

MID 113 - CID 1870 - FMI 03

Conditions Which Generate This Code:

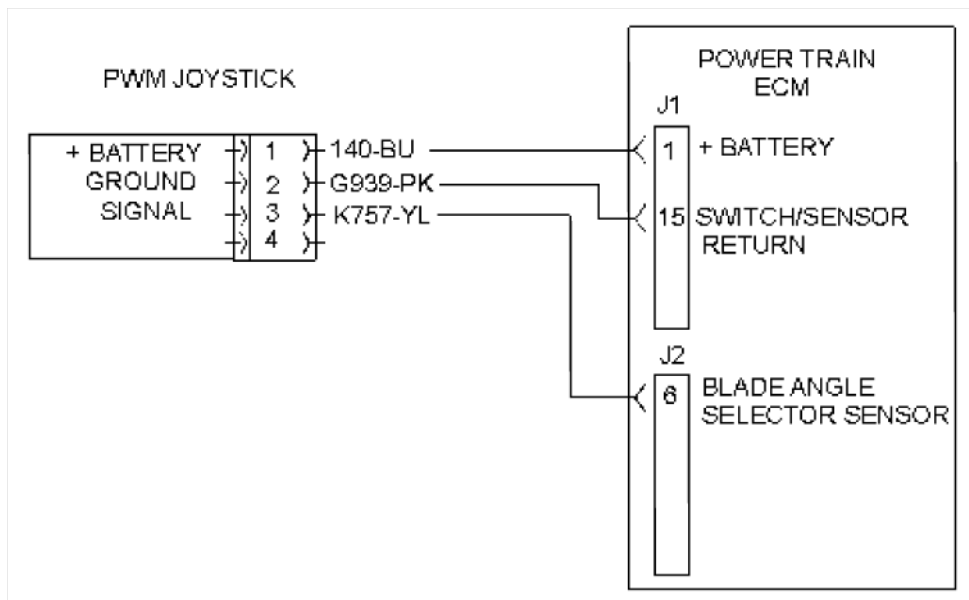


Illustration 1

Schematic of the position sensor (thumb lever) of the blade control handle

This diagnostic code is associated with the position sensor (thumb lever) of the blade control handle. The FMI 03 means that the electronic control module (ECM) has determined that the voltage of the circuit for the sensor is above normal.

The position sensor is a PWM sensor that operates at a frequency of approximately 500 Hz. The duty cycle of the sensor operates from a range of 10% to 90%.

The possible causes of this diagnostic code are listed below:

- The signal circuit for the sensor is open.
- The signal circuit for the sensor is shorted to the +battery circuit.
- The sensor has failed.
- The power circuit or the ground circuit has failed.
- The ECM has failed. This is unlikely.

Note: The following test procedure may create other diagnostic codes. Ignore these created diagnostic codes and clear the diagnostic codes when the original diagnostic code has been corrected. **Ensure that the diagnostic code of CID 1870 FMI 03 is active before performing this procedure.**

Note: Use the **146-4080** Digital Multimeter for the measurements in this procedure.

System Response:

The diagnostic code of CID 1870 FMI 03 will be logged in the internal memory of the Power Train ECM.

Test Step 1. CHECK FOR POWER AT THE SENSOR.

- A. Do not disconnect the harness connector from the sensor.
- B. Turn the key start switch and the disconnect switch to the ON position.
- C. At the back of the harness connector for the sensor, insert a **7X-1710** Multimeter Probe along the voltage supply wire (contact 1).
- D. Measure the voltage from contact 1 to frame ground.

Expected Result:

The voltage is 24 volt.

Results:

- **OK** - The voltage is 24 volt. Proceed to Test Step 2.
- **NOT OK** - The voltage is not 24 volt. The + battery circuit in the machine harness has failed.

Repair: Replace the machine harness or repair the machine harness.

STOP

Test Step 2. CHECK FOR PROPER GROUND AT THE SENSOR.

- A. The machine harness remains connected to the sensor.
- B. Turn the key start switch and the disconnect switch to the OFF position.
- C. Remove the **7X-1710** Multimeter Probe from the voltage supply wire (contact 1).
- D. At the back of the harness connector for the sensor, insert a **7X-1710** Multimeter Probe along the ground wire (contact 2).

