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Service Information Bulletin

SUBJECT	DATE
SPN 625 (CPC)(GHG17) and SPN 625 (CPC) (EPA10;GHG14)	June 2016

Additions, Revisions, or Updates

Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN- 0193	GHG17 DD Medium Duty	SPN 625/FMI 2, 4, 8, 9, 13, 14 - GHG17	New DD5 and DD8 diagnostic procedures
DDC-SVC-MAN- 0191	GHG17 DD Heavy Duty	SPN 625/FMI 2, 4, 8, 9, 13, 14 - GHG17	Updated GHG17 HDEP diagnostic procedures
DDC-SVC-MAN- 0084	EPA10, GHG14 DD Heavy Duty	SPN 625/FMI 2, 4, 8, 9, 14 - EPA10 - GHG14	Updated EPA10 and GHG14 HDEP diagnostic procedures

DiagnosticLink users: Please update the troubleshooting guides in DiagnosticLink with this newest version. To update the tool troubleshooting guide, open DiagnosticLink and from the Help – Troubleshooting Guides menu, select the appropriate troubleshooting manual, then click Update.



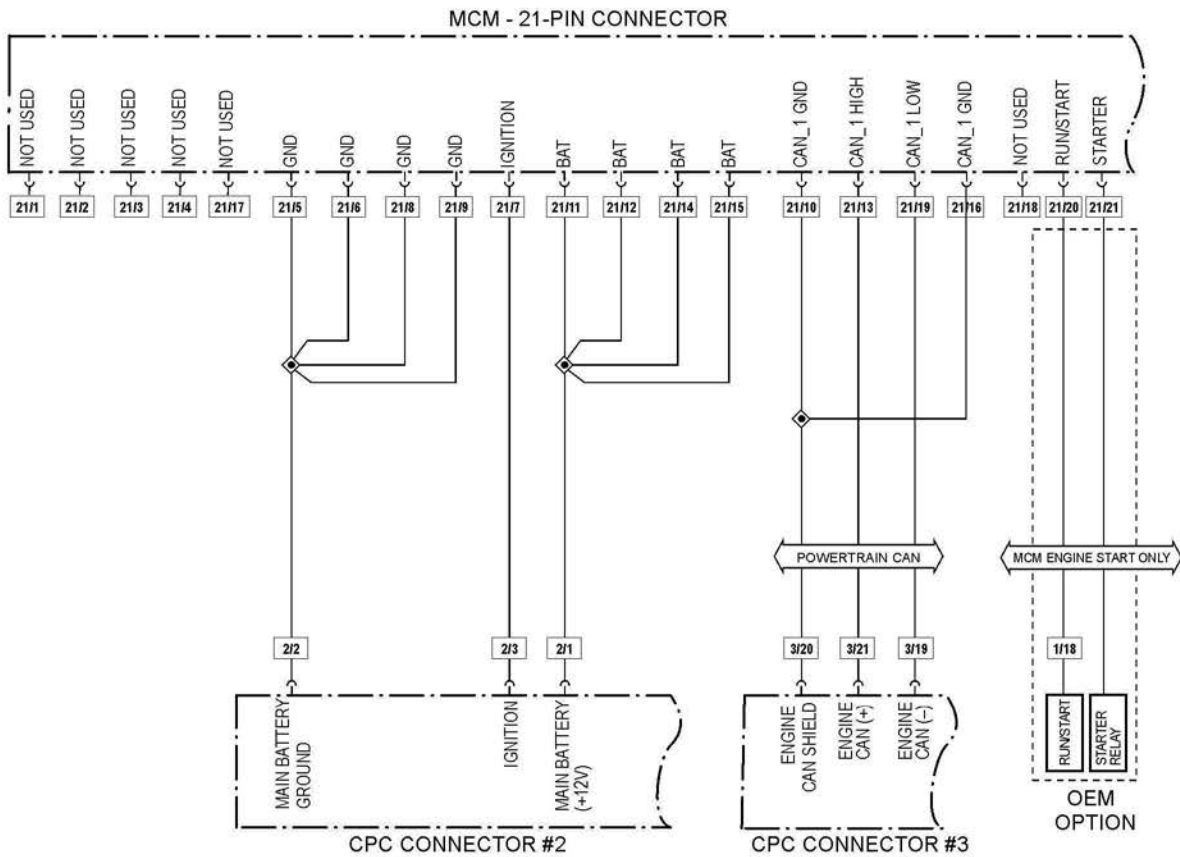
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2 SPN 625/FMI 2 - GHG17

PTCAN Incorrect MCM System ID Received

Table 1.

SPN 625/FMI 2	
Description	Invalid Data on Engine Controller Area Network (CAN) Link
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	
Verification	Engine Idle (One Minute)



d150388

Check as follows:

1. Have the Motor Control Module (MCM) and/or the Common Powertrain Controller (CPC) recently been changed or reprogrammed?
 - a. Yes; verify that the correct MCM calibration and/or the correct CPC parameter list has been installed. If the correct calibration and correct parameter list have been installed, then Go to step 2.
 - b. No; Go to step 2.
2. Disconnect the MCM 21-pin connector.
3. Turn the ignition ON (key ON, engine OFF).

NOTE: Poor battery grounds can be a possible cause of low battery voltage.

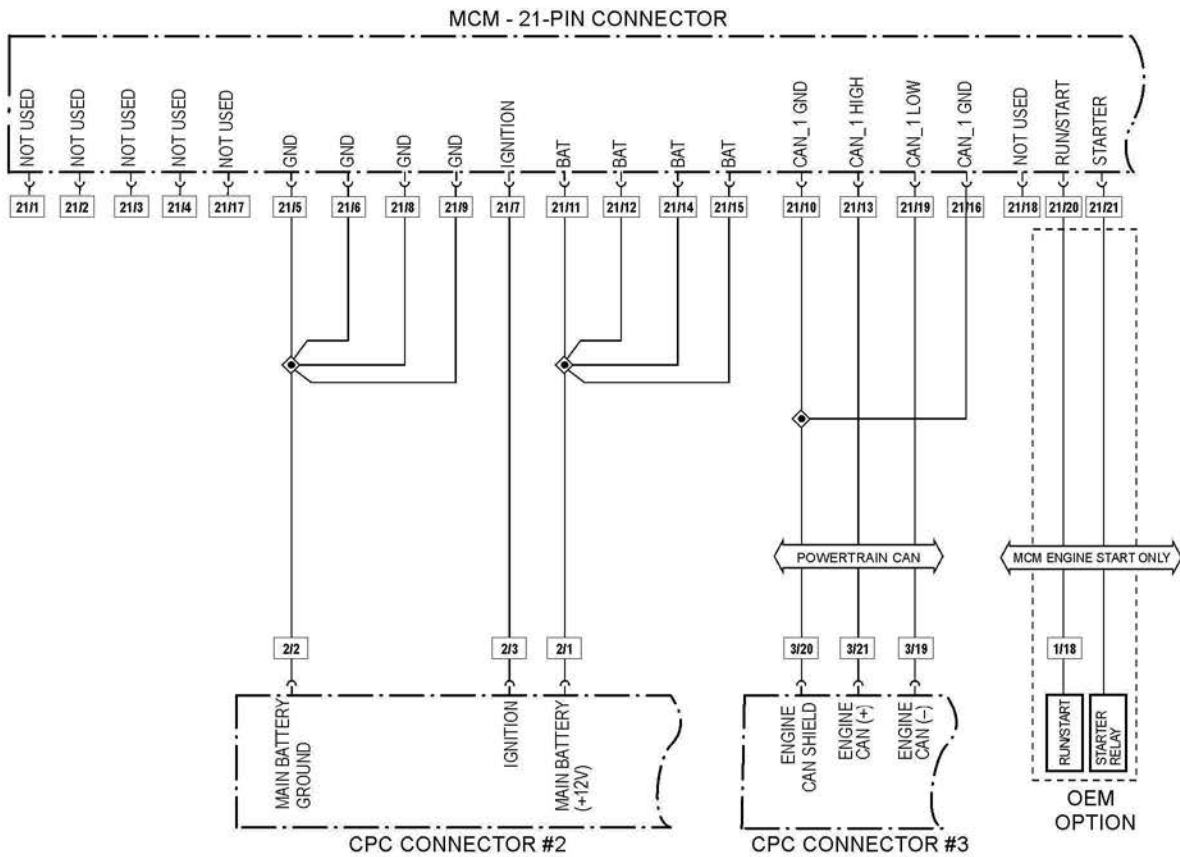
4. Measure the battery voltage at pin 7 on the MCM 21-pin connector. Is the battery voltage less than 10.5 volts?
 - a. Yes; restore the battery voltage at pins 7, 11, 12, 14, and 15 on the MCM 21-pin connector.
 - b. No; Go to step 5.
5. Turn ignition OFF. Leave the MCM 21-pin connector disconnected.
6. Disconnect the CPC connector #3.
7. Measure the resistance between pins 21 and 19 of the CPC connector #3. Is the resistance greater than five ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the short circuit in the wires between pins 21 and 19 of the CPC connector #3 and pins 13 and 19 of the MCM 21-pin connector.
8. Measure the resistance between pin 21 of the CPC #3 connector and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the short circuit to ground between pin 21 of the CPC connector #3 and ground.
9. Check the resistance between pin 19 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 10.
 - b. No; repair the short circuit to ground between pin 19 of the CPC connector #3 and ground.
10. Measure the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector.
 - b. No; Go to step 11.
11. Measure the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
 - b. No; replace the CPC. Refer to OEM procedures.

3 SPN 625/FMI 4 - GHG17

ECAN Link Circuit Failure

Table 2.

SPN 625/FMI 4	
Description	Erratic Data on Engine Controller Area Network (CAN) Link
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	
Verification	Engine Idle (One Minute)



d150388

Check as follows:

NOTE: This diagnostic is typically erratic data or the CAN propriety data link has failed between the MCM and the CPC.

1. Have the Motor Control Module (MCM) and/or the Common Powertrain Controller (CPC) recently been changed or reprogrammed?
 - a. Yes; verify that the correct MCM calibration and/or the correct CPC parameter list has been installed. If the correct calibration and correct parameter list have been installed, then Go to step 2.
 - b. No; Go to step 2.
2. Disconnect the MCM 21-pin connector.
3. Turn the ignition ON (key ON, engine OFF).

NOTE: Poor battery grounds can be a possible cause of low battery voltage.

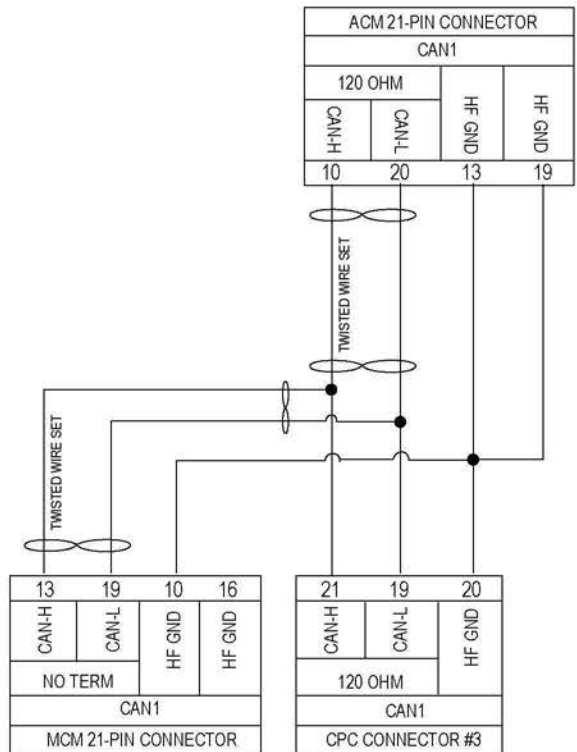
4. Measure the battery voltage at pin 7 on the MCM 21-pin connector. Is the battery voltage less than 10.5 volts?
 - a. Yes; restore the battery voltage at pins 7, 11, 12, 14, and 15 on the MCM 21-pin connector.
 - b. No; Go to step 5.
5. Turn ignition OFF; leave the MCM 21-pin connector disconnected.
6. Disconnect the CPC connector #3.
7. Measure the resistance between pins 19 and 21 of the CPC connector #3. Is the resistance greater than five ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the short circuit in the wires between pins 19 and 21 of the CPC connector #3 and pins 13 and 19 of the MCM 21-pin connector.
8. Measure the resistance between pin 19 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the short circuit to ground between pin 19 of the CPC connector #3 and ground.
9. Check the resistance between pin 21 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 10.
 - b. No; repair the short circuit to ground between pin 21 of the CPC connector #3 and ground.
10. Measure the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector.
 - b. No; Go to step 11.
11. Measure the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
 - b. No; replace the CPC. Refer to OEM procedures.

4 SPN 625/FMI 8 - GHG17

MCM PT-CAN DM1 Message Not Received or has Stopped Arriving

Table 3.

SPN 625/FMI 8	
Description	Powertrain Controller Area Network DM1 Message Not Received Or Has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	2 Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None

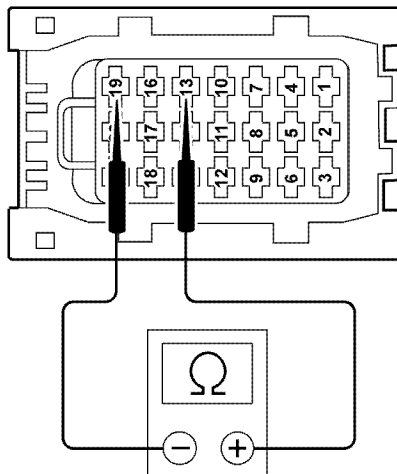


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Check as follows:

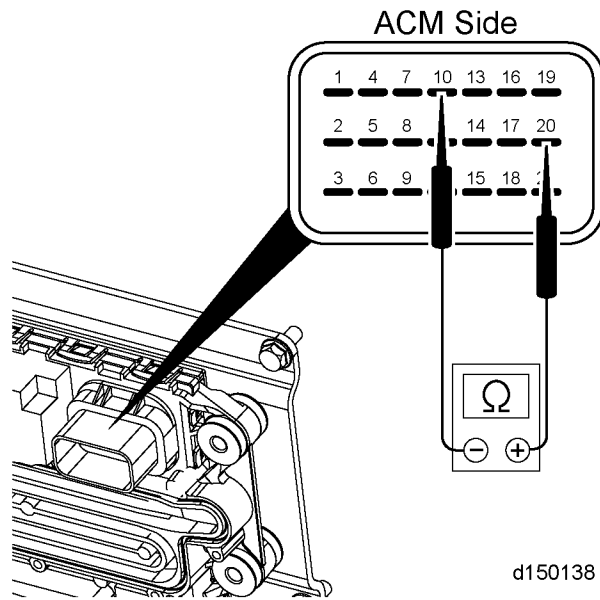
1. Are there any battery voltage faults present (SPN 168/FMI any)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Have the Aftertreatment Control Module (ACM), Motor Control Module (MCM) or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle. If faults become active, Go to step 3.
 - b. No; Go to step 3.

