

NAVISTAR
TRUCK GROUP



A NAVISTAR COMPANY

2010 After Treatment

Dash Lamp and Regeneration Information

Eric George

Revised: September 5, 2013

System Status

System Reaction

Operator Communication

Operator Response

Passive Regen:

Diesel Particulate Filter (DPF) filters soot produced by engine.

Lamp: Hot Exhaust Temperature (HET) lamp **ON** solid when exhaust gas temperature is above **752°F (400°C)** and vehicle speed is below **5 mph**

No Response needed.

Active Regen:

Soot level threshold is reached.

Changes in air management system and fuel is injected into exhaust system.

Diesel Oxidation Catalyst (DOC) increases exhaust temperature.

Soot is burned due to elevated temperatures.



Normal Operation

Regen Active:

Level 1 Warning

Soot level may continue to increase due to inability to properly regenerate DPF.



Lamp: DPF lamp **ON** solid

Drive at highway speed until lamp goes out, **OR** perform a Parked Regen.

Regen Active:

Level 2 Warning

Engine De-rate **15%**



Lamp: DPF lamp **Flashing**

Perform a **Parked Regen.**

Regen Active:

Level 3 Warning

Engine De-rate **85%**



Lamp: DPF lamp **Flashing** and buzzer sounding



Regen Active:

Level 3 Warning with Red Stop Lamp (RSL)

Engine shutdown will occur if continued vehicle operation.

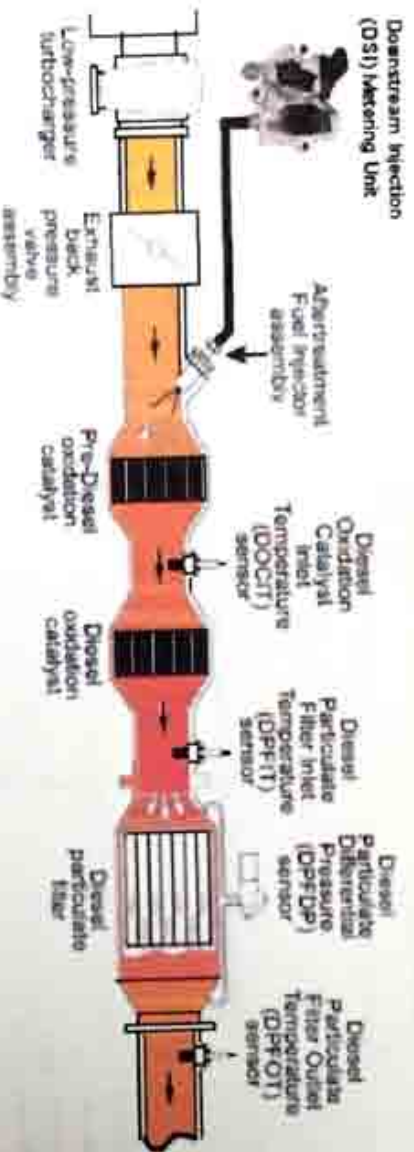


Lamp: DPF lamp **Flashing** and buzzer sounding with **Red Stop Lamp**

Tow Vehicle in for service.



AFTERTREATMENT AND REGENERATION.



