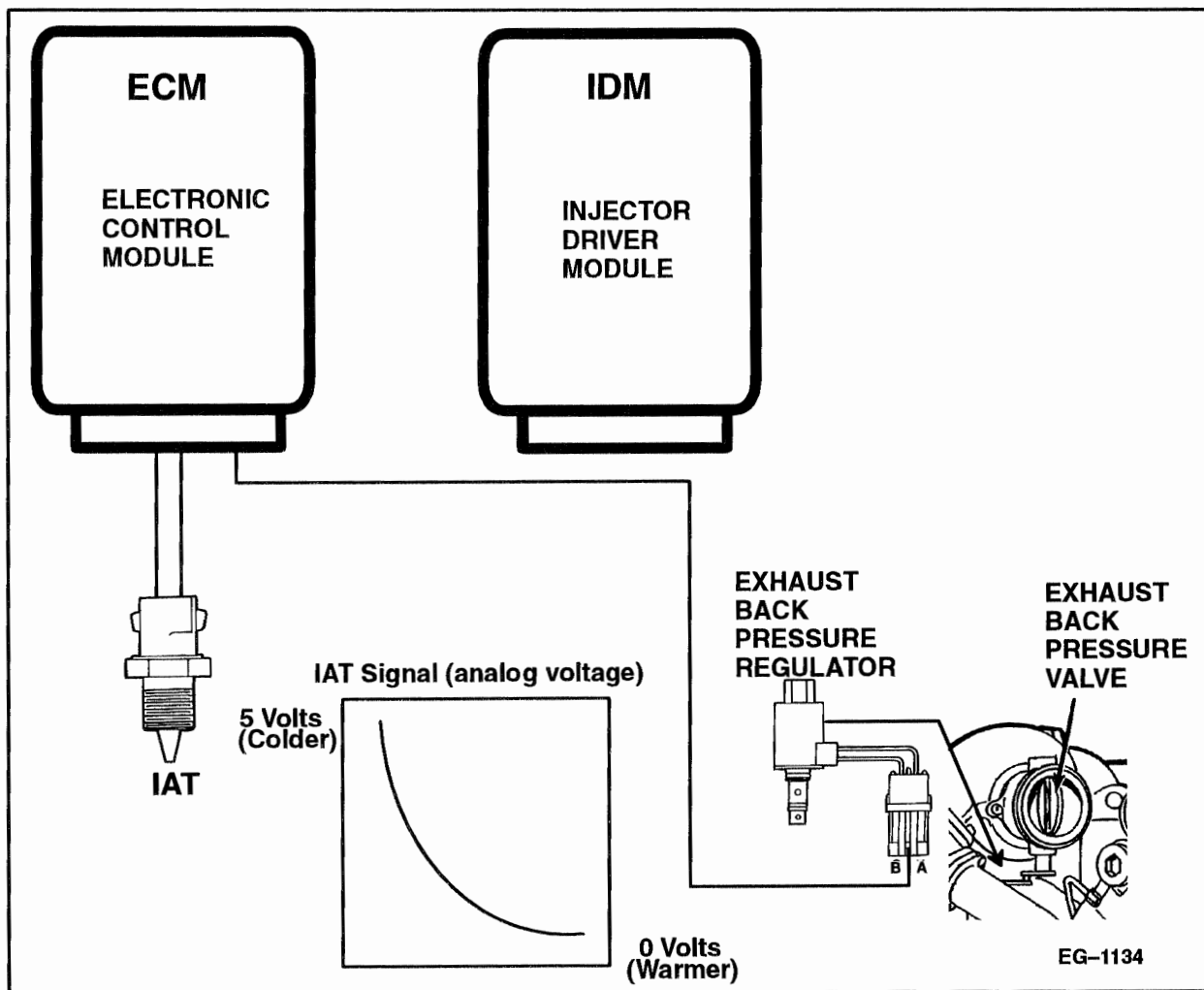


## ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

### INTAKE AIR TEMPERATURE SENSOR (IAT)

#### INTAKE AIR TEMPERATURE (IAT) SENSOR



#### SIGNAL FUNCTIONS

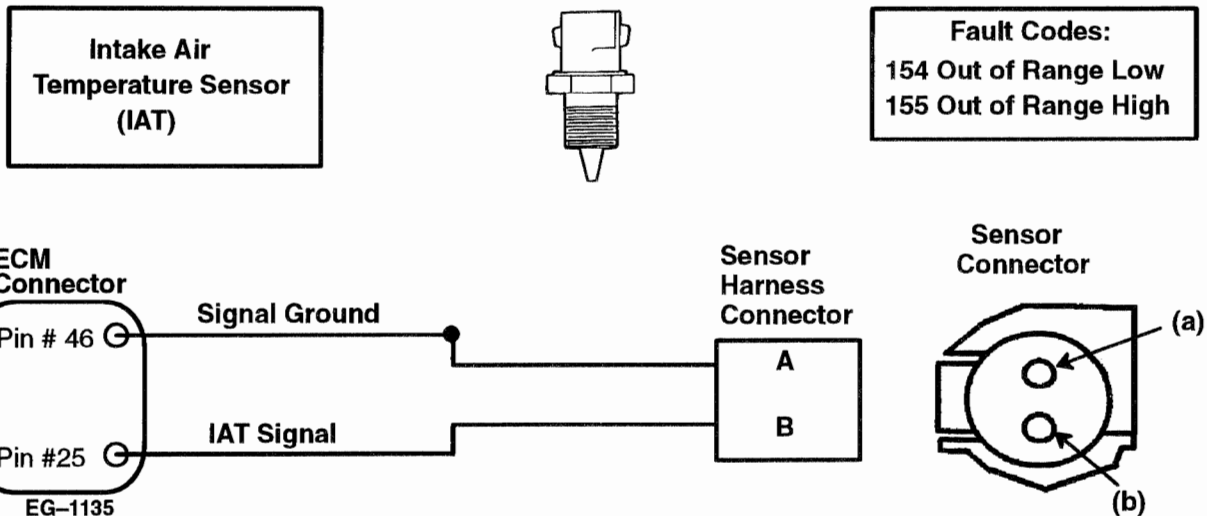
The Intake Air Temperature (IAT) sensor is a thermistor type sensor that has a variable resistance that changes when exposed to different temperatures. When interfaced with the ECM it produces a 0–5 volt analog signal that will deduce temperature.

**Exhaust Back Pressure Device** – The IAT sensor's primary function is to measure intake air temperature in order to determine when the exhaust back pressure function is needed.

#### FAULT DETECTION/MANAGEMENT

An IAT signal that is detected out of range high or low by the ECM will cause the engine to ignore the IAT signal, disable exhaust back pressure operation and assume an ambient temperature of 59° F (15° C).

## INTAKE AIR TEMPERATURE SENSOR (IAT)



**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 grd, 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 to grd.
A to Grd.	0 – .25v	If greater than .25 volts, signal 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
#25 to B	< 5 ohms	Resistance from harness connector to 60 pin connector – IAT Signal

Test Points (+) #25 to (–) #46		Operational Voltage Checks (Check with breakout box installed in line with the ECM)		
Voltage	Temp. ° F	Temp. ° C	Resistance	Comments
1.72 v	122	50	10.9 K ohms	
3.09 v	68	20	37.34 K ohms	
3.897 v	32	0	68.75 K ohms	
4.33 v	0	–18	120.9 K ohms	
4.537 v	–40	–40	194.3 K ohms	

**Circuit Fault Code Descriptions****Circuit Faults:**

154 = Signal voltage was less than .127 volts for more than 0.2 seconds.

155 = Signal voltage was greater than 4.6 volts for more than 0.2 seconds.

## ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

### INTAKE AIR TEMPERATURE SENSOR (IAT)

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#### INTAKE AIR TEMPERATURE SENSOR EXTENDED SYSTEM DESCRIPTION

##### FUNCTION

The Navistar engine control system includes an Intake Air Temperature Sensor (IAT). The ECM measures the signal from the IAT sensor to determine the temperature of the air entering the engine. The ECM uses this data to adjust timing and fuel rate for starting in cold weather to limit smoke emissions.

##### OPERATION

The Intake Air Temperature Sensor is a thermistor type sensor which changes resistance when exposed to different air temperatures.

When the temperature of the intake air decreases, the resistance of thermistor increases which causes the signal voltage to increase. When the air temperature increases, the resistance of the thermistor decreases causing the signal voltage to decrease.

The IAT sensor is supplied a regulated 5 volt reference signal at terminal B from ECM terminal 25. A return circuit (ground) is supplied at terminal A from the ECM terminal 46. As the air temperature increases or decreases, the sensor changes resistance and provides the ECM with the air temperature signal voltage reading at terminal 25.

##### ECM DIAGNOSTICS

With the ignition key "ON", the ECM continuously monitors the IAT 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 IAT sensor is not sending a correct signal, the ECM will default to 77°F (25° C).

IAT 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. IAT codes will cause the Engine Warning light to be illuminated.

##### FLASH CODE 154

**ATA CODE PID 171 FMI 4**

***AMBIENT AIR TEMP SIGNAL OUT OF RANGE  
LOW***

An out of range low code will be set if the ECM detects the signal voltage to be less than .127 volts for more than 0.2 seconds. If this fault is active, the ECM will default to a value of 77°F (25° C) for starting.

