ENGINE CONTROLS AND FUEL SYSTEMS

TechPro Bulletin

1987-88 FORD TRUCKS F SERIES, BRONCO W/ 4.9, 5.0, 5.8, & 7.3 L ENGINES- LOW OR ERRATIC OIL PRESSURE GAUGE READINGS

If you run across one of these vehicles that is equipped with a gauge which reads low or erratic oil pressure, here is something to keep in mind. These vehicles do not really have what we would call a conventional oil pressure gauge. The sending unit that is used is not a variable resistance unit. It is merely an "On-Off" switch. There is a fixed resistance in the dash gauge that will cause the needle to deflect a certain amount regardless of the actual oil pressure. So, it does not matter how high or low the pressure, in any case, the gauge will read the same, as long as there is sufficient oil pressure to close the switch. Any time there is a question of oil pressure, the first step is to ignore what the gauge reads and verify the oil pressure with a mechanical gauge. Once you have eliminated a mechanical problem, then concentrate on the electrical part. On these vehicles, if you have eliminated the mechanical problem, and, have replaced the oil pressure sender with no improvement in the gauge reading, Ford recommends that you use a 20 ohm resistor in line between the sending unit and the gauge. Installation of the resistor will stabilize the gauge reading and eliminate the customer concern.

Bob Reuther- Technical Services

MITSUBISHI EQUIPPED VEHICLES- NO START CONDITION

Mitsubishi, Hyundai, and some Chrysler vehicles use a common engine management system. Here are some quick checks to make if one of these vehicles is brought into your shop.

Check the MIL (Malfunction Indicator Light or Check Engine Light) for proper operation. Turn the key to the "on" position. Normal operation is for the light to come on for about 5 to 7 seconds and then go off. If this occurs, then perform routine checks for spark output, injector pulse, fuel supply, etc. No illumination of the light may indicate an inoperative MPI control relay, or, the ECU is missing a power feed or ground. The MPI relay supplies power to the ECM and the fuel pump. These are usually located near the ECU.

A constant illumination of the light usually indicates something that is more serious. If this is the case, check for the presence of the 5 volt reference output. This is usually the green wire with a red stripe. The throttle position sensor is the easiest place to check for this reference voltage. If you measure approximately battery voltage, try disconnecting the other sensors that use this 5 volt reference one at a time (these include: throttle position sensor, mass air flow sensor, and the motor position sensor). The motor position sensor is part of the idle speed control motor. The position sensor provides feedback to the ECU so that the ECU can control idle speed. If your meter still measures battery voltage with all of these sensors disconnected, suspect a failed ECU. If the voltage decreases to 5 volts, then the sensor that you have just disconnected is probably shorted. The mass air flow sensor in most cases is the most likely candidate for failure since it is the only sensor involved in this situation that uses a battery voltage feed circuit. Some techs may prefer to check for the 5 volt reference at the MAF sensor. This is a good starting point because the MAF sensor also gets a key-on power feed from the MPI control relay and also shares an ECU sensor ground. If the 5 volt reference is between 5 volts and battery voltage, suspect a faulty ground. A voltage drop test on the ground circuits is in order (.050 volts, or 50 millivolts is the maximum allowed). A faulty ground circuit will skew all of the sensor readings to a higher than normal voltage value. The majority of Mitsubishi ECU's have three connectors. Look for the heavy gauge black wires on the 10 pin connector (which consists of 2 rows of 5 pins in each row) . There is one in each row, and they are right on top of each other at the end of the terminal connector. These terminals are the main ECU grounds.If the 5 volt reference is missing, then either the reference voltage is being shorted to ground by a bad sensor, or faulty wiring, or, the ECU is unable to supply the reference voltage. The way to determine this is to disconnect the sensors that use this 5 volt reference one at a time. If after disconnecting all of the sensors, the 5 volt reference does not come back, then disconnect the ECU to check for a short to ground on the green wire with the red stripe. Also check for continuity on this wire from end to end. If you find that there is no short or open, then the ECU is at fault.