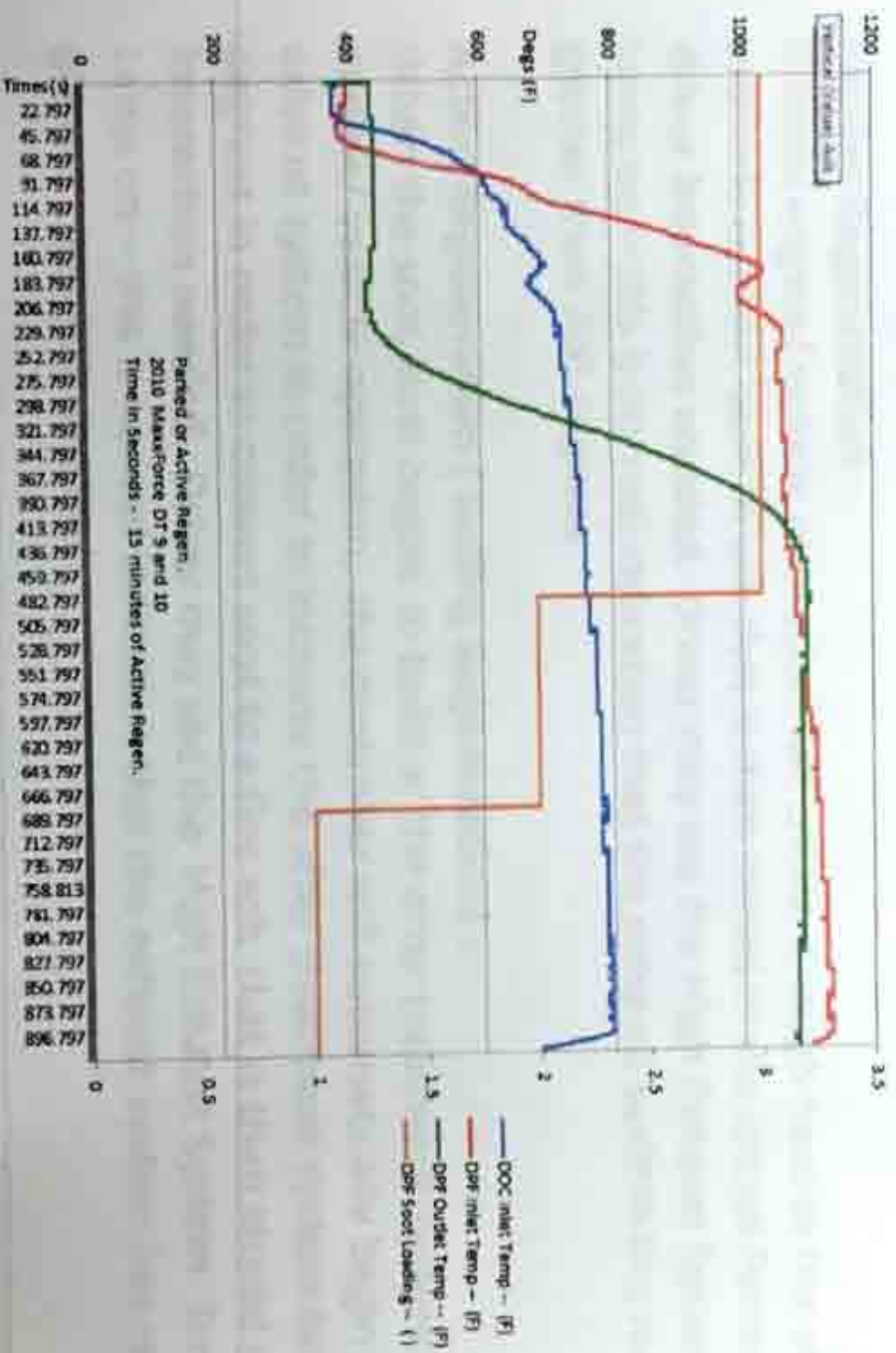
2010 Down Stream Injection for DPF Regeneration

- DOC = Diesel Oxidation Catalyst
- DPF = Diesel Particulate Filter
- ECM = Engine Control Module
- DSI = Down Stream Injector (Doser)

Active Regeneration Function

- Engine ECM monitors exhaust Temperatures and Differential Pressure (Delta P) at the DPF
- When the DPF begins to plug with soot (High Diff Press) the ECM will command the DSI to inject fuel through the AFI into the exhaust.
- Fuel will react at the DOC and create heat (1200 Deg F.) which will convert (burn) the soot to fine ash to be trapped and stored in the DPF.
- If fuel is not properly dispensed or proper exhaust heat is not present - the DOC cannot build proper heat to regenerate.

Exhaust Temps During Regen




Note:

The after treatment system temperatures and the soot load on this chart. The higher the temperatures and longer length of time the lower the soot load.


