2015 Dodge or Ram Truck RAM 3500 Truck 4WD L6-6.7L DSL Turbo
Vehicle > ALL Diagnostic Trouble Codes ( DTC ) > Testing and Inspection > U Code Charts > U0164 > U0164-00

COMMUNICATIONS - NO RESPONSE FROM ECU

## NO RESPONSE FROM ECU

For a complete wiring diagram, **refer to the Wiring Information**.

# Theory of Operation

Electronic Control Units (ECUs) require the following four components to properly communicate on a Controller Area Network (CAN) data bus:

- Power (Battery/Fused B+/Ignition)
- Ground
- Correct CAN bus voltage
- Correct vehicle configuration

**CAN BUS FAULTS**

| TYPES OF CAN BUS FAULTS | |
|---|---|
| LOSS OF COMMUNICATION | will set by an active receiving/reporting ECU on a CAN Bus network that detects no communication from another ECU on the same CAN Bus network. Insufficient power, ground, bus voltage, or inaccurate vehicle configuration will cause a loss of communication. |
| IMPLAUSIBLE MESSAGE | will set by an active receiving/reporting ECU, when it determines the data sent from the active transmitting/offending ECU is missing part of the message, or the message is an irrational value over the CAN Bus. |
| MISSING MESSAGE | will set by an active receiving/reporting ECU, when it determines a data message to be missing partial information when sent from the active transmitting/offending ECU over the CAN Bus network. |
| BUS OFF | set by an ECU that has experienced approximately 32 transmit errors, this can be caused by ECU internal faults as well as external bus faults like shorts or plugging and unplugging test tools to the diagnostic connector. |
| PHYSICAL | is only detectable by an ECU that has a transceiver that is able to detect shorts on the bus. If the ECU does not, it generally will set bus off faults due to shorted bus lines. |

Several ECUs on this vehicle are connected to and communicate on multiple CANs. For additional information on the communication network(s), Refer to section(s) 08 - Electrical - 8E - Electronic Control Modules - Communication - Description and Operation.

# When Monitored and Set Conditions

| Possible Causes |
| --- |
| DEALER INSTALLED EQUIPMENT |
| POWER SUPPLY (FUSED B+/IGNTION) RELATED CIRCUIT(S) SHORTED TO GROUND, OPEN, OR SHORTED |
| GROUND CIRCUIT(S) OPEN/HIGH RESISTANCE |
| CAN BUS CIRCUIT(+/-) OPEN/HIGH RESISTANCE |
| ELECTRONIC CONTROL UNIT (ECU) |

**If the COMMUNICATION DIAGNOSTIC PROCEDURE has not been performed, (Refer to 28 - DTC-Based Diagnostics/Standard Procedure) .**

# Diagnostic Test

1. **CHECK THE ECU STATUS ON THE CAN BUS**

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1. Turn the ignition on.
2. With the scan tool, read the Controller Area Network (CAN) topology on the Vehicle View screen.

**NOTE: This vehicle may be equipped with a CAN architecture using multiple CAN buses (i.e. CAN-C1, CAN-C2, CAN-BH etc.) for communication with an ECU.**

**Is the ECU active on all of the CAN buses connected to the ECU?**

**Yes**

- Perform the TESTING FOR AN INTERMITTENT CONDITION procedure. (Refer to 28 - DTC-Based Diagnostics/Standard Procedure) .

**No**

- Go To **2**

2. **CHECK THE VEHICLE CONFIGURATION**

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1. *Previous Step* **1**
2. Turn the ignition off.
3. Connect a battery charger to the vehicle battery to maintain proper system voltage during this diagnostic procedure.

4. Leave the scan tool connected and on the Vehicle View screen. The CAN bus will remain active with the scan tool connected and the ignition off.
5. Using Dealer Connect, perform a Single VIN Inquiry.
6. Select the OPTIONS tab.
7. Review the information found under the Dealer Installed Equipment section.

