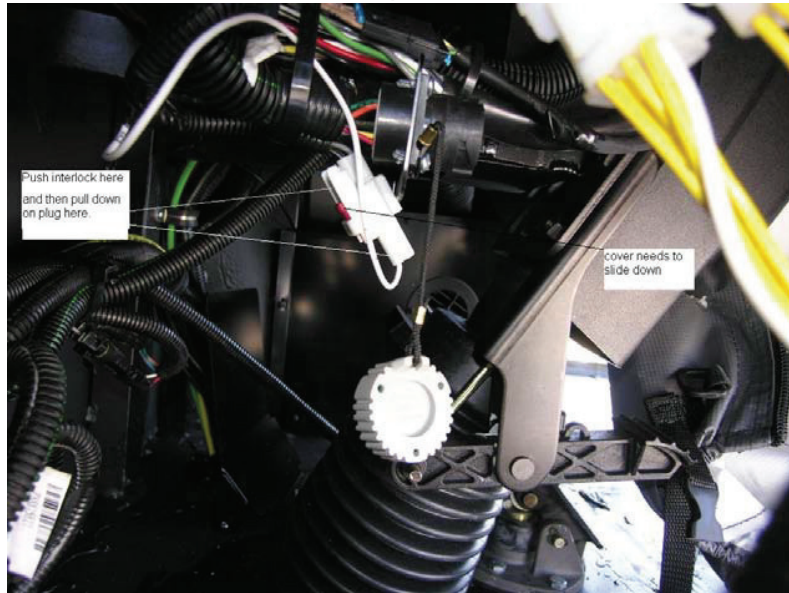


## Cab Parked Regen Switch

### Parked Regeneration



- Located on left hand side of Instrument Panel
- Allows Parked Regen when:
  - DPF light is on
  - Vehicle is parked.

#### CAUTION

During the stationary regeneration, the exhaust gas temperature can reach 800°C [1500°F] and the surface temperature can exceed 700°C [1300°F].

This picture shows where the new Freightliner cab switch for ISB07 CM2150 powered Motorhomes. It is the Parked Regeneration Switch Connector.

The parked regeneration switch is used to manually initiate an Active Regeneration while the vehicle is parked.

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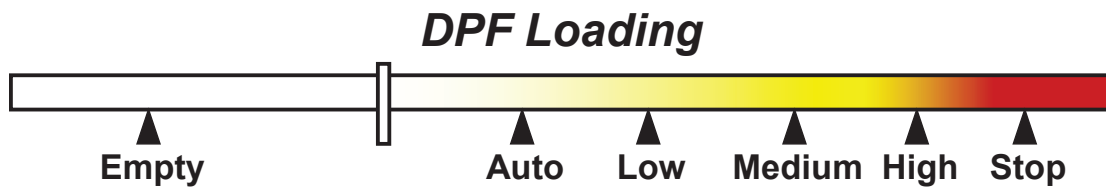
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## Simulator

<i>Situation</i>	<i>Dash Lamps</i>	<i>Operator Action</i>
Normal Operation Passive Regeneration	No Lamps On	Drive Normally



Now you've been introduced to the dash lamps and switches that relate to the Aftertreatment system. We want to use the following graphics to represent different situations, the lamps that may be on, relative loading level in the Diesel Particulate Filter, or DPF, and finally what the operator should do.

First we'll have a row of text boxes to indicate:

The Situation the vehicle and operator is in

The status of the Dash Lamps

And finally, the Operator Action required.

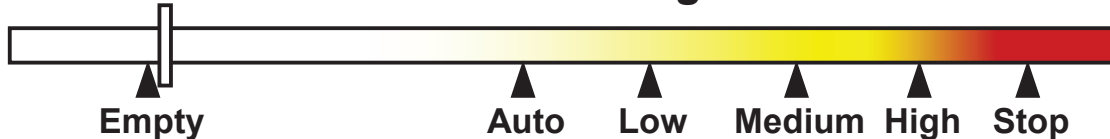
Next, we have the dash lamps that we just went through, and we'll add the new switches when appropriate. Finally, we have a graphic with a slider bar to show the relative particulate matter loading of the diesel particulate filter. The slider bar will go from empty to high, to correspond with the situation being discussed. The term Auto on the scale is the point where Active Regeneration will start. Once the Regeneration process starts, the particulate matter, or soot load, will decrease and move again toward the empty location on the scale.

