



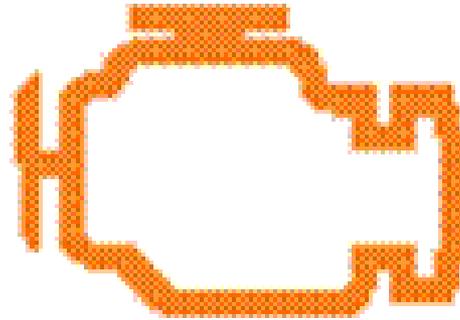
MAINTENANCE & TECHNOLOGY COUNCIL

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# ON-BOARD DIAGNOSTICS



Malfunction Indicator Lamp – MIL

Present on passenger cars since mid-1990's

Indicates that the vehicle is no longer emissions compliant due to some detected malfunction

# MIL

## Malfunction Indicator Lamp

Lamp	Lamp Name	Description	Results
	Malfunction Indicator Lamp (MIL)	Yellow lamp Indicates a failure of an Emission Control device. May illuminate at the same time as the Amber Warning Lamp.	Vehicle can be driven to end of the shift. Call for service.
<b>Lamp Solid</b>		<b>Lamp Flashing</b>	
<ul style="list-style-type: none"><li>• At the start of every ignition cycle (a bulb check)</li><li>• For any emission related fault (light out when the fault is inactive)</li></ul>		Never flashes	

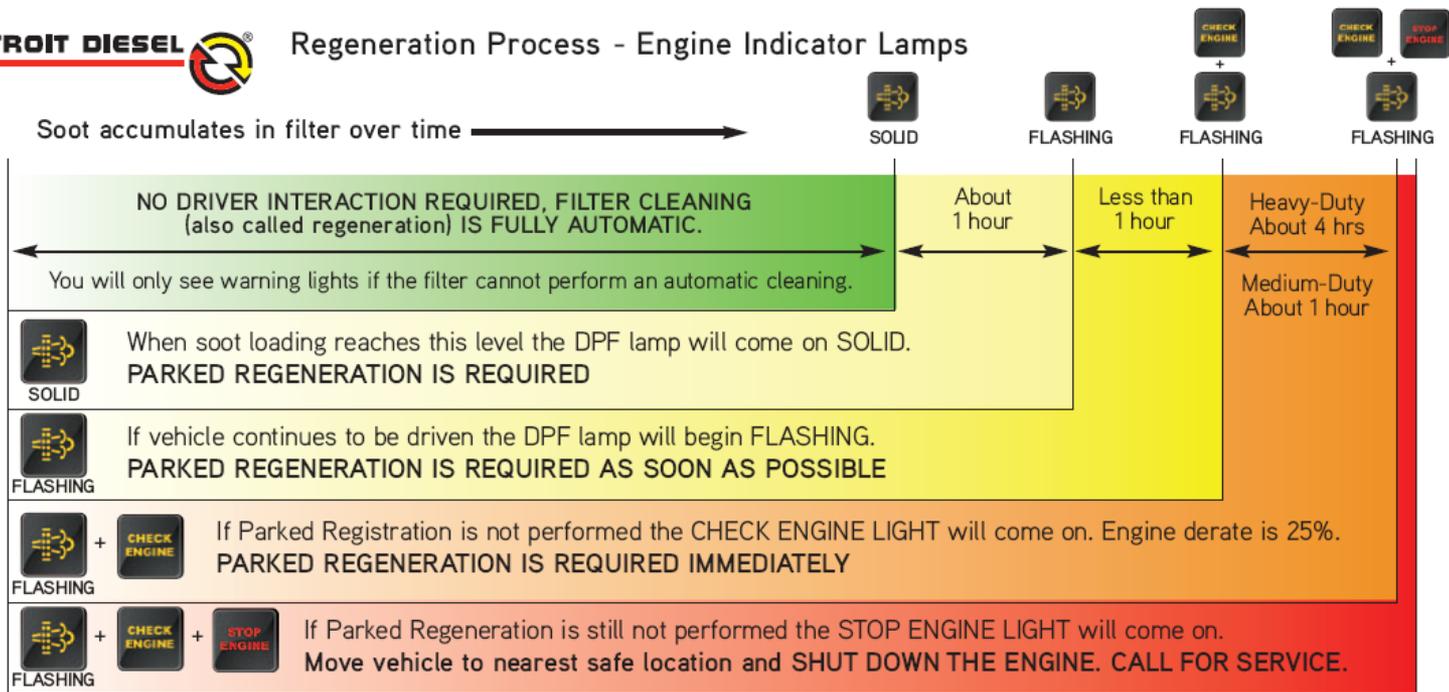
# INSTRUMENT PANEL LAMPS

- MIL Lamp
- DPF Regeneration Lamp
- Hot Exhaust System Temperature Lamp
- Amber Warning Lamp
- Red Stop Lamp





## Regeneration Process - Engine Indicator Lamps



Example of visor label

Note: Consult the Owner Operators Guide for a complete description of aftertreatment system.

