

2008 DURAMAX[®] Diesel Engine

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This manual contains information that pertains to the operation of your diesel engine. It also contains your Diesel Maintenance Schedule. The sections in this manual correspond to the sections in your owner manual. This manual, along with your owner manual, will assist you in the proper use and maintenance of your vehicle.

Keep this manual with the owner manual in your vehicle, so it will be there if you ever need it while you are on the road. If you sell your vehicle, leave this manual and the owner manual with the vehicle.

This manual includes the latest information at the time it was printed. We reserve the rights to make changes in the product after that time without notice.

Canadian Owners

A French language copy of this manual can be obtained from your dealer/retailer or from:

Helm, Incorporated
P.O. Box 07130
Detroit, MI 48207
1-800-551-4123
helminc.com

Propriétaires Canadiens

On peut obtenir un exemplaire de ce guide en français auprès de concessionnaire ou à l'adresse suivante:

Helm Incorporated
P.O. Box 07130
Detroit, MI 48207
1-800-551-4123
helminc.com

Section 2 Features and Controls

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Starting and Operating Your Vehicle

Starting the Diesel Engine

Your diesel engine starts differently than a gasoline engine. As a safety feature, your vehicle will only start in the PARK (P) or the NEUTRAL (N) position.

Move your shift lever to PARK (P) or NEUTRAL (N). To restart when you are already moving, use NEUTRAL (N) only.

Notice: Do not try to shift to P (Park) if your vehicle is moving. If you do, you could damage the transmission. Shift to P (Park) only when your vehicle is stopped.

Starting Your Engine

1. Turn your ignition key to RUN.

Observe the wait to start light. See *Wait to Start Light on page 3-7*. This light may not come on if the engine is warm.

2. As soon as the wait to start light goes off, immediately turn the ignition key to START. When the engine starts, let go of the key.

Your engine has a fast warm-up glow plug system. The wait to start light will illuminate for a much shorter time than most diesel engines, due to the rapid heating of the glow plug system.

Notice: If the wait to start light stays on after starting your vehicle, your vehicle may not run properly. Have your vehicle serviced right away.

3. If the engine does not start after 15 seconds of cranking, turn the ignition key to LOCK. Wait one minute for the starter to cool, then try the same steps again.

If you are trying to start your engine after you have run out of fuel, follow the steps in *Running Out of Fuel on page 5-13*.

When your engine is cold, let it run for a few minutes before you move your vehicle. This lets oil pressure build up. Your engine will sound louder when it's cold.

Notice: If you are not in an idling vehicle and the engine overheats, you would not be there to see the overheated engine indication. This could damage your vehicle. Do not let your engine run when you are not in your vehicle.

Cold Weather Starting (Diesel Engine)

The following tips will help you get good starting in cold weather.

Use the recommended engine oil when the outside temperature drops below freezing. See *Engine Oil* on page 5-23. When the outside temperature drops below 0° F (–18°C), use of the engine coolant heater is recommended.

If you experience longer cranking times, notice an unusual amount of exhaust smoke or are at higher elevations (over 7,000 ft. or 2 135 m), you may use your engine coolant heater. See *Engine Coolant Heater* on page 2-11.

See *Diesel Fuel Requirements and Fuel System* on page 5-3 for information on what fuel to use in cold weather.

If Your Diesel Engine Will Not Start

If you have run out of fuel, look at *Running Out of Fuel* on page 5-13. See *Diesel Fuel Requirements and Fuel System* on page 5-3.

If you are not out of fuel, and your engine will not start, do this:

Turn your ignition key to RUN. Immediately after the wait to start light goes off, turn the ignition key to START.

If the light does not go off, wait a few seconds, then try starting your engine again. See your dealer/retailer as soon as you can for a starting system check.

If the light comes on and then goes off and you know your batteries are charged, but your engine still will not start, your vehicle needs service.

If the light does not come on when the engine is cold, your vehicle needs service.

If your batteries don't have enough charge to start your engine, see "Battery" in the Index of the vehicle's owner manual.

Be sure you have the right oil for your engine, and that you have changed the oil at the proper times. If you use the wrong oil, your engine may be harder to start.

Be sure you are using the proper fuel for existing weather conditions. See *Diesel Fuel Requirements and Fuel System* on page 5-3.

If the engine starts, runs a short time, then stops, your vehicle needs service.

 **CAUTION:**

Do not use gasoline or starting aids, such as ether, in the air intake. They could damage your engine. There could also be a fire, which could cause serious personal injury.

Elevated Idle

The engine has a cold temperature high idle feature which elevates the engine idle speed from base idle to 1050 rpms for pickup models or 1200 rpms for van models when outside temperatures are below 32°F (0°C), and the engine coolant temperature is below 150°F (65°C.) This feature enhances heater performance by raising the engine coolant temperature faster.

This feature can be turned on or off using the DIC steering wheel control buttons. If your vehicle is not equipped with the DIC steering wheel control buttons, do the following to turn this feature on or off:

1. Turn the ignition to RUN, with the vehicle off.
2. Press the accelerator pedal to the floor and hold while quickly pressing the brake pedal three times in less than eight seconds.
3. Release the accelerator pedal and start the engine.

When the engine is started, it will slowly ramp up to the high idle speed after a delay of a few seconds up to approximately two minutes. For this method to work properly there must be no throttle or brake pedal faults.

The engine idle speed will return to normal once the following conditions are met:

- Once engine coolant temperature reaches 150°F (65°C).
- Air intake temperature reaches 32°F (0°C).

The high idle speed will be temporarily interrupted and the engine speed will return to normal if any of the following conditions occur:

- The brake pedal is applied.
- The accelerator pedal is pressed.
- The transmission is shifted out of PARK (P) or NEUTRAL (N).
- Vehicle speed is detected.

Once these inputs are removed, the engine idle speed will slowly ramp back up to high idle after the normal delay, if the conditions for engine coolant temperature and air intake temperature are still met.

Fast Idle Control

This system can be used to increase your engine idle speed.

Fast Idle control will be enabled when the following conditions are met:

- The park brake is set.
- The transmission is in PARK (P) or NEUTRAL (N).
- The vehicle speed is about 0 mph (0 km/h).
- The cruise control is in the On position. See “Cruise Control” in the Index of the vehicle’s owner manual.
- The cruise control Set switch is pressed and released for Preset Fast Idle Speed (1200 rpm).

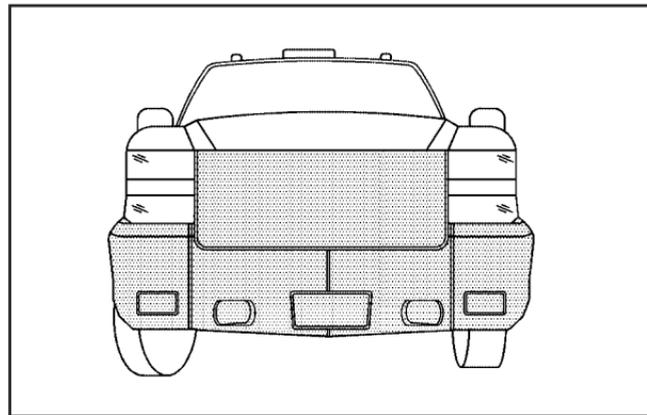
Fast Idle control will be disabled when one or more of the following conditions occur:

- The cruise control is in the Off position.
- The cruise control SET switch is pressed and released. See “Cruise Control” in the Index of the vehicle’s owner manual.
- The cruise control Cancel switch is pressed.
- The brake pedal is pressed.
- The transmission is shifted out of PARK (P) or NEUTRAL (N).
- The park brake is released.
- The vehicle speed is not 0 mph (0 km/h).

When Fast Idle is active, a FAST IDLE ON message will be displayed in Driver Information Center (DIC). See *DIC Warnings and Messages* on page 3-8.

Winter Cover

If your vehicle includes a winter cover, it enhances heater performance and reduces the amount of time it takes to warm the inside of your vehicle in extremely cold conditions (below 0°F (-18°C)). The winter cover consists of two parts, the front bumper cover (if equipped) and the grille cover. The winter cover installs over the front bumper of your vehicle and restricts the air flowing to the engine compartment by covering the radiator grille.



Usage Guidelines

The winter cover should only be used while operating your vehicle in extremely cold temperatures or in heavy snow for extended periods of time. In these temperatures, the vehicle does not need a large amount of air to properly cool the engine. During periods of operation when more airflow is required to cool the vehicle, the winter cover should not be used. The following usage guidelines will allow adequate airflow for proper radiator grille and air cooler performance:

- Do not use the winter cover when temperatures are expected to be above 32°F (0°C). Use of the cover in these conditions could cause your vehicle to overheat. If this happens while the cover is being used, remove the cover.
- Do not use the winter cover if towing a trailer. The added power needed to tow a trailer requires the radiator grille to have full airflow under all conditions. Your vehicle may overheat if the cover is used while towing a trailer.
- Do not modify the cover. The winter cover does not cover some sections of the front of the vehicle because these openings are needed to provide enough airflow to the radiator grille and air cooler in extremely cold temperatures.

- When the winter cover is used, the temperature sensor found on the inside rearview mirror will not function properly. The temperature that is shown will be incorrect.
- Keep the underside of your winter cover as clean as possible at all times. Remove monthly or as necessary and clean away dust and debris.
- Use only a mild soap to clean your winter cover. Do not use harsh soap, strong detergents or vinyl protectant/sealant type products as they may destroy the special finish of your new winter cover. Allow the winter cover to dry completely before reinstalling on your vehicle.

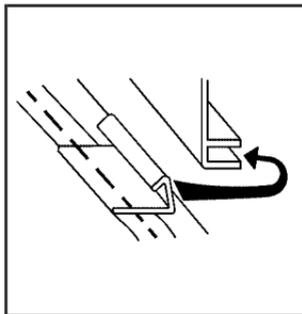
Installation Instructions

The following instructions explain how to install and remove your vehicle's winter cover. When installing or removing the cover please refer to the "Usage Guidelines" mentioned previously. When you first try to fit the cover it may appear to be undersized. This is due to the nature of the special vinyl, which will stretch during installation to ensure a tight fit. For this reason, the initial installation of the cover is best performed when the winter cover is warm.

Installation (Chevrolet)

Grille Cover

1. Open the hood and prop it up.
2. Slide the sides of the cover down into the channels on both sides of the back edge of the grille.

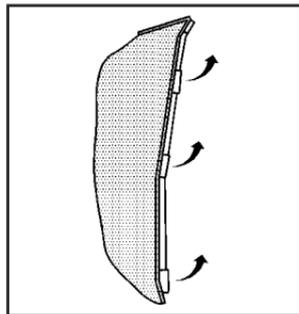


3. Hook J-clips to the bottom of the grille.

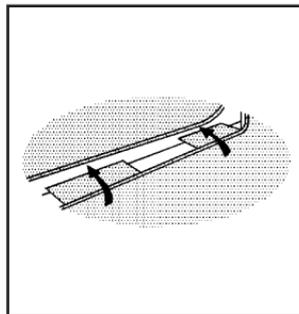
4. Hook J-clips on to the top edge of the grille by the engine compartment.
5. Hook J-clips to the side edge of the grille.

Lower Cover

1. If you must use a license plate, or the vehicle has fog lamps, snip the black threads on the back of the license plate and fog lamp patches. Remove the license plate and fog lamp patches from the white felt backing.

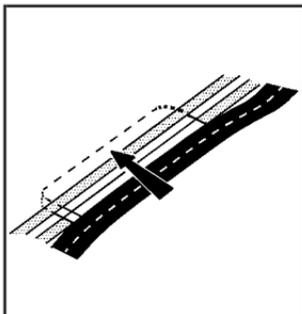


2. Fasten each J- hook to edge of the bumper.



3. If the cover has four pockets, insert the pockets between the grille and the bumper until they drop down behind bumper.

