
TECHNICIAN
TRAINING
BY DORMAN PRODUCTS
DORMAN
Training Seminar Series
Presents
Heavy Duty OBD Part 2
"Making Life Easier"

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DORMAN
Aftermarket Innovators

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Your Instructor For This Class

Sulev "Swede" Oun

- **Owner, O&K Truck and Auto Repairs Ltd.**
- **ATTP Master Instructor, New York State**
- **Author, "Medium/Heavy Duty Truck Electricity and Electronics"**
- **Training provider for various Associations, industry and various NY State agencies**
- **Developed trainings that range from four hours to multiple days, specializing in brakes, electrical, regulations and many other subjects relating to our industry.**
- **Member of various organizations such as SAE, CVSA, TANY**

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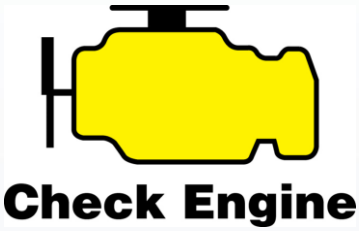
What will be covered

- **Quick review of OBD**
- **Diagnosing Common Faults/ components in an OBD required System**

Objective

- **Enhance diagnostic skills**



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Heavy Duty Truck OBD Quick Review of Part 1

HD OBD:

- Is an engine/vehicle ability to self-diagnose, report electrical and mechanical issues and record.
- Required since 2010 and later class 4 and above vehicles (weighing 14,000 lbs. or more).

How does OBD inform there is an issue/malfunction?

- A universal set of Malfunction Indicator lamps (MIL)
- OBD requirements regulate when, where, how and why the MIL should illuminate and shut "OFF"
- Emissions-related malfunction is stored in the ECM. "Diagnostic Trouble Code" (DTC).

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Information Stored in the ECM/PCM

- Suspect Parameter Number (SPN)
- Failure Mode Indicator (FMI)
- Failure Description
- Fault Status
- Freeze Frame Data
- Fault code count

Monitors

- Used to collect Engine System and component information as "Live Data".
- Stores the information in memory.

Note: A monitor is basically a strategy used by the ECM/PCM to evaluate performance and integrity of systems and components by comparing sensor values to programmed parameters in the ECM memory.

Reminder: Another OBD-requirement is a "Engine-Off (key-off)" timer used to monitor cold-soak conditions.

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Monitors utilize sensors to identify the following information:

Enable Condition

- Conditions required to run a monitor.

Malfunction Criteria

- Performance thresholds to compare measured data to programmed parameters.
- Used to determine "Pass" or "Fail".

Diagnostic Trouble Code Info

- SPN and FMI numbers used to identify each DTC (also description).
- Freeze Frame (snapshot) data for clues and useful information utilized for diagnostics.
- Status such as "Pending", "Active" or " Previously Active".

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OBD Strategies: Open-Loop?????? Does that make sense????

YES!

- **In a closed-loop system a measurement of the quantity being controlled is compared with the desired value.**
  - O_2 sensor signal is used for fuel control.
  - ABS – Wheel speed sensor readings used to determine impending wheel lock-up.
- **In an open-loop system, an actuator is set to a fixed value. Controlling a EGR valve as an example:**
  - Utilizing a look-up table.
  - The look-up table contains EGR settings for "ALL" possible engine speed and load values.
  - Data in the look-up table are usually based on the results of engine mapping.
  - The control is scheduled according to the pre-programmed look-up table, at the same time the sensors can be used to determine the engines operating condition.
  - The sensors are used to progressively shift control more to closed loop.

Note: On occasion you might run across where the enable criteria might state: Open-loop required.

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DTC Types

Pending DTC's

- When a fault is detected on the first drive cycle.
- If the same fault is not detected on the second or third drive cycles, the fault is cleared from memory.

Note: MIL remains "OFF" for "Pending" DTC.

Active DTC

- If the same fault is detected two times within three drive cycles, the DTC becomes "Active".

Note: If the same fault is not detected on three consecutive drive cycles the fault becomes a "Previously Active" and the MIL is turned off.
Be Aware there one or trip fault codes.

Permanent DTC

- Faults that were detected and cannot be cleared using the "Clear DTC" function.

Note: This faults are cleared by the ECM.
DO NOT treat permanent DTC's as a current problem. Use as knowledge that someone has worked on it and are you getting involved with a previous issue.

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MID, PID,SID and FMI – Used by diagnostic software/generic code readers.
Message Identifiers (MIDs).
A "MID" identifies system/component used on a truck.

- MID 128 = Engine
- MID 130 = Transmission Control unit
- MID 136 = Anti-Lock Brakes (ABS)
- MID 140 = Instrument Cluster

There are hundreds of MIDs that are defined, but only a handful are commonly used.

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Failure Mode Identifiers (FMI)

Every diagnostic trouble code (DTC) will have an FMI. This code is set by the ECM when a problem is detected such as too much voltage. Incorrect resistance etc.

The following is a partial list of possible FMI values:

- **0 = Data Valid but Above Normal Operating Range, Most Severe Level.**
- **1 = Data Valid but Below Normal Operating Range, Most Severe Level.**
- **2 = Data Erratic, Intermittent or Incorrect (rationality).**
- **3 = Voltage Above Normal, or Shorted to High Source.**
- **4 = Voltage Below Normal, or Shorted to High Source.**
- **5 = Current Below Normal, or Open Circuit.**
- **6 = Current Above Normal, or Grounded Circuit.**
- **7 = Mechanical System Not Responding or Out of Adjustment.**
- **8 = Abnormal Frequency or Pulse Width or Period.**
- **9 =Abnormal Update Rate.**
- **10 = Abnormal Rate of Change.**
- **11 = Failure Code Identifiable.**

If the computer is looking for these, we should be looking for these when diagnosing

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Subsystem Identifiers (SIDs)

These values are used to identify subsystems of components (MIDs), such as engine. Each subsystem has its own set of SIDs. An example would be: MID 128 (engine) with a subsystem "SID 6" for injector number 6.