**NOTE: This is to review the possibility of an Electronic Control Unit upgrade/addition (i.e. upgrading a Radio from a base to a Premium or the addition of a Rear Seat Video System).**

**Does this vehicle have any Dealer Installed Equipment?**

**Yes**

- Go To **3**

**No**

- Go To **4**

3. **CHECK THE DEALER INSTALLED EQUIPMENT**

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1. *Previous Step* **2**

**Is the Dealer Installed Equipment related to the ECU that is not active on bus?**

**Yes**

- Contact Mopar Accessories for further technical and diagnostic support.

**No**

- Go To **4**

4. **ISOLATE AND LOAD TEST ALL POWER SUPPLY (FUSED B+/IGNITION) RELATED CIRCUITS TO THE ECU FOR A SHORT TO GROUND, OPEN, OR HIGH RESISTANCE**

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1. *Previous Step* **2** or **3**
2. Check the fuse for an open. If the fuse is open, make sure to check for a short to ground prior to replacing the fuse.
3. The ignition must be off when performing a load test on a circuit.

4. Isolate the circuit(s) by disconnecting the Electronic Control Unit (ECU) and all other harness connectors containing the circuit(s) being tested.

5. Connect the positive lead of the load test tool to the positive side of the Battery (A). Refer to the diagram below.

6. Using an approved back probe tool, connect the negative lead of the load test tool to the circuit being tested at the ECU harness connectors (B).

7. Using an approved back probe tool and a fused jumper wire, connect the circuit being tested to the negative side of the Battery or a known good ground at the other ECU/Power Distribution Center (PDC) harness connector (C and D).

8. The bulb on the load test tool should be illuminated and bright if there is no resistance in the circuit.

NOTE: **Why load test a circuit? A load test is used to determine if a circuit is capable of carrying the amperage needed to perform properly. The 3156 bulb in the load tool illustrated, is a simple but effective method of testing circuit functionality. A 3156 Bulb has approximately 6.0 Ohms of resistance when the bulb is powered and draws approximately 2.0 amps of current. Read the CIRCUIT LOAD TESTING PROCEDURE for information on building a simple load test tool and for additional load testing information and alternative methods of load testing or voltage drop testing a circuit, (Refer to 28 - DTC-Based Diagnostics/Standard Procedure) .**

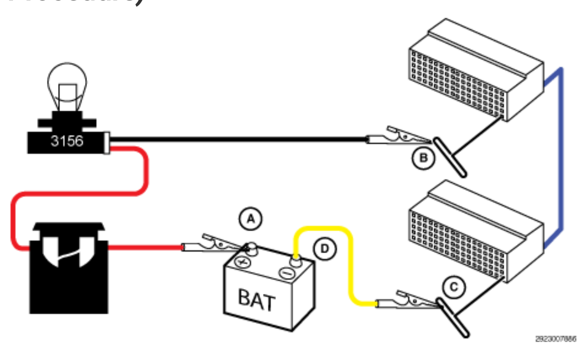
NOTE: **A 12-volt test light can be substituted for the load test tool, but only if the test light draws enough current to effectively load test the circuit. Many high impedance test lights draw very little amperage (less than 0.1 amps) and are not reliable to load test a circuit. To perform a proper load test of a circuit, the tool being used should draw more than approximately 0.75 amps.**

NOTE: **Why perform a Voltage Drop Test? To verify with certainty there is not any resistance in the circuit being tested, perform a simple voltage drop test across the 3156 bulb of the load test tool. To do so perform the following:**

- **1. Connect the leads of a DVOM to the alligator clips on the load test tool while the load test tool is connected in series with the circuit.**
- **2. Compare the voltage drop across the bulb to the voltage reading across the Battery terminals.**
- **3. The voltage dropped across the bulb should be equal to the voltage reading across the Battery terminals if there is no resistance in the circuit being tested.**

**Example: 2.0 Ohms of resistance in the circuit being tested will cause the voltage measurement across the bulb to be 25% less than when compared to Battery voltage. The reason for this is that the 2.0 Ohms in the circuit makes up 25% of the total circuit resistance of 8.0 Ohms. Read the CIRCUIT LOAD TESTING PROCEDURE for information on building a simple load test tool and for additional load testing information and alternative methods of load testing or voltage drop testing a circuit, (Refer to 28 - DTC-Based Diagnostics/Standard Procedure) .**

