

## Throttle Switch Circuit - Test

### System Operation Description:

The throttle switch and the decelerator pedal provide the operator with the ability to select the desired engine speed. Engine speed will decrease with increasing load. The throttle switch is a toggle switch with two positions.

The throttle switch is connected to the four throttle inputs of the ECM. Each position generates a specific on/off pattern on the throttle inputs. A diagnostic code is generated if a pattern that does not correspond with any of the switch positions is detected.

Once a diagnostic code is generated, the ECM ignores the throttle input signals and desired engine speed is set to the last valid pattern that was recognized by the ECM. The throttle switch may be toggled between low idle and high idle. Desired engine speed is set to low idle while the engine is not running.

Voltage at the throttle inputs to the ECM should be  $7.5 \pm 0.5$  VDC when the throttle inputs are open. The voltage should be less than 0.5 VDC when the throttle inputs are closed.

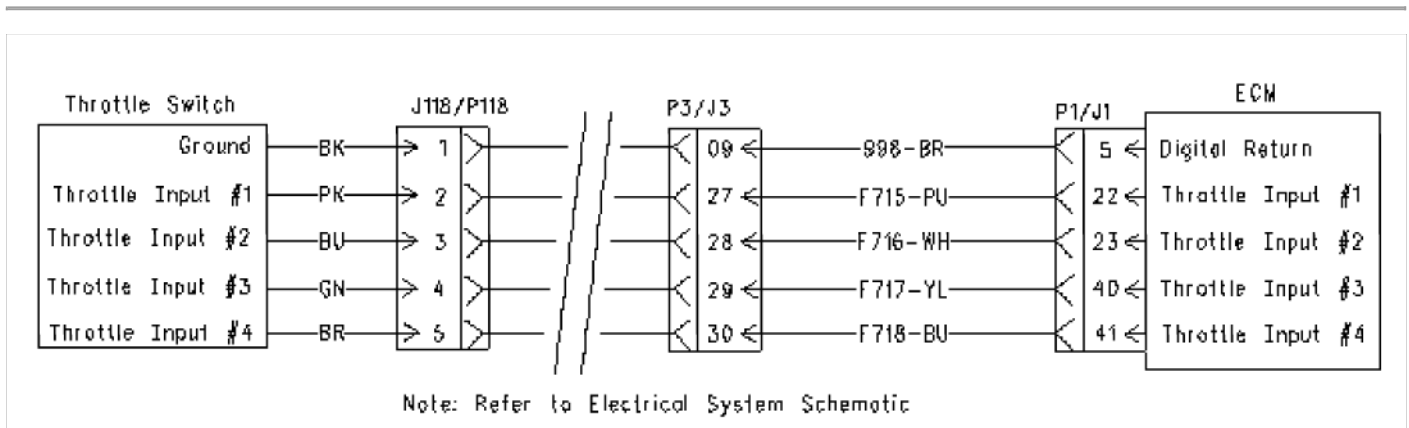


Illustration 1

Schematic

## Test Step 1. Inspect Electrical Connectors and Wiring

- A. Turn the keyswitch to the OFF/RESET position.
- B. Thoroughly inspect ECM connector J1/P1, machine connector J3/P3, and throttle switch connector J118/P118. Refer to Troubleshooting, "Electrical Connectors - Inspect" for details.
- C. Check the harness and wiring for corrosion, abrasion, and pinch points from the throttle switch to the ECM.

### Expected Result:

All connectors, pins, and sockets should be completely inserted and coupled. The harness and wiring should be free of corrosion, abrasion, and pinch points.

### Results:

- **OK** - Proceed to Test Step 2.
- **Not OK** -

**Repair:** Repair the circuit. Verify that the repair eliminates the problem.

**STOP**

## Test Step 2. Check "Throttle Cab Switch Position" on ET

- A. Connect ET at the service tool connector.
- B. Turn the keyswitch to the ON position.
- C. Observe the status of the throttle switch and the throttle inputs on ET while you operate the throttle switch in each position.

### Results:

- **OK** - The throttle switch is functioning properly at this time.

**Repair:** Refer to Troubleshooting, "Electrical Connectors - Inspect" if the problem is intermittent.

**STOP**

- **Not OK** - Record the suspect input. Proceed to Test Step 3.

## Test Step 3. Jumper the Switch Input at the Throttle Switch Connector

- A. Disconnect throttle switch connector J118/P118.
- B. Observe the status of the suspect throttle input on ET.
- C. Use a suitable piece of wire to short P118:1 (Digital Return) to the terminal for the suspect throttle input at throttle switch connector P118.
- D. Observe the status of the suspect throttle input on ET.
- E. Remove the wire short.

### Expected Result:

The status of the suspect throttle input should be "Off" when throttle switch connector J118/P118 is disconnected. The status should be "On" when the wire short is installed.

**Results:**

- **OK** - The harness and the ECM are OK.

**Repair:** Replace the throttle switch. Verify that the repair eliminates the problem.

**STOP**

- **Not OK** - Proceed to Test Step 4.

