Taken When the DTC Sets

B2A00 00, B297B 5A

The driver information center will display the Service Driver Door Switch message

Conditions for Clearing the DTC

- The DTC will be current for as long as the fault is present.
- When the keyless entry control module receives a serial data message from the BCM that the door is ajar before the keyless entry control module detects the door open switch is active, then the DTC will be a history DTC.
- A history DTC will clear after 50 ignition cycles.

Reference Information

Schematic Reference

- [Door Lock/Indicator Schematics](#)
- [Remote Function Schematics](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Keyless Entry System 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 Body Control Module Driver Door Ajar Switch parameter changes between Inactive and Active when opening and closing the driver door.
 - **If the parameter does not change**
Refer to [Door Ajar Indicator Malfunction](#)
 - **If the parameter changes**
3. Verify the scan tool Keyless Entry Control Module Driver Door Ajar Switch parameter changes between Inactive and Active when opening and closing the driver door.
 - **If the parameter does not change**
Refer to Circuit/System Testing
 - **If the parameter changes**
4. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A23D Door Latch Assembly-Driver. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 3 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.
4. Test for greater than 10 V between the signal circuit terminal listed below and ground:
 - Signal circuit terminal 2 (LHD)
 - Signal circuit terminal 4 (RHD)
 - **If 10 V or less**
 1. Ignition OFF, disconnect the harness connector at the K84 Keyless Entry Control Module
 2. Test for infinite resistance between the signal 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 on the circuit.
 - If less than 2 Ω , replace the K84 Keyless Entry Control Module
 - **If greater than 10 V**
5. Test or replace the A23D Door Latch Assembly-Driver.

Component Testing

1. Ignition OFF, disconnect the harness connector at the A23D Door Latch Assembly-Driver.

2. Test for infinite resistance between the signal terminal and ground terminal listed below with the switch in the open position.
 - Signal terminal 2 and ground terminal 3 (LHD)
 - Signal terminal 4 and ground terminal 3 (RHD)
 - **If less than infinite resistance**

Replace the A23D Door Latch Assembly-Driver.
 - **If infinite resistance**
3. Test for less than 5 Ω between the signal terminal and ground terminal listed below with the switch in the closed position.
 - Signal terminal 2 and ground terminal 3 (LHD)
 - Signal terminal 4 and ground terminal 3 (RHD)
 - **If 5 Ω or greater**

Replace the A23D Door Latch Assembly-Driver.
 - **If less than 5 Ω**
4. All OK

Repair Instructions

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

- Refer to [Front Side Door Latch Replacement](#)
- Refer to [Control Module References](#) for keyless entry control module replacement, programming and setup

DTC C1280: ELECTRIC PARK BRAKE AVAILABILITY STATUS MESSAGE COUNTER INCORRECT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC C1280

Electric Park Brake Availability Status Message Counter Incorrect

Circuit/System Description

The internal fault detection is handled inside the device. No external circuit diagnosis is involved.

Conditions for Running the DTC

The device runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The device has detected an internal malfunction.

Action Taken When the DTC Sets

The device refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the device.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the device.
- If this DTC is retrieved as both a current and history DTC, replace the device that set the DTC.
- Resolve any current DTC's that are present relating to the Electronic Transmission Range Selector system prior to replacement of components or programming/setup of module. Faults in any component or module that work together in this system may cause the programming/setup failure.
- Replacement or inspection of K173 Transmission Range Control Module requires rod linkage (if equipped) to be adjusted. If rod linkage is not properly adjusted, programming and setup procedure may fail and DTCs may set. Check K173 Transmission Range Control Module rod linkage adjustment prior to replacing the K173 Transmission Range Control Module. Something as simple as loosening the K173 Transmission Range Control Module mounting bolts can cause the module to be out of adjustment.

Reference Information

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Transmission Range Selector Description

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. Check for updated software in K17 Electronic Brake Control Module.

- **If software is not current**

Perform the **programming** procedure for the K17 Electronic Brake Control Module.

- **If software is up to date**

3. Replace the K17 Electronic Brake Control Module.

4. Verify DTC C1280 is not set.

- **If DTC C1280 is set**

Replace the K38 Chassis Control Module

- **If DTC C1280 is not set**

5. All OK.

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Control Module References](#) for module replacement, programming and setup

DTC P073D, P073E, P07E4, P07E5, P1769, OR P1789: UNABLE TO ENGAGE R-D-N-P/TRANSMISSION RANGE SENSOR TRCM CORRELATION/CURRENT TRANSMISSION RANGE UNKNOWN

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P073E

Unable to Engage Reverse

DTC P07E5

Unable to Engage Drive

DTC P073D

Unable to Engage Neutral

DTC P07E4

Unable to Engage Park

DTC P1769

Transmission Range Sensor TRCM Correlation

DTC P1789

Current Transmission Range Unknown

Circuit/System Description

The Transmission Shift Lever will provide electrical signals based on customer input to the Chassis Control Module, where the customer shift request will be determined. When the Chassis Control Module receives the gear request signal from the Transmission Shift Lever it sends the message for the Transmission Range Control Module to engage the selected gear.

Conditions for Running the DTC

Ignition ON/Vehicle in Service Mode.

Conditions for Setting the DTC

P073E

The actual transmission range does not equal Reverse within 1 s of commanding Reverse.

P07E5

The actual transmission range does not equal Drive within 1 s of commanding Drive.

P073D

The actual transmission range does not equal Neutral within 1 s of commanding Neutral.

P07E4

The actual transmission range does not equal Park within 1 s of commanding Park.

NOTE: DTC P07E4 could set on conditions when battery voltage is low or battery voltage is high. This may not indicate an issue in the Electronic Transmission Range Selector system but may be a result of a low battery condition. Battery voltage DTCs should be resolved prior to resolving DTC P07E4.

P1769

The actual transmission range from the internal mode switch does not match the actual transmission range from the rotary shaft position sensor in the TRCM.

P1789

The actual transmission range is not valid for 1 s. This DTC will put the vehicle in Latent Fault Mode. Refer to [Latent Fault Mode Description](#).

Action Taken When the DTC Sets

DTC P073E, P07E5, P073D, P07E4, P1769, or P1789 is a Type B DTC. The device refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Reference Information

Schematic Reference

[Electronic Transmission Range Selector Schematics](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Electronic Transmission Range Selector Description](#)

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 no other DTCs are set.
 - If other DTCs are set

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) and resolve all other DTCs

- **If no other DTCs are set**

3. Verify K173 Transmission Range Control Module is mounted securely and if it has a linkage ensure the linkage from K173 Transmission Range Control Module to Transmission is adjusted properly with no excessive play.

- **If play is found in the mounting of the K173 Transmission Range Control Module or linkage**

Resolve issue and perform K173 Transmission Range Control Module learn procedure.
Refer to [Transmission Range Control Module Range Motor Position Learn](#).

- **If no play is found in the mounting of the K173 Transmission Range Control Module or linkage**

4. Check for updated software in K173 Transmission Range Control Module.

- **If software is not current**

Perform the **programming** procedure for the K173 Transmission Range Control Module.

- **If software is up to date**

5. Replace the K173 Transmission Range Control Module

6. Verify DTC P073E, P07E5, P073D, P07E4, P1769, or P1789 did not set.

- **If any of the DTCs are set**

Replace the K38 Chassis Control Module

- **If none of the DTCs are set**

7. All OK.

Repair Instructions

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

Refer to [Control Module References](#) for module replacement, programming and setup.

DTC P07B3-P07B5: TRANSMISSION PARK POSITION SWITCH 1 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P07B3

Transmission Park Position Switch 1 Circuit Low

DTC P07B4

Transmission Park Position Switch 1 Circuit High

DTC P07B5

Transmission Park Position Switch 1 Circuit Performance

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P07B3	P07B4	P07B4	P07B5

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Low Reference	-	P07B4	-	-

Circuit/System Description

The Park Button Switch is located in the S156 Transmission Shift Lever Knob which is mounted on the S3 Transmission Shift Lever. The Park Button Switch has two internal sensors which are monitored by the K38 Chassis Control Module. When the Park switch is pressed the K38 Chassis Control Module will process the Park request and send a command signal to the K173 Transmission Range Control Module via serial data. These DTCs will put the vehicle in Latent Fault Mode. Refer to [Latent Fault Mode Description](#).

Conditions for Running the DTC

P07B3 or P07B4

The K38 Chassis Control Module monitors this DTC at all times.

P07B5

P07B3 or P07B4 is not set.

Conditions for Setting the DTC

P07B3

The K38 Chassis Control Module detects a low voltage condition, in the Park Button Switch 1 circuit for 1 s. Low voltage is considered 0.2 - 0 V. Fault must be present for 7 out of 9 samples.

P07B4

The K38 Chassis Control Module detects a high voltage condition, in the Park Button Switch 1 circuit for 1 s. High voltage is considered anything greater than 4.8 V. Fault must be present for 7 out of 9 samples.

P07B5

The K38 Chassis Control Module detects a circuit performance condition, in the Park Button Switch 1 circuit for 1 s. Voltage performance fault is considered 3.1 - 3.5 V. Fault must be present for 7 out of 9 samples.

Action Taken When the DTC Sets

- MIL will be illuminated on second trip with fault present. Type B DTC.
- Vehicle will not be allowed to shift out of park after 35 to 50 trips with fault present.

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 40 ignition cycles with no current DTC active during the 40 ignition cycles.

Reference Information

Schematic Reference

[Electronic Transmission Range Selector 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 Transmission Park Position Switch 1 parameter is 35% - 45% when the Park Button Switch is pressed on the Transmission Shift Lever assembly.
 - **If parameter is not 35% - 45%**

Refer to Circuit/System Testing.
 - **If parameter is 35% - 45%**
3. All OK.

Circuit/System Testing

1. Ignition OFF/Vehicle OFF, disconnect the X1 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 low reference circuit terminal 10 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If less than 10 Ω**
3. Ignition ON/Vehicle in Service Mode.
4. Verify the scan tool Transmission Park Position Switch 1 parameter is greater than 95%.
 - **If less than 95%**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for infinite resistance between the signal circuit terminal 9 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K38 Chassis Control Module.
 - **If greater than 95%**
5. Install a 3 A fused jumper wire between the signal circuit terminal 9 and the low reference circuit terminal 10.
6. Verify the scan tool Transmission Park Position Switch 1 is less than 5%.
 - **If greater than 5%**
 1. Ignition OFF/Vehicle OFF, remove the jumper wire, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.