WARNING: **To avoid possible serious or fatal injury, DO NOT load test any air bag/restraint system components or circuits using the procedures listed here. Refer to the Service Information for proper air bag/restraint system testing procedures.**



CAUTION: **Do not load test any circuits with components still connected to the circuit.**

**NOTE: When probing a circuit at an Electronic Control Unit (ECU) harness connector, always use an appropriate back probing tool to prevent any possible damage to the ECU terminals.**
**NOTE: Compare the brightness of the bulb in the load test tool to that of a direct connection to Battery.**

**Is the load test bulb illuminated and bright?**

**Yes**

- Go To **5**

**No**

- Repair the circuit(s) for an open or high resistance.
- Perform the appropriate ECU verification test. If a verification test in not available, perform the BODY VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Body Control (BCM) - Standard Procedure).

5. **CHECK THE GROUND CIRCUIT(S) TO THE ECU BY LOAD TESTING THE CIRCUIT FOR AN OPEN OR HIGH RESISTANCE**

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1. *Previous Step* **4**
2. Disconnect the ECU harness connector to isolate the ground circuit(s).
3. Connect the positive lead of the load test tool to the positive side of the Battery.
4. Connect the negative lead of the load test tool to the ground circuit at the ECU harness connector (A). **Note:** refer to the diagram below.
5. The bulb on the load test tool should be illuminated and bright if there is no resistance in the circuitry.

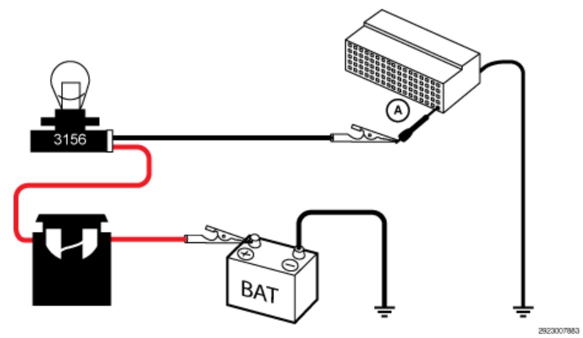
**NOTE: Why load test a circuit? A load test is used to determine if a circuit is capable of carrying the amperage needed to perform properly. The 3156 bulb in the load tool illustrated, is a simple but effective method of testing circuit functionality. A 3156 Bulb has approximately 6.0 Ohms of resistance when the bulb is powered and draws approximately 2.0 amps of current. Read the CIRCUIT LOAD TESTING PROCEDURE for information on building a simple load test tool and for additional load testing information and alternative methods of load testing or voltage drop testing a circuit, (Refer to 28 - DTC-Based Diagnostics/Standard Procedure) .**
**NOTE: A 12-volt test light can be substituted for the load test tool, but only if the test light draws enough current to effectively load test the circuit. Many high impedance test lights draw very little amperage (less than 0.1 amps) and are not reliable to load test a circuit. To perform a proper load test of a circuit, the tool being used should draw more than approximately 0.75 amps.**
**NOTE: Why perform a Voltage Drop Test: To verify with certainty there is not any resistance in the circuit being tested,**

perform a simple voltage drop test across the 3156 bulb of the load test tool. To do so perform the following:

- 1. Connect the leads of a DVOM to the alligator clips on the load test tool while the load test tool is connected in series with the circuit.
- 2. Compare the voltage drop across the bulb to the voltage reading across the Battery terminals.
- 3. The voltage dropped across the bulb should be equal to the voltage reading across the Battery terminals if there is no resistance in the circuit being tested.

Example: 2.0 Ohms of resistance in the circuit being tested will cause the voltage measurement across the bulb to be 25% less than when compared to Battery voltage. The reason for this is that the 2.0 Ohms in the circuit makes up 25% of the total circuit resistance of 8.0 Ohms. Read the CIRCUIT LOAD TESTING PROCEDURE for information on building a simple load test tool and for additional load testing information and alternative methods of load testing or voltage drop testing a circuit, (Refer to 28 - DTC-Based Diagnostics/Standard Procedure) .