Detroit Diesel Customer Support Center: **313-592-5800**

6SA101 (0703) For the nearest Detroit Diesel Distributor or Dealer visit, [www.detroitdiesel.com](http://www.detroitdiesel.com) RP 10M 3/07

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# WHAT DOES MID/PID MEAN

SAE originally developed the J1587 protocol for heavy-duty and most medium-duty vehicles built after 1985. Beginning in 2007, J1587 was being phased out in favor of the new and improved J1939 protocol to take advantage of the CAN features in today's multi Electronic Control Unit (ECU) vehicles.

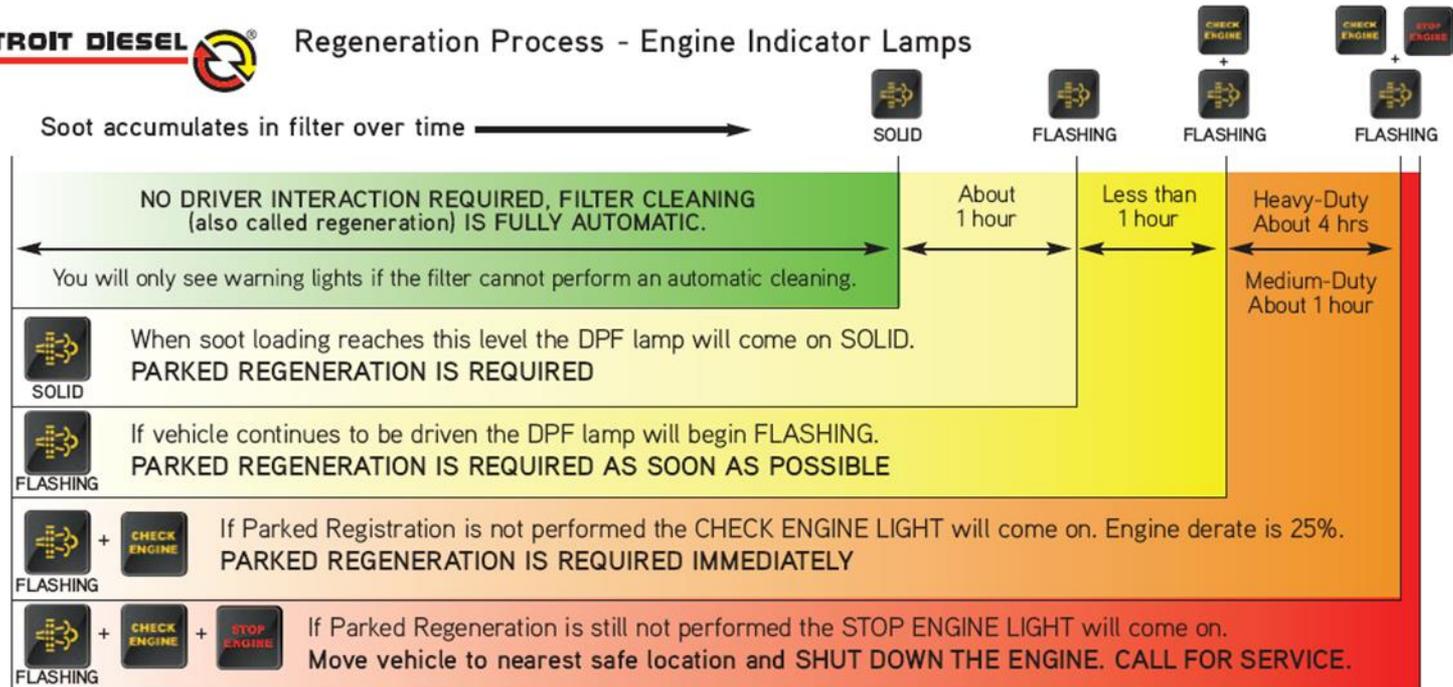
The J1587 Fault code message consists of a Message Identifier (MID) which identifies the ECU sending the Message (MID 128 = Engine Controller #1), either a Parameter Identifier (PID) or Subsystem Identifier (SID) which identifies the Parameter or subsystem sending the DTC, and then a Failure Mode Identifier (FMI) which identifies the type of fault the system has detected. A SID identifies a section of a control system that does not have a PID assigned by SAE. For example, SIDS 1 through 6 for MID 128 (Engine Controller) are assigned as Fuel Injectors 1 through 6 SIDs respectively.