E. Measure the resistance from contact 2 to frame ground.

Expected Result:

The resistance is less than 5 ohms.

Results:

- **OK** - The resistance is less than 5 ohms. The ground circuit is correct. Proceed to Test Step 3.
- **NOT OK** - The resistance is greater than 5 ohms. The ground circuit in the machine harness has failed.

Repair: Replace the machine harness or repair the machine harness.

STOP

Test Step 3. CHECK THE WIRING HARNESS OF THE SENSOR FOR AN OPEN CIRCUIT.

- A. The key start switch and the disconnect switch remain in the OFF position.
- B. Disconnect the machine harness from the sensor.
- C. At the harness connector for the sensor, connect a jumper wire between contact 2 and contact 3.
- D. Disconnect the machine harness connector(s) from the ECM.
- E. At the harness connector for the ECM, measure the resistance between contact J2-6 (wire K757-YL) and contact J1-15 (wire G939-PK).

Expected Result:

The resistance measurement is less than 5 ohms.

Results:

- **OK** - The resistance measurement is less than 5 ohms. The circuit is correct. Proceed to Test Step 4.
- **NOT OK** - The resistance is greater than 5 ohms. The circuit is not correct. There is an open circuit in the wiring harness.

Repair: There is an open circuit in the wiring harness. Repair the wiring harness or replace the wiring harness.

STOP

Test Step 4. CHECK THE WIRING HARNESS OF THE SENSOR FOR A SHORT TO THE +BATTERY CIRCUIT.

- A. The key start switch and the disconnect switch remain in the OFF position.
- B. The machine harness remains disconnected from the sensor. Remove the jumper wire that was installed in the previous step.
- C. The machine harness connector(s) remains disconnected from the ECM.
- D. At the machine harness connector for the ECM, measure the resistance from the signal contact J2-6 (wire K757-YL) of the machine harness to all contacts that are used in the machine harness connectors for the ECM.

Expected Result:

Each resistance measurement is greater than 5000 ohms.

Results:

- **OK** - Each resistance measurement is greater than 5000 ohms. The machine harness is correct. Proceed to Test Step 5.
- **NOT OK** - One or more resistance measurements is not correct. There is a short in the machine harness.

Repair: The short is between signal contact J2-6 (wire K757-YL) and the circuit with the low resistance measurement. Repair the machine harness or replace the machine harness.

STOP

Test Step 5. CHECK THE OUTPUT OF THE SENSOR.

- A. Reconnect the machine harness connectors to the ECM. Reconnect the machine harness connector to the sensor.
- B. At the back of the harness connector for the sensor, insert a **7X-1710** Multimeter Probe along the signal wire (contact 3).
- C. At the back of the harness connector for the sensor, insert a **7X-1710** Multimeter Probe along the ground wire (contact 2).
- D. Turn the disconnect switch and the key start switch to the ON position.
- E. Measure the signal of the sensor. The proper signal is described at the beginning of this procedure.

Expected Result:

The signal from the sensor is valid.

Results:

- **OK** - The signal from the sensor is valid. Proceed to Test Step 6.
- **NOT OK** - The signal from the sensor is not valid.

Repair: The sensor has failed. Replace the sensor.

STOP

Test Step 6. CHECK IF THE DIAGNOSTIC CODE REMAINS.

- A. Inspect the contacts of the harness connectors and clean the connectors.
- B. Reconnect all harness connectors.
- C. Turn the disconnect switch and the key start switch to the ON position.
- D. Operate the machine.
- E. Check the status of the CID 1870 FMI 03.

Expected Result:

The CID 1870 FMI 03 is active.

Results:

- **YES** - The CID 1870 FMI 03 is active. The diagnostic code has not been corrected. The ECM may have failed.

Repair: It is unlikely that the ECM has failed. Exit this procedure and perform this procedure again. If the cause of the diagnostic code is not found, replace the ECM. See the Troubleshooting, "Electronic Control Module (ECM) - Replace" Story in this manual.

STOP

- **NO** - The CID 1870 FMI 03 is not active. The diagnostic code does not exist at this time.

Repair: The initial diagnostic code was probably caused by a poor electrical connection at one of the harness connectors that was disconnected and reconnected. Resume normal machine operation.

STOP