
Electronic Engine Diagnostics

J.De La Hunt

Smith Power Products

Computer controls offer

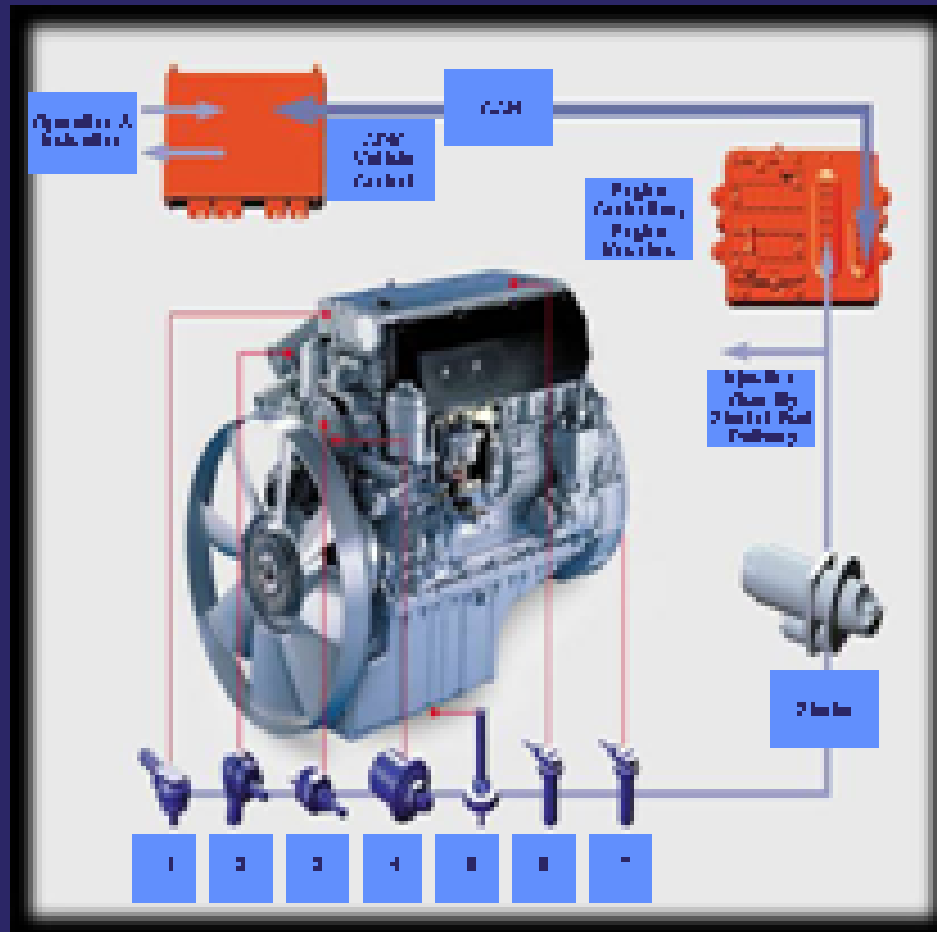
- Injection/Governing of engine
 - Engine Protection
 - Diagnostics
 - Data collection
-

Governing / Injection

- Controls timing, metering and delivery of fuel.
 - Injection pressure is developed mechanically. All other functions are controlled using electronics driven by computer logic.
 - “No more mechanical hardware, governors, linkage, or timing adjustments”
-

Series 900 Electronic Control System

- 1. Load-Air Temperature Pressure
- 2. Coolant Temperature
- 3. Oil Temperature
- 4. Oil Pressure
- 5. Oil Level
- 6. Camshaft Speed + Position
- 7. Crankshaft Speed + Position



Engine Protection

- Sensors monitor analog and binary values (gauges and switches).
 - Information is sent to the engine computer for processing. This occurs many times per second.
 - Values out of operational ranges are reported as faults or fault codes to operator.
-

Non Critical Warning

- Check engine light
- Continue operation until repairs can be made.



Critical Warning

- Stop engine light (red)
- Operation will stop if condition continues.

