Transmission Lamp and Gear Display Descriptions

Overview

All UltraShift PLUS and Fuller Advantage Automated transmission systems utilize a service lamp that can be illuminated when certain system failures are detected. The service lamp may be part of the Shift Device or may be a separate light in the vehicle dash.

Additionally, UltraShift PLUS and Fuller Advantage transmission systems utilize a gear display that indicates the current state of the transmission. The gear display may be an integral part of the vehicle dash, or may be a separate dash mounted display.

This procedure describes the possible states of the service lamp and gear display.
Lamp Descriptions

Transmission Service Lamp

The Transmission Service Lamp is usually a red light that reads “Service”. However, on some chassis an amber transmission icon or “Check Trans” light may be substituted for the red Service Lamp. It may be located on the Push Button Shift Control, Shift Lever, or in the vehicle dash. The Transmission Service Lamp is commanded on and off by the Transmission Electronic Control Unit (TECU) via a direct wire, J1939, or the High Integrity Link (HIL).

- Under normal conditions, the Service Lamp lights momentarily at key-on as part of the TECU self-test.
- A continuously flashing Service Lamp indicates a currently Active fault code. However, not all fault codes will turn on the Service Lamp.
- A Service Lamp that is continuously illuminated indicates a failure of the TECU.

Hill Start Aid (HSA) Lamp

The Hill Start Aid (HSA) lamp flashes when the Hill Start Aid is turned off. The Hill Start Aid (HSA) defaults to the “On” position. In Heavy-Duty UltraShift PLUS and Fuller Advantage Automated models, HSA can be turned “Off” by pressing and releasing the HSA Switch.

Gear Display Descriptions

Solid “N” in Gear Display

Indicates that the transmission is currently in Neutral.
**Flashing “F” in Gear Display**

Indicates that the transmission has detected an Active fault code. This fault code can be accessed with the ServiceRanger diagnostic software. See *Fault Code Isolation Procedure Index* on page 14.

**Double Stars “* *” in Gear Display**

Indicates that the gear display is receiving no communication over the data link. The gear display may communicate over the J1939 or J1587 data link depending upon the specific display type. See *Diagnostic Procedure* on page 11. If no problem is found, troubleshoot the gear display connection to the J1939 or J1587 data link per OEM guidelines.

**Double Dashes “- -” in Gear Display**

Indicates that the gear display has lost communication with the TECU over the data link. The gear display may communicate over the J1939 or J1587 data link depending upon the specific display type. See *Diagnostic Procedure* on page 11. If no problem is found, troubleshoot the gear display connection to the J1939 or J1587 data link per OEM guidelines.

**Blank Gear Display**

Indicates that the gear display has lost power or has lost communication with the TECU over the data link. See *Diagnostic Procedure* on page 11. If no problem is found, troubleshoot the gear display power and ground supply per OEM guidelines.
“PD” in Gear Display

Indicates that the transmission is in Product Diagnostic (PD) Mode. See <Italic>Product Diagnostic (PD) Mode<Italic> on page 6.

“CA” in Gear Display

Indicates that a clutch abuse event is occurring.

“AN” in Gear Display

Indicates that the transmission is currently in Auto Neutral.

“GI” in Gear Display

Indicates that the clutch released bearing will need to be greased soon. See the Heavy-Duty Clutch Service Manual (CLSM0200).

“ST” in Gear Display

Indicates that the driver has recorded a Driver Triggered Snapshot in the TECU. Snapshot is a diagnostic procedure used to capture specific data at the time an event is happening. This data should be collected and reviewed at the direction of Eaton technical support.
To collect a Driver Triggered Snapshot:

1. Drive or operate vehicle and attempt to duplicate the shift complaint.

**IMPORTANT:** The purpose of this test is to duplicate the complaint and set a fault code or capture a driver triggered snapshot of the event happening.

2. If the shift complaint is duplicated, while driving capture a driver triggered snapshot of the event by placing the transmission shift device into Low (L) mode, and quickly pressing the upshift button twice.

**IMPORTANT:** Capturing the driver triggered snapshot is time sensitive; for the best results, perform this sequence immediately after the symptoms occur.

3. The transmission will set a tone and the letters “ST” will appear in the gear display if the Snapshot is captured.

**Note:** A driver triggered snapshot will capture data that cannot otherwise be captured. This data can be reviewed with Eaton technical support.

4. Key on with engine off.
5. Connect ServiceRanger.
6. Retrieve Snapshot and VPA data by creating a Service Activity Report within ServiceRanger.
7. Contact Eaton technical support at (800) 826-4357 for review.
Product Diagnostic (PD) Mode

PD Mode is used to diagnose Inactive fault codes that may have set during normal operation. This diagnostic mode increases the fault sensing capability of the transmission system, making it more likely to detect intermittent electrical or wiring issues. The PD Mode procedure tests loose, degraded and intermittent connections.

When troubleshooting an Inactive fault code, use the Fault Isolation Procedures to guide you to the wiring and connectors associated with that fault. Once PD Mode is activated, flex the wiring harness and connectors to attempt to recreate the fault.

This procedure may be used prior to performing any troubleshooting or as directed by a Fault Isolation Procedure. PD Mode may be used to troubleshoot intermittent electrical fault issues when there are no Active fault codes present.

**IMPORTANT:** The vehicle will not start in PD Mode. You must turn vehicle key off, and allow the transmission to fully power down to exit PD Mode before the vehicle will start.

