

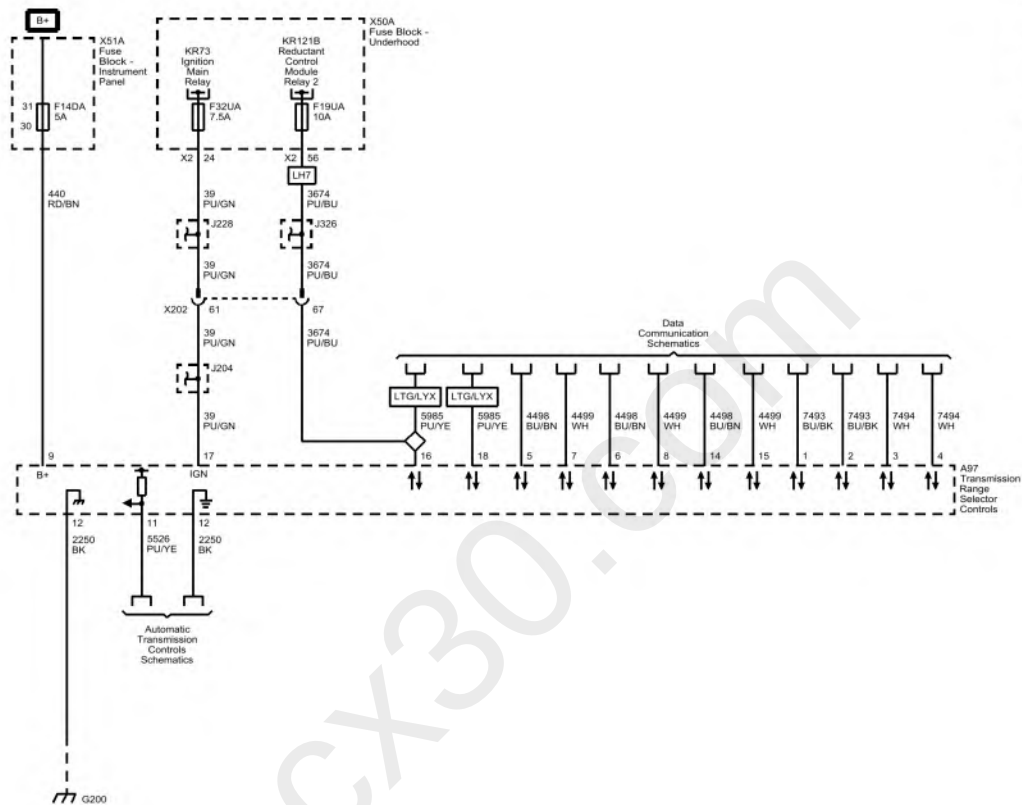
## 2018 TRANSMISSION

### Electronic Transmission Range Select - Equinox & Terrain

## SCHEMATIC WIRING DIAGRAMS

### ELECTRONIC TRANSMISSION RANGE SELECTOR WIRING SCHEMATICS

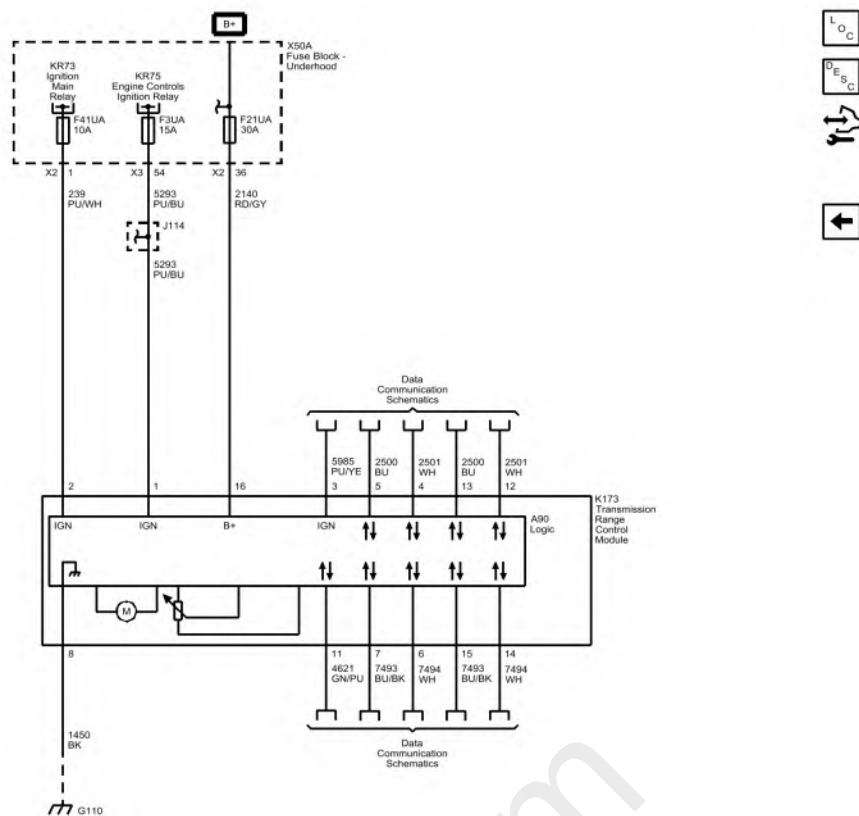
#### Electronic Shift Controls (EPH)



**Fig. 1: Electronic Shift Controls (EPH)**

Courtesy of GENERAL MOTORS COMPANY

#### Transmission Range Controls - Power, Ground and Serial Data (EPH+LH7)



**Fig. 2: Transmission Range Controls - Power, Ground and Serial Data (EPH+LH7)**  
 Courtesy of GENERAL MOTORS COMPANY

## DIAGNOSTIC INFORMATION AND PROCEDURES

### DTC B2A00: DOOR OPEN SWITCH SIGNAL - DOOR AJAR SWITCH SIGNAL 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.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

#### DTC Descriptors

#### DTC B2A00 00

Door Open Switch Signal - Door Ajar Switch Signal Not Plausible

#### Diagnostic Fault Information

| Circuit                       | Short to Ground | Open/High Resistance | Short to Voltage | Signal Performance |
|-------------------------------|-----------------|----------------------|------------------|--------------------|
| Signal                        | B2A00 00        | B2A00 00             | B2A00 00         | -                  |
| 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 Wiring Schematics](#)
- [Remote Function Wiring Schematics](#)

#### Connector End View Reference

### COMPONENT CONNECTOR END VIEWS - INDEX

#### Description and Operation

#### Keyless Entry System Description and Operation (Without ATH), Keyless Entry System Description and Operation (With ATH)

#### 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.
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](#)
    - **Go to next step: 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 below
    - **Go to next step: 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  $\Omega$  between the ground circuit terminal 3 and ground.
  - **If 10  $\Omega$  or greater**
    1. Ignition OFF.
    2. Test for less than 2  $\Omega$  in the ground circuit end to end.
      - If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
  - **Go to next step: If less than 10  $\Omega$**
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  $\Omega$  in the control circuit end to end.
      - If 2  $\Omega$  or greater, repair the open/high resistance on the circuit.
      - If less than 2  $\Omega$ , replace the K84 Keyless Entry Control Module
  - **Go to next step: 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.

- **Go to next step: If infinite resistance**

3. Test for less than 5  $\Omega$  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  $\Omega$  or greater**

Replace the A23D Door Latch Assembly-Driver.

