1 04 03-17

Service Information Bulletin

SUBJECT	DATE
SPN 677/FMI 2 Starter Switch Inconsistent Diagnostics	April 2017

Additions, Revisions, or Updates

Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN-0193	GHG17 Medium Duty	SPN 677/FMI 2 - MCM GHG17	New diagnostic procedure has been added.
DDC-SVC-MAN-0191	GHG17 DD Platform	SPN 677/FMI 2 - MCM GHG17	The diagnostic procedure has been updated.
DDC-SVC-MAN-0084	GHG14 DD Platform	SPN 677/FMI 2 - MCM GHG14	New diagnostic procedure has been added.

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.

13400 Outer Drive, West, Detroit, Michigan 48239-4001
Telephone: 313-592-5000
www.demanddetroit.com

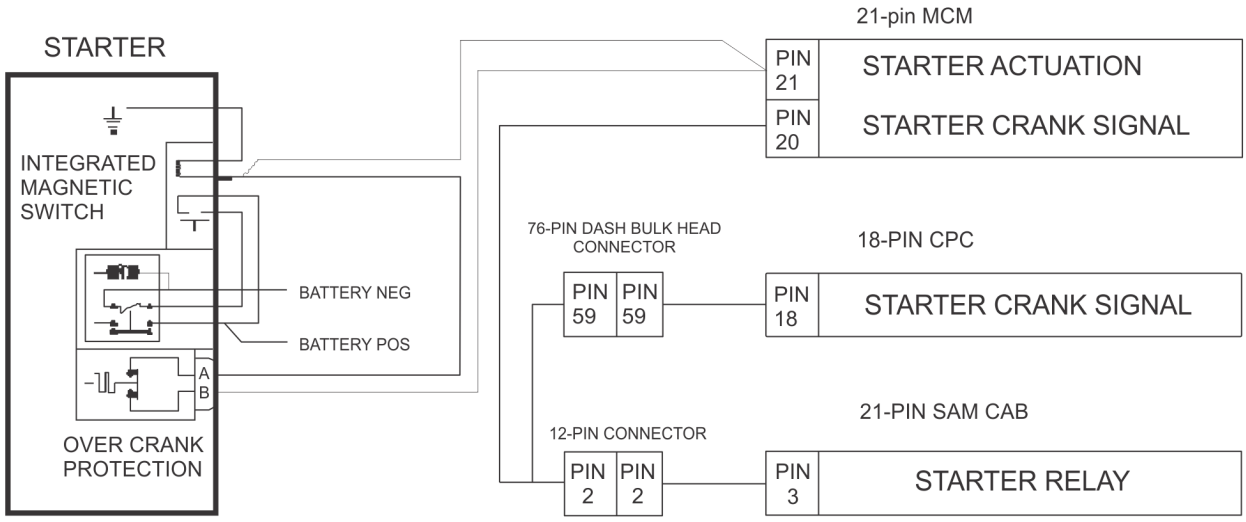
2 SPN 677/FMI 2 - GHG17

Starter Switch Inconsistent

Table 1.

SPN 677/FMI 2	
Description	This Fault Code Sets When the Motor Control Module (MCM) Sees that the Starter Ignition Status from the Common Powertrain Controller (CPC) and MCM Do Not Match.
Monitored Parameter	Starter Voltage Signal
Typical Enabling Conditions	Engine Start
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	CEL
Engine Reaction	None
Verification	Engine Start

Check as follows:



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1. Connect DiagnosticLink ®.
2. Erase fault code SPN 677/FMI 2.