Pat Sugar- Top Gun Technician

GM'S "J" & "N" BODY ANTI THEFT SYSTEM 1996-97

A new anti-theft system called "PASSLOCK" is used on late model GM cars such as the Achieva, Cavelier, Grand AM, and Skylark. This system differs from the older "PASS KEY" system in that the ignition key no longer uses the resistor chip which you may have become accustomed to seeing. It also disables fuel injector pulse only in the "Run" position, not the "Crank" position. The ignition cylinder now contains a Hall-effect sensor that sends the signal to the instrument cluster panel. After receiving this signal, the cluster will send a coded signal to the power train computer, which will determine whether fuel injector pulse will be allowed after the engine has started. We have seen vehicles with this system that have had components replaced, or the battery disconnected for an extended period of time, exhibit a start and stall symptom. If you have a vehicle which starts and stalls, check to see if this vehicle is equipped with this system, since it was optional. An easy way to tell is if the "Security" indicator on the instrument panel is flashing. If it is, try to start the car, letting it stall 3 times. After that, leave the

car with the key in the "On" position and the "Security" indicator flashing for approximately ten minutes or until the "Security" indicator stops flashing.

This will allow the components to "relearn" each other so that they may function together. At this point the system should return to normal operation.

Joe Dantuono- GM Specialist

HONDA IDLE PROBLEMS 92-95 CIVIC, DEL SOL

Major engine work can be a long and tedious job without having subsequent driveability problems after you're done. But if you experience idle problems after doing major engine work, here's a tip that can save you a lot of diagnostic time. If the vehicle exhibits a surging idle after it warms up, check for code # 14, which is for the electronic air control valve solenoid (EACV). If you have this code, you may have crossed the connectors for the EACV with the Purge Control solenoid valve. These two connectors are identical in shape as well as being very close together in the engine compartment. The best way to identify the connectors is by using the wire colors to differentiate them. Both connectors have a yellow wire with a black stripe, which is the power feed wire. The EACV has a blue wire with a yellow stripe,

while the Purge Control has a red wire. A simple repositioning of these connectors should alleviate the idle problem. (Refer to diagram # 1).

James D'Anna- Top Gun Technician

FORD TAURUS-3.0L ENG.- NO START

You may encounter this vehicle with a no-start condition. Your initial testing may reveal that there is no spark, no injector pulse, and no fuel pressure. The first step to diagnose this problem is to disconnect the SPOUT connector, then crank the engine while checking for spark. If you do not have spark with the SPOUT disconnected, then the problem lies within the Hall-effect pick up, ignition module, or the wiring. If you do get spark, then the cause of the no-start is the ECM not being powered up, or the 5 volt reference supplied by the ECM is shorted to ground. A quick way to check for this is by disconnecting the sensors that use the 5 volt reference, one at a time. This includes the TPS, MAP, & the PFE (Pressure Feedback EGR) sensors. If any one of these sensors are shorted, it will shut down the ECM. If, after unplugging all of the sensors reveals nothing, then check for the presence of 5 volts at the STI (Self Test Input) line. This is the single wire gray connector that is right next to the diagnostic connector. If you do not measure 5 volts at this connector, the ECM may have lost its ability to generate this voltage. You can verify this by unplugging the Coolant Temperature sensor, and checking for the 5 volts at the supply line. No or low voltage here indicates a possible problem with the ECM or the wiring. Next step is to check for battery voltage at all times at ECM pin # 1. Also check for "Key on" battery voltage at pins # 37, & 57. It is important to have good grounds at pins: # 6, 16, 20, 40, 46, 49, & 60. A good ground is determined when the voltage drop across this point is 50 millivolts (that's .050 volts) or less. Pin # 6 is a very important ground, since it enables the ECM to generate the 5 volt reference. A poor ground will affect the 5 volt reference output, which will contribute to a no start condition. This ground is usually located on the driver's side inner fender, just in front of the strut tower.