- If less than 1 V
- 3. Ignition OFF/Vehicle OFF
- 4. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
- **If less than 5%**
- 7. Replace the S3 Transmission Shift Lever.
- 8. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.
 - **If the DTC sets**

Replace the S156 Transmission Shift Lever Knob.
 - **If the DTC does not set**
- 9. All OK.

Component Testing

NOTE: When performing Component Testing on the S3 Transmission Shift Lever, the S156 Transmission Shift Lever Knob should remain attached.

1. Ignition OFF, disconnect the X1 harness connector at the S3 Transmission Shift Lever.
2. Verify circuit is 3 - 3.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch not pressed.
 - **If circuit is not between 3 - 3.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 2. If issue still occurs, replace the S156 Transmission Shift Lever Knob.
 - **If circuit is between 3 - 3.5 K Ω**
3. Verify circuit is 1 - 1.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch pressed.
 - **If circuit is not between 1 - 1.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 3. If issue still occurs, replace the S156 Transmission Shift Lever Knob.
 - **If circuit is between 1 - 1.5K Ω**
4. All OK

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming, and setup.

DTC P07B9-P07BB: TRANSMISSION PARK POSITION SWITCH 2 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P07B9

DTC P07BA

Transmission Park Position Switch 2 Circuit High

DTC P07BB

Transmission Park Position Switch 2 Circuit Performance

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P07B9	P07BA	P07BA	P07BB
Low Reference	-	P07BA	-	-

Circuit/System Description

The Park Button Switch is located in the S156 Transmission Shift Lever Knob which is mounted on the S3 Transmission Shift Lever. The Park Button Switch has two internal sensors which are monitored by the K38 Chassis Control Module. When the Park switch is pressed the K38 Chassis Control Module will process the Park request and send a command signal to the K173 Transmission Range Control Module via serial data. These DTCs will put the vehicle in Latent Fault Mode. Refer to [Latent Fault Mode Description](#).

Conditions for Running the DTC

P07B9 or P07BA

The K38 Chassis Control Module monitors this DTC at all times.

P07BB

P07B9 or P07BA is not set.

Conditions for Setting the DTC

P07B9

The K38 Chassis Control Module detects a low voltage condition, in the Park Button Switch 2 circuit for 1 s. Low voltage is considered 0.2 - 0 volts. Fault must be present for 7 out of 9 samples.

P07BA

The K38 Chassis Control Module detects a high voltage condition, in the Park Button Switch 2 circuit for 1 s. High voltage is considered anything greater than 4.8 volts. Fault must be present for 7 out of 9 samples.

P07BB

The K38 Chassis Control Module detects a circuit performance condition, in the Park Button Switch 2 circuit for 1 s. Voltage performance fault is considered 3.1 - 3.5 volts. Fault must be present for 7 out of 9 samples.

Action Taken When the DTC Sets

- MIL will be illuminated on second trip with fault present. Type B DTC.
- Vehicle will not be allowed to shift out of park after 35 to 50 trips with fault present.

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 40 ignition cycles with no current DTC active during the 40 ignition cycles.

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

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Description and Operation

Electronic Transmission Range Selector Description

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 Transmission Park Position Switch 2 parameter is 35% - 45% when the Park Button Switch is pressed on the Transmission Shift Lever assembly.
 - **If parameter is not 35% - 45%**
Refer to Circuit/System Testing.
 - **If parameter is 35% - 45%**
3. All OK.

Circuit/System Testing

1. Ignition OFF/Vehicle OFF, disconnect the X1 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 low reference circuit terminal 12 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If less than 10 Ω**
3. Ignition ON/Vehicle in Service Mode.
4. Verify the scan tool Transmission Park Position Switch 2 parameter is greater than 95%.
 - **If less than 95%**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for infinite resistance between the signal circuit terminal 11 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K38 Chassis Control Module.
 - **If greater than 95%**

5. Install a 3 A fused jumper wire between the signal circuit terminal 12 and the low reference circuit terminal 11.
6. Verify the scan tool Transmission Park Position Switch 2 is less than 5%.
 - **If greater than 5%**
 1. Ignition OFF/Vehicle OFF, remove the jumper wire, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Ignition OFF/Vehicle OFF
 4. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If less than 5%**
7. Replace the S3 Transmission Shift Lever.
8. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.
 - **If the DTC sets**

Replace the S156 Transmission Shift Lever Knob.
 - **If the DTC does not set**
9. All OK.

Component Testing

NOTE: When performing Component Testing on the S3 Transmission Shift Lever, the S156 Transmission Shift Lever Knob should remain attached.

1. Ignition OFF, disconnect the X1 harness connector at the S3 Transmission Shift Lever.
2. Verify circuit is 3 - 3.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch not pressed.
 - **If circuit is not between 3 - 3.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 2. If issue still occurs, replace the S156 Transmission Shift Lever Knob.
 - **If circuit is between 3 - 3.5K Ω**
3. Verify circuit is 1 - 1.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch pressed.
 - **If circuit is not between 1 - 1.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 3. If issue still occurs, replace the S156 Transmission Shift Lever Knob.
 - **If circuit is between 1 - 1.5K Ω**
4. All OK

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming, and setup.

DTC P07BE OR P17F3: TRANSMISSION PARK POSITION SWITCH 1-2 NOT PLAUSIBLE/TRANSMISSION PARK POSITION SWITCH CIRCUIT 1 OR 2 STUCK ON

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P07BE

Transmission Park Position Switch 1-2 Not Plausible

DTC P17F3

Transmission Park Position Switch Circuit 1 or 2 Stuck On

Circuit/System Description

The Park Button Switch is located in the S156 Transmission Shift Lever Knob which is mounted on the S3 Transmission Shift Lever. The Park Button Switch has two internal sensors which are monitored by the K38 Chassis Control Module. When the Park switch is pressed the K38 Chassis Control Module will process the Park request and send a command signal to the K173 Transmission Range Control Module via serial data. These DTCs will put the vehicle in Latent Fault Mode. Refer to [Latent Fault Mode Description](#).

Conditions for Running the DTC

The K38 Chassis Control Module monitors this DTC at all times.

Conditions for Setting the DTC

P07BE

Park Button Switch 1 and Park Button Switch 2 are both in valid positions (Pressed or Released) but positions do not match. Fault must be present for 7 out of 9 samples.

P17F3

Park Button Switch 1 and Park Button Switch 2 are both in valid positions (Pressed or Released) but positions do not match. Fault must be present for 7 out of 9 samples.

Action Taken When the DTC Sets

- MIL will be illuminated on second trip with fault present. Type B DTC.
- Vehicle will not be allowed to shift out of park after 35 to 50 trips with fault present.

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 40 ignition cycles with no current DTC active during the 40 ignition cycles.

Diagnostic Aids

If the Park Button is not firmly pressed in the center, there is a chance that 1 of the 2 contacts within the button will not make contact. This could cause DTC P07BE or DTC P17F3 to set without any fault present. If this is the case, the customer should be educated to press the Park Button firmly and in the center.

Reference Information

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- [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 Transmission Park Position Switch 1 and Transmission Park Position Switch 2 is between 55% - 70% when the Park Button Switch is not being pressed on the Transmission Shift Lever assembly.
 - **If parameter is not between 55% - 70%**
 1. Replace the S156 Transmission Shift Lever Knob.
 2. Verify the DTC does not set while operating the vehicle with the Conditions for Running the DTC.
 - If the DTC sets, replace the S3 Transmission Shift Lever.
 - If the DTC does not set
 3. All OK.
 - **If parameter is between 55% - 70%**
3. Verify the scan tool Transmission Park Position Switch 1 and Transmission Park Position Switch 2 is between 35% - 45% when the Park Button Switch is pressed on the Transmission Shift Lever assembly.
 - **If parameter is not between 35% - 45%**
 1. Replace the S156 Transmission Shift Lever Knob.
 2. Verify the DTC does not set while operating the vehicle with the Conditions for Running the DTC.
 - If the DTC sets, replace the S3 Transmission Shift Lever.
 - If the DTC does not set
 3. All OK.
 - **If parameter is between 35% - 45%**
4. All OK.

[Component Testing](#)

NOTE: When performing Component Testing on the S3 Transmission Shift Lever, the S156 Transmission Shift Lever Knob should remain attached.

1. Ignition OFF, disconnect the X1 harness connector at the S3 Transmission Shift Lever.
2. Verify circuit is 3 - 3.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch not pressed.

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 - **If circuit is not between 3 - 3.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 2. If issue still occurs, replace the S156 Transmission Shift Lever Knob.

- **If circuit is between 3 - 3.5K Ω**

3. Verify circuit is 1 - 1.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch pressed.

- **If circuit is not between 1 - 1.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 3. If issue still occurs, replace the S156 Transmission Shift Lever Knob.

- **If circuit is between 1 - 1.5K Ω**

4. All OK

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming, and setup.

DTC P082A-P082F: TRANSMISSION RANGE SELECTOR X/Y POSITION SENSOR 1 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P082A

Transmission Range Selector X Position Sensor 1 Circuit Performance

DTC P082B

Transmission Range Selector X Position Sensor 1 Circuit Low Duty Cycle

DTC P082C

Transmission Range Selector X Position Sensor 1 Circuit High Duty Cycle

DTC P082D

Transmission Range Selector Y Position Sensor 1 Circuit Performance

DTC P082E

Transmission Range Selector Y Position Sensor 1 Circuit Low Duty Cycle

DTC P082F

Transmission Range Selector Y Position Sensor 1 Circuit High Duty Cycle

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	P082B, P082E	P082B, P082E	P082C, P082F	-
Signal 1	P082B	P082B	P082C	P082A
Signal 2	P082E	P082E	P082F	P082D

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Low Reference	-	P082B, P082E	-	-

Circuit/System Description

The S3 Transmission Shift Lever will provide electrical signals based on customer input to the K38 Chassis Control Module, where the customer shift request will be determined. The shift lever position is determined by 2 internal sensors that each transmit an X and Y coordinate signal. All 4 signal circuits are inputs to the K38 Chassis Control Module and are diagnosable for a high duty cycle condition, low duty cycle condition, and a signal performance condition. These DTCs will put the vehicle in Latent Fault Mode. Refer to [Latent Fault Mode Description](#).

Conditions for Running the DTC

The K38 Chassis Control Module monitors this DTC at all times.

Conditions for Setting the DTC

P082B

The chassis control module detects a low duty cycle percentage, in the Transmission Range Selector X Position Sensor 1 Circuit for 1 s. Low duty cycle is considered less than 5%. Fault must be present for 7 out of 9 samples.

P082C

The chassis control module detects a high duty cycle percentage, in the Transmission Range Selector X Position Sensor 1 Circuit for 1 s. High duty cycle is considered greater than 95%. Fault must be present for 7 out of 9 samples.