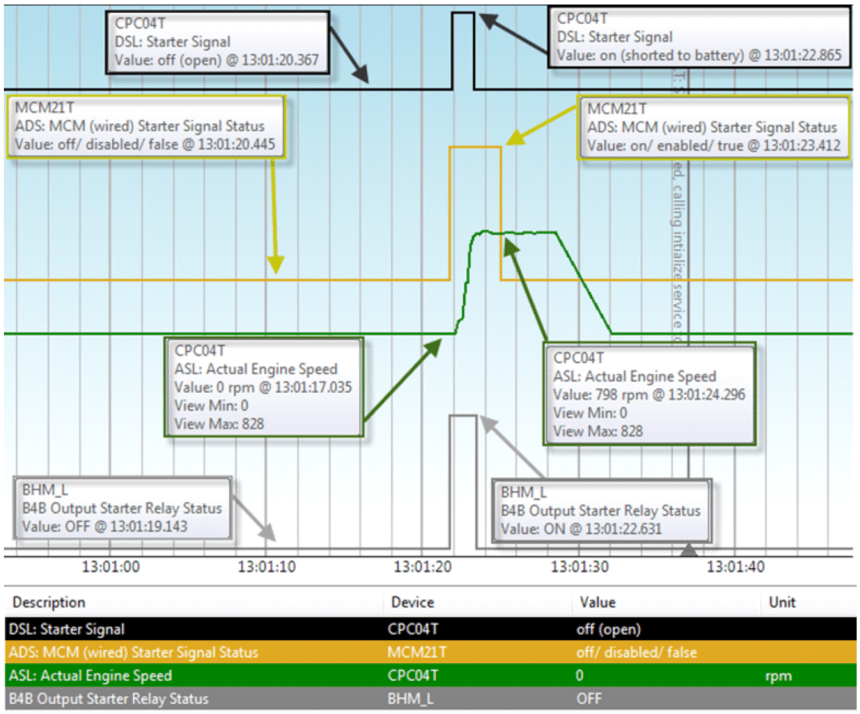
WARNING: PERSONAL INJURY

To avoid injury before starting and running the engine, ensure the vehicle is parked on a level surface, parking brake is set, and the wheels are blocked.

WARNING: ENGINE EXHAUST

To avoid injury from inhaling engine exhaust, always operate the engine in a well-ventilated area. Engine exhaust is toxic.

3. Start the engine.
4. Check the fault codes. Does SPN 677/FMI 2 become active?
   a. Yes; Go to step 5.
   b. No; the fault may have been caused by a previous low voltage concern. No further diagnostics or repairs are needed.
5. Turn the ignition OFF.
6. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.
7. In the left side menu, select Instrumentations and select chart view in the top menu. Load the following monitors:
   - DSL: Starter Signal CPC
   - ADS: MCM (wired) Starter Signal Status
   - ASL: Actual Engine Speed
   - B4B Output Starter Relay Status



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WARNING: ENGINE EXHAUST

To avoid injury from inhaling engine exhaust, always operate the engine in a well-ventilated area. Engine exhaust is toxic.

8. Monitor the DSL: Starter Signal CPC and the B4B Output Starter Relay status, then start the engine. Does the DSL: Starter Signal CPC status change from "Value: off (Open)" to "Value: on (shorted to battery)" when the B4B Output Starter Relay status changes from "Value: OFF" to "Value: ON"?
    a. Yes; Go to step 9.
    b. No; Go to step 17.

NOTE: it is normal for the ADS: MCM (wired) Starter Signal Status to remain on longer than the DSL: Starter Signal CPC and B4B Output Starter Relay status.

9. Turn the ignition OFF.
10. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.
11. Monitor the ADS: MCM (wired) Starter Signal Status and the B4B Output Starter Relay status, then start the engine. Does the ADS: MCM (wired) Starter Signal Status change from "Value: off/disabled/false" to "Value: on/enabled/true when the B4B Output Starter Relay status changes from "Value: OFF" to "Value: ON"?
    a. Yes; Go to step 12.
    b. No; Go to step 22.
12. Turn the ignition OFF.
13. Program and install a test CPC.
14. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.

