DETROIT DIESEL
CORPORATION

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TO: DDC Distributors, FLLC Dealers, OEMS

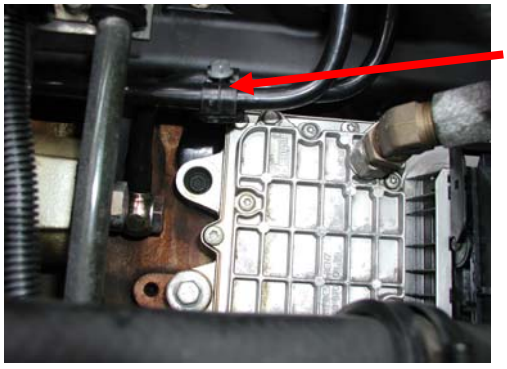
FROM: Technical Service

SUBJECT: **Troubleshoot Code 57/04 PWM Driver #1 Shorted to Ground**

ISSUE
Code 57/04 on MBE 900 and MBE 4000 EPA 98 and EPA 04 engines implies that the PWM Driver #1 is shorted to ground. The code can either be constantly active or occur on an intermittent basis. This code can be apparent on all Freightliner, Sterling and Western Star truck models including Thomas Built buses.

REQUIRED ACTION
In troubleshooting and resolving this code (PWM Driver #1 shorted to ground), the technician needs to check three different areas of the engine:

1. PLD case – is it grounded?
   a) Check the PLD:
      - Ignition key is off
      - Both the 16 and the 55 pin connectors are attached to the PLD
      - Using a DVOM (digital volt ohm meter) check the resistance between the PLD case (PLD installed on the engine) and the engine block and then check the resistance between the PLD case and the negative terminal of the battery
      - Resistance value in both locations should be approximately 1k ohm.
   b) If the resistance reading is low (e.g. 0.2 to 0.4 ohms) this indicates that the PLD is grounded. Possible causes are:
      - Defective PLD
      - Improper PLD mounting
      - Steel braided fuel supply line (MBE 4000 only – incorporates fuel cooler on the PLD)
      - Any other metal brackets or fasteners that come in contact with the PLD



This only applies to EPA 98 4000's in Sterling and Western Star trucks.

Figure 1 Bolt and Bracket Securing the Fuel Lines

2. Check power and ground wires from the PLD (16-pin connector) to the battery.
   a) Check the continuity between the battery power circuits (pins 5 and 6 on the 16 pin connector of the PLD) and the positive terminal of the battery (disconnect the battery terminal) – resistance reading should be low (0.2 to 0.4 ohms).
   b) Check the continuity between the battery ground circuits (pins 9 and 11 on the 16 pin connector of the PLD) and the negative terminal of the battery – resistance reading should be low (0.2 to 0.4 ohms).

   Ideally, the battery power and battery ground circuits from the 16-pin connector of the PLD should be wired directly back to the battery.

   c) With the 16 pin connector of the PLD removed, resistance between the PLD case (PLD installed on the engine) and ground (engine block or the negative terminal of the battery) should be infinite.
   d) Finally inspect cavity 10 on the 16-pin connector of the PLD. Make sure there is no ground wire inserted into that cavity.

   Code 57/04 will be constantly active (Key On Engine Off) if there is a ground wire located in cavity 10 of the EC1 connector (16-pin – PLD). Cavity 10 is PV 1 – 4 high side supply.

3. Proportional valve circuits grounded (12 volt power supply).

   Proportional valves – if the 12 volt power supply for the PV's (e.g. exhaust flap, fans) is shorted to ground the result is a 57/04 code. This code will override an open circuit issue with the PV's (e.g. code 57/05).

   To check the PV circuits:

   1. Disconnect the 55 pin connector from the PLD
   2. Remove the 12 volt power supply circuit for each PV (e.g. pin 12 – fan power supply).
   3. After removing the 12 volt power supply terminal for each PV, reconnect the 55 pin connector of the PLD (N3), turn the ignition key on. Disregard the circuit codes, that the system will log open. The 57/04 code will take priority over an open circuit code on a PV circuit. With the Key On Engine Off, start reconnecting the 12 volt power circuit for each PV one at a time (if the 55 pin connector is removed the ignition key will need to be cycled).
   4. A 57/04 code will be logged once the defective circuit is reconnected to the PLD. The open circuit code will be erased by the 57/04.
   5. An active 57/04 code will disable all PV's. Turning off the PVs in the calibration file of the PLD will not cause the code to become inactive (AWL off).
   6. An amperage draw (pull-in or hold current) in excess of 4.0 amps on a PV circuit will also generate a 57/04 code.
   7. If the code appears (AWL on) while the fan is trying to engage, the initial PV pull-in current of the PLD exceeded the maximum limit of 4.0 amps.

REPAIR PROCEDURE

The required repair procedure will be defined by the root cause of the 57/04 code (i.e. wire harness, fan hub, solenoids, fuel lines, PLD).

CONTACT INFORMATION

Please contact the DDC Customer Support Center at 313-592-5800 if you have any questions.