Mack Chassis - Diagnostic Trouble Code (DTC) / Fault Code SPN 1231 FMI 9 Inactive On DTC Readout, Counts In Multiples Of Three - US10 Emissions

Internal Content

When checking codes on a MP7, MP8, MP10 powered trucks built between Jan 1, 2010 and Jan 1, 2013 and an inactive fault code of SPN 1231 (SAE J1939 Data Link 2 – MID 128 PSID 229 FMI 9) or U010E (CAN Link: Lost Communication With Aftertreatment Control Module) is found logged in multiples of three (3, 6, 9, etc.) you will need to update the engine software before troubleshooting. Here is the diagnostic workflow that should be followed:

Overview: An investigation determined that a delay of communication between the EECU and ACM when TT2 is connected to a US10 emission vehicle caused this interruption and is generating unnecessary eService cases and diagnostic time. An update to the EMS software has corrected the issue and allows for an increase in the time the ECU waits for the message from ACM over J1939. This will provide the margin needed by ACM to respond over J1939 on the engine subnet without setting the fault code.

Recommended Actions:

• Is fault active

· Yes – Trouble shoot w/GD

· No – Do not troubleshoot, no action required

• Is the fault counter in multiples of three (3, 6, 9, etc.)

· Yes – Program EMS module with the latest software

· No – Trouble shoot w/GD

• Clear the fault with TT and then check for the fault using the instrument cluster (when possible), is the fault present

· Yes – Trouble shoot w/GD

· No – Do not troubleshoot, no action required

If SPN 1231 is ACTIVE or not in multiples of three, refer to the CBR solution CBR-750 for general troubleshooting of SPN 1231 FMI 9.

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US10 Emission Engines - Diagnostic Trouble Code (DTC) SPN 1231 FMI 9 Troubleshooting

SPN 1231 FMI 9 is a code indicating a disturbance on the J1939-7 datalink which enables communication between the engine and aftertreatment control modules, sensors, and components. There are numerous causes for this code, but with basic fault tracing and and a logical path of elimination, the issue can be resolved consistently. Components on J1939-7 are as follows:

- Engine Management System (EMS) MID 128
- Aftertreatment Control Module (ACM) MID 233
- Transmission Electronic Control Unit (TECU) MID 130 (If I-Shift equipped)
- Smart Remote Actuator (SRA, commonly but erroneously referred to as the VGT)
- Inlet and outlet Nox sensors

Further information and pinouts of the circuit can be found HERE.

The circuit also has two terminating resistors installed. One is internal in the EMS, the other is plugged into a dedicated connector located near the Nox sensors. These 120 ohm resistors give the datalink 60 ohms of resistance.
The datalink can be checked with the breakout harness installed at the ACM, EMS, or Engine Interface (EI) connector. Basic fault tracing values are as follows:

Positive Lead	Negative Lead	Multimeter Setting	Battery State	Key Position	Nominal Reading
J1939 High	J1939 Low	Voltage DC	Connected	On	1-5 Volts
J1939 High	J1939 Low	Voltage DC	Connected	Off	0 Volts
J1939 High	Ground	Voltage DC	Connected	On	2-5 Volts
J1939 Low	Ground	Voltage DC	Connected	On	1-3 Volts
J1939 High	J1939 Low	Ohms (Resistance)	Disconnected	Off	50-70 Ohms
J1939 High	Ground	Ohms (Resistance)	Disconnected	Off	14k Ohms
J1939 Low	Ground	Ohms (Resistance)	Disconnected	Off	14k Ohms

Verify the following:

- Remove, clean, and inspect the ring terminals on the ground stud in the frame rail. Make sure the terminals are not damaged, free of corrosion, and securely crimped to the cable.
- Remove, clean, and inspect the ring terminal on the positive

Remove, clean, and inspect the ring terminal on the positive battery post feeding power to the ACM. Make sure the terminal is not damaged, free of corrosion, and is securely crimped to the cable.

- Inspect the inline fuse connector and fuse in the battery positive feed to the ACM. Ensure the fuse is not blown, terminals secure and not corroded, and that power is consitent during a wiggle test.
- Verify battery voltage and load test
- Verify proper voltage and ground to all components on J1939-7. Ensure no high resistance on the ground circuits.
- Inspect the ACM connector for corrosion and proper pin tension on power, ground, and datalink terminals.
- Ensure no signs of DEF contamination in the DEF pump, chassis harness, or ACM connectors.

Examples of failed testing and possible causes:

- Very low resistance between J1939-7 high and low, i.e. 0.5 ohms: Datalink wires shorted together. Perform pin to pin testing to isolate the short. EI may be disconnected to isolate short to engine or chassis side.
- Very high resistance between high and low: Missing terminating resistor, faulty module, damaged/corroded wire. Ensure 120 ohms on EMS directly, ensure the terminating resistor in place in the chassis harness and functioning correctly. Disconnect each component one at a time on J1939-7 and recheck resistance after each one. If no change, wiring must be load tested from pin to pin.
- Very high voltage on high or low side: Likely shorted to power, also possible faulty module.
- Very low voltage on high or low side: Likely shorted to ground, also possible faulty module.
- Continuity to ground low i.e. 2 ohms: Likely module shorting to ground.
- Continuity to ground high i.e. 30k ohms or OL: Poor or open chassis/engine ground. EI may be disconnected and rechecked to isolate issue to chassis or engine.
- There is also a possibility of a bad module bringing the link down with no apparent faults. Disconnect each module one at a time and refresh TechTool and verify 1231 inactive.

Tags

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