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WARNING: ENGINE EXHAUST

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15. Start the engine.
16. Does fault code SPN 677/FMI 2 become active?
    a. Yes; replace the MCM.
    b. No; replace the CPC.
17. Disconnect and inspect the CPC #1 electrical connector harness side. Is there corrosion present?
    a. Yes; replace the CPC and the electrical connector.
    b. No; Go to step 18.
18. Is the connector or pin 18 damaged?
    a. Yes; Go to step 19.
    b. No; Go to step 20.
19. Inspect the CPC #1 electrical connector component side. Is the connector or pin 18 damaged?
    a. Yes; replace the CPC and repair the electrical connector.
    b. No; repair/replace the CPC electrical connector and/or pin 18.
20. Using the appropriate probe tool, check pin 18 of the CPC #1 electrical connector. Is pin 18 spread?
    a. Yes; replace pin 18 in the CPC #1 electrical connector.
    b. No; Go to step 21.
21. Measure the voltage on pin 18 when the ignition is turned ON (key ON, engine OFF). Is the voltage on pin 18 greater than 10.5 volts?
    a. Yes; replace the CPC.
    b. No; repair the circuit between pin 18 of the#1 CPC electrical connector and the circuit splice.
22. Disconnect and inspect the MCM 21-pin electrical connector. Is there any corrosion present?
    a. Yes; replace the MCM and repair the 21-pin electrical connector.
    b. No; Go to step 23.

23. Are any of the pins or the connector damaged?
    a. Yes; Go to step 24.
    b. No; Go to step 25.
24. Inspect the MCM 21-pin electrical connector component side. Are any of the pins or the connector damaged?
    a. Yes; replace the MCM and the 21-pin electrical connector.
    b. No; repair the MCM 21-pin electrical connector.
25. Use the appropriate flex probe to check pin 20 in the MCM 21-pin electrical connector. Is pin 20 spread?
    a. Yes; replace pin 20 in the MCM 21-pin electrical connector harness side. Verify repair.
    b. No; Go to step 26.
26. Measure the voltage on pin 20 of the MCM 21-pin electrical connector harness side when the ignition is turned ON (key ON, engine OFF). Is the voltage on pin 20 greater than 10.5 volts?
    a. Yes; replace the MCM.
    b. No; repair the circuit between pin 20 of the MCM 21-pin electrical connector and the circuit splice.