P082A

The chassis control module detects a circuit performance condition, in the Transmission Range Selector X Position Sensor 1 Circuit for 1 s. Fault must be present for 7 out of 9 samples. DTC P082B or P082C is not set.

P082E

The chassis control module detects a low duty cycle percentage, in the Transmission Range Selector Y Position Sensor 1 Circuit for 1 s. Low duty cycle is considered less than 5%. Fault must be present for 7 out of 9 samples.

P082F

The chassis control module detects a high duty cycle percentage, in the Transmission Range Selector Y Position Sensor 1 Circuit for 1 s. High duty cycle is considered greater than 95%. Fault must be present for 7 out of 9 samples.

P082D

The chassis control module detects a circuit performance condition, in the Transmission Range Selector Y Position Sensor 1 Circuit for 1 s. Fault must be present for 7 out of 9 samples. DTC P082E or P082F is not set.

Action Taken When the DTC Sets

- MIL will be illuminated on second trip with fault present. Type B DTC.
- Vehicle will not be allowed to shift out of park after 35 to 50 trips with fault present.

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 40 ignition cycles with no current DTC active during the 40 ignition cycles.

Reference Information

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Electronic Transmission Range Selector 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 Transmission Gear Lever X Position 1 Duty Cycle and Transmission Gear Lever Y Position 1 Duty Cycle parameters are between 5% and 95% and duty cycle changes when gear lever is moved to different positions.
 - **If Transmission Gear Lever X Position 1 Duty Cycle is less than 5% or greater than 95% or does not change**
Refer to Circuit/System Testing for Transmission Range Selector X Position Sensor 1.
 - **If Transmission Gear Lever Y Position 1 Duty Cycle is less than 5% or greater than 95% or does not change**
Refer to Circuit/System Testing for Transmission Range Selector Y Position Sensor 1.
 - **If both parameters are between 5% and 95% and change but the DTC is still present**
Refer to Circuit/System Testing for the appropriate sensor.
 - **If both parameters are between 5% and 95% and change with no DTC present**
3. All OK.

Circuit/System Testing

Transmission Range Selector X Position Sensor 1

1. Ignition OFF/Vehicle OFF, disconnect the X1 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 low reference circuit terminal 15 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If less than 10 Ω**
3. Ignition ON/Vehicle in Service Mode.
 4. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 13 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for infinite resistance between the 5 V reference 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 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K38 Chassis Control Module.
 - **If between 4.8 - 5.2 V**
 5. Test for 4.8 - 5.2 V between the signal circuit terminal 14 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for infinite resistance between the signal 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 signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K38 Chassis Control Module.
 - **If between 4.8 - 5.2 V**
 6. Replace the S3 Transmission Shift Lever.

Transmission Range Selector Y Position Sensor 1

1. Ignition OFF/Vehicle OFF, disconnect the X1 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 low reference circuit terminal 15 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.

- **If less than 10 Ω**

3. Ignition ON/Vehicle in Service Mode.

4. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 13 and ground.

- **If less than 4.8 V**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.

2. Test for infinite resistance between the 5 V reference 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 5 V reference circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K38 Chassis Control Module.

- **If greater than 5.2 V**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.

2. Test for less than 1 V between the 5 V reference circuit and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K38 Chassis Control Module.

- **If between 4.8 - 5.2 V**

5. Test for 4.8 - 5.2 V between the signal circuit terminal 16 and ground.

- **If less than 4.8 V**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.

2. Test for infinite resistance between the signal 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 signal circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K38 Chassis Control Module.

- **If greater than 5.2 V**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.

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

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K38 Chassis Control Module.

- **If between 4.8 - 5.2 V**

6. Replace the S3 Transmission Shift Lever.

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming, and setup.

DTC P089B-P089D OR P08A0-P08A2: TRANSMISSION RANGE SELECTOR X/Y POSITION SENSOR 2 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P089B

Transmission Range Selector X Position Sensor 2 Circuit Performance

DTC P089C

Transmission Range Selector X Position Sensor 2 Circuit Low Duty Cycle

DTC P089D

Transmission Range Selector X Position Sensor 2 Circuit High Duty Cycle

DTC P08A0

Transmission Range Selector Y Position Sensor 2 Circuit Performance

DTC P08A1

Transmission Range Selector Y Position Sensor 2 Circuit Low Duty Cycle

DTC P08A2

Transmission Range Selector Y Position Sensor 2 Circuit High Duty Cycle

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	P089C, P08A1	P089C, P08A1	P089D, P08A2	-
Signal 1	P089C	P089C	P089D	P089B
Signal 2	P08A1	P08A1	P08A2	P08A0
Low Reference	-	P089C, P08A1	-	-

Circuit/System Description

The S3 Transmission Shift Lever will provide electrical signals based on customer input to the K38 Chassis Control Module, where the customer shift request will be determined. The shift lever position is determined by 2 internal sensors that each transmit an X and Y coordinate signal. All 4 signal circuits are inputs to the K38 Chassis Control Module and are diagnosable for a high duty cycle condition, low duty cycle condition, and a signal performance condition. These DTCs will put the vehicle in Latent Fault Mode. Refer to [Latent Fault Mode Description](#).

Conditions for Running the DTC

The K38 Chassis Control Module monitors this DTC at all times.

Conditions for Setting the DTC

P089C

The chassis control module detects a low duty cycle percentage, in the Transmission Range Selector X Position Sensor 2 Circuit for 1 s. Low duty cycle is considered less than 5%. Fault must be present for 7 out of 9 samples.

P089D

The chassis control module detects a high duty cycle percentage, in the Transmission Range Selector X Position Sensor 2 Circuit for 1 s. High duty cycle is considered greater than 95%. Fault must be present for 7 out of 9 samples.

P089B

The chassis control module detects a circuit performance condition, in the Transmission Range Selector X Position Sensor 2 Circuit for 1 s. Fault must be present for 7 out of 9 samples.

P08A1

The chassis control module detects a low duty cycle percentage, in the Transmission Range Selector Y Position Sensor 2 Circuit for 1 s. Low duty cycle is considered less than 5%. Fault must be present for 7 out of 9 samples.

P08A2

The chassis control module detects a high duty cycle percentage, in the Transmission Range Selector Y Position Sensor 2 Circuit for 1 s. High duty cycle is considered greater than 95%. Fault must be present for 7 out of 9 samples.

P08A0

The chassis control module detects a circuit performance condition, in the Transmission Range Selector Y Position Sensor 2 Circuit for 1 s. Fault must be present for 7 out of 9 samples.

Action Taken When the DTC Sets

- MIL will be illuminated on second trip with fault present. Type B DTC.
- Vehicle will not be allowed to shift out of park after 35 to 50 trips with fault present.

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 40 ignition cycles with no current DTC active during the 40 ignition cycles.

Reference Information

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

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- **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 Transmission Gear Lever X Position 2 Duty Cycle and Transmission Gear Lever Y Position 2 Duty Cycle parameters are between 5% and 95% and duty cycle changes when gear lever is moved to different positions.

- **If Transmission Gear Lever X Position 2 Duty Cycle is less than 5% or greater than 95% or does not change**

Refer to Circuit/System Testing for Transmission Range Selector X Position Sensor 2.

- **If Transmission Gear Lever Y Position 2 Duty Cycle is less than 5% or greater than 95% or does not change**

Refer to Circuit/System Testing for Transmission Range Selector Y Position Sensor 2.

- **If both parameters are between 5% and 95% and change but the DTC is still present**

Refer to Circuit/System Testing for the appropriate sensor.

- **If both parameters are between 5% and 95% and change with no DTC present**

3. All OK.

Circuit/System Testing

Transmission Range Selector X Position Sensor 2

1. Ignition OFF/Vehicle OFF, disconnect the X1 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 low reference circuit terminal 2 and ground.

- **If 10 Ω or greater**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K38 Chassis Control Module.

- **If less than 10 Ω**

3. Ignition ON/Vehicle in Service Mode.

4. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 4 and ground.

- **If less than 4.8 V**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.

2. Test for infinite resistance between the 5 V reference 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 5 V reference circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K38 Chassis Control Module.

- **If greater than 5.2 V**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.

2. Test for less than 1 V between the 5 V reference circuit and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K38 Chassis Control Module.

- **If between 4.8 - 5.2 V**

5. With the X1 harness connector at the S3 Transmission Shift Lever still disconnected, test for 4.8 - 5.2 V between the signal circuit terminal 1 and ground.

- **If less than 4.8 V**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.

2. Test for infinite resistance between the signal 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 signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K38 Chassis Control Module.
 - **If between 4.8 - 5.2 V**
6. Replace the S3 Transmission Shift Lever.

Transmission Range Selector Y Position Sensor 2

1. Ignition OFF/Vehicle OFF, disconnect the X1 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 low reference circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If less than 10 Ω**
3. Ignition ON/Vehicle in Service Mode.
4. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 4 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for infinite resistance between the 5 V reference 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 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K38 Chassis Control Module.
 - **If between 4.8 - 5.2 V**
5. With the X1 harness connector at the S3 Transmission Shift Lever still disconnected, test for 4.8 - 5.2 V between the signal circuit terminal 3 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for infinite resistance between the signal 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 signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K38 Chassis Control Module.
 - **If between 4.8 - 5.2 V**
6. Replace the S3 Transmission Shift Lever.

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming, and setup.