Proper Driver Interaction is Important

After Treatment Regeneration process

Passive Regeneration :

Normal engine/ vehicle operation will create enough heat in the after treatment system to properly convert soot to ash that is then stored in the Diesel Particulate Filter (DPF). **No driver interaction needed.** Driver may see the High Exhaust System Temperature (HEST)  Lamp on – this is normal indication that the exhaust system has reached a temperature greater than 700 degrees

Active Regeneration (Rolling Regeneration) :

When the soot level begins to build in the after treatment system and during normal engine/ vehicle operation, the controller will automatically begin to inject fuel into the exhaust system in order to increase the after treatment system heat to about 1100 – 1200 degrees in order to convert soot to a fine ash that is then stored in the DPF. **No driver interaction needed.** Driver may see the High Exhaust System Temperature (HEST)  Lamp on – this is normal indication that the exhaust system has reached a temperature greater than 700 degrees

Proper Driver Interaction is Important

After Treatment Regeneration process

Parked Regeneration :

During Normal engine/ vehicle operation soot levels may reach a critical point that requires the driver to safely pull the vehicle off the road and follow the instructions on the sun visor and perform a Parked Regeneration. This process should be completed as soon and safely possible. This process and associated lamps are explained further in this presentation .

Level 1 After treatment warning - Parked Regeneration can take from 15 minutes to 35 minutes depending how much soot has to be converted.

Level 2 After treatment warning - Parked Regeneration can take from 25 minutes to 90 minutes depending how much soot has to be converted.

Level 3 - After treatment warning and engine stop warning. – Service is required. A parked regeneration may not be successful.

Proper Driver Interaction is Important

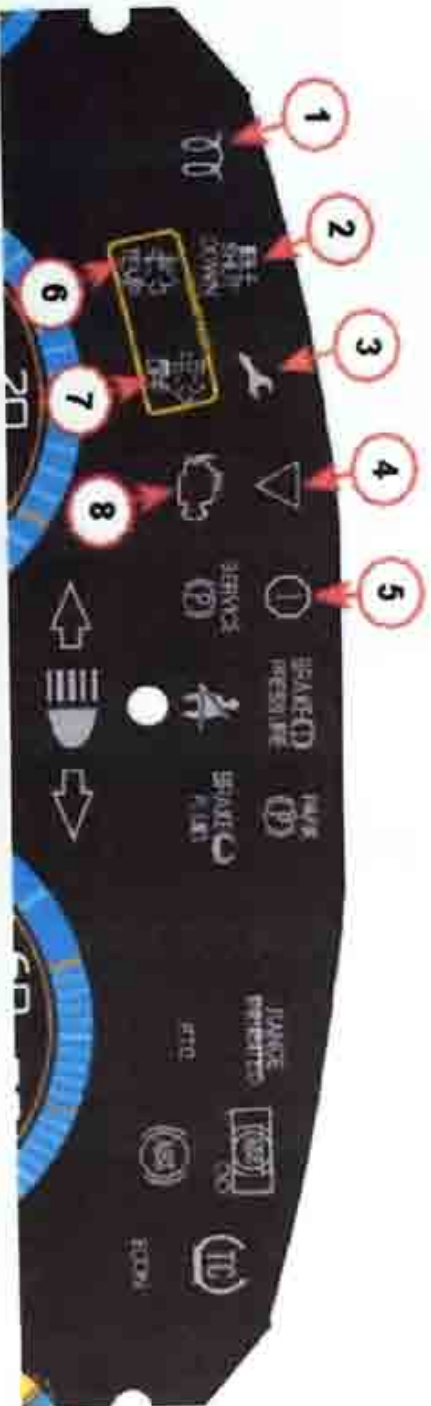
After Treatment Regeneration process




Note : It is important to address the Level 1 after treatment warning ASAP and perform a Parked Regeneration . Waiting to perform the requested Parked Regeneration will cause additional soot buildup and will cause extended regeneration time and possible level 3 engine stop conditions. Waiting until the end of the shift or day to perform the Parked Regeneration may cause further soot load and extended regeneration time and frequency which also can lead to premature DPF plugging that will require manual DPF cleaning .