Kerry Jonsson- Domestic Specialist

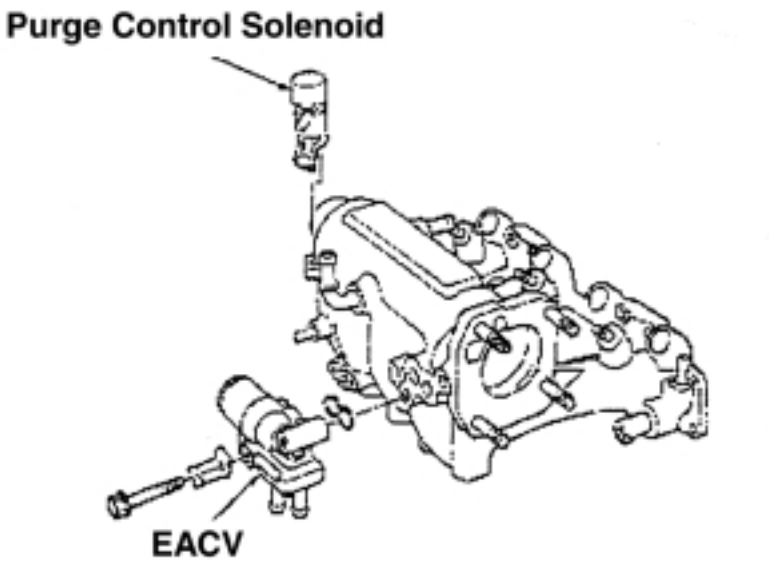


DIAGRAM # 1

BUICK REGAL W/ 3.8L SUPERCHARGED ENG. 98-97- START AND STALL

You may run across one of these vehicles that exhibits a start and stall symptom. During diagnostics, you notice that it starts OK, but it dies out after a few seconds of running. Fuel pressure at Key on, engine off, is up to spec. (48-55 psi.). However, once the car is started, the pressure drops gradually until it stalls.On this system the fuel pump can be run at two speeds, depending on fuel demand. At idle and light load conditions, the pump is run at a reduced speed because the voltage to the pump is reduced. During cranking and high load conditions, the pump is running at full speed because it is receiving full battery voltage. This is accomplished through the use of two fuel pump relays and a dropping resistor in series with the fuel pump.The first relay is designated as the "fuel pump relay". This relay is controlled in the same manner as GM has been doing for years. It is turned on for two seconds at "key on", and it is turned on whenever the engine is cranking or running. The second relay is designated as the "fuel pump speed control relay". As its name implies, it is used to control the speed of the fuel pump.

