

Swamp's Diesel Performance
Competition Parts For Your Diesel
304-A Sand Hill Rd.
La Vergne, TN 37086
Tel 615-793-5573 or (866) 595-8724/ Fax 615-793-5572
Email: dave@swampsdiesel.com

6.0's, FICM's and cold-start issues.

If your 6.0 will not start cold, the issue may be either the glow plugs or glow plug controller, or it can be the FICM (Fuel Injection Control Module). If after a long cranking with no start you get a lot of white smoke (raw unburnt fuel) out the exhaust, the problem is in the glow plug system. If you do not get any smoke, the problem is probably in the FICM.

The 6.0 injector has two solenoids on it; one turns the injector on (open) and the other turns it off (close). A few years ago, Ford came out with a new program referred to as inductive heating for the FICM, intended to combat issues with missing and rough-running during cold startup due to sticking spool valves in the injectors. This program works by running "extra" current through the close coil to generate heat and warm up the spool. On paper it was an excellent idea, and I advised a lot of potential injector customers to have their FICM's reflashed rather than buy a set of injectors.

Based on my testing, it appears that the early models of FICM's only used the inductive heating when the EOT was less than 48°F or so. The "first" updated heating strategy turned it on any time the EOT was less than 184°F, meaning every time you started the truck if it was shut off for more than 10 minutes! Ford's newest update to the heating strategy has it coming on below 148°F; better, but that's still a lot of current draw.

Unfortunately, there have been some very serious consequences

Although the FICM on the 6.0 is way more "intelligent" than the IDM on a 7.3, its basic job is to convert 12VDC to 48VDC and deliver this to the injectors at the proper time. Under normal operating conditions, the FICM typically draws 6-7 amps at 12V into the FICM power supply, which is well within its design limits. However, with the inductive heating active this

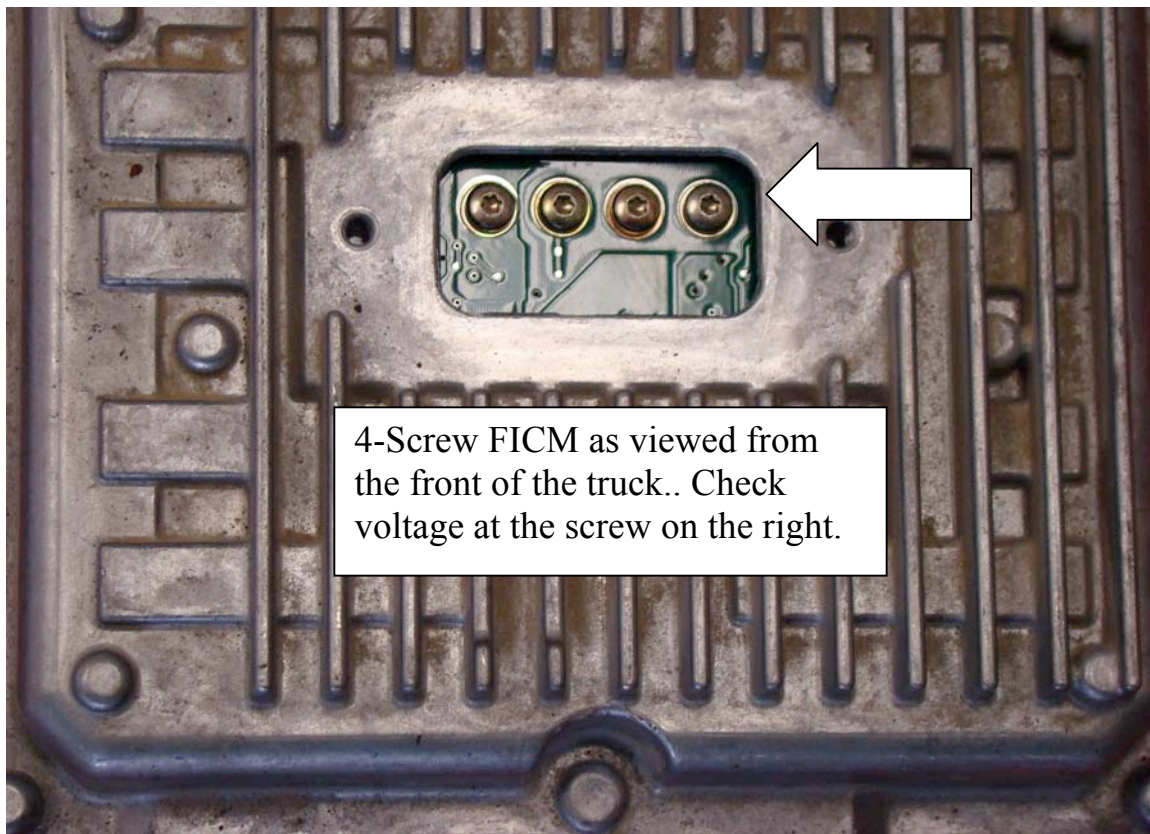
current draw increases to 24-32 amps—it pegs the 30 amp meter on my test bench! Although the FICM power supply is capable of sustaining this load for short periods of time (1-2 minutes) it eventually gets very hot.

