RWRG0079 - Generation 1 Electronic Clutch Actuator (ECA) Only Pre-Authorized Fault Code 65 Repair Guideline

Overview
The UltraShift PLUS transmission is equipped with an Electronic Clutch Actuator (ECA) Speed Sensor that provides a secondary engine speed signal to the Transmission Electronic Control Unit (TECU). The ECA Speed Sensor is installed in the clutch housing. The ECA broadcasts the ECA Speed Sensor signal to the TECU through the High Integrity Link (HIL) contained within the transmission harness.

The TECU uses the ECA Speed Sensor signal to determine engine speed when the J1939 engine speed signal is not available. Early models have a thread-in ECA Speed Sensor installed in the flywheel housing. Fault Code 65 indicates either a loss of the signal or an electrical issue with the ECA Speed Sensor.

Note: it has been determined that performing an electrical pre-test is not needed.

Symptom(s)
• “F” flashes in gear display.
• Service light flashes (if equipped).
• No fallback mode is associated with this fault. TECU uses the vehicle engine speed signal, broadcast over J1939, to operate the transmission.

Warranty Coverage
This Warranty Repair Guideline repair DOES NOT apply if the Fault Code is Inactive and there are other Active Faults in the Eaton/OEM System. If there are other Active Faults, please follow normal troubleshooting procedure using the correct troubleshooting manual per transmission model.

This Pre-Authorization DOES NOT apply if the failed part has been replaced within the last 90 days on the truck.

The warranty coverage varies depending on vehicle vocation and transmission model type. Warranty coverage is the same as that of its respective transmission coverage including extended warranty.

Possible Causes
Note: Generation 1 only.
FMI 2
• ECA Speed Sensor
• ECA
FMI 5
• ECA Speed Sensor
• Transmission Harness
• ECA
Component Identification

1. Transmission Electronic Control Unit (TECU)
2. 38-Way Transmission Harness Connector
3. ECA Shield
4. Electronic Clutch Actuator (ECA)
5. 8-Way ECA Connector
1. Transmission Electronic Control Unit (TECU)
2. 38-Way Transmission Harness Connector
3. 8-Way ECA Connector
4. 2-Way ECA Speed Sensor Connector Body
5. 2-Way ECA Speed Sensor

- Battery Voltage
- Ignition Voltage
- Switched Battery from TECU
- Switched 5V from TECU
- Ground
- Switched Ground
- Communication
- Relay/Solenoid Driver
- Signal
Fault Code 65 Troubleshooting

Purpose: Identify ECA installed on transmission.

1. Inspect ECA OEM Power Supply Connector, reference image below.
   - If equipped with a Gen1 ECA, go to Step B.
   - If equipped with a Gen2 ECA, refer to the Troubleshooting Guide (TRTS0940, TRTS0980) on Roadranger.com. Troubleshoot the active code normally and file failed part through normal channels. This pre-authorization DOES NOT apply to Gen2 ECA part.

Purpose: Check for Active or Inactive fault codes.

1. Record the transmission fault codes, FMIs, occurrences, and timestamps from the Service Activity Report created during the Diagnostic Procedure.
   - If Fault Code 56 with FMI 2 is Active, troubleshoot code through normal channels. This Pre Authorization DOES NOT apply to active fc 56 FMI 2.
   - If Fault Code 65 is inactive and there are other active fault codes, troubleshoot active codes, go to troubleshooting Guide (TRTS0940, TRTS0980) on Roadranger.com and troubleshoot active faults. This Warranty Repair Guideline DOES NOT apply when other active codes are present.
   - If Fault Code 65 with FMI 2 or 5 is Active or Inactive, go to Step C.

Purpose: Check for Active or Inactive fault codes.

1. Retrieve fault code(s) recorded in Step A.
   - If Fault Code 65 with FMI 2 or 5 is Inactive, go to Step D.
   - If Fault Code 65 with FMI 2 or 5 is Active, go to Step E.
1. Set parking brake and chock wheels.

2. Place transmission in PD Mode. See more about Product Diagnostic (PD) Mode on page 6.  
   **Note:** Transmission does not enter PD Mode when Active fault codes exist.

3. Wiggle wiring and connections of the Transmission Harness from the 2-Way ECA Speed Sensor to the 8-Way ECA Connector. Look for signs of pinched or chafed wiring. Verify all connections are clean and tight.