3. Turn ignition OFF and wait five minutes before proceeding. Main battery power must be left ON (the five-minute time frame allows the ACM to go completely offline).
4. Disconnect the MCM 21-pin connector.
5. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 6.

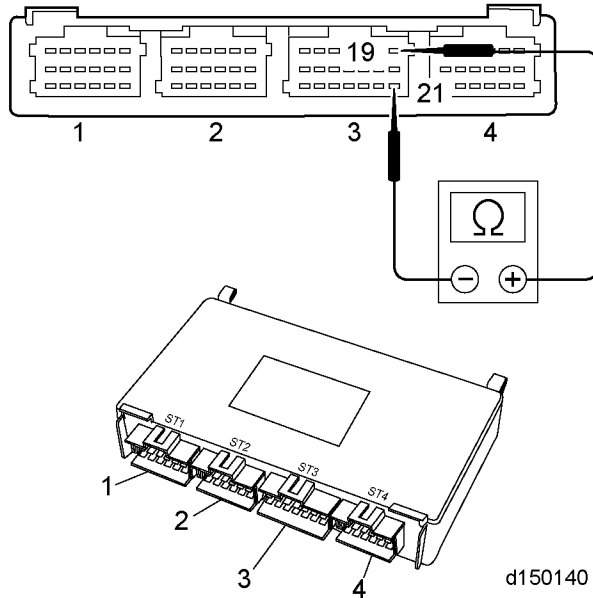


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6. Measure and record the resistance across pins 13 and 19 of the MCM 21-pin connector. Is the resistance greater than 80 ohms?
 - a. Yes; Go to step 9.
 - b. No; Go to step 7.
7. Is the resistance reading from step 6 less than five ohms?
 - a. Yes; replace the PT-CAN harness.
 - b. No; Go to step 8.
8. Is the resistance from step 6 between 40 and 80 ohms?
 - a. Yes; Go to step 21.
 - b. No; Go to step 9.
9. Disconnect the ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector. Is the resistance between 110 and 130 ohms?

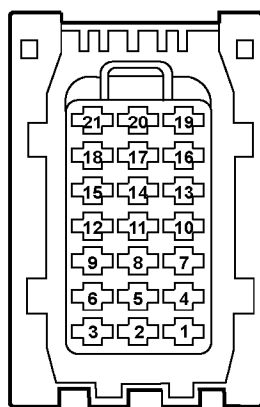


- a. Yes; Go to step 12.
 - b. No; replace the ACM.
12. Disconnect the CPC connector #3.
 13. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 14.
 14. Check CPC internal terminating resistor by measuring the resistance across pins 19 and 21 of the CPC electrical connector #3, component side. Is the resistance between 110 and 130 ohms?



- a. Yes; Go to step 15.
 - b. No; replace the CPC.
15. Measure and record the resistance between pin 19 of CPC connector #3, and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 16.
 - b. No; repair the wire between pin 19 of the CPC connector #3, and pin 20 of the ACM 21-pin connector.

16. Measure and record the resistance between pin 21 of the CPC connector #3, and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 21 of the CPC connector #3, and pin 10 of the ACM 21-pin connector.
17. Measure and record the resistance between pin 19 of the CPC connector #3, and pin 19 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 19 of the CPC connector #3, and pin 19 of the MCM 21-pin connector.
18. Measure and record the resistance between pin 21 of the CPC connector #3, and pin 13 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the wire between pin 21 of the CPC connector #3, and pin 13 of the MCM 21-pin connector.
19. Measure and record the resistance between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 20.
 - b. No; repair the wire between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector.
20. Measure and record the resistance between the pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; replace the MCM. Refer to section "*Removal of the Motor Control Module*".
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector
21. Turn the ignition ON (key ON, engine OFF).



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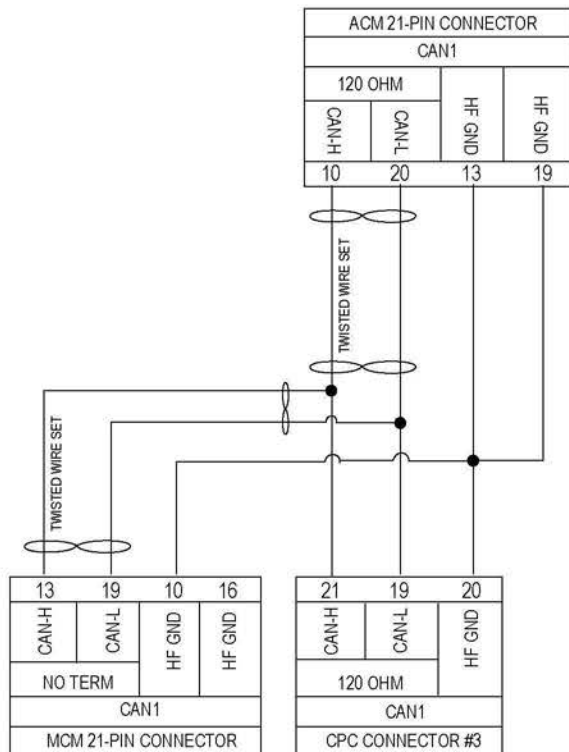
22. Measure the voltage between pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector (ignition/battery voltage) and ground. Is the voltage less than 11.5 volts?
 - a. Yes; restore voltage to pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector.
 - b. No; Go to step 23.
23. Turn the ignition OFF.
24. Measure the resistance between pins 5, 6, 8 and 9 of the MCM 21-pin connector and the negative battery post. Is resistance greater than five ohms?
 - a. Yes; restore the battery ground to pins 5, 6, 8 and 9 of the 21-pin connector.
 - b. No; Go to step 25.
25. Disconnect MCM 120-pin connector and inspect connector for corrosion, or oil, fuel or water intrusion. Is contamination found?
 - a. Yes; repair as necessary.
 - b. No; install a test MCM. If communication is restored (fault inactive), replace the MCM. Refer to section "*Removal of the Motor Control Module*".

5 SPN 625/FMI 9 - GHG17

ACM PT-CAN DM1 Message Not Received or has Stopped Arriving

Table 4.

SPN 625/FMI 9	
Description	Aftertreatment Control Module PT-CAN DM1 Message Not Received or has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None
Verification	Ignition Cycle



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Check as follows:

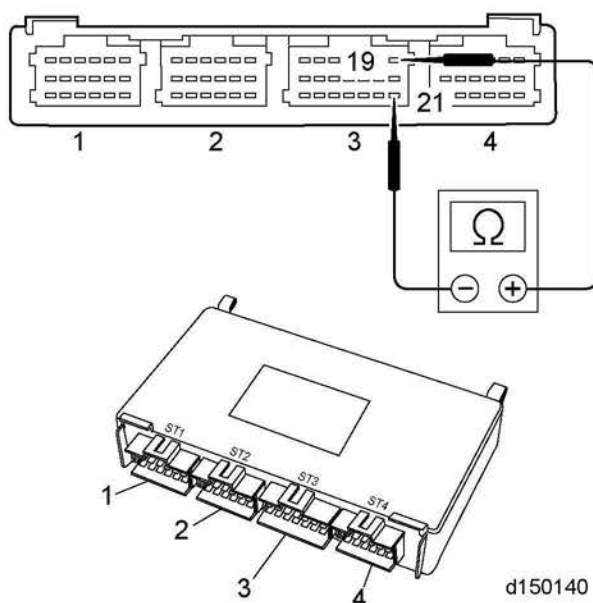
1. Are there any battery voltage faults (SPN 168/FMI any faults)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Has the Aftertreatment Control Module (ACM), Motor Control Module (MCM), or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle. If faults become active, Go to step 3.
 - b. No; Go to step 3.

NOTE: ACM, MCM, and CPC all communicate on the same CAN line. If water penetrates any connector, it can short the CAN line and may prevent communications with other ECUs.

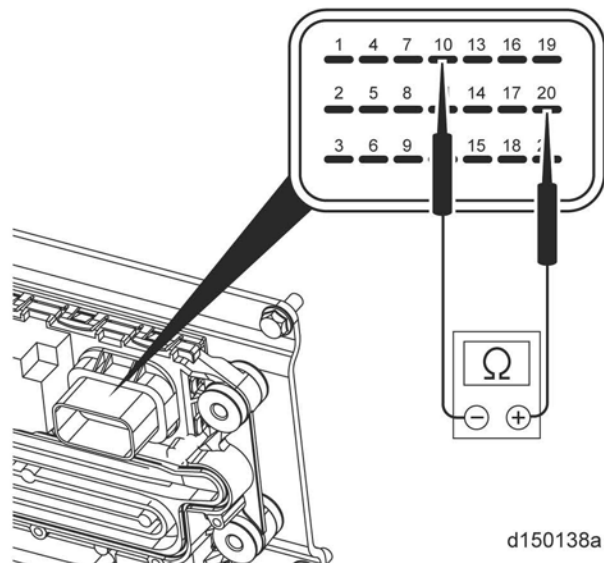
NOTE: Main battery power must be left ON.

NOTE: The five-minute time-frame allows the ACM to go completely offline.

3. Turn ignition OFF and wait five minutes before proceeding.
4. Disconnect the CPC electrical harness connector #3.
5. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 6.
6. Check CPC internal terminating resistor by measuring the resistance across pins 19 and 21 of the CPC electrical connector #3, component side. Is the resistance between 110 and 130 ohms?



- a. Yes; Go to step 7.
 - b. No; replace the CPC. Go to step 20.
7. Measure the resistance between pin 19 of the CPC connector #3, harness side and battery ground. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the wire short to ground between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Go to step 20.
8. Measure the resistance between pin 21 of the CPC connector #3, harness side and battery ground. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the wire short to ground between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
9. Disconnect ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector, component side. Is the resistance between 110 to 130 ohms?



- a. Yes; Go to step 12.
 - b. No; replace the ACM. Go to step 20.
12. Check the resistance between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 13.
 - b. No; repair the wire between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Go to step 20.
 13. Measure the resistance between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 14.
 - b. No; repair the wire between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
 14. Disconnect MCM 21-pin connector.
 15. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 16.
 16. Measure the resistance between pin 19 of the CPC connector #3, harness side and pin 19 of the MCM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 19 of the CPC connector #3, harness side and pin 19 of the MCM 21-pin connector, harness side. Go to step 20.
 17. Measure the resistance between pin 21 of the CPC connector #3, harness side and pin 13 of the MCM 21-pin harness connector. Is the resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 21 of the CPC connector #3, harness side and pin 13 of the MCM 21-pin harness connector. Go to step 20.

NOTE: Ensure MCM and ACM connectors are disconnected during this step.

18. Measure the resistance between pins 19 and 21 of the CPC connector #3, harness side. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the harness shorted wires between pin 19 and pin 21 of the CPC connector #3, harness side. Refer to Original Equipment Manufacturer (OEM) literature for schematic information. Go to step 20.

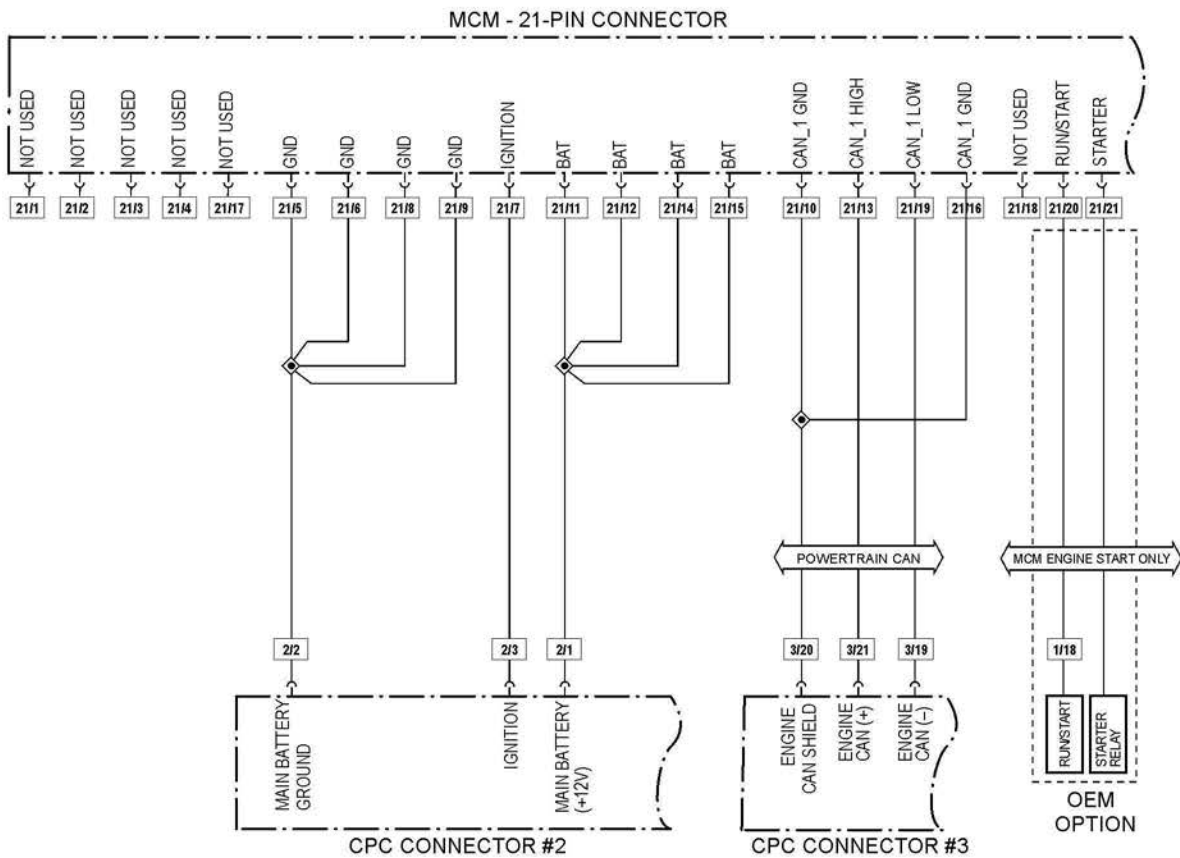
19. Measure the resistance between pin 13 of the MCM 21-pin connector, harness side and pin 10 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; install a test CPC and retest. If code does not return, replace CPC. Go to step 20.
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
20. Verify repairs. Restore all connections. Cycle the ignition key. Is fault code still active?
 - a. Yes; replace the CPC. Refer to OEM procedures.
 - b. No; if fault does not become active, clear the fault codes and release the vehicle.

