|  |  |  |  |
| --- | --- | --- | --- |
| Station | | Task | |
| 40 | | 5 | |
| Running 903 | | | |
|  |  |  |  |

**

# Dynamic Testing CAN

## Task Objective

At the completion of this task the technician will be able to properly diagnose a CAN system, and loss of communication with the diagnostic software

**Repair Order information**

The customer complains that the cluster displays check engine but the engine does run.

**Introduction**

This is where the diagnosis begins. You need to apply a logical method of diagnosis.

**For example**, you should think of what the repair order complaint is and possible causes for it. Remember the basics first: Verify the complaint. If you determine it is an electrical issue, first check the schematic and check the wire colors and locations of the terminals and components. Visually check for disconnected connectors or backed out terminals. Ensure there is enough grip on the terminal. Ensure the wires are in the correct positions in the connector. Test the component, first from the MPEM or ECM connector, then at the component. Then verify the continuity of the wires from the component to the ECM.

Use the tools you have at hand, the most important ones being the knowledge that you have and the thought process you use to narrow the problem down to its root cause. Remember diagnosis is a process of eliminating what is good to determine what is bad.

**Controller Area Network (CAN)**

The CAN (Controller Area Network) protocol is an ISO standard for serial data communication.

The CAN bus links the ECM, multifunction gauge and IBR module together so that they can communicate with each other and interact as required. The components, (modules) are connected together by 2 wires and are in constant communication at a rate of about 20 milliseconds.

CAN lines consist of a pair of wires (WHITE / BEIGE and WHITE BLACK).

If a component or system malfunction is detected, a module (ECM, iBR or Gauge) may generate a fault code, which is transmits through the CAN bus as a signal. The fault signal may be used for various functions such as triggering the display of an error message in the Gauge Cluster, turning on a fault indicator light, limiting or inhibiting vehicle or engine operation, or viewed using BUDS software for troubleshooting.

**Procedures**

#### Place the switches on the switch box in the following positions.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A | X | X | X |  | X | X | X | X |
| B |  |  |  | X |  |  |  |  |

|  |
| --- |
| 1. Start the machine and verify the complaint. What needs to be repaired on the unit? Be specific list circuit numbers, color codes and any other pertinent information.   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A | X | X | X | X | X | X | X | X |
| B |  |  |  |  |  |  |  |  |

|  |
| --- |
| Clear any codes, cleanup work station and disconnect BUDS. |

### Questions

At the diagnostic connector measure the resistance between the two CAN lines.

1. What is the resistance?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The gauge and the ECM each contain a 120 ohm resistor. Using the formula for calculating the total resistance of resistors in parallel we know that if the Gauge and the ECM are connected to the CAN lines, the total resistance is approximately 60 ohms, but if only one is connected the resistance is 120 ohms.

1. How could this knowledge help diagnose the CAN Line circuit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What information travels through the CAN lines?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Instructor sign off-- Go \_\_\_\_\_\_\_\_\_**