However, the SID 6 on transmission (MID 136) would be C6 solenoid valve.

Note: The SIDs can be downloaded from various sources.

Note: When it comes to diagnostic trouble codes, chances are good that you will either have a PID or SID, followed by an FMI, not both.

Note: Some manufacturers like Volvo & Mack added their own PIDs and SIDS, known as Proprietary PID and Proprietary SID.

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Parameter Identifiers (PIDs) and Suspect Parameter Number (SPN)

- PIDs are numbers and names used to identify data that is being displayed such as coolant level, engine RPMs, oil temperature etc.
- PID is a J1708 term (see OBD Part 1).
- SPN is a J1939 term (see OBD Part 1).
- PIDs go from 0 to 511.
- SPNs go from 0 to over 50,000
- PIDs and SPNs are almost identical from 0 to 511.

Note: Not every vehicle uses each one. Most/many manufacturers translate all the above like the SIDs and FMIs (generic/raw data) to read codes with a generic scanner. Enhanced tools can give us "Flash Codes". Flash codes can make it easier to find repair information in service manuals, online and various other sources.

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Another Acronym Found in J1939
Fault Code Source Address (SA)
Examples:

- 0 = Primary Engine Controller (CPC, ECM)
- 1 = Secondary Engine Controller (MCM, ECM #2)
- 3 = Primary Transmission Controller (TCM)
- 11 = Brakes –System Controller (ABS)
- 23 = Instrument Cluster (ICU, RX)
- 25 = Climate Control #1 (FCU)
- 33 = Body Controller ((SSAM, SAM-CAB, BHM)
- 47 = Suspension – System Controller (ECAS)
- 49 = Cab Controller Primary (MSF, SHM, ECC)
- 61 = Exhaust Emission Controller (ACM)
- 71 = Chassis Controller (CHHM, SAM – Chassis)
- 139= J1939-139

NOTE: SAM stands for "Signal Acquisition Module". Basically, it's a controller with multiple functions. Typically, it's a part of the Controller Area Network (CAN) . The SAM acts almost like a router in a communications network.

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Why would you care about the previous slide?
Answer: When fault codes descriptions don't provide you enough details to diagnose an issue, all this information might be useful to do your own research.
Example:

SA = 0 – Primary Engine Controller (ECM)
SPN = 1185 – Engine Turbocharger 2 Turbine Outlet Temperature
FMI = 3 – Voltage above normal, or shorted to high source

SA = 61 – Exhaust Emission Controller (ACM)
SPN = 3283 – Aftertreatment 2 Exhaust Temp 2
FMI = 4 – Voltage below normal. Or shorted to high source.

You will find similar sequences with ABS etc.
At a minimum it will give you a direction.

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Typical Troubleshooting Sequence Troubleshooting OBD Fault Codes.
First, use the same strategy troubleshooting OBD fault codes as any traditional fault code.

- Retrieve any fault codes.
- Refer to the troubleshooting tree for each fault code.
- Troubleshooting trees are usually found in troubleshooting manuals specific to that engine or vehicle. Quite often built into the scan tool.
- Follow the troubleshooting tree carefully and step by step (sometimes we get cocky and skip a crucial step).
- Once the repair is completed, follow the instructions on how to complete a drive cycle or trip to validate the repair.

Note: If the repair was successful, the fault code status will become "Inactive".

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Extinguishing the MIL

- OBD faults require three drive cycles or trips to extinguish MIL.
- The fault code goes "Inactive" after the diagnostic runs and passes once. However, the MIL stays on until two additional drive cycles or trips are completed and the diagnostic runs and passes.
- However, if one drive cycle has completed and the fault code is "Inactive", that "Inactive" fault code can be cleared with the electronic tool (scantool), typically hitting the clear/reset all faults button.
- This extinguishes the appropriate dash lamps.

Note: If "Inactive" is not cleared, the MIL will stay on until the diagnostic has run and passed two additional drive cycles (three drive cycles total).

This is so important. We need to assure our reputation of fixing vehicles right the first time stays intact.
Seems like every time something goes wrong the whole world is made aware of it via social media.

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Typical Code

SPN 520372 FMI 16 GHG 17

" Selective Catalyst Reduction Closed Loop at Maximum Limit"

What the heck is GHG 17?

➢ **It's a "Greenhouse Gas" rating.**

- This rating reflects vehicle tailpipe emissions of CO_2.

Note: CO_2 emissions typically constitute 99% of the tailpipe emissions of greenhouse gases (as per EPA).

- A rating applied to vehicles.
- Utilizes a scoring system of 0-10 (ten being the cleanest).
- The ratings scales are applied by Model Year (MY).
- Hence "GHG"
- This means that this vehicle/engine met the Model Year 2017 for Greenhouse Gas reduction requirements.