6 SPN 625/FMI 13 - GHG17

TCM System IDs Not Received or Stopped Arriving

Table 5.

SPN 625/FMI 13	
Description	ECAN ID_1629 Message Not Received Or Has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Verification	Engine Idle (One Minute)

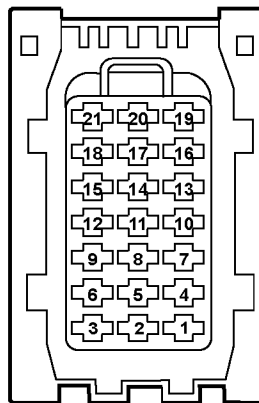


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Check as follows:

1. Are there any battery voltage faults (SPN 168/FMI any) also present?

- a. Yes; repair battery voltage faults first.
 - b. No; Go to step 2.
2. Disconnect the Motor Control Module (MCM) 21-pin connector.
 3. Turn the ignition ON (key ON, engine OFF).
 4. Measure the voltage between pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector (ignition/battery voltage) and ground. Is the voltage less than 11.5 volts?



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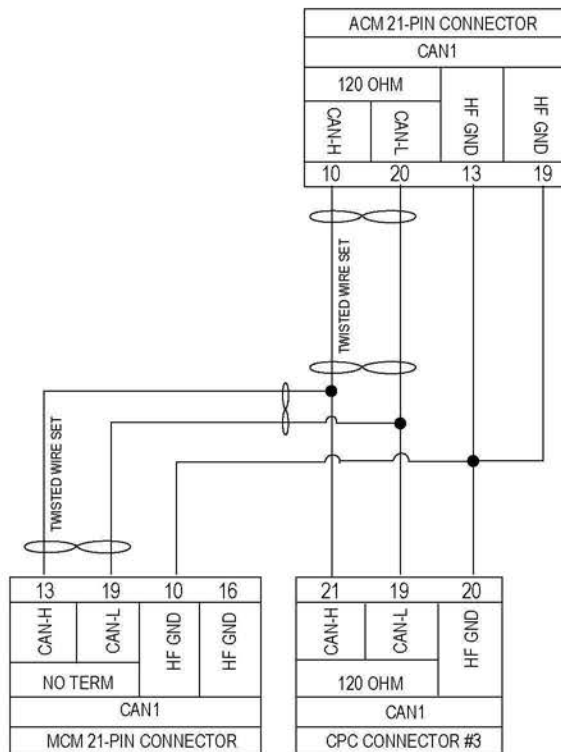
- a. Yes; restore voltage to pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector.
 - b. No; Go to step 5.
5. Turn the ignition OFF.
 6. Measure the resistance between pins 5, 6, 8 and 9 of the MCM 21-pin connector and the negative battery post. Is resistance greater than five ohms?
 - a. Yes; restore battery ground to pins 5, 6, 8 and 9 of the MCM 21-pin connector.
 - b. No; Go to step 7.
 7. Disconnect MCM 120-pin connector and inspect connector for corrosion, oil, fuel, or water intrusion. Is contamination found?
 - a. Yes; repair as necessary.
 - b. No; Go to step 8.
 8. Reconnect MCM 120-pin connector.
 9. Install Vehicle Interface Module (VIM) J-48372.
 10. Is the communication restored to the CPC/MCM?
 - a. Yes; repair vehicle side power/ground issue.
 - b. No; replace the MCM. Refer to section " *Removal of the Motor Control Module*".

7 SPN 625/FMI 14 - GHG17

PTCAN: MCM System ID/MCM_C01 Not Received or Stopped Arriving

Table 6.

SPN 625/FMI 14	
Description	MCM Message Not Received Or Has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None

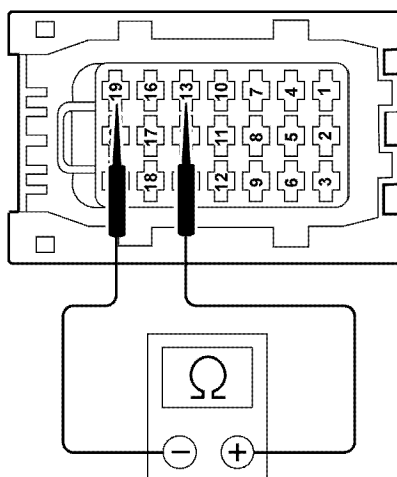


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Check as follows:

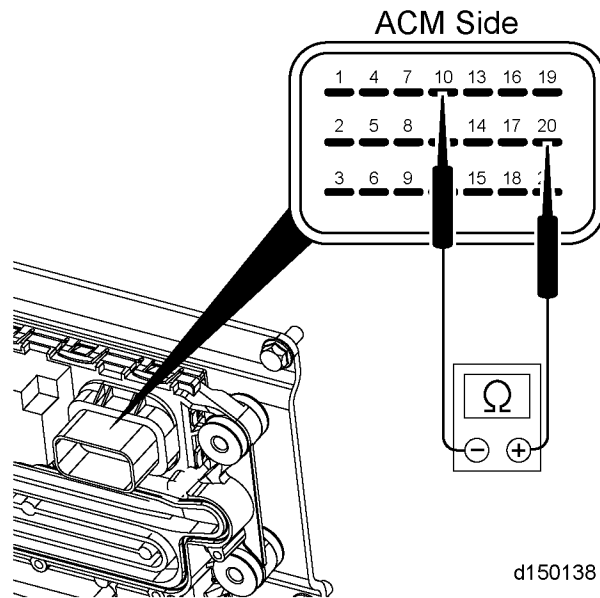
1. Are there any battery voltage faults present (SPN 168/FMI any)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Have the Aftertreatment Control Module (ACM), Motor Control Module (MCM) or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle; if faults become active, Go to step 3.
 - b. No; Go to step 3.
3. Turn ignition OFF and wait five minutes before proceeding. Main battery power must be left ON (the five-minute time frame allows the ACM to go completely offline).

4. Disconnect the MCM 21-pin connector.
5. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 6.

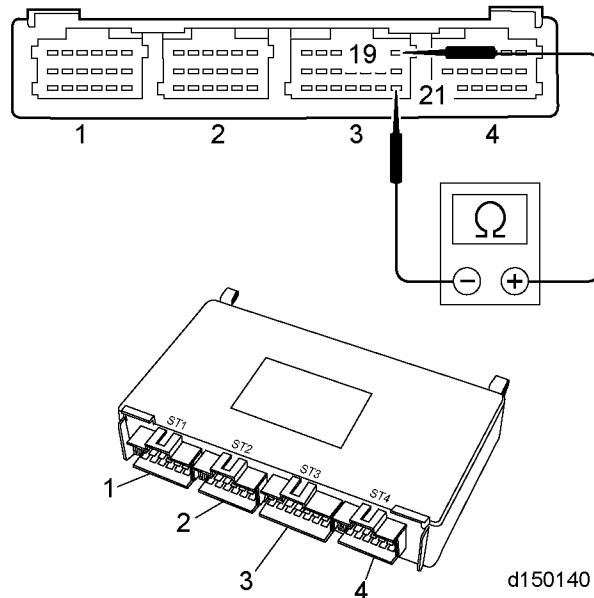


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6. Measure and record the resistance across pins 13 and 19 of the MCM 21-pin connector. Is the resistance greater than 80 ohms?
 - a. Yes; Go to step 9.
 - b. No; Go to step 7.
7. Is the resistance reading from step 6 less than five ohms?
 - a. Yes; replace the PT-CAN harness.
 - b. No; Go to step 8.
8. Is the resistance from step 6 between 40 and 80 ohms?
 - a. Yes; Go to step 21.
 - b. No; Go to step 9.
9. Disconnect the ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector. Is the resistance between 110 and 130 ohms?

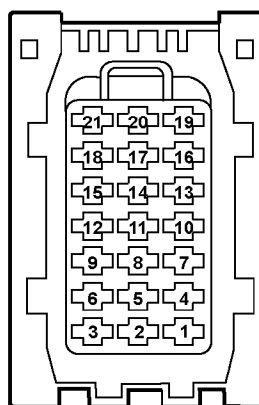


- a. Yes; Go to step 12.
 - b. No; replace the ACM.
12. Disconnect the CPC connector #3.
 13. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 14.
 14. Check the CPC internal terminating resistor by measuring and recording the resistance across pins 19 and 21 of the CPC connector #3. Is the resistance between 110 and 130 ohms?



- a. Yes; Go to step 15.
 - b. No; replace the CPC.
15. Measure and record the resistance between pin 19 of the CPC connector #3 and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 16.
 - b. No; repair the wire between pin 19 of the CPC connector #3 and pin 20 of the ACM 21-pin connector.

16. Measure and record the resistance between pin 21 of the CPC connector #3 and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 21 of the CPC connector #3 and pin 10 of the ACM 21-pin connector.
17. Measure and record the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 19 of the CPC connector #3 and pin 19 of the ACM 21-pin connector.
18. Measure and record the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the wire between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
19. Measure and record the resistance between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 20.
 - b. No; repair the wire between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector.
20. Measure and record the resistance between the pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; replace the MCM. Refer to section "*Removal of the Motor Control Module*".
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector
21. Turn the ignition ON (key ON, engine OFF).



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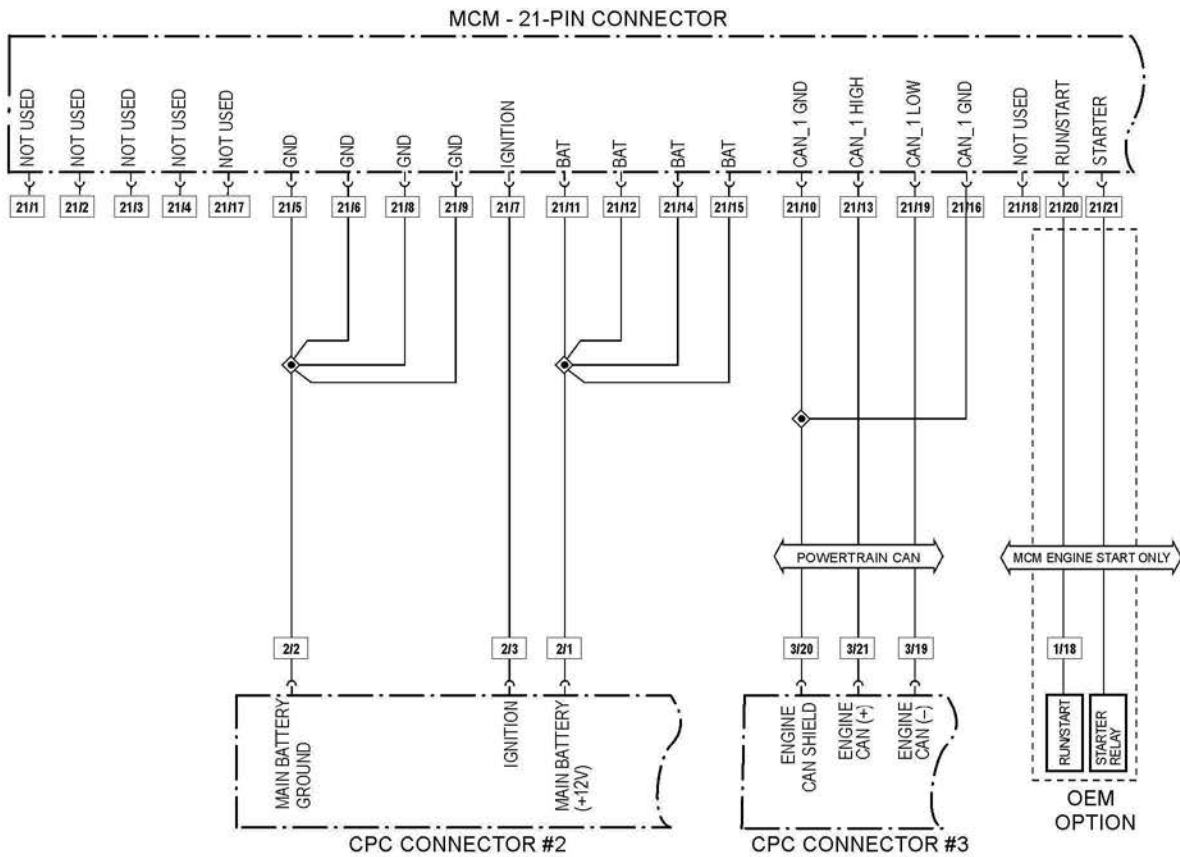
22. Measure the voltage between pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector (ignition/battery voltage) and ground. Is the voltage less than 11.5 volts?
 - a. Yes; restore voltage to pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector.
 - b. No; Go to step 23.
23. Turn the ignition OFF.
24. Measure the resistance between pins 5, 6, 8 and 9 of the MCM 21-pin connector and the negative battery post. Is resistance greater than five ohms?
 - a. Yes; restore the battery ground to pins 5, 6, 8 and 9 of the MCM 21-pin connector.
 - b. No; Go to step 25.
25. Disconnect MCM 120-pin connector and inspect connector for corrosion, or oil, fuel or water intrusion. Is contamination found?
 - a. Yes; repair as necessary.
 - b. No; install a test MCM. If communication is restored (fault inactive), replace the MCM. Refer to section "*Removal of the Motor Control Module*".