The output of the "fuel pump relay" is

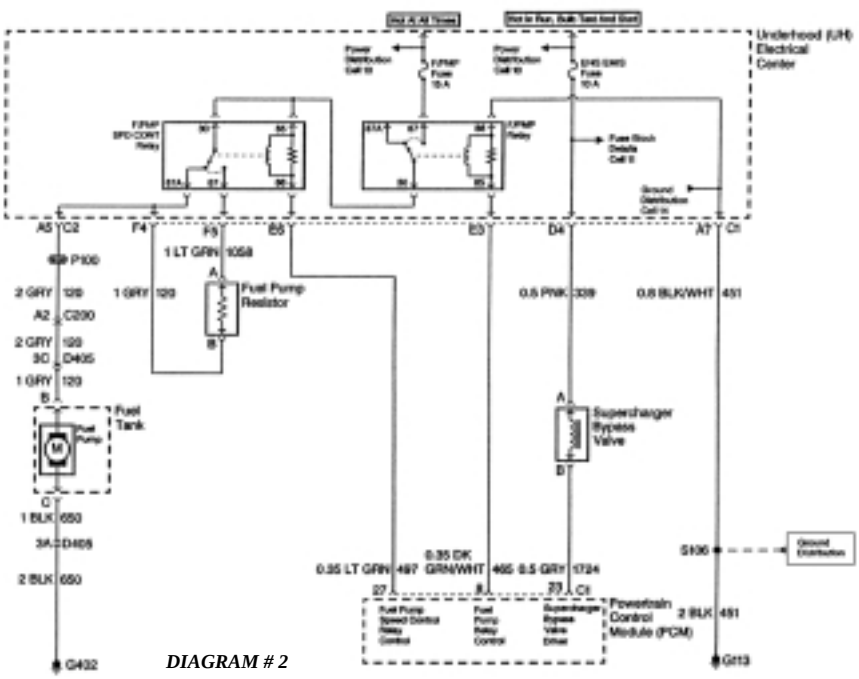


DIAGRAM # 2

these vehicles. The symptoms are usually the same: no fuel pressure, but it does have spark and injector pulse. It seems that the connector that supplies battery power from the power distribution box to the fuel pump has a tendency to collect moisture. When that happens, electrical problems will arise. The suspect connector is located in the driver's side rear engine compartment (see diagram #3). It is black in color, and has 4 to 8 wires in it (see diagram #4). A quick way to determine if there is a problem with this connector is to bypass it. On some models, Ford makes this very easy by supplying a fuel pump test connector. This is a two wire connector which looks similar to the SPOUT connector. A quick way to identify it is by looking for one of the wires to be a dark green with a yellow stripe. This connector bypasses the relay, ignition switch, and the ECM. All you have to do is jump the connector to get the fuel pump to run. If you jump the connector and the pump does not run, either you do not have power to the connector, or the inertia switch needs to be checked (see diagram # 5). If the vehicle does not have the connector, then you can jump the harness

routed through the "fuel pump speed control relay". When the speed control relay is energized by the ECM, power to the fuel pump is sent through a resistor, dropping the circuit voltage, resulting in reduced pump speed. When the ECM decides not to energize the speed control relay, the resistor is bypassed and the pump runs at full speed because it is receiving full battery voltage. (Refer to diagram #2) Failure of the resistor will create the symptom of a start and stall as we have described. This resistor is located on the outside of the frame rail, just ahead of the passenger side front wheel housing. It is a ceramic resistor that is similar to the ignition ballast resistors found on earlier cars. Its location causes it to be exposed to the elements, road debris, as well as any potential body damage. If the resistor is suspected as being a problem, it can be bypassed by jumping a test lead across the harness. If the vehicle now runs, the resistor needs to be replaced. This is also a good location to test fuel pump current draw. Just disconnect the resistor and connect the leads to your ammeter.

Peter Mc Ardle- Domestic Specialist

FORD, LINCOLN, MERCURY- CROWN VICTORIA, GRAND MARQUIS, TOWN CAR 92-97 – NO START

We have encountered numerous calls concerning a no start condition regarding

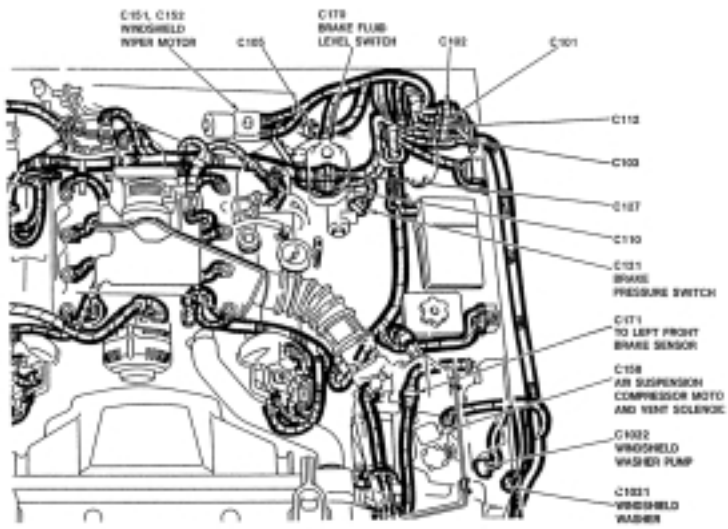
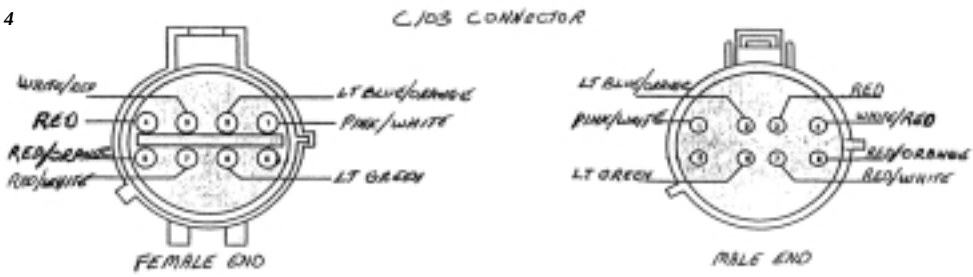


DIAGRAM # 3

DIAGRAM # 4



at the fuel pump relay. On most vehicles the connector is identified as connector C103, while on the Lincoln it is identified as connector C120. Depending on how long the connector has been exposed to corrosion and moisture, will determine the extent of the repair. Regardless of the repair, the connector, whether new or repaired, should be packed with dielectric grease to prevent another failure. By the way, just about any of the other connectors in that area are also subject to the same problem.

