

Technical Service Bulletin Number
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TSB120060



Technical Service Bulletin

Subject

Engine Control Module (ECM) Malfunctions Due to Incorrect Switch Input Wiring

Issue

Symptom

- Engine control module (ECM) switch inputs, such as the power take-off (PTO)/Accelerator Interlock/Oil Pressure switch, are inoperable.
- Fault Codes 175, 176, and 415 (ISB **Only**) are common on CM2350s with incorrect switch wiring.

Root Cause

- The ECM switch inputs are wired incorrectly.

This document directs the field to inspect the ECM switch to ground input wiring to make sure the inputs are connected to ground and to prevent ECM malfunctions due to this issue.

Verification

For CM2250 Modules:

Perform the following steps to check and verify that the ECM switch inputs are wired correctly.

- Remove the original equipment manufacturer (OEM) connector from the ECM.
- Use a multimeter to measure for voltage between pins 24 through 30, 36 through 40, 49, 50, 59, 60, and ECM switch RETURN pin 19 at the OEM harness connector.

NOTE: The specific pins used in the connector depend on what switches were installed by the OEM.

- Toggle the switch to ground inputs and check for battery voltage with the keyswitch in both the ON and OFF positions.

The multimeter **must** show no voltage. If any voltage is observed, the switch **must** be wired correctly before the ECM is installed.

Reference the circuit diagram or wiring diagram for connector pin identification.

Use the following procedure for general multimeter usage techniques. [Refer to Procedure 019-359 in Section 19](#) of the appropriate service manual

For CM2350 Modules:

Perform the following steps to check and verify that the ECM switch inputs are wired correctly.

- Remove the OEM connector from the ECM.
- Use a multimeter to measure for voltage between pins 11, 12, 19, 20, 43, 44, 47, 66 through 70, 86 through 94, and ECM switch RETURN pin 62 at the OEM harness connector.

NOTE: The specific pins used in the connector depend on what switches were installed by the OEM.

- Toggle the switch to ground inputs and check for battery voltage with the keyswitch in both the ON and OFF positions.

The multimeter **must** show no voltage. If any voltage is observed, the switch **must** be wired correctly before the ECM is installed.

Reference the circuit diagram or wiring diagram for connector pin identification.

Use the following procedure for general multimeter usage techniques. [Refer to Procedure 019-359 in Section 19](#) of the appropriate service manual.

For CM2250 and CM2350 Modules:

NOTE: The resistance measurement given in this document of 0.020 Ohms is different than the Service Manual specification.

Perform the following steps to check and verify that the ECM power return (ground) wires are grounded correctly.

- Disconnect the batteries. See equipment manufacturer service information.
- Use a multimeter to measure the resistance between the OEM connector ECM ground return pins and Battery (-) cable connection.
- The multimeter ohm reading **must** be less than 0.020 Ohms. If reading is **not** less than

- 0.020 Ohms, the high resistance ground connection **must** be corrected.
- Reconnect batteries. See equipment manufacturer service information.
 - With all components connected, use a multimeter to measure the voltage between the engine ECM block ground stud and battery negative connection with the following conditions met in order:
 - Key off
 - Key on; engine **not** running
 - Key on; engine running and electrical accessories on
 - The multimeter **must** show less than 0.5VDC. If voltage is **not** less than 0.5VDC, the high resistance ground connection **must** be corrected.

Reference the circuit diagram or wiring diagram for connector pin identification.

Use the following procedure for general multimeter usage techniques. See the corresponding Service Manual. Reference Procedure 019-359 in Section 19.

Resolution

If any of the pins show a voltage with the multimeter when the switches are toggled, the switch **must** be wired correctly, so an open or ground is observed. If the ECM is installed before the switch is wired correctly, the ECM will be susceptible to repeat malfunctions.

NOTE: Subsequent damage to the ECM, caused by failure to rewire the incorrectly wired switches prior to ECM installation, will not be warrantable.

ECM power return (ground) wiring **must** be connected to the engine block ground stud and then return from the engine block to the battery by a low resistance circuit of 0.020 Ohms or less between the ECM and battery.

Sustained voltage differential or peak-peak voltage differential levels between the engine ECM block ground stud and battery negative **not** to exceed 0.5VDC.

Warranty Statement

The information in this document has no effect on present warranty coverage or repair practices, nor does it authorize TRP or Campaign actions.

Document History

Date	Details
2012-2-29	Module Created
2012-3-27	QSOL Quick Fix Reason: Spelling Error Notes: none
2012-10-5	QSOL Quick Fix Reason: Incorrect Part Number Notes: none
2013-12-5	Add CM2350 Pins
2014-6-10	none

2016-3-17 Added ground wiring verification for CM2250 and CM2350 Modules.

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