4. Fasten each L-hook to the bumper near the lower edge of the grille.
5. Hook the J-clips on the bottom of the bumper.



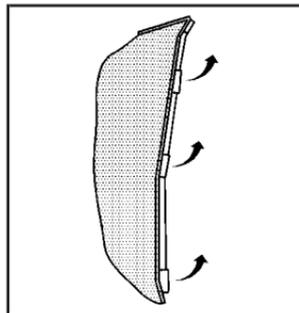
6. Push plastic inserts between the edge of the bumper and splash guard.

To remove the winter cover, reverse the steps listed previously.

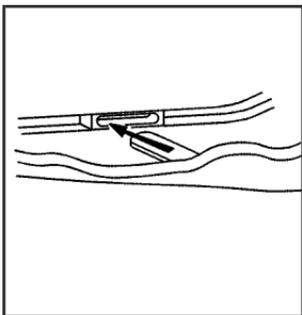
Installation (GMC)

Lower Cover

1. If you must use a license plate, or the vehicle has fog lamps, snip the black threads on the back of the license plate and fog lamp patches. Remove the license plate and fog lamp patches from the white felt backing.

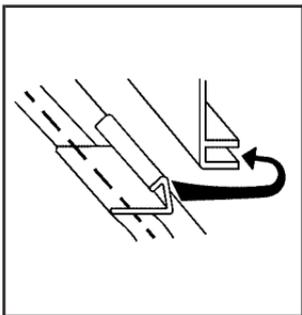


2. Fasten each J- hook to the edge of the bumper.



3. Insert plastic strips into the tab openings below the grille.

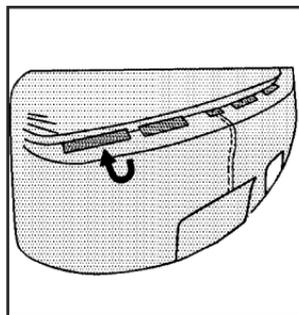
4. Fasten each L-hook to the bumper near the lower edge of the grille.



5. Hook the J-clips on the bottom of the bumper.

Grille Cover

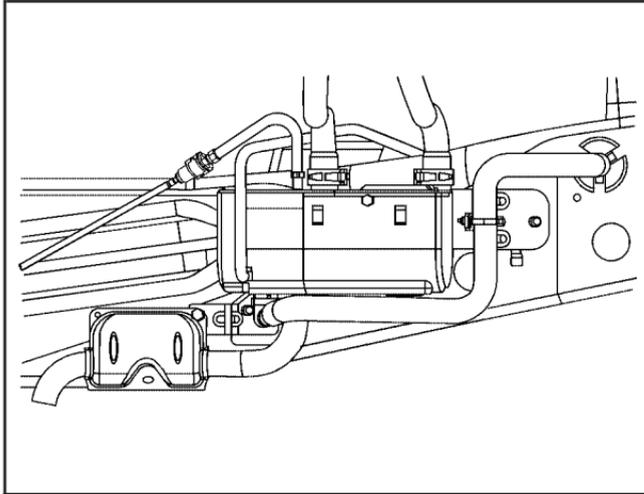
1. Open the hood and prop it up.
2. Slide the sides of the cover down into the channels on both sides of the back edge of the grille.



3. Insert pockets between the grille and the bumper.

4. Hook the J-clips, located on to the top edge of the grille by the engine compartment.
5. To remove the winter cover, reverse the steps listed previously.

Fuel Operated Heater (FOH) (Van Models Only)



If your vehicle includes a FOH, it will enhance heater performance and will reduce the amount of time it takes to warm the inside of your vehicle in cold conditions below or equal to 39°F (4°C). The FOH is installed in the frame rail on the driver's side of the vehicle and uses diesel fuel to heat the engine coolant, which finally warms up the passenger's cabin air.

The FOH will turn on if all of the following conditions exist:

- Outside air temperature is below or equal to 39° F (4°C).
- Fuel level is greater or equal to 12.5 percent of the total fuel tank volume.
- The engine is running.
- Coolant temperature is less than 167° F (75°C).

Engine Coolant Heater

The engine coolant heater, if available, can help in cold weather conditions at or below 0°F (-18°C) for easier starting and better fuel economy during engine warm-up. Plug in the coolant heater at least four hours before starting your vehicle.

To Use the Engine Coolant Heater

1. Turn off the engine.
2. Open the hood and unwrap the electrical cord. The cord is located in the engine compartment, on the passenger's side of the vehicle, near the right side auxiliary battery.
3. Plug it into a normal, grounded 110-volt AC outlet.

CAUTION:

Plugging the cord into an ungrounded outlet could cause an electrical shock. Also, the wrong kind of extension cord could overheat and cause a fire. You could be seriously injured. Plug the cord into a properly grounded three-prong 110-volt AC outlet. If the cord will not reach, use a heavy-duty three-prong extension cord rated for at least 15 amps.

4. Before starting the engine, be sure to unplug and store the cord as it was before to keep it away from moving engine parts. If you don't, it could be damaged.

How long should you keep the coolant heater plugged in? The answer depends on the outside temperature. You may wish to use your coolant heater to improve ease of starting at temperatures between 0°F (-18°C) and -20°F (-29°C). Keep the coolant heater plugged in for a minimum of four hours. At temperatures below -20°F (-29°C), the coolant heater should remain plugged in for at least eight hours. It will not harm either the coolant heater or the vehicle to leave the coolant heater plugged in longer than the times stated. Be sure to remove and store the cord before starting the engine. See *Diesel Fuel Requirements and Fuel System* on page 5-3 for information on what fuel to use in cold weather.

Parking Over Things That Burn

CAUTION:

Things that can burn could touch hot exhaust parts under your vehicle and ignite. Do not park over papers, leaves, dry grass, or other things that can burn.

Diesel Particulate Filter

Your vehicle has a Diesel Particulate Filter (DPF) as part of the exhaust system to reduce vehicle emissions. The DPF requires a unique exhaust tailpipe with an exhaust cooler. The exhaust cooler mixes air with the exhaust at the tailpipe. This lowers the exhaust temperature before it leaves the tailpipe.

The DPF, the tailpipe, or other exhaust system components must not be altered. The area where the exhaust cooler connects to the tailpipe should be inspected, especially the area where the fresh air enters the cooler. Make sure the openings are not restricted or plugged with mud or dirt which could inhibit exhaust gas cooling. See “Exhaust System Inspection” under *At Least Once a Year on page 6-13*.

The DPF will regenerate (self-clean) itself as part of normal operation. The Engine Control Module (ECM) controls this function based on several factors including the amount of fuel consumed, hours of engine operation and miles driven. On average, the DPF will clean itself about once per tank of fuel.

Notice: Use of diesel fuel other than Ultra Low Sulfur Diesel (15 ppm sulfur maximum) or engine oil other than low ash CJ-4 oil will cause permanent damage to the DPF and related components. This damage would not be covered by your warranty.

Your DPF equipped vehicle has specific fuel and engine oil requirements. See *What Fuel to Use on page 5-4* and *Engine Oil on page 5-23* to make sure you use the required fuel and engine oil.

CAUTION:

During DPF regeneration, the exhaust system and exhaust gases are very hot. Things that burn could touch hot exhaust parts under your vehicle and ignite. You or others could be burned. Do not park near or over papers, leaves, dry grass, or other things that can burn.

Notice: Extended idle should be avoided because the DPF system is not capable of regenerating at idle. During extended idle, be sure to watch for the DPF warning light/message which could come on to indicate that the DPF is becoming full and needs regeneration. If the light/message comes on, stop the idling and drive the vehicle as described previously to clean the filter. Continued idling with the warning light/message on could cause irreversible damage to the DPF requiring repair and possible replacement that might not be covered by your warranty.

Extended idling in PARK (P) can cause exhaust parts and gases to become very hot. Keep the exhaust area clear of material that could ignite or burn. See *Parking Over Things That Burn on page 2-12* for more information.

The DPF warning message comes on when the DPF is dirty and needs regenerating. You will also notice a change in the exhaust sound and engine idle speed. This is normal.

If you continue to drive with the DPF warning message on and the exhaust filter is not cleaned as required, the check engine light and the ENGINE POWER IS REDUCED message will come on and dealer/retailer service is necessary. See *Malfunction Indicator Lamp on page 3-4* and *DIC Warnings and Messages on page 3-8* for more information.

For vehicles with Power Take-Off (PTO), monitor the instrument panel cluster for lights related to the DPF.

All engines consume some amount of engine oil. This is normal. The by-product of combustion of engine oil is ash. The ash will become trapped in the DPF over the life of the vehicle. Eventually, the buildup of ash will restrict the exhaust gases and the DPF will need to be cleaned or replaced.

See *Accessories and Modifications on page 5-2* for important information.

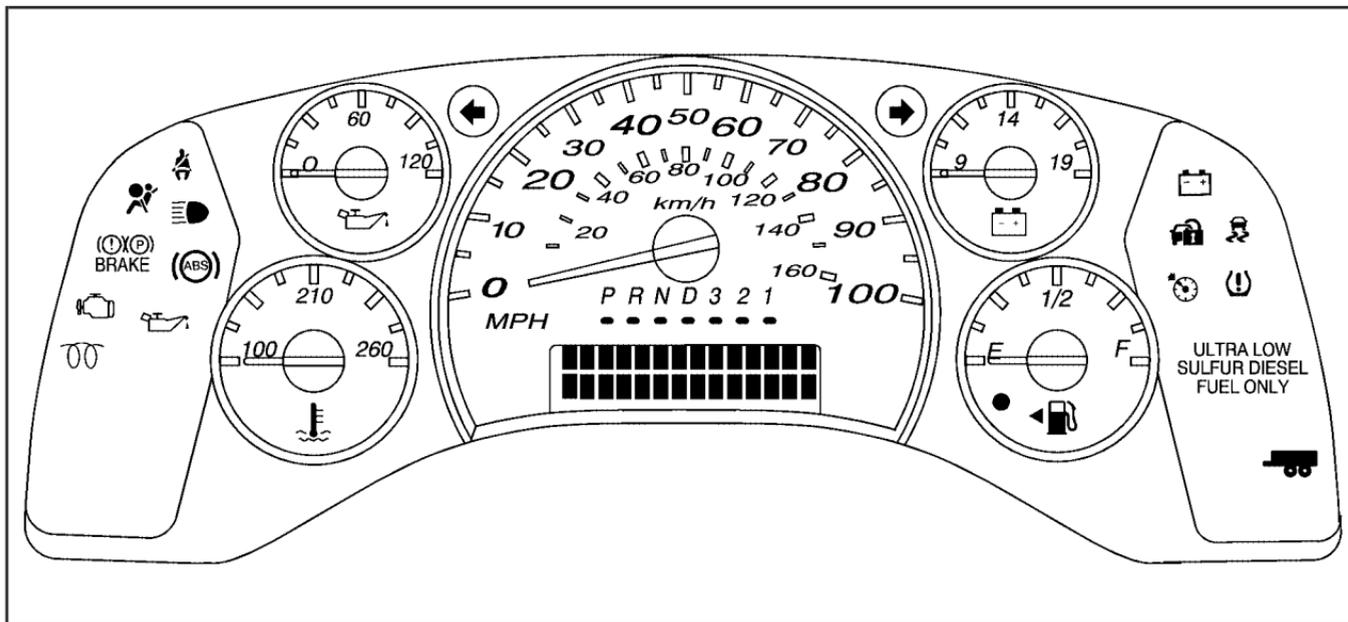
Cleaning the Exhaust Filter

If the CLEAN EXHAUST FILTER SEE OWNERS MANUAL NOW message appears in the Driver Information Center (DIC), the DPF needs to be cleaned.