- **Go to next step: If less than 5  $\Omega$**

4. All OK

### Repair Instructions

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

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

**DTC P073D, P073E, P07E4, P07E5, P16F4, P1769, P1772, P1773, P1774, P1778, P177A, P1787, P1789, P178A, P178B, P178C, P178D, P178E, P17CF, P17D5, P17F3, P187F OR P188A: MESSAGE COUNTER INCORRECT/BACKUP PARK LOCK ACTUATOR/TRANSMISSION RANGE (WITH MHG)**

### Diagnostic Instructions

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

### DTC Descriptor

#### DTC P073D

Unable to Engage Neutral

#### DTC P073E

Unable to Engage Reverse

#### DTC P07E4

Unable to Engage Park

#### DTC P07E5

Unable to Engage Drive

#### DTC P16F4

Control Module Transmission Range Switch Input Circuitry Performance

#### DTC P1769

Transmission Range Signal - Transmission Range Selector Shaft Position Sensor Not Plausible

#### DTC P1772

Powerflow Engaged Signal Message Counter Incorrect

#### **DTC P1773**

Internal Mode Switch State Signal Message Counter Incorrect

#### **DTC P1774**

Range Motor Position Status Message Counter Incorrect

#### **DTC P1778**

Transmission Range Availability Signal Message Counter Incorrect

#### **DTC P177A**

Backup Park Lock Actuator Status Message Counter Incorrect

#### **DTC P1787**

Unexpected Range Change Detected

#### **DTC P1789**

Current Transmission Range Unknown

#### **DTC P178A**

Commanded Transmission Range - Transmission Range Selector Shaft Position Sensor Not Plausible

#### **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 P17CF**

Backup Park Lock Actuator Supply Voltage Circuit Low Voltage

#### **DTC P17D5**

Transmission Range Control Slow Response

#### **DTC P187F**

Transmission Range Primary Input Signal Message Counter Incorrect

#### **DTC P188A**

Transmission Range Secondary Input 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 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 Transmission Range Control Module rod linkage adjustment prior to replacing the Transmission Range Control Module. Something as simple as loosening the Transmission Range Control Module mounting bolts can cause the module to be out of adjustment.

### Reference Information

Schematic Reference

### Electronic Transmission Range Selector Wiring 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. Verify all other Transmission related faults are not present.
  - **If Transmission related faults are present**

- **Go to next step: If Transmission related faults are not present**
- 2. Verify K173 Transmission Range Control Module is mounted securely and if it has a linkage ensure the linkage from 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.
  - **Go to next step: If no play is found in the mounting of the K173 Transmission Range Control Module or linkage**
- 3. Check for updated software in K173 Transmission Range Control Module.
  - **If software is not current**  
  
Perform the programming and learn procedure for the K173 Transmission Range Control Module.
  - **Go to next step: If software is up to date**
- 4. Check for updated software in K20 Engine Control Module.
  - **If software is not current**  
  
Perform the programming for the K20 Engine Control Module.
  - **Go to next step: If software is up to date**
- 5. Replace the K20 Engine Control Module
- 6. Verify above mentioned DTC's are not set.
  - **If above mentioned DTC's are set**  
  
Replace the K173 Transmission Range Control Module
  - **Go to next step: If above mentioned DTC's are not set**
- 7. All OK.

#### Repair Instructions

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

**DTC P073D, P073E, P07E4, P07E5, P16F4, P1772, P1773, P1778, P1787, P1789, P17F3, P187F OR P188A: UNABLE TO ENGAGE/SIGNAL MESSAGE COUNTER INCORRECT (WITH M3H)**

#### Diagnostic Instructions

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

#### DTC Descriptor

##### DTC P073D

Unable to Engage Neutral

##### DTC P073E

Unable to Engage Reverse

##### DTC P07E4

Unable to Engage Park

#### **DTC P07E5**

Unable to Engage Drive

#### **DTC P16F4**

Control Module Transmission Range Switch Input Circuitry Performance

#### **DTC P1772**

Powerflow Engaged Signal Message Counter Incorrect

#### **DTC P1773**

Internal Mode Switch State Signal Message Counter Incorrect

#### **DTC P1778**

Transmission Range Availability Signal Message Counter Incorrect

#### **DTC P1787**

Unexpected Range Change Detected

#### **DTC P1789**

Current Transmission Range Unknown

#### **DTC P187F**

Transmission Range Primary Input Signal Message Counter Incorrect

#### **DTC P188A**

Transmission Range Secondary Input 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.

