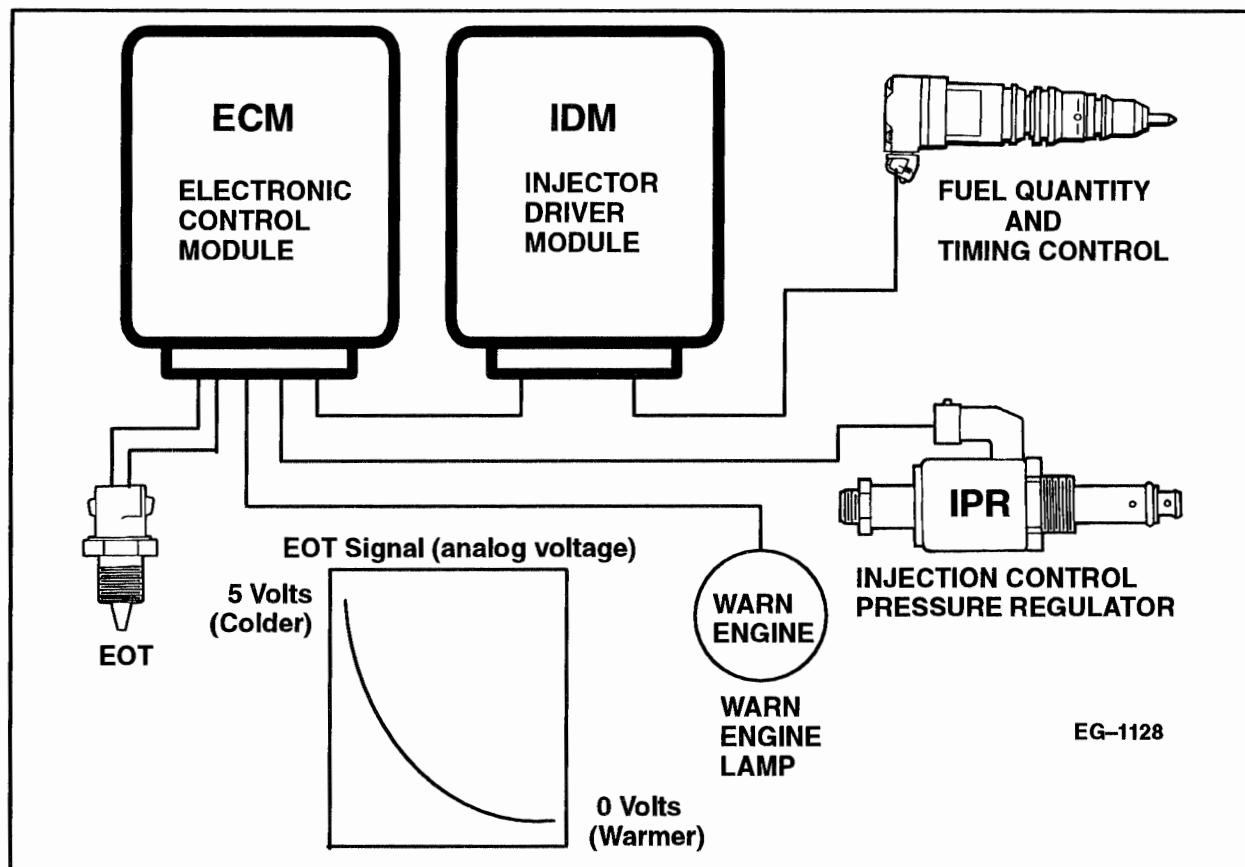


ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

ENGINE OIL TEMPERATURE SENSOR (EOT)

ENGINE OIL TEMPERATURE (EOT) SENSOR



SIGNAL FUNCTIONS

The Engine Oil Temperature (EOT) sensor is a thermistor type sensor that has a variable resistance which changes when exposed to different temperatures. When interfaced with the ECM, it produces a 0 to 5 volt analog signal that indicates temperature.