8 SPN 625/FMI 2 - GHG17

PTCAN Incorrect MCM System ID Received

Table 7.

SPN 625/FMI 2	
Description	Invalid Data on Engine Controller Area Network (CAN) Link
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	
Verification	Engine Idle (One Minute)



d150388

Check as follows:

1. Have the Motor Control Module (MCM) and/or the Common Powertrain Controller (CPC) recently been changed or reprogrammed?
 - a. Yes; verify that the correct MCM calibration and/or the correct CPC parameter list has been installed. If the correct calibration and correct parameter list have been installed, then Go to step 2.
 - b. No; Go to step 2.
2. Disconnect the MCM 21-pin connector.
3. Turn the ignition ON (key ON, engine OFF).

NOTE: Poor battery grounds can be a possible cause of low battery voltage.

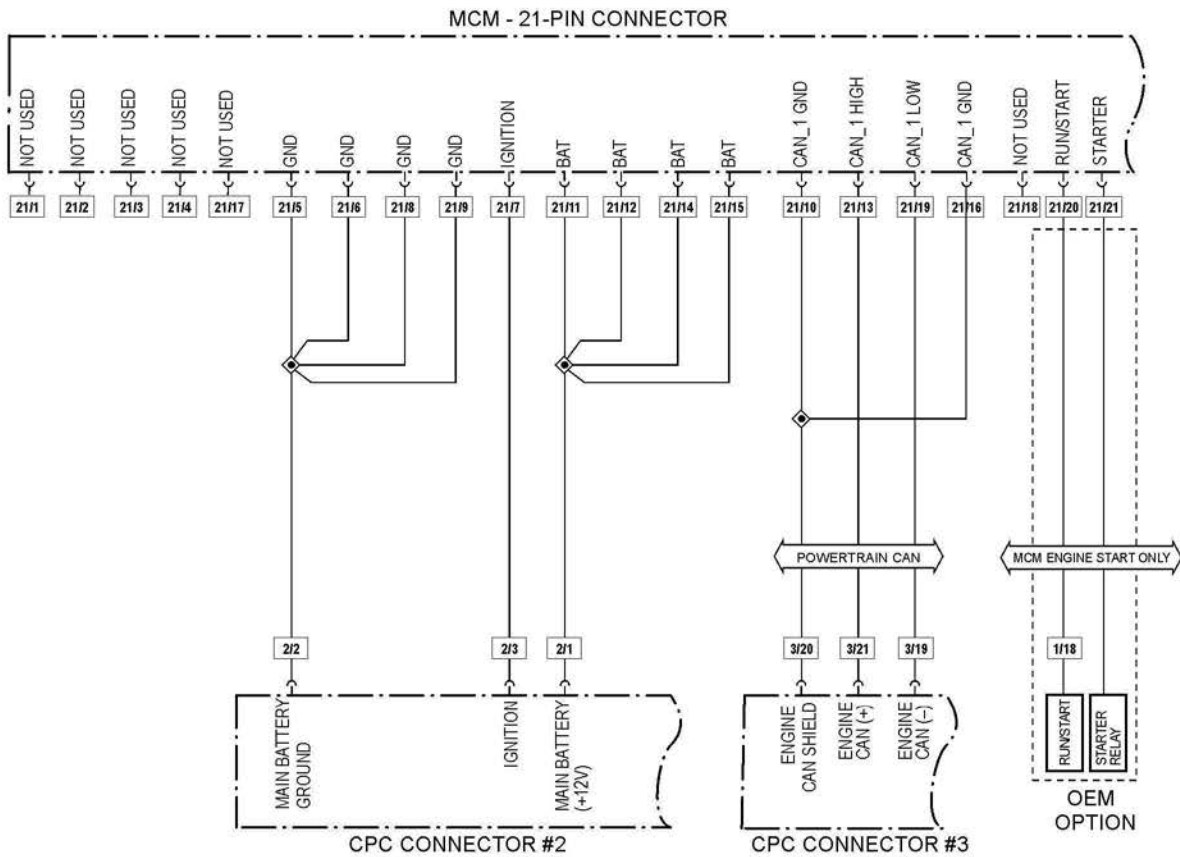
4. Measure the battery voltage at pin 7 on the MCM 21-pin connector. Is the battery voltage less than 10.5 volts?
 - a. Yes; restore the battery voltage at pins 7, 11, 12, 14, and 15 on the MCM 21-pin connector.
 - b. No; Go to step 5.
5. Turn ignition OFF. Leave the MCM 21-pin connector disconnected.
6. Disconnect the CPC connector #3.
7. Measure the resistance between pins 21 and 19 of the CPC connector #3. Is the resistance greater than five ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the short circuit in the wires between pins 21 and 19 of the CPC connector #3 and pins 13 and 19 of the MCM 21-pin connector.
8. Measure the resistance between pin 21 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the short circuit to ground between pin 21 of the CPC connector #3 and ground.
9. Check the resistance between pin 19 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 10.
 - b. No; repair the short circuit to ground between pin 19 of the CPC connector #3 and ground.
10. Measure the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector.
 - b. No; Go to step 11.
11. Measure the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
 - b. No; replace the CPC. Refer to OEM procedures.

9 SPN 625/FMI 4 - GHG17

ECAN Link Circuit Failure

Table 8.

SPN 625/FMI 4	
Description	Erratic Data on Engine Controller Area Network (CAN) Link
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	
Verification	Engine Idle (One Minute)



d150388

Check as follows:

NOTE: This diagnostic is typically erratic data or the CAN propriety data link has failed between the MCM and the CPC.

1. Have the Motor Control Module (MCM) and/or the Common Powertrain Controller (CPC) recently been changed or reprogrammed?
 - a. Yes; verify that the correct MCM calibration and/or the correct CPC parameter list has been installed. If the correct calibration and correct parameter list have been installed, then Go to step 2.
 - b. No; Go to step 2.
2. Disconnect the MCM 21-pin connector.
3. Turn the ignition ON (key ON, engine OFF).

NOTE: Poor battery grounds can be a possible cause of low battery voltage.

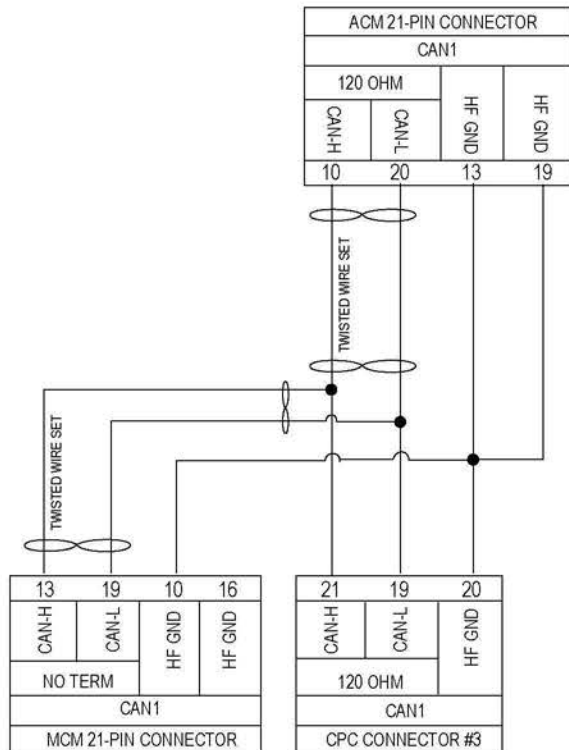
4. Measure the battery voltage at pin 7 on the MCM 21-pin connector. Is the battery voltage less than 10.5 volts?
 - a. Yes; restore the battery voltage at pins 7, 11, 12, 14, and 15 on the MCM 21-pin connector.
 - b. No; Go to step 5.
5. Turn ignition OFF; leave the MCM 21-pin connector disconnected.
6. Disconnect the CPC connector #3.
7. Measure the resistance between pins 19 and 21 of the CPC connector #3. Is the resistance greater than five ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the short circuit in the wires between pins 19 and 21 of the CPC connector #3 and pins 13 and 19 of the MCM 21-pin connector.
8. Measure the resistance between pin 19 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the short circuit to ground between pin 19 of the CPC connector #3 and ground.
9. Check the resistance between pin 21 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 10.
 - b. No; repair the short circuit to ground between pin 21 of the CPC connector #3 and ground.
10. Measure the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector.
 - b. No; Go to step 11.
11. Measure the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
 - b. No; replace the CPC. Refer to OEM procedures.

10 SPN 625/FMI 8 - GHG17

MCM PT-CAN DM1 Message Not Received or has Stopped Arriving

Table 9.

SPN 625/FMI 8	
Description	Powertrain Controller Area Network DM1 Message Not Received Or Has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	2 Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None

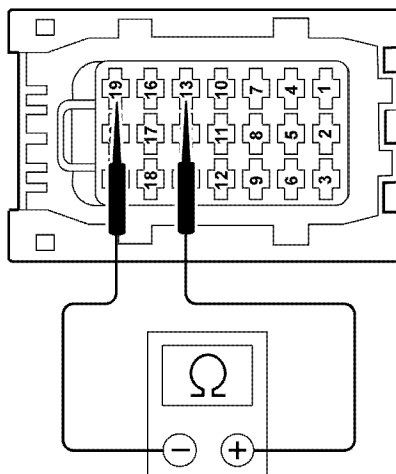


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Check as follows:

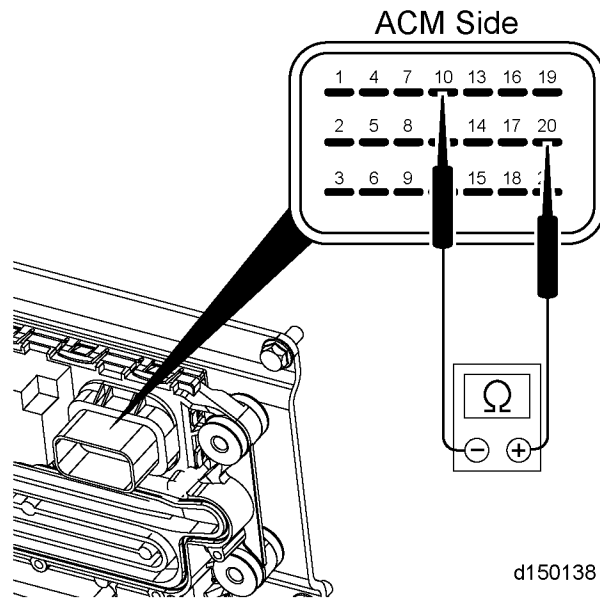
1. Are there any battery voltage faults present (SPN 168/FMI any)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Have the Aftertreatment Control Module (ACM), Motor Control Module (MCM) or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle. If faults become active, Go to step 3.
 - b. No; Go to step 3.

3. Turn ignition OFF and wait five minutes before proceeding. Main battery power must be left ON (the five-minute time frame allows the ACM to go completely offline).
4. Disconnect the MCM 21-pin connector.
5. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 6.

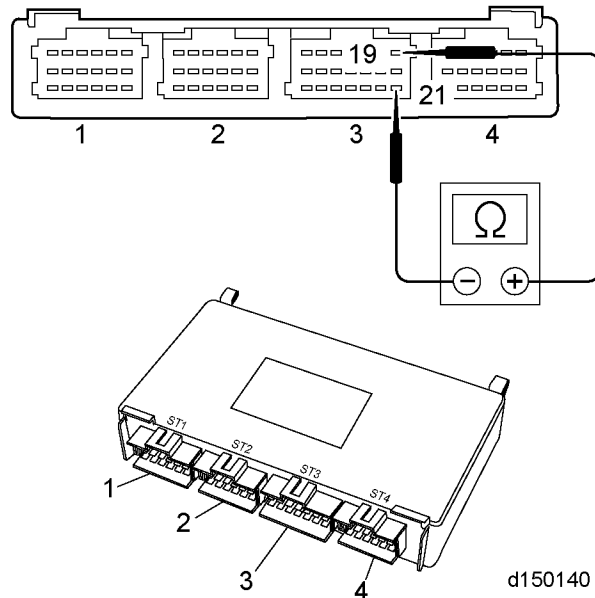


d150139

6. Measure and record the resistance across pins 13 and 19 of the MCM 21-pin connector. Is the resistance greater than 80 ohms?
 - a. Yes; Go to step 9.
 - b. No; Go to step 7.
7. Is the resistance reading from step 6 less than five ohms?
 - a. Yes; replace the PT-CAN harness.
 - b. No; Go to step 8.
8. Is the resistance from step 6 between 40 and 80 ohms?
 - a. Yes; Go to step 21.
 - b. No; Go to step 9.
9. Disconnect the ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector. Is the resistance between 110 and 130 ohms?

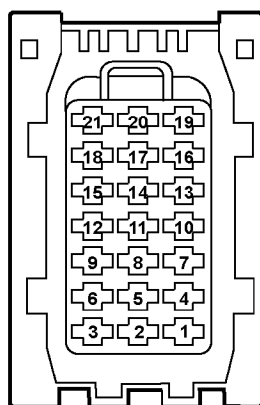


- a. Yes; Go to step 12.
 - b. No; replace the ACM.
12. Disconnect the CPC connector #3.
 13. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 14.
 14. Check CPC internal terminating resistor by measuring the resistance across pins 19 and 21 of the CPC electrical connector #3, component side. Is the resistance between 110 and 130 ohms?



- a. Yes; Go to step 15.
 - b. No; replace the CPC.
15. Measure and record the resistance between pin 19 of CPC connector #3, and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 16.
 - b. No; repair the wire between pin 19 of the CPC connector #3, and pin 20 of the ACM 21-pin connector.