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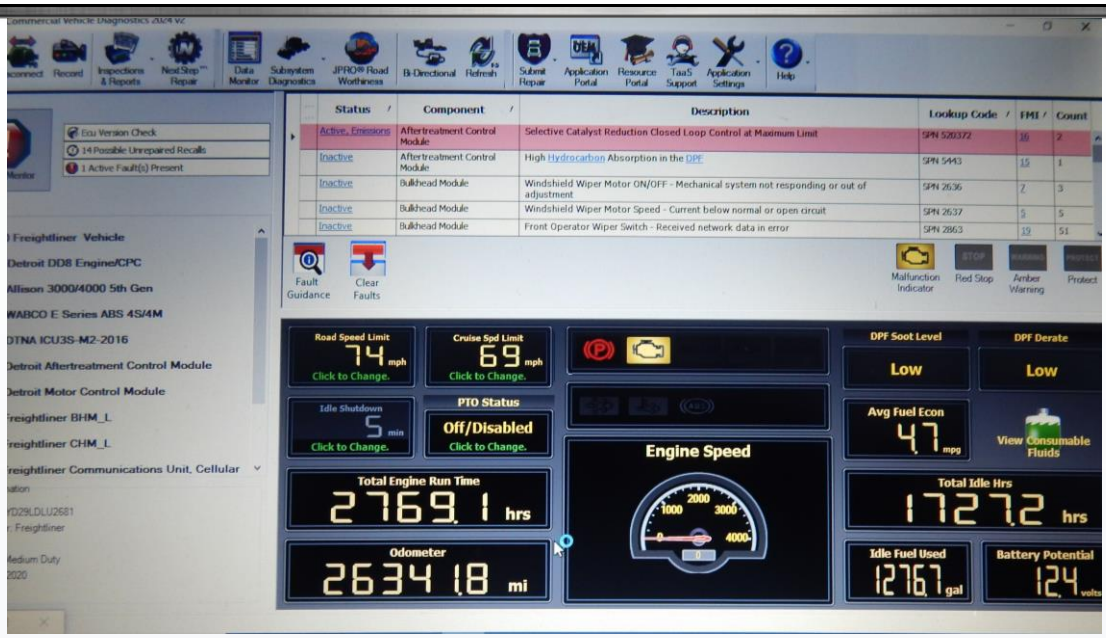
Status
Component
Description
Lookup Code
FMI
Count
Active, Emissions
Aftertreatment Control Module
Selective Catalyst Reduction Closed Loop Control at Maximum Limit
SPN 520372
16
2
Inactive
Aftertreatment Control Module
High Hydrocarbon Absorption in the DPF
SPN 5443
15
1
Inactive
Bulkhead Module
Windshield Wiper Motor ON/OFF - Mechanical system not responding or out of adjustment
SPN 2636
7
3
Inactive
Bulkhead Module
Windshield Wiper Motor Speed - Current below normal or open circuit
SPN 2637
5
5
Inactive
Bulkhead Module
Front Operator Wiper Switch - Received network data in error
SPN 2863
19
51
Fault Guidance
Clear Faults
Malfunction Indicator
Red Stop
Amber Warning
Road Speed Limit
74 mph
Click to Change.
Cruise Spd Limit
69 mph
Click to Change.
DPF Soot Level
Low
DPF Derate
Low
Idle Shutdown
5 min
Click to Change.
PTO Status
Off/Disabled
Click to Change.
Avg Fuel Econ
4.7 mpg
View Consumable Fluids
Engine Speed
Total Engine Run Time
2769.1 hrs
Total Idle Hrs
1727.2 hrs
Odometer
26341.8 mi
Idle Fuel Used
1276.1 gal
Battery Potential
12.4 volts

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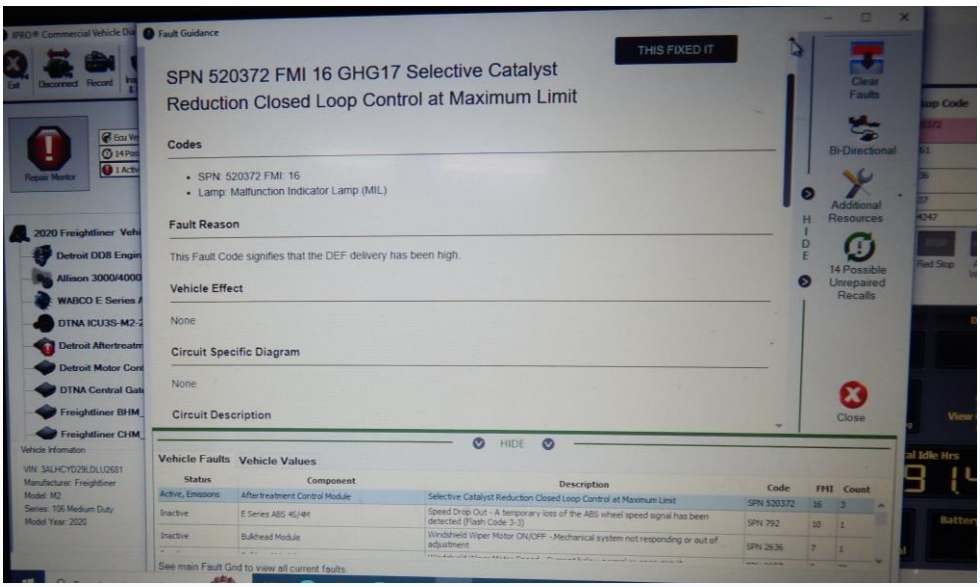
Fault Guidance
THIS FIXED IT
SPN 520372 FMI 16 GHG17 Selective Catalyst Reduction Closed Loop Control at Maximum Limit
Codes
SPN: 520372 FMI: 16
Lamp: Malfunction Indicator Lamp (MIL)
Fault Reason
This Fault Code signifies that the DEF delivery has been high.
Vehicle Effect
None
Circuit Specific Diagram
None
Circuit Description
Clear Faults
Bi-Directional
Additional Resources
14 Possible Unrepaired Recalls
Close
HIDE
Vehicle Faults
Vehicle Values
Status
Component
Description
Code
FMI
Count
Active, Emissions
Aftertreatment Control Module
Selective Catalyst Reduction Closed Loop Control at Maximum Limit
SPN 520372
16
3
Inactive
E Series ABS 4S/4M
Speed Drop Out - A temporary loss of the ABS wheel speed signal has been detected (Flash Code 3-3)
SPN 792
10
1
Inactive
Bulkhead Module
Windshield Wiper Motor ON/OFF - Mechanical system not responding or out of adjustment
SPN 2636
7
1
See main Fault Grid to view all current faults

