AUTOMOTIVE TECHNICIAN TRAINING SERVICES

Presents

Diagnosing Electrical Problems on Today's Motor Vehicles

1

Your Instructor For This Class

"G" Jerry Truglia

- **National Trainer, ASE World Class, Master: Auto, Truck, School Bus, L1, L3, CNG and…**
- **ATTP Master Instructor, New York State, CT and New Jersey**
- **STS (Service Technician Society) 2003 President**
- **TST (Technicians Service Training) Founder and President**
- **Author / Co Author/ Technical adviser on 25 plus books including OBD II and Mode 6, and Understanding and Diagnosing Hybrid Vehicles**
- **Published articles for multiple newsletters, and magazines**
- **Picked as one of the Top Instructors in the country by EPA & SAE**
- **Numerous Radio, TV, Internet, and SAE Video appearances**
- **PTEN, MotorAge and TST Webcast Instructor**
- **Motor Magazine Top 20 award winner**
- **Provider of OBD II Training for 13 states, Ontario Canada and the US EPA**
- **Guest speaker at SAE Congress, IM Solutions and Clean Air Conference**

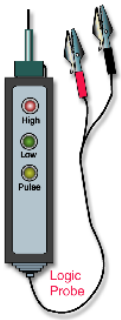
2

WE'RE NOT WORKING ON THESE ANYMORE ARE WE?

HOW ABOUT THESE'S?

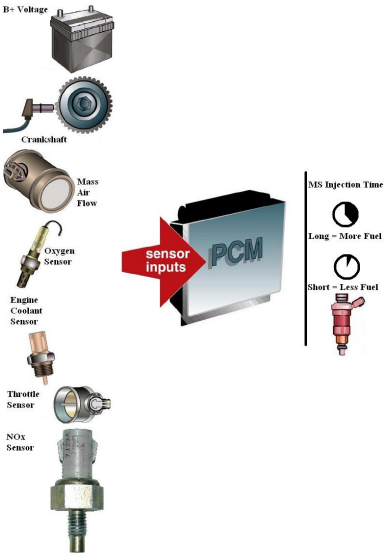
3

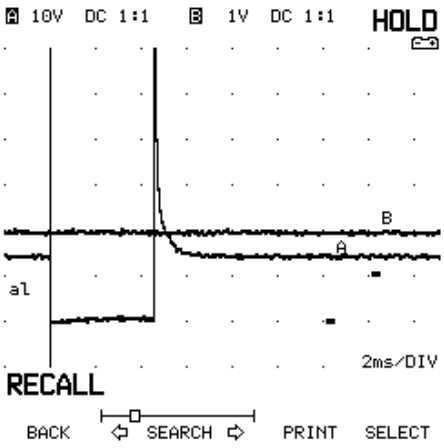
Tools



4

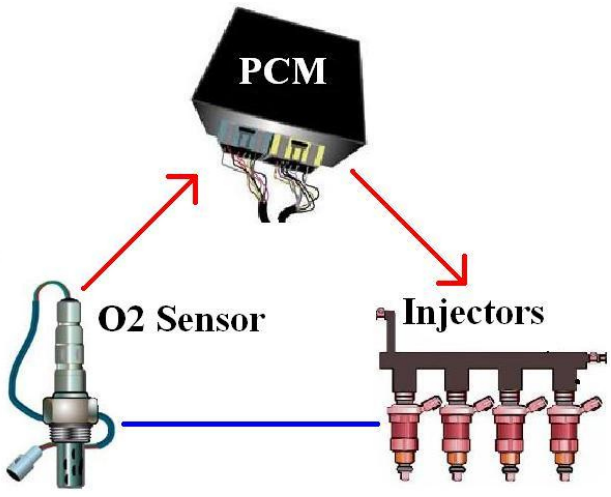
How to Verify PCM Control





5

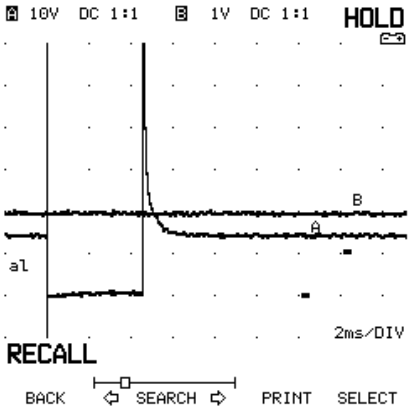
Sense, Compare and Adjust



6

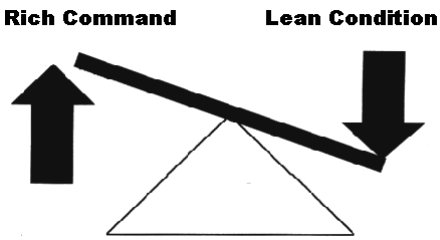
Computer Control

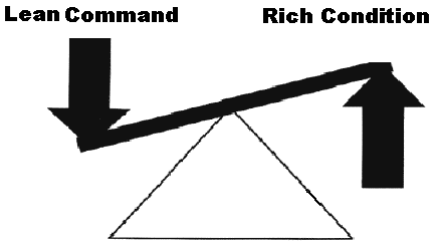
1. RPM AC (2 & 3 wire) Hall (3 Wire) Optical 4 (Wire)
2. CTS / IAT
3. Load Map (A) Map (D) Vane Air, Hot Wire, Film, HZ
4. TPS
5. HO2S (Zirconium, Titanium, Renix Titanium, Wide Range) Air Fuel