16. Measure and record the resistance between pin 21 of the CPC connector #3, and pin 10 of the ACM 21-pin connector.
Is resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 21 of the CPC connector #3, and pin 10 of the ACM 21-pin connector.
17. Measure and record the resistance between pin 19 of the CPC connector #3, and pin 19 of the MCM 21-pin connector.
Is resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 19 of the CPC connector #3, and pin 19 of the MCM 21-pin connector.
18. Measure and record the resistance between pin 21 of the CPC connector #3, and pin 13 of the MCM 21-pin connector.
Is resistance less than five ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the wire between pin 21 of the CPC connector #3, and pin 13 of the MCM 21-pin connector.
19. Measure and record the resistance between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 20.
 - b. No; repair the wire between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector.
20. Measure and record the resistance between the pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; replace the MCM. Refer to section "Removal of the Motor Control Module".
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector
21. Turn the ignition ON (key ON, engine OFF).



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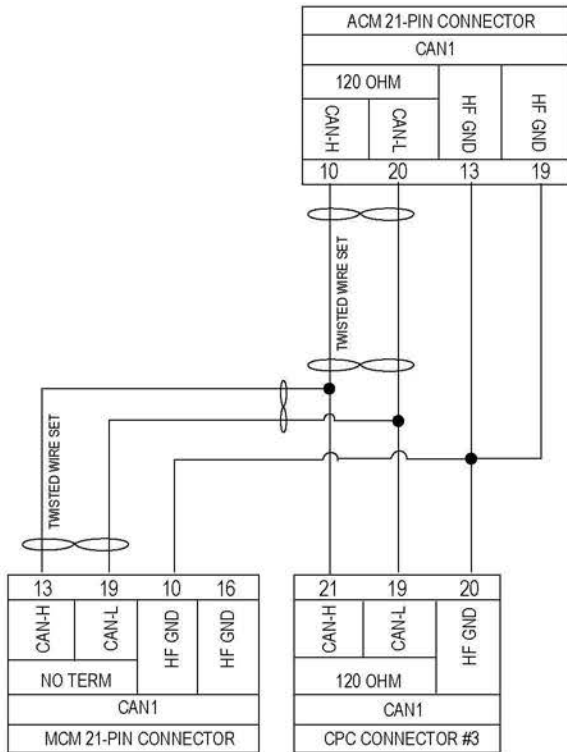
22. Measure the voltage between pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector (ignition/battery voltage) and ground. Is the voltage less than 11.5 volts?
 - a. Yes; restore voltage to pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector.
 - b. No; Go to step 23.
23. Turn the ignition OFF.
24. Measure the resistance between pins 5, 6, 8 and 9 of the MCM 21-pin connector and the negative battery post. Is resistance greater than five ohms?
 - a. Yes; restore the battery ground to pins 5, 6, 8 and 9 of the 21-pin connector.
 - b. No; Go to step 25.
25. Disconnect MCM 120-pin connector and inspect connector for corrosion, or oil, fuel or water intrusion. Is contamination found?
 - a. Yes; repair as necessary.
 - b. No; install a test MCM. If communication is restored (fault inactive), replace the MCM. Refer to section "Removal of the Motor Control Module".

11 SPN 625/FMI 9 - GHG17

ACM PT-CAN DM1 Message Not Received or has Stopped Arriving

Table 10.

SPN 625/FMI 9	
Description	Aftertreatment Control Module PT-CAN DM1 Message Not Received or has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	2 Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None
Verification	Ignition Cycle



d150235

Check as follows:

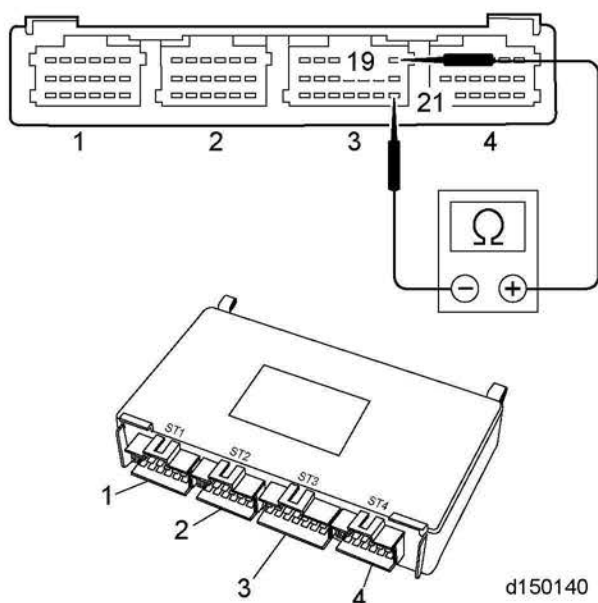
1. Are there any battery voltage faults (SPN 168/FMI any faults)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Has the Aftertreatment Control Module (ACM), Motor Control Module (MCM), or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle. If faults become active, Go to step 3.
 - b. No; Go to step 3.

NOTE: ACM, MCM, and CPC all communicate on the same CAN line. If water penetrates any connector, it can short the CAN line and may prevent communications with other ECUs.

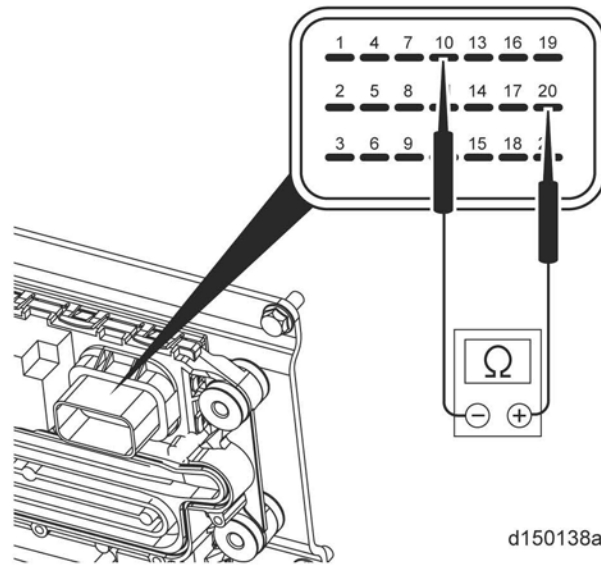
NOTE: Main battery power must be left ON.

NOTE: The five-minute time-frame allows the ACM to go completely offline.

3. Turn ignition OFF and wait five minutes before proceeding.
4. Disconnect the CPC electrical harness connector #3.
5. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 6.
6. Check CPC internal terminating resistor by measuring the resistance across pins 19 and 21 of the CPC electrical connector #3, component side. Is the resistance between 110 and 130 ohms?



- a. Yes; Go to step 7.
 - b. No; replace the CPC. Go to step 20.
7. Measure the resistance between pin 19 of the CPC connector #3, harness side and battery ground. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the wire short to ground between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Go to step 20.
8. Measure the resistance between pin 21 of the CPC connector #3, harness side and battery ground. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the wire short to ground between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
9. Disconnect ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector, component side. Is the resistance between 110 to 130 ohms?



- a. Yes; Go to step 12.
 - b. No; replace the ACM. Go to step 20.
12. Check the resistance between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 13.
 - b. No; repair the wire between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Go to step 20.
 13. Measure the resistance between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 14.
 - b. No; repair the wire between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
 14. Disconnect MCM 21-pin connector.
 15. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 16.
 16. Measure the resistance between pin 19 of the CPC connector #3, harness side and pin 19 of the MCM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 19 of the CPC connector #3, harness side and pin 19 of the MCM 21-pin connector, harness side. Go to step 20.
 17. Measure the resistance between pin 21 of the CPC connector #3, harness side and pin 13 of the MCM 21-pin harness connector. Is the resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 21 of the CPC connector #3, harness side and pin 13 of the MCM 21-pin harness connector. Go to step 20.

NOTE: Ensure MCM and ACM connectors are disconnected during this step.

18. Measure the resistance between pins 19 and 21 of the CPC connector #3, harness side. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the harness shorted wires between pin 19 and pin 21 of the CPC connector #3, harness side. Refer to Original Equipment Manufacturer (OEM) literature for schematic information. Go to step 20.

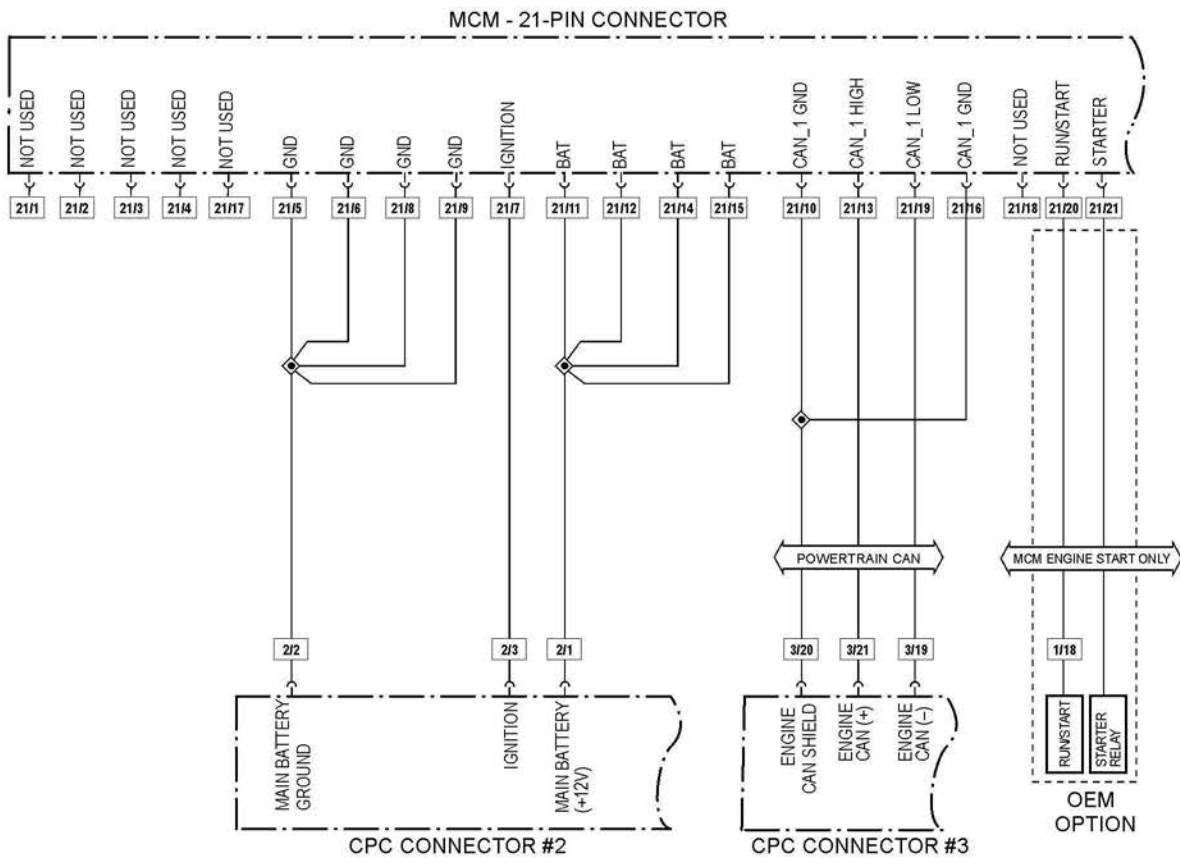
19. Measure the resistance between pin 13 of the MCM 21-pin connector, harness side and pin 10 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; install a test CPC and retest. If code does not return, replace CPC. Go to step 20.
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
20. Verify repairs. Restore all connections. Cycle the ignition key. Is fault code still active?
 - a. Yes; replace the CPC. Refer to OEM procedures.
 - b. No; if fault does not become active, clear the fault codes and release the vehicle.

12 SPN 625/FMI 13 - GHG17

TCM System IDs Not Received or Stopped Arriving

Table 11.

SPN 625/FMI 13	
Description	ECAN ID_1629 Message Not Received Or Has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Verification	Engine Idle (One Minute)

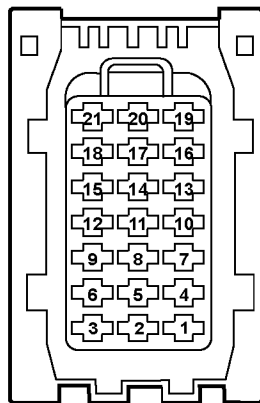


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Check as follows:

1. Are there any battery voltage faults (SPN 168/FMI any) also present?

- a. Yes; repair battery voltage faults first.
 - b. No; Go to step 2.
2. Disconnect the Motor Control Module (MCM) 21-pin connector.
 3. Turn the ignition ON (key ON, engine OFF).
 4. Measure the voltage between pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector (ignition/battery voltage) and ground. Is the voltage less than 11.5 volts?



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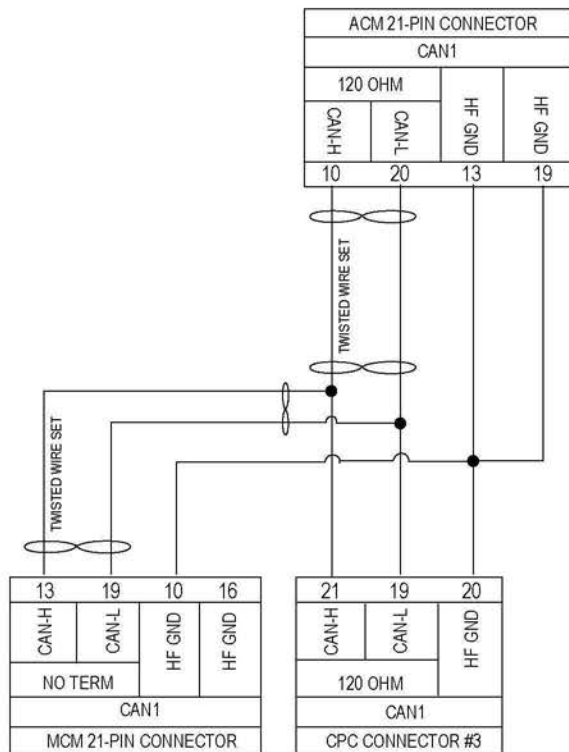
- a. Yes; restore voltage to pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector.
 - b. No; Go to step 5.
5. Turn the ignition OFF.
 6. Measure the resistance between pins 5, 6, 8 and 9 of the MCM 21-pin connector and the negative battery post. Is resistance greater than five ohms?
 - a. Yes; restore battery ground to pins 5, 6, 8 and 9 of the MCM 21-pin connector.
 - b. No; Go to step 7.
 7. Disconnect MCM 120-pin connector and inspect connector for corrosion, oil, fuel, or water intrusion. Is contamination found?
 - a. Yes; repair as necessary.
 - b. No; Go to step 8.
 8. Reconnect MCM 120-pin connector.
 9. Install Vehicle Interface Module (VIM) J-48372.
 10. Is the communication restored to the CPC/MCM?
 - a. Yes; repair vehicle side power/ground issue.
 - b. No; replace the MCM. Refer to section "Removal of the Motor Control Module".