**Test Step 4. Check for Shorts in the Harness**

- A. Turn the keyswitch to the OFF/RESET position.
- B. Disconnect ECM connector J1/P1 and throttle switch connector J118/P118.
- C. Measure the resistance between engine ground and the terminal for the suspect throttle input at throttle switch connector P118.
- D. Measure the resistance between the terminal for the suspect throttle input at throttle switch connector P118 and the remaining terminals at the connector.

**Expected Result:**

Resistance should be greater than 20,000 for each reading.

**Results:**

- **OK** - Proceed to Test Step 5.
- **Not OK** - There is a short in the harness between the ECM and the throttle switch.

**Repair:** Repair the circuit. Verify that the repair eliminates the problem.

**STOP**

**Test Step 5. Check Resistance through the Harness**

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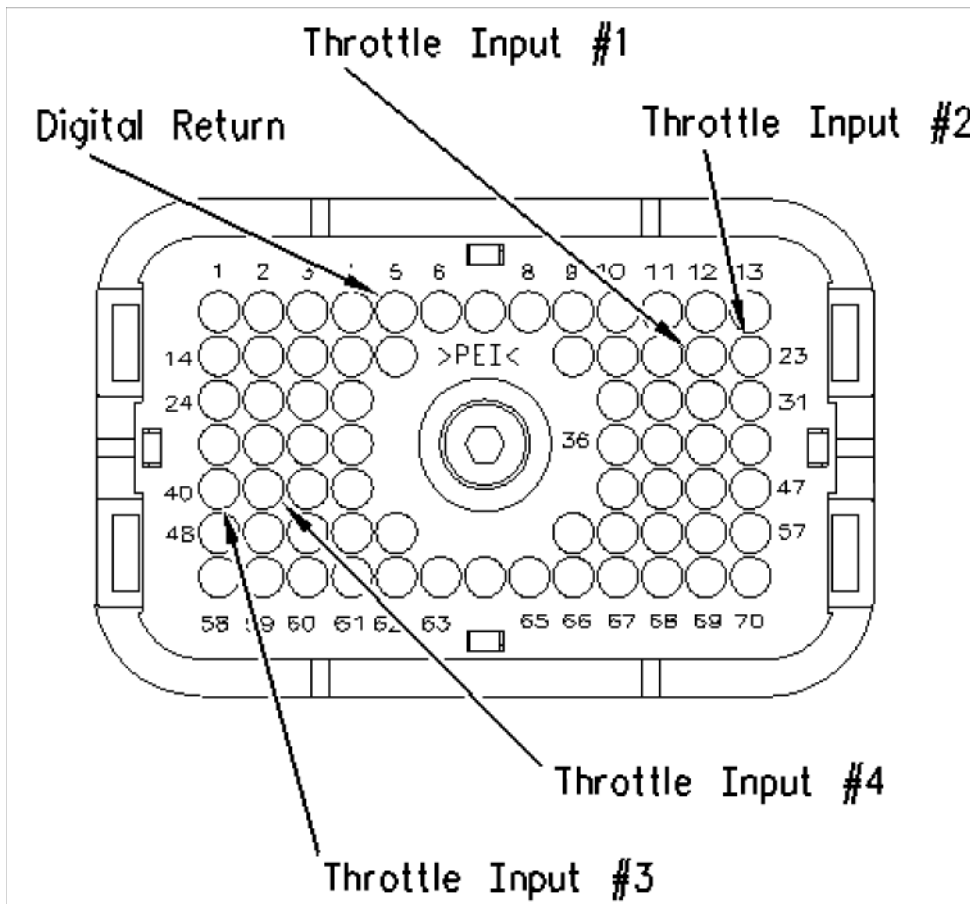


Illustration 3

ECM connector P1 (wire side)

- A. Turn the keyswitch to the OFF/RESET position.
  - B. Disconnect ECM connector J1/P1 and remove the wire for the suspect throttle input from ECM connector P1.
  - C. Reconnect all connectors.
  - D. Turn the keyswitch to the ON position.
  - E. Observe the status of the suspect throttle input on ET.
  - F. Turn the keyswitch to the OFF/RESET position.
  - G. Disconnect ECM connector J1/P1 and remove the wire from P1:5 (Digital Return).
  - H. Fabricate a jumper wire with pins at both ends. Insert the jumper wire at P1:5 (Digital Return) and the suspect throttle input at ECM connector P1.
  - I. Reconnect all connectors.
  - J. Turn the keyswitch to the ON position.
- Note:** Additional diagnostic codes will be generated because P1:5 (Digital Return) will no longer be connected to other sensors and switches. Ignore the codes and clear the codes when you complete this test.
- K. Observe the status of the suspect throttle input on ET.
  - L. Turn the keyswitch to the OFF/RESET position.

M. Remove the jumper wire from ECM connector P1 and reconnect all wires and connectors.

**Expected Result:**

The status of the suspect throttle input should be "Off" when the throttle input is open. The status should be "On" when the jumper wire (short) is installed.

**Results:**

- **OK** - There is a problem in the harness between the ECM and the throttle switch.

**Repair:** Repair the circuit. Verify that the repair eliminates the problem.

**STOP**

- **Not OK** - The switch signal appears at the ECM. The ECM is not reading the switch properly.

**Repair:** Verify your results. Replace the ECM. Refer to Troubleshooting, "Replacing the ECM" before replacing the ECM.

**STOP**