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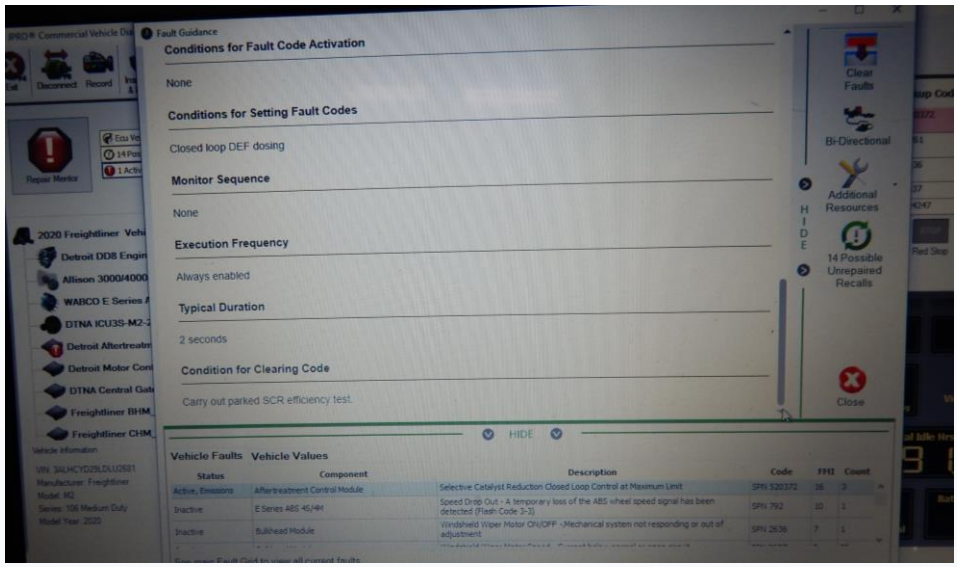

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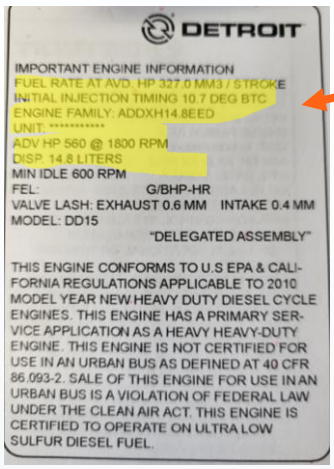
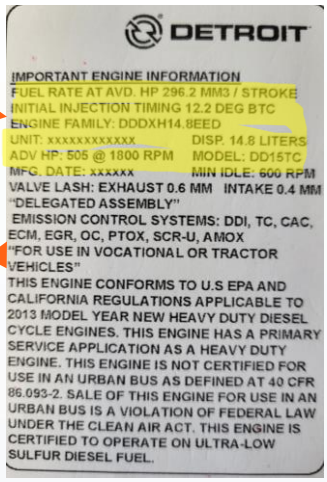


Both engines are 14.8 Liters.
Look at the difference in horsepower and initial injection timing

Look at the component list. Just like in OBD cars.



EPA 10 Engine certification Label

GHG14 Engine certification Label

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- Periodically engine manufacturers advertise their engines met a particular year GHG requirement.
- Example from "Detroit Diesel":
  "More than a year ago, we announced that our entire portfolio of model-year 2013 engines were fully compliant with Greenhouse Gas 2014 (GHG14)".
- Another Example:
  "Cummins announced today it has received GHG17 certification and will offer engines in 2017 that will be 2.5-7.5% more fuel efficient than the 2013 ISX15"

What does that mean to us?

- To meet these requirements the manufacturers are redesigning these engines to offer the new ratings. Examples of redesigns are:
  - Reducing weight
  - New after-treatment systems (less weight)
  - Increased down speeding
  - Better fuel mix and combustion
  - Redesigning components
  - Strategies for timing, fuel mapping etc.
  - Integrated powertrain solutions

Let's try to make sense of all this and put it into perspective.
(Same engines-different categories)

SPN 3251/FMI 0- GHG14

- FMI 0 = "Data is valid but above the normal operational range"
- SPN 3251/FMI 0-GHG14 = "DPF Pressure out of range – very high.
- This code sets when the DOC inlet pressure is **35KPa (5psi)** greater than the DPF outlet pressure for more than 10 seconds.
- Engine reaction is: Derate 25%

Verification: Run engine between 1200 to 1800 rpm with a load less than 10%.

SPN 3251/FMI 16- GHG14

- FMI16 = indicates that the DPF outlet pressure is too high for too long.
- This code sets when the DOC inlet pressure is **28Kpa (4.2psi)** greater than the DPF outlet pressure for more than 10 seconds.
- Engine reaction is: Derate 25%.

Verification: Run engine between1200 and 1800 rpm with aload less than 10%.

SPN 3251/FMI 0-EPA10

- This fault code sets when the DOC inlet pressure is 35 Kpa (5psi) greater than the DPF outlet pressure for more than 10 seconds.
- Engine reaction: Derate 25%

Verification: Run engine between 1200 and 1800 rpm with a load less than 10%.

- One of the diagnostic steps is to monitor the DOC inlet pressure sensor voltage (Detroit pin 87) to be between 0.44 and 0.56 volts. All three we covered so far are the same.
- Also monitor the DPF outlet pressure sensor voltage (Detroit pin 72). The voltage should be between 0.44 and 0.56 volts.

What do we know from all this?

- Pressure sensor voltages tend to be the same across the board'
- However, for verification purposes we need to make sure that our spec's are applied for the right engine and codes.

Don't shoot off the hip and assume.

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SPN 2659/FMI 0-EPA10-GHG14 (damn, that's a long string of numbers. I love light duty P codes).

Description: Exhaust Gas Recirculation (EGR) flow target error- Actual Flow above the Threshold of Desired Flow.

