



# *Dorman Training Center Presents:*

## *"OBD II DIAGNOSTIC STRATEGIES"*



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### *Your Instructor For This Seminar*

- National Trainer, ASE World Class, Master Auto, Truck, School Bus, L1, L3, CNG
- 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, Motor Age and TST Webcast Instructor - Dorman Training Director
- Motor Magazine Top 20 award winner
- Provider of OBD II Training for 14 states, Ontario Canada and the US EPA
- Guest speaker at SAE Congress, IM Solutions and Clean Air Conference



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## What Will Be Covered

### Instructions For This Seminar

This seminar will be approx. 1 + hour long

- All slides that are presented are in your handout and are numbered
- Have a pen or pencil and paper for notes
- Questions can be asked at anytime

- 01 **What Is The OBD II Emission Test**
- 02 **Checking The OBD II Link Connector**
- 03 **Different Scan Tools**
- 04 **Monitors**
- 05 **Case Studies and more.....**

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## OBD II Diagnostic Strategies

**OBD II vehicles are being tested everyday in many states with a scan tool instead of an emissions analyzer or just for diagnostic purposes.**

**The following must be checked for a complete diagnosis or OBD II test:**

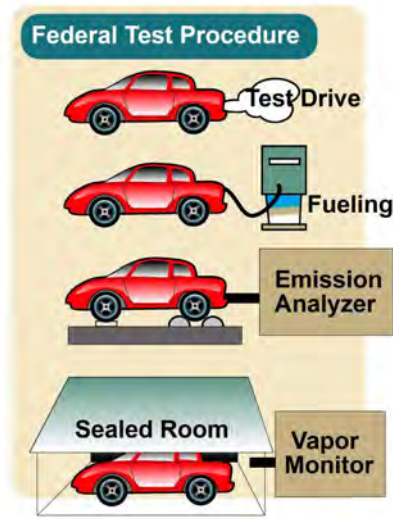
- **DTCs**
- **MIL commanded state (ON/OFF)**
- **Completion status of Non-Continuous Monitors**

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## About The MIL



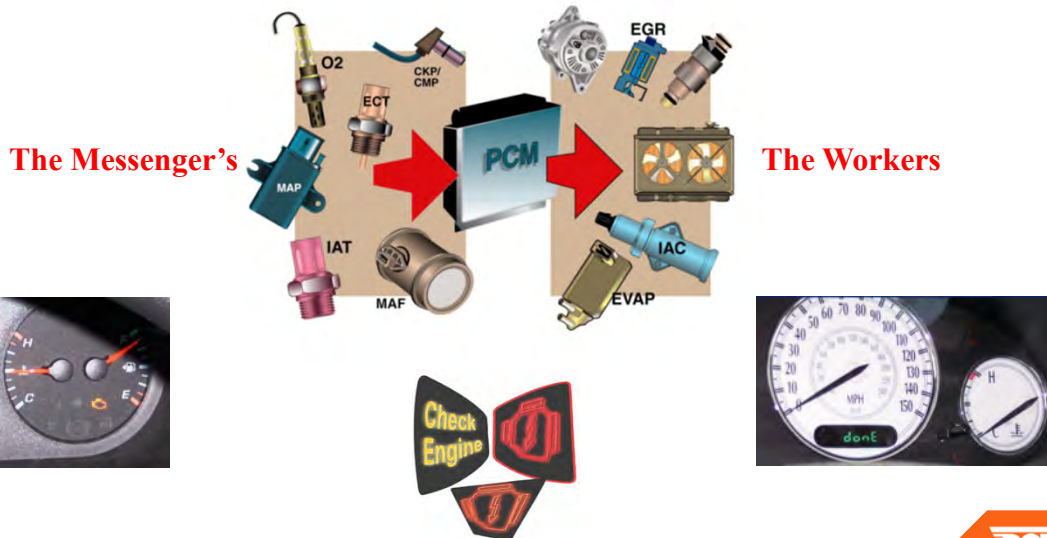
**Federal Test Procedure**  
How does OBD II know if the vehicle passes or fails its tests?



**The Federal Test Procedure is a set of EPA tests used to certify emission levels of new vehicles.**

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## OBD II Emission Technology



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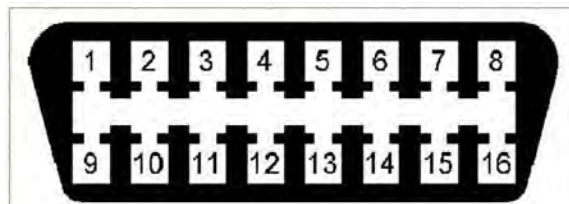
## Things To Know About OBD II

- PIDs
- DTCs
- Freeze Frame
- Readiness Status
- Monitors
- Enabling Criteria
- Pending DTCs



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## OBD II Connector



PIN	DESCRIPTION	PIN	DESCRIPTION
1	Vendor Option	9	Vendor Option
2	J1850 Bus +	10	j1850 BUS
3	Vendor Option	11	Vendor Option
4	Chassis Ground	12	Vendor Option
5	Signal Ground	13	Vendor Option
6	CAN (J-2234) High	14	CAN (J-2234) Low
7	ISO 9141-2 K-Line	15	ISO 9141-2 Low
8	Vendor Option	16	Battery Power

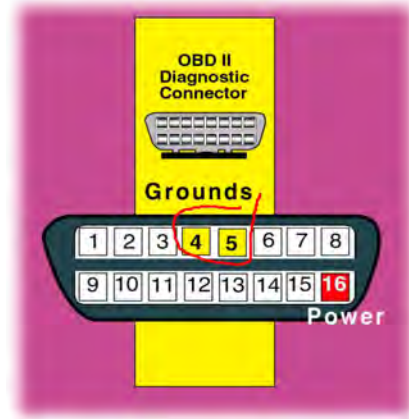
**What Pins are used to power up your scan tool?  
Others?**

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## Things To Know About OBD II

### DLC (Diagnostic Link Connector)

- 16 Cavities
- PIN 4 Chassis Ground
- PIN 5 Sensor Ground
- PIN 16 Battery Voltage