PD Mode Inactive Fault Codes

The following is a list of fault codes that work with PD Mode:

13, 14, 15, 16, 17, 19, 22, 29, 33, 34, 35, 36, 43, 44, 46, 51, 52, 56, 57, 58, 61, 63, 65, 66, 67 and 99.

Entering PD Mode

**Note:** Vehicle must have no Active fault codes.

**Note:** Vehicle must be stationary, engine off with vehicle parking brake set.

8. Turn the ignition on and allow the transmission to fully power up. Verify the transmission is in Neutral.
9. Perform two key cycles of the ignition switch starting in the on position and ending in the on position.

![Ignition Switch Diagram](image)

**Note:** The gear display may flash a “88” at key on, which is a normal power-up test of the display.

![Gear Display Flashing 88](image)

- The gear display will flash a “25.” Then a solid “PD” to indicate that the transmission has entered PD Mode.

![Gear Display Flashing 25 PD](image)

**Exiting PD Mode**

- Turn the ignition key off. Allow the transmission to completely power down.

**Note:** The transmission must exit PD Mode before the engine can be started again. The transmission will no longer show “PD” in the gear display when it has exited PD Mode.
**Condition:** Engine Will Not Start

**Possible Cause:** Shift control not in Neutral, Vehicle Power and Ground

**Action:**

1. Confirm the transmission shift lever in “N” NEUTRAL and turn the ignition key to the Off position.
2. Wait at least 2 minutes.
3. Turn the Key to the ON position and wait until a solid “N” is in the gear display.
4. Turn the Key to the START position and restart the engine.
5. If the problem continues and the vehicle is inoperable, contact a service facility to have the vehicle and transmission system evaluated.

**Condition:** Transmission frequently shifting between two gears as the road terrain changes OR Transmission skip shifting OR Transmission not skip shifting.

**Possible Cause:** This is Normal Operation. The transmission constantly adapts based on weight of load, grade, and engine power. The appropriate starting gear is selected and makes shift decisions based on grade, vehicle weight, engine torque and throttle position—skip shifting when appropriate, making the most efficient shift changes based on those conditions.

**Action:** For optimal vehicle performance, it is recommended the vehicle be operated in “D” Drive mode. MULTIPLE OPERATING MODES: Automatic, Manual and Low modes offer the driver full control. In Manual mode, the driver can override computerized shifts on demand. Using Low mode can help maximize engine braking and reduce wear on brakes.
**Condition:** Transmission will not shift in Manual mode when pushing the up/down buttons.

**Possible Cause:** The ability to restrict driver use of MANUAL mode is configurable. The default setting for this configuration allows standard MANUAL mode operation in all gears. When configured to Hold Mode the MANUAL mode becomes a Hold gear function only (i.e. up/down buttons have no effect). In addition, provides an alert tone every 10 seconds. If the driver has selected MANUAL mode, and the transmission is in a gear equal to or greater than the configured Hold Gear; the transmission will remain in the current gear, up/down buttons are disabled (except for “Transmission Override” conditions). Gears lower than the configured hold gear will allow standard MANUAL mode operation.

**Action:** Fleets have the ability to choose how Manual mode is configured. Low mode may be used on downgrades instead of Manual mode if the transmission is configured to Hold Mode and the driver is unable to manually shift the transmission using the up/down buttons. Reference the transmission Driver Instruction Guide for details on Low mode and how it can be used to maximize engine braking. Changes to the transmission ECU configuration requires Fleet approval and is typically done at a dealership.

**Condition:** Transmission holds a gear instead of upshifting right after engine power-up or after changing loads OR makes an aggressive shift right after engine power-up or after changing loads OR Transmission not shifting fast enough from a stop with a loaded trailer.

**Possible Cause:** This is Normal Operation. The transmission constantly adapts based on weight of load, grade, and engine power. Right after engine power-up or after changing loads, the transmission needs to learn the new conditions. While learning, it may hold a gear longer instead of up shifting resulting in an aggressive shift at a higher rpm.

**Action:** Push the up button to start the up shift. It may take three or four shifts for Ultra-Shift to learn the new conditions. Upshifts and downshifts will now be handled automatically.

**Condition:** Truck lacks power.

**Possible Cause:** This may be Normal Operation. The appropriate gears are selected and shift decisions are based on grade, vehicle weight, engine torque and throttle position, making the most efficient shift changes. Eaton and the Engine manufactures have worked to develop shift strategies to keep the engine within its designed sweet spot.

**Action:** For optimal vehicle performance, it is recommended the vehicle be operated in “D” Drive mode. MULTIPLE OPERATING MODES: Automatic, Manual and Low modes offer the driver full control. In Manual mode, the driver can override computerized shifts on demand. Using Low mode can help maximize engine braking and reduce wear on brakes.
**Condition:** Transmission continues to pull at engine idle speed.

**Possible Cause:** Creep Mode is most likely activated and engaged. The Creep mode function allows the vehicle to be driven at a constant speed at engine idle without the need to hold the throttle pedal position. The mode is useful for very slow speed maneuvering or applications where steady vehicle speed is required. By default, Creep mode can be activated while in MANUAL or LOW mode. In some applications Creep mode may be desirable in Drive and/or Reverse.

**Action:** Fleets have the ability to choose how Creep Mode is configured. Changes to the transmission ECU configuration requires Fleet approval and is typical.