The J1939 fault code error message consists of a Source Address (SA) identifying the Electronic Control Unit (ECU) sending the DTC (SA0 = Engine Controller #1), a Suspect Parameter Number (SPN) which identifies the parameter sending the fault code error message, and a Failure Mode Identifier (FMI) which identifies the type of fault detected.

# HOW CAN DRIVER TELL THE SEVERITY LEVEL?



## Regeneration Process - Engine Indicator Lamps



Example of visor label

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# WHAT IS THE HEST LIGHT

## High Exhaust System Temperature Lamp

Lamp	Lamp Name	Description	Results
	High Exhaust System Temperature (HEST) Lamp	Lamp is yellow. Indicates exhaust temperature is above a preset limit and unit is operating at low vehicle speed (below 5 mph [8 kph]). When the engine speed is elevated for a parked regeneration, lamp will flash once every 10 seconds.	Vehicle can be driven. Lamp solid for an extended period (Longer than 40 Minutes) - call for service.
<b>Lamp Solid</b>		<b>Lamp Flashing</b>	
<ul style="list-style-type: none"> <li>• At the start of every ignition cycle (bulb check).</li> <li>• Vehicle speed is less than 5 mph and the Diesel Particulate Filter (DPF) outlet temperature is greater than 525° C (977° F).</li> </ul>		Flashes every 10 seconds when the Selective Catalytic Reduction ( SCR Catalyst) is not up to temperature	

## Blue light for regeneration inhibit switch – what does it mean?

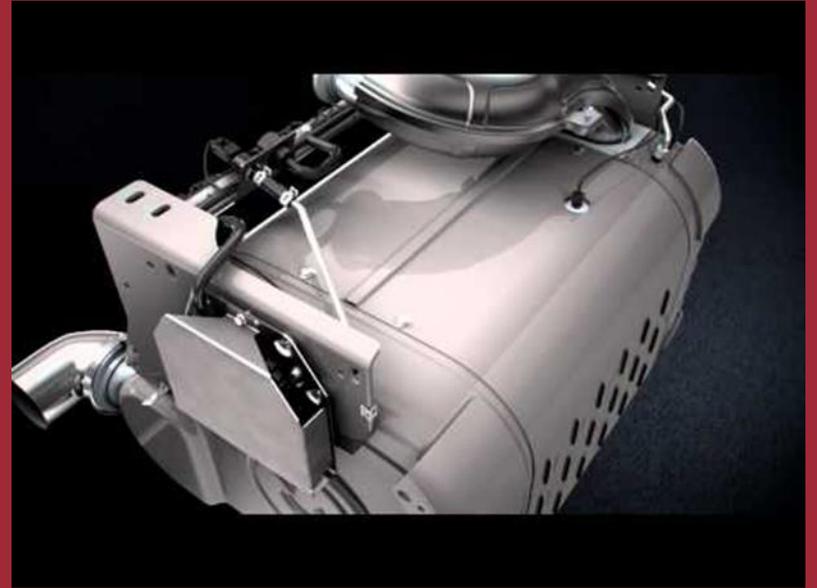
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### **Regeneration Inhibit Switch/Lamp**

Pressing the Regeneration Inhibit Switch allows the operator to prevent active regeneration. Should be used only when high exhaust temperatures present a hazard. Excess use will result in need to service/replace DPF. Lamp on indicates that the Inhibit Switch is set to the “On” position.

# AFTERTREATMENT SYSTEM REVIEW



# AFTER-TREATMENT SERVICE INTERVALS

## Long Haul Service Maintenance Intervals (EPA07)

Aftertreatment Device	Inspect external hardware and connections at every oil change. Remove ash at 300,000 miles (480,000 km) or 9,000 hours.*
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**NOTE:** Diesel Oxidation Catalyst (DOC) and the Selective Catalytic Reduction (SCR Catalyst) do not require maintenance.

