



YMMS: 2011 Freightliner M2 Series - M2-106  
 Engine: Cummins ISB6.7 CM2250 6 CYL  
 VIN: 1FVACWDT8BDBA0266

Apr 21, 2021

License:  
 Odometer:

## TESTING

### STEP 1: FAULT CODE INSPECTION

**NOTE:** For Fault Code Description, see Code Description.

#### STEP 1A: ACTIVE FAULT CODES INSPECTION

**Condition:** Connect Scan Tool, Ignition on

**Action:** Inspect for active fault codes with Scan Tool.

**Specification:** Verify if Fault Codes 1879, 1881 or 1883 are active.

**Repair:**

If Fault Codes are active, go to Fault Code Index and follow proper Diagnostics.

Otherwise, go to Step 2A.

#### STEP 2A: INSPECT AFTERTREATMENT DPF DIFFERENTIAL PRESSURE SENSOR TUBES

**Condition:** Ignition off.

**Action:** Inspect Aftertreatment DPF Differential Pressure Sensor tubes for: leaks/cracks, loose fittings, missing/broken or plugging.

Ensure proper installation of differential pressure tubes, tubes may be connected backwards at rubber tubes at sensor connection.

**Specification:** Verify proper installation of Aftertreatment DPF Differential Pressure Sensor tubes.

**Repair:**

If sensor tubes are installed correctly, go to Step 3A.

If sensor tubes are not installed correctly, repair or install new Aftertreatment DPF Differential Pressure Sensor tubes and go to Step 4A.

#### STEP 3A: INSPECT AFTERTREATMENT DPF

**Condition:** Ignition off and remove Aftertreatment DPF.

**Action:** Inspect Aftertreatment System to determine if DPF is present in exhaust system and has NOT been tampered with.

**Specification:** Verify if Aftertreatment System is tampered or removed.

**Repair:**

If system is tampered or removed, install correct Aftertreatment System for vehicle, see go to Step 4A.

If system is not tampered or removed, install new Aftertreatment DPF Differential Pressure Sensor, go to Step 4A.

#### STEP 4: INSPECT ECM CALIBRATION & ERASE CODES

##### STEP 4A: ECM CALIBRATION UPDATE AVAILABILITY INSPECTION

**Condition:** Ensure all components and Scan Tool is connected.

**Action:** Make comparison of ECM Code and revision number in ECM to calibration revision number in ECM Calibration Revision History for proper changes related to this code.

Determine current ECM Code and revision number in ECM with Scan Tool. See Calibration Information section of System ID and Dataplate in Features and Parameters.

**Specification:** Verify If ECM contains most recent update for fault code (or newer version).

**Repair:**

If ECM contains most recent update for fault code (or newer version), go to Step 4B.

Otherwise, calibrate ECM, if required, go to Step 4B.

##### STEP 4B: DISABLE FAULT CODE

**Condition:** Ensure all components and Scan Tool is connected.

**Action:** Disable Fault Code and erase - run Engine using Conditions For Clearing Fault Code.

**Specification:** Verify if Fault Code is inactive.

**Repair:**

If Fault Code is inactive, repair is complete.

If Fault Code is not inactive, repeat diagnostics beginning at Step 1A.

#### ENGINE CONTROL MODULE (ECM) [ ELECTRONIC CONTROL MODULE (ECM) ]

Ignition on while monitoring fault lights. Fault lights must illuminate for 2 to 3 seconds.

If lights do **not** illuminate, inspect for damaged bulbs.

Ignition off.

Connect an electronic service tool to vehicle data link.

Ignition on.

Select monitor mode on electronic service tool. Electronic service tool **must** be able to communicate with ECM. If ECM will **not** communicate with service tool, see ECM - no communication diagnostics section.

Record values of ECM Distance Offset, ECM Time Offset, Engine Distance Offset and Engine Time Offset prior to replacement or calibration of ECM. These parameters can be found in Trip Information section of Features and Parameters.