## Normal with Passive Regeneration

<i>Situation</i>	<i>Dash Lamps</i>	<i>Operator Action</i>
Normal Operation Passive Regeneration	None	None



### DPF Loading



This slide relates to the normal operating mode or when the Aftertreatment system is in a Passive Regeneration mode.

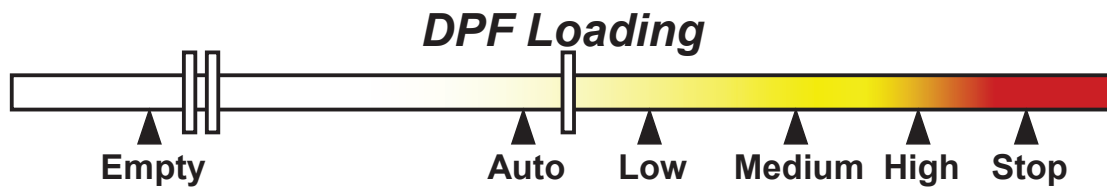
This slide depicts how the indicator lamps will look the vast majority of the time --darkened.

It is very important to convey that Passive Regeneration occurs the vast majority of time.

In essence, Passive Regeneration is about self-cleaning. ---the system naturally takes care of itself. Notice that the slider bar will naturally move from empty up to about the Auto area as the vehicle is operated in a normal duty cycle and none of the lamps come on. The operator doesn't need to do anything with the Aftertreatment system in this situation. Now let's look at what happens when the DPF is starting to fill up.

## Normal with Active Regeneration

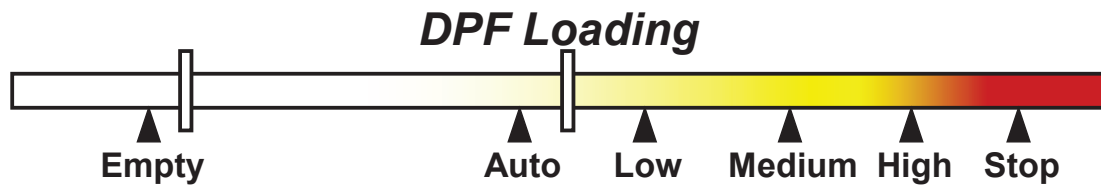
<i>Situation</i>	<i>Dash Lamps</i>	<i>Operator Action</i>
Normal Operation <span style="border: 1px solid red; padding: 2px;">Active Regen.</span> Exh Temp below 977F & Vehicle Speed Above 20 MPH	HEST Lamp OFF	None



During normal operation, the system may start to collect more Particulate Matter, or PM, than it can oxidize, so the DPF starts to become filled with Carbon, or PM. That's when the engine's Engine Control Module, or ECM, will switch into Active Regeneration mode. This is the point where the engine changes regeneration from passive to active. Active Regeneration is done 'behind the scenes' so to speak, as the operator may not even notice that the exhaust temperature is increased by the ECM. The PM is removed from the filter, and as represented on the PM loading graphic, the level of loading moves back towards empty. Notice that there are still no lamps on.

## Normal with Active Regeneration

<i>Situation</i>	<i>Dash Lamps</i>	<i>Operator Action</i>
Normal Operation <span style="border: 1px solid red; padding: 2px;">Active Regen.</span> <span style="border: 1px solid red; padding: 2px;">Exh Temp above 977F &amp; Vehicle Speed Below 5 MPH</span>	HEST Lamp On	Use Caution



The operator should ensure the exhaust pipe outlet is not directed at any material that will melt, burn or explode.

Avoid parking the vehicle over readily combustible items –such as paper or leaves.