Monitored Parameter- EGR Mass Flow

Typical Enabling Condition:

- Desired EGR Mass Flow Greater Than .08, EGR in closed-loop control, CAC outlet temperature greater than 0ºC (32ºF), engine speed 1080-2500 rpm, engine torque 200-2500 N-M (148-1894 lb-ft). Coolant temperature greater than -8ºC (17.6ºF) ambient and barometric pressure greater than 755 Mbar (11 psi).
- Execution Frequency- Always enabled (continuous).
- Engine reaction: Derate 25%.

Verification: Start engine, warm up such that the coolant temperature is greater than 65ºC (149ºF). Ensure ambient temperature is greater than -8ºC (17.6ºF). Ambient barometric pressure is greater than 755 mbar (11psi). Desired EGR mass flow is greater than .08, EGR is in closed-loop and CAC outlet temperature is greater than 0ºC (32ºF). Engine speed 1080 t0 2500 rpm and engine torque 200 to 2500Nm (148 to 1894 lbs. ft.).

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SPN-3058/FMI 10-GHG17
EGR slow response
Description: This fault code sets when Actual EGR Flow vs. Desired EGR Flow is greater than the Calibrated Threshold.
Monitored Parameters: EGR delta P sensor, Intake Manifold Pressure Sensor, Intake Manifold Temperature Sensor.
Typical Enabling Condition: Low engine to High engine Load.
Monitor Sequence: One second after acceleration load, actual EGR vs. Desired EGR flow is greater than a calibrated threshold.
Execution frequency: Continuous.
Engine reaction: None
Verification: Road test with a trailer while performing multiple accelerations. Engine loads need to increase above 50% during acceleration.
What did we learn?
How to duplicate what the computer is looking for if we want to verify a repair so it doesn't come back with the "You Suck Light" back on.

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Diagnostic Quick Steps
Monitor EGR delta P voltage. Is it between 0.55 and 0.83 volts?

- **If Yes-** Remove the EGR delta P sensor, inspect the EGR delivery pipe and ports for blockage. If yes, clean/repair as necessary.
- If No – Remove the EGR delta P sensor from the mounting pad, leave the electrical harness connected, and see if the voltage is between 0.55 and 0.83 volts.
- **If No-** Perform electrical troubleshooting such as checking connectors for loose, bent corroded pins etc.
- If okay, replace the delta P sensor.

Note: Perform an EGR delta P re-calibration.
What did we learn?

- **Enable criteria**
- **Sensors have commonalities**
- **Scan tools are important**
- **Our brains are the best tools we have.**

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Failure Checklist

A simple list from what we have learned so far:

1. **Always start with air filter, check for"**
   - **Plugged or restricted. (start with the basics)**
2. **Inspect for plugged Delta P (Pressure differential) ports.**
3. **Allow engine and aftertreatment system to fully cool down to ambient temperatures. With Key On-Engine Off (KOEO) compare "ALL" temperature readings to each other to look for *drifted* sensor readings.**
   - **Engine temperature readings should be within 15º F of each other.**
   - **ATD) temperatures should be within 45º F of each other.**
4. **Using scan tool, check the pressure sensors with KOEO.**
   - **DPF and DOC pressure sensor voltages should read between 0.44 and 0.56 volts.**
   - **Absolute pressure should read within 10.3 Kpa (1.5 psi) of barometric pressure.**
   - **All other sensors be zero at KOEO.**

So, what the "H" is Barometric pressure or absolute pressure?

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Nominal barometric pressure is 101.325KPa absolute or 14.69 psi absolute.

Barometric pressure depends on weather conditions and altitude.

- **During a rainy day, the barometric pressure would be lower than on a sunny day.**
- **Altitude: The higher you are, the smaller the barometric pressure.**

In the U.S. we like using barometric pressure readings in terms of "inches of mercury".

The standard barometric pressure at sea level is 29.92 inches of mercury.

- **Normal range is between 28.5 and 30.7 inches of mercury (in HG).**

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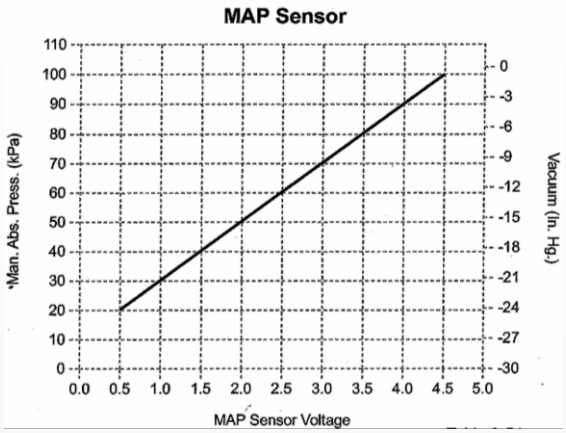

Vacuum at Sea Level (In. Hg.)	Manifold Absolute Pressure (kPa)	Sensor Voltage
0	101.3	4.5
3	91.2	4.0
6	81.0	3.5
9	70.8	3.0
12	60.7	2.5
15	50.5	2.0
18	40.4	1.5
21	30.2	1.0
24	20.1	0.5

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Altitude	Baro Pressure	Voltage
0-1000′	29-30″	4.5-4.8 V
1000 to 2000′	28-29	4.3-4.5 V
2000 to 3000′	27-28″	4.1-4.3 V
3000 to 4000′	26-27″	3.9-4.1 V
4000 to 5000′	25-26″	3.8-4.0 V

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Bullet Points on Pressure Sensors:

- **Most vehicles have a minimum and maximum operating range. If the ECM detects sensor readings out of these parameters, a code will set for an open or short in that circuit. The ECM is programmed to recognize signal faults that fall within a certain voltage or frequency (Digital type) range.**
  - **That's why it is important to monitor the voltage or frequency output and compare it to desired/required readings.**

Let's Think. With the KOEO, the pressure in the intake manifold is the same as atmospheric pressure. Thus, under KOEO conditions, the scan-tool should display 30" Hg or approximately 102 kPa at sea level. With the engine running the reading should be between 18-20" Hg (62-69 kPa) on a mechanically sound engine.