13 SPN 625/FMI 14 - GHG17

PTCAN: MCM System ID/MCM_C01 Not Received or Stopped Arriving

Table 12.

SPN 625/FMI 14	
Description	MCM Message Not Received Or Has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None

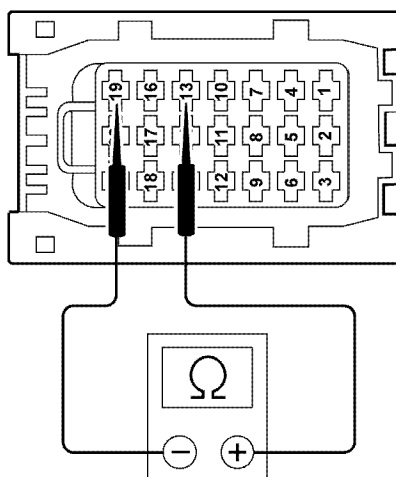


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Check as follows:

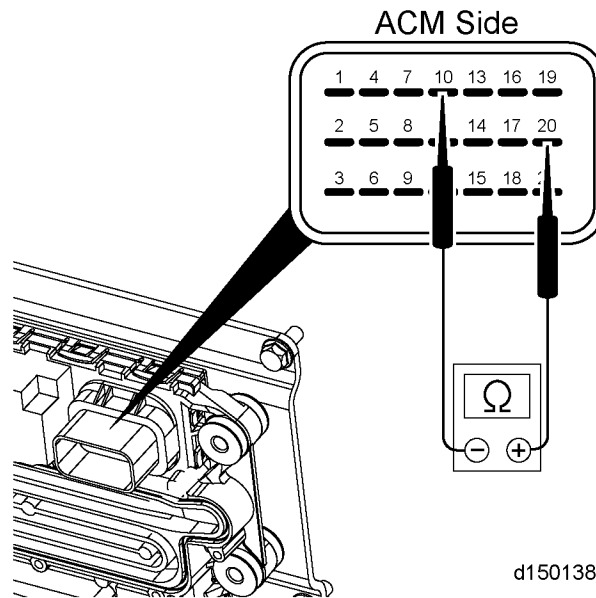
1. Are there any battery voltage faults present (SPN 168/FMI any)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Have the Aftertreatment Control Module (ACM), Motor Control Module (MCM) or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle; if faults become active, Go to step 3.
 - b. No, Go to step 3.
3. Turn ignition OFF and wait five minutes before proceeding. Main battery power must be left ON (the five-minute time frame allows the ACM to go completely offline).

4. Disconnect the MCM 21-pin connector.
5. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 6.

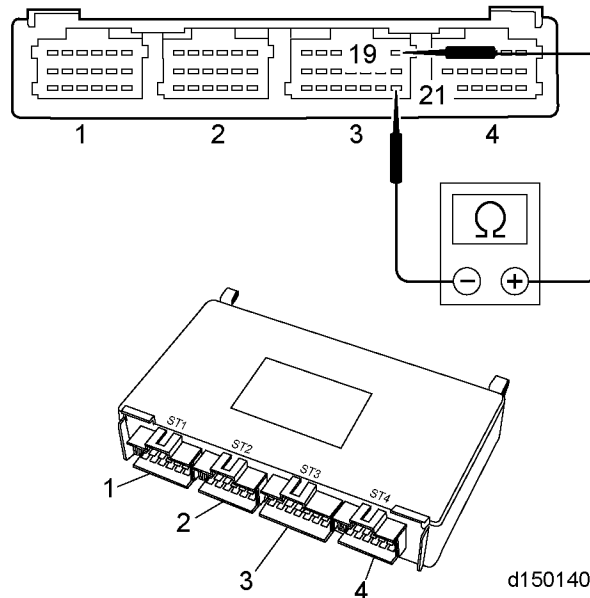


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6. Measure and record the resistance across pins 13 and 19 of the MCM 21-pin connector. Is the resistance greater than 80 ohms?
 - a. Yes; Go to step 9.
 - b. No; Go to step 7.
7. Is the resistance reading from step 6 less than five ohms?
 - a. Yes; replace the PT-CAN harness.
 - b. No; Go to step 8.
8. Is the resistance from step 6 between 40 and 80 ohms?
 - a. Yes; Go to step 21.
 - b. No; Go to step 9.
9. Disconnect the ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector. Is the resistance between 110 and 130 ohms?

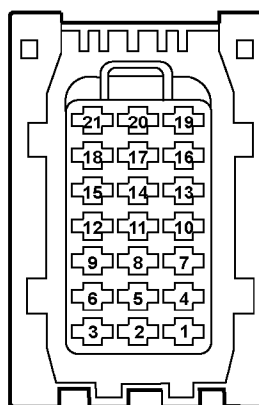


- a. Yes; Go to step 12.
 - b. No; replace the ACM.
12. Disconnect the CPC connector #3.
 13. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 14.
 14. Check the CPC internal terminating resistor by measuring and recording the resistance across pins 19 and 21 of the CPC connector #3. Is the resistance between 110 and 130 ohms?



- a. Yes; Go to step 15.
 - b. No; replace the CPC.
15. Measure and record the resistance between pin 19 of the CPC connector #3 and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 16.
 - b. No; repair the wire between pin 19 of the CPC connector #3 and pin 20 of the ACM 21-pin connector.

16. Measure and record the resistance between pin 21 of the CPC connector #3 and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 21 of the CPC connector #3 and pin 10 of the ACM 21-pin connector.
17. Measure and record the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 19 of the CPC connector #3 and pin 19 of the ACM 21-pin connector.
18. Measure and record the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the wire between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
19. Measure and record the resistance between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 20.
 - b. No; repair the wire between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector.
20. Measure and record the resistance between the pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; replace the MCM. Refer to section "Removal of the Motor Control Module".
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector
21. Turn the ignition ON (key ON, engine OFF).



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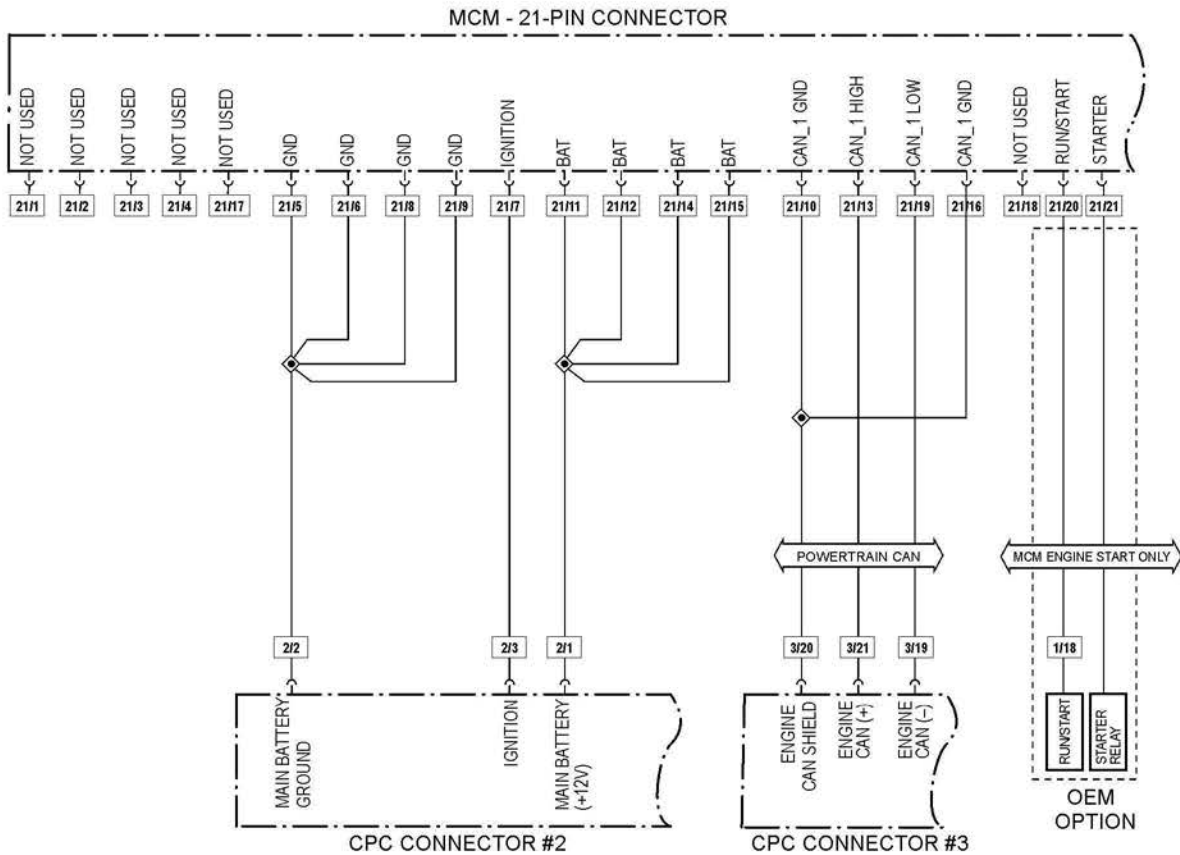
22. Measure the voltage between pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector (ignition/battery voltage) and ground. Is the voltage less than 11.5 volts?
 - a. Yes; restore voltage to pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector.
 - b. No; Go to step 23.
23. Turn the ignition OFF.
24. Measure the resistance between pins 5, 6, 8 and 9 of the MCM 21-pin connector and the negative battery post. Is resistance greater than five ohms?
 - a. Yes; restore the battery ground to pins 5, 6, 8 and 9 of the MCM 21-pin connector.
 - b. No; Go to step 25.
25. Disconnect MCM 120-pin connector and inspect connector for corrosion, or oil, fuel or water intrusion. Is contamination found?
 - a. Yes; repair as necessary.
 - b. No; install a test MCM. If communication is restored (fault inactive), replace the MCM. Refer to section "Removal of the Motor Control Module".

14 SPN 625/FMI 2 - EPA10 - GHG14

PTCAN Incorrect MCM System ID Received

Table 13.

SPN 625/FMI 2	
Description	Invalid Data on Engine Controller Area Network (CAN) Link
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	
Verification	Engine Idle (One Minute)



d150388

Check as follows:

1. Have the Motor Control Module (MCM) and/or the Common Powertrain Controller (CPC) recently been changed or reprogrammed?
 - a. Yes; verify that the correct MCM calibration and/or the correct CPC parameter list has been installed. If the correct calibration and correct parameter list have been installed, then Go to step 2.
 - b. No; Go to step 2.
2. Disconnect the MCM 21-pin connector.
3. Turn the ignition ON (key ON, engine OFF).

NOTE: Poor battery grounds can be a possible cause of low battery voltage.

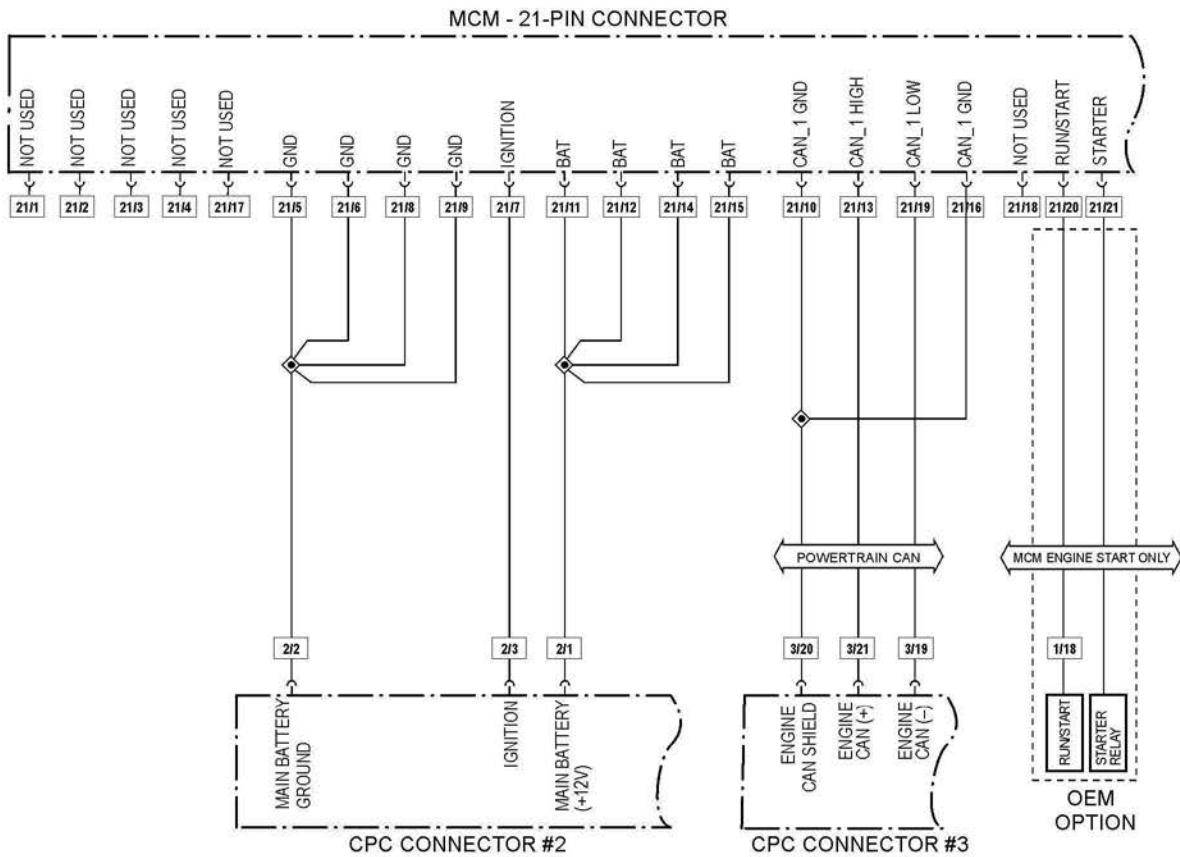
4. Measure the battery voltage at pin 7 on the MCM 21-pin connector. Is the voltage less than 10.5 volts?
 - a. Yes; restore the battery voltage at pins 7, 11, 12, 14, and 15 on the MCM 21-pin connector.
 - b. No; Go to step 5.
5. Turn ignition OFF. Leave the MCM 21-pin connector disconnected.
6. Disconnect the CPC connector #3.
7. Measure the resistance between pins 21 and 19 of the CPC connector #3. Is the resistance greater than five ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the short circuit in the wires between pins 21 and 19 of the CPC connector #3 and pins 13 and 19 of the MCM 21-pin connector.
8. Measure the resistance between pin 21 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the short circuit to ground between pin 21 of the CPC connector #3 and ground.
9. Check the resistance between pin 19 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 10.
 - b. No; repair the short circuit to ground between pin 19 of the CPC connector #3 and ground.
10. Measure the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector.
 - b. No; Go to step 11.
11. Measure the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
 - b. No; replace the CPC. Refer to OEM procedures.