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## Things To Know About OBD II

### Dealership (Factory)

- Increased data PIDS
- Programming and Re - programming
- Diagnosis of complete vehicle systems

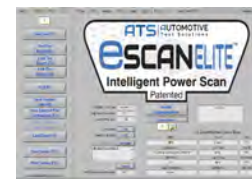


### OEM Enhanced

- Full DataStream
- Most other computer system datastream
- Actuator output test
- Diagnosis of complete vehicle systems

### Generic OBD II

- Read Generic/Global DTCs
- Read Freeze Frame
- Erase DTCs
- Monitor Status
- Mode 6, 9 and 0A/10



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## Actual vs. Calculated Data Values

**OEM Enhanced Normal**

Engine RPM	640	rpm
TPS Volts	0.61	V
Throttle Angle %	0	%
Engine Coolant Temp V	2.59	V
Engine Coolant Temp	189	DegF
Intake Air Temp Volts	2.00	V
Intake Air Temp	93	DegF
O2 Sensor 1/1 Volts	0.	V
Vehicle Speed Sensor	0	mph

**OBD Generic**

Engine RPM	796	rpm
Throttle Position	12	%
Engine Coolant Temp	-40	DegF
Intake Air Temp	86	DegF
O2 Sensor 1/1 Volts	0.08	V
Vehicle Speed	0	mph
Spark Advance	10	Deg

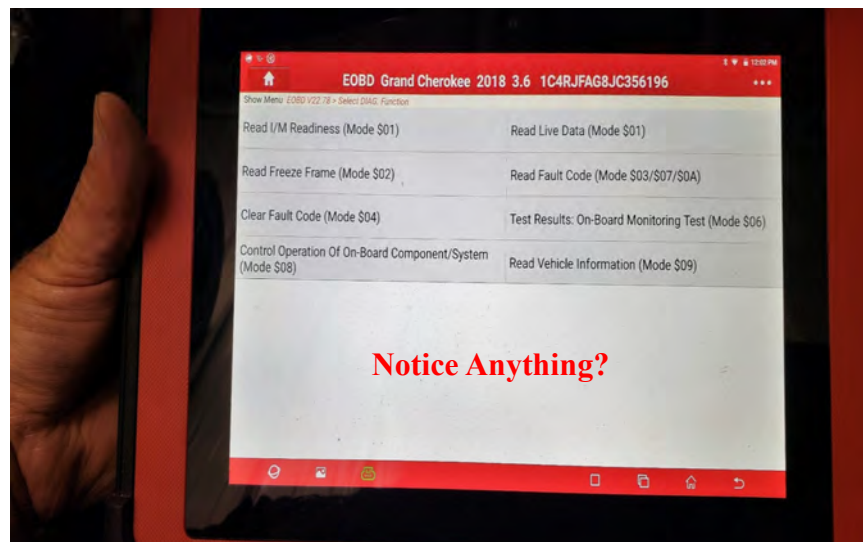
**OEM Enhanced Open ECT**

Engine RPM	736	rpm
TPS Volts	0.61	V
Throttle Angle %	0	%
Engine Coolant Temp V	5.00	V
Engine Coolant Temp	115	DegF
Intake Air Temp Volts	2.27	V
Intake Air Temp	86	DegF
O2 Sensor 1/1 Volts	0.06	V
Vehicle Speed Sensor	0	mph

Always use Generic / Global OBD II First

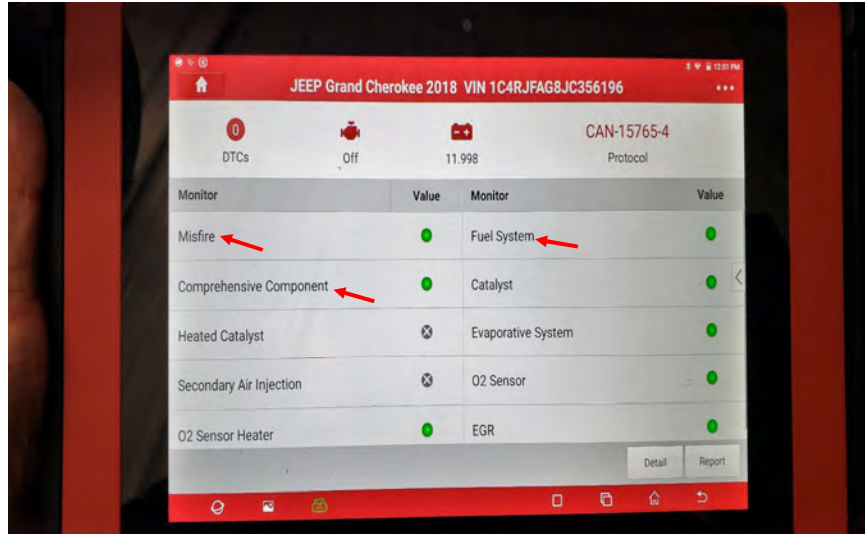
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## Monitors



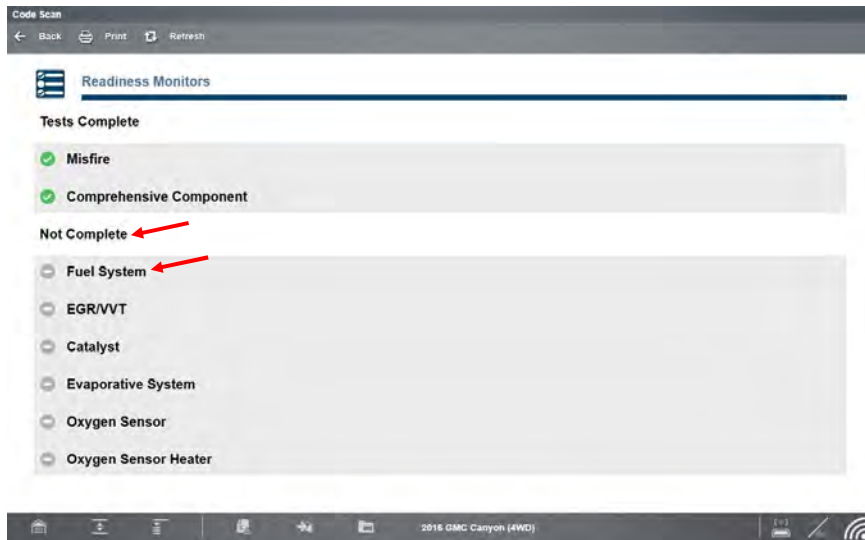
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# Monitors