NOTE: An ohmmeter cannot be used to test a load sensor. Voltage must be applied for it to function.

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Example of specifications for a Cummins ISM engine

Component	Voltage
Ambient Air/Barometric Pressure Sensor.	3.65 – 4.28 @ Sea Level 3.06 - 3.6 @ 3000 Feet Above Sea Level 2.52 - 2.96 @ 6000 Feet Above Sea Level 1.57 – 1.84@ 12,000 Feet Above Sea Level
Exhaust Gas Pressure sensor.	.81 - .99 @ Zero Inches Hg. 1.12 – 1.37 @ 15 Inches Hg. 1.34 – 1.64 @ 25 Inches Hg. 2.11 – 2.58 @ 30 Inches Hg. 2.54 – 3.11 @ 40 Inches Hg. 4.08 – 4.98 @ 75 Inches Hg.

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Checking DeltaP Pressure Differential Sensor Live Demo

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This slide is from last months OBD Part1

Which plug should I use?

- **Mack and Volvo use the 16-pin OBDII plug/port.**
  - **But they also added the 9-pin port to allow repair facilities without the means to connect to the 16-pin configuration to connect to Macks and Volvos with Cummins engines and diagnose the truck with the 16-pin.**
- **The problem is that the 500k 9-pin doesn't always read the entire vehicle and may only provide diagnostic information from the drivetrain.**
- **Unfortunately, we are creatures of habit. Which plug do we go to first? Yes, the 9-pin.**
- **You will get engine information for diagnostics but fail to find issues related to the truck.**
- **Get in the habit of connecting to the 16-pin to identify all issues.**

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Connected to 16 pin OBD DLC.
Used the 9 pin J1939 first and it got us nowhere.

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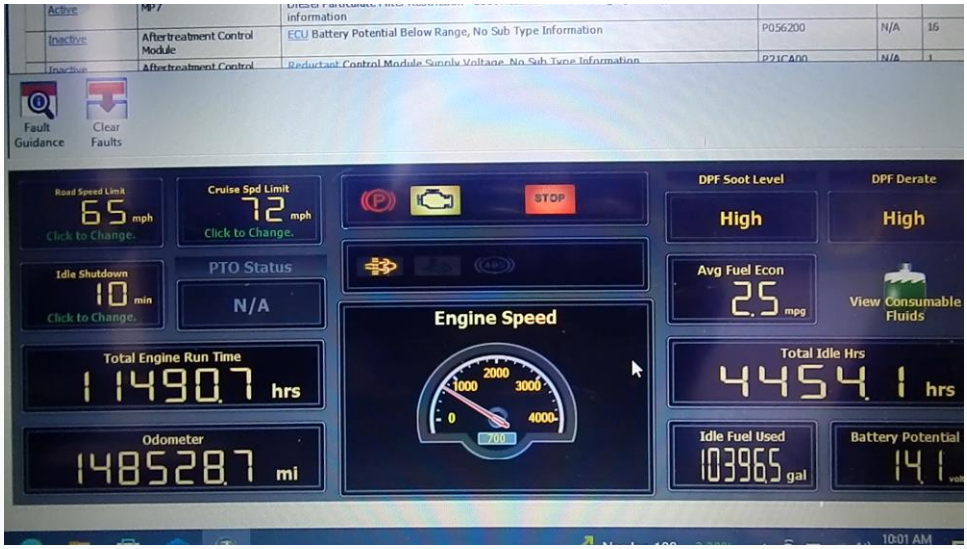
Active
MP7
information
Inactive
Aftertreatment Control Module
ECU Battery Potential Below Range, No Sub Type Information
P056200
N/A
16
Fault Guidance
Clear Faults
Road Speed Limit
65 mph
Click to Change.
Cruise Spd Limit
72 mph
Click to Change.
STOP
DPF Soot Level
High
DPF Derate
High
Idle Shutdown
10 min
Click to Change.
PTO Status
N/A
Avg Fuel Econ
2.5 mpg
View Consumable Fluids
Engine Speed
0
1000
2000
3000
4000
Total Engine Run Time
11490.7 hrs
Total Idle Hrs
4454.1 hrs
Odometer
148528.7 mi
Idle Fuel Used
10396.5 gal
Battery Potential
14.1
10:01 AM

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Status
Component
Description
Lookup Code
Active
Aftertreatment Control Module
Aftertreatment Reagent Hose Heater 1 Open Circuit, Circuit Open
P208913
Active
MP7
Particulate Filter Restriction - Soot Accumulation Moderately High Bank 1, No additional information
P1BFE00
Active
MP7
Diesel Particulate Filter Restriction - Soot Accumulation Too High (Bank 1), No additional information
P24A400
Inactive
Aftertreatment Control Module
ECU Battery Potential Below Range, No Sub Type Information
P056200
Fault Guidance
Clear Faults
Road Speed Limit
65 mph
Click to Change.
Cruise Spd Limit
72 mph
Click to Change.
STOP
DPF Soot Level
High
DPF Derate
High
Idle Shutdown
10 min
Click to Change.
PTO Status
N/A
Avg Fuel Econ
2.5 mpg
View Consumable Fluids
Engine Speed
Total Engine Run Time
11490.9 hrs
Total Idle Hrs
4454.3 hrs
Odometer
148528.7 mi
Idle Fuel Used
10396.9 gal
Battery Potential
14.1