Code 154 may be set due to a short to ground in the signal circuit or a defective sensor.

##### FLASH CODE 155

**ATA CODE PID 171 FMI 3**

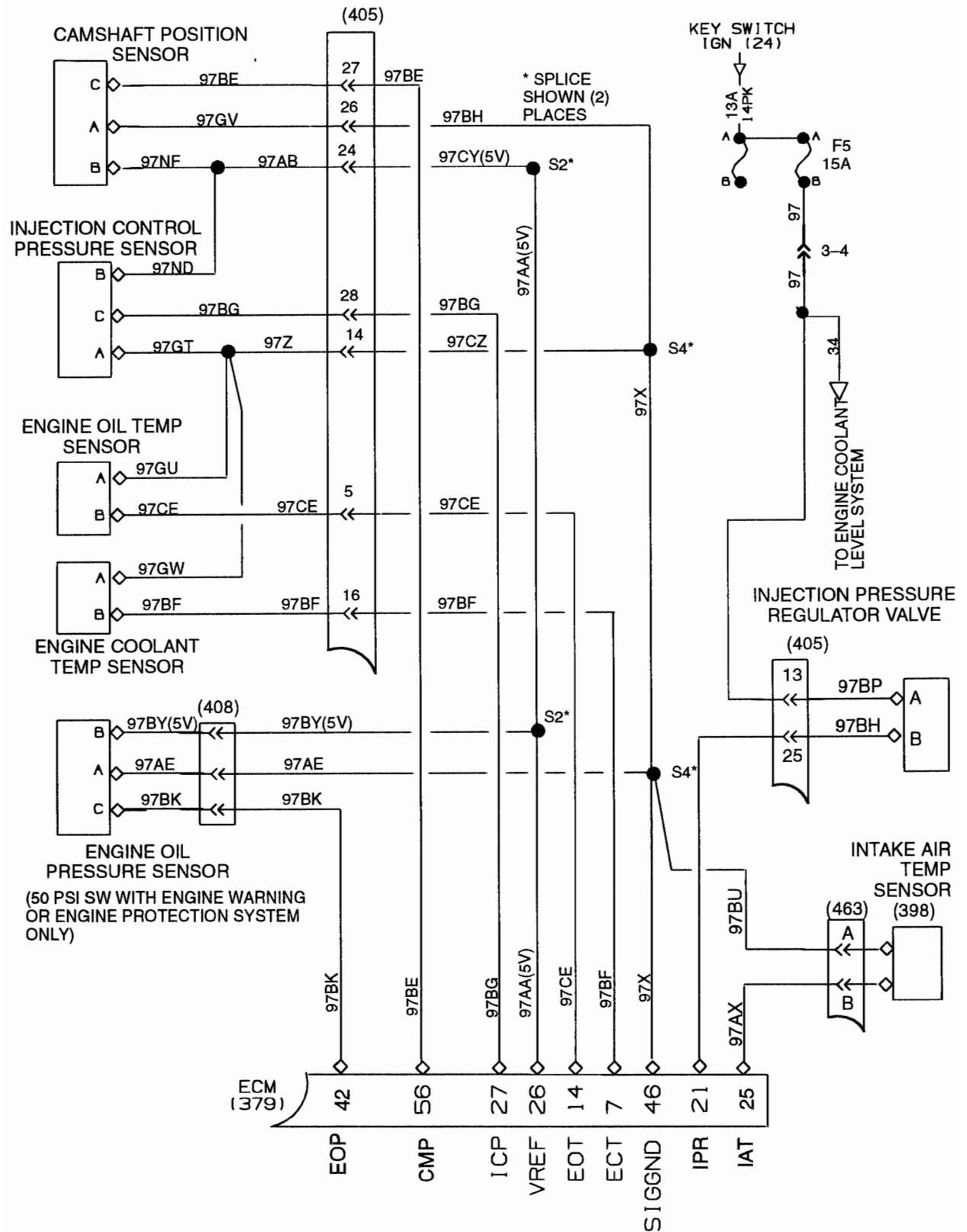
***AMBIENT AIR TEMP SIGNAL OUT OF RANGE  
HIGH***

An out of range high code will be set if the ECM detects the signal voltage to be more than 4.6 volts for more than 0.2 seconds. If this fault is active, the ECM will default to a value of 77°F (25° C) for starting.

Code 155 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 155 to be set.

## INTAKE AIR TEMPERATURE SENSOR (IAT)

## SENSOR CIRCUIT DIAGRAM



## ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

### INTAKE AIR TEMPERATURE SENSOR (IAT)

#### TESTING IAT (INTAKE AIR TEMPERATURE CIRCUITS)

Refer to circuit diagram  
on page 141.