If this was all that happened, things wouldn't be too bad, but there are several components on the printed circuit board that were not properly soldered during the manufacturing process, and as the PCB heats up and expands, the solder under these components cracks and they lose their electrical connection. The FICM's 48 volt power supply is actually four separate or independent units; if one of the four goes down, the other three can supply enough current to run the truck, even with the inductive heating active. If two of the four go out, the truck will start and run normally as long as it is warm out, i.e. as long as the inductive heating does not turn on. If three of the four go out, the truck will probably not start or run unless it is at full operating temperature, and even then it may not start. If the injector voltage is over 35 volts, they run OK, although not as well as when it is 48 volts. If the voltage drops below around 24 volts, the injectors cannot fire. While most scan tools will display the FICM voltage, they do not always show the correct value. For instance, AutoEngenuity can only display voltages between 40 to 56 volts, so if the voltage is 35, it will display 40.

How to check your FICM for proper voltage output.

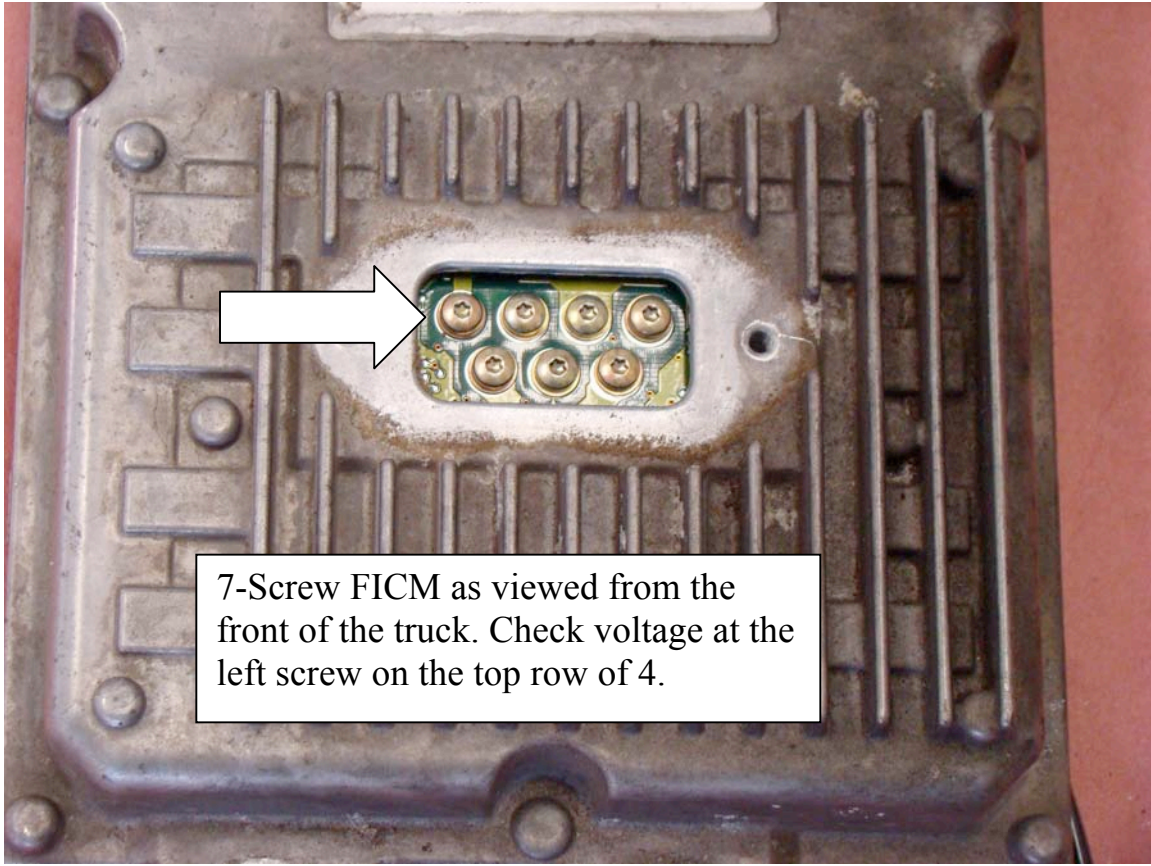
(Perform this check when the engine is completely cold.)

1. Remove the two bolts that hold the coolant reservoir to the cowl and push the reservoir out of the way forward and to your right. You do not need to disconnect any of the hoses.
2. On top of the FICM is a small cover held on by two #20 Torx screws; remove these two screws and pry the cover off.
3. On 2003 and early 2004 trucks, you will see 7 screw heads under the cover. On 2004 and later trucks you will see 4 screws.



4. Take a multi-meter set on DC volts and connect the ground lead to battery negative, and with the key ON measure the voltage at the screw on your right—closest to the driver's side fender. ***Do not let the probe short against the case!*** The voltage should be right at 48 volts. Anything between 47 and 49 is good.