## Reference Information

Schematic Reference

### Electronic Transmission Range Selector Wiring 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. Verify all other Transmission related faults are not present.

- **If Transmission related faults are present**

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#)

- **Go to next step: If Transmission related faults are not present**

2. Check for updated software in K71 Transmission Control Module.

- **If software is not current**

Perform the programming and learn procedure for the K71 Transmission Control Module.

- **Go to next step: If software is up to date**

3. Check for updated software in K20 Engine Control Module.

- **If software is not current**

Perform the programming for the K20 Engine Control Module.

- **Go to next step: If software is up to date**

4. Replace the K71 Transmission Control Module

5. Verify above mentioned DTC's are not set.

- **If above mentioned DTC's are set**

Replace the K20 Engine Control Module

- **Go to next step: If above mentioned DTC's are not set**

6. All OK.

## Repair Instructions

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

**DTC P07B3-P07B5, P07B7, P07B9, P07BA, P07BB, P07BD, P07BE, P17D7, P17D8, P17D9, P17DA, P17DB, P17DC, P17E3, P17E4, P17E5, P17E6, P17E7, P17E8, P17E9, P17EA, P17EB, P17EC, P17ED, P17EF, P17F0, P17F3, P17F8, P17F9, P17FD, P17FE, P1803, P1805, P1806, P1807, P180C, P180D, P180E, P180F, P1812, P1861, P1869, P186A, P186B, P186C, P186D, P189D, P18CC, P18CD, P18CE, P18CF, P18D0, P18D1, P18D2, P18D3, P18D4, P18D5, P18D6, P18D7, P18D8, P18D9, P18DA, P18DB, P18DC, P18DD, P18E0, P18E1, P18E6, P18E9, P18EA OR P18EB: TRANSMISSION PARK POSITION SWITCH, TRANSMISSION RANGE SELECTOR**