Note: Interrupting the Parked Regeneration process may cause further soot load and extended regeneration time and frequency which also can lead to premature DPF plugging that will require manual DPF cleaning .

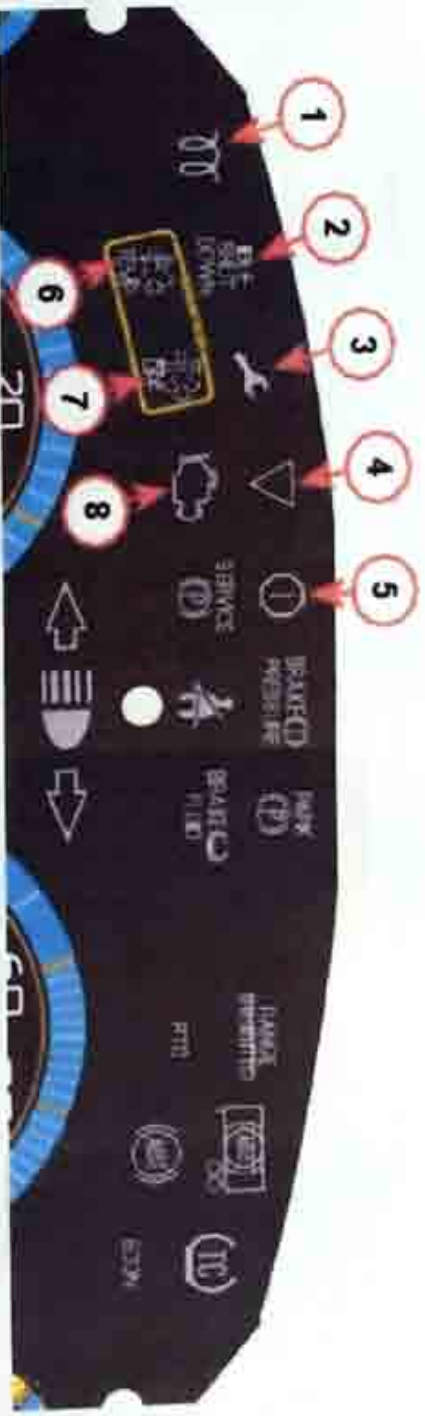
Note: Before performing a Parked Regeneration , be sure the engine is at least **172** degrees. Do not operate the PTO if equipped. Depressing the Clutch pedal , Brake Pedal or Accelerator Pedal will shut off (interrupt) the Parked Regeneration. This will cause incomplete regeneration and may cause further soot load and extended regeneration time and frequency which also can lead to premature DPF plugging that will require manual DPF cleaning .




Dash Cluster Lamps and Regen Instructions


















| Lamp# | Lamp | Name | Description |
|-------|---|---------------------------------|--|
| 4 |  | Warning | Illuminates Yellow. Used in conjunction with other Warning Lights or General Text and Warning Messages to indicate an Alert condition to the operator. This lamp in an indication that a fault has been detected in one or more controllers: Transmission controller, Multiplex electrical controller (Body Controller), Cluster, Brake Controller and other connected controllers. Use the appropriate Diagnostic software to view the Diagnostic Trouble Codes (DTC). |
| 5 |  | Stop Engine | Illuminates Red Used in conjunction with other Warning Lights or General Text and Warning Messages to indicate a red STOP alert. This alert may be an indication of a serious problem has occurred. The Engine may derate or Shutdown soon. Pull the vehicle safely off the roadway, turn on flashers, set park brake, place warning and Shut Off the engine. Seek service immediately. |
| 6 |  | High Exhaust Temperature (HEST) | Illuminates Yellow when exhaust system components are operating under normal conditions and exhaust gases are at high temperatures. This is normal operation when the aftertreatment system is in active or passive regeneration. This lamp may only illuminate when vehicle speed is less than 5 MPH |