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# Monitors



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## Monitors

The screenshot shows a diagnostic software interface with the following elements:

- Navigation tabs: EScan, DTCs, Monitors, PIDs, Digital, Graphs, Mode6, O2, Sharp SHOOTER, Patented.
- Buttons: "?", "Read Everything Once (also done at startup)", "O2 Sensor Location Pictures".
- O2 Sensors Present: Bank 1 - Sensor 1, 2, 3, 4; Bank 2 - Sensor 1, 2, 3, 4. Power Take Off (PTO) Active.
- Commanded Secondary Air Status: Reading.
- OBD Requirements to Which Vehicle is Designed: OBD and OBD II, Fuel System 1 Status, Fuel System 2 Status, Error detecting status.
- Reading Monitors/MIL#DTCs: A green bar at the top of a graph area.
- MIL: Red indicator light.
- Number of DTCs: 1.
- Vehicle Speed Sensor (VSS) km/h: To graph VSS make sure VSS is selected on the PIDs tab.
- Number of Points displayed on Graph: 100.
- Monitor Status List:
  - Misfire Monitor Complete
  - Fuel System Monitor Complete
  - Comprehensive Component Monitor Complete
  - Oxygen Sensor Heater Monitor Complete
  - Oxygen Sensor Monitor Complete
  - Catalyst Monitor Complete
  - EGR System Monitor Complete
  - Evaporative System Monitor Complete (highlighted with a red arrow)
  - Secondary Air Monitor Complete
  - Heated Catalyst Monitor Complete
  - A/C System Refrigerant Monitor Complete

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## Monitor Information

**Monitors on OBD II systems work like this:**

- ✓ Onboard test strategies programmed into the PCM check the vehicle systems
- ✓ These test sequences are called “Monitors”
- ✓ Monitors run when conditions are right for them to run
- ✓ Vehicle operating conditions required to run Monitors are referred to as “Trips”



Monitors  
Not Complete

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## Monitor Information

- **Just like the Hall monitor's job is to monitor the halls, there are different kinds of Monitors in the vehicle that monitor different vehicle systems.**
- **All vehicles have at least 3 Non - Continuous Monitors:**
- **O2 Heater, O2 Sensor & Catalyst.**
- **Other Monitors may include EVAP, EGR, Secondary AIR, AC System & VVT.**
- **These Monitors run only after completing a "Trip," which is a specific set of driving conditions demanded by the manufacturer.**

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## Continuous Monitors

**Some Monitors run *continuously* as the vehicle is operated. These are known as "Continuous Monitors." They include the Comprehensive Component, Fuel System, and Misfire Monitors. Continuous Monitors should always appear as "Ready" when viewed on a scan tool. (Some scan tools and inspection machines may show them as "Complete," "Done," or "Yes.")**

***Three Continuous Monitors are supported on all OBD II vehicles: Misfire, Comprehensive Component, and Fuel System.***

Continuously Monitored Systems	
OnBoard Module/System	Status
Misfire Monitoring	Complete
Fuel System Monitoring	Complete
Comprehensive Component Monitoring	Complete

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## Non - Continuous Monitors

**Non - Continuous Monitors run once per Trip. Unlike Continuous Monitors, the status of Non - Continuous Monitors are checked as part of the OBD II emissions test. If there are too many incomplete (Not Ready) Monitors, the vehicle fails an emission test and may illuminate the MIL.**

Non-Continuous Monitoring Tests		
Monitor	Availability	Status
⌘ Catalyst	Supported	Not Complete
⊘ Heated Catalyst	Unsupported	
⊘ Evaporative System	Unsupported	
⊘ Secondary Air System	Unsupported	
⊘ A/C System	Unsupported	
⌘ Oxygen Sensor	Supported	Not Complete
⌘ Oxygen Sensor Heater	Supported	Not Complete
⌘ EGR System	Supported	Not Complete

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## Non - Continuous Monitors

**Non - Continuous Monitors, Oxygen Sensor Heater, Oxygen Sensor, Catalyst, EVAP, EGR, Secondary Air and now VVT are used in many vehicles.**

**Air Conditioning and Heated Catalyst are not currently used and are listed as Unsupported. The Air Conditioning Monitor was originally intended for use only in vehicles with R-12 systems.**

Non-Continuous Monitoring Tests		
Monitor	Availability	Status
⌘ Catalyst	Supported	Not Complete
⊘ Heated Catalyst	Unsupported	
⊘ Evaporative System	Unsupported	
⊘ Secondary Air System	Unsupported	
⊘ A/C System	Unsupported	
⌘ Oxygen Sensor	Supported	Not Complete
⌘ Oxygen Sensor Heater	Supported	Not Complete
⌘ EGR System	Supported	Not Complete

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## Non - Continuous Monitors

Two other Non - Continuous Monitors, Thermostat Monitor (began 2000 M/Y) and PCV Monitor (began 2002 M/Y) do not have their own Monitor title on most scan tools, however they do have a set of DTCs that are checked in the Comprehensive Component Monitor (CCM).

**Note: Not all light duty diesel vehicles support Non - Continuous Monitors, but new ones do.**

The Non - Continuous Monitors that must be used all the time are: Oxygen Sensor Heater, Oxygen Sensor and Catalyst.