DTC C1201, P16F4, P173A-P173F, P174B, P1771, P178B-P178E, P17AA, P17AC-P17AE, P17B1-P17B9, P17BA-P17BF, P17CF, OR P17D5: TRANSMISSION RANGE CONTROL MODULE

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC C1201

Transmission Range Redundant Command Message Counter Incorrect

DTC P16F4

Control Module Transmission Range Switch Input Circuitry Performance

DTC P173A

Transmission Range Control Module 5V Reference 1 Circuit Low Voltage

DTC P173B

Transmission Range Control Module 5V Reference 1 Circuit High Voltage

DTC P173C

Transmission Range Control Module 5V Reference 1 Circuit Intermittent

DTC P173D

Transmission Range Control Module 5V Reference 2 Circuit Low Voltage

DTC P173E

Transmission Range Control Module 5V Reference 2 Circuit High Voltage

DTC P173F

Transmission Range Control Module 5V Reference 2 Circuit Intermittent

DTC P174B

Transmission Range Control Module Range Command Signal Message Counter Incorrect

DTC P1771

Transmission Range Control Module Actuation Command Signal Message Counter Incorrect

DTC P178B

Backup Park Lock Actuator Backup Power Supply Performance

DTC P178C

Backup Park Lock Actuator Performance During Park Test

DTC P178D

Backup Park Lock Actuator Performance

DTC P178E

Backup Park Lock Actuator Arming Performance

DTC P17AA

Transmission Range Control Module Read Only Memory Performance

DTC P17AC

Transmission Range Control Module Long Term Memory Reset

DTC P17AD

Transmission Range Control Module Random Access Memory Performance

DTC P17AE

Transmission Range Control Module Performance

DTC P17B1

Transmission Range Control Module System Voltage Performance

DTC P17B6

Transmission Range Selector Shaft Position Sensor Loss of Signal

DTC P17B7

Transmission Range Selector Shaft Position Sensor Signal Low Voltage

DTC P17B8

Transmission Range Selector Shaft Position Sensor Signal High Voltage

DTC P17B9

Transmission Range Selector Shaft Position Sensor Performance

DTC P17BA

Transmission Range Control Module Range Motor Enable Circuit Low Voltage

DTC P17BB

DTC P17BC

Transmission Range Control Module Range Motor Low Voltage

DTC P17BD

Transmission Range Control Module Range Motor High Voltage

DTC P17BF

Transmission Range Control Module Range Motor Control Circuit High Current

DTC P17CF

Backup Park Lock Actuator Supply Voltage Circuit Low Voltage

DTC P17D5

Transmission Range Control Slow Response

Circuit/System Description

The internal fault detection is handled inside the device. No external circuit diagnosis is involved.

Conditions for Running the DTC

The device runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The device has detected an internal malfunction.

Action Taken When the DTC Sets

The device refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the device.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the device.
- If this DTC is retrieved as both a current and history DTC, replace the device that set the DTC.
- Resolve any current DTC's that are present relating to the Electronic Transmission Range Selector system prior to replacement of components or programming/setup of module. Faults in any component or module that work together in this system may cause the programming/setup failure.
- Replacement or inspection of K173 Transmission Range Control Module requires rod linkage (if equipped) to be adjusted. If rod linkage is not properly adjusted, programming and setup procedure may fail and DTCs may set. Check K173 Transmission Range Control Module rod linkage adjustment prior to replacing the K173 Transmission Range Control Module. Something as simple as loosening the K173 Transmission Range Control Module mounting bolts can cause the module to be out of adjustment.

Reference Information

[Electronic Transmission Range Selector Schematics](#)

Connector End View Reference

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Scan Tool Reference

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

[Circuit/System Verification](#)

1. Ignition ON/Vehicle in Service Mode.
2. Verify DTC C1201, P16F4, P173A-P173F, P174B, P1771, P178B-P178E, P17AA, P17AC-P17AE, P17B1-P17B9, P17BA-P17BF, P17CF, or P17D5 is not set.
 - **If any of the DTCs are set**
 1. Perform the **programming** procedure for the K173 Transmission Range Control Module.
 2. Verify the DTC does not set.
 - If the DTC is set, replace the K173 Transmission Range Control Module.
 - If the DTC does not set
 3. All OK
 - **If none of the DTCs are set**
3. All OK

[Repair Instructions](#)

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming and setup

DTC P174C: TRANSMISSION RANGE CONTROL MODULE WHEEL SPEED SIGNAL MESSAGE COUNTER INCORRECT

[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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

[DTC Descriptor](#)

DTC P174C

Transmission Range Control Module Wheel Speed Signal Message Counter Incorrect

[Circuit/System Description](#)

The wheel speeds are detected by active wheel speed sensors. Each wheel speed sensor receives a 12V reference voltage from the electronic brake control module (EBCM) and provides an alternating current

square wave signal to the EBCM. As the wheel spins, the EBCM uses the frequency of the square wave signal to calculate the wheel speed. The EBCM sends the wheel speed information as a high speed controller area network (CAN) serial data message.

Conditions for Running the DTC

Ignition ON/Vehicle in Service Mode.

Conditions for Setting the DTC

A supervised periodic message that includes the wheel speed serial data has not been received.

Action Taken When the DTC Sets

Specific subsystems will not function or operate in degraded mode.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS 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

Diagnostic Aids

- This DTC can be set due to an incorrect part wheel speed sensor installed.
- Inspect the wheel encoder ring for rust or corrosion.
- If the customer comments that the ABS indicator is ON only during moist environmental conditions (rain, snow, vehicle wash, etc.), inspect the wheel speed sensor wiring for signs of water intrusion.

Circuit/System Verification

1. Ignition ON/Vehicle in Service Mode.
2. Verify that DTC C0035, C0040, C0045, or C0050 is not set in the K17 Electronic Brake Control Module.
 - **If any listed DTC is set**

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) to diagnose DTC prior to this diagnostic.

- **If any listed DTC is not set**

3. Replace the K17 Electronic Brake Control Module.

4. Verify the DTC does not set while operating the vehicle under the Conditions for Running the DTC.

- **If the DTC sets**

Replace the module that set the DTC.

- **If the DTC does not set**

5. All OK.

Repair Instructions

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

Refer to [Control Module References](#) for control module replacement, programming and setup

DTC P174D OR P17AB: TRANSMISSION RANGE CONTROL MODULE RANGE NOT LEARNED/NOT PROGRAMMED

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P174D

Transmission Range Control Module Range Not Learned

DTC P17AB

Transmission Range Control Module Not Programmed

Circuit/System Description

Some devices must be configured with specific software, serial numbers, vehicle options, or other information. If a device was not properly configured after installation that module may set DTC P174D or DTC P17AB. No external circuit diagnosis is involved.

Conditions for Running the DTC

Battery voltage is between 9 - 16 V and data link communications operate normally.

Conditions for Setting the DTC

The device is not configured properly.

Conditions for Clearing the DTC

- MIL will be illuminated on first trip with fault present. Type A DTC.
- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

Connector End View Reference

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Description and Operation

[Electronic Transmission Range Selector Description](#)

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 that DTC P174D or P17AB is not set.

- **If DTC P174D is set**

Perform the **programming and learn** procedure for the K173 Transmission Range Control Module.

1. Verify DTC P174D is not set.

- If DTC P174D is set

Replace the K173 Transmission Range Control Module.

- If DTC P174D is not set

All OK.

- **If DTC P17AB is set**

Perform the **programming** procedure for the K173 Transmission Range Control Module.

1. Verify DTC P17AB is not set.

- If DTC P17AB is set

Replace the K173 Transmission Range Control Module.

- If DTC P17AB is not set

All OK.

- **If none of the DTCs are set**

3. All OK

[Repair Instructions](#)

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

Refer to [Control Module References](#) for module replacement, programming and setup.

AVAILABILITY SIGNAL MESSAGE COUNTER(S) INCORRECT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P1772

Powerflow Engaged Signal Message Counter Incorrect

DTC P1773

Internal Mode Switch State Signal Message Counter Incorrect

DTC P1775

Transmission Range Request Signal Message Counter Incorrect

DTC P1778

Transmission Range Availability Signal Message Counter Incorrect

Circuit/System Description

The internal fault detection is handled inside the device. No external circuit diagnosis is involved.

Conditions for Running the DTC

The device runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The device has detected an internal malfunction.

Action Taken When the DTC Sets

The device refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the device.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the device.
- If this DTC is retrieved as both a current and history DTC, replace the device that set the DTC.
- Resolve any current DTC's that are present relating to the Electronic Transmission Range Selector system prior to replacement of components or programming/setup of module. Faults in any component or module that work together in this system may cause the programming/setup failure.
- Replacement or inspection of K173 Transmission Range Control Module requires rod linkage (if equipped) to be adjusted. If rod linkage is not properly adjusted, programming and setup procedure may fail and DTCs may set. Check K173 Transmission Range Control Module rod linkage adjustment prior to replacing the K173 Transmission Range Control Module. [Something.com](#)

as simple as loosening the K173 Transmission Range Control Module mounting bolts can cause the module to be out of adjustment.

Reference Information

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Transmission Range Selector Description

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. Check for updated software in K71 Transmission Control Module.
 - **If software is not current**

Perform the **programming** procedure for the K71 Transmission Control Module.

- **If software is up to date**
3. Replace the K71 Transmission Control Module.
 4. Verify DTC P1772, P1773, P1775, or P1778 did not set.
 - **If any of the DTCs are set**

Replace the K38 Chassis Control Module

- **If none of the DTCs are set**
5. All OK.

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Control Module References](#) for module replacement, programming and setup

DTC P1774 OR P177A: RANGE MOTOR POSITION/BACKUP PARK LOCK ACTUATOR STATUS MESSAGE COUNTER(S) INCORRECT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P1774

Range Motor Position Status Message Counter Incorrect

DTC P177A

Backup Park Lock Actuator Status Message Counter Incorrect

Circuit/System Description

The internal fault detection is handled inside the device. No external circuit diagnosis is involved.

Conditions for Running the DTC

The device runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The device has detected an internal malfunction.

Action Taken When the DTC Sets

The device refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the device.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the device.
- If this DTC is retrieved as both a current and history DTC, replace the device that set the DTC.
- Resolve any current DTC's that are present relating to the Electronic Transmission Range Selector system prior to replacement of components or programming/setup of module. Faults in any component or module that work together in this system may cause the programming/setup failure.
- Replacement or inspection of K173 Transmission Range Control Module requires rod linkage (if equipped) to be adjusted. If rod linkage is not properly adjusted, programming and setup procedure may fail and DTCs may set. Check K173 Transmission Range Control Module rod linkage adjustment prior to replacing the K173 Transmission Range Control Module. Something as simple as loosening the K173 Transmission Range Control Module mounting bolts can cause the module to be out of adjustment.

Reference Information

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

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Description and Operation

Electronic Transmission Range Selector Description

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 no other DTCs are set.
 - **If other DTCs are set**
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) and resolve all other DTCs
 - **If no other DTCs are set**
3. Verify K173 Transmission Range Control Module is mounted securely and if it has a linkage ensure the linkage from K173 Transmission Range Control Module to Transmission is adjusted properly with no excessive play.
 - **If play is found in the mounting of the K173 Transmission Range Control Module or linkage**
Resolve issue and perform K173 Transmission Range Control Module learn procedure. Refer to [Transmission Range Control Module Range Motor Position Learn](#).
 - **If no play is found in the mounting of the K173 Transmission Range Control Module or linkage**
4. Check for updated software in K173 Transmission Range Control Module.
 - **If software is not current**
Perform the **programming** procedure for the K173 Transmission Range Control Module.
 - **If software is up to date**
5. Replace the K173 Transmission Range Control Module
6. Verify DTC P1774 or P177A did not set.
 - **If any of the DTCs are set**
Replace the K38 Chassis Control Module
 - **If none of the DTCs are set**
7. All OK.