Mike Nieto- Ford Specialist

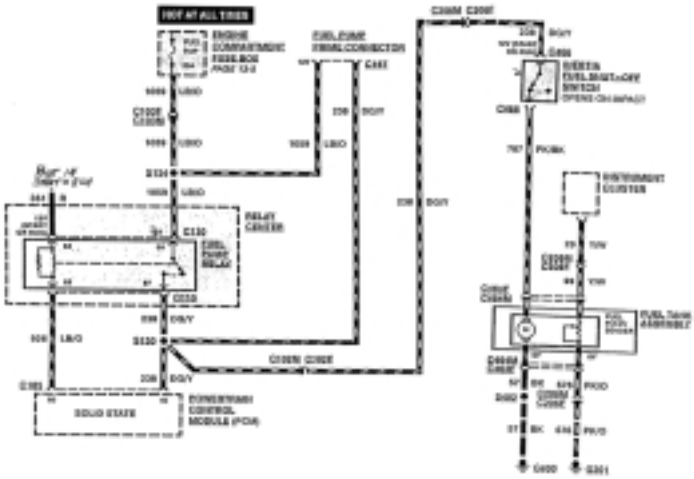


DIAGRAM # 5

back in the 3rd quarter tips of '96), you can always check EGR operation with a scan tool by monitoring "Desired EGR" verses "Actual EGR". At idle, "Actual EGR" should never be higher than 3%. If it is higher, then the EGR valve may be hung open. If your scan tool is bi-directional, then you can command EGR operation while watching your scan tool values. If a scan tool is not available, then a digital voltmeter can be used by monitoring the voltage on the brown wire, which happens to be terminal C, or the middle wire of the five wire connector. At idle, the EGR position sensor should not read higher than 0.85 volts. Again, any higher than that indicates a stuck EGR valve. You can also command EGR operation by tapping the gray wire at the end of the connector (terminal A) to ground in order to simulate the ECM's command. If the valve operation is not smooth, it will be obvious. Just a quick note when you actuate the EGR at idle and see the valve operate; if the engine does not run rough or stall, the passages are probably blocked with carbon. If it becomes necessary to clean the passages of carbon and/or replace the valve, note the original position of the valve and gasket, because they can be installed in reverse, causing more problems.

Jeff Auerbach- Domestic Specialist

GM FRONT WHEEL DRIVE W/ 3.4L ENG – IDLE PROBLEMS, SURGE, STALL

The vehicle in question may exhibit high idle, surging, stalling, and maybe even a hard brake pedal resulting in difficult braking. It also may run fine one minute and then terribly in the next. The oxygen sensor may indicate a lean mixture regardless of engine speed. IAC counts could change rapidly without any changes in engine speed. If this is the case, before doing any extensive diagnostics, check the brake booster vacuum hose that runs to the back side of the engine. It seems that all of the engine movement, especially if the mounts are weak, will cause this hose to split, creating sudden vacuum leaks which will cause the symptoms which we have described. Since this is a specially molded hose, we recommend using only the correct hose for the application. Use of universal type hose can cause intermittent hard braking, due to the vacuum supply to the brake booster being cut off because of the hose flexing.

John Rogers- Domestic Specialist

GM BLAZER, JIMMY W/ 4.3 ENG- HARD START, POOR IDLE

These vehicles have had their share of no start or idle quality problems. Two of the biggest causes of these problems are low fuel pressure and an improperly working EGR system. Fuel pressure should be 55 to 61 psi. with the key on, engine off, and it should remain at that value. If the pressure drops, that should be repaired first. Second, the EGR system has contributed its share of problems to this power plant. If this vehicle uses a linear type EGR valve (which we have described how it works