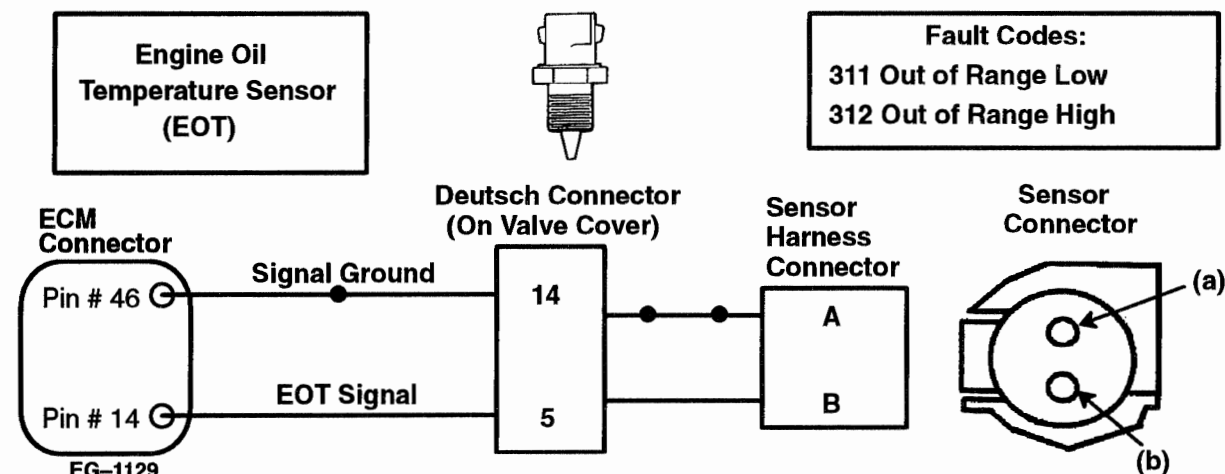
Cranking Fuel Quantity/Timing Control – The EOT signal is used to determine the timing and quantity of fuel required to optimize starting over all temperature conditions.

Temperature Compensation – Fuel quantity and timing is controlled throughout the total operating range to compensate for oil viscosity changes due to temperature variations and insure that adequate torque and power is available.

FAULT DETECTION/MANAGEMENT

An EOT signal that is detected out of range high or low by the ECM will cause the ECM to ignore the EOT signal and default to the engine coolant temperature (ECT) sensor. The WARN engine lamp will also be illuminated as long as the fault condition exists. If both the EOT and ECT sensors are not functioning, the ECM will assume a 212°F (100°C) value for engine oil temperature.

ENGINE OIL TEMPERATURE SENSOR (EOT)



After removing connectors always check for damaged pins, corrosion, loose terminals etc.

Connector Checks to Chassis Ground

(Check with Sensor Connector Disconnected and Ignition key off, all accessories off)

Test Points	Spec.	Comments
A to Grd.	< 5 ohms	Resistance to chassis ground, check with key OFF, if > 5 ohms the harness is open.
B to Grd.	> 1000 ohms	Resistance less than 1000 ohms indicates a short to ground.

Connector Voltage Checks

(Check with sensor Connector Disconnected and Ignition Key On)

Test Points	Spec.	Comments
B to Grd.	4.8 – 5.0v	Pull up voltage, if no or low voltage, circuit has open or high resistance or short ground.
A to Grd.	0 – .25v	If greater than .25 volts, signal ground wire is shorted to V Ref. or battery

Harness Resistance Checks

(Check with breakout box installed on engine harness only)

Test Points	Spec.	Comments
#46 to A	< 5 ohms	Resistance from harness connector to 60 pin connector – Signal ground
#14 to B	< 5 ohms	Resistance from harness connector to 60 pin connector – EOT Signal

Test Points (+) #14 to (–) #46		Operational Voltage Checks (Check with breakout box installed in line with the ECM)		
Voltage	Temp. ° F	Temp. ° C	Resistance	Comments
0.53 v	248	120	1.19 K ohms	
0.96 v	205	96	2 K ohms	
1.37 v	176	80	3.84 K ohms	
4.37 v	32	0	69.2 K ohms	
4.60 v	–5	–20	131.0 K ohms	

Fault Code Descriptions**Circuit Faults:**

311 = Signal was less than 0.2 volts for more than 0.1 seconds.