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Control Module References](#) for module replacement, programming and setup

DTC P1787 OR P17C8: UNEXPECTED RANGE CHANGE DETECTED/TRANSMISSION RANGE CONTROL MODULE RANGE MOTOR COMMAND PERFORMANCE - PROTECTION MODE ACTIVE

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P1787

Unexpected Range Change Detected

DTC P17C8

Transmission Range Control Module Range Motor Command Performance - Protection Mode Active

Circuit/System Description

The S3 Transmission Shift Lever will provide electrical signals based on customer input to the K38 Chassis Control Module, where the customer shift request will be determined. When the K38 Chassis Control Module receives the gear request signal from the S3 Transmission Shift Lever it sends the message for the K173 Transmission Range Control Module to engage the selected gear.

Conditions for Running the DTC

The Ignition is ON.

Conditions for Setting the DTC

P1787

The actual transmission range does not equal the requested transmission range, without the driver requesting a range change.

P17C8

The device has detected an internal malfunction.

Action Taken When the DTC Sets

DTC P1787 or P17C8 is a Type B DTC. The device refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Reference Information

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Transmission Range Selector Description

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Circuit/System Verification

1. Ignition ON/Vehicle in Service Mode.

2. Verify no other DTCs are set.

- **If other DTCs are set**

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) and resolve all other DTCs

- **If no other DTCs are set**

3. Verify K173 Transmission Range Control Module is mounted securely and if it has a linkage ensure the linkage from K173 Transmission Range Control Module to Transmission is adjusted properly with no excessive play.

- **If play is found in the mounting of the K173 Transmission Range Control Module or linkage**

Resolve issue and perform K173 Transmission Range Control Module learn procedure.

Refer to [Transmission Range Control Module Range Motor Position Learn](#).

- **If no play is found in the mounting of the K173 Transmission Range Control Module or linkage**

4. Verify K173 Transmission Range Control Module has the most up to date software.

- **If software is not current**

Perform the **programming** procedure for the K173 Transmission Range Control Module.

- **If software is up to date**

5. Perform the Backup Park Lock Actuator Arming procedure. Refer to [Backup Park Lock Actuator Arming](#).

6. Verify DTC P1787 or P17C8 is not set.

- **If DTC P1787 or P17C8 is set**

Replace the K173 Transmission Range Control Module

1. Verify DTC P1787 or P17C8 is not set.

- If DTC P1787 or P17C8 is set

Replace the K38 Chassis Control Module.

- If DTC P1787 or P17C8 is not set

All OK.

- **If DTC P1787 or P17C8 is not set**

7. All OK.

Repair Instructions

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

Refer to [Control Module References](#) for module replacement, programming and setup.

DTC P17A3-P17A5: TRANSMISSION SHIFT INTERLOCK 1 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P17A3

Transmission Shift Interlock 1 Circuit Low

DTC P17A4

Transmission Shift Interlock 1 Circuit High

DTC P17A5

Transmission Shift Interlock 1 Circuit Performance

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P17A3	P17A4	P17A4	P17A5
Low Reference	-	P17A4	-	-

Circuit/System Description

The Shift Interlock Button Switch is located in the S156 Transmission Shift Lever Knob which is mounted on the S3 Transmission Shift Lever. The Shift Interlock Button Switch has two internal sensors which are monitored by the K38 Chassis Control Module. When the Shift Interlock switch is pressed the K38 Chassis Control Module will process the request and send a command signal to the K173 Transmission Range Control Module via serial data.

Conditions for Running the DTC

P17A3 or P17A4

The K38 Chassis Control Module monitors this DTC at all times.

P17A5

P17A3 or P17A4 is not set.

Conditions for Setting the DTC

P17A3

The chassis control module detects a low voltage condition, in the Shift Interlock 1 circuit for 1 s. Low voltage is considered 0.2 - 0 volts. Fault must be present for 7 out of 9 samples.

P17A4

The chassis control module detects a high voltage condition, in the Shift Interlock 1 circuit for 1 s. High voltage is considered anything greater than 4.8 volts. Fault must be present for 7 out of 9 samples.

P17A5

The chassis control module detects a circuit performance condition, in the Shift Interlock 1 circuit for 1 s. Voltage performance fault is considered 3.1 - 3.5 volts. Fault must be present for 7 out of 9 samples.

Action Taken When the DTC Sets

- MIL will be illuminated on second trip with fault present.
- Vehicle will not be allowed to shift out of park after 35 to 50 trips with fault present.

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 40 ignition cycles with no current DTC active during the 40 ignition cycles.

Reference Information

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

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Description and Operation

Electronic Transmission Range Selector Description

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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 Transmission Shift Interlock Switch 1 parameter is 50% - 60% when the Shift Interlock Button is pressed on the Transmission Shift Lever assembly.
 - **If parameter is not 50% - 60%**
Refer to Circuit/System Testing.
 - **If parameter is 50% - 60%**
3. All OK.

Circuit/System Testing

1. Ignition OFF/Vehicle OFF, disconnect the X1 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 low reference circuit terminal 18 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If less than 10 Ω**
3. Ignition ON/Vehicle in Service Mode.
4. Verify the scan tool Transmission Shift Interlock Switch 1 parameter is greater than 95%.
 - **If less than 95%**
 1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.
 2. Test for infinite resistance between the signal circuit terminal 19 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance, replace the K38 Chassis Control Module.
 - **If greater than 95%**
5. Install a 3 A fused jumper wire between the signal circuit terminal 19 and the low reference circuit terminal 18.
 6. Verify the scan tool Transmission Shift Interlock Switch 1 is less than 5%.
 - **If greater than 5%**
 1. Ignition OFF/Vehicle OFF, remove the jumper wire, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Ignition OFF/Vehicle OFF
 4. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K38 Chassis Control Module.
 - **If less than 5%**
 7. Replace the S3 Transmission Shift Lever.
 8. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.
 - **If the DTC sets**
Replace the S156 Transmission Shift Lever Knob.
 - **If the DTC does not set**
 9. All OK.

Component Testing

NOTE: When performing Component Testing on the S3 Transmission Shift Lever, the S156 Transmission Shift Lever Knob should remain attached.

1. Ignition OFF, disconnect the X1 harness connector at the S3 Transmission Shift Lever.
2. Verify circuit is 3 - 3.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch not pressed.
 - **If circuit is not between 3 - 3.5K Ω**
Replace the S3 Transmission Shift Lever and repeat step 2. If issue still occurs, replace the S156 Transmission Shift Lever Knob.
 - **If circuit is between 3 - 3.5K Ω**
3. Verify circuit is 1 - 1.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch pressed.
 - **If circuit is not between 1 - 1.5K Ω**
Replace the S3 Transmission Shift Lever and repeat step 3. If issue still occurs, replace the S156 Transmission Shift Lever Knob.
 - **If circuit is between 1 - 1.5K Ω**
4. All OK

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming, and setup.

DTC P17A6 OR P17F4: TRANSMISSION SHIFT INTERLOCK SWITCH 1-2 NOT PLAUSIBLE/TRANSMISSION SHIFT INTERLOCK SWITCH CIRCUIT 1 OR 2 STUCK ON

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P17A6

Transmission Shift Interlock Switch 1-2 Not Plausible

DTC P17F4

Transmission Shift Interlock Switch Circuit 1 or 2 Stuck On

Circuit/System Description

The Shift Interlock Button Switch is located in the S156 Transmission Shift Lever Knob which is mounted on the S3 Transmission Shift Lever. The Shift Interlock Button Switch has two internal sensors which are monitored by the K38 Chassis Control Module. When the Shift Interlock switch is pressed the K38 Chassis Control Module will process the request and send a command signal to the K173 Transmission Range Control Module via serial data.

Conditions for Running the DTC

The K38 Chassis Control Module monitors this DTC at all times.

Conditions for Setting the DTC

P17A6

Shift Interlock Switch 1 and Shift Interlock Switch 2 are both in valid positions (Pressed or Released) but positions do not match. Fault must be present for 7 out of 9 samples.

P17F4

Shift Interlock Switch 1 and Shift Interlock Switch 2 are both in valid positions (Pressed or Released) but positions do not match. Fault must be present for 7 out of 9 samples.

Action Taken When the DTC Sets

- MIL will be illuminated on second trip with fault present.
- Vehicle will not be allowed to shift out of park after 35 to 50 trips with fault present.

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 40 ignition cycles with no current DTC active during the 40 ignition cycles.

Diagnostic Aids

If the Shift Interlock Button is not firmly pressed in the center, there is a chance that 1 of the 2 contacts within the button will not make contact. This could cause DTC P17A6 or DTC P17F4 to set without any fault present. If this is the case, the customer should be educated to press the Shift Interlock Button firmly and in the center.

Reference Information

cardiagn.com

Schematic Reference

Connector End View Reference

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Description and Operation

[Electronic Transmission Range Selector Description](#)

Electrical Information Reference

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- [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 Shift Interlock Switch 1 and Shift Interlock Switch 2 is between 67% - 85% when the Park Button Switch is not being pressed on the Transmission Shift Lever assembly.
 - **If parameter is not between 67% - 85%**
 1. Replace the S156 Transmission Shift Lever Knob.
 2. Verify the DTC does not set while operating the vehicle with the Conditions for Running the DTC.
 - If the DTC sets, replace the S3 Transmission Shift Lever.
 - If the DTC does not set
 3. All OK.
 - **If parameter is between 67% - 85%**
3. Verify the scan tool Shift Interlock Switch 1 and Shift Interlock Switch 2 is between 50% - 60% when the Shift Interlock Button is pressed on the Transmission Shift Lever assembly.
 - **If parameter is not between 50% - 60%**
 1. Replace the S156 Transmission Shift Lever Knob.
 2. Verify the DTC does not set while operating the vehicle with the Conditions for Running the DTC.
 - If the DTC sets, replace the S3 Transmission Shift Lever.
 - If the DTC does not set
 3. All OK.
 - **If parameter is between 50% - 60%**
4. All OK.

[Component Testing](#)

NOTE: When performing Component Testing on the S3 Transmission Shift Lever, the S156 Transmission Shift Lever Knob should remain attached.

1. Ignition OFF, disconnect the X1 harness connector at the S3 Transmission Shift Lever.
2. Verify circuit is 3 - 3.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch not pressed.
 - **If circuit is not between 3 - 3.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 2. If issue still occurs, replace the S156 Transmission Shift Lever Knob.