To clean the filter, drive the vehicle above 30 mph (50 km/h) until the warning message goes off. This will take about 20 minutes.

Section 3 Instrument Panel

Warning Lights, Gages, and Indicators	3-2	Wait to Start Light	3-7
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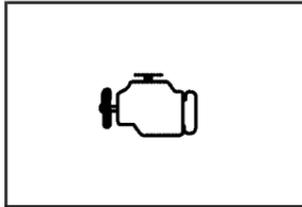
United States Van version shown, Canada similar

Your instrument cluster is designed to let you know at a glance how your vehicle is running. You'll know how fast you're going, about how much fuel you have and many other things you'll need to know to drive safely and economically.

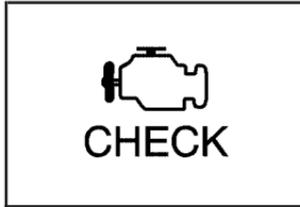
Malfunction Indicator Lamp

Check Engine Light

A computer system called OBD II (On-Board Diagnostics-Second Generation) monitors operation of the fuel, ignition, and emission control systems. It makes sure that emissions are at acceptable levels for the life of the vehicle, helping to produce a cleaner environment.



Pickup Models



Van Models

The check engine light comes on to indicate that there is an OBD II problem and service is required.

Malfunctions often are indicated by the system before any problem is apparent. This can prevent more serious damage to your vehicle. This system is also designed to assist your service technician in correctly diagnosing any malfunction.

Notice: If you keep driving your vehicle with this light on, after a while, the emission controls might not work as well, your vehicle's fuel economy might not be as good, and the engine might not run as smoothly. This could lead to costly repairs that might not be covered by your warranty.

Notice: Modifications made to the engine, transmission, exhaust, intake, or fuel system of your vehicle or the replacement of the original tires with other than those of the same Tire Performance Criteria (TPC) can affect your vehicle's emission controls and can cause this light to come on. Modifications to these systems could lead to costly repairs not covered by your warranty. This could also result in a failure to pass a required Emission Inspection/Maintenance test.

If the Light Comes On

This light comes on, as a check to show it is working, when the ignition is turned to ON/RUN but the engine is not running. If it does not, have it repaired. This light also comes on if an emission control system malfunction has been detected on your vehicle. Diagnosis and service might be required.

You might be able to correct the emission system malfunction by considering the following:

Did you just drive through a deep puddle of water?

If so, your vehicle's electrical system might be wet. The condition is usually corrected when the electrical system dries out. A few driving trips should turn the light off.

Are you low on fuel?

As the engine starts to run out of fuel, it might not run as efficiently as designed since small amounts of air are sucked into the fuel line. The system can detect this. Adding fuel should correct this condition. It will take a few driving trips to turn the light off.

If none of the above steps have made the light turn off, your dealer/retailer can check the vehicle. Your dealer/retailer has the proper test equipment and diagnostic tools to fix any mechanical or electrical problems that might have developed.

Emissions Inspection and Maintenance Programs

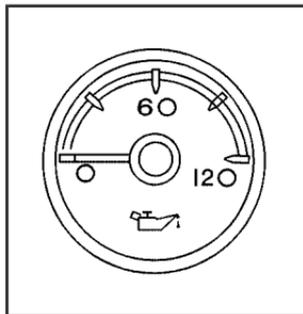
Some state/provincial and local governments have or might begin programs to inspect the emission control equipment on your vehicle. Failure to pass this inspection could prevent you from getting a vehicle registration.

Here are some things you need to know in order to help your vehicle pass an inspection:

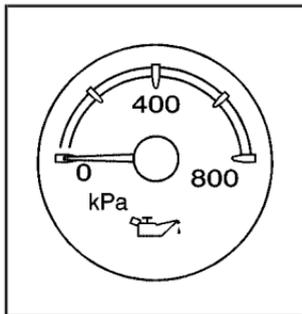
Your vehicle will not pass this inspection if the check engine light is on or not working properly.

Your vehicle will not pass this inspection if the OBD (on-board diagnostic) system determines that critical emission control systems have not been completely diagnosed by the system. The vehicle would be considered not ready for inspection. This can happen if you have recently replaced the battery or if the battery has run down. The diagnostic system is designed to evaluate critical emission control systems during normal driving. This can take several days of routine driving. If you have done this and your vehicle still does not pass the inspection for lack of OBD system readiness, your dealer/retailer can prepare the vehicle for inspection.

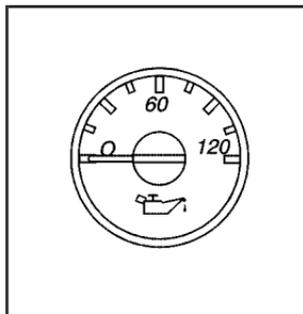
Oil Pressure Gage



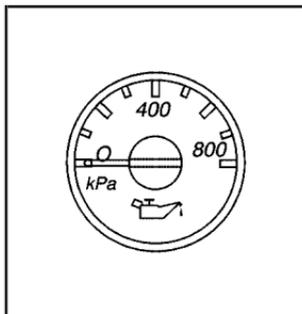
United States
(Pickup Models)



Canada (Pickup Models)



United States
(Van Models)



Canada (Van Models)

The oil pressure gage shows the engine oil pressure in psi (pounds per square inch) when the engine is running. Canadian vehicles indicate pressure in kPa (kilopascals).

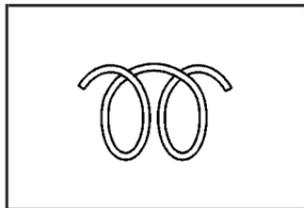
Oil pressure may vary under different driving conditions and oil types. The DURAMAX engine may generate oil pressure in excess of 80 psi (548 kPa) under certain conditions, especially in cold temperatures. This is a normal operating range.

CAUTION:

Do not keep driving if the oil pressure is low. If you do, your engine can become so hot that it catches fire. You or others could be burned. Check your oil as soon as possible and have your vehicle serviced.

Notice: Lack of proper engine oil maintenance may damage the engine. The repairs would not be covered by your warranty. Always follow the maintenance schedule in this manual for changing engine oil.

Wait to Start Light



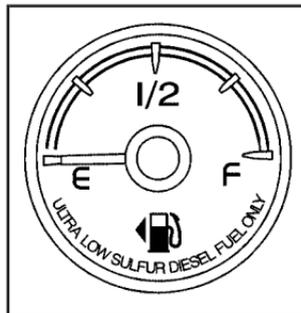
Your diesel engine has a glow plug system to aid in starting your vehicle.

This light shows that the system is functioning properly and tells you when the engine is ready to be started.

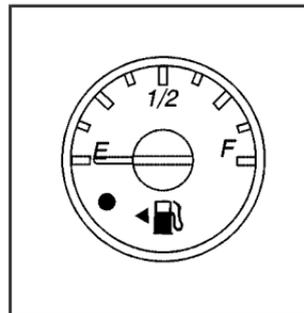
Your vehicle has a fast warm-up glow plug system. The wait to start light will illuminate for a considerably shorter time than most diesel engines due to the rapid heating of the glow plug system.

For more information, see *Starting the Diesel Engine* on page 2-2.

Fuel Gage



Pickup Models, United States version shown



Van Models, United States version shown

When the ignition is on, the fuel gage shows you approximately how much fuel you have left in your tank. The gage will first indicate E (empty) before you are out of fuel, but you should get more fuel as soon as possible.

Listed are four situations you may experience with your fuel gage:

- At the gas station, the fuel pump shuts off before the gage reads F (full).
- It takes a little more or less fuel to fill up than the fuel gage indicated. For example, the gage may have indicated the tank was half full, but it actually took a little more or less than half the tank's capacity to fill the tank.
- The gage moves a little when you turn a corner or speed up.
- The gage doesn't go back to E (empty) when you turn off the ignition.

None of these indicate a problem with the fuel gage.

For information on how to fill your fuel tank, see *Filling the Tank* on page 5-17.

Your vehicle also has a fuel cooler. To clean, powerwash the bottom of the vehicle.

Driver Information Center (DIC)

DIC Warnings and Messages

The Driver Information Center (DIC) is located on the instrument panel above the steering wheel. The DIC comes on when the ignition is on.

If a problem is detected, a warning message will appear on the display. Pressing the select button or the set/reset button on the DIC buttons, or the trip odometer reset stem for vehicles without DIC steering wheel buttons, will acknowledge some current warning or service messages.

Some messages that your DURAMAX[®] diesel may show are:

CHANGE FUEL FILTER

This message will appear on the DIC for 10 seconds when a fuel filter change is required. See *Fuel Filter Replacement* on page 5-14 for more information.

CLEAN EXHAUST FILTER SEE OWNERS MANUAL NOW

This message will appear on the DIC when an exhaust particulate filter cleaning is required. To clean the filter, drive the vehicle above 30 mph (50 km/h) until the warning message goes off. This will take about 20 minutes.

If the filter is not cleaned, this message and a chime will also sound and vehicle performance is limited. See *Diesel Particulate Filter* on page 2-13 for more information.

COOLANT LEVEL LOW ADD COOLANT

Notice: Engine damage from running your engine without coolant is not covered by your warranty. See “Overheated Engine Protection Operating Mode” in the Index of your owner’s manual for information on driving to a safe place in an emergency.

If your vehicle has a low coolant level sensor, this message will appear on the DIC if the engine coolant level is low. Adding coolant to the coolant recovery tank will clear the message. See Cooling System in the owner’s manual Index.

ELEVATED IDLE OFF

If your vehicle does not have DIC buttons, this message will appear when the elevated idle/exhaust restrictor feature has been turned off. This feature can be turned on or off by pressing the pedals. For more information on the elevated idle/exhaust restrictor feature, see *Starting the Diesel Engine* on page 2-2.

If your vehicle has DIC buttons, this message will not be displayed. The Elevated Idle can be turned on or off using the customization menus. Press the customization button until ELEVATED IDLE appears on the DIC display. Press the set/reset button once to access the settings for this feature. Then press the customization button to scroll through the following settings: OFF, ON or NO CHANGE. Choose one of the available settings and press the set/reset button while it is displayed on the DIC to select it.

ELEVATED IDLE ON

If your vehicle does not have DIC buttons, this message will appear when the elevated idle/exhaust restrictor feature has been turned on. This feature can be turned on or off by pressing the pedals. For more information on the elevated idle/exhaust restrictor feature, see *Starting the Diesel Engine on page 2-2*.

If your vehicle has DIC buttons, this message will not be displayed. The Elevated Idle can be turned on or off using the customization menus. Press the customization button until ELEVATED IDLE appears on the DIC display. Press the set/reset button once to access the settings for this feature. Then press the customization button to scroll through the following settings: OFF, ON or NO CHANGE. Choose one of the available settings and press the set/reset button while it is displayed on the DIC to select it.

ENGINE OIL LOW ADD OIL

If your vehicle has an oil level sensor, this message displays if the oil level in the vehicle is low. Check the oil level and correct it as necessary. You may need to let the vehicle cool or warm up and cycle the ignition to be sure this message clears.

This message clears itself after 10 seconds, until the next ignition cycle. See *Engine Oil on page 5-23* for additional information.

FAST IDLE ON

If your vehicle has this feature, this message displays when the fast idle feature is on. See “Fast Idle Control” under *Starting the Diesel Engine on page 2-2*.