15 SPN 625/FMI 4 - EPA10 - GHG14

ECAN Link Circuit Failure

Table 14.

SPN 625/FMI 4	
Description	Erratic Data on Engine Controller Area Network (CAN) Link
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	
Verification	Engine Idle (One Minute)



d150388

Check as follows:

NOTE: This diagnostic is typically erratic data or the CAN propriety data link has failed between the MCM and the CPC.

1. Have the Motor Control Module (MCM) and/or the Common Powertrain Controller (CPC) recently been changed or reprogrammed?
 - a. Yes; verify that the correct MCM calibration and/or the correct CPC parameter list has been installed. If the correct calibration and correct parameter list have been installed, then Go to step 2.
 - b. No; Go to step 2.
2. Disconnect the MCM 21-pin connector.
3. Turn the ignition ON (key ON, engine OFF).

NOTE: Poor battery grounds can be a possible cause of low battery voltage.

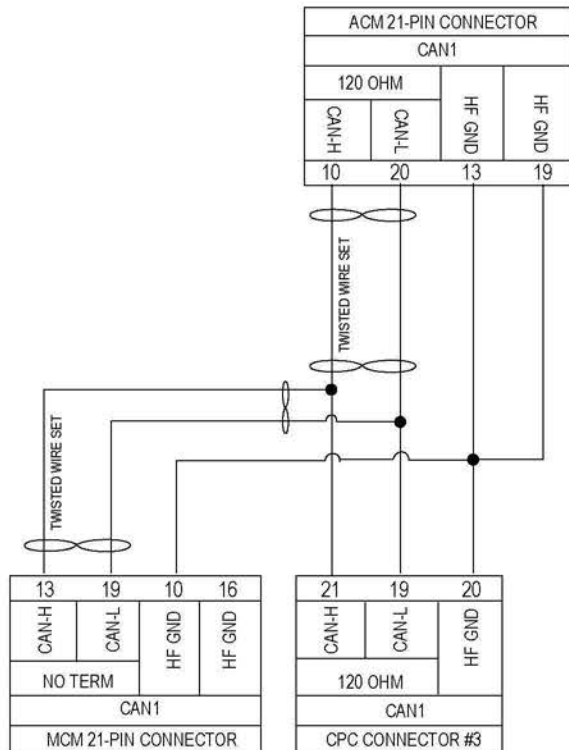
4. Measure the battery voltage at pin 7 on the MCM 21-pin connector. Is the battery voltage less than 10.5 volts?
 - a. Yes; restore the battery voltage at pins 7, 11, 12, 14, and 15 on the MCM 21-pin connector.
 - b. No; Go to step 5.
5. Turn ignition OFF; leave the MCM 21-pin connector disconnected.
6. Disconnect the CPC connector #3.
7. Measure the resistance between pins 19 and 21 of the CPC connector #3. Is the resistance greater than five ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the short circuit in the wires between pins 19 and 21 of the CPC connector #3 and pins 13 and 19 of the MCM 21-pin connector.
8. Measure the resistance between pin 19 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the short circuit to ground between pin 19 of the CPC connector #3 and ground.
9. Check the resistance between pin 21 of the CPC connector #3 and ground. Is the resistance greater than five ohms?
 - a. Yes; Go to step 10.
 - b. No; repair the short circuit to ground between pin 21 of the CPC connector #3 and ground.
10. Measure the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector.
 - b. No; Go to step 11.
11. Measure the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is the resistance greater than five ohms?
 - a. Yes; repair the open circuit between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
 - b. No; replace the CPC. Refer to OEM procedures.

16 SPN 625/FMI 8 - EPA10 - GHG14

MCM PT-CAN DM1 Message Not Received or has Stopped Arriving

Table 15.

SPN 625/FMI 8	
Description	Powertrain Controller Area Network DM1 Message Not Received Or Has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None

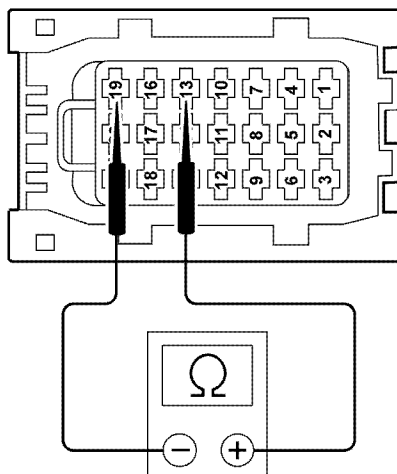


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Check as follows:

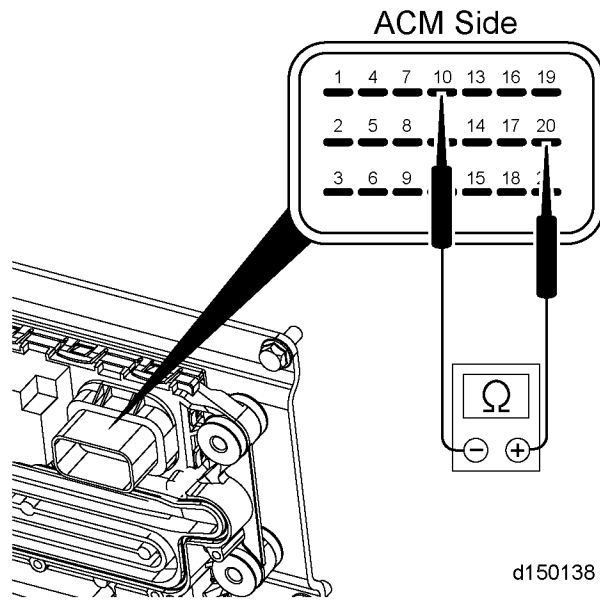
1. Are there any battery voltage faults present (SPN 168/FMI any)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Have the Aftertreatment Control Module (ACM), Motor Control Module (MCM) or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle. If faults become active, Go to step 3.
 - b. No; Go to step 3.

3. Turn ignition OFF and wait five minutes before proceeding. Main battery power must be left ON (The five-minute time frame allows the ACM to go completely offline).
4. Disconnect the MCM 21-pin connector.
5. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 6.

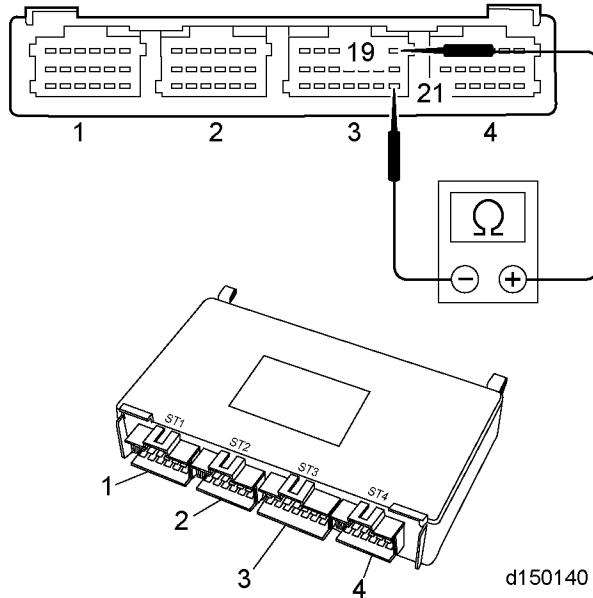


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6. Measure and record the resistance across pins 13 and 19 of the MCM 21-pin connector. Is the resistance greater than 80 ohms?
 - a. Yes; Go to step 9.
 - b. No; Go to step 7.
7. Is the resistance reading from step 6 less than five ohms?
 - a. Yes; replace the PT-CAN harness.
 - b. No; Go to step 8.
8. Is the resistance from step 6 between 40 and 80 ohms?
 - a. Yes; Go to step 21.
 - b. No; Go to step 9.
9. Disconnect the ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector. Is the resistance between 110 and 130 ohms?

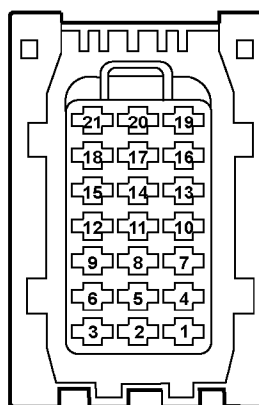


- a. Yes; Go to step 12.
 - b. No; replace the ACM.
12. Disconnect the CPC connector #3.
 13. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 14.
 14. Check CPC internal terminating resistor by measuring the resistance across pins 19 and 21 of the CPC electrical connector #3, component side. Is the resistance between 110 and 130 ohms?



- a. Yes; Go to step 15.
 - b. No; replace the CPC.
15. Measure and record the resistance between pin 19 of the CPC connector #3, and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 16.
 - b. No; repair the wire between pin 19 of the CPC connector #3, and pin 20 of the ACM 21-pin connector.

16. Measure and record the resistance between pin 21 of the CPC connector #3 and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 21 of the CPC connector #3 and pin 10 of the ACM 21-pin connector.
17. Measure and record the resistance between the pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector.
18. Measure and record the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the wire between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
19. Measure and record the resistance between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 20.
 - b. No; repair the wire between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector.
20. Measure and record the resistance between the pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; replace the MCM. Refer to section "Removal of the Motor Control Module"
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector
21. Turn the ignition ON (key ON, engine OFF).



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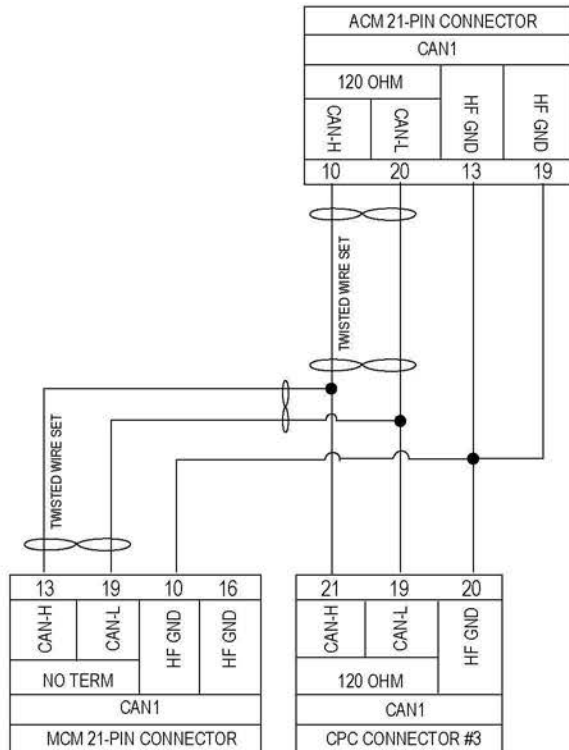
22. Measure the voltage between pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector (ignition/battery voltage) and ground. Is the voltage less than 11.5 volts?
 - a. Yes; restore voltage to pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector.
 - b. No; Go to step 23.
23. Turn the ignition OFF.
24. Measure the resistance between pins 5, 6, 8 and 9 of the MCM 21-pin connector and the negative battery post. Is resistance greater than five ohms?
 - a. Yes; restore the battery ground to pins 5, 6, 8 and 9 of the MCM 21-pin connector.
 - b. No; Go to step 25.
25. Disconnect MCM 120-pin connector and inspect connector for corrosion, or oil, fuel or water intrusion. Is contamination found?
 - a. Yes; repair as necessary.
 - b. No; install a test MCM. If communication is restored (fault inactive), replace the MCM. Refer to section "Removal of the Motor Control Module".

17 SPN 625/FMI 9 - EPA10 - GHG14

ACM PT-CAN DM1 Message Not Received or has Stopped Arriving

Table 16.

SPN 625/FMI 9	
Description	Aftertreatment Control Module PT-CAN DM1 Message Not Received or has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None
Verification	Ignition Cycle



d150235

Check as follows:

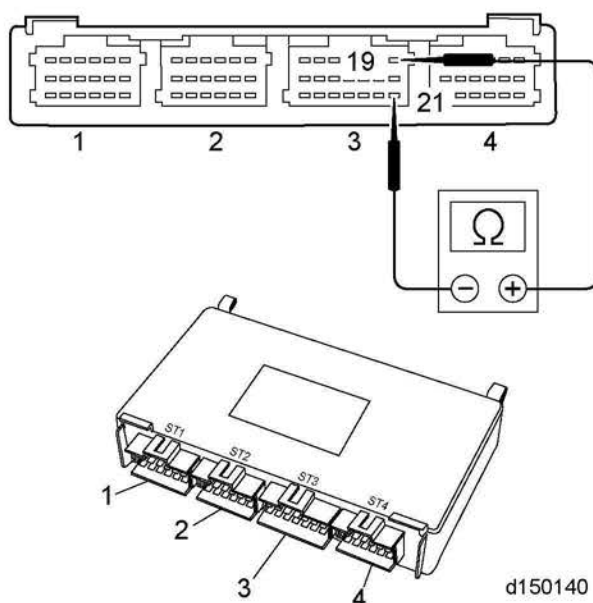
1. Are there any battery voltage faults (SPN 168 FMI any faults)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Has the Aftertreatment Control Module (ACM), Motor Control Module (MCM), or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle. If faults become active, Go to step 3.
 - b. No; Go to step 3.