## ENGINE CONTROL MODULE (ECM) [ TROUBLESHOOTING ]

### TROUBLESHOOTING

Use this troubleshooting procedure for following symptoms:

- No communication and Engine does not start
- No communication and Engine will start
- No communication related Scan Tool errors
- Communication with some ECMs but not all ECMs on a multi-module Engine

### HOW TO USE THIS TROUBLESHOOTING PROCEDURE

This troubleshooting guidelines will aid in determining cause of J1939 data link related communication issues between electronic service tool and ECM. Whenever required this troubleshooting guide, use references: See SPECIAL TOOLS for necessary tools to perform diagnostics.

Troubleshooting steps are structured based on information from previous steps. Perform steps in specified sequence.

This troubleshooting procedure covers various Engines, therefore some instructions are stated in a general manner. Steps and actions required for specific Engine family are also included.

### DIAGNOSTIC TIPS

Troubleshooting for this complaint uses following basic principles in structuring sequence of task.

- Verifying operation of high level system before troubleshooting individual components of system. Behavior of system will aid in determining next troubleshooting steps.
- Disconnecting ECM from vehicle using Bench Top Harness; this isolates ECM from possible vehicle issues that could be causing no communication.
- Using a test ECM or vehicle and attempting to isolate high level system issues prior to troubleshoot individual components of system.

### TESTING

#### STEP 1: SCAN TOOL ERROR CODE INSPECTION

##### STEP 1A: INSPECT SCAN TOOL ERROR CODE 5023

**Condition:** Scan Tool connected, Ignition on.

**Action:** Inspect for Scan Tool error code 5023.

Read error codes using Scan Tool tool.

**Specification:** Scan Tool error code 5023.

**Repair:**

Code 5023 is present - Go to Step 2A

Code 5023 is not present - Go to Step 1B

##### STEP 1B: INSPECT SCAN TOOL ERROR CODE 5080 OR 5081

**Condition:** Scan Tool connected, Ignition on

**Action:** Inspect for Scan Tool error code 5080 or 5081.

View error codes using Scan Tool.

**Specification:** Error code 5080 or 5081.

**Repair:**

5080 or 5081 present - Download ECM calibration. Repair complete

5080 or 5081 not present - Go to Step 1C

##### STEP 1C: INSPECT SCAN TOOL OTHER ERROR CODE

**Condition:** Scan Tool connected, Ignition on,

**Action:** Inspect to see if any Scan Tool error codes other than 5023, 5080 or 5081 is logged.

View error codes using Scan Tool.

**Specification:** Scan Tool error codes other than 5023, 5080 or 5081 logged.

**Repair:**

If as in specification - See Electronic Service Tool manual for troubleshooting guidelines.

Inspect to see if any Scan Tool error codes other than 5023, 5080 or 5081 are logged. Repair complete

Not as in specification - Go to Step 1D

##### STEP 1D: ECM PASSWORD INSPECTION

**Condition:** Scan Tool connected, Ignition on.

**Action:** Inspect to see if Scan Tool indicates ECM is password protected.

Use Scan Tool.

**Specification:** Inspect to see if Scan Tool indicates ECM is password protected.

**Repair:**

If as in specification - Enter correct password

If no password is available, consult customer regarding password. If customer fails to give information, see scan tool manual for password removal information. Repair complete

Not as in specification - Go to Step 2A

#### STEP 2: INITIAL DATA LINK ADAPTER & SCAN TOOL INSPECTION

##### STEP 2A: INITIAL DATA LINK ADAPTER INSPECTION

**Condition:** Data link adapter connected to OEM data link connector in vehicle, Scan Tool computer not connected.

**NOTE:** If hardwired to 3 Terminal Engine data link connector communication lights will not blink, go to Step 2B.

**Action:** Ignition on.

**Specification:** Flashing of communication lights on data link adapter.

- For Inline: J1708
- For Inline II, Inline 4 and Inline 5: J1708 or J1939.