And, of course, no one should work in close proximity to the hot exhaust system at this time

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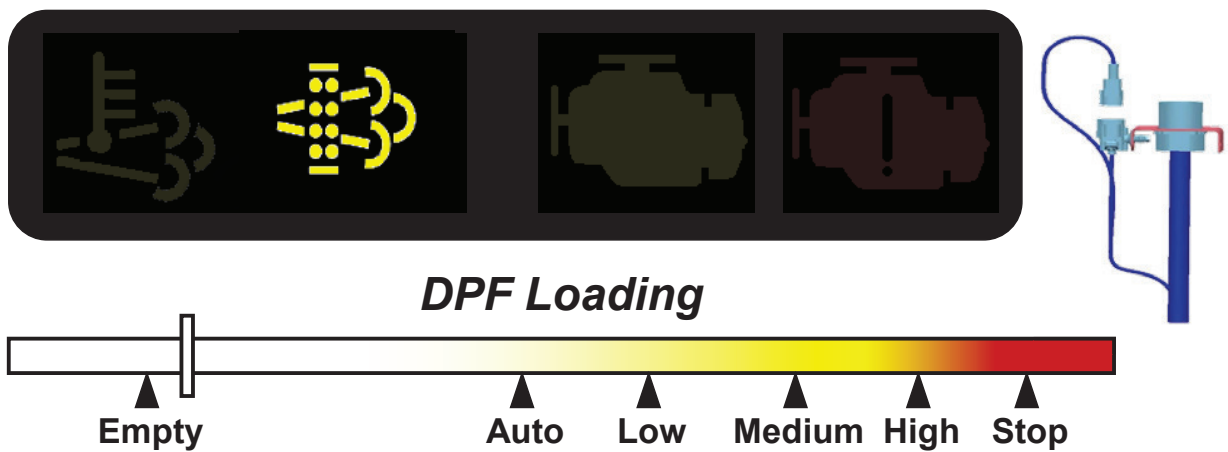
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## Light Duty Cycle

<i>Situation</i>	<i>Dash Lamps</i>	<i>Operator Action</i>
Light Duty Cycle No Active Regeneration DPF Starting to Fill	DPF Lamp on (FC 2639)	Regeneration (next 2-6 hours) Change Duty Cycle Parked Regeneration



(Engine will log a fault code (2639), but will NOT illuminate the check engine light.)

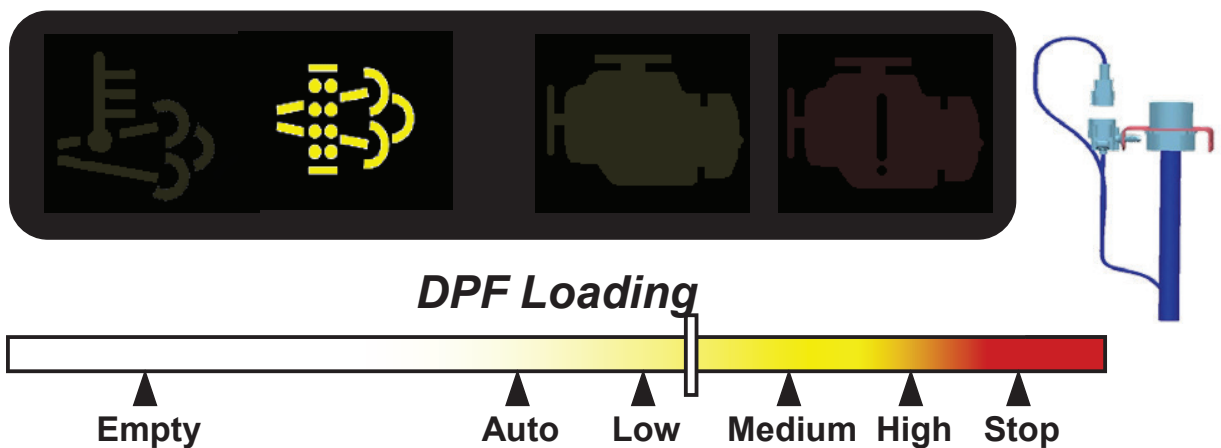
This situation is where a vehicle is under light load operation and not running in a way that allows the ECM to initiate an Active Regeneration on its own, like running in town for a long time or for long periods of idle.