NOTE: ACM, MCM, and CPC all communicate on the same CAN line. If water penetrates any connector, it can short the CAN line and may prevent communications with other ECUs.

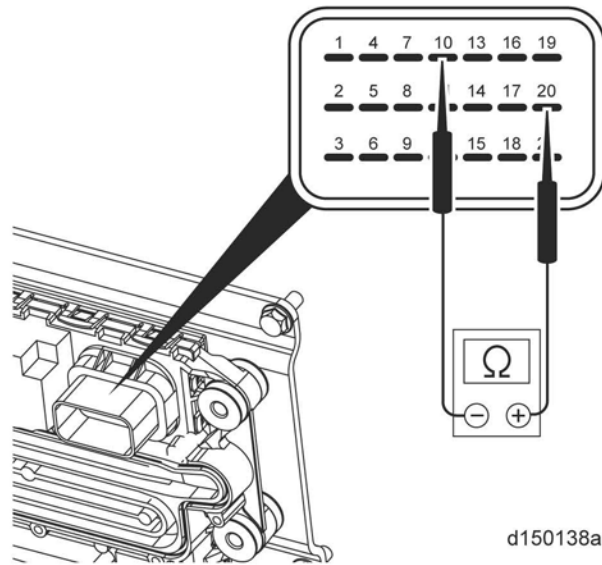
NOTE: Main battery power must be left ON.

NOTE: The five minute timeframe allows the ACM to go completely offline.

3. Turn ignition OFF and wait five minutes before proceeding.
4. Disconnect the CPC electrical harness connector #3.
5. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 6.
6. Check CPC internal terminating resistor by measuring the resistance across pins 19 and 21 of the CPC electrical connector #3, component side. Is the resistance between 110 to 130 ohms?



- a. Yes; Go to step 7.
 - b. No; replace the CPC. Go to step 20.
7. Measure the resistance between pin 19 of the CPC connector #3, harness side and battery ground. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 8.
 - b. No; repair the wire short to ground between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Go to step 20.
8. Measure the resistance between pin 21 of the CPC connector #3, harness side and battery ground. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 9.
 - b. No; repair the wire short to ground between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
9. Disconnect ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector, component side. Is the resistance between 110 to 130 ohms?



- a. Yes; Go to step 12.
 - b. No; replace the ACM. Go to step 20.
12. Check the resistance between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 13.
 - b. No; repair the wire between pin 19 of the CPC connector #3, harness side and pin 20 of the ACM 21-pin connector, harness side. Go to step 20.
 13. Measure the resistance between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 14.
 - b. No; repair the wire between pin 21 of the CPC connector #3, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
 14. Disconnect MCM 21-pin connector.
 15. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary. Go to step 20.
 - b. No; Go to step 16.
 16. Measure the resistance between pin 19 of the CPC connector #3, harness side and pin 19 of the MCM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 19 of the CPC connector #3, harness side and pin 19 of the MCM 21-pin connector, harness side. Go to step 20.
 17. Measure the resistance between pin 21 of the CPC connector #3, harness side and pin 13 of the MCM 21-pin harness connector. Is the resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 21 of the CPC connector #3, harness side and pin 13 of the MCM 21-pin harness connector. Go to step 20.

NOTE: Ensure MCM and ACM connectors are disconnected during this step.

18. Measure the resistance between pins 19 and 21 of the CPC connector #3, harness side. Is the resistance greater than 10K ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the harness shorted wires between pin 19 and pin 21 of the CPC connector #3, harness side. Refer to Original Equipment Manufacturer (OEM) literature for schematic information. Go to step 20.

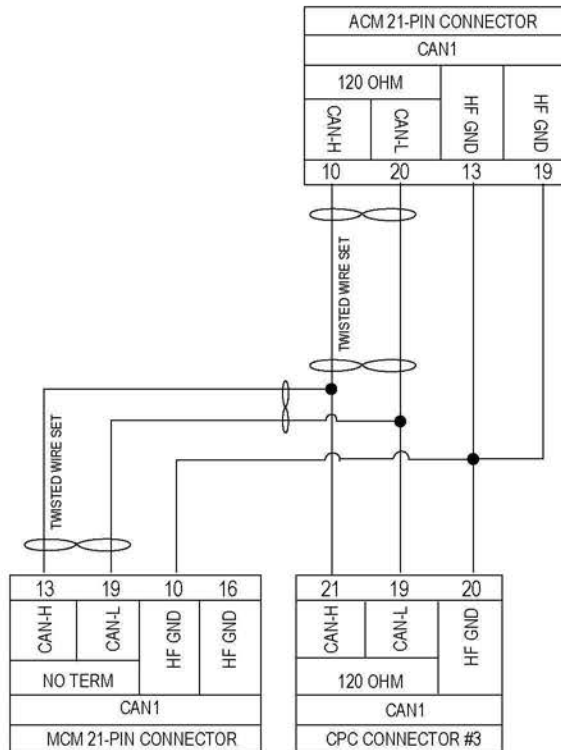
19. Measure the resistance between pin 13 of the MCM 21-pin connector, harness side and pin 10 of the ACM 21-pin connector, harness side. Is the resistance less than five ohms?
 - a. Yes; install a test CPC and retest. If code does not return, replace CPC. Go to step 20.
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector, harness side and pin 10 of the ACM 21-pin connector, harness side. Go to step 20.
20. Verify repairs. Restore all connections. Cycle the ignition key. Is fault code still active?
 - a. Yes; replace the CPC. Refer to OEM procedures.
 - b. No; if fault does not become active, clear the fault codes and release the vehicle.

18 SPN 625/FMI 14 - EPA10 - GHG14

PTCAN: MCM System ID/MCM_C01 Not Received or Stopped Arriving

Table 17.

SPN 625/FMI 14	
Description	MCM Message Not Received Or Has Stopped Arriving
Monitored Parameter	CAN Communication
Typical Enabling Conditions	Always Enabled
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	MIL, CEL
Engine Reaction	None

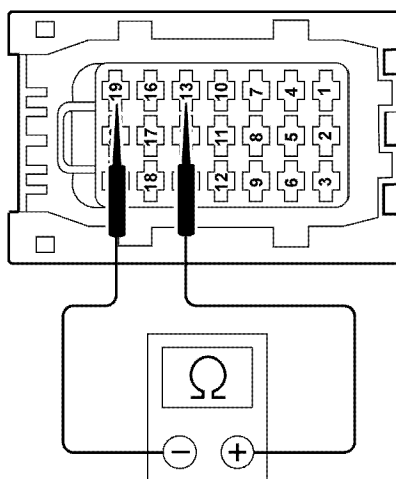


d150235

Check as follows:

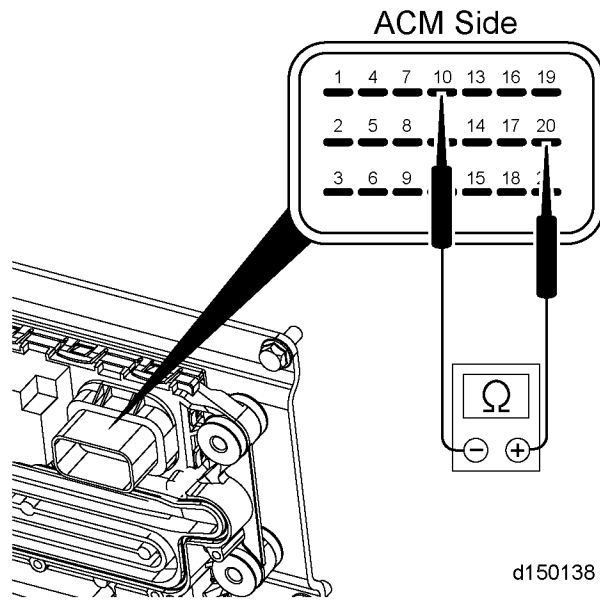
1. Are there any battery voltage faults (SPN 168/FMI ANY)?
 - a. Yes; troubleshoot battery voltage faults first.
 - b. No; Go to step 2.
2. Has the Aftertreatment Control Module (ACM), Motor Control Module (MCM) or Common Powertrain Controller (CPC) been recently programmed?
 - a. Yes; verify that the correct MCM, CPC and/or ACM parameter list has been installed, then clear the fault codes. If faults do not become active, release the vehicle; if faults become active, Go to step 3.
 - b. No; Go to step 3.
3. Turn ignition OFF and wait five minutes before proceeding. Main battery power must be left ON (The five minute time frame allows the ACM to go completely offline).

4. Disconnect the MCM 21-pin connector.
5. Inspect the MCM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 6.

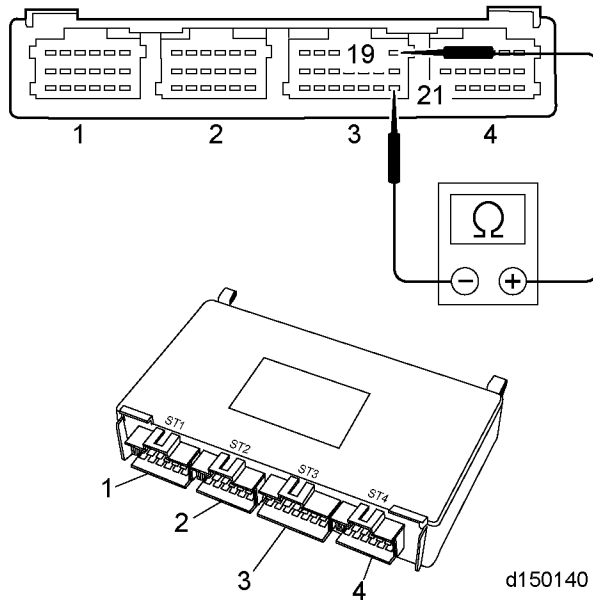


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6. Measure and record the resistance across pins 13 and 19 of the MCM 21-pin connector. Is the resistance greater than 80 ohms?
 - a. Yes; Go to step 9.
 - b. No; Go to step 7.
7. Is the resistance reading from step 6 less than five ohms?
 - a. Yes; replace the PT- CAN harness.
 - b. No; Go to step 8.
8. Is the resistance from step 6 between 40 and 80 ohms?
 - a. Yes; Go to step 21.
 - b. No; Go to step 9.
9. Disconnect the ACM 21-pin connector.
10. Inspect the ACM 21-pin connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
 - a. Yes; repair as necessary.
 - b. No; Go to step 11.
11. Check ACM internal terminating resistor by measuring and recording the resistance across pins 10 and 20 of the ACM 21-pin connector. Is the resistance between 110 and 130 ohms?

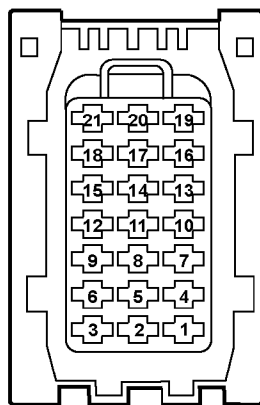


- a. Yes; Go to step 12.
 - b. No; replace the ACM.
12. Disconnect the CPC connector #3.
13. Inspect the CPC connector for corroded, unseated (pushed out) or damaged pins, bent or spread pins; inspect the connector seal for damage (signs of water or oil intrusion). Is damage present?
- a. Yes; repair as necessary.
 - b. No; Go to step 14.
14. Check the CPC internal terminating resistor by measuring and recording the resistance across pins 19 and 21 of the CPC connector cavity #3. Is the resistance between 110 and 130 ohms?



- a. Yes; Go to step 15.
 - b. No; replace the CPC.
15. Measure and record the resistance between pin 19 of the CPC connector #3 and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
- a. Yes; Go to step 16.
 - b. No; repair the wire between pin 19 of the CPC connector #3 and pin 20 of the ACM 21-pin connector.

16. Measure and record the resistance between pin 21 of the CPC connector #3 and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 17.
 - b. No; repair the wire between pin 21 of the CPC connector #3 and pin 10 of the ACM 21-pin connector.
17. Measure and record the resistance between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 18.
 - b. No; repair the wire between pin 19 of the CPC connector #3 and pin 19 of the MCM 21-pin connector.
18. Measure and record the resistance between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 19.
 - b. No; repair the wire between pin 21 of the CPC connector #3 and pin 13 of the MCM 21-pin connector.
19. Measure and record the resistance between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; Go to step 20.
 - b. No; repair the wire between pin 19 of the MCM 21-pin connector and pin 20 of the ACM 21-pin connector.
20. Measure and record the resistance between pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector. Is resistance less than five ohms?
 - a. Yes; replace the MCM. Refer to section "Removal of the Motor Control Module".
 - b. No; repair the wire between pin 13 of the MCM 21-pin connector and pin 10 of the ACM 21-pin connector.
21. Turn the ignition ON (key ON, engine OFF).



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22. Measure the voltage between pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector (ignition/battery voltage) and ground. Is the voltage less than 11.5 volts?
 - a. Yes; restore voltage to pins 7, 11, 12, 14, and 15 of the MCM 21-pin connector.
 - b. No; Go to step 23.
23. Turn the ignition OFF.
24. Measure the resistance between pins 5, 6, 8 and 9 of the MCM 21-pin connector and the negative battery post. Is resistance greater than five ohms?
 - a. Yes; restore the battery ground to pins 5, 6, 8 and 9 of the MCM 21-pin connector.
 - b. No; Go to step 25.
25. Disconnect MCM 120-pin connector and inspect connector for corrosion, or oil, fuel or water intrusion. Is contamination found?
 - a. Yes; repair as necessary.
 - b. No; install a test MCM. If communication is restored (fault inactive), replace the MCM. Refer to section "Removal of the Motor Control Module".