Non-Continuous Monitoring Tests		
Monitor	Availability	Status
Catalyst	Supported	Not Complete
Heated Catalyst	Unsupported	
Evaporative System	Unsupported	
Secondary Air System	Unsupported	
A/C System	Unsupported	
Oxygen Sensor	Supported	Not Complete
Oxygen Sensor Heater	Supported	Not Complete
EGR System	Supported	Not Complete

## Things That Prevent Monitors From Running - Becoming READY

1. Engine Thermostat
2. Engine Coolant/ Antifreeze Mixture
3. Crankshaft Relearn Not Completed
4. DTC's or Pending DTC's Stored
5. Vehicle Fuel Level Above 15% And Below 85 % \* Check Manufacturer Specs
6. Battery And Charging Voltage
7. Mode 6 data that indicates a system that is borderline failing
8. The PCM needs a soft reset

Monitors  
Not Complete

## Things That Prevent Monitors From Running - Becoming READY

**No hocus pocus is necessary. The previous need to be corrected in order to run Monitors.**

**On extremely tough - to - run Monitors, some vehicles need you to artificially set a DTC to wake up the PCM.**

**After making a misfire or some other malfunction, a DTC will be set.**

**Erase it and afterward complete the Drive Cycle to allow Monitors to become Ready.**

Monitors  
Not Complete

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## Monitors Tips

**As previous stated on some vehicles you will need to force a DTC, followed by erasing the DTC. Or**

**If all else fails, you may need to erase the computer learned memory and start over. Disconnect the battery cables and connect a 1 ohm - 10 watt resistor for at least 5 minutes.**

**This erases learned computer values and place the computer in a "fast-learn" mode that accelerates Monitor completion.**

Monitors  
Not Complete



Ready Scan from OTC/SPX



1 Ohm - 10 watt resistor

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## Monitors Tips

**Caution:** Disconnecting the battery in some vehicles can cause significant problems when some "drive by wire" throttles and radios with security codes refuse to work after the battery is reconnected. This is especially problematic on newer vehicles.

**Note:** If you replaced an O2, MAF or any other part with a poor quality aftermarket part and now the Monitors are not completing, you may want to replace it with an OE equivalent.

**NOTE:** The sensor heater may have to be relearned.



Ready Scan from OTC/SPX



1 Ohm - 10 watt resistor

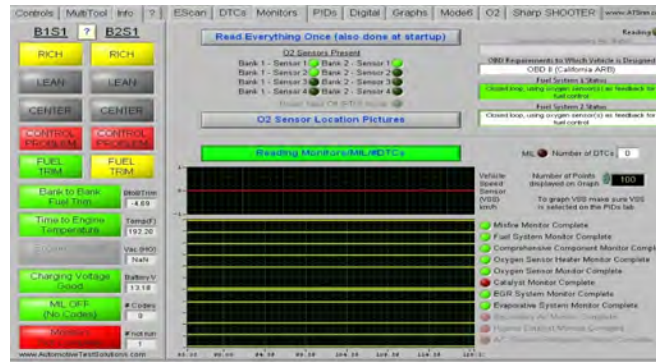
Monitors  
Not Complete

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## Monitor Information

**Monitors on all vehicles are Incomplete (Not Ready) until they run to completion one time. Once they are set to Ready they will NOT change back to Incomplete (Not Ready) until the DTCs are erased, battery power is disconnected, or the PCM is disconnected and/or KAM (Keep Alive Memory) is lost.**



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## Monitors Tips

The next examples are not typical but demonstrate very odd criteria are sometimes required to run Monitors.

<b>Readiness Monitor Drive Patterns: EVAP Monitors (Continued)</b>	<b>Drive Pattern Preconditions</b> The monitor will not run unless:	<i>Courtesy of University Toyota, Toyota Motor Sales USA, Inc.</i>
	<ul style="list-style-type: none"> <li>MIL is OFF.</li> <li>Fuel level is between 1/2 to 3/4 full.</li> <li>Altitude is 7800 feet (2400 m) or less.*</li> <li>ECT (Coolant Temp) is between 40F and 95F (4.4C - 35C).</li> <li>IAT (Intake Air) is between 40F and 95F (4.4C - 35C).*</li> <li>Cold Soak Procedure has been completed.</li> </ul> <p>* For 2002 MY and later vehicles: The readiness test can be completed in cold ambient conditions (less than 40F / 4.4C) and/or at high altitudes (more than 7800 feet / 2400 m) if the complete drive pattern (including Cold Soak) is repeated a second time after cycling the ignition OFF.</p>	
<p><b>NOTE:</b> Before starting the engine, the difference between ECT (Coolant Temp) and IAT (Intake Air) must be less than 13F (7C). (Refer to Examples 1 and 2 on previous page.)</p>		

Courtesy of Toyota North America



## Monitors Tips

### Monitor Disablers You Might Not Be Thinking About:

**Wrong or defective thermostat. This can prevent the engine from reaching the correct operating temperature in a specific time. Air trapped in the cooling system can have the same effect.**