4. Exit PD Mode by powering down.  
   **IMPORTANT:** Allow 2–3 minutes for the TECU to perform a complete power-down sequence before proceeding.
   - If any fault code sets Active while wiggling the Transmission Harness, replace Transmission Harness. Go to Step V.
   - If any fault code sets Active while wiggling the ECA Speed Sensor wiring, replace ECA Speed Sensor. Go to Step V.
   - If no fault code sets Active, go to Step E.

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**D**  
**Purpose:** Use Product Diagnostic (PD) Mode to locate intermittent failures.

**E**  
**Purpose:** Verify resistance of Transmission Harness and ECA Speed Sensor circuit and not shorted to ground.

1. Key off.

2. Disconnect 8-Way ECA Connector.

3. Inspect 8-Way Connector body for damage and bent, spread, corroded or loose terminals.  
   **Note:** there are two locations for the ECA Speed Sensor. early models (2010 and older) are typically found at engine flywheel. Late models can be found on clutch housing.

4. Measure resistance between 8-Way Connector Pin F and Pin G. Record reading(s) in table based on configuration.

5. Measure resistance between 8-Way ECA Connector Pin F to ground. Record reading(s) in table.
6. Compare reading(s) in table.
   - If readings are out of range, and harness is undamaged, replace ECA Speed Sensor K-4149 go to Step V.
   - If readings are in range, replace ECA with updated K-4252. go to Step V.

<table>
<thead>
<tr>
<th>ECA Speed Sensor Location</th>
<th>Pins</th>
<th>Range</th>
<th>Reading(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission Clutch Housing</td>
<td>F to G</td>
<td>2.0k–4.5k Ohms</td>
<td></td>
</tr>
<tr>
<td>Engine Flywheel Housing</td>
<td>F to G</td>
<td>140–180 Ohms</td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>F to ground</td>
<td>Open Circuit (OL)</td>
<td></td>
</tr>
</tbody>
</table>

V | Purpose: Verify repair.

1. Key off.
2. Reconnect all connectors and verify that all components are properly installed.
3. Key on with engine off.
5. Drive vehicle and attempt to reset the code or duplicate the previous complaint.
6. Check for fault codes using ServiceRanger.
   - If no fault codes set Active and vehicle operates properly, test complete.
   - If Fault Code 65 sets Active during the test drive, return to transmission specific diagnostic manual for extended trouble shooting.
   - If a fault code other than 65 sets, troubleshoot using appropriate troubleshooting manual.
Pre-Authorized Warranty Repair Guideline RWRG0079

Warranty Parts

- K-4252: Gen 2 ECA, includes adapter harness to OEM power supply and shield.
- K-4149: ECA Speed Sensor
- Varies: Transmission Harness Kit

Warranty Labor

- Transmission Harness R&R – OEM Set
- ECA R&R SRT – 0.7 hrs
- Speed Sensor R&R SRT – OEM Set
- Diagnostics – 0.5 hr
- Check Codes and Send SAR - 0.3 hr
- Software Update if not current version - 0.5 h
- Road test repair confirmation – 0.5 hrs

Warranty Coding

- Part: 4306651 (Gen 1 ECA)
  or
- Part: 4307350 (ECA Speed Sensor)

  - Complaint: FAIL LIGHT FLASHING
  - Failure: ROOT CAUSE NOT DETERMINED

Warranty Claim Filing

File Pre-Authorized warranty claim through appropriate OEM or through Direct Pay.

- RWRG0079
- OEM Warranty Coverage
- Software Revision (from and to)

Filing through Direct Pay

Click here for Direct Pay submission guidelines and claim forms:

![Submission Guidelines and Claim Forms]

Parts Disposition

Return Parts per OEM or Direct Pay guidelines.

Warranty Disclaimer

If the failure is not the result of an accident, damage, negligence, abuse or misuse, improper installation or maintenance or any other conditions described in the Limits and Exclusions section of the Eaton Warranty Manual TCWY0600, then Eaton will treat the condition as covered under its warranty. However, this conclusion does not necessarily mean that a defect in fact exists. In all cases, Eaton shall make the final determination and interpretation as to the warrantability of the product.