#### **Diagnostic Instructions**

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

#### **DTC Descriptor**

##### **DTC P07B3**

Transmission Park Position Switch 1 Circuit Low Voltage

##### **DTC P07B4**

Transmission Park Position Switch 1 Circuit High Voltage

##### **DTC P07B5**

Transmission Park Position Switch 1 Performance

##### **DTC P07B7**

Transmission Park Position Switch 1 Circuit Erratic

##### **DTC P07B9**

Transmission Park Position Switch 2 Circuit Low Voltage

##### **DTC P07BA**

Transmission Park Position Switch 2 Circuit High Voltage

##### **DTC P07BB**

Transmission Park Position Switch 2 Performance

##### **DTC P07BD**

Transmission Park Position Switch 2 Circuit Erratic

##### **DTC P07BE**

Transmission Park Position Switch 1-2 Not Plausible

##### **DTC P17D7**

Transmission Range Selection Signal Message Counter Incorrect

##### **DTC P17D8**

Transmission Range Selector Controls Memory Checksum Error

##### **DTC P17D9**

Transmission Range Selector Controls Long Term Memory Reset

#### **DTC P17DA**

Transmission Range Selector Controls Random Access Memory Performance

#### **DTC P17DB**

Transmission Range Selector Controls Processor Performance

#### **DTC P17DC**

Transmission Range Selector Controls Long Term Memory Performance

#### **DTC P17E3**

Transmission Range Selector Switch 1 Circuit High Voltage

#### **DTC P17E4**

Transmission Range Selector Switch 1 Circuit Low Voltage

#### **DTC P17E5**

Transmission Range Selector Switch 1 Circuit Performance

#### **DTC P17E6**

Transmission Range Selector Switch 2 Circuit High Voltage

#### **DTC P17E7**

Transmission Range Selector Switch 2 Circuit Low Voltage

#### **DTC P17E8**

Transmission Range Selector Switch 2 Circuit Performance

#### **DTC P17E9**

Transmission Range Selector Switch 3 Circuit High Voltage

#### **DTC P17EA**

Transmission Range Selector Switch 3 Circuit Low Voltage

#### **DTC P17EB**

Transmission Range Selector Switch 3 Circuit Performance

#### **DTC P17EC**

Transmission Range Selector Switch 4 Circuit High Voltage

#### **DTC P17ED**

Transmission Range Selector Switch 4 Circuit Low Voltage

#### **DTC P17EE**

Transmission Range Selector Switch 4 Circuit Performance

#### **DTC P17EF**

Transmission Range Selector Switch 5 Circuit High Voltage

**DTC P17F0**

Transmission Range Selector Switch 5 Circuit Low Voltage

**DTC P17F3**

Transmission Park Position Switch 1 or 2 Stuck On

**DTC P17F8**

Transmission Range Selector Switch 5 Circuit Performance

**DTC P17F9**

Transmission Range Selector Switch 6 Circuit High Voltage

**DTC P17FD**

Transmission Range Selector Switch 6 Circuit Low Voltage

**DTC P17FE**

Transmission Range Selector Switch 6 Circuit Performance

**DTC P1803**

Transmission Range Selector Switch 7 Circuit High Voltage

**DTC P1805**

Transmission Range Selector Switch 7 Circuit Low Voltage

**DTC P1806**

Transmission Range Selector Switch 7 Circuit Performance

**DTC P1807**

Transmission Range Selector Switch 8 Circuit High Voltage

**DTC P180C**

Transmission Range Selector Switch 8 Circuit Low Voltage

**DTC P180D**

Transmission Range Selector Switch 8 Circuit Performance

**DTC P180E**

Transmission Range Selector Switch 9 Circuit High Voltage

**DTC P180F**

Transmission Range Selector Switch 9 Circuit Low Voltage

**DTC P1812**

Transmission Range Selector Switch 9 Circuit Performance

**DTC P1861**

Transmission Range Selector Switch 10 Circuit High Voltage

**DTC P1869**

Transmission Range Selector Switch 10 Circuit Low Voltage

**DTC P186A**

Transmission Range Selector Switch 10 Circuit Performance

**DTC P186B**

Transmission Range Selector Switch 11 Circuit High Voltage

**DTC P186C**

Transmission Range Selector Switch 11 Circuit Low Voltage

**DTC P186D**

Transmission Range Selector Switch 11 Circuit Performance

**DTC P189D**

Transmission Park Position Switch 1 or 2 Stuck Off

**DTC P18CC**

Transmission Range Selector Switch 1 Circuit Erratic

**DTC P18CD**

Transmission Range Selector Switch 1 Not Plausible

**DTC P18CE**

Transmission Range Selector Switch 2 Circuit Erratic

**DTC P18CF**

Transmission Range Selector Switch 2 Not Plausible

**DTC P18D0**

Transmission Range Selector Switch 3 Circuit Erratic

**DTC P18D1**

Transmission Range Selector Switch 3 Not Plausible

**DTC P18D2**

Transmission Range Selector Switch 4 Circuit Erratic

**DTC P18D3**

Transmission Range Selector Switch 4 Not Plausible

**DTC P18D4**

Transmission Range Selector Switch 5 Circuit Erratic

**DTC P18D5**

Transmission Range Selector Switch 5 Not Plausible

**DTC P18D6**

Transmission Range Selector Switch 6 Circuit Erratic

**DTC P18D7**

Transmission Range Selector Switch 6 Not Plausible

**DTC P18D8**

Transmission Range Selector Switch 7 Circuit Erratic

**DTC P18D9**

Transmission Range Selector Switch 7 Not Plausible

**DTC P18DA**

Transmission Range Selector Switch 8 Circuit Erratic

**DTC P18DB**

Transmission Range Selector Switch 8 Not Plausible