**Wrong coolant mix, specifically those with way too much antifreeze.**

DTC	Component/System	Monitor disablement (X: disabled)
P0100, P0101	MAF sensor	X
P0102, P0103	MAF sensor	X
P0104, P0105	MAF sensor	X
P0106, P0107	MAF sensor	X
P0108, P0109	MAF sensor	X
P0110, P0111	MAF sensor	X
P0112, P0113	MAF sensor	X
P0114, P0115	MAF sensor	X
P0116, P0117	MAF sensor	X
P0118, P0119	MAF sensor	X
P0120, P0121	MAF sensor	X
P0122, P0123	MAF sensor	X
P0124, P0125	MAF sensor	X
P0126, P0127	MAF sensor	X
P0128, P0129	MAF sensor	X
P0130, P0131	MAF sensor	X
P0132, P0133	MAF sensor	X
P0134, P0135	MAF sensor	X
P0136, P0137	MAF sensor	X
P0138, P0139	MAF sensor	X
P0140, P0141	MAF sensor	X
P0142, P0143	MAF sensor	X
P0144, P0145	MAF sensor	X
P0146, P0147	MAF sensor	X
P0148, P0149	MAF sensor	X
P0150, P0151	MAF sensor	X
P0152, P0153	MAF sensor	X
P0154, P0155	MAF sensor	X
P0156, P0157	MAF sensor	X
P0158, P0159	MAF sensor	X
P0160, P0161	MAF sensor	X
P0162, P0163	MAF sensor	X
P0164, P0165	MAF sensor	X
P0166, P0167	MAF sensor	X
P0168, P0169	MAF sensor	X
P0170, P0171	MAF sensor	X
P0172, P0173	MAF sensor	X
P0174, P0175	MAF sensor	X
P0176, P0177	MAF sensor	X
P0178, P0179	MAF sensor	X
P0180, P0181	MAF sensor	X
P0182, P0183	MAF sensor	X
P0184, P0185	MAF sensor	X
P0186, P0187	MAF sensor	X
P0188, P0189	MAF sensor	X
P0190, P0191	MAF sensor	X
P0192, P0193	MAF sensor	X
P0194, P0195	MAF sensor	X
P0196, P0197	MAF sensor	X
P0198, P0199	MAF sensor	X
P0200, P0201	MAF sensor	X
P0202, P0203	MAF sensor	X
P0204, P0205	MAF sensor	X
P0206, P0207	MAF sensor	X
P0208, P0209	MAF sensor	X
P0210, P0211	MAF sensor	X
P0212, P0213	MAF sensor	X
P0214, P0215	MAF sensor	X
P0216, P0217	MAF sensor	X
P0218, P0219	MAF sensor	X
P0220, P0221	MAF sensor	X
P0222, P0223	MAF sensor	X
P0224, P0225	MAF sensor	X
P0226, P0227	MAF sensor	X
P0228, P0229	MAF sensor	X
P0230, P0231	MAF sensor	X
P0232, P0233	MAF sensor	X
P0234, P0235	MAF sensor	X
P0236, P0237	MAF sensor	X
P0238, P0239	MAF sensor	X
P0240, P0241	MAF sensor	X
P0242, P0243	MAF sensor	X
P0244, P0245	MAF sensor	X
P0246, P0247	MAF sensor	X
P0248, P0249	MAF sensor	X
P0250, P0251	MAF sensor	X
P0252, P0253	MAF sensor	X
P0254, P0255	MAF sensor	X
P0256, P0257	MAF sensor	X
P0258, P0259	MAF sensor	X
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P0318, P0319	MAF sensor	X
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P0380, P0381	MAF sensor	X
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P0438, P0439	MAF sensor	X
P0440, P0441	MAF sensor	X
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P0444, P0445	MAF sensor	X
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P0470, P0471	MAF sensor	X
P0472, P0473	MAF sensor	X
P0474, P0475	MAF sensor	X
P0476, P0477	MAF sensor	X
P0478, P0479	MAF sensor	X
P0480, P0481	MAF sensor	X
P0482, P0483	MAF sensor	X
P0484, P0485	MAF sensor	X
P0486, P0487	MAF sensor	X
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P0520, P0521	MAF sensor	X
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P0530, P0531	MAF sensor	X
P0532, P0533	MAF sensor	X
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P0558, P0559	MAF sensor	X
P0560, P0561	MAF sensor	X
P0562, P0563	MAF sensor	X
P0564, P0565	MAF sensor	X
P0566, P0567	MAF sensor	X
P0568, P0569	MAF sensor	X
P0570, P0571	MAF sensor	X
P0572, P0573	MAF sensor	X
P0574, P0575	MAF sensor	X
P0576, P0577	MAF sensor	X
P0578, P0579	MAF sensor	X
P0580, P0581	MAF sensor	X
P0582, P0583	MAF sensor	X
P0584, P0585	MAF sensor	X
P0586, P0587	MAF sensor	X
P0588, P0589	MAF sensor	X
P0590, P0591	MAF sensor	X
P0592, P0593	MAF sensor	X
P0594, P0595	MAF sensor	X
P0596, P0597	MAF sensor	X
P0598, P0599	MAF sensor	X
P0600, P0601	MAF sensor	X
P0602, P0603	MAF sensor	X
P0604, P0605	MAF sensor	X
P0606, P0607	MAF sensor	X
P0608, P0609	MAF sensor	X
P0610, P0611	MAF sensor	X
P0612, P0613	MAF sensor	X
P0614, P0615	MAF sensor	X
P0616, P0617	MAF sensor	X
P0618, P0619	MAF sensor	X
P0620, P0621	MAF sensor	X
P0622, P0623	MAF sensor	X
P0624, P0625	MAF sensor	X
P0626, P0627	MAF sensor	X
P0628, P0629	MAF sensor	X
P0630, P0631	MAF sensor	X
P0632, P0633	MAF sensor	X
P0634, P0635	MAF sensor	X
P0636, P0637	MAF sensor	X
P0638, P0639	MAF sensor	X
P0640, P0641	MAF sensor	X
P0642, P0643	MAF sensor	X
P0644, P0645	MAF sensor	X
P0646, P0647	MAF sensor	X
P0648, P0649	MAF sensor	X
P0650, P0651	MAF sensor	X
P0652, P0653	MAF sensor	X
P0654, P0655	MAF sensor	X
P0656, P0657	MAF sensor	X
P0658, P0659	MAF sensor	X
P0660, P0661	MAF sensor	X
P0662, P0663	MAF sensor	X
P0664, P0665	MAF sensor	X
P0666, P0667	MAF sensor	X
P0668, P0669	MAF sensor	X
P0670, P0671	MAF sensor	X
P0672, P0673	MAF sensor	X
P0674, P0675	MAF sensor	X
P0676, P0677	MAF sensor	X
P0678, P0679	MAF sensor	X
P0680, P0681	MAF sensor	X
P0682, P0683	MAF sensor	X
P0684, P0685	MAF sensor	X
P0686, P0687	MAF sensor	X
P0688, P0689	MAF sensor	X
P0690, P0691	MAF sensor	X
P0692, P0693	MAF sensor	X
P0694, P0695	MAF sensor	X
P0696, P0697	MAF sensor	X
P0698, P0699	MAF sensor	X

# TIME OUT - CASE STUDY

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## 2013 Subaru Outback

The screenshot shows a diagnostic tool interface for a 2013 Subaru Outback. The main display area shows the following DTC codes:

- P0031** Heated oxygen sensor (HO2S) 1, bank 1, heater control -circuit low  
\*Probable Cause: Wiring short to earth, HO2S, ECM
- P0420** Catalytic converter system, bank 1, efficiency below threshold  
\*Probable Cause: Catalytic converter, wiring, HO2S 2