- **If circuit is between 3 - 3.5K Ω**

3. Verify circuit is 1 - 1.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch pressed.

- **If circuit is not between 1 - 1.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 3. If issue still occurs, replace the S156 Transmission Shift Lever Knob.

- **If circuit is between 1 - 1.5K Ω**

4. All OK

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming, and setup.

DTC P17A7-P17A9: TRANSMISSION SHIFT INTERLOCK 2 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P17A7

Transmission Shift Interlock 2 Circuit Low

DTC P17A8

Transmission Shift Interlock 2 Circuit High

DTC P17A9

Transmission Shift Interlock 2 Circuit Performance

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P17A7	P17A8	P17A8	P17A9
Low Reference	-	P17A8	-	-

Circuit/System Description

The Shift Interlock Button Switch is located in the S156 Transmission Shift Lever Knob which is mounted on the S3 Transmission Shift Lever. The Shift Interlock Button Switch has two internal sensors which are monitored by the K38 Chassis Control Module. When the Shift Interlock switch is pressed the K38 Chassis Control Module will process the request and send a command signal to the K173 Transmission Range Control Module via serial data.

Conditions for Running the DTC

P17A7 or P17A8

The K38 Chassis Control Module monitors this DTC at all times.

P17A9

P17A7 or P17A8 is not set.

Conditions for Setting the DTC

P17A7

The chassis control module detects a low voltage condition, in the Shift Interlock 2 circuit for 1 s. Low voltage is considered 0.2 - 0 volts. Fault must be present for 7 out of 9 samples.

P17A8

The chassis control module detects a high voltage condition, in the Shift Interlock 2 circuit for 1 s. High voltage is considered anything greater than 4.8 volts. Fault must be present for 7 out of 9 samples.

P17A9

The chassis control module detects a circuit performance condition, in the Shift Interlock 2 circuit for 1 s. Voltage performance fault is considered 3.1 - 3.5 volts. Fault must be present for 7 out of 9 samples.

Action Taken When the DTC Sets

- MIL will be illuminated on second trip with fault present.
- Vehicle will not be allowed to shift out of park after 35 to 50 trips with fault present.

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 40 ignition cycles with no current DTC active during the 40 ignition cycles.

Reference Information

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Transmission Range Selector Description

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 Transmission Shift Interlock Switch 2 parameter is 50% - 60% when the Shift Interlock Button is pressed on the Transmission Shift Lever assembly.

- **If parameter is not 50% - 60%**

Refer to Circuit/System Testing.

- **If parameter is 50% - 60%**

3. All OK.

Circuit/System Testing

1. Ignition OFF/Vehicle OFF, disconnect the X1 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 low reference circuit terminal 20 and ground.

- **If 10 Ω or greater**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K38 Chassis Control Module.

- **If less than 10 Ω**

3. Ignition ON/Vehicle in Service Mode.

4. Verify the scan tool Transmission Shift Interlock Switch 2 parameter is greater than 95%.

- **If not greater than 95%**

1. Ignition OFF/Vehicle OFF, disconnect the harness connector at the K38 Chassis Control Module.

2. Test for infinite resistance between the signal circuit terminal 21 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K38 Chassis Control Module.

- **If greater than 95%**

5. Install a 3 A fused jumper wire between the signal circuit terminal 21 and the low reference circuit terminal 20.

6. Verify the scan tool Transmission Shift Interlock Switch 2 is less than 5%.

- **If greater than 5%**

1. Ignition OFF/Vehicle OFF, remove the jumper wire, disconnect the harness connector at the K38 Chassis Control Module, Ignition ON/Vehicle in Service Mode.

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

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V

3. Ignition OFF/Vehicle OFF

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

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K38 Chassis Control Module.

- **If less than 5%**

7. Replace the S3 Transmission Shift Lever.

8. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.

- **If the DTC sets**

Replace the S156 Transmission Shift Lever Knob.

- **If the DTC does not set**

9. All OK.

Component Testing

NOTE: When performing Component Testing on the S3 Transmission Shift Lever, the S156 Transmission Shift Lever Knob should remain attached.

1. Ignition OFF, disconnect the X1 harness connector at the S3 Transmission Shift Lever.
2. Verify circuit is 3 - 3.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch not pressed.

- **If circuit is not between 3 - 3.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 2. If issue still occurs, replace the S156 Transmission Shift Lever Knob.

- **If circuit is between 3 - 3.5K Ω**

3. Verify circuit is 1 - 1.5K Ω between signal circuit terminal 9 and the low reference circuit terminal 10, with the Park Button Switch pressed.

- **If circuit is not between 1 - 1.5K Ω**

Replace the S3 Transmission Shift Lever and repeat step 3. If issue still occurs, replace the S156 Transmission Shift Lever Knob.

- **If circuit is between 1 - 1.5K Ω**

4. All OK

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Electronic Transmission Range Selector Component Replacement Reference](#)
- Refer to [Control Module References](#) for module replacement, programming, and setup.

DTC P17CB: HYBRID CHARGING SYSTEM PARK REQUEST SIGNAL MESSAGE COUNTER INCORRECT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptor

DTC P17CB

Hybrid Charging System Park Request Signal Message Counter Incorrect

Circuit/System Description

The internal fault detection is handled inside the device. No external circuit diagnosis is involved.

Conditions for Running the DTC

The device runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The device has detected an internal malfunction.

Action Taken When the DTC Sets

The device refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the device.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the device.
- If this DTC is retrieved as both a current and history DTC, replace the device that set the DTC.
- Resolve any current DTC's that are present relating to the Electronic Transmission Range Selector system prior to replacement of components or programming/setup of module. Faults in any component or module that work together in this system may cause the programming/setup failure.
- Replacement or inspection of K173 Transmission Range Control Module requires rod linkage (if equipped) to be adjusted. If rod linkage is not properly adjusted, programming and setup procedure may fail and DTCs may set. Check K173 Transmission Range Control Module rod linkage adjustment prior to replacing the K173 Transmission Range Control Module. Something as simple as loosening the K173 Transmission Range Control Module mounting bolts can cause the module to be out of adjustment.

Reference Information

Schematic Reference

Electronic Transmission Range Selector Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Transmission Range Selector Description

Electrical Information Reference

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- [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. Check for updated software in T6 Hybrid Powertrain Control Module.

- **If software is not current**

Perform the **programming** procedure for the T6 Hybrid Powertrain Control Module.

- **If software is up to date**

3. Replace the T6 Hybrid Powertrain Control Module.

4. Verify DTC P17CB is not set.

- **If DTC P17CB is set**

Replace the K38 Chassis Control Module

- **If DTC P17CB is not set**

Repair Instructions

- Perform the [Diagnostic Repair Verification](#) after completing the repair.
- Refer to [Control Module References](#) for module replacement, programming and setup

ELECTRONIC TRANSMISSION RANGE SELECTOR COMPONENT REPLACEMENT REFERENCE

Component	Transmission RPO	Repair Instruction
S3 Transmission Shift Lever	MKE	Transmission Electronic Control Replacement
K173 Transmission Range Control Module	MKE	Automatic Transmission Range Selector Actuator Hardware Module Replacement

BACKUP PARK LOCK ACTUATOR ARMING

Introduction

The Backup Park Lock function is electrically isolated from the Transmission Range Control Module, and forces the transmission manual shaft to the Park position under specified conditions. Under these conditions the vehicle is put in Latent Fault Mode, refer to [Latent Fault Mode Description](#). The procedures below are designed to assist in the arming of the Backup Park Lock Actuator when the position of the actuator becomes unknown. Before you start, read these procedures carefully and completely. For further information regarding the Transmission Range Selector system refer to [Electronic Transmission Range Selector Description](#).

Before Running the Arming Procedure

- Ensure Transmission Range Control Module and Chassis Control Module software packages are the most current software available.
- Resolve any current DTC's that are present relating to the Electronic Transmission Range Selector system prior to running learn procedure. Refer to [Electronic Transmission Range Selector Description](#). Faults in any component or module that work together in this system may cause a learn procedure failure.
- Ensure the MDI tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during learn, learn failure or ECU damage may occur.
- Stable battery voltage is critical during learn procedure. Any fluctuation, spiking, over voltage or loss of voltage will interrupt learn procedure. Install the **EL-49642** SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack unplugged/disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.

Starting the Arming Procedure

1. With your foot off the brake, press and hold the Start/Run Button for 10 seconds to set the ignition correctly.
2. Install a scan tool.
3. Verify that the transmission fluid temperature is 50Å,Å°F (10Å,Å°C) or greater before running the arming procedure.
4. In the scan tool under Transmission Range Control Module, Configuration/Reset Functions perform the Backup Park Lock Actuator Arming procedure. Follow all on-screen instructions.
5. If arming procedure failure occurs, refer to wiring diagnostics to resolve any electrical faults.
6. Attempt rerunning the arming procedure 2 additional times before replacing Transmission Range Control Module. If the test successfully completed, cycle the ignition OFF.
7. After the Backup Park Lock Actuator Arming procedure has completed successfully, perform the [Diagnostic Repair Verification](#) .

8. Clear DTCs after arming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

BACKUP PARK LOCK ACTUATOR DISARMING

Introduction

The Backup Park Lock function is an electrically isolated smart actuator inside the Transmission Range Control Module that is activated when the transmission does not achieve Park. When the Backup Park Lock function is activated, the gear is "disarmed" which rotates the torsional spring forcing the transmission manual shaft to the Park position. The procedure below is designed to disarm the Backup Park Lock Actuator when the rod linkage is adjusted (if equipped) or if the Transmission Range Control Module is being removed then reinstalled. Before you start, read these procedures carefully and completely. For further information regarding the Transmission Range Selector system refer to [Electronic Transmission Range Selector Description](#).

Before Running the Disarming Procedure

- Ensure Transmission Range Control Module and Chassis Control Module software packages are the most current software available.
- Resolve any current DTC's that are present relating to the Electronic Transmission Range Selector system prior to running the disarming procedure. Refer to [Electronic Transmission Range Selector Description](#). Faults in any component or module that work together in this system may cause a disarming procedure failure.
- Ensure the MDI tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during disarming, disarming failure or ECU damage may occur.
- Stable battery voltage is critical during disarming procedure. Any fluctuation, spiking, over voltage or loss of voltage will interrupt disarming procedure. Install the **EL-49642** SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack unplugged/disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.

Starting the Disarming Procedure

1. With your foot off the brake, press and hold the Start/Run Button for 10 seconds to set the ignition correctly.
2. Install a scan tool.
3. Verify that the transmission fluid temperature is 50Å,Å°F (10Å,Å°C) or greater before running the disarming procedure.
4. In the scan tool under Transmission Range Control Module, Configuration/Reset Functions perform the Backup Park Lock Actuator Disarming procedure. Follow all on-screen instructions.
5. If disarming procedure failure occurs, refer to wiring diagnostics to resolve any electrical faults.
6. Attempt rerunning the disarming procedure 2 additional times before replacing Transmission Range Control Module. If the test successfully completed, cycle the ignition OFF.