###% FUEL FILTER LIFE REMAINING (Pickup Models)

To access this display, the vehicle must be in PARK (P). If your vehicle has DIC buttons, press the vehicle information button until FUEL FILTER LIFE REMAINING displays. If your vehicle does not have DIC buttons, press the trip stem until FUEL FILTER LIFE REMAINING displays. This display shows an estimate of the fuel filter's remaining useful life. If you see 90% FUEL FILTER LIFE REMAINING on the display, it means 90% of the current fuel filter life remains. The fuel filter life system will alert you to change your fuel filter on a schedule consistent with your driving conditions.

When the remaining fuel filter life is low, the CHANGE FUEL FILTER message will appear on the display. You should change your fuel filter as soon as you can.

FUEL FILTER LIFE RESET (Pickup Models)

You must reset the FUEL FILTER LIFE REMAINING display after each fuel filter change. It will not reset itself. Also, be careful not to reset the FUEL FILTER LIFE REMAINING display at any time other than when the fuel filter has just been changed because it cannot be reset accurately until the next fuel filter change. The fuel filter life will change to 100% when the system has been reset. To reset the system, press and hold the set/reset button, or the trip stem if there are no DIC buttons, for two seconds while ###% FUEL FILTER LIFE REMAINING is displayed on the DIC. For more information on DIC Vehicle Customization, see “Driver Information Center (DIC)” in your owner manual.

ENGINE POWER IS REDUCED

A computer monitors the operation of the electric accelerator. If the ENGINE POWER IS REDUCED message comes on while you are driving, the computer is indicating that your vehicle has a problem. You should take your vehicle in for service very soon.

SHIFT INHIBITED SELECT N TO RESET (Pickup Models)

If the transmission is unable to shift into a selected gear, this message will appear on the DIC. The electronic shift position indicator on the instrument panel cluster may blink when this occurs. To make the vehicle shift to the requested gear, you may have to shift back to PARK (P) or NEUTRAL (N) and re-select the desired gear.

WATER IN FUEL SERVICE REQUIRED

This message will come on to warn you if there is water in the diesel fuel system. For more information on how this message works, see *Diesel Fuel Requirements and Fuel System on page 5-3*.

Section 4 Driving Your Vehicle

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Towing

Towing a Trailer

When towing at high elevation on steep uphill grades, consider the following:

Engine coolant at higher elevation will boil at a lower temperature than at or near sea level. If you turn your engine off immediately after towing at high elevation on steep uphill grades, your vehicle may show signs similar to engine overheating.

To avoid this, let the engine run while parked (preferably on level ground) with the transmission in PARK (P) and the park brake applied for at least five minutes before turning the engine off. If you do get the overheat warning, see *Engine Overheating on page 5-44*.

Use one of the following charts to determine how much your vehicle can weigh, based upon your vehicle model and options.

Vehicle	Axle Ratio	Max. Trailer Wt.	GCWR**
C-2500 Extended Cab Standard Box HD – 2WD*†	3.73	15,400 lbs (6 985 kg)	22,000 lbs (9 979 kg)
C-2500 Crew Cab Standard Box HD – 2WD*†	3.73	15,200 lbs (6 895 kg)	22,000 lbs (9 979 kg)
C-2500 Regular Cab Long Box HD – 2WD*†	3.73	15,800 lbs (7 167 kg)	22,000 lbs (9 979 kg)
C-2500 Extended Cab Long Box HD – 2WD*†	3.73	15,000 lbs (6 804 kg)	22,000 lbs (9 979 kg)
C-2500 Crew Cab Long Box HD – 2WD*†	3.73	14,400 lbs (6 532 kg)	22,000 lbs (9 979 kg)
K-2500 Extended Cab Standard Box HD – 4WD*†	3.73	14,300 lbs (6 486 kg)	22,000 lbs (9 979 kg)
K-2500 Crew Cab Standard Box HD – 4WD*†	3.73	13,600 lbs (6 169 kg)	22,000 lbs (9 979 kg)

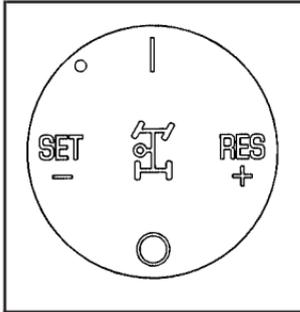
Vehicle	Axle Ratio	Max. Trailer Wt.	GCWR**
K-2500 Regular Cab Long Box HD – 4WD*†	3.73	15,500 lbs (7 031 kg)	22,000 lbs (9 979 kg)
K-2500 Extended Cab Long Box HD – 4WD*†	3.73	13,400 lbs (6 078 kg)	22,000 lbs (9 979 kg)
K-2500 Crew Cab Long Box HD – 4WD*†	3.73	12,500 lbs (5 670 kg)	22,000 lbs (9 979 kg)
C-3500 Extended Cab – 2WD*†			
Single Rear Wheels	3.73	15,100 lbs (6 849 kg)	22,000 lbs (9 979 kg)
Dual Rear Wheels	3.73	16,300 lbs (7 393 kg)	23,500 lbs (10 659 kg)
C-3500 Crew Cab – 2WD*†			
Single Rear Wheels	3.73	14,900 lbs (6 758 kg)	22,000 lbs (9 979 kg)
Dual Rear Wheels	3.73	16,200 lbs (7 348 kg)	23,500 lbs (10 659 kg)
K-3500 Regular Cab – 4WD*†			
Single Rear Wheels	3.73	15,300 lbs (6 940 kg)	22,000 lbs (9 979 kg)
Dual Rear Wheels	3.73	16,500 lbs (7 484 kg)	23,500 lbs (10 659 kg)
K-3500 Extended Cab – 4WD*†			
Single Rear Wheels	3.73	14,900 lbs (6 758 kg)	22,000 lbs (9 979 kg)
Dual Rear Wheels	3.73	16,000 lbs (7 257 kg)	23,500 lbs (10 659 kg)
K-3500 Crew Cab – 4WD*†			
Single Rear Wheels	3.73	14,600 lbs (6 622 kg)	22,000 lbs (9 979 kg)
Dual Rear Wheels	3.73	15,900 lbs (7 212 kg)	23,500 lbs (10 659 kg)

Vehicle	Axle Ratio	Max. Trailer Wt.	GCWR**
G2500 Cargo Van Short Wheelbase – 2WD	3.73	10,000 lbs (4 536 kg)	17,000 lbs (7 711 kg)
G2500 Cargo Van Long Wheelbase – 2WD	3.73	10,000 lbs (4 536 kg)	17,000 lbs (7 711 kg)
G3500 Cargo Van Short Wheelbase – 2WD	3.73	10,000 lbs (4 536 kg)	17,000 lbs (7 711 kg)
G3500 Cargo Van Long Wheelbase – 2WD	3.73	10,000 lbs (4 536 kg)	18,500 lbs (8 391 kg)
G3500 Passenger Van Short Wheelbase – 2WD	3.73	10,000 lbs (4 536 kg)	17,000 lbs (7 711 kg)
<p>*Fifth-wheel or gooseneck kingpin weight should be 15 percent to 25 percent of trailer weight up to 3,500 lbs (1 587 kg) maximum.</p> <p>†Trailer rating limited to 13,000 lbs (5 897 kg) with weight distributing hitch.</p> <p>**The Gross Combination Weight Rating (GCWR) is the total allowable weight of the completely loaded vehicle and trailer including any passengers, cargo, equipment and conversions. The GCWR for your vehicle should not be exceeded.</p>			

See “Towing a Trailer” in the Index of the vehicle’s owner manual for more information.

Power Take-Off (PTO) (Pickup Models)

The power take-off (PTO) is an upfitter integrated system that allows the user to create an auxiliary power source for running add-on equipment, such as salt spreaders, snow plows, winches and lift buckets. The PTO system controls engine speed to values higher than normal base idle, PTO load relay engagement and shutdown of the engine.



Primary PTO Operating Modes

PTO modes of operation include the following:

- Preset PTO Mode: (Stationary operation only)
- Variable PTO Mode: (Stationary and mobile operation)

The PTO stationary mode provides both in-cab and remote controls. The in-cab controls are enabled as the factory preset. The remote controls are disabled. This factory preset configuration can be programmed to enable the remote controls, and/or disable the in-cab PTO controls. See your dealer for more information.

PTO Sub - Modes

The primary PTO modes have the following sub-modes:

- Engine speed control
- PTO load relay engagement/disengagement
- Remote engine shutdown (Stationary vehicle operation only)

PTO Enabling/Disabling Conditions

Enabling Conditions - Stationary PTO

To engage stationary PTO operation, the following conditions must be met:

- The engine must be running.
- The vehicle cannot be moving and the parking brake must be set.
- The shift lever must be in PARK (P) or NEUTRAL (N).
- The brake pedal must not be pressed.
- The engine speed must be less than the maximum allowed PTO engage speed of 1500 rpm. The PTO engage speed can be adjusted by a service technician.

For in-cab PTO operation:

Press and release the 1 position on the PTO switch. The PTO LED light will blink fast until the PTO load becomes engaged. The LED light will then be on steady. The -/SET and +/RES switch positions can then be used to establish the desired PTO operating speed.

For remote PTO operation:

Press and release the remote PTO arming switch, then within five seconds, move the PTO enable switch from OFF to ON (open to closed). The remote LED light will come on when the PTO Load is engaged. The PTO remote SET switch can then be used to establish the desired PTO operating speed. Additional information is available in the service manual for the correct wiring configuration and programming of the remote PTO enable and set switches. These switches are accessed through the PTO upfitter connector, located under the passenger side door.

Enabling Conditions - Mobile PTO

To engage mobile PTO operation, the following conditions must be met prior to turning on PTO:

- The engine must be running.
- The vehicle speed must be less than the PTO top vehicle speed limit. The default setting is 50 mph (80 km/h). This limit can be adjusted by a service technician.
- The shift lever may be in any position.
- The brake must be pressed and then released. The brake must then remain released.
- Cruise control cannot be active.
- Engine speed must be less than the maximum allowed PTO engage speed of 1500 rpm.
- Press and release the 1 position on the PTO switch. The PTO LED light will blink fast until the PTO load becomes engaged, at which point the LED light will be on steady. The -/SET and +/RES switch positions can then be used to establish the desired PTO operating speed. See Variable PTO Mode - PTO Switch operation below.

DIC WARNING MESSAGES

One or more of the following Driver Information Center (DIC) messages may appear on the instrument panel cluster if the PTO will not engage. The operator must take the action indicated, then again press and release the 1 position of the PTO switch.

- PTO: SHIFT TO PARK (P) OR NEUTRAL (N) (Stationary only)
- PTO: SET PARK BRAKE (Stationary only)
- PTO: PRESS & RELEASE BRAKE (Mobile only)
- PTO: RELEASE BRAKE
- PTO: RELEASE ACCELERATOR
- PTO: REDUCE ENGINE SPEED
- PTO: DISENGAGE CRUISE CONTROL (Mobile only)

In addition to these messages, the PTO switch LED will indicate when all conditions required to engage PTO have not been met. When enabling PTO, the LED will turn on, then off after one second. Under normal operating conditions, the PTO LED will remain on throughout the PTO operating cycle.