**DTC P18DC**

Transmission Range Selector Switch 9 Circuit Erratic

**DTC P18DD**

Transmission Range Selector Switch 9 Not Plausible

**DTC P18E0**

Transmission Range Selector Switch 10 Circuit Erratic

**DTC P18E1**

Transmission Range Selector Switch 10 Not Plausible

**DTC P18E6**

Transmission Range Selector Controls Monitoring Processor Performance

**DTC P18E9**

Transmission Range Selector Switch 1-2-3 Stuck On

**DTC P18EA**

Transmission Range Selector Switch 4-5-6 Stuck On

**DTC P18EB**

Transmission Range Selector Switch 7-8-9 Stuck On

**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 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 Transmission Range Control Module rod linkage adjustment prior to replacing the Transmission Range Control Module. Something as simple as loosening the Transmission Range Control Module mounting bolts can cause the module to be out of adjustment.

## Reference Information

Schematic Reference

### Electronic Transmission Range Selector Wiring 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. Verify all other Transmission related faults are not present.
  - **If Transmission related faults are present**  
  
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#)
    - **Go to next step: If Transmission related faults are not present**
2. Verify the K20 Engine Control Module software is up to date.
  - **If software is not up to date**  
  
Program the K20 Engine Control Module.

- **Go to next step: If software is up to date**

3. Perform pull test on A97 Transmission Range Selector Controls connector to ensure it is fully seated and locked into place.
4. Disconnect and visually inspect each connector terminal of the A97 Transmission Range Selector Controls for damage or corrosion. Repair as necessary.
5. Reconnect A97 Transmission Range Selector Controls connector.
6. Verify none of the DTCs set.

- **If DTCs set**

Replace the A97 Transmission Range Selector Controls

- **Go to next step: If DTCs are not set**

7. Verify none of the DTCs set while operating the vehicle within the Conditions for Running the DTC.

- **If DTCs are set**

Replace the K20 Engine Control Module

- **Go to next step: If DTCs are not set**

8. All OK.

### Repair Instructions

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

**DTC P173A, P173B, P174C, P174D, P173E, P173F, P174B, P174C, P174D, P1771, P17AA, P17AB, P17AC, P17AD, P17AE, P17B6, P17B7, P17B8, P17B9, P17BA, P17BB, P17BC, P17BD, P17BF OR P17C8: 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.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

### DTC Descriptor

#### 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 P174C**

Transmission Range Control Module Wheel Speed Signal Message Counter Incorrect

**DTC P174D**

Transmission Range Control Module Range Not Learned

**DTC P1771**

Transmission Range Control Module Actuation Command Signal Message Counter Incorrect

**DTC P17AA**

Transmission Range Control Module Read Only Memory Performance

**DTC P17AB**

Transmission Range Control Module Not Programmed

**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 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**

Transmission Range Control Module Range Motor Enable Circuit High Voltage

**DTC P17BC**

Transmission Range Control Module Range Motor Low Voltage

**DTC P17BD**

## **DTC P17BF**

Transmission Range Control Module Range Motor Control Circuit High Current

## **DTC P17C8**

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

### **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 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 Transmission Range Control Module rod linkage adjustment prior to replacing the Transmission Range Control Module. Something as simple as loosening the Transmission Range Control Module mounting bolts can cause the module to be out of adjustment.

### **Reference Information**

Schematic Reference

### **Electronic Transmission Range Selector Wiring Schematics**

Connector End View Reference

### **COMPONENT CONNECTOR END VIEWS - INDEX**

Description and Operation

### **Electronic Transmission Range Selector Description**

- [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. Verify K173 Transmission Range Control Module is mounted securely and if it has a linkage ensure the linkage from 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 \(with MHG\)](#).
  - **Go to next step: If no play is found in the mounting of the K173 Transmission Range Control Module or linkage**
2. Check for updated software in K173 Transmission Range Control Module.
  - **If software is not current**  
  
Perform the programming and learn procedure for the K173 Transmission Range Control Module.
  - **Go to next step: If software is up to date**
3. Replace the K173 Transmission Range Control Module
4. Verify above mentioned DTC's are not set.
  - **If above mentioned DTC's are set**  
  
Replace the K20 Engine Control Module
  - **Go to next step: If above mentioned DTC's are not set**
5. All OK.