312 = Signal voltage was greater than 4.8 volts for more than 0.1 seconds.

ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

ENGINE OIL TEMPERATURE SENSOR (EOT)

ENGINE OIL TEMPERATURE SENSOR EXTENDED SYSTEM DESCRIPTION

FUNCTION

The Navistar engine control system includes an Engine Oil Temperature (EOT) sensor. The ECM monitors engine oil temperature via the EOT sensor signal to control fuel quantity and timing throughout the operating range of the engine. The EOT signal allows the ECM to compensate for oil viscosity variations due to temperature changes in the operating environment. This insures that adequate power and torque are available under all operating conditions.

OPERATION

The Engine Oil Temperature Sensor is a thermistor type sensor which changes resistance when exposed to different oil temperatures.

When the temperature of the oil is decreased the resistance of the thermistor increases which causes the signal voltage to increase. As the temperature of the oil is increased, the resistance of the thermistor decreases, causing the signal voltage to decrease.

The EOT sensor is supplied a regulated 5 volt reference signal at terminal B from ECM terminal 14. A return circuit (ground) is supplied at terminal A from ECM terminal 46. As the oil temperature increases or decreases, the sensor changes resistance and provides the ECM with the oil temperature signal voltage at terminal 14. This signal voltage is then read by the ECM to determine the temperature of the oil.

ECM DIAGNOSTICS

With the ignition key "ON", the ECM continuously monitors the EOT signal to determine if it is within expected values. If the signal voltage is above or below the expected levels, the ECM will set a fault code.

If the ECM detects a fault, it will use the value of the Engine Coolant Temperature signal, in place of the EOT signal. If the ECT sensor is not sending a cor-

rect signal, the ECM will default to -4°F (-20°C) for starting or 212°F (100°C) for engine running operation.

EOT sensor faults can be retrieved using the Electronic Service Tool or by reading the flash codes from the warning light using the STI diagnostic switch located on the vehicle dash. If the ignition key is shut off, the code will become an Inactive code. EOT codes will cause the Engine Warning light to be illuminated.

FLASH CODE 311

ATA CODE PID 175 FMI 4

ENGINE OIL TEMPERATURE SIGNAL OUT OF RANGE LOW

Code 311 out of range low, will be set if the signal voltage was less than 0.2 volts for more than 0.1 seconds. If this code is set, the ECM will default to ECT temperature or a default value of -4°F (-20°C) for starting or 212°F (100°C) for engine running operation. This code will cause the ECM to illuminate the Engine Warning light.

Code 311 may be set due to a short to ground in the signal circuit or a defective sensor.