PTO Disengage Conditions

To disengage the stationary or mobile PTO operation, do one of the following:

- Press the brake. PTO will disengage immediately. The PTO LED will blink slowly, indicating that the PTO set speed is stored in memory. Pressing the +/RES switch position will restore engine speed to the stored PTO set speed. PTO can also be programmed to reengage at PTO standby speed upon releasing the brake pedal (mobile PTO only).
- Press and release the 0 on the PTO in-cab switch. The engine speed will return to normal engine idle. The PTO LED light will go off indicating the PTO load relay has been disengaged and PTO set speed has been cleared from memory.
- From the remote PTO controls, move the speed enable switch to the off position. The engine will return to normal idle. The PTO load relay is disengaged. PTO memory speed is also cleared. (Stationary PTO only)
- From the remote PTO controls, press the remote engine shutdown switch. PTO is disengaged and the engine is shutdown simultaneously. (Stationary remote PTO only)

The mobile PTO mode will also disengage if the following conditions are detected by the vehicle electronics:

- The PTO load becomes disengaged. (See service manual)
- Vehicle speed exceeds 50 mph (80 km/h).
- Engine speed exceeds the maximum allowed PTO operating speed of 3100 rpm (factory setting 2100 rpm).
- The PTO control system will attempt to limit accelerator pedal and PTO switch input as the vehicle approaches the above operational limits. There are some vehicle conditions, such as down hill acceleration, which may cause vehicle speed and/or engine speed limits to be exceeded. Under these conditions, PTO is disengaged.

The stationary PTO mode will also disengage if any of the following conditions are detected by the vehicle electronics:

- Movement of the vehicle.
- The park brake is released.
- The transmission is shifted from PARK (P) or NEUTRAL (N) to DRIVE (D) or REVERSE (R).
- The PTO load becomes disengaged. (See service manual)

Preset PTO Mode

Preset PTO can only be used when the vehicle is not moving. The engine speed is initially set to a stand-by engine speed (850 rpm) when the PTO in-cab 1 switch position is pressed or, by pressing and releasing the remote arming switch. Then within five seconds, assert the remote PTO enable switch to on. This provides an initial start-up engine speed to match the engagement of the PTO load. The PTO standby engine speed can be reprogrammed to a higher speed by your dealer.

Choose one of two factory presets by pressing the PTO In-cab -/SET or +/RES switch positions or the remote PTO SET switch. Speed 1 and Speed 2 are programmable by a service technician from base engine idle rpm to max PTO operation speed (3100 rpm).

- Speed 1: Pressing the -/SET position of the PTO switch results in a preset speed of 1250 rpm.
- Speed 2: Pressing the +/RES position of the PTO switch results in a preset speed of 1700 rpm.

Pressing the 0 switch position on the PTO in-cab switch or moving the remote PTO enable switch to OFF results in the return of the engine speed back to normal idle. The PTO load relay is also disengaged.

Maximum PTO Operating Speed: During PTO operation, the accelerator pedal can be pressed to adjust the engine speed. To protect the PTO from over-speed, the PTO system will disengage when the engine speed exceeds 2100 rpm.

The Stationary PTO Mode provides both in-cab and remote controls. The in-cab controls are enabled as the factory preset. The remote controls are disabled. This factory preset configuration can also be reprogrammed to enable the remote controls, and disable the in-cab PTO controls (i.e., PTO switch, accelerator pedal). See your dealer for more information.

Variable PTO Mode

In this mode, the vehicle can be programmed for stationary or mobile operation.

The variable PTO mode controls engine speed and PTO load engagement is selected by either the PTO in-cab or remote switches. Engine speed selection is variable between base engine idle speed and a maximum of 3100 rpm (factory setting 2100 rpm).

In the mobile PTO mode, the vehicle will operate at a vehicle speed resulting from the current PTO engine speed request and current transmission gear range selected.

Vehicle speed stability is greatly improved by shifting into the transmission manual mode because upshifts are limited. This reduces the maximum vehicle speed while allowing high engine speed operation. Therefore, low vehicle speed operation (10-25 mph) (16-40 km/h) and high PTO engine speed (1,500 -2,000 rpm) can be achieved in the manual mode 1 and 2 transmission ranges.

PTO Switch Operation

The In-cab PTO Switch has four positions: |, ○, -/SET, and +/RES.

|: This is the PTO switch On position.

To engage PTO, press and release the in-cab 1 switch position or, press and release the remote PTO arming switch, then within five seconds, assert the remote enable switch to on. The vehicle will increase engine speed to a factory preset engine speed (800 rpm). This PTO stand-by speed is not intended to be an operational PTO speed, but allows the engagement of the PTO at lower initial start-up rpm to match with the engagement of the PTO load relay.

The initial stand-by speed can be adjusted by holding the accelerator to the desired engine speed, then pressing and releasing the 1 in-cab PTO switch position. The current engine speed will become the new stand-by speed. This adjustment can only be done once at the initial engagement of PTO. The initial stand-by speed adjustment must be between engine base idle speed and 1800 rpm (maximum PTO engage speed).

○ : This is the PTO switch Off position.

Press and release the in-cab 0 switch position or assert the remote enable switch to off to disengage PTO. The engine speed will be reduced to the base idle speed and the PTO load relay will be disengaged.

-/SET (SET/TAP-DOWN/COAST)

SET: Press and hold the accelerator to obtain the desired engine speed, then press and release the -/SET position of the PTO switch. The current engine speed will be maintained. This action can be repeated as desired to a higher rpm value. The PTO set speed cannot exceed 2100 rpm.

TAP-DOWN: Press and release the -/SET switch position on the PTO switch to reduce the engine speed by increments of 100 rpm.

COAST: Press and hold the -/SET switch position on the PTO switch to reduce the rpm by 200 rpm per second until the desired engine speed is reached or until the initial PTO standby speed is reached.

+/RES (RESUME/TAP-UP/ACCEL)

RESUME: When a PTO set speed has been achieved, press and release the brake pedal. Engine speed will reduce to basic idle speed. The PTO LED will blink slowly indicating the previous PTO set speed has been retained in memory. Press and release the +/RES switch position to resume the previous PTO set speed. The PTO set speed cannot exceed 2100 rpm.

TAP-UP: Press and release the +/RES position to increase the engine speed by increments of 100 rpm.

ACCEL: Press and hold the +/RES position to increase the rpm by 200 rpm per second until the desired engine speed is reached or until the maximum allowable PTO set speed is reached.

Engine Shutdown Control

The vehicle's PTO system allows for remote engine shutdown while operating in the stationary PTO mode. This feature has the following functions:

- Engine shutdown using the operator remote switch: The vehicle wiring system provides remote engine shutdown switch connections, which is accessed through the PTO upfitter connector.
- Timed auto-engine shutdown: The timed auto-engine shutdown feature provides the means to shut down the engine automatically after a predefined time. PTO must be operational for this function to be active.
- Engine shutdown based on critical engine conditions: The engine will be shutdown when PTO is operating if a critical engine condition is detected by the vehicle system (i.e., low oil, low oil pressure, hot engine, hot transmission, low fuel, diesel particulate filter regeneration). If PTO operation is continued when critical engine conditions are present, a horn chirp warning will occur after 2 to 5 minutes. The engine will be shutdown 2 minutes after the horn warning. The operator can re-start the engine with the ignition key. The above horn warning and engine shutdown will again occur if the critical engine condition is still present.

Prolonged or Extended PTO Operation

While operating your vehicle in stationary PTO mode, the Diesel Particulate Filter (DPF) will continue to filter the exhaust and accumulate soot. The engine control system, depending on the speed and load being applied by the PTO, may not be able to generate enough energy or adequate heat needed to clean or regenerate the DPF. Continued operation under conditions that do not allow effective regeneration or cleaning will eventually plug the DPF and result in reduced power. The ENGINE POWER IS REDUCED Driver Information Center (DIC) message and Malfunction Indicator Lamp will be displayed, and dealer/retailer service will be required to return your vehicle to normal, full power operation. To prevent this from occurring, frequently monitor your vehicle during PTO operation, paying particular attention to the CLEAN EXHAUST FILTER SEE OWNER MANUAL NOW DIC warning message. If the DIC message is displayed during PTO operation, see *Diesel Particulate Filter on page 2-13* for information on how to clean or regenerate the DPF. Also see "Engine Shutdown Control" earlier in this section.

Factory Preset Parameters

The following table lists the factory preset parameters. These may be altered by the service technician to configure the various PTO features.

Programmable Parameters	Factory Setting	Minimum Value	Maximum Value
PTO In-cab Control	ENABLED	DISABLED	ENABLED
PTO Remote Control	DISABLED	DISABLED	ENABLED
Type of Set Switch Operation	MOMENTARY	MOMENTARY	LATCHING
Press ON then go to Set 1 Speed	DISABLED	DISABLED	ENABLED
Remote Engine Shutdown	DISABLED	DISABLED	ENABLED
Load Feedback	DISABLED	DISABLED	ENABLED
Engage Relay	DISABLED	DISABLED	ENABLED
Keep Relay engage during braking	DISABLED	DISABLED	ENABLED
Action after brake is released	RETURN TO BASE IDLE RPM	RETURN TO BASE IDLE RPM	RETURN TO STANDBY RPM
Auto Engine Shutdown Timer	ENABLED	DISABLED	ENABLED
Eng. Shutdown Due to Failure	DISABLED	DISABLED	ENABLED

Programmable Parameters	Factory Setting	Minimum Value	Maximum Value
Engine Shutdown Warning	DISABLED	DISABLED	ENABLED
Set Low Fuel Level for Engine Shutdown	15%	0	25%
Engine Run Time While PTO is Active - Timer	7 Hours	4 minutes	7 hours
Min. PTO Engage Speed	500 RPM	500 RPM	1800 RPM
Max. PTO Engine Speed	1800 RPM	950 RPM	3100 RPM
PTO Standby RPM	850 RPM	500 RPM Normal engine idle will override if higher than Standby Speed	3100 RPM
PTO Set Speed 1	1250 RPM	500 RPM PTO Set Speed 1 cannot be set below PTO Standby speed	3100 RPM
PTO Set Speed 2	1700 RPM	500 RPM PTO Set Speed 2 cannot be set below PTO Standby speed	3100 RPM
Maximum Operating Speed	2100 RPM	500 RPM	3100 RPM
Tap Step	100 RPM	4 RPM	500 RPM
Ramp Rate	200 RPM	4 RPM	1000 RPM
Maximum Vehicle Speed	80 mph (129 km/h)	18 mph (30 km/h)	80 mph (129 km/h)

Programmable Parameters	Factory Setting	Minimum Value	Maximum Value
Minimum Remote Accelerator Voltage	0.25V	0.0V	2.5V
Maximum Remote Accelerator Voltage	4.75V	2.5V	5.0 V
Remote Set Switch Transition to Low Voltage (<1.66V)	SET_SPEED 1	STANDBY SPEED, SET SPEED_1 or SET SPEED_2	
Remote Set Switch Transition to Open State (1.66V, <3.33V)	PTO_STANDBY	STANDBY SPEED, SET SPEED_1 or SET SPEED_2	
Remote Set Switch Transition to High Voltage (3.33V)	SET_SPEED 2	STANDBY SPEED, SET SPEED_1 or SET SPEED_2	

If the PTO factory preset parameters do not match the settings described above, then they may have already been altered in order to satisfy the requirements of the installed PTO system and body equipment.

See <http://www.gmupfitter.com> more information on the installation of wiring and programming for PTO aftermarket equipment.

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Service

Accessories and Modifications

Adding non-dealer accessories to your vehicle can affect your vehicle's performance and safety. Such things as, airbags, braking, stability, ride and handling, emissions systems, aerodynamics, durability, and electronic systems like anti-lock brakes, traction control, and stability control could be affected. Some non-dealer accessories could even cause malfunction or damage to parts and systems and would not be covered by the vehicle warranty.

GM Accessories are designed to complement and function with other systems on your vehicle. Your GM dealer can accessorize your vehicle using genuine GM Accessories. When you go to your GM dealer and ask for GM Accessories, you will know that GM-trained and supported service technicians will perform the work using genuine GM Accessories.