If as in specification - Go to Step 2C

**Repair:**

No Repair

Not as in specification - Go to Step 2B

#### STEP 2B: DATA LINK ADAPTER RESET INSPECTION

**Condition:** Scan Tool connected to vehicle.

**Action:** Inspect data link adapter reset

Disconnect power from data link adapter and ensure it is left disconnected for 30 seconds

RE-connect power to Inline adapter

Ignition on.

**Specification:** ECM has communication link

**Repair:**

If as in specification - Repair complete

Not as in specification - Go to Step 3A

#### STEP 2C: INITIAL SCAN TOOL INSPECTION

**Condition:** Scan Tool connected to vehicle, Ignition on,

**Action:** Reboot Scan Tool PC.

Launch Scan Tool

Inspect for ECM communication.

**Specification:** ECM has communication link

**Repair:**

If as in specification - Repair complete

Not as in specification - Go to Step 2D

#### STEP 2D: DATA LINK ADAPTER VERIFICATION INSPECTION

**Condition:** None

**Action:** Inspect to see if an Inline or Inline I data link adapter is needed to communicate with ECM.

See SPECIAL TOOLS.

**Specification:** Inline or Inline I used to communicate with ECM.

**Repair:**

If as in specification - Go to Step 8A

Not as in specification - Go to Step 2E

#### STEP 2E: DATA LINK ADAPTER FIRMWARE INSPECTION

**Condition:** None

**Action:** Inspect to see if data link adapter firmware version is compatible with ECM.

See Electronic Service Tool manual.

**Specification:** Firmware version compatible with ECM.

**Repair:**

If as in specification - Go to Step 8A

Not as in specification - Go to Step 2C

Load correct firmware version

#### STEP 3: INSPECT BENCH COMMUNICATION SETUP

##### STEP 3A: INSPECT BENCH SETUP AVAILABILITY

**Condition:** Bench setup available.

**Action:** Ensure availability.

**Specification:** A bench setup available.

**Repair:**

If available - Go to Step 3B

Not as in specification - Go to Step 3A-1

##### STEP 3A-1: INSPECT TO SEE IF ENGINE STARTS

**Condition:** None

**Action:** Inspect to see if Engine starts.

**Specification:** Engine starts

**Repair:**

If as in specification - Go to Step 5A

Not as in specification - Go to Step 4A

##### STEP 3B: INSPECT INITIAL BENCH SETUP COMMUNICATION

**Condition:** Same Scan Tool PC being used as was used for previous inspections, bench setup connected to ECM, Bench top calibration harness Ignition on.

**Action:** Establish communication with ECM using bench setup.

**Specification:** ECM communicates with bench setup.

**Repair:**

If as in specification - Go to Step 3B-1

Not as in specification - Go to Step 3C

#### **STEP 3B-1: INSPECT TO SEE IF ENGINE STARTS**

**Condition:** None

**Action:** From ECM, disconnect bench top calibration cable.

Connect ECM to original Engine or OEM wiring harness connector. Inspect to see if Engine starts.

**Specification:** Engine starts

**Repair:**

If as in specification - Go to Step 5A

Not as in specification - Go to Step 4A

#### **STEP 3C: SECOND VEHICLE OR SECOND ECM AVAILABILITY INSPECT FOR BENCH SETUP**

**Condition:** Second vehicle / ECM available for testing.

**Action:** Inspect to see if a second vehicle or second ECM is available to connect to bench setup.

**Specification:** A second vehicle / ECM available to connect to bench setup.

**Repair:**

If as in specification - Go to Step 3D

Not as in specification - Go to Step 3E

#### **STEP 3D: INITIAL BENCH SETUP FUNCTIONALITY INSPECTION**

**Condition:** Same Scan Tool PC and bench setup tools that were originally used on problem vehicle are used, bench setup hardwired to second vehicle or second ECM, Bench top calibration harness Ignition on.