FLASH CODE 312

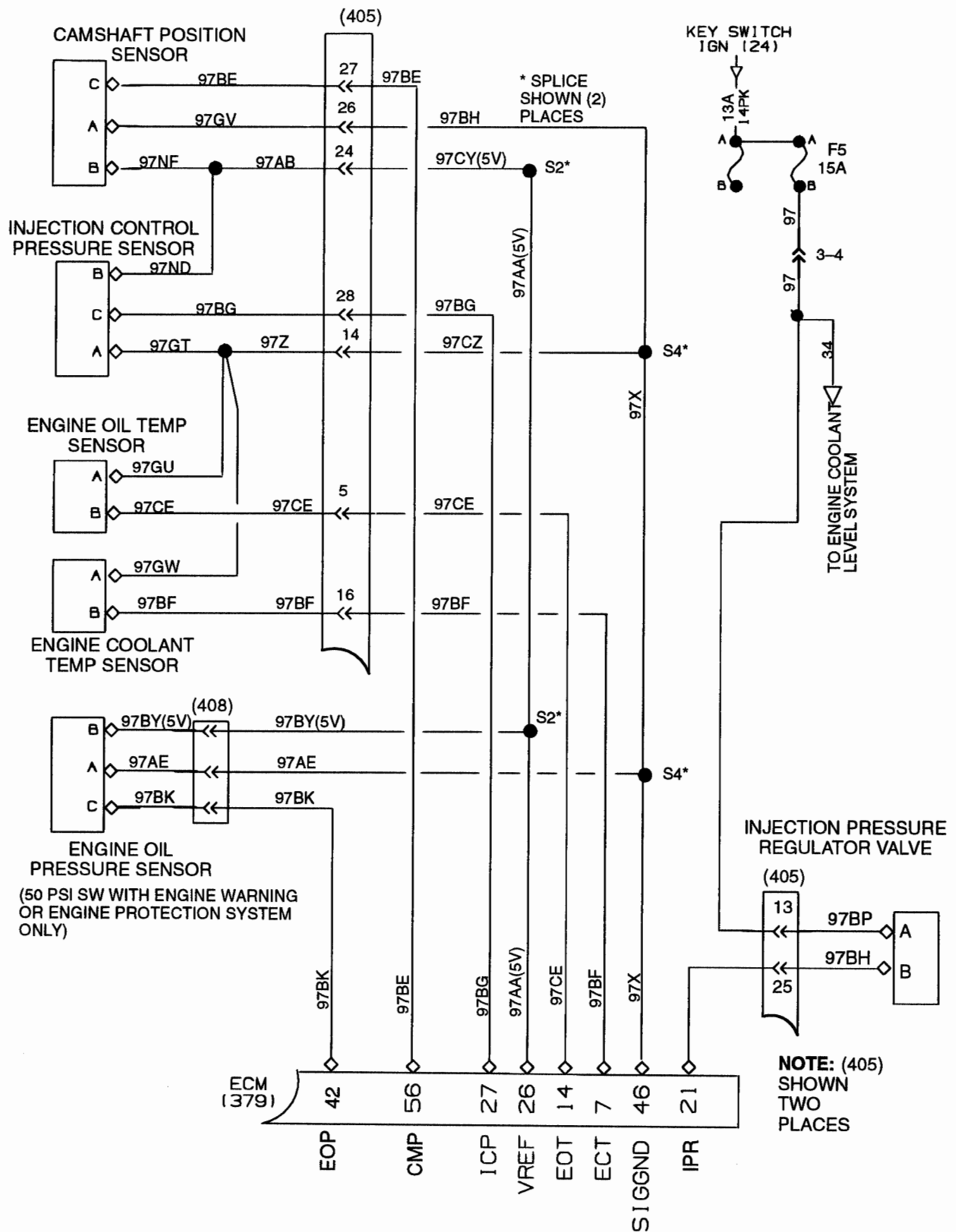
ATA CODE PID 175 FMI 3

ENGINE OIL TEMPERATURE SIGNAL OUT OF RANGE HIGH

Code 312 out of range high, will be set if the signal voltage is more than 4.8 volts for more than 0.1 seconds. If this code is set, the ECM will default to ECT temperature or a default value of -4°F (-20°C) for starting or 212°F (100°C) for engine running operation. This code will cause the ECM to illuminate the Engine Warning light.

Code 312 may be set due to an open signal circuit between the ECM and the sensor or a short to a voltage source. A defective sensor may also cause code 312 to be set.

SENSOR CIRCUIT DIAGRAM



ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

ENGINE OIL TEMPERATURE SENSOR (EOT)

ENGINE OIL TEMPERATURE (EOT) SENSOR DIAGNOSTICS

Refer to circuit diagram
on page 127.