The 'Supported PIDs' table is as follows:

Supported PID	Address	Data	Units
* P0031 DTC caused Freeze Frame Storage #0			
Calculated Load	LOAD_PCT	16.9794	%
Engine Coolant Temperature	ECT	174.2000	Deg F
Short Term Fuel Trim Bank 1	SHRTFT1	0.0000	%
Long Term Fuel Trim Bank 1	LONGFT1	6.2500	%
Intake Manifold Absolute Pressure	MAP	9.1543	HG
Engine RPM	RPM	903.0000	RPM
Vehicle Speed Sensor	VSS	0.0000	mph
Ignition Timing Advance for #1 Cylinder	SPARKADV	20.5000	deg
Intake Air Temperature	IAT	82.4000	Deg F
Air Flow Rate from Mass Air Flow Sensor	MAP_gps	3.3500	g/s
Air Flow Rate from Mass Air Flow Sensor	MAP_lbmin	0.4422	lb/min
Absolute Throttle Position	TP	15.8883	%
O2 Bank 1 - Sensor 2	O2B1S2	0.0000	V
O2 Bank 1 - Sensor 2	FIDB1C2	0.0000	%
Time Since Engine Start	RUNTIME	4.0000	s
Commanded EGR	EGR_PCT	0.0000	%
EGR Error	EGR_ERR	0.0000	%
Commanded Evaporative Purge	EVAP_PCT	0.0000	%
Fuel Level Input	PLI	59.2157	%

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## 2013 Subaru Outback



AF Sensor Yellow Front O2

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# TIME OUT - CASE STUDY

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## Start Screen - Always Check The VIN

Controls | MultiTool | Info | ? | EScan | DTCs | Monitors | PIDs | Digital | Graphs | Modes | O2 | Sharp SHOOTER | Patented

Clear Data (F1)  
Save Text Report (F2)  
Load Text Report (F3)  
Print Text Report (F4)  
Hold (F5)  
Save Graphed Data (F8)  
Save Selected PIDs Continuously (F9)  
Load Data (F10)  
Save Screen (F11)  
Print Screen (F12)

ATS | AUTOMOTIVE Test Solutions  
**eSCANELITE™**  
Intelligent Power Scan  
Patented

Detected Comm Type: ISO9141-2  
Log Read Speed (ms): 2719  
Speed Per PID (ms): 1148  
Demo Mode: OFF  
EPA/MA Noise Status: OFF  
VIN: WBAW6361UR79172  
BARO at Shop Location (kPa): 101.32

Restart Communications  
No Error  
Change Options

VIN Decoded Information Start at Startup

Make	Model	Year
BMW	3 Series	2002
Engine Make	Cyl. Type	Max HP
2.0L I4 16 double overhead cam (DOHC) 24V	DOHC	184 G
Line Size	Cam Timing	Max Torque
2.5	None	175 G
Engine Aspiration	Fuel Injection	Fuel Type
Natural	FI	G

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## Next Check DTCs & Freeze Frame

Controls | MultiTool | Info | ? | EScan | DTCs | Monitors | PIDs | Digital | Graphs | Modes | O2 | Sharp SHOOTER | Patented

Clear Data (F1)  
Save Text Report (F2)  
Load Text Report (F3)  
Print Text Report (F4)  
Hold (F5)  
Save Graphed Data (F8)  
Save Selected PIDs Continuously (F9)  
Load Data (F10)  
Save Screen (F11)  
Print Screen (F12)

Select Make: BMW

Read DTC & Pending Codes  
Clear DTCs  
Read Permanent Codes  
Read Freeze Frame DMA

DTC that Caused Freeze Frame Storage #0: P0174

DTC Codes:

Code	Description
P0213	Misfire Detected with Low Fuel
P0300	Random/Multiple Cylinder Misfire Detected
P1344	Misfire During Start Cylinder 2
P1346	Misfire During Start Cylinder 3
P1353	Misfire Cylinder 6 With Fuel Cutoff
P1342	Misfire During Start Cylinder 1
P1065	Fuel Control Mixture Lean (Bank 2 Sensor 1)
P1351	Misfire Cylinder 5 With Fuel Cutoff
P1348	Misfire Cylinder 4 With Fuel Cutoff
P0171	System Too Lean Bank 1
P0174	System Too Lean Bank 2
	Pending Codes

Supported PIDs:

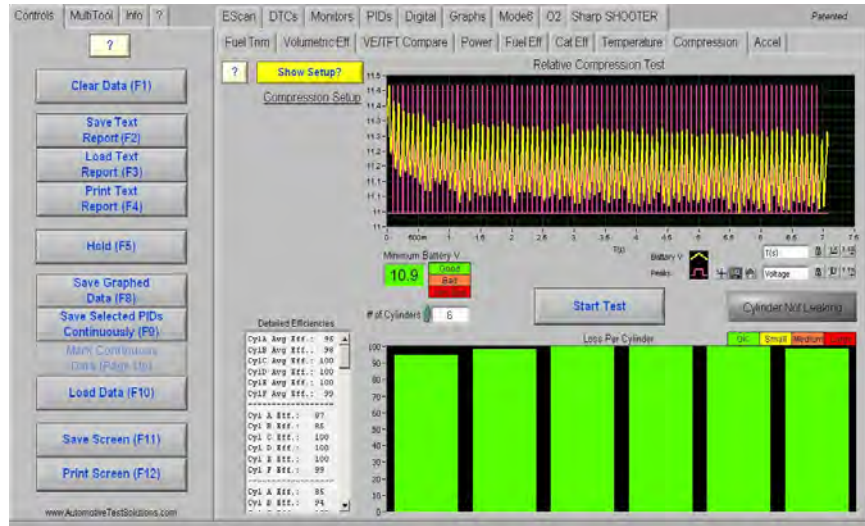
Address	Data	Units
P0174 DTC caused Freeze Frame Storage #0		
Calculated Load	LOAD_PCT	1.5686 %
Engine Coolant Temperature	ECT	48.0000 Deg C
Short Term Fuel Trim Bank 1	SHORTFT1	15.6250 %
Long Term Fuel Trim Bank 1	LONGFT1	11.7187 %
Short Term Fuel Trim Bank 2	SHORTFT2	15.6250 %
Long Term Fuel Trim Bank 2	LONGFT2	11.7187 %
Engine RPM	RPM	741.0000 RPM
Vehicle Speed Sensor	VSS	0.0000 km/h
Ignition Timing Advance for #1 Cylinder	SPARKADV	8.5000 deg
Intake Air Temperature	IAT	1.0000 Deg C
Air Flow Rate from Mass Air Flow Sensor	MAF_gls	3.5000 g/s
Air Flow Rate from Mass Air Flow Sensor	MAF_lbm	0.4620 lbm
Absolute Throttle Position	TP	10.1961 %