**Action:** Establish communication with ECM on second vehicle or a spare ECM using bench setup.

**Specification:** Second ECM communicates using bench setup.

**Repair:**

If as in specification - Go to Step 11A

Not as in specification - Go to Step 3E

#### **STEP 3E: TROUBLESHOOT BENCH SETUP HARDWARE**

**Condition:** None

**Action:** Troubleshoot these areas:

- Bench calibration cable
- Bench calibration harness
- Serial cable.

Perform troubleshooting procedures for evaluating bench calibration cable, bench calibration harness and serial cable.

**Specification:** Bench setup inspection proves okay.

If as in specification - Go to Step 3F

Not as in specification - Go to Step 3B

**Repair:**

Repair or replace bench calibration cable, bench calibration harness or serial cable as necessary.

#### **STEP 3F: DATA LINK ADAPTER REPLACEMENT INSPECTION**

**Condition:** None

**Action:** Use a replacement data link and attempt to communicate with bench setup.

**Specification:** Bench setup communicates with second ECM.

**Repair:**

If as in specification - Go to Step 3B

Use replacement data link adapter.

Not as in specification - Go to Step 3E

There is issue with bench setup. Troubleshoot bench setup again.

#### **STEP 4: ECM POWER UP CIRCUIT INSPECTION**

##### **STEP 4A: ENGINE CONFIGURATION INSPECTION**

**Condition:** None

**Action:** Determine if Engine has a fuel shutoff valve

**Specification:** A fuel shutoff valve is used.

**Repair:**

If as in specification - Go to Step 4A-1

Not as in specification - Go to Step 4A-2

##### **STEP 4A-1: INSPECT FUEL SHUTOFF VALVE VOLTAGE**

**Condition:** Ignition on.

**Action:** Inspect for voltage across fuel shutoff valve post to Engine block ground.

Fuel shutoff valve voltage needs to be within 1-Volt of vehicle system voltage; 12 and 24 Volt systems are employed.

**Specification:** Fuel shutoff valve voltage within 1-Volt of vehicle system voltage.

**Repair:**

If as in specification - Go to Step 5A

Not as in specification - Go to Step 4B

**STEP 4A-2: COOLANT TEMPERATURE SENSOR SIGNAL VOLTAGE INSPECTION**

**Condition:** Ignition on, coolant temperature Sensor Connector disconnected.

**Action:** Inspect voltage across 2 Terminals of coolant temperature sensor on wiring harness connector.

Use appropriate ENGINE PERFORMANCE WIRING DIAGRAMS to identify connector Terminal.

**Specification:** More than 4.5-Volt coolant temperature signal voltage.

**Repair:**

If as in specification - Go to step 5A

Not as in specification - Go to step 4B

**STEP 4B: ECM IGNITION VOLTAGE INSPECTION**

**Condition:** Ignition OFF, disconnect wiring harness connector containing Ignition signal disconnected from ECM, Ignition on.

**Action:** Inspect for voltage across Ignition input SIGNAL wire of wiring harness and Engine block ground. Use appropriate ENGINE PERFORMANCE WIRING DIAGRAMS to identify connector Terminal.

**Specification:** Ignition voltage within 1-Volt of vehicle system voltage.

**Repair:**

If as in specification - Go to step 4C

Not as specified - Repair or replace wiring harness containing Ignition signal or repair or replace Ignition or inspect Battery connection.

**STEP 4C: INSPECT ECM POWER & GROUND**

**Condition:** Ignition off.

Disconnect wiring harness from ECM wiring harness connector containing ECM Battery SUPPLY Negative and SUPPLY Positive wiring.

**Action:** Inspect for voltage across each ECM Battery SUPPLY Positive Terminal to all Battery SUPPLY Negative Terminals in wiring harness connector.

Use appropriate ENGINE PERFORMANCE WIRING DIAGRAMS to identify connector Terminal.

**Specification:** ECM Battery supply voltage equals to Battery voltage.

**Repair:**

If as in specification see applicable troubleshooting and repair information. Repair complete

Not as specified - Repair or replace wiring harness containing ECM Battery SUPPLY Positive and Battery SUPPLY Negative wiring.