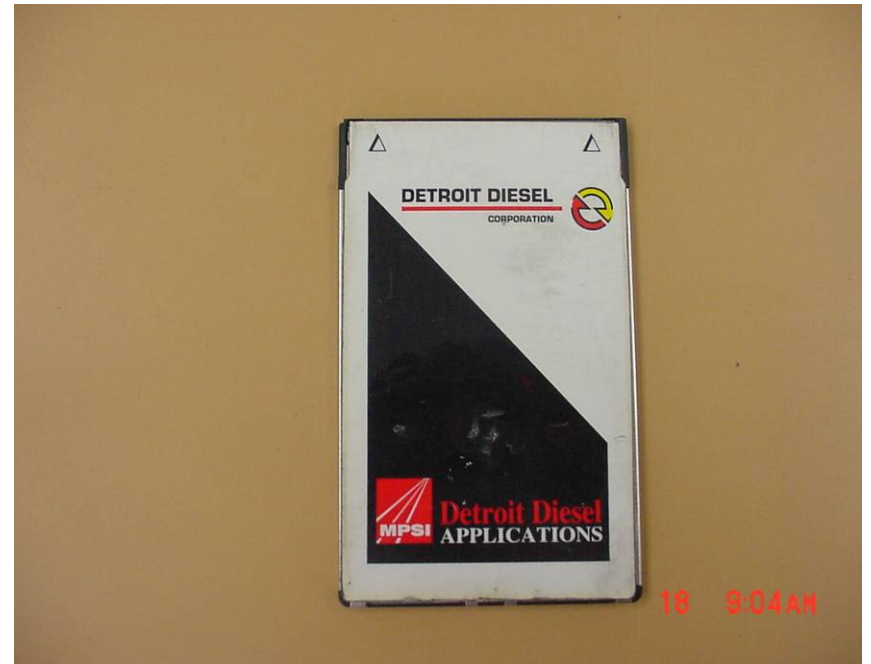


Hand held /Reader

- Convenient for underground mobile use.
- Durable (to a point!)
- Easy to navigate.
- Cards available for different manufactures
- Lower cost than laptop.



Program Card



What is Diagnostic Link?

- It is a maintenance and troubleshooting software program that performs all of the same functions as a hand-held reader;
 - View and Clear Active and Inactive Diagnostic Codes
 - View Fuel injector Response Times, Injector Calibrations and Cylinder Cut-Out Tests
 - View Total Engine Data and Engine Trip Data
 - Diagnostic Link has many additional features that save time & money
 - Current Version
 - Version 6.1: DDEC II/III/IV/V and MBE 900/4000
 - Compatible with Windows 98/ME/NT/2000/XP
-

Calibration Template

The image displays two overlapping software windows from a vehicle calibration application. The primary window, titled 'valley.CDF', contains a menu bar with options: Speed Limit ^7, Compressor ^8, Econ & ESS ^9, Lockout ^0, Misc ^1, Limits ^2, Vehicle ^1, Shift ^2, Protection ^3, ISD & VSG ^4, Cruise ^5, and VSS ^6. The main area is divided into several sections:

- Oil:** Oil Pressure (Shutdown), Oil Temperature (Warning), Oil Level (Warning).
- Coolant:** Coolant Pressure (Warning), Coolant Temperature (Shutdown), Coolant Level (Shutdown).
- Auxiliary Shutdown:** Auxiliary Shutdown 1 (Warning), Auxiliary Shutdown 2 (Warning).
- Misc Shutdown:** Intercooler Temperature (Warning), Crankcase Pressure (Warning).
- R1 Protection Parameters:** R1 Oil Temperature (Shutdown), R1 Coolant Pressure (Warning), R1 Auxiliary Shutdown 1 (Warning), R1 Auxiliary Shutdown 2 (Warning).

At the bottom of this window is a 'Password:' field with '****' and buttons for 'Reset', 'Transmit', and 'Close'. A secondary window, titled 'PasSmart', is partially visible on the right, showing a menu bar with options: ISD & VSG ^4, Cruise ^5, VSS ^6, SS ^9, Lockout ^0, Misc ^1, and Limits ^2. It features three numerical input fields with up/down arrows: 'Duration (min):' (0.255), 'Reset Interval (hr):' (1.24), and 'Speed Increment (mph):' (0.20). At the bottom of this window are buttons for 'Restore', 'Reset', 'Transmit', and 'Close'.

Fault Code Display

Fault Description	Flash	ECM	ID	FMI	Start	End	Duration	Count
Fuel temp sensor - input voltage low	24	Mas	P174	4				4
Fuel temperature high	77	Mas	P174	0				0

Troubleshooting Help Close

Play 00:04:41 Fuel temp sensor - input voltage low ▾

On-Line Troubleshooting Guide

Troubleshooting Help

File Edit Bookmark Options Help

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FLASH CODE 23 - FUEL TEMP SENS

DESCRIPTION OF FLASH CODE 23

Flash Code 23 indicates that the engine Fuel Temperature [Temperature Sensors](#), input to the ECM has exceeded 95 supply voltage.