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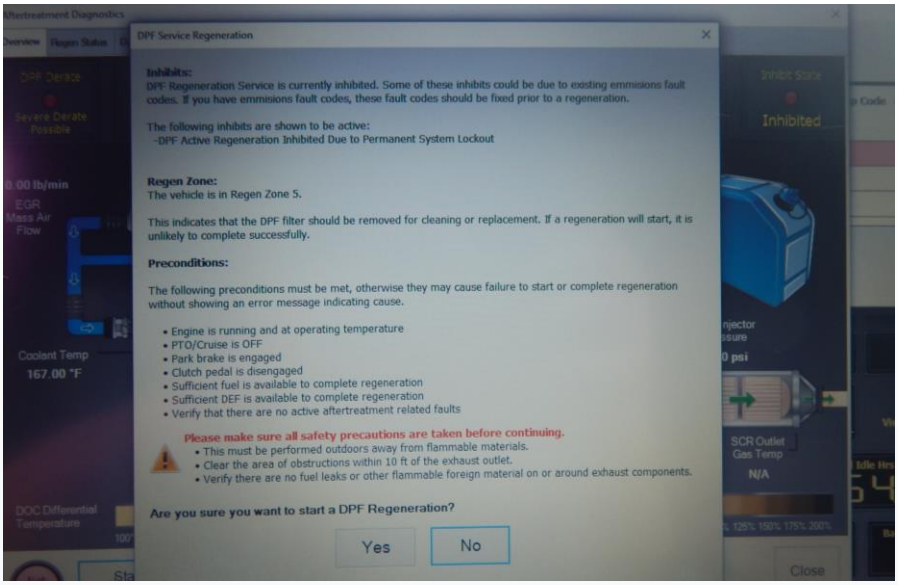
Aftertreatment Diagnostics
Overview
Regen Status
Data
Graphing
DPF Derate
Severe Derate Possible
Regen Zone
5
STOP
Regen Needed
Yes
Inhibit State
Inhibited
Click an aftertreatment component for additional information.
0.00 lb/min
EGR Mass Air Flow
EGR Differential Pressure
0.04 psi
EGR Valve Position
0.00 %
DPF Differential Pressure
0.71 psi
DEF Level
99.60 %
DEF Tank Temp
77.00 °F
DEF Heater
N/A
Exhaust Gas Temp
382.16 °F
DPF Inlet Pressure
N/A
DPF Outlet Pressure
N/A
DEF Injector Pressure
0.73 psi
Coolant Temp
167.00 °F
Aftertreatment Injector Pressure
1.38 psi
DOC Inlet Temp
382.46 °F
DPF Intake Gas Temp
388.58 °F
DPF Outlet Gas Temp
428.00 °F
SCR Intake Gas Temp
N/A
SCR Outlet Gas Temp
N/A
DPF Soot Load
DOC Differential Temperature
Active Regen Time
Start DPF Regen
Regen Zone Info
Instructions
Bi Directional Tests
Close
DPF Derate
High
Idle Hrs
543 hrs
Battery Potential
141

43


DPF Service Regeneration
Inhibits:
DPF Regeneration Service is currently inhibited. Some of these inhibits could be due to existing emmisions fault codes. If you have emmisions fault codes, these fault codes should be fixed prior to a regeneration.
The following inhibits are shown to be active:
-DPF Active Regeneration Inhibited Due to Permanent System Lockout
Regen Zone:
The vehicle is in Regen Zone 5.
This indicates that the DPF filter should be removed for cleaning or replacement. If a regeneration will start, it is unlikely to complete successfully.
Preconditions:
The following preconditions must be met, otherwise they may cause failure to start or complete regeneration without showing an error message indicating cause.
• Engine is running and at operating temperature
• PTO/Cruise is OFF
• Park brake is engaged
• Clutch pedal is disengaged
• Sufficient fuel is available to complete regeneration
• Sufficient DEF is available to complete regeneration
• Verify that there are no active aftertreatment related faults
Please make sure all safety precautions are taken before continuing.
• This must be performed outdoors away from flammable materials.
• Clear the area of obstructions within 10 ft of the exhaust outlet.
• Verify there are no fuel leaks or other flammable foreign material on or around exhaust components.
Are you sure you want to start a DPF Regeneration?
Yes
No

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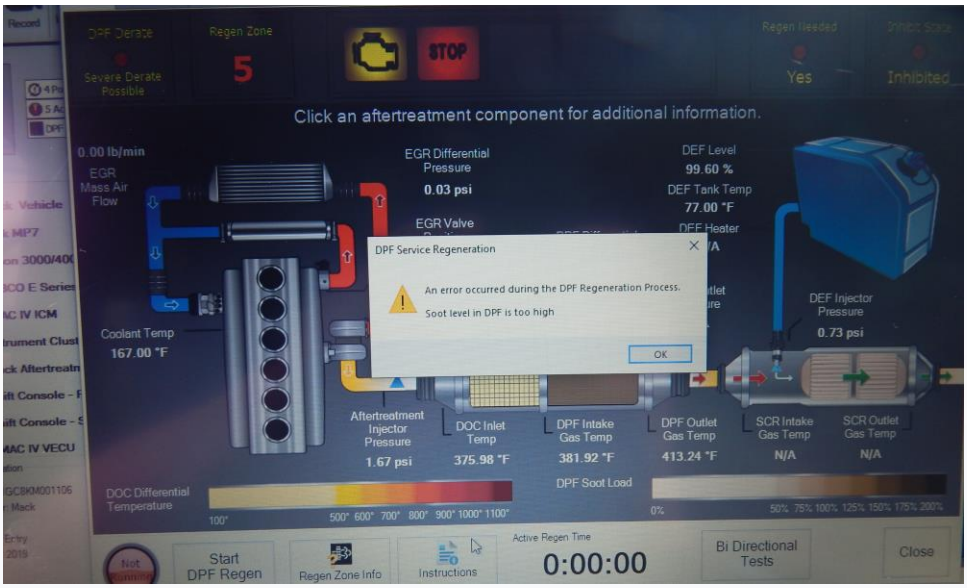
DPF Derate
Severe Derate Possible
Regen Zone
5
STOP
Regen Needed
Yes
Inhibited
Click an aftertreatment component for additional information.
0.00 lb/min
EGR Mass Air Flow
EGR Differential Pressure
0.03 psi
EGR Valve
DEF Level
99.60 %
DEF Tank Temp
77.00 °F
DEF Heater
DPF Service Regeneration
An error occurred during the DPF Regeneration Process.
Soot level in DPF is too high
OK
DEF Injector Pressure
0.73 psi
Coolant Temp
167.00 °F
Aftertreatment Injector Pressure
1.67 psi
DOC Inlet Temp
375.98 °F
DPF Intake Gas Temp
381.92 °F
DPF Outlet Gas Temp
413.24 °F
SCR Intake Gas Temp
N/A
SCR Outlet Gas Temp
N/A
DOC Differential Temperature
DPF Soot Load
Active Regen Time
0:00:00
Start DPF Regen
Regen Zone Info
Instructions
Bi Directional Tests
Close