See Engine performance troubleshooting guide, if no start still occurs.

**STEP 5: INITIAL ELECTRONIC TOOL INSPECTION****STEP 5A: BENCH SETUP PREVIOUSLY USED FOR TROUBLESHOOTING INSPECTION**

**Condition:** None

**Action:** Verify if bench setup was used to communicate with ECM in Step 3.

**Specification:** Bench setup was used.

**Repair:**

If as in specification - Go to Step 6A

ECM is okay, repair complete if communication is not required through OEM data link connector or harness. If communication link is needed, continue to Step 6A.

Not as in specification - Go to Step 5B

**STEP 5B: SECOND VEHICLE AVAILABILITY INSPECTION FOR ELECTRONIC TOOL**

**Condition:** Second vehicle available for testing

**Action:** Inspect to see if a second vehicle is available to connect to electronic tool.

**Specification:** A second vehicle available to connect to electronic tool.

**Repair:**

If as in specification - Go to 5C

Not as in specification - Go to 6A

**STEP 5C: INITIAL ELECTRONIC TOOL FUNCTIONALITY INSPECTION**

**Condition:** Scan tool connected to a second vehicle Ignition on.

**Action:** Establish communication with ECM on second vehicle using same electronic tool hardware used on problem vehicle.

**Specification:** Second ECM communicates using electronic tool.

**Repair:**

If as in specification - Go to 6A

Not as in specification - Go to 9A

**STEP 6: DATA LINK ADAPTER POWER INSPECTION****STEP 6A: DATA LINK ADAPTER DETERMINATION INSPECTION**

**Condition:** None

**Action:** Inspect to see if an Inline 1 data link adapter is needed to establish communication with Scan Tool.

See special tools.

**Specification:** An Inline I data link adapter is using to communicate with Scan Tool.

**Repair:**

If as in specification - Go to 6G

Not as in specification - Go to 6B

#### STEP 6B: INSPECT DATA LINK ADAPTER POWER

**Condition:** Inline 1 data link adapter not used, electronic tool hardware connected to vehicle, Scan Tool launched, Ignition on.

**Action:** For all data link adapters except Inline I; establish communication with Scan Tool and Inspect to see if data link adapter power light turns ON.

See Electronic Service Tool manual.

**Specification:** Data link adapter power light turned on.

**Repair:**

If as in specification - Go to 7A

Not as in specification - Go to 6C

#### STEP 6C: DETERMINATION IF COMMUNICATION IS BEING ATTEMPTED AT OEM DATA LINK DASH CONNECTOR

**Condition:** None

**Action:** Inspect to see if communication is attempted at OEM data link dash connector.

**Specification:** Communication attempted at OEM data link dash connector.

**Repair:**

If as in specification - Go to 6D

Not as in specification - Go to 6E

#### STEP 6D: OEM DATA LINK DASH CONNECTOR VOLTAGE INSPECTION

**Condition:** Ignition on.

**Action:** Inspect voltage from SUPPLY to ground Terminals of OEM data link connector.

Use appropriate ENGINE PERFORMANCE WIRING DIAGRAMS for Terminal identification.

**Specification:** Equal to or more than 9 Volt.

**Repair:**

If as in specification - Replace data link adapter Repair complete

Not as in specification - Go to step 6F

#### STEP 6E: INSPECT VOLTAGE AT DATA LINK ADAPTER AUXILIARY POWER SUPPLY

**Condition:** Ignition on.

**Action:** Determine data link adapter supply voltage at data link adapter harness connector.

Use appropriate ENGINE PERFORMANCE WIRING DIAGRAMS for Terminal identification.

**Specification:** Equal to or more than 9-Volt.

**Repair:**

If as in specification - Replace data link adapter. Repair complete

Not as in specification - Go to 6F

#### STEP 6F: INSPECT VOLTAGE AT VEHICLE BATTERY

**Condition:** None

**Action:** Inspect vehicle Battery voltage in all cases except if using an Inline I. If using an Inline I, measure data link adapter voltage supply from computer.