5. Have an assistant cycle the key and measure the voltage during the initial key-on buzz test. Voltage should not drop below 46 volts.
6. Next start the engine and measure the voltage with the engine running. If voltage stays at or above 45-46 volts, the FICM is fine. Abnormally low battery voltage can give a false low FICM voltage reading, so make sure your batteries are good.

The procedure is the same for FICM's with 7 screws, except that you will be checking voltage at a different screw, as shown in this picture.



If the voltage is above 46 volts in all the tests, your FICM is in excellent condition. If it is between 36 and 45 volts its OK, but not great. If it is between 25 and 35 volts, you have serious FICM problems.

We (Swamp's) are able to repair most FICM's with low voltage problems, but some units may be either fried beyond repair, or the time it would take to repair them would be more than a good used FICM costs. If you send your unit in to us for repair, the price is \$350.00 if we can repair it. There is no charge if we can't fix it. Return shipping via FedEx Ground is \$15.00. We can also step the voltage up from 48 to 58 volts for an additional \$50.00. All units have a 1-year warranty. Due to a lack of FICM cores, you will have to send your unit in for repair, and since I am the only person who fixes them, it will be about a week for me to turn it around. (I do almost my electronics work at home during the weekends) If you have an extra FICM or two, we're interested in trading to build up our stock of cores.

We are only doing hardware-level modifications as opposed to software / code changes, so having your unit reflashed at a dealership will not cause any problems. Also, please note that we cannot reprogram FICM's. For that, we recommend Power Hungry Performance or Innovative Diesel.