See your vehicle's Warranty booklet for more information.

Aftermarket Engine Performance Enhancement Products and Modifications

Some aftermarket engine performance products and modifications promise a way to increase the horsepower and torque levels of your vehicle's powertrain. You should be aware that these products could have harmful effects on the performance and life of the engine, exhaust emission system, transmission, and drivetrain. The Duramax[®] Diesel Engine, Allison Automatic Transmission[®], and drivetrain have been designed and built to offer industry leading durability and performance in the most demanding applications. Engine power enhancement products may enable the engine to operate at horsepower and torque levels that could damage, create failure, or reduce the life of the engine, engine emission system, transmission, and drivetrain. Damage, failure, or reduced life of the engine, transmission, emission system, drivetrain, or other vehicle components caused by aftermarket engine performance enhancement products or modifications may not be covered under your vehicle warranty.

Diesel Fuel Requirements and Fuel System

Some states and provinces have restrictions on the purchase of diesel fuel for light-duty vehicles and require you to buy permits or pay special taxes. Some of these restrictions apply only to residents, and others apply to both residents and visitors. These restrictions can change. To learn the current restrictions in any state or province, contact your auto club, the police, or other officials.

Diesel Engine Fuel

Notice: Diesel fuel or fuel additives not recommended in this manual could damage the fuel system, fuel-operated heater (FOH) (Van models only), and engine. Your warranty would not cover this damage. And:

- Diesel fuel that has been mixed with engine oil or automatic transmission fluid could damage the engine and emission controls.
- We do not test aftermarket diesel fuel additives. Some additives, particularly those which contain alcohol or water emulsifiers, could damage the fuel system. If you believe that unique circumstances call for a fuel additive to be used, consult your dealer/retailer for advice.
- If you ever run out of diesel fuel, it can be difficult to restart the engine. To avoid this, never let the tank get empty.

If gasoline is ever accidentally added to the fuel tank, to avoid severe engine damage, do not run the engine until the fuel tank can be drained.

If you run out of fuel, *Running Out of Fuel on page 5-13* tells you how to restart the engine.

What Fuel to Use

Notice: Use of diesel fuel other than Ultra Low Sulfur Diesel (15 ppm sulfur maximum) or engine oil other than low ash CJ-4 oil will cause permanent damage to the DPF and related components. This damage would not be covered by your warranty.

The emission control system requires the use of diesel fuel with ultra low-sulfur (0.0015% by weight, or 15 ppm, maximum) content. Both Ultra Low Sulfur Diesel and Low Sulfur Diesel fuels are available in the United States and Ultra Low Sulfur Diesel fuel is available in Canada. However, only higher sulfur diesel fuel is available in Mexico.

At a minimum, the diesel fuel you use should meet the latest version of ASTM specification D 975 (Grades No. 2-D or No. 1-D S15 commonly known as Ultra Low Sulfur diesel) in the United States. In addition, the Engine Manufacturers Association (EMA) has identified properties of an improved diesel fuel for better engine performance and durability. Diesel fuels corresponding to the EMA Recommended Guideline on Premium Diesel Fuel (FQP-1A) could provide better starting, less noise, and better vehicle performance. If there are questions about the fuel you are using, contact your fuel supplier.

In the United States, for best results use No. 2-D diesel fuel year-round (above and below freezing conditions) as oil companies blend No. 2-D fuel to address climate differences. No. 1-D diesel fuel can be used in very cold temperatures (when it stays below 0°F or -18°C); however, it will produce a power and fuel economy loss. Avoid the use of No. 1-D diesel fuel in warm or hot climates. It can result in stalling, poor starting when the engine is hot, and could damage the fuel injection system.

It is acceptable to use diesel fuel containing up to 5% biodiesel (B5), but the final blended fuel must meet the same specification, ASTM D 975 (Grades No. 2-D or No. 1-D S15 commonly known as Ultra Low Sulfur diesel), as other fuels used in your vehicle, and the biodiesel used for making this fuel must meet the latest version of ASTM specification D 6751. Biodiesel is produced from vegetable oils or animal fat that have been chemically modified to reduce the possibility of damage to the fuel system and engine. Higher concentration (i.e., greater than B5) biodiesel-containing fuels or the use of unmodified bio-oils blended into diesel fuel at any concentration is not recommended and could damage the fuel system and engine. Such damage would not be covered by your warranty. If there are questions about the biodiesel-containing fuels you are using, contact your fuel supplier.

Because of the cleansing properties of biodiesel, switching from straight diesel to a biodiesel blend can prematurely restrict the fuel filter with normal deposits in the fuel system. A fuel filter replacement might be required sooner than the recommended interval.

Diesel fuel can foam when you fill the tank. This can cause the automatic pump nozzle to shut off, even though the tank is not full. If this happens, just wait for the foaming to stop and then try filling the tank more slowly. See *Filling the Tank on page 5-17*.

 **CAUTION:**

Heat coming from the engine can cause the fuel to expand and force the fuel out of the tank. If something ignites the fuel, a fire could start and people could be burned. To help avoid this, try filling the tank more slowly and fill the fuel tank only until the automatic nozzle shuts off. Do not try to top it off.

What Fuel to Use in Canada

Notice: Use of diesel fuel other than Ultra Low Sulfur Diesel (15 ppm sulfur maximum) or engine oil other than low ash CJ-4 oil will cause permanent damage to the DPF and related components. This damage would not be covered by your warranty.

The emission control system requires the use of diesel fuel with ultra low-sulfur (0.0015% by weight, or 15 ppm, maximum) content. Both Ultra Low Sulfur Diesel and Low Sulfur Diesel fuels are available in the United States and Ultra Low Sulfur Diesel fuel is available in Canada. However, only higher sulfur diesel fuel is available in Mexico.

At a minimum, the diesel fuel you use should meet the latest version of specification CAN/CGSB-3.517 (ULS) in Canada. In addition, the Engine Manufacturers Association (EMA) has identified properties of an improved diesel fuel for better engine performance and durability (FQP-1A). Diesel fuels corresponding to the EMA description could provide better starting, less noise, and better vehicle performance. If there are questions about the fuel you are using, contact your fuel supplier.

Canadian fuels are blended for seasonal changes. Diesel Type “A” fuel is blended for better cold weather starting (below 0°F or –18°C); however, you might notice some power and fuel economy loss. If Type “A” fuel is used in warmer temperatures, stalling and hard starting may occur. Diesel Type “B” fuel is blended for temperatures above 0°F (–18°C).

It is acceptable to use diesel fuel containing up to 5% biodiesel (B5), but the final blended fuel must meet the same specification, CAN/CGSB-3.517 (ULS) in Canada, as other fuels used in your vehicle, and the biodiesel used for making this fuel must meet the latest version of ASTM specification D 6751. Biodiesel is produced from vegetable oils or animal fat that have been chemically modified to reduce the possibility of damage to the fuel system and engine. Higher concentration (i.e., greater than B5) biodiesel-containing fuels or the use of unmodified bio-oils blended into diesel fuel at any concentration is not recommended and could damage the fuel system and engine. Such damage would not be covered by your warranty. If there are questions about the biodiesel-containing fuels you are using, contact your fuel supplier.

Very Cold Weather Operation

Follow the instructions listed previously under the heading “What Fuel to Use.”

Notice: Never use home heating oil or gasoline in your vehicle’s diesel engine. They can cause engine damage.

In cold weather, the fuel filter could become clogged (waxed). To unclog it, move the vehicle to a warm garage area and warm the filter to between 32°F and 50°F (0°C to 10°C). You will not need to replace it. Additional information on the fuel filter follows.

Water in Fuel

CAUTION:

Diesel fuel containing water is still flammable. You could be burned. If you ever try to drain water from your fuel, keep sparks, flames and smoking materials away from the mixture.

Notice: If there is water in your diesel fuel and the weather is warm or humid, fungus and bacteria can grow in the fuel. They can damage your fuel system and fuel operated heater (FOH) (if equipped). A diesel fuel biocide can be used to sterilize your fuel system. However, your fuel system may still need to be cleaned. Your dealer can advise you of the appropriate solution.

If your fuel tank needs to be purged to remove water, see your dealer or a qualified technician. Improper purging can damage your fuel system and block your FOH.

Sometimes, water can be pumped into your fuel tank along with your diesel fuel. This can happen if a service station doesn't regularly inspect and clean its fuel tanks, or if it gets contaminated fuel from its suppliers.

If you have a pickup model and this happens, a WATER IN FUEL message will appear on the Driver Information Center (DIC). The water must be drained.

If you have a van model and this happens, a WATER IN FUEL warning light will appear on the instrument panel cluster. The water must be drained from both chassis mounted fuel filters. Your dealer can show you how to do this.

Water in Fuel Light Chart

If the WATER IN FUEL DIC message or water in fuel warning light comes on, use this chart.

Problem	Recommended Action
Light/Message comes on intermittently.	Drain water from fuel filter. When there is no more water, recheck the light/message on the next ignition cycle. If the light/message stays on with no water in the fuel, take the vehicle in for service.
Light/Message stays on:	
<ul style="list-style-type: none">At temperatures above freezing.	Drain fuel filter immediately. If no water can be drained and light stays on, see your dealer for assistance.

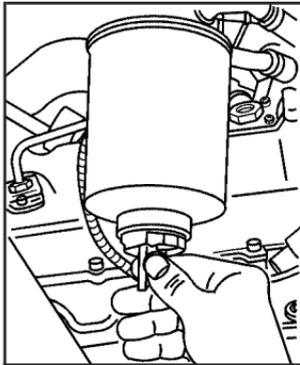
Problem	Recommended Action
<ul style="list-style-type: none">At temperatures below freezing.	Drain fuel filter immediately. If no water can be drained — water may be frozen in water drain system. Water may be frozen in the fuel lines. Move the vehicle to a warm location to thaw out, and then drain filter system.
<ul style="list-style-type: none">Immediately after refueling, large amount of water possibly pumped into fuel tank.	Fuel tank purging required. See your dealer for assistance.

Notice: If you drive when this warning indicator is on, you can damage your fuel injection system and your engine. If the indicator comes on right after you refuel, it means water was pumped into your fuel tank. Turn off your engine immediately. Then, have the water drained at once.

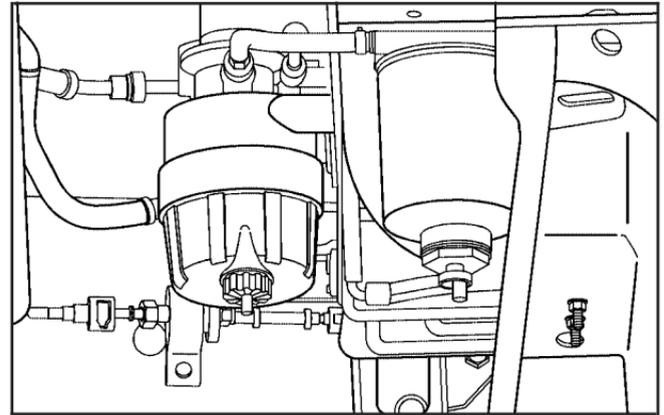
Hard starting, hesitation or flat performance at high speed or during hard acceleration may be an indication of premature fuel filter plugging due to dirty or contaminated fuel. The filter element may need to be changed if this happens. See *Fuel Filter Replacement* on page 5-14.

To drain water, do the following:

1. Stop and park the vehicle in a safe place.
Turn off the engine and apply the parking brake.
2. Remove the fuel cap.
3. Place a fuel-resistant container under the fuel filter(s). For pickup models, the filter drain valve is located in the engine compartment, on the passenger side of the vehicle, on the bottom of the fuel filter. For van models, the filter drain valves for the primary and secondary fuel filters are located in the chassis (inside frame rail) compartment. They are on the driver side of the vehicle, below the fuel filters.