7

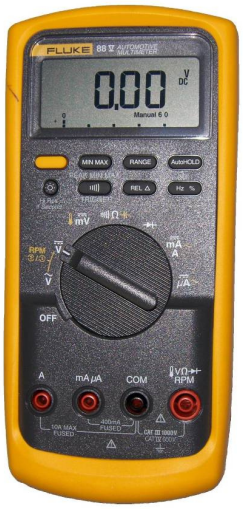
Fuel Control





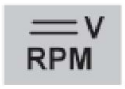
8

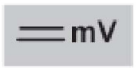
Meters

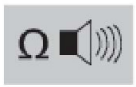


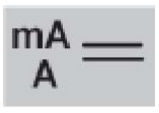
9

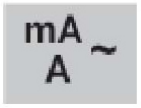
Meter Symbols











What is the definition for the above symbols?

10

Meters

Volt Scale Ranges
AC Scale
400 mv
4 v
40 v
400 v
4000 v
DC Scale
4 v
40 v
400 v
4000 v
MV Scale
400 mv

10 amp fused

400 ma fused

Zero Min Max Range Hold

Smooth RPM HZ % Duty MS-Pulse Alert

Ohm Scale
400
4 k
40 k
400 k
4000 k
4 m
40 m
400 m

Diode Test
3 volt max

Ma & Amp Scale
4000 ma
40 a

Ground

Volt –Amp-Ohm-Diode-RPM

11

Meters

12

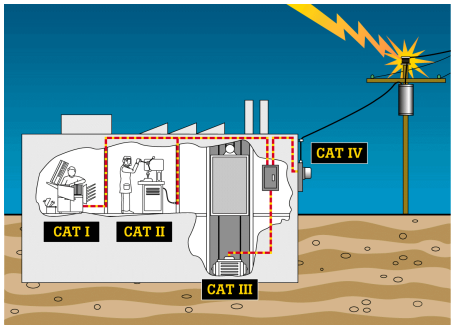
Meters – What Are You Working With

Fingerprints burned into probes

Source Fluke Corporation

13

Meters – What Are You Working With



Overvoltage category	Working voltage (dc or ac – rms to grnd)	Peak impulse transient (20 repetitions)	Test source (Ohm = V/A)
CAT I	600V	2500 V	30 ohm source
CAT I	1000V	4000 V	30 ohm source
CAT II	600V	4000 V	12 ohm source
CAT II	1000V	6000 V	12 ohm source
CAT III	600V	6000 V	2 ohm source
CAT III	1000V	8000 V	2 ohm source