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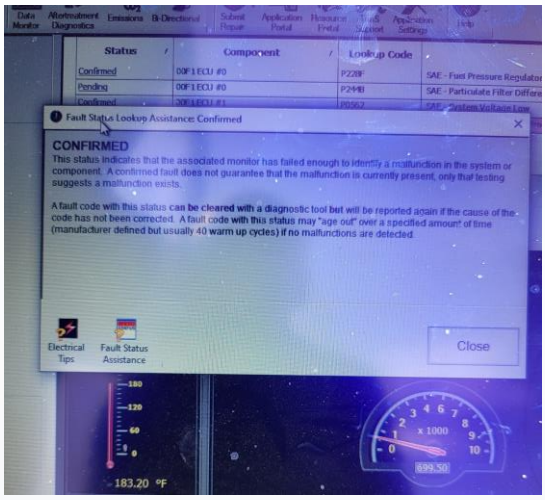
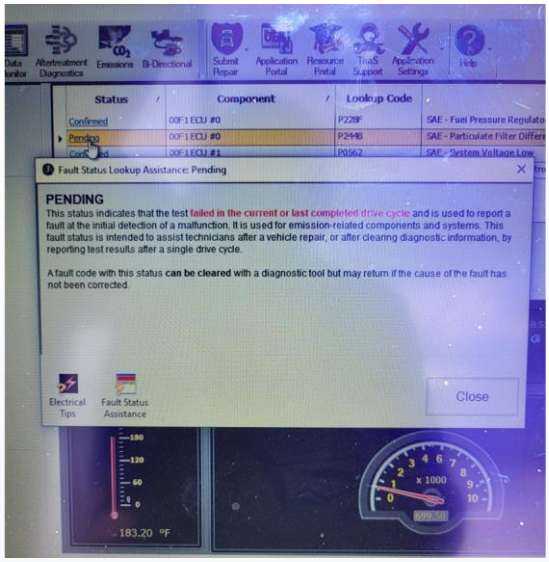

Status
Component
Lookup Code
Fault Status Lookup Assistance: Confirmed
CONFIRMED
This status indicates that the associated monitor has failed enough to identify a malfunction in the system or component. A confirmed fault does not guarantee that the malfunction is currently present, only that testing suggests a malfunction exists.
A fault code with this status can be cleared with a diagnostic tool but will be reported again if the cause of the code has not been corrected. A fault code with this status may "age out" over a specified amount of time (manufacturer defined but usually 40 warm up cycles) if no malfunctions are detected.
Electrical Tips
Fault Status Assistance
Close
183.20 °F


Status
Component
Lookup Code
Fault Status Lookup Assistance: Pending
PENDING
This status indicates that the test failed in the current or last completed drive cycle and is used to report a fault at the initial detection of a malfunction. It is used for emission-related components and systems. This fault status is intended to assist technicians after a vehicle repair, or after clearing diagnostic information, by reporting test results after a single drive cycle.
A fault code with this status can be cleared with a diagnostic tool but may return if the cause of the fault has not been corrected.
Electrical Tips
Fault Status Assistance
Close
183.20 °F

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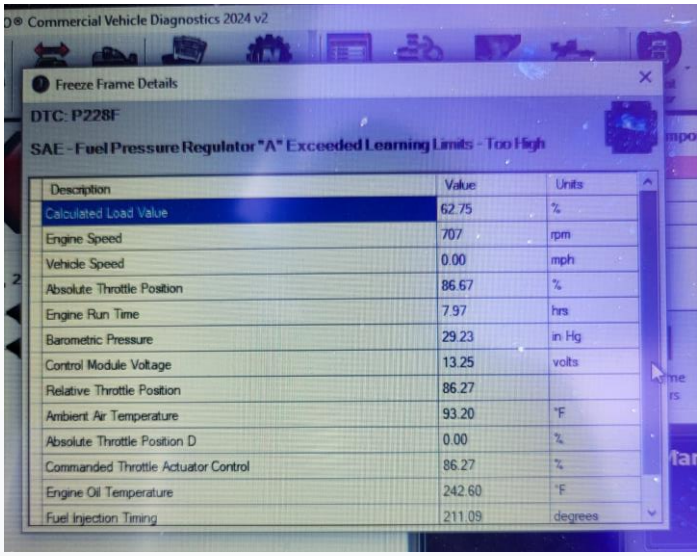
This code P228F is a generic powertrain code that applies to vehicles equipped with OBD-II.
Any repair steps will depend on the vehicle's make and model.
In this case this code indicates that the fuel pressure regulator "A" (1) is too high and has exceeded control limits.



Could not find the OBD connector.
I'm thinking somebody stole it.
Sounds like a misfire?

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We offer greater freedom to fix cars and trucks
by engineering exclusive, labor-saving
and cost-effective repair solutions.

Thank You !

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