NOTE: When probing a circuit at an Electronic Control Unit (ECU) harness connector, always use an appropriate back probing tool to prevent any possible damage to the ECU terminals.
NOTE: Compare the brightness of the bulb in the load test tool to that of a direct connection to Battery.




**Is the load test bulb illuminated and bright?**

Yes

- Go To **6**

No

- Repair the ground circuit(s) for an open or high resistance.
- Perform the appropriate ECU verification test. If a verification test in not available, perform the BODY VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Body Control (BCM) - Standard Procedure).

6. **CHECK THE CAN BUS (+) CIRCUIT(S) FOR AN OPEN OR HIGH RESISTANCE**

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1. *Previous Step* **5**
2. Measure the voltage on the CAN Bus (+) circuit(s) at the harness connector(s) of the ECU.

**Is the voltage below 2.6 volts?**

NOTE:
The CAN communication network wires typically contain 33-50 twists per meter (one twist for every 20 to 30.3 mm, or one twist for every 0.75 to 1.2 inches). It is important to maintain the twisted pair configuration whenever servicing a dual-wire communication network.

**The length of the circuit wires are also important in communication systems so both wires need to maintain their same lengths or it can result in communication fault / error.**

**Due to the twisted pair configuration and length of wiring, an overlay harness is NOT a recommended repair.**

**Yes**

- Repair the CAN Bus (+) circuit(s) for an open or high resistance.
- Perform the appropriate ECU verification test. If a verification test in not available, perform the BODY VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/ECU, Body Control (BCM) /Standard Procedure).

**No**

- Go To **7**

7. **CHECK THE CAN BUS (-) CIRCUIT(S) FOR AN OPEN OR HIGH RESISTANCE**

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1. *Previous Step* **6**
2. Measure the voltage on the CAN Bus (-) circuit(s) at the harness connector(s) of the ECU.

**Is the voltage below 1.3 volts?**

**NOTE:**
**The CAN communication network wires typically contain 33-50 twists per meter (one twist for every 20 to 30.3 mm, or one twist for every 0.75 to 1.2 inches). It is important to maintain the twisted pair configuration whenever servicing a dual-wire communication network.**

**The length of the circuit wires are also important in communication systems so both wires need to maintain their same lengths or it can result in communication fault / error.**

**Due to the twisted pair configuration and length of wiring, an overlay harness is NOT a recommended repair.**

**Yes**

- Repair the CAN Bus (-) circuit(s) for an open or high resistance.
- Perform the appropriate ECU verification test. If a verification test in not available, perform the BODY VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/ECU, Body Control (BCM) /Standard Procedure).

**No**

- Go To **8**

8. **CHECK RELATED HARNESS CONNECTIONS**

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1. *Previous Step* **7**
2. Disconnect the scan tool at this time.
3. Disconnect all related harness connectors to the ECU.
4. Disconnect all related in-line harness connections (if equipped).
5. Disconnect the related ECU harness connectors.
6. Inspect harness connectors, ECU connectors, and all male and female terminals for the following conditions:
   - Proper connector installation.
   - Damaged connector locks.
   - Corrosion.
   - Other signs of water intrusion.
   - Weather seal damage (if equipped).
   - Bent terminals.
   - Overheating due to a poor connection (terminal may be discolored due to excessive current draw).
   - Terminals that have been pushed back into the connector cavity.
   - Perform a terminal drag test on each connector terminal to verify proper terminal tension.

   Repair any conditions that are found.
7. Reconnect all related harness connectors to the ECU. Be certain that all harness connectors are fully seated and the connector locks are fully engaged.
8. Reconnect all in-line harness connectors (if equipped). Be certain that all connectors are fully seated and the connector locks are fully engaged.
9. Reconnect all related ECU harness connectors. Be certain that all connectors are fully seated and the connector locks are fully engaged.
10. Turn the ignition on.
11. With the scan tool, read the Controller Area Network (CAN) topology on the Vehicle View screen.

**Is the ECU active on all of the CAN buses connected to the ECU?**
**NOTE: Choose the one answer that best describes the vehicle condition that exists.**

**Yes - The ECU is active on all of the CAN buses connected to the ECU WITHOUT previous history of a related concern.**

- The wiring or poor connection problem has been repaired.
- Perform the appropriate ECU verification test. If a verification test in not available, perform the BODY VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/ECU, Body Control (BCM) /Standard Procedure).