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VIN: WBAW6361UR79172

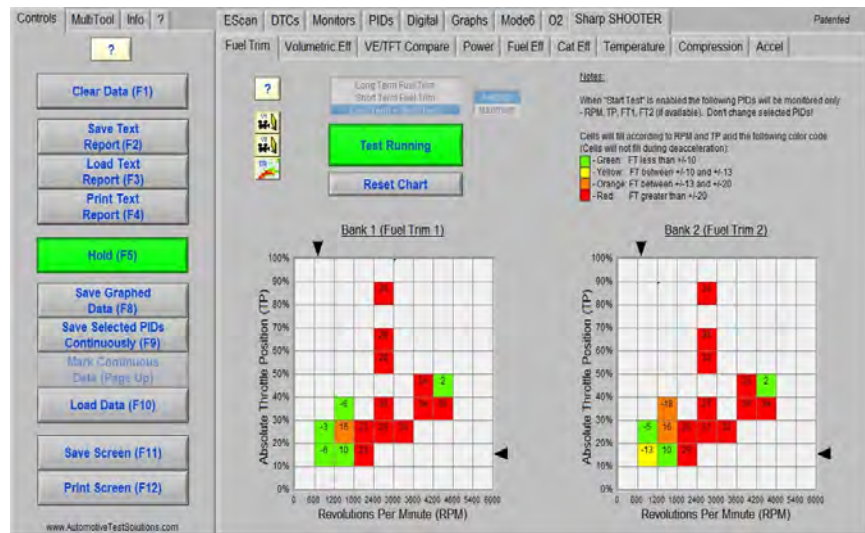
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## Check The Battery & Engine With Relative Compression



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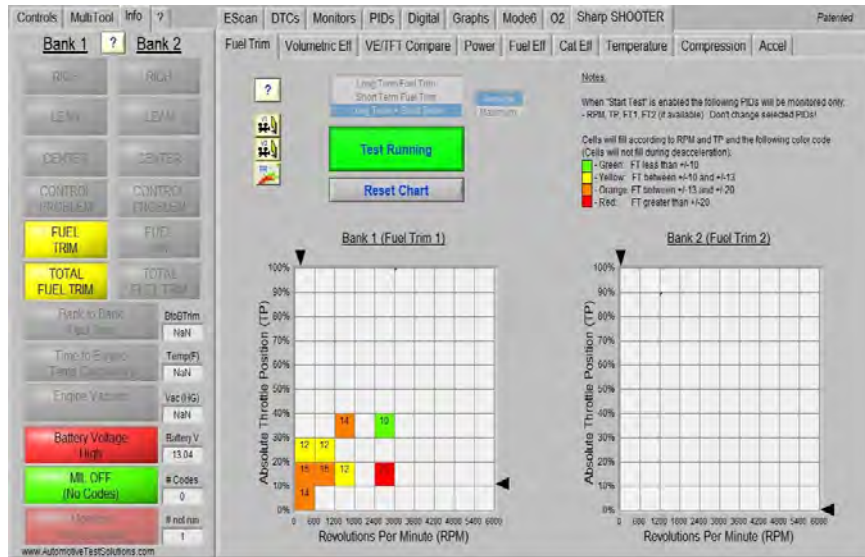
## Check The Fuel Trim



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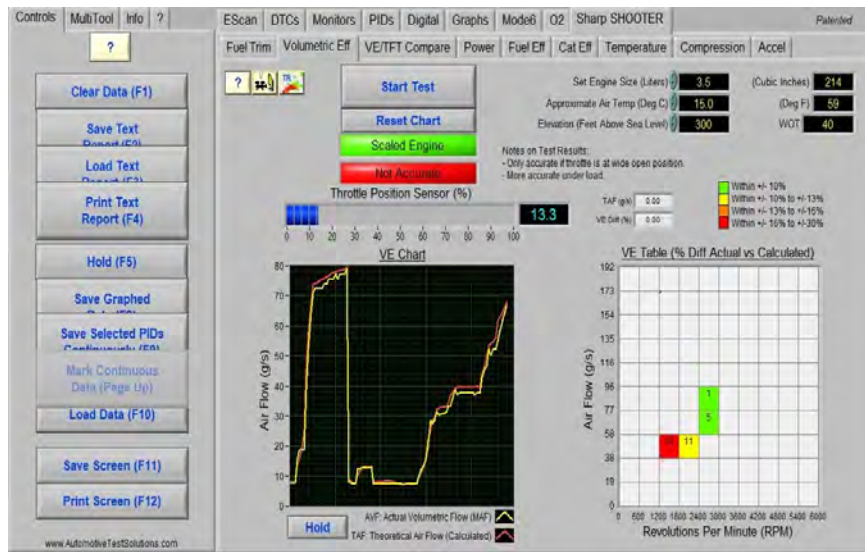