Note: This code will only be logged during warm engine

This diagnostic condition is typically:

1. Open sensor signal circuit
2. Open sensor circuit return
3. Sensor signal circuit is shorted to the sensor +

SAE J1587 EQUIVALENT CODE FOR FLASH

The SAE J1587 equivalent code for Flash Code 23 is p 174

[TROUBLESHOOT FLASH CODE 23](#)

Troubleshooting Help

File Edit Bookmark Options Help

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Sensor Check

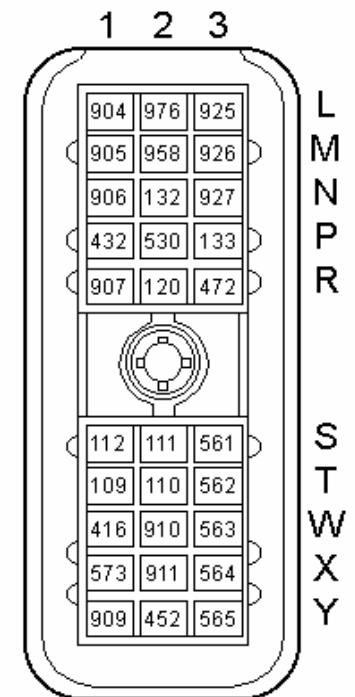
Perform the following steps to check the sensor:

1. Turn ignition OFF.
2. Disconnect the FTS connector.
3. Install a jumper wire between sockets A and B of the FTS harness connector. See [Figure "Fuel Temperature Sensor"](#).
4. Turn ignition ON.
5. Read active codes.
 - a. If code 174/4 and any other codes except code 174/3 are logged to ["Check for Short to +5 Volt Line"](#).
 - b. If any code except 174/4 is logged, refer to ["Open Line Check"](#).