TRANSMISSION RANGE CONTROL MODULE RANGE MOTOR POSITION LEARN

Introduction

The Electronic Transmission Range Selector system needs to know exact position of the Transmission Range Control Module Range Motor and the Backup Park Lock Actuator on the Transmission manual shaft. The procedures below are designed to assist in the learning of the Transmission Range Control Module Range Motor and Backup Park Lock Actuator position. Before you start, read these procedures carefully and completely. For further information regarding the Transmission Range Selector system refer to [Electronic Transmission Range Selector Description](#).

Before Running the Learn Procedure

- Ensure Transmission Range Control Module and Chassis Control Module software packages are the most current software available.
- Resolve any current DTC's that are present relating to the Electronic Transmission Range Selector system prior to running learn procedure. Refer to [Electronic Transmission Range Selector Description](#). Faults in any component or module that work together in this system may cause a learn procedure failure.
- Ensure the MDI tool is equipped with the latest software and is securely connected to the data link connector. If there is an interruption during learn, learn failure or ECU damage may occur.
- Stable battery voltage is critical during learn procedure. Any fluctuation, spiking, over voltage or loss of voltage will interrupt learn procedure. Install the **EL-49642** SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack unplugged/disconnected from the AC voltage supply.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio, etc.

NOTE: **Loosening of the fasteners or replacement of the Transmission Range Control Module will cause module to become out of adjustment. If module is not properly adjusted, learn procedure may fail. If learn procedure fails, check Transmission Range Control Module mounting bolts and rod linkage if applicable prior to replacing the Transmission Range Control Module and running the learn procedure.**

Starting the Learn Procedure

1. With your foot off the brake, press and hold the Start/Run Button for 10 seconds to set the ignition correctly.
2. Install a scan tool.
3. Verify that the transmission fluid temperature is between 50Å,Å°F (10Å,Å°C) to 104Å,Å°F (40Å,Å°C) before running a learn procedure.
4. In the scan tool under Transmission Range Control Module, Configuration/Reset Functions perform the Transmission Range Control Module Range Motor Position Learn procedure. Follow all on-screen instructions.
5. If learn procedure failure occurs, refer to wiring diagnostics to resolve any electrical faults and check Transmission Range Control Module mounting bolts, and rod linkage adjustment if applicable. Any looseness or movement in the Transmission Range Control Module will cause learn failure.
6. Attempt rerunning the learn procedure 2 additional times (adjusting rod linkage, if equipped, before each attempt) before replacing Transmission Range Control Module. If the test successfully completed, cycle the ignition OFF.
7. After the Transmission Range Control Module Range Motor Position Learn procedure has completed successfully, perform the [Diagnostic Repair Verification](#) .
8. Clear DTCs after learn is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

REPAIR INSTRUCTIONS

CHASSIS CONTROL MODULE REPLACEMENT

Removal Procedure

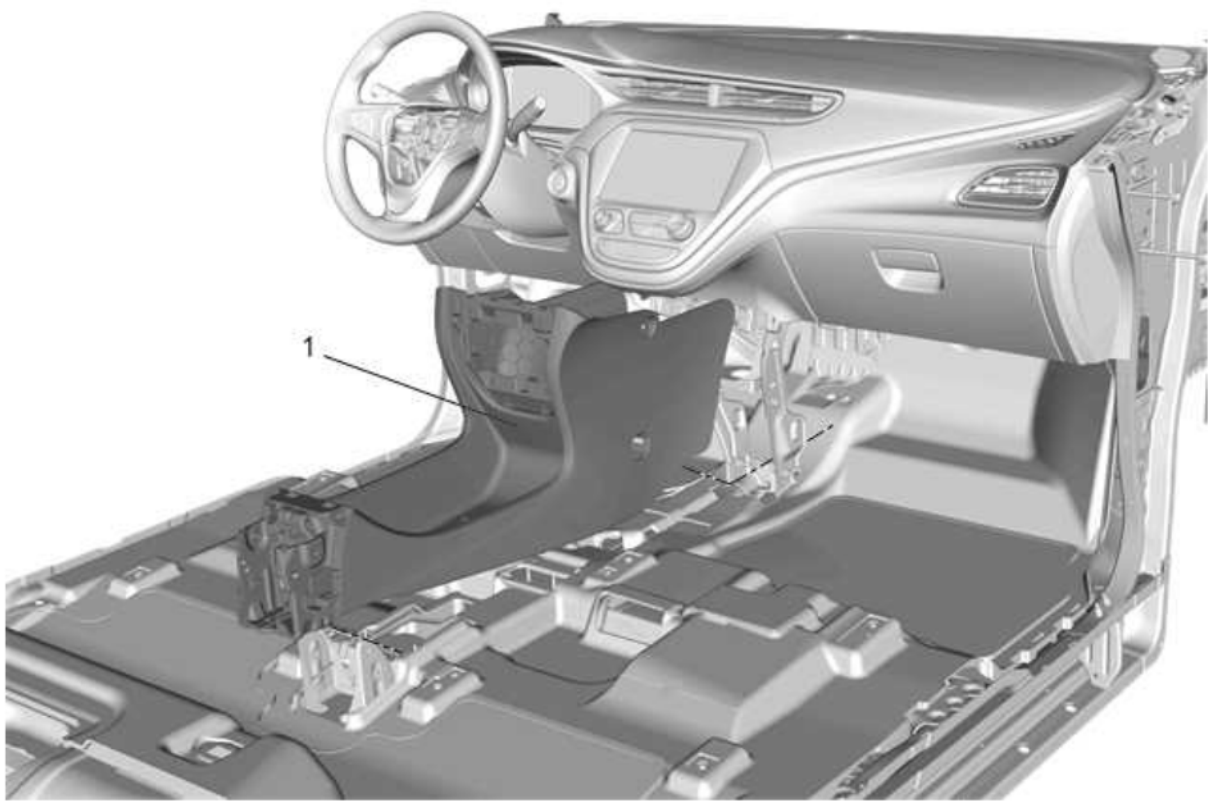


Fig. 3: Front Floor Console

Courtesy of GENERAL MOTORS COMPANY

1. Remove Front Floor Console (1) @ Vehicle. Refer to [Front Floor Console Replacement](#)

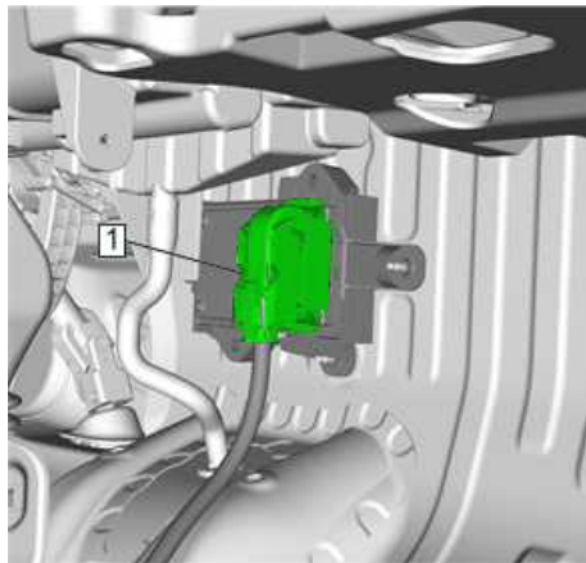


Fig. 4: Electrical Connector

Courtesy of GENERAL MOTORS COMPANY

2. Disconnect Electrical Connector (1) @ Chassis Control Module

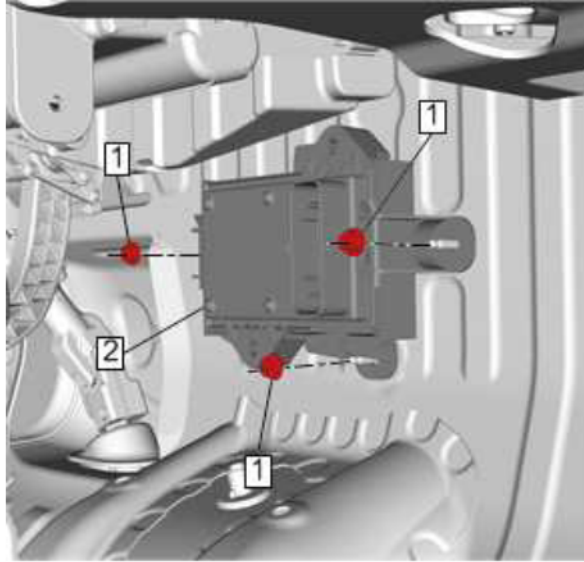


Fig. 5: Chassis Control Module/Bracket Assembly And Nuts
Courtesy of GENERAL MOTORS COMPANY

3. Remove Chassis Control Module Bracket Nuts (1) (Qty: 3)
4. Remove the chassis control module and bracket assembly (2) from the vehicle.