#### Repair Instructions

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

### DTC P17E0, P17E1, P17E2: TRANSMISSION RANGE SELECTOR CONTROLS IGNITION

#### Diagnostic Instructions

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

#### DTC Descriptors

#### DTC P17E0

Transmission Range Selector Controls Ignition On/Start Switch Circuit Low Voltage

#### DTC P17E1

## DTC P17E2

### Transmission Range Selector Controls Ignition Accessory Circuit Low Voltage

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

#### Circuit/System Description

The vehicle control modules or sensors monitor the system voltage to verify the system voltage is within the normal operating range.

#### Conditions for Running the DTC

The ignition is ON.

#### Conditions for Setting the DTC

The control module or sensor detects a system voltage below or above a threshold.

#### Action Taken When the DTC Sets

- A driver information center message and/or warning indicator may be displayed.
- The control module may be temporarily disabled.

#### Conditions for Clearing the DTC

The system voltage returns to normal operating range.

#### Diagnostic Aids

- A high or low voltage DTC set or voltage value in multiple modules/sensors indicates a concern in the charging system.
- A possible cause of this DTC could be overcharging with a battery charger or jump starting.

#### Reference Information

Schematic Reference

#### Electronic Transmission Range Selector Wiring 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 OFF, measure and record the battery voltage at the battery terminals.

2. Verify the battery voltage stabilizes between 12.4 and 12.8 V within a few minutes of turning the ignition OFF.

- **If battery voltage is less than 12.4 V or more than 12.8 V**

Refer to [Battery Inspection/Test](#) .

- **Go to next step: If battery voltage is between 12.4 and 12.8 V**

3. Engine running, headlights ON, measure and record the battery voltage at the battery terminals.

4. Verify the voltage is at least 1 V greater than the voltage measured in step 1, but less than 15 V.

- **If the voltage is not at least 1 V greater than the voltage measured in step 1 or is greater than 15 V.**

Refer to [Charging System Test](#) .

- **Go to next step: If the voltage is at least 1 V greater than the voltage measured in step 1, but less than 15 V.**

5. Verify the appropriate control module battery voltage and ignition voltage parameters are available in the scan tool.

- **If parameters are not available in the scan tool**

Refer to Circuit/System Testing below

- **Go to next step: If parameters are available in the scan tool**

6. Verify the appropriate control module scan tool battery voltage and ignition voltage parameters are within 1 V of the battery voltage.

- **If not within 1 V of the battery voltage**

Refer to Circuit/System Testing below

- **Go to next step: If within 1 V of the battery voltage**

7. All OK.

### **Circuit/System Testing**

**NOTE:** Some control module ground circuits may require up to 20 min after the ignition is turned off before achieving a resistance reading of less than 5  $\Omega$ . In most cases the readings will drop below 20  $\Omega$  within 1 min indicating the control module is going to sleep.

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connectors at the A97 Transmission Range Selector Controls. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 10  $\Omega$  between ground circuit terminal 12 and ground.

- **If 10  $\Omega$  or greater**

1. Ignition OFF.

2. Test for less than 2  $\Omega$  in the ground circuit end to end.

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

- **Go to next step: If less than 10  $\Omega$**

3. Verify a test lamp illuminates between B+ circuit terminal 9 and ground.

- **If the test lamp does not illuminate and the circuit fuse is good**

1. Ignition OFF.

2. Test for less than 2  $\Omega$  in the B+ circuit end to end.

- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , verify the fuse is not open and there is voltage at the fuse.