**Specification:** Equal to or more than 11-Volt.

**Repair:**

If as in specification - Repair or replace damaged wiring. Repair complete

Not as specified - Clean Battery connections or replace Batteries. Repair complete

#### STEP 6G: COMPUTER SERIAL PORT VOLTAGE INSPECTION

**Condition:** None

**Action:**

**NOTE:** For Inline I only.

Inspect voltage across SIGNAL ground Terminal and data Terminal ready Terminal and SIGNAL ground Terminal and request to send Terminal on computer serial port.

Use appropriate ENGINE PERFORMANCE WIRING DIAGRAMS for Terminal identification.

**Specification:** At least 5 Volt.

**Repair:**

If as in specification - Replace data link adapter Repair complete

Not as specified - Consult PC administration support. Repair complete

#### STEP 7A: INSPECT J1939 OR J1587 CIRCUITS

**Condition:** None

**Action:** Based on data link circuit being used, inspect J1939 circuit using following procedures.

See in applicable troubleshooting and repair information.

Information on complete resistance inspection, inspection for short circuit to ground and short circuit from Terminal to Terminal are given in this procedure.

**Specification:** Circuit inspections are okay.

**Repair:**

If as in specification - Go to step 11A

Not as specified - Repair or replace harness with data link problem, either Engine or OEM harness. Repair complete

**STEP 8: INITIAL ELECTRONIC TOOL INSPECTION****STEP 8A: SECOND VEHICLE AVAILABILITY INSPECTION FOR ELECTRONIC TOOL**

**Condition:** Second vehicle available for testing

**Action:** Inspect to see if a second vehicle is available to connect to electronic tool.

**Specification:** A second vehicle available.

**Repair:**

If as in specification - Go to 8B

Not as in specification - Go to 10A

**STEP 8B: INITIAL ELECTRONIC TOOL FUNCTIONALITY INSPECTION**

**Condition:** Scan tool hardwired to second vehicle

**Action:** Using scan tool, establish communication with ECM on second vehicle.

**Specification:** Second ECM communicates using electronic tool.

**Repair:**

If as in specification - Go to 11A

Not as in specification - Go to 10A

**STEP 9A: TROUBLESHOOT ELECTRONIC TOOL HARDWARE**

**Condition:** None

**Action:** Evaluate following electronic tool hardware using troubleshooting procedures:

- Data link adapter cable
- Data link adapter power supply cable
- Data link adapter
- Serial cable
- Computer.

Complete following inspections:

- Scan Tool - Initial Inspection
- Data link Adapters - Initial Inspection
- Serial Cable - Resistance Inspection
- Data link adapter cable and data link adapter power supply cable - Resistance Inspection.

**Specification:** All electronic tool hardware pass inspections.

**Repair:**

If as in specification - Go to step 11A

Not as specified - Repair or replace damaged hardware. Repair complete

**STEP 10A: TROUBLESHOOT SERIAL CABLE & COMPUTER**

**Condition:** None

**Action:** Evaluate serial cable and computer using troubleshooting procedures.

Perform:

- Scan Tool - Initial Inspection
- Serial Cable - Resistance Inspection.

**Specification:** Serial cable and computer inspection okay.

**Repair:**

If as in specification - Go to step 11A

Not as specified - Repair or replace damaged hardware. Repair complete

**STEP 11: ROM BOOT ECM****STEP 11A: ROM BOOT TOOL AVAILABILITY INSPECTION**

**Condition:** None

**Action:** Inspect to see if ROM boot tool is available for specific ECM.

**Specification:** ROM boot tool available.

**Repair:**

If as in specification - Go to step 11B

Not as specified - Replace ECM.

**STEP 11B: ROM BOOT ECM**

**Condition:** None

**Action:** ROM boot ECM.

**Specification:** ECM has communication link

**Repair:**

If as in specification - Re-calibrate ECM. Repair complete

Not as specified - Replace ECM.