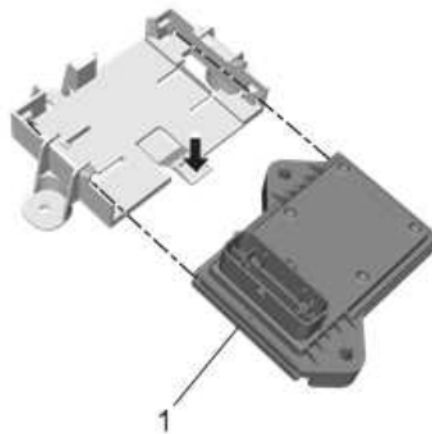


Fig. 6: Chassis Control Module And Chassis Control Module Bracket
Courtesy of GENERAL MOTORS COMPANY

5. Remove Chassis Control Module (1) @ Chassis Control Module Bracket

Installation Procedure

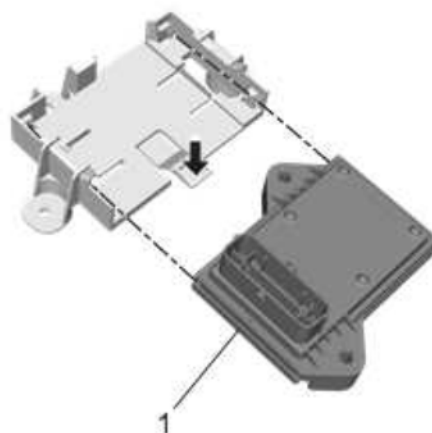


Fig. 7: Chassis Control Module And Chassis Control Module Bracket
Courtesy of GENERAL MOTORS COMPANY

1. Install Chassis Control Module (1) @ Chassis Control Module Bracket

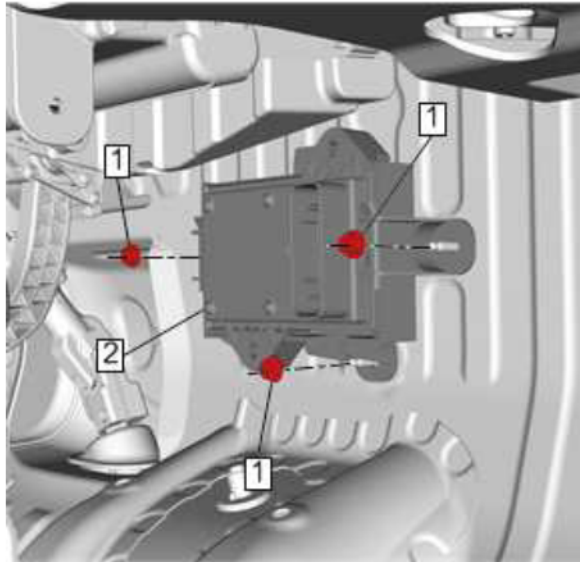


Fig. 8: Chassis Control Module/Bracket Assembly And Nuts
Courtesy of GENERAL MOTORS COMPANY

2. Install the chassis control module and bracket assembly (2) to the vehicle.

CAUTION: Refer to **Fastener Caution**

3. Install and tighten Chassis Control Module Bracket Nuts (1) (Qty: 3) to 9 N.m (80 lb in)

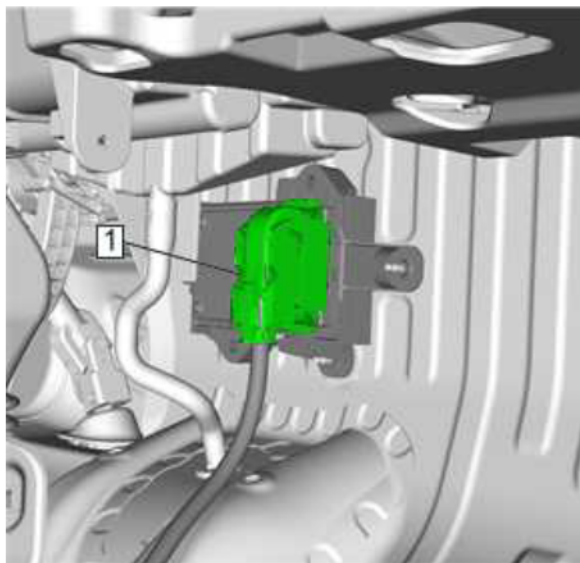


Fig. 9: Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

4. Connect Electrical Connector (1) @ Chassis Control Module

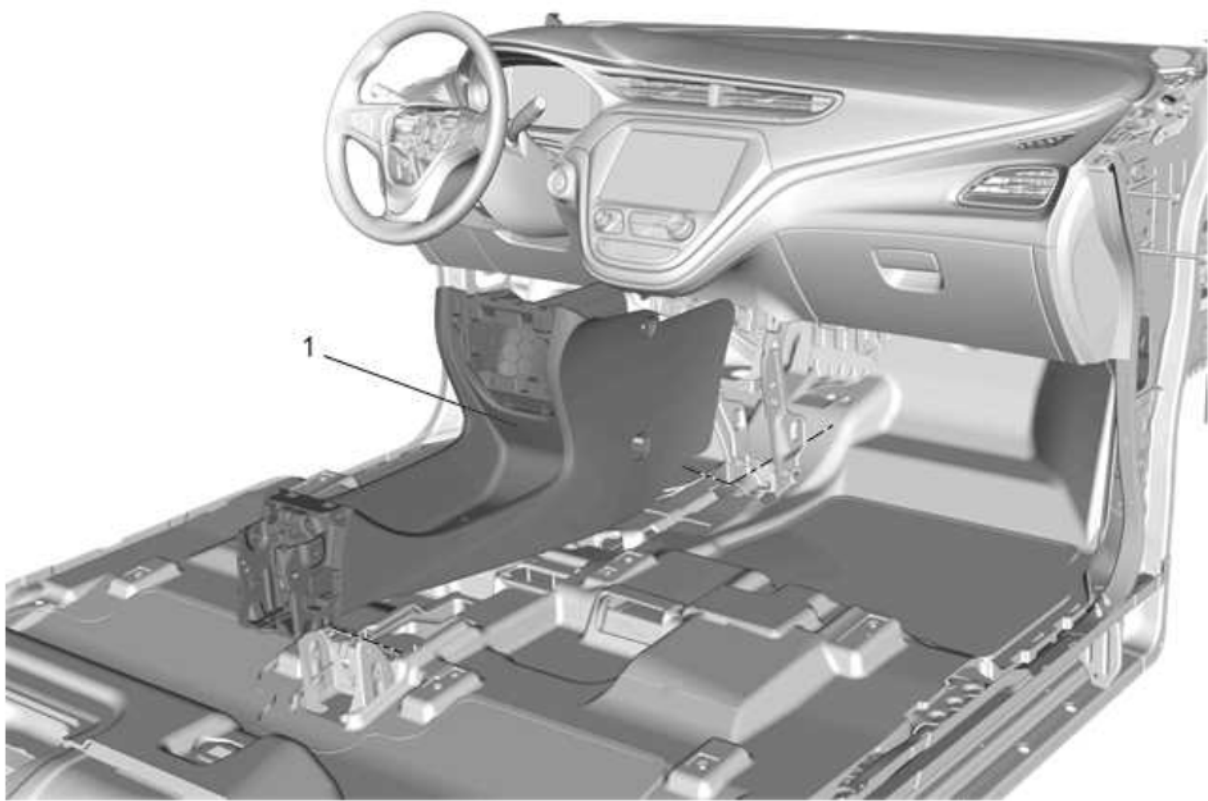


Fig. 10: Front Floor Console

Courtesy of GENERAL MOTORS COMPANY

5. Install Front Floor Console (1) @ Vehicle. Refer to [Front Floor Console Replacement](#)
6. Program the chassis control module. Refer to [Control Module References](#)

CRITICAL FAULT MODE MANEUVERING

Critical Fault Mode Maneuvering

The following procedure should be followed if vehicle is in Critical Fault Mode and needs to be moved:

- Verify charge of battery. If necessary, charge or jump start battery.
- Set the parking brake in service mode: [Rear Parking Brake Service Mode Selection](#)
- If accessible, remove linkage at the transmission: [Range Selector Lever Link Adjustment](#) . Manually shift the vehicle using transmission shift lever.
- If linkage is not accessible, wheel dollies should be used.

DESCRIPTION AND OPERATION

CRITICAL FAULT MODE DESCRIPTION

Critical Fault Mode

When a fault is detected in the Electronic Transmission Range Selector system and the Requested Gear Position or Actual Gear Position cannot be determined

- Vehicle will remain in current commanded gear position until the vehicle speed is below 3 kph
- In order to lower vehicle speed, the electronic brake control module will engage braking
- When vehicle speed is below 3 kph, the vehicle will engage electronic park brake and backup park lock (also know as Default to Park)
- Electronic park brake will not disengage until the issue is corrected and all related DTC's are History

ELECTRONIC TRANSMISSION RANGE SELECTOR DESCRIPTION

The Electronic Transmission Range Select (ETRS) subsystem selects the transmission range (Park, Reverse, Neutral, Drive, or Manual) by means of electronic control rather than by mechanical means.

The ETRS feature is controlled in the Chassis Control Module. All Electronic Transmission Range Selector and Transmission Range Control Module DTC's will set in the Chassis Control Module. The Chassis Control Module communicates via HS GMLAN, the Chassis Expansion Bus, and LIN.

When a gear is selected, the Transmission Range Control Module (TRCM) will move the transmission manual shaft into the range commanded by the ETRS. The TRCM will communicate on HS GMLAN and the Chassis Expansion Bus.

The Backup Park Lock function is electrically isolated from the TRCM, and forces the transmission manual shaft to the Park position under specified conditions. Under these conditions the vehicle is put in Latent Fault Mode, refer to [Latent Fault Mode Description](#). The Backup Park Lock communicates with the Chassis Control Module via LIN.

The Shifter Assembly in the ETRS system has no mechanical linkage to the transmission. Instead, the shifter will provide electrical signals based on customer input to the Chassis Control Module, where the customer shift request will be determined.

ETRS Shift Lever Assembly includes:

- Shift Interlock Button - The Shift Interlock Button has two sensors which are both inputs to the Chassis Control Module.
- Park Button - The Park Button has two sensors which are both inputs to the Chassis Control Module.
- Two Dimensional Shift Lever - The shift lever is designed so any single fault at the shifter can be isolated and error corrected by the Chassis Control Module. The shift lever position is determined by 2 internal sensors that each transmit an X and Y coordinate signal. All 4 signal circuits are inputs to the Chassis Control Module.
- Transmission Shift Lever Position Indicator - LED display located on the face of the shifter. Indicates transmission actual gear position. Displays "R N P D M", which refer to Reverse, Neutral, Park, Drive, or Manual.

Transmission Range Control Module includes:

- Coupler to coupler, or lever to rod linkage interface with the transmission manual shaft.
- Backup Park Lock function (also know as Default to Park)

The vehicle is equipped with the following Electronic Transmission Range Selector Components:

- S3 Transmission Shift Lever
- K38 Chassis Control Module
- K173 Transmission Range Control Module
- Backup Park Lock is located within the K173 Transmission Range Control Module
- P2 Transmission Shift Lever Position Indicator is located within the S3 Transmission Shift Lever
- K71 Transmission Control Module

LATENT FAULT MODE DESCRIPTION

Latent Fault Mode

When a fault is detected in the Electronic Transmission Range Selector system, the data information center will display the message "Service Transmission Now, Unable to Shift Soon" along with a 10 second chime. The driver must acknowledge the message to show other data on the data information center. The frequency that the message and chime occur will increase until 50 trips are reached with the fault present. At that point, the transmission will not be allowed to shift out of park.

When "Service Shifter See Owner's Manual" message is shown on the data information center, the shift lever is requiring service. If the vehicle is automatically shifting into P (Park), check to see if the park button is stuck by running through the shifter electrical diagnostics. To operate the vehicle, hold the shift lever in the desired gear, R (Reverse) or D (Drive), until vehicle speed exceeds 15 km/h (10 mph), then release the shift lever.