The Diesel Particulate Filter may start to become filled with Carbon, or PM, to a level of loading between low and medium. The DPF lamp then comes on to tell an operator that the Diesel Particulate Filter is starting to fill.

The situation isn't urgent. But, the lamp is telling the operator that the system needs operator assistance at the next opportunity, meaning within 2-6 hours. The operator can either perform a parked regen or note the light on the daily DVIR report and the tech will perform a parked regen. You can only do a Parked Regeneration down to minus 40 degrees Fahrenheit. The operator should not ignore the DPF lamp, because when this lamp illuminates, the system needs their help. These lamps are there to protect the equipment and fuel economy.

## Light Duty Cycle No Regeneration

<i>Situation</i>	<i>Dash Lamps</i>	<i>Operator Action</i>
Light Duty Cycle No Regeneration DPF <u>Moderately Full</u> Slight Derate	DPF Lamp <u>Flashing</u> (FC2639)	Regeneration (next 1-2 hours) Change Duty Cycle Parked Regeneration



(Engine will log a fault code (2639), but will NOT illuminate the check engine light.) If an operator continues to operate the vehicle, but was unable to perform a regeneration, the DPF lamp will begin flashing to indicate the PM loading in the DPF is now between medium and high. At this point, there will be a slight derate in power that removes a marginal amount of peak torque, which protects the DPF. Now, the operator only has 1-2 hours to initiate regeneration. Again, the operator can do this by either increasing the load on the engine or by performing a Parked Regeneration. This is considered a maintenance event, not a failure. Again, the operator should not ignore the flashing DPF lamp, because this means the system needs their help and it's there to protect the equipment and fuel economy.

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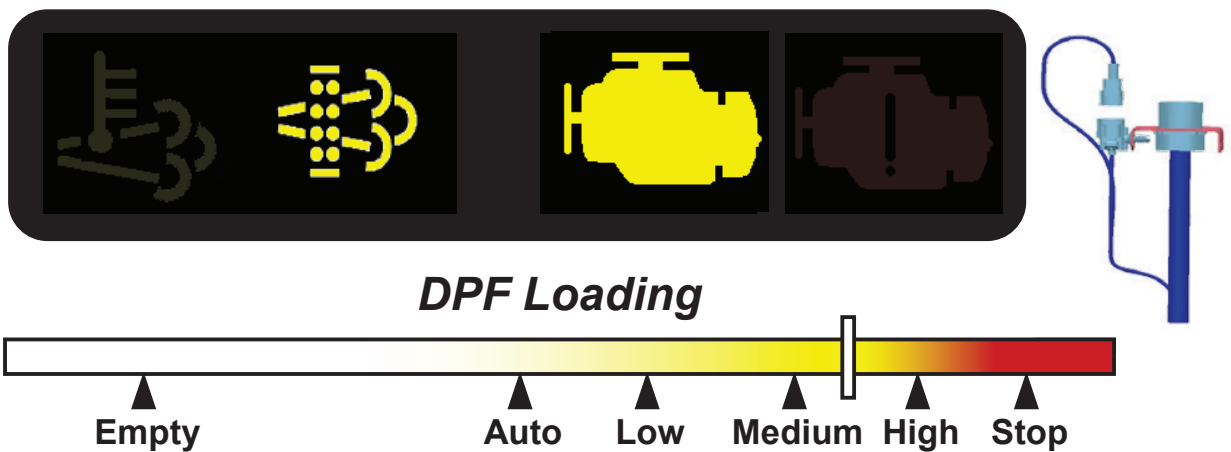