# AFTER-TREATMENT SERVICE INTERVALS

Long Haul Maintenance Intervals (EPA10/GHG14)						
Exhaust System						
Aftertreatment Devices	Inspect external hardware and connections every 6 months or at oil change intervals.					
Diesel Particulate Filter	A Check Engine Light will illuminate when ash requires removal. Normal DPF ash clean intervals are 300,000 miles (480,000 km) 9,000 hours to 400,000 miles (640,000 km) 10,250 hours.**					
DEF Pump Filter	Replace filter every 250,000 miles (400,000 km).					
DEF Pump Air Bladder	(2010 engines only) Refill bladder with air every 24 months.					

**NOTE:** Diesel Oxidation Catalyst (DOC) and the Selective Catalytic Reduction (SCR Catalyst) do not require maintenance.

# HOW CAN DRIVER/FLEET PREVENT REPETITIVE FAILURES (FACE PLUGGING)



# AUTO ELEVATE - INTRODUCTION

During extended periods of idle, unburned fuel from the combustion process slowly collects in the ATD. This unburned fuel is also referred to as hydrocarbon.

If too much of hydrocarbon is allowed to accumulate in the ATD, the next drive cycle could result in internal ATD temperatures (as the hydrocarbon oxidizes) that could potentially fail the DPF unit.

The Auto-Elevate Feature eliminates the hydrocarbon build-up before reaching critical levels by automatically increasing engine RPM. This process results in a temporary increase of exhaust temperatures that effectively oxidizes the hydrocarbon within the ATD.

# AUTO-ELEVATE - OPERATION

Once the inter-locks have been met; transmission neutral, park brake set, clutch not depressed, VSL=0 mph, and engine at idle the auto elevate timer will start.

After a predetermined amount of time at idle, DDEC VI will automatically elevate engine RPM, typically 7-8 minutes, in order to raise exhaust temperatures and eliminate hydrocarbon build-up in the ATD.

Engine speed is slowly elevated from idle to 1200 RPM and is held there for 3-4 minutes. This is followed by an increase in engine speed to 1600 RPM for the remainder of the cycle.

Once the correct exhaust temperature is achieved, hydrocarbon will be oxidized (“burned-off”) from the ATD and the engine will return to normal idle speed.

When the process of eliminating the hydrocarbon from the ATD is complete, the timer for the Auto-Elevate feature re-sets.

If the auto-elevate is interrupted by voiding any of the inter-locks

- Engine will do a fast ramp down to idle rpm.
- Once all inter-locks have been met again for 4 minutes, auto-elevate will resume (assuming HC oxidation has not yet occurred).

# AUTO-ELEVATE – DRIVER INTERACTIONS

There are now TWO sets of timers that control the DFP lamp.

1. Soot Regeneration (same as before), always running.
2. Hydrocarbon Build-up, starts when engine sees vehicle idle state.

Timer number 2 can start at any time along the normal regeneration cycle.

Driver interaction with the DPF lamp has not changed. Only now he will not know whether it is for soot or hydrocarbon.

A large part of Diesel Exhaust Fluid (DEF) is de-ionized water, do I have to worry about the tank or other parts of the Selective Catalytic Reduction (SCR) system freezing?

Diesel Exhaust Fluid (DEF) freezes into a crystalline slush at 12 °F (-11 °C) and should not be kept at temperatures above 86 °F (30 °C). If DEF is frozen on your vehicle, for example overnight or over a weekend, you do not need to take any action. Use the vehicle as you normally would. Truck manufacturers use a variety of heating methods to thaw frozen DEF tanks, including in-tank heating elements. While the thawing process is taking place the vehicle's performance will not be affected (the amount of DEF used will be reduced because a cold engine produces a low level of NOx emissions). In some cases the DEF supply tubes are also heated to prevent freezing or tubes are emptied once the engine is turned off. In short, there is no reason to be concerned about using your SCR truck in cold weather.

# **ANY ISSUES AROUND DEF QUALITY YOU HAVE EXPERIENCED ?**

## **EPA10/GHG14 Diesel Exhaust Fluid Specifications**

**Diesel Exhaust Fluid (DEF) is manufactured to strict quality standards to ensure**

**proper emissions control. Only DEF that meets DIN70700 or ISO 22241-1 specifications can be used. The American Petroleum Institute has developed a quality certification program to ensure the quality of DEF available at service outlets.**

# **315.3 SPN 3364/FMI 17 - EPA10 IMPROPER DIESEL EXHAUST FLUID QUALITY WARNING**

Connect DiagnosticLink® .

If SPN 3364/FMI any (improper Diesel Exhaust Fluid (DEF) quality) is also present, repair SPN 3364 first.

Using refractometer from DEF test kit W060589001900, measure DEF percentage. Is DEF percentage between 28 and 36%?