- **Yes - The ECU is active on all of the CAN buses connected to the ECU; but WITH previous history of a related concern.**
- **.... OR....**
- **No - The ECU is not active on all of the CAN buses connected to the ECU.**

- Go To **9**

9. **CHECK THE CAN BUS COMMUNICATION WITH THE MOPAR SCOPE**

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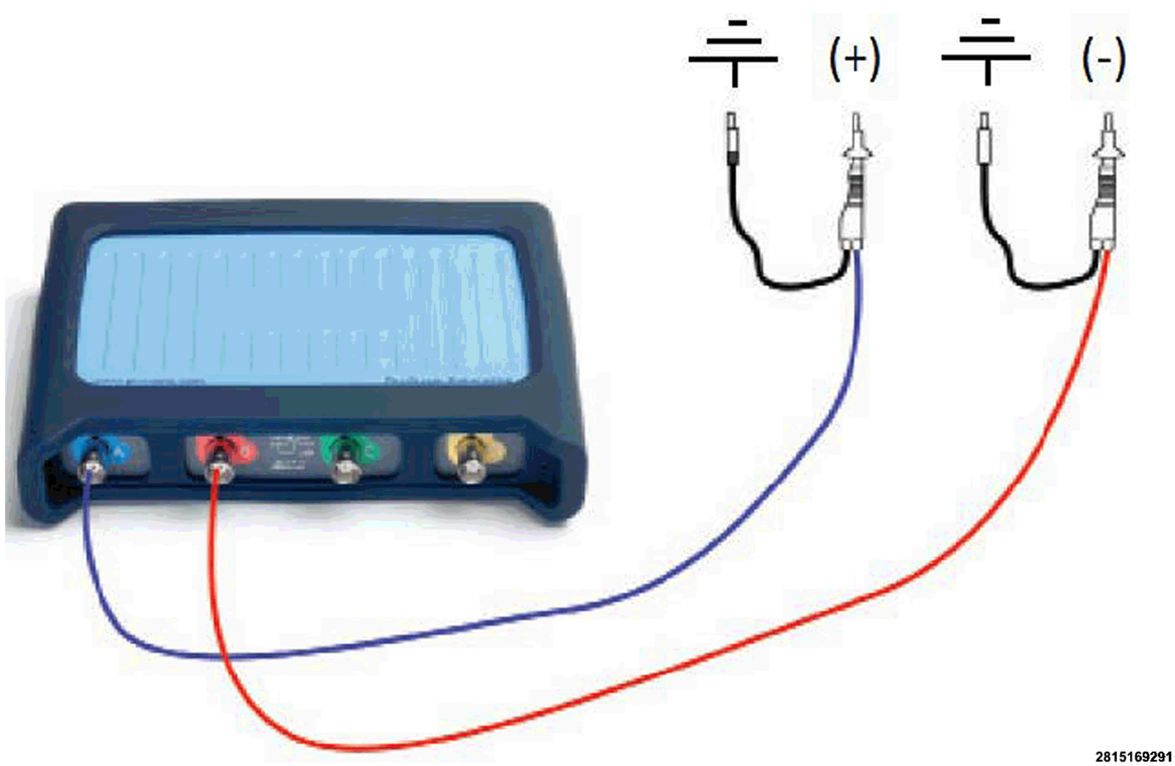
1. *Previous Step* **8**

**NOTE: Some vehicles can have multiple CAN connections within a connector, make sure that you are testing the same CAN for both circuits.** Connect the black pin for each test lead to Chassis ground. Connect the blue lead to CAN (+) and the red lead to CAN (-) for the circuits to be tested.