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## Still No Regeneration

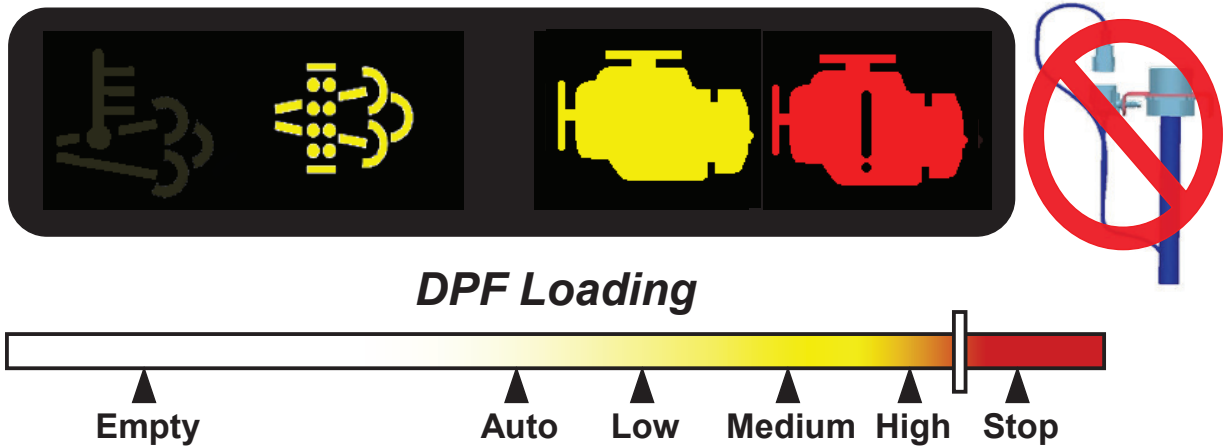
<i>Situation</i>	<i>Dash Lamps</i>	<i>Operator Action</i>
Light Duty Cycle No Regeneration DPF Almost Full <b>Moderate Derate</b>	DPF Lamp Flashing  Check Engine Comes On  (FC1921)	Regeneration <i>Immediately!</i> <del>Change Duty Cycle</del> <b>Parked Regeneration</b>



(The engine logs a new fault code FC 1921 and illuminates the Check Engine Light and the DPF light continues to flash.) If the operator still didn't find the time to do a regeneration when the DPF lamp was flashing and an Active or Parked Regeneration hadn't occurred, the particulate matter loading will continue to increase above the high mark. At this point, the yellow Check Engine lamp will also come on, with the DPF lamp, as shown here. If that happens, Active Regeneration has been disabled, so changing to a more difficult duty cycle and increasing the load on the engine, is no longer an option. The operator will need to pull over in a safe area and perform a Parked Regeneration immediately. The vehicle should return to normal operation after regeneration. Again, this is considered a maintenance event, not a failure. If the yellow Check Engine lamp is still on, after a Parked Regeneration and the DPF lamp is off, the operator should seek service at the next opportunity to inspect the engine systems. Operators should not ignore the flashing DPF lamp and the Check Engine lamp, because if they do, the next lamp that comes on will spell trouble for the operator and the equipment.

## DPF Full

<i><b>Situation</b></i>	<i><b>Dash Lamps</b></i>	<i><b>Operator Action</b></i>
DPF <u>Full</u> Severe Derate No Regeneration Allowed	Stop Engine Lamp Comes On (FC1922)	Stop Engine Immediately! Take Vehicle to Authorized Cummins Repair Location



(The engine logs a new fault code FC 1922 and illuminates the Stop Engine Light.) If the operator continues to drive without a regeneration, after the DPF lamp is flashing and the yellow Check Engine lamp comes on... then, eventually the red stop engine lamp is going to illuminate, as shown here. The diesel particulate filter is now full and there will be a severe derate in power to protect the system. At this point, there may be damage to the engine and the Aftertreatment system if the operator continues to operate the engine. So, if the red engine lamp illuminates, all operator-initiated regeneration options will be disabled. The operator must take the vehicle to a Cummins authorized repair location and a qualified service technician will need to replace the DPF.