

## 68RFE - POWERTRAIN CONTROL MODULE (PCM) (68RFE)

### 68RFE PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE

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**NOTE:**

**This vehicle uses a Cummins Control Module which controls the Transmission operation and the Diesel engine operation. In these procedures, the Cummins Control Module is referred to as the Powertrain Control Module (PCM)**

The Pre-Diagnostic Troubleshooting Procedure is intended to provide the technician with a common starting point for all DTC troubleshooting procedures. The DTC troubleshooting procedures assume that the following steps have been performed and therefore are not always repeated. Failure to follow the steps in this procedure can lead to misdiagnosis.

If any repairs are performed, perform the appropriate VERIFICATION TEST.

**NOTE: Do not perform repairs not related to the customer complaint.**

1. With the scan tool, **read DTCs and record on the repair order.**

**NOTE: DTC Event Data may exist even if no DTCs are stored. DTC Event Data is erased by a Battery Disconnect, reflash, Quick Learn procedure or an actual disconnection of the battery. Clearing DTCs does NOT erase the DTC Event Data. Some DTCs require two "bad trips" before they are stored (and the MIL illuminates). The transmission may enter "limp-in" mode during the first "bad trip," but if the fault condition is not present after the vehicle is restarted, the pending DTC may be cleared without lighting the MIL. Nevertheless, the DTC Event Data for the pending DTC will remain stored and can be retrieved with the scan tool. If the customer reports a "limp-in" event but no DTCs are present, check the DTC Event Data.**

2. With the scan tool, **run a Vehicle Scan Report and a ECU Configuration Report** and save the files for future use.
3. With the scan tool, **run a Vehicle DTC Event Data Report** and save the files for future use.
4. **Check the vehicle repair history** for any recent repairs that may be related to the customer complaint.
5. If possibly related to the customer complaint, **verify the vehicle build configuration** with the OEM Vehicle Build Configuration on TechCONNECT. Properly configure the vehicle if necessary.
6. If possibly related to the customer complaint, **verify all Electronic Control Units (ECU)s have the same Original Vehicle Identification Number (VIN)**. If a mismatch is found, this could indicate the source of the problem. Typically, this condition will cause multiple communication DTCs to set however, this is not always the case.
7. With a scan tool, **check all ECUs for available software updates** that are related to the customer complaint.
  - Read Service Bulletins to determine if the software update is applicable to the customer complaint.
    - Update the (ECU)s if necessary.
8. Use the Search function in TechCONNECT to **read any related information under SERVICE ACTIONS/TIPS.**

- Perform any Service Bulletins or other procedures that may apply.
9. With the scan tool, check pinion factor (if equipped) for proper tire identification and program or reprogram if necessary.
  10. Performing a Battery Disconnect will clear all Event Data and reset all learned Transmission values to the default values which may temporarily result in erratic shift schedules.
  11. With the scan tool, perform the Shift Lever Position Test. If the test does not pass, refer to the diagnostic procedure for P0706 Transmission Range Sensor Rationality.
  12. For Gear Ratio Error DTCs, use the scan tool to view Clutch Volume Index (CVI) Monitor data. Read and record the Clutch Volume Index information.
  13. **Check for aftermarket electrical accessories.** Be certain they are installed properly and do not interfere with any related power, ground, signal, or communication circuits. Be certain aftermarket wiring harnesses are routed away from vehicle wiring harness to avoid electromagnetic interference (EMI) where applicable.  
**NOTE: A low battery State Of Charge (SOC) or a charging system that is not operating properly can cause many symptoms and DTCs to set.**
  14. If possibly related to the customer complaint, **check the vehicle charging system and battery for proper operation.** Refer to the appropriate Service Information.
  15.  
**NOTE: Incorrect fluid level, incorrect fluid, fluid contamination, and poor fluid condition can cause many Transmission symptoms. Check the Transmission Fluid for proper level and condition.** Visually inspect for external leaks and repair as necessary in accordance with the Service Information.
  16.  
**NOTE: The Engine must be operating properly for the Transmission to operate properly.** With the scan tool, read Powertrain Control Module (PCM) DTCs. **Repair all PCM DTCs prior to performing Transmission diagnostic procedures.**
  17. **Check other ECUs for DTCs** that could cause this DTC to set.
  18. If multiple DTCs are set in one ECU, and no detectable pattern is evident (i.e. the DTCs are not related to just one or two components or subsystems), **check the applicable ECU ground circuit(s) for proper continuity.** As a general rule, **diagnose the DTCs in the following order** unless instructed otherwise by the specific DTC procedure:
    - a. ECU Configuration DTCs
    - b. ECU Voltage DTCs
    - c. ECU Internal Error DTCs
    - d. Communication DTCs (See below)
    - e. Circuit Fault DTCs (Low voltage, High Voltage, Open Circuit, Short Circuit, Low Current, High Current, etc.,)
    - f. Performance / Rationality DTCs
    - g. Implausible or Invalid Data
    - h. Missing Message
    - i. Other
  19. If multiple communication DTCs are set, **diagnose the DTCs in the following order** unless instructed otherwise by the specific DTC procedure:
    - a. CAN Bus Off
    - b. CAN Bus Off Performance
    - c. Lost Communication
    - d. Other

**NOTE: IMPORTANT: Some Control Modules simply pass information from one Control Module to the other. In some cases, a U-code DTC may be set that implicates the “pass-through” module that sent the information. For example, if an Engine Coolant Temperature (ECT) Sensor DTC is set in the Powertrain Control Module**

(PCM), the HVAC module may set an “Implausible Data from BCM” DTC because the BCM is the module that normally passes that information from the PCM to the HVAC module. However, the BCM may not set any DTCs related to the faulted ECT Sensor because the BCM does not use the ECT information. In this case, the PCM ECT DTC should be diagnosed before the Implausible Data DTC. If you suspect a scenario like this, diagnose the non U-code DTC(s) before diagnosing any Implausible Data, Implausible Signal, Invalid Data, or Missing Message DTCs.