

# **DIESEL TECHNOLOGY**

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## **of CHATTANOOGA**

### 5VREF Troubleshooting

These troubleshooting steps are for situations where the PCM has tested good, but the truck will not start, there is no WTS light, the other dash lights do not cycle when the key is turned on, the CEL/SES light is on all the time, or a scan tool will not connect.

#### Section 1.

Check for 12V power at pin 16 on the OBD plug, and GND on pins 4 & 5. You should have 12V in pin 16 key on or key off. When looking at the plug with the wider side on top, pin 1 is top left and pin 8 is top right. Pin 9 is bottom left and pin 16 is bottom right.

Check for 12V power at pins 55, 71 & 97 on the PCM plug (with the PCM disconnected). You should have 12V on pin 55 at all times, and 12V on 71 and 97 with the key on.

Check for Ground at pins 51, 77 & 103 on the PCM.

If any of the above tests fail, fix them before going to the next section.

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#### Section 2.

Internal to the PCM is a 5V regulator; its output is what the PCM itself uses for its operation, and it also powers the ICP (Injection Control Pressure), EBP (Exhaust Back Pressure), MAP (Manifold Absolute Pressure), APP (Accelerator Pedal Position), CPS (Camshaft Position Sensor) and on 1995 through early-99 trucks, the BARO (Barometric Pressure Sensor). The 5V regulator is on any time there is power to PCM pins 71 & 97. It is very, very robust with built in short circuit protection, and failure is virtually unheard of.

Shorted EBP sensors, which draws the 5V way, way down, are very common, and then the PCM can't boot up. ICP and APP sensors occasionally short. I have never seen any of the others short out—yet. However, frayed insulation at the various plugs is quite common.

The pins on the ICP (Injection Control Pressure) sensor plug are labeled A, B and C. (There is nothing special about the ICP sensor itself, we just need to check the 5V system, and it is an easy place to access it.) With the ICP unplugged, PCM unplugged and the key Off check the following:

A is Ground aka Signal Return, Grey/Red wire, check continuity to PCM pin 91. It should be under 1 Ohm.

B is 5V aka VREF or Reference Voltage, Brown/White wire, check continuity to PCM pin 90. It should be under 1 Ohm.

C is the sensor's output signal, Dark Blue/Green wire, check continuity to PCM pin 87. It should be under 1 Ohm.

Is there continuity from these three pins to the corresponding pins on the PCM connector? If there isn't, you have broken wire(s) somewhere inside the wiring harness. :(

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#### Section 3.

With the PCM plugged in, the ICP sensor unplugged, and the key in the ON position, measure the following voltages:

Step 1: Between pin A and B. It should be 4.97-5.03 volts.

Step 2: Pin A and Battery Negative. Basically zero volts, or .01 to .05 volts or so.

Step 3: Pin B and Battery Negative: 4.97-5.03 volts.

With the key On and PCM and ICP sensor plugged in, you should see around .25 volts at pin C on the ICP sensor. The PCM considers anything below .25 volts to be zero PSI, and .35 volts is about 100 PSI. The high pressure oil system can easily hold 100-200 PSI residual pressure for a while after shutting the engine off or cranking the truck.

If any of these tests fail, repeat them on the Exhaust Back Pressure sensor plug. EBP pin C connects to PCM pin 30. Also, you should have continuity (0 Ohms) from ICP A to EBP A and ICP B to EBP B.

If you do not get 5V in step 1 & 3 the problem is probably a short circuit somewhere in the 5V circuit. Begin by inspecting the wires at the plug / pigtail on all the sensors mentioned above for frayed wires or chaffed insulation. If they all look good, unplug the sensors and repeat the tests in Section 3. If the voltage returns to normal after unplugging one of the sensors, it is probably shorted out and needs to be replaced.