2. Start the Mopar Scope.

3. Once the Mopar Scope is running, select **Guided Tests**.

4. Select **Communications**.

5. Select **CAN L&H**.

6. Select **CAN bus testing / diagnostics**.

7. Select **Load settings file**.

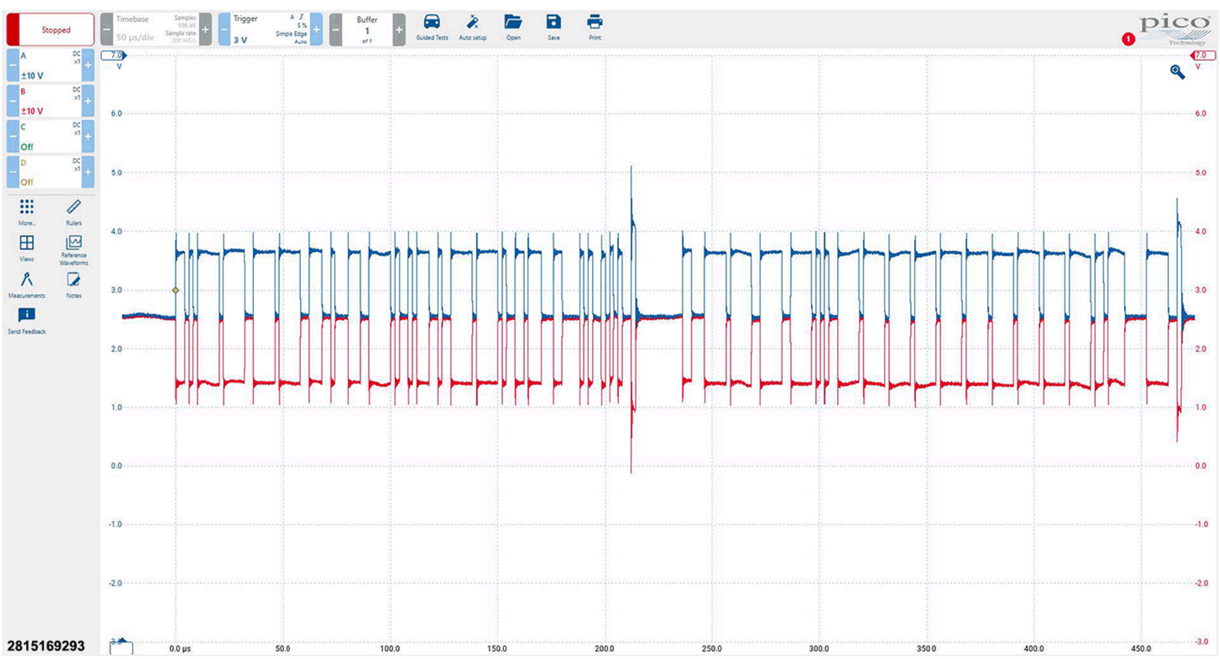
8. Turn the ignition on.

**NOTE: When connected to the vehicle harness correctly, the LEDs on the breakout box will light up to indicate that there is activity on the bus.**

9. A waveform should appear. The image below is of a normal CAN bus waveform using the Mopar Scope. The waveform should reveal that data is being exchanged continuously along the CAN bus and the peak voltages are correct.

*Mopar Scope Settings*

| DESCRIPTION | MEASUREMENT |
| --- | --- |
| CHANNEL A | 10 volts |
| CHANNEL B | 10 volts |
| TIME BASE | 50 $\mu$s/div [microseconds / division control] |
| ZOOM / VIEW | X1 - HORIZONTAL & VERTICAL |




10. With the Mopar Scope running, use the wiring diagrams as a guide to trace the circuits and look for any in-line connectors where the fault could occur intermittently by wiggling **ALL related** wire harness and connectors.

**Did the Mopar Scope show the CAN bus waveform fault?**

**NOTE:**

**The CAN communication network wires typically contain 33-50 twists per meter (one twist for every 20 to 30.3 mm, or one twist for every 0.75 to 1.2 inches). It is important to maintain the twisted pair configuration whenever servicing a dual-wire communication network.**

**The length of the circuit wires are also important in communication systems so both wires need to maintain their same lengths or it can result in communication fault / error.**

**Due to the twisted pair configuration and length of wiring, an overlay harness is NOT a recommended repair.**

Yes

- Repair any conditions that are found.

No

- Replace the ECU in accordance with the Service information.
- Perform the appropriate ECU verification test. If a verification test in not available, perform the BODY VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/ECU, Body Control (BCM) /Standard Procedure).