4. For pickup models, open the drain valve by turning it two to three turns.



5. Pump the primer until all of the water has been removed. When fuel empties from the valve, all the water has been drained. Close the valve hand tight.

For van models, in order to drain the water from the system, you will have to repeat the operation for the primary and secondary fuel filters.

6. Remove the fuel-resistant container and properly dispose of the contaminated fuel. To find out how to properly dispose of contaminated diesel fuel, see “What to Do With Used Oil” under *Engine Oil on page 5-23*.
7. Install the fuel cap.
8. For pickup models, start the engine and let it run for a few minutes. If the engine stalls, the fuel system may need to be primed. While draining the water from the fuel filter, air may enter the fuel system. If air has entered the fuel system the fuel system will need to be primed. For van models, start the engine and let it run for a few minutes.

If the WATER IN FUEL message/warning light comes on again after driving a short distance or the engine runs rough or stalls, a large amount of water has probably been pumped into the fuel tank. The fuel tank should be purged.

Fuel Priming

In order for the fuel system to work properly, the fuel lines must be full of fuel and contain no air. If air gets into the fuel lines, it will be necessary to prime the fuel lines to eliminate air before operating the vehicle and the fuel operated heater (FOH).

If air is in the fuel lines. One of the following may have happened:

- The vehicle ran out of fuel
- The fuel filter was removed for servicing or replacement
- The fuel lines were removed or disconnected for servicing
- The fuel filter water drain valve was opened while the engine was running
- The fuel operated heater (FOH) pump and FOH fuel lines were removed or disconnected for servicing.

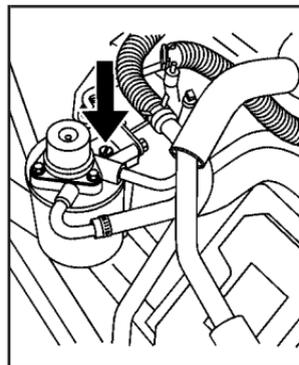
If one or more of the above occur, it is very likely that air has entered your fuel system and that you will need to prime the fuel system before operating the vehicle. Air in the fuel lines will not harm the engine, the fuel operated heater (FOH) or the vehicle.

However, the engine and/or the fuel operated heater (FOH) may not be able to start until the fuel system is primed and the air is removed.

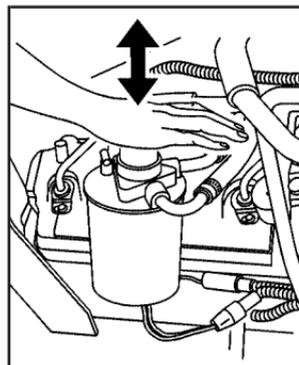
To prime the vehicle (Pickup Models)

Your vehicle is equipped with a priming pump which is part of the engine mounted fuel filter. The priming pump is hand operated (pickup only) and is designed to bring fuel to the engine to eliminate any air that may be in the fuel lines. To prime the engine, do the following:

1. You must correct the condition which caused the loss of prime by making sure there is fuel in the tank.
2. Make sure the fuel filter has been installed and properly tightened.
3. Make sure the fuel lines are properly connected and the fuel filter is cool enough to touch.
4. Remove any dirt from the fuel filter head and vent valve by wiping with a cloth.



5. Open the fuel filter vent valve by turning the screw counterclockwise several full turns. The vent valve is located on top of the fuel filter housing.



6. Repeatedly push down on the fuel filter priming pump with the palm of your hand. The pump is located on top of the fuel filter housing. Let the pump return upward between pushes.

7. Operate the priming pump until a small amount of fuel seeps from the vent valve. When you see the fuel, the filter is now full of fuel and the system should be primed.
8. Close the vent valve. Clean any fuel which accumulated on the fuel filter. Start the engine and let idle for a few minutes. Check the filter for leaks.

To prime the vehicle (Van Models)

Your vehicle is equipped with an electric priming pump which is located in front of the fuel tank under your vehicle. The priming pump is operated electrically and is designed to bring fuel to the engine to eliminate any air that may be in the fuel lines. To prime the engine, do the following:

1. Turn the ignition key on for two minutes. The fuel pump will be operating and starting the priming process. Do not start the engine during the first two minutes.
2. After completing the initial prime in Step 1, turn the ignition off, then back to start and crank the engine for 15 seconds.

3. If the engine does not start, repeat Steps 1 and 2 until the engine starts.
4. If the engine does not run after repeating Steps 1 and 2 three times, turn the ignition key off for 60 seconds, allowing the Electronic Control Module (ECM) to reset.
5. Repeat the above steps until the engine starts.
6. If the engine runs, but does not run smoothly, increase the engine speed slightly by pressing the accelerator pedal. This will help to force out air through the system.
7. If the engine starts and runs but stalls again, turn the ignition key off for 60 seconds to reset the ECM and repeat the steps above.
8. When the engine starts, let it idle for a few minutes and check the filters for any leaks.

To prime the fuel operated heater (FOH) fuel lines (Van Models)

See your dealer/retailer or qualified technician if the FOH fuel lines need to be primed.

Running Out of Fuel

Pickup Models

If the engine stalls and you think that you have run out of fuel, do this to restart your engine:

CAUTION:

Diesel fuel is flammable. It could start a fire if it gets on hot engine parts. You could be burned. Do not let too much fuel flow from the air bleed valve, and wipe up any spilled fuel with a cloth.

1. If you are parked on a level surface, add at least two gallons of fuel. However, if you are parked on a slope, you may need to add up to five gallons of fuel.
2. Follow the fuel priming procedure earlier in this section to prime the fuel filter.
3. Close the air bleed valve.
4. Turn the ignition key to START for 10 to 15 seconds at a time until your engine starts. If the engine tries to run, but does not run smoothly, increase the rpm a little using the accelerator pedal. This will help force air through the system.

Van Models

If the engine stalls and you think that you may have run out of fuel, do this to restart your engine:

1. If you are parked on a level surface, add at least one gallon of fuel. However, if you are parked on a slope, you may need to add up to five gallons of fuel.
2. Follow the vehicle fuel system priming procedure earlier in this section to re-prime the system and re-start the engine.

Your check engine light may come on if the vehicle has run out of fuel. This light may stay on for a few drive cycles after the condition is corrected, but will eventually clear itself.

The fuel operated heater stops automatically when the fuel tank volume is less or equal to 10 percent of the total tank volume. If the vehicle runs out of fuel, the FOH fuel lines will not need to be primed because they will still have fuel remaining.

Fuel Filter Replacement

Pickup Models

If you want to change the fuel filter yourself, here's how to do it:

CAUTION:

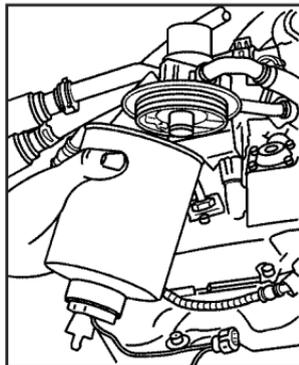
Diesel fuel is flammable. It could start a fire if something ignites it, and you could be burned. Do not let it get on hot engine parts, and keep matches or other ignition sources away.

First, drain any water from the filter following the procedure for draining water listed previously.

Your vehicle's engine must be off until the end of this procedure.

The fuel filter is located in the engine compartment on the passenger's side of the vehicle.

1. Apply the parking brake. Access the fuel filter through the passenger side wheel house opening. It is not necessary to remove all of the wheel liner fasteners.
2. Remove only the necessary fasteners to allow the rear of the wheel liner to be lowered enough for fuel filter access.



3. Unplug the water sensor wire connected to the fuel filter and unscrew the filter element.

4. Remove the filter element. If there is any dirt on the filter sealing surface, clean it off. Remove and reuse the water sensor float switch located on the bottom of the fuel filter.
5. Install the new filter element.
6. Reinstall and tighten the filter container and reconnect the water sensor wire to the filter.
7. Reposition the wheel liner.
8. Install and tighten fasteners.
9. Use the fuel filter priming procedure earlier in this section to prime the fuel filter.
10. Tighten the air bleed valve by turning it clockwise until hand tight.
11. Start your engine and let it idle for five minutes. Check your fuel filter and air bleed valve for leaks.
12. Reset the fuel filter monitor. See *DIC Warnings and Messages* on page 3-8 for more information.

Van Models

If your fuel operated heater (FOH) is not working, your FOH line requires priming. See your dealer for service. See *Fuel Operated Heater (FOH) (Van Models Only)* on page 2-11 for more information.

If you want to change the fuel filter yourself, here's how to do it:

CAUTION:

Diesel fuel is flammable. It could start a fire if something ignites it, and you could be burned. Do not let it get on hot engine parts, and keep matches or other ignition sources away.

First, drain any water from the filter following the procedure for draining water listed previously.

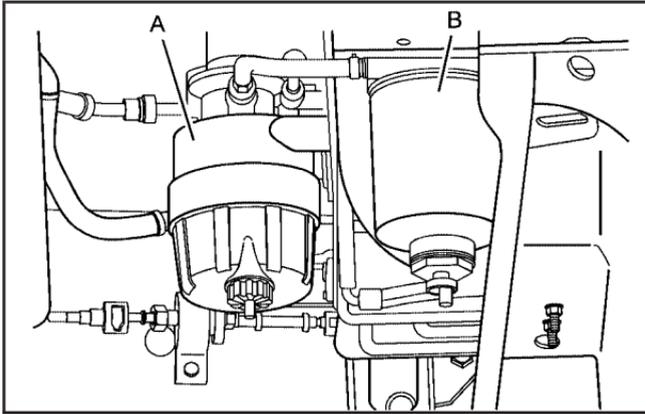
Your vehicle's engine must be off until the end of this procedure.

The fuel filters are located on the driver's side frame rail in front of the fuel tank.

To minimize fuel siphoning from the fuel tank during fuel filter replacement, be sure the fuel tank is less than 3/4 full.

Primary Filter (A)

1. Apply the parking brake.



2. Unplug the water sensor wire connected to the fuel filter (lowest wire) and unscrew the filter's cap.
3. Remove the filter element. If there is any dirt on the filter sealing surface, clean it off.
4. Install the new filter element.

5. Reinstall and tighten the filter's cap and reconnect the water sensor wire to the filter.
6. Prime the fuel system.
7. Start your engine and let it idle for five minutes.

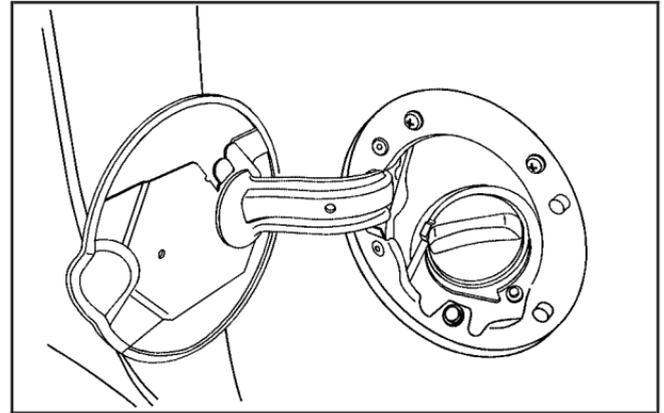
Secondary Filter (B)

1. Apply the parking brake.
2. Unscrew the filter element.
3. Remove the filter element. If there is any dirt on the filter sealing surface, clean it off. Remove and reuse the water drain valve located at the bottom of the fuel filter.
4. Install and tighten the new filter element.
5. Prime the fuel system.
6. Start your vehicle and let it idle for five minutes.