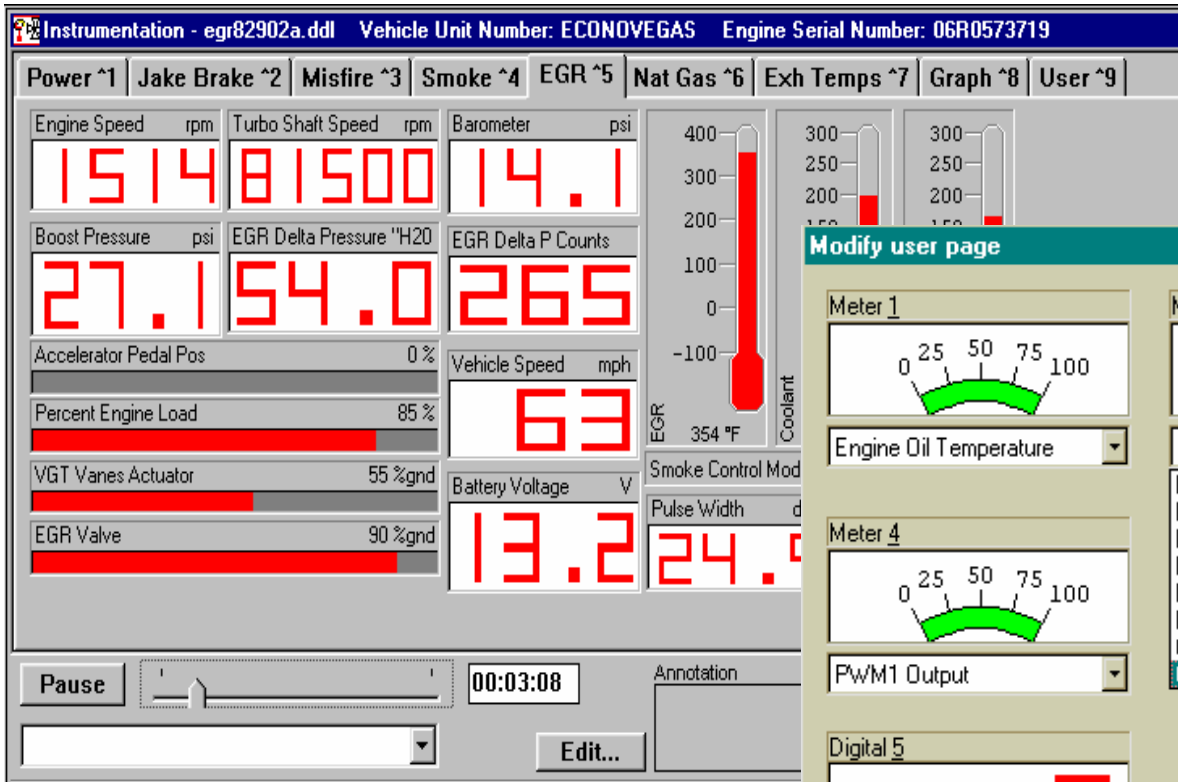
Figure

Help Topics Back Options

ECM Engine Harness Connector



Customize the way you look at data



Modify user page

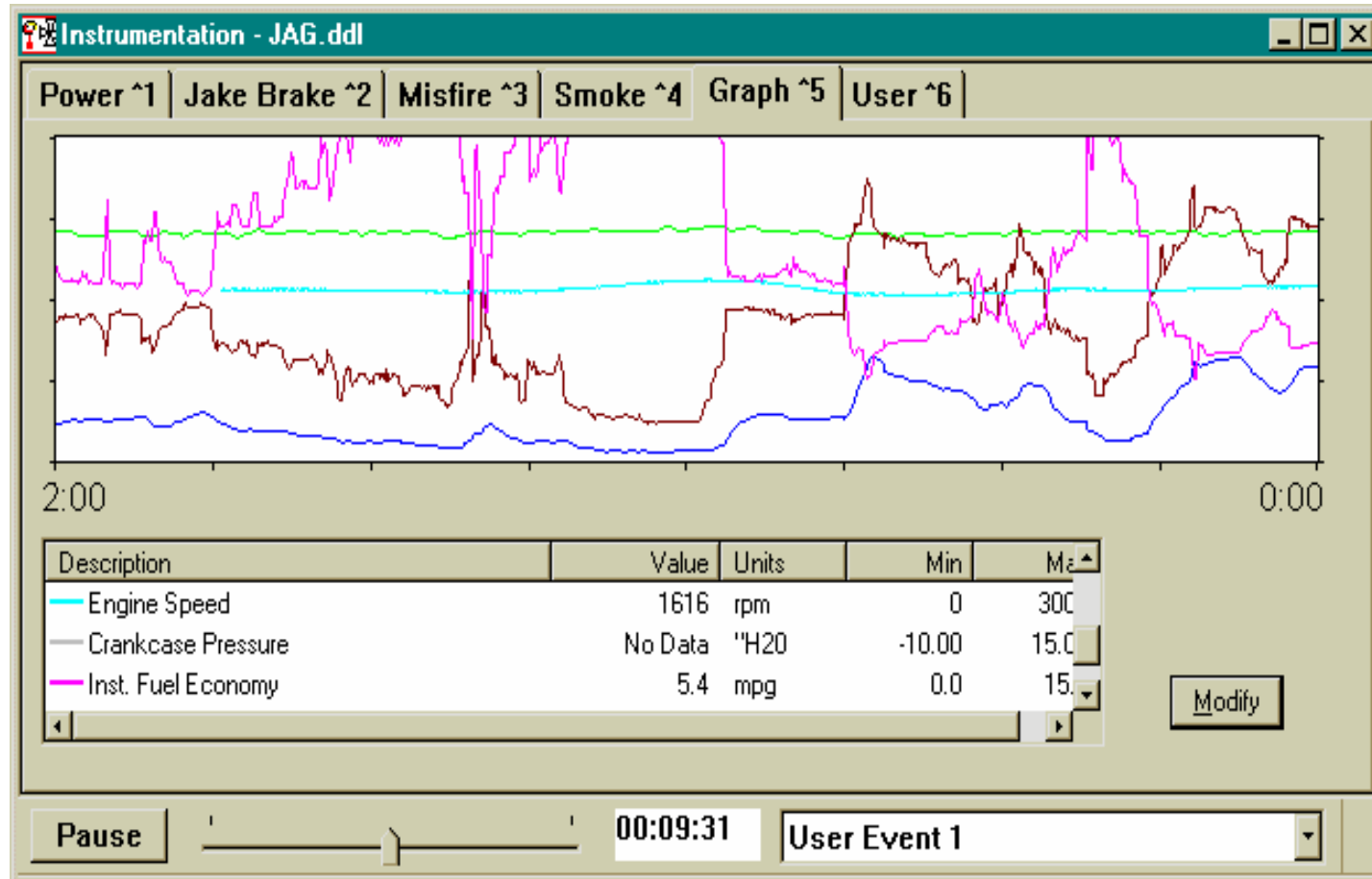
Meter	Value	Unit
Meter 1	0 25 50 75 100	Engine Oil Temperature
Meter 2	0 25 50 75 100	Injector Pressure
Meter 3	0 25 50 75 100	Boost Pressure
Meter 4	0 25 50 75 100	Output Torque
Digital 5	[]	Engine Oil Level
TPS Counts		

Dropdown menu for Meter 4:

- Injector Pressure
- Injector Pump Usage
- Inst. Fuel Economy
- Intake Air Temp
- Knock Volts
- Non ESS Shifts
- Output RPM
- Output Torque

Buttons: OK, Cancel

Snapshot is saved for future playback, it can be sent as an email attachment



Questions