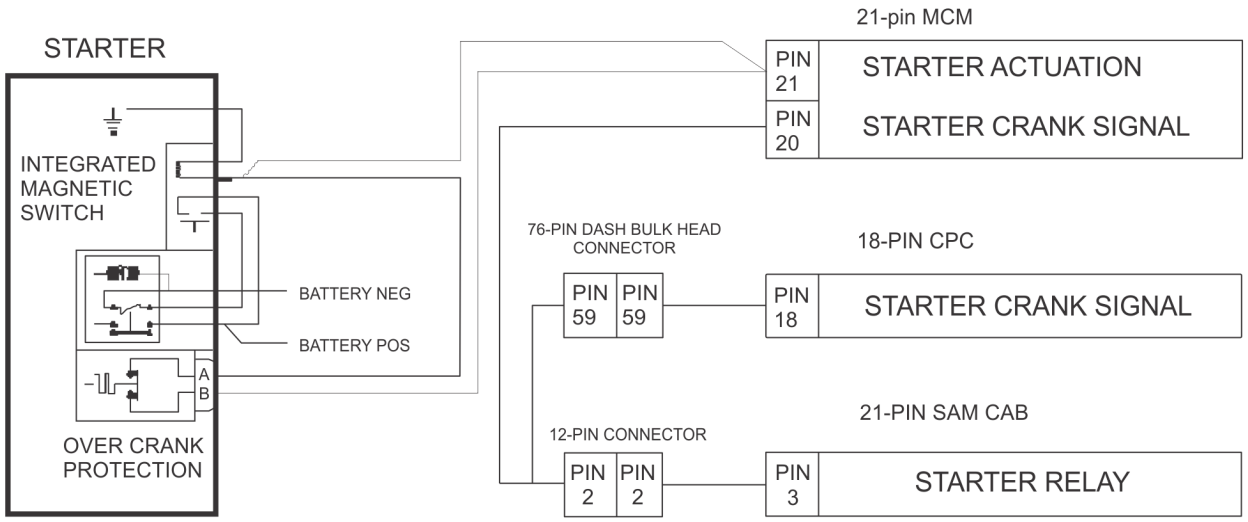
3 SPN 677/FMI 2 - GHG17

Starter Switch Inconsistent

Table 2.

SPN 677/FMI 2	
Description	This Fault Code Sets When the Motor Control Module (MCM) Sees that the Starter Ignition Status from the Common Powertrain Controller (CPC) and MCM Do Not Match.
Monitored Parameter	Starter Voltage Signal
Typical Enabling Conditions	Engine Start
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	CEL
Engine Reaction	None
Verification	Engine Start

Check as follows:



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1. Connect DiagnosticLink ®.
2. Erase fault code SPN 677/FMI 2.

WARNING: ENGINE EXHAUST

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WARNING: PERSONAL INJURY

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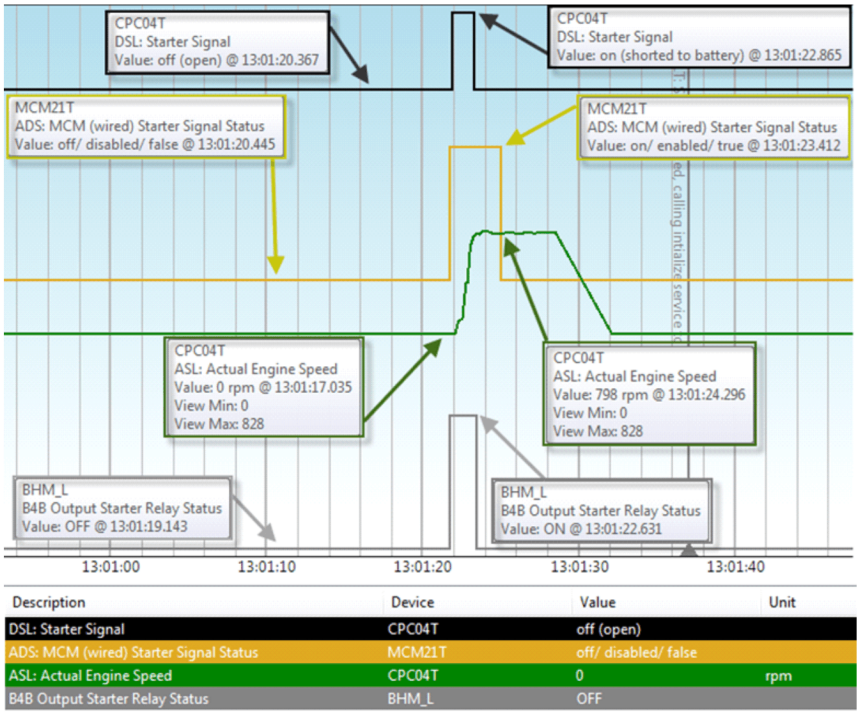
3. Start the engine.
4. Check the fault codes. Does SPN 677/FMI 2 become active?
   a. Yes; Go to step 5.
   b. No; the fault may have been caused by a previous low voltage concern. No further diagnostics or repairs are needed.
5. Turn the ignition OFF.
6. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.
7. In the left side menu, select Instrumentations and select chart view in the top menu. Load the following monitors:
   - DSL: Starter Signal CPC
   - ADS: MCM (wired) Starter Signal Status
   - ASL: Actual Engine Speed
   - B4B Output Starter Relay Status



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8. Monitor the DSL: Starter Signal CPC and the B4B Output Starter Relay status, then start the engine. Does the DSL: Starter Signal CPC status change from "Value: off (Open)" to "Value: on (shorted to battery)" when the B4B Output Starter Relay status changes from "Value: OFF" to "Value: ON"?
    a. Yes; Go to step 9.
    b. No; Go to step 17.