Filling the Tank

CAUTION:

Fuel vapor burns violently and a fuel fire can cause bad injuries. To help avoid injuries to you and others, read and follow all the instructions on the pump island. Turn off your engine when you are refueling. Do not smoke if you are near fuel or refueling your vehicle. Do not use cellular phones. Keep sparks, flames, and smoking materials away from fuel. Do not leave the fuel pump unattended when refueling your vehicle. This is against the law in some places. Do not re-enter the vehicle while pumping fuel. Keep children away from the fuel pump; never let children pump fuel.



Pickup Shown, Van Similar

The green fuel cap is located behind a hinged door on the driver side of the vehicle.

For chassis-cab models, refuel the front tank first, or in instances when only a partial fuel fill is desired. An automatic transfer mechanism will maintain approximately equal fuel levels in both tanks, so no switching is required by the operator.

To remove the fuel cap, turn it slowly to the left (counterclockwise).

 **CAUTION:**

Fuel can spray out on you if you open the fuel cap too quickly. If you spill fuel and then something ignites it, you could be badly burned. This spray can happen if your tank is nearly full, and is more likely in hot weather. Open the fuel cap slowly and wait for any hiss noise to stop. Then unscrew the cap all the way.

Be careful not to spill diesel fuel. Do not top off or overfill your tank, and wait a few seconds after you have finished pumping before you remove the nozzle. Clean fuel from painted surfaces as soon as possible. See “Washing Your Vehicle” in the Index of your owner’s manual. When you put the fuel cap back on, turn it to the right (clockwise) until you hear a clicking sound. Make sure you fully install the cap.

 **CAUTION:**

If a fire starts while you are refueling, do not remove the nozzle. Shut off the flow of fuel by shutting off the pump or by notifying the station attendant. Leave the area immediately.

Notice: If you need a new fuel cap, be sure to get the right type. Your dealer can get one for you. If you get the wrong type, it may not fit properly.

Notice: If your vehicle has been accidentally filled with gasoline, do not run the engine or severe engine damage can occur. Contact your dealer to have the fuel system flushed.

Filling a Portable Fuel Container

CAUTION:

Never fill a portable fuel container while it is in your vehicle. Static electricity discharge from the container can ignite the fuel vapor. You can be badly burned and your vehicle damaged if this occurs. To help avoid injury to you and others:

- Dispense fuel only into approved containers.
- Do not fill a container while it is inside a vehicle, in a vehicle's trunk, pickup bed, or on any surface other than the ground.

CAUTION: (Continued)

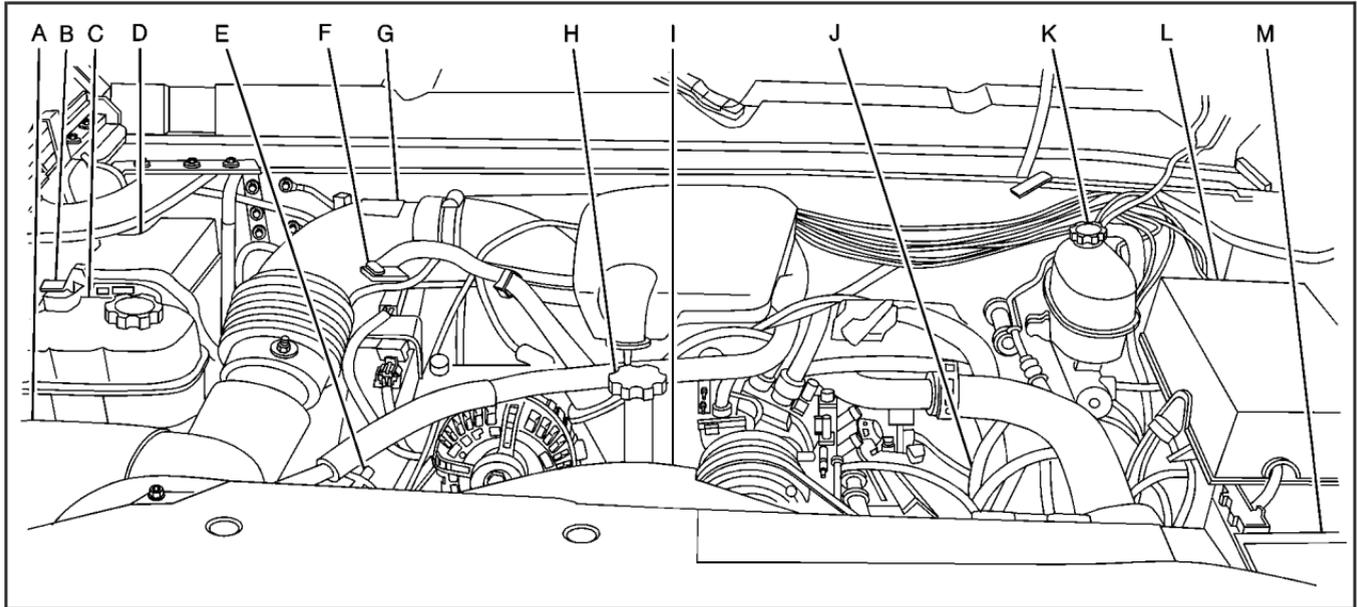
CAUTION: (Continued)

- Bring the fill nozzle in contact with the inside of the fill opening before operating the nozzle. Contact should be maintained until the filling is complete.
- Do not smoke while pumping fuel.
- Do not use a cellular phone while pumping fuel.

Checking Things Under the Hood

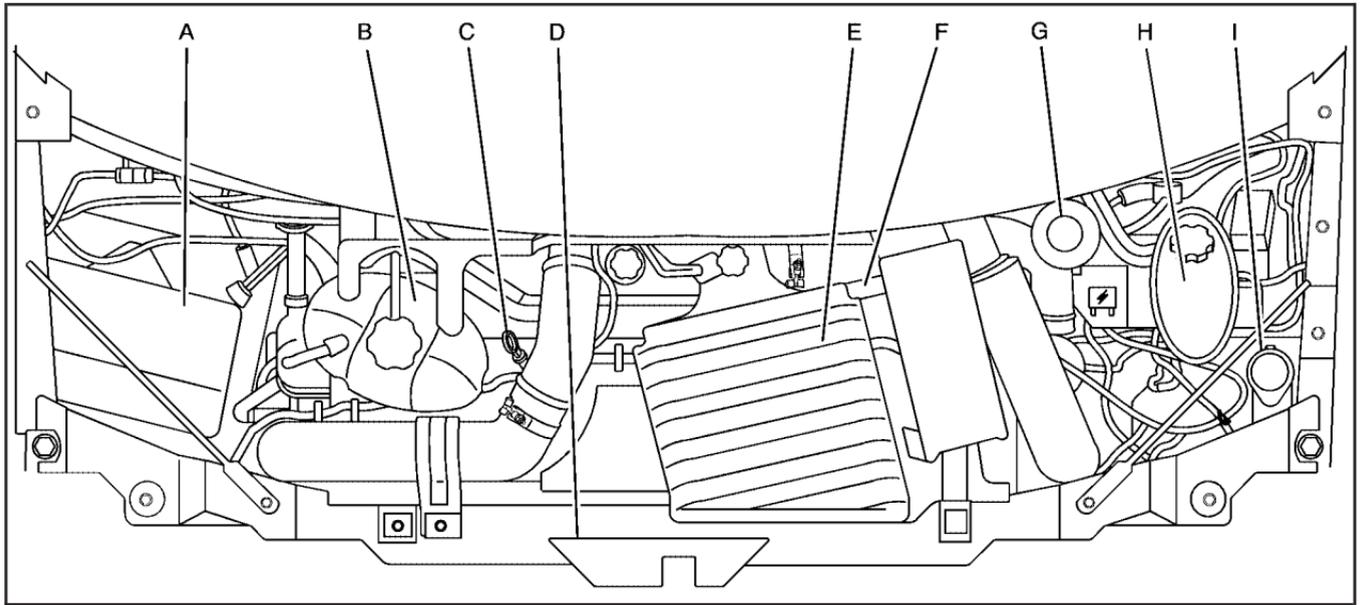
Engine Compartment Overview

When you open the hood on the 6.6L DURAMAX® Diesel Engine, you will see the following:



United States Pickup models shown, Canada similar

- A. Engine Air Cleaner/Filter
- B. Remote Positive (+) Terminal
- C. Coolant Surge Tank
- D. Battery
- E. Engine Air Cleaner/Filter Restriction Indicator
(If Equipped)
- F. Engine Oil Dipstick
- G. Automatic Transmission Dipstick
- H. Engine Oil Fill Cap
 - I. Engine Fan
- J. Power Steering Fluid Reservoir
- K. Brake Fluid Reservoir
- L. Underhood Fuse Block
- M. Windshield Washer Fluid Reservoir



United States Van models shown, Canada similar

- | | |
|------------------------------------|---|
| A. Battery | F. Air Cleaner/Filter Restriction Indicator |
| B. Coolant Surge Tank | G. Power Steering Fluid Reservoir |
| C. Automatic Transmission Dipstick | H. Brake Fluid Reservoir |
| D. Engine Fan | I. Windshield Washer Fluid Reservoir |
| E. Engine Air Cleaner/Filter | |

Engine Oil

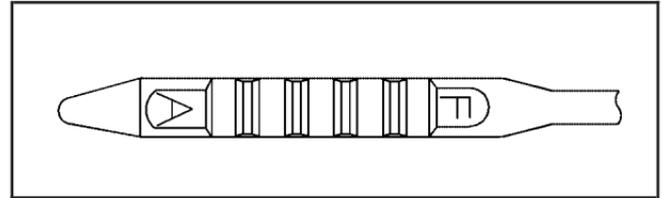
Checking Engine Oil

It is a good idea to check the engine oil level every time you get fuel.

The engine oil dipstick handle is a yellow loop. See *Engine Compartment Overview on page 5-20* for the location of the engine oil dipstick.

In order to get an accurate reading, the oil must be warm, at normal operating temperature, and the vehicle must be on level ground.

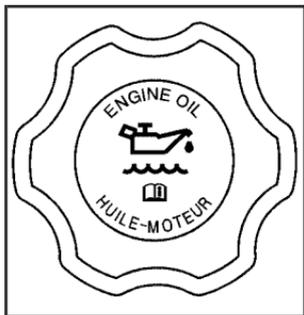
1. Turn off the engine and give the oil at least five minutes to drain back into the oil pan. With a cool engine, allow 30 minutes. If you do not do this, the oil dipstick might not show the actual level.
2. Pull out the dipstick and clean it with a paper towel or a cloth, then push it back in all the way. Remove it again, keeping the tip down.



When to Add Engine Oil

If the oil is below the add mark (A) at the tip of the dipstick, add at least one quart/liter of the recommended oil. This section explains what kind of oil to use. For engine oil crankcase capacity, see *Specification Charts on page 5-59*.

Notice: Do not add too much oil. If the engine has so much oil that the oil level gets above the full mark (F) on the dipstick, the engine could be damaged.



See *Engine Compartment Overview* on page 5-20 for the location of the engine oil fill cap.

Be sure to add enough oil to put the level somewhere in the proper operating range. Push the dipstick all the way back in when you are through.

What Kind of Engine Oil to Use

Look for three things:

- CJ-4

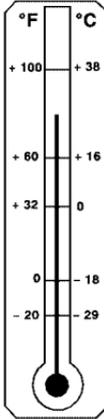
Oils designated as API CJ-4 are required for your vehicle. The CJ-4 designation can appear either alone or in combination with other American Petroleum Institute (API) designations, such as API CJ-4/SL. These letters show API levels of quality.

Notice: Use only engