|  |  |  |  |
| --- | --- | --- | --- |
| Station | | Task | |
| 7 | | 5 | |
| Running 1503 | | | |
|  |  |  |  |

**

# Output fault Diagnosis

## TASK OBJECTIVE

At the completion of this task the technician will be able to properly perform various electrical circuit diagnostics by methods of dynamic testing and using input versus output strategies.

In addition, the student will be able to demonstrate how to perform a logical approach on an electrical diagnostic situation.

**REPAIR ORDER INFORMATION**

Feels like running in learning key mode. The engine runs rough. Further information states that a compression test has been performed and compression is within specifications.

**INTRODUCCTION**

Now the diagnosis begins. You need to apply a logical method of diagnosis.

For example, 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 terminals.

Ensure the wires are in the correct positions in the connectors.

Test any power source and/or ground to the component at the component. If any resistance values exist for the component, check those values at the component and if in specification, continue testing in the direction of the ECM connectors or ECM.

Remember, disconnecting or replacing the ECM should only be done as a last resort. When it is necessary to disconnect the ECM, ensure to verify the continuity of the wires from the component to the ECM.

In conclusion, diagnosis is simply a process of eliminating what is good to determine what is bad.

**Note:** The ECM connector terminals are **very** delicate and therefore the ECM connections should never be removed unless absolutely necessary. Perform as many tests as possible without disrupting the ECM connectors.

A LED (Light Emitting Diode) or a Noid light is useful in finding output fault codes. Simply insert the test device into the suspect component connector and activate the component. If the light flashes, the positive and negative is going to the component. The circuit would be good and the component at fault. If the light does not flash further circuit diagnosis will be necessary.

Note: A LED will only allow current to flow in one direction. If the light does not flash in the first test, reverse the polarity of the wires and try it again.

**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 |  |  |  |

Follow the steps and answer the questions below:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Connect BUDS to the unit and read data | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Check for faults on the "faults" screen. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Record the faults and the descriptions here | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Go to the "monitoring" screens "pages 1 and 2" and view the data. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Is there anything out of the ordinary? | | | | | | | | | YES | | | | | |  | | | | NO | | |  |  |
| 1. If so, list what: | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Start the engine and perform the shut down cylinder tests and record the following. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. What is the RPM drop, when the #1 cylinder is shut? | | | | | | | | | | | | | | | | | | | | | | | |
| 1. What is the RPM drop, when the #2 cylinder is shut? | | | | | | | | | | | | | | | | | | | | | | | |
| 1. What is the RPM drop, when the #3 cylinder is shut? | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Shut the engine off. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Were the readings correct? If not explain why. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. From the "activation" page, activate the components on that cylinder. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Did the components activate? | | YES | | | |  | | | NO | | |  | | | | |  | | | | | | |
| 1. What are the colors codes of the wires going to the output component that did not activate? | | | | | | | | | | | | | | | | | | | | | | | |
| 1. What are the terminal locations of the wires going to the component that did not activate? | | | | | | | | | | | | | | | | | | | | | | | |
| 1. What fuse protects this circuit? | | | | | | | | | | | | | | | | | | | | | | | |
| 1. What supplies the power? | | | | | | | | | | | | | | | | | | | | | | | |
| 1. What supplies the ground? | | | | | | | | | | | | | | | | | | | | | | | |
| 1. With the LED or noid light check if the component is receiving a signal to operate. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Is the component receiving a signal? | | | YES | | | | |  | | NO | | | | | |  | | |  | | | | |
| 1. Check the voltage to the component with a multi-meter | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Is the component receiving the proper voltage? | | | | | | | YES | | | |  | | | | | NO | | | |  | |  | |
| 1. Check the voltage at the component with a test light. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Does the test light illuminate? | | YES | | |  | | | | NO | | | | |  | | | |  | | | | | |
| 1. Install the ECM diagnostic box. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Check the continuity of the wire to the component from the ECM. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Is the continuity good? | YES |  | | NO | | | | | | | | |  | | | | | | | |  | | |
| 1. Remove the ECM diagnostic box. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Check the terminals of the wires for grip. | | | | | | | | | | | | | | | | | | | | | | | |
| 1. What component have you determined to be at fault? | | | | | | | | | | | | | | | | | | | | | | | |

####  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 | X |
| B |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. Start the engine and perform the cylinder shut down tests. | | | | | |
| 1. Is the vessel repaired? | YES |  | NO |  |  |
| 1. Clear the occurred codes from BUDS. | | | | | |
| 1. Disconnect BUDS | | | | | |

**QUESTIONS**

1. What have you learned from this task?

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2. **Let us now try to do a sample diagnostic scenario!**

Suppose that during the test you just performed, when you tested with the test light, the light lit up. So then you did a voltage test across the connector and the meter showed battery voltage. Even so, there is still no rpm change when you perform a cylinder drop test.

What is the most likely cause for this condition to exist? **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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