Dash Cluster Lamps and Regen Instructions



| Lamp # | Lamp | Name | Description |
|--------|---|----------------------------------|---|
| 6 |  | High Exhaust Temperature (HET) | Illuminates Yellow when exhaust system components are operating under normal conditions and exhaust gases are at high temperatures. This is normal operation when the aftertreatment system is in active or passive regeneration. |
| 7 |  | Diesel Particulate Filter (DPF) | Yellow (Solid or Flashing) to indicate the need to regenerate the Diesel Particulate Filter. Operators should follow the instructions on the Sun Visor Decal. See the Regeneration Instructions listed below. |
| 8 |  | Malfunction Indicator Lamp (MIL) | Illuminates Yellow. The Malfunction Indicator Lamp (MIL) alerts the vehicle operator by illuminating when improper emission related functionality is detected. This lamp is used in conjunction with other Warning Lights or General Text and Warning Messages. Technician can retrieve diagnostic trouble codes to determine cause |

Dash Cluster Lamps and Cluster Text Instructions






| | | | |
|--|---|--|---|
|  |  |  | <p>Parked Regen is Active. This message will display if all regeneration conditions are met and the Parked Regen Switch is enabled.</p> |
| <p>Regeneration is Inhibited</p> |  |  | <p>Parked Regen is Inhibited. This message will display after the Parked Regen switch is pressed and one of the parked regen conditions are not met. See Parked Regen instructions below.</p> |
| <p>Solid OR Flashing</p>   |  | <p style="text-align: center;">Scroll</p>   | <p>Parked Regen is Required. See Sun Visor Decal for instructions or Regen instructions below.</p> |
| <p>Regeneration Inhibited Low Engine Temp</p> |  |  | <p>Parked Regen is Inhibited due to Low Engine Temperature. See instructions below.</p> |
|  |  |  | <p>Parked Regen Inhibit Switch is Enabled (Active) This switch will Inhibit a Parked or Active Regen.</p> |

Dash Cluster Lamps and Regen Sun Visor Instructions

| EMISSION SYSTEM INSTRUCTIONS | | | | |
|---|--|--|--|--|
| LEVEL 1 | LEVEL 2 | LEVEL 3 | Exhaust System Temperature is High | |
|  Exhaust filter regeneration required. |  Exhaust filter is full. |  Exhaust filter is full. Engine performance LIMITED. |  WARNING: Exhaust components are operating under normal conditions and exhaust gases are at normal operating temperatures. When starting, keep away from possible hot surfaces, exhaust pipes, or components or STOP ENGINE. | |
| Drive on highway at highway speeds. OK Start "Parked Regeneration" to prevent loss of engine power. | Full vehicle safety off roadway and start "Parked Regeneration" to prevent loss of engine power. | WARNING: Full vehicle safety off roadway and start "Parked Regeneration" to prevent engine stopping. | | |
| *See Operator's Manual for Further Details | | | | |
| WARNING: When operating "Parked Regeneration," ensure vehicle is safely off roadway and exhaust system is away from people, or any flammable materials, vapors, or structures. "Parked Regeneration" may increase engine speed. | | |  A serious problem has occurred. Engine may SHUT-DOWN soon. Pull vehicle safely off roadway, turn on flashers and check engine. Check service immediately. | |
| WARNING: Engine to follow these instructions may result in a loss of engine power, vehicle speed, increased exhaust temperature, and may cause an accident or fire resulting in property damage, personal injury, or death. | | | | |