# 2006 Hummer H3 Rough Idle



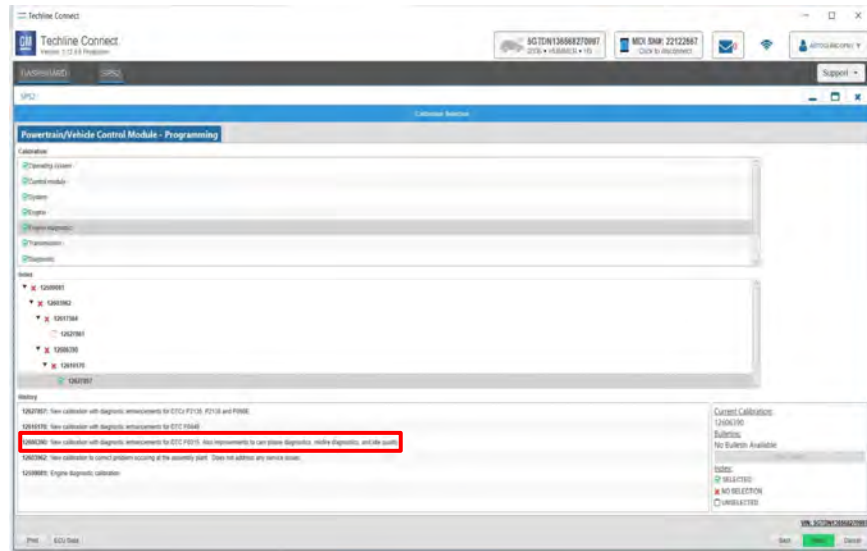
39

# 2006 Hummer H3 Rough Idle



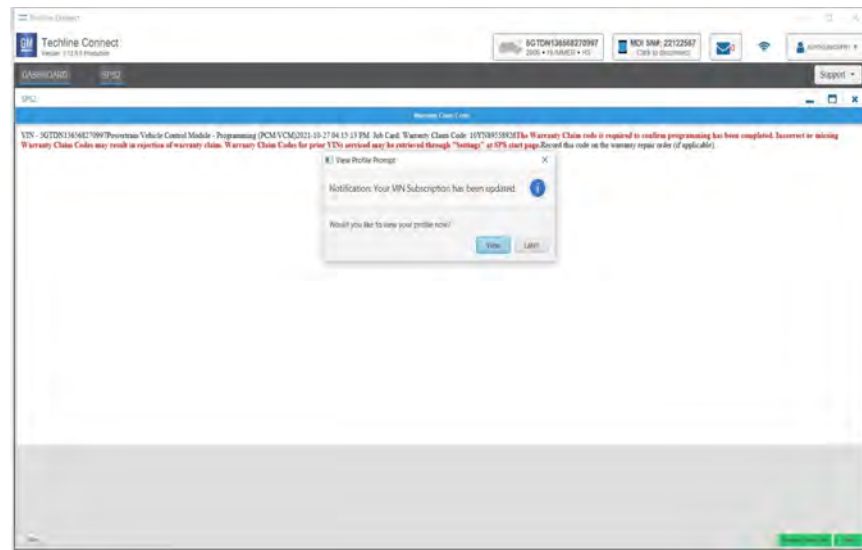
40

## 2006 Hummer H3 Rough Idle



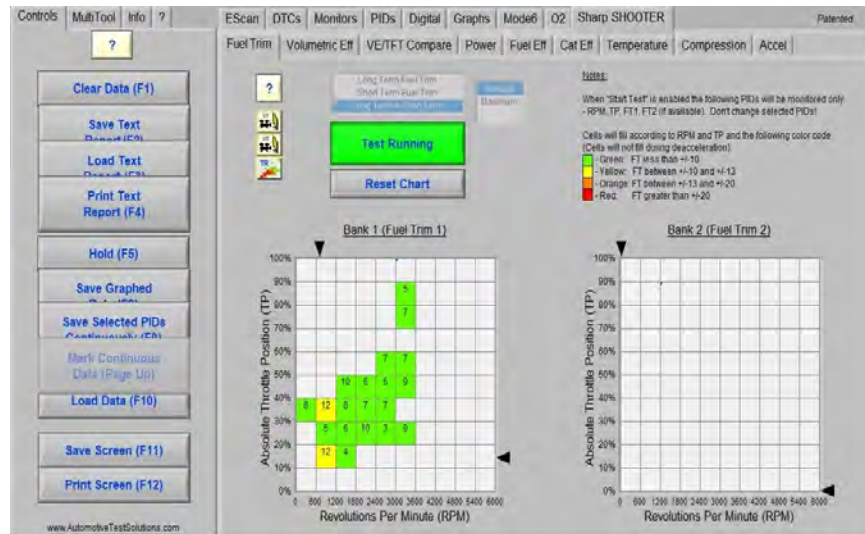
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## 2006 Hummer H3 Rough Idle



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## 2006 Hummer H3 Rough Idle



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**Tuesday November 26th, 2024**

**Heavy Duty Lunch & Learn 12:00pm to 1:00pm ET**

### ***"Heavy Duty Vehicle Multiplexing" Part 2***

#### **What will be covered:**

- **Continuation of "Multiplexing"**
- **Controller Area Networking (CAN)**
- **Understanding Scan-tool interfaces and relationship to a network.**
- **Terminating resistors**

**Instructor: Swede Oun**

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## "Dorman Training"



### Utilizing the Autel Diagnostic Tool Part 1 - Hands-On Class

Tuesday, December 3, 2024 or Thursday December 5, 2024

Joliet Junior College - Room C1090 (map)

6:00 p.m.—10:00 p.m. CDT | Joliet, IL

In the first part of this series, learn how to maximize the effectiveness of your AUTEL scan tool. Technicians will learn button functions, diagnostic aids, pre- and post-scan reports, graphing techniques, interpretation and use cases for Modes 6, 9 and 0A/10, plus an overview of generic and enhanced modes for the tool.

[View Event -->](#)



### Utilizing the Autel Diagnostic Tool Part 1 - Hands-On Class

Wednesday, December 4, 2024 or Thursday December 5, 2024

Smitty's Maintenance & Repair (map)

6:00 p.m.—10:00 p.m. EST | Easton, PA

In the first part of this series, learn how to maximize the effectiveness of your AUTEL scan tool. Technicians will learn button functions, diagnostic aids, pre- and post-scan reports, graphing techniques, interpretation and use cases for Modes 6, 9 and 0A/10, plus an overview of generic and enhanced modes for the tool.

[View Event -->](#)



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# Questions?



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# *Thank You!*



Please scan the QR code to fill out a quick survey about this presentation



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