- **If the test lamp does not illuminate and the circuit fuse is open**

1. Ignition OFF.
2. Test for infinite resistance between the B+ circuit and ground.
  - If less than infinite resistance, repair the short to ground on the circuit.
  - If infinite resistance, replace the appropriate control module.
- **Go to next step: If the test lamp illuminates**
4. Ignition ON.
5. Verify a test lamp illuminates between ignition circuit terminal 17 and ground.
  - **If the test lamp does not illuminate and the circuit fuse is good**
    1. Ignition OFF.
    2. Test for less than 2  $\Omega$  in the ignition circuit end to end.
      - If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
      - If less than 2  $\Omega$ , verify the fuse is not open and there is voltage at the fuse.
  - **If the test lamp does not illuminate and the circuit fuse is open**
    1. Ignition OFF.
    2. Test for infinite resistance between the ignition circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance, replace the appropriate control module.
  - **Go to next step: If the test lamp illuminates**
6. Replace the A97 Transmission Range Selector Controls.

### Repair Instructions

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

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

## BACKUP PARK LOCK ACTUATOR ARMING (WITH MHG)

### 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 50°F (10°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 (WITH MHG)**

### **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 Engine 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 50°F (10°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.

## 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

## 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 Engine Control Module. All Transmission Range Selector Controls and Transmission Range Control Module DTC's will set in the Engine Control Module. The Engine Control Module communicates via HS GMLAN and the Powertrain Expansion Bus.

Transmission RPO: MHG

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, Powertrain Expansion Bus or LIN.

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 Engine Control Module via LIN.

The A97 Transmission Range Selector Controls in the ETRS system has no mechanical linkage to the transmission. Instead, the A97 Transmission Range Selector Controls will provide electrical signals based on customer input to the Engine Control Module, where the customer shift request will be determined.

A97 Transmission Range Selector Controls Assembly includes:

- Park Button - Park button has two internal contacts. Single push button. Normally open switch that is closed when the button is pressed. Actuation is one push.
- Reverse Button - Reverse button has three internal contacts. Single pull button. Normally open switch that is closed when the button is pressed. Actuation is one pull.
- Neutral Button - Neutral button has three internal contacts. Single push button. Normally open switch that is closed when the button is pressed. Actuation is one push.

- Drive Button - Drive button has three internal contacts. Single pull button. Normally open switch that is closed when the button is pressed. Actuation is one pull.
- Manual/Low Button - Manual/Low button has one internal contacts. Single push button. Normally open switch that is closed when the button is pressed. Actuation is one push.

K173 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:**

- A97 Transmission Range Selector Controls
- K173 Transmission Range Control Module
- Backup Park Lock is located within the K173 Transmission Range Control Module
- K20 Engine Control Module
- K71 Transmission Control Module

Transmission RPO: M3H

When a gear is selected, the Transmission will shift into the range commanded by the ETRS system. The ETRS system components will communicate on HS GMLAN and Powertrain Expansion Bus.

The Backup Park Lock functionality is internal to the Transmission, and forces the transmission into Park position under specified conditions. Under these conditions the vehicle is put in Latent Fault Mode, refer to [Latent Fault Mode Description](#).

The A97 Transmission Range Selector Controls in the ETRS system has no mechanical linkage to the transmission. Instead, the A97 Transmission Range Selector Controls will provide electrical signals based on customer input to the Engine Control Module, where the customer shift request will be determined.

A97 Transmission Range Selector Controls Assembly includes:

- Park Button - Park button has two internal contacts. Single push button. Normally open switch that is closed when the button is pressed. Actuation is one push.
- Reverse Button - Reverse button has three internal contacts. Single pull button. Normally open switch that is closed when the button is pressed. Actuation is one pull.
- Neutral Button - Neutral button has three internal contacts. Single push button. Normally open switch that is closed when the button is pressed. Actuation is one push.
- Drive Button - Drive button has three internal contacts. Single pull button. Normally open switch that is closed when the button is pressed. Actuation is one pull.
- Manual/Low Button - Manual/Low button has one internal contacts. Single push button. Normally open switch that is closed when the button is pressed. Actuation is one push.

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

- A97 Transmission Range Selector Controls
- K20 Engine Control Module
- 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.

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