2010 Emission System Instructions on Sun Visor or above the driver's compartment

Dash Cluster Lamps and Regen Sun Visor Instructions

| Lamp | Level | Condition | Operator Action |
|---|----------|---|---|
|  Solid DPF | Level 1 | Exhaust Filter regeneration is required | Drive on highway at highway speeds or start Parked Regen to prevent loss of power to prevent loss of power |
|  Flashing DPF | Level 2 | Exhaust Filter is full. Parked Regeneration is required | Pull vehicle safely off roadway and start Parked Regen to prevent loss of engine power |
|  Flashing And Alarm DPF | Level 3 | Exhaust Filter is full. Engine Performance is Limited | Pull vehicle safely off roadway and start Parked Regen to prevent engine shutdown. |
|  | Shutdown | A serious problem has occurred | WARNING Pull vehicle safely of roadway, turn on flashers, set parking brake, place warning devices, and STOP ENGINE. <u>Seek service Immediately.</u> |
|  | | Exhaust System is Hot | WARNING Exhaust components are operating under normal conditions and exhaust gases are at extremely high temperatures. When stationary, keep away from people and flammable materials, vapors, or structures or STOP ENGINE |





Parked Regeneration Instructions

Parked Regeneration Instructions

| Procedure | | | | | | | |
|--|---|----|--|----|--|----|---|
| Step | | | | | | | |
| 1 | Park the vehicle safely off the roadway and away from flammable materials. Do not operate PTO or vehicle mounted equipment during regen. Engine speed may increase unexpectedly. | | | | | | |
| 2 | Before initiating parked regeneration (pressing the PARKD REGEN switch), the following four conditions must be in place | | | | | | |
| 2A |  Park Brake Applied | 2B |  Transmission in Park or Neutral | 2C |  No Foot Pedals Applied If ANY Foot Pedal is applied during regen the process will stop | 3C |  Engine Coolant Temperature above 172F or 78C |
| NOTE: If any of the above conditions are altered during the Parked Regeneration process, regeneration will be halted, and must be restarted. Other conditions that inhibit Parked Regen are certain Active Engine Diagnostic codes, or other vehicle electrical system problems. MIL lamp or other lamps are an indication of problems that may inhibit a Parked Regen. Resolve all Diagnostic Codes and Problems before attempting a Parked Regeneration | | | | | | | |

Parked Regeneration Instructions

Parked Regeneration Instructions Continued

| | | |
|---|---|--|
| 3 | <p>Press and hold the PARKD REGEN switch for 2 seconds to initiate the regeneration cycle. The engine speed will automatically ramp up to a preset RPM and the switch indicator will illuminate solidly when the cycle is started. If the indicator is blinking, check to be sure that all conditions in step 2 are met. Once started, the regeneration cycle will last approximately 15 - 45 minutes.</p> <p>NOTE: In the event of an emergency situation where the vehicle must be moved after beginning Parked Regeneration, press PARKD REGEN switch OFF to cancel Parked Regeneration.</p> |  |
| 3A |  <p>This light will stop blinking and eventually turn OFF during the parked regeneration indicating a cleaned exhaust filter.</p> <p>The normal Parked Regeneration time 15 minutes to 45 minutes depending on the soot level in the DPF.</p> | |
| 3B |  <p>This light (HEST lamp) will turn ON during the parked regen or with NORMAL high temp duty cycle indicating High Exhaust Temp. HEST lamp comes on if exhaust temp is 400C+. This condition is NORMAL.</p> | |
| 4 | <p>When the regeneration cycle is complete, the switch light will go off, the engine rpm will return to normal idle and all exhaust filter indicators will be off. The vehicle may now be driven normally.</p> <p>WARNING: When performing a Parked Regen, make certain the vehicle is safely off the roadway and exhaust system is away from people or any flammable materials, vapors, or structures. Parked Regen may increase engine speed. Do not run PTO equipment during a Parked Regen.</p> | |
|  | <p>WARNING: Failure to follow these instructions may result in loss of engine power, vehicle speed, increased exhaust temperatures and may cause an accident or fine resulting in property damage, personal injury or death.</p> | |

After Treatment Maintenance

Below is a chart of the recommended Diesel Particulate Filter (DPF) Cleaning Intervals Depending on specific drive cycles, idle time and PTO operations, cleaning may be required sooner than this chart indicates. Stop and go, short run operation and / or high idle times will require shorter cleaning intervals.