NOTE: It is normal for the ADS: MCM (wired) Starter Signal Status to remain on longer than the DSL: Starter Signal CPC and B4B Output Starter Relay status.

9. Turn the ignition OFF.
10. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.

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11. Monitor the ADS: MCM (wired) Starter Signal Status and the B4B Output Starter Relay status, then start the engine. Does the ADS: MCM (wired) Starter Signal Status change from "Value: off/disabled/false" to "Value: on/enabled/true when the B4B Output Starter Relay status changes from "Value: OFF" to "Value: ON"?
    a. Yes; Go to step 12.
    b. No; Go to step 22.
12. Turn the ignition OFF.
13. Program and install a test CPC.
14. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.

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WARNING: ENGINE EXHAUST

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15. Start the engine.
16. Does fault code SPN 677/FMI 2 become active?
    a. Yes; replace the MCM.
    b. No; replace the CPC.
17. Disconnect and inspect the CPC #1 electrical connector harness side. Is there corrosion present?
    a. Yes; replace the CPC and the electrical connector.
    b. No; Go to step 18.
18. Is the connector or pin 18 damaged?
    a. Yes; Go to step 19.
    b. No; Go to step 20.
19. Inspect the CPC #1 electrical connector component side. Is the connector or pin 18 damaged?
    a. Yes; replace the CPC and repair the electrical connector.

b. No; repair/replace the CPC electrical connector and/or pin 18.

20. Using the appropriate probe tool, check pin 18 of the CPC #1 electrical connector. Is pin 18 spread?
    a. Yes; replace pin 18 in the CPC #1 electrical connector.
    b. No; Go to step 21.
21. Measure the voltage on pin 18 when the ignition is turned ON (key ON, engine OFF). Is the voltage on pin 18 greater than 10.5 volts?
    a. Yes; replace the CPC.
    b. No; repair the circuit between pin 18 of the #1 CPC electrical connector and the circuit splice.
22. Disconnect and inspect the MCM 21-pin electrical connector. Is there any corrosion present?
    a. Yes; replace the MCM and repair the 21-pin electrical connector.
    b. No; Go to step 23.
23. Are any of the pins or the connector damaged?
    a. Yes; Go to step 24.
    b. No; Go to step 25.
24. Inspect the MCM 21-pin electrical connector component side. Are any of the pins or the connector damaged?
    a. Yes; replace the MCM and the 21-pin electrical connector.
    b. No; repair the MCM 21-pin electrical connector.
25. Use the appropriate flex probe to check pin 20 in the MCM 21-pin electrical connector. Is pin 20 spread?
    a. Yes; replace pin 20 in the MCM 21-pin electrical connector harness side. Verify repair.
    b. No; Go to step 26.
26. Measure the voltage on pin 20 of the MCM 21-pin electrical connector harness side when the ignition is turned ON (key ON, engine OFF). Is the voltage on pin 20 greater than 10.5 volts?
    a. Yes; replace the MCM.
    b. No; repair the circuit between pin 20 of the MCM 21-pin electrical connector and the circuit splice.