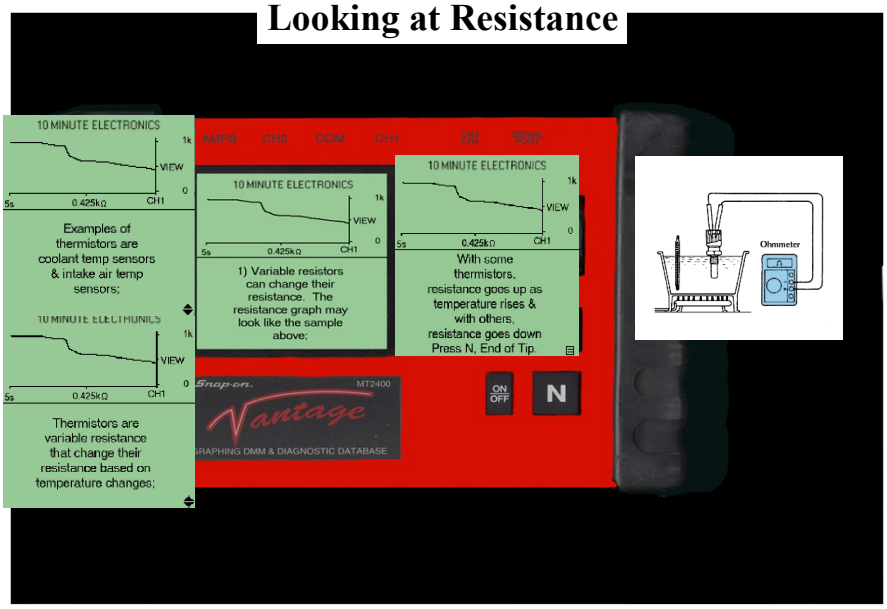
Source
Fluke Corporation

14

Meters Ohm Testing

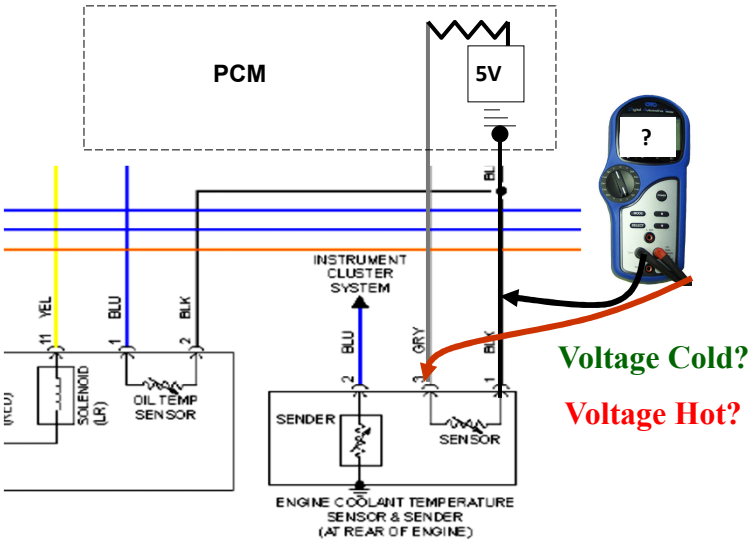
15

Looking at Resistance



16

Coolant Sensors And Other NTCs



17

2000 Volvo C-70 Smoked ECM

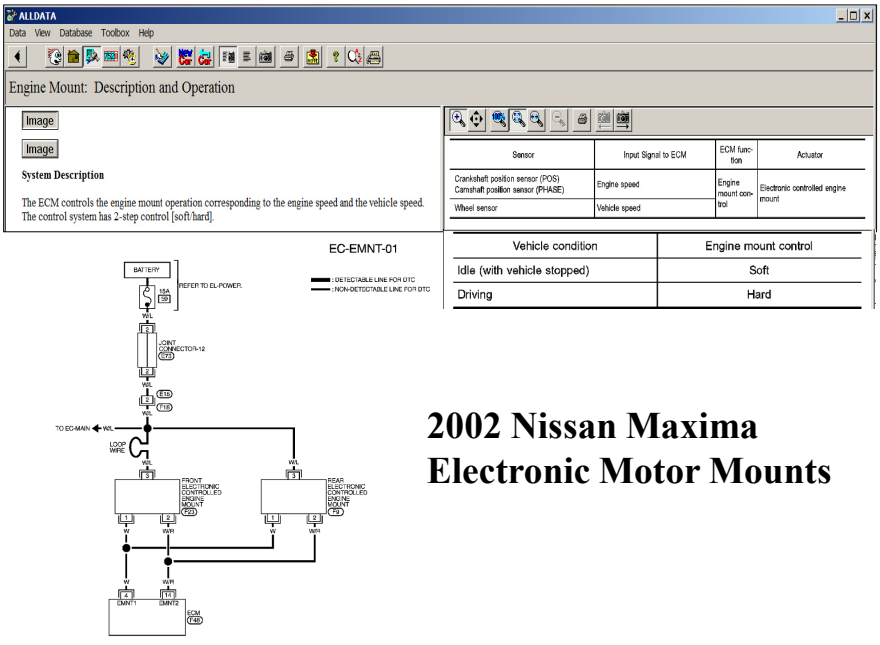
A 2000 Volvo C-70 for just that problem (smoking ECM's). I broke out my Ohm meter and starting checking the resistance of all the output circuits that the ECM controls. When I got to the O2 heater circuits, I found that the rear O2 heater resistance was 70 Ohms but the front heater resistance was only 6 Ohms. This caused a melt down which took out other circuits too. A new front O2 sensor and a third new ECM solved the problem.

18

2002 Nissan Maxima

A 2002 Nissan Maxima has smoked several ECMs. After checking all the control circuits and finding them to be within specs., I ran into a control circuit called Electronically controlled motor mounts. A description and operation page explained the system but the test section revealed only a visual inspection of the mounts. Studying the wiring diagrams revealed that each mount had two separate coils, one coil to activate hard mode and one coil to activate soft mode. B+ is fed to each coil and the two hard mode coils are grounded at one pin of the ECM and the two soft mode coils are grounded at another pin of the ECM. I found that one set of coils read 75 Ohms and the other set read 7 Ohms, problem found. The wiring to the mounts was disconnected and a new ECM installed.

19



2002 Nissan Maxima Electronic Motor Mounts

20