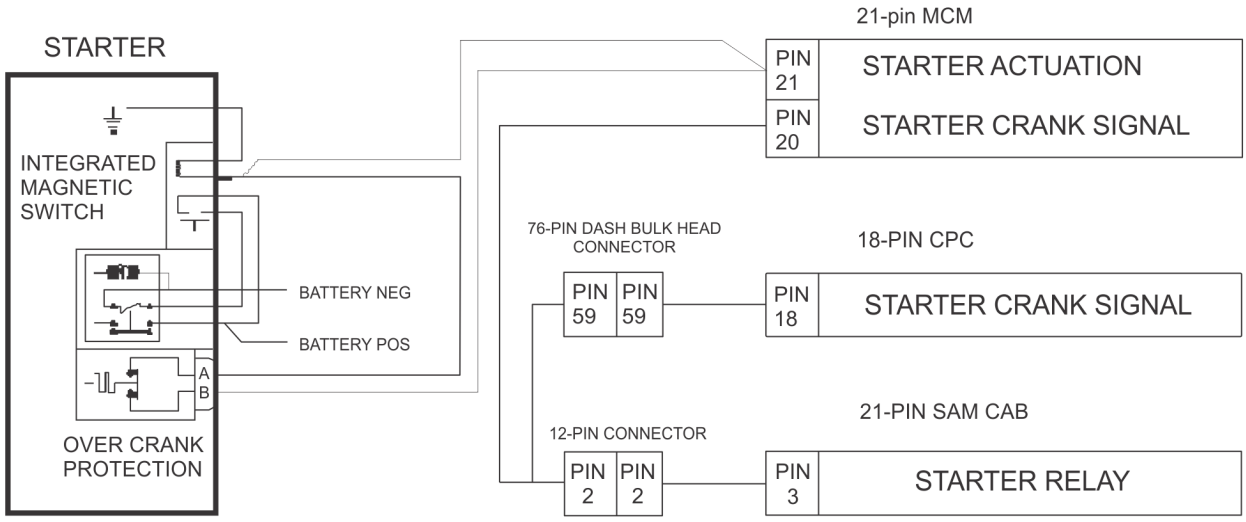
4 SPN 677/FMI 2 - GHG14

Starter Switch Inconsistent

Table 3.

SPN 677/FMI 2	
Description	This Fault Code Sets When the Motor Control Module (MCM) Sees that the Starter Ignition Status from the Common Powertrain Controller (CPC) and MCM Do Not Match.
Monitored Parameter	Starter Voltage Signal
Typical Enabling Conditions	Engine Start
Monitor Sequence	None
Execution Frequency	Always Enabled
Typical Duration	Two Seconds
Dash Lamps	CEL
Engine Reaction	None
Verification	Engine Start

Check as follows:



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3. Start the engine.
4. Check the fault codes. Does SPN 677/FMI 2 become active?
   a. Yes; Go to step 5.
   b. No; the fault may have been caused by a previous low voltage concern. No further diagnostics or repairs are needed.
5. Turn the ignition OFF.
6. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.
7. In the left side menu, select Instrumentations and select chart view in the top menu. Load the following monitors:
   - DSL: Starter Signal CPC
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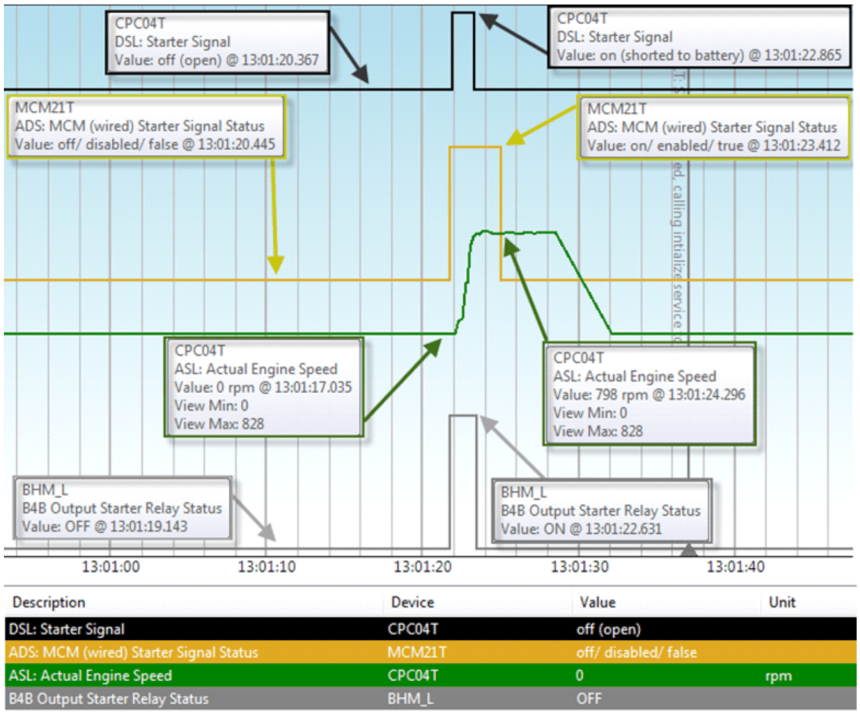
   - B4B Output Starter Relay Status



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    a. Yes; Go to step 9.
    b. No; Go to step 17.

NOTE: it is normal for the ADS: MCM (wired) Starter Signal Status to remain on longer than the DSL: Starter Signal CPC and B4B Output Starter Relay status.

9. Turn the ignition OFF.
10. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.
11. Monitor the ADS: MCM (wired) Starter Signal Status and the B4B Output Starter Relay status, then start the engine. Does the ADS: MCM (wired) Starter Signal Status change from "Value: off/disabled/false" to "Value: on/enabled/true when the B4B Output Starter Relay status changes from "Value: OFF" to "Value: ON"?
    a. Yes; Go to step 12.
    b. No; Go to step 22.
12. Turn the ignition OFF.
13. Program and install a test CPC.
14. Turn the ignition ON (key ON, engine OFF) and reconnect DiagnosticLink.

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15. Start the engine.
16. Does fault code SPN 677/FMI 2 become active?
    a. Yes; replace the MCM.
    b. No; replace the CPC.
17. Disconnect and inspect the CPC #1 electrical connector harness side. Is there corrosion present?
    a. Yes; replace the CPC and the electrical connector.
    b. No; Go to step 18.
18. Is the connector or pin 18 damaged?
    a. Yes; Go to step 19.
    b. No; Go to step 20.
19. Inspect the CPC #1 electrical connector component side. Is the connector or pin 18 damaged?
    a. Yes; replace the CPC and repair the electrical connector.
    b. No; repair/replace the CPC electrical connector and/or pin 18.
20. Using the appropriate probe tool, check pin 18 of the CPC #1 electrical connector. Is pin 18 spread?
    a. Yes; replace pin 18 in the CPC #1 electrical connector.
    b. No; Go to step 21.
21. Measure the voltage on pin 18 when the ignition is turned ON (key ON, engine OFF). Is the voltage on pin 18 greater than 10.5 volts?
    a. Yes; replace the CPC.
    b. No; repair the circuit between pin 18 of the #1 CPC electrical connector and the circuit splice.
22. Disconnect and inspect the MCM 21-pin electrical connector. Is there any corrosion present?
    a. Yes; replace the MCM and repair the 21-pin electrical connector.
    b. No; Go to step 23.

23. Are any of the pins or the connector damaged?
    a. Yes; Go to step 24.
    b. No; Go to step 25.
24. Inspect the MCM 21-pin electrical connector component side. Are any of the pins or the connector damaged?
    a. Yes; replace the MCM and the 21-pin electrical connector.
    b. No; repair the MCM 21-pin electrical connector.
25. Use the appropriate flex probe to check pin 20 in the MCM 21-pin electrical connector. Is pin 20 spread?
    a. Yes; replace pin 20 in the MCM 21-pin electrical connector harness side. Verify repair.
    b. No; Go to step 26.
26. Measure the voltage on pin 20 of the MCM 21-pin electrical connector harness side when the ignition is turned ON (key ON, engine OFF). Is the voltage on pin 20 greater than 10.5 volts?
    a. Yes; replace the MCM.
    b. No; repair the circuit between pin 20 of the MCM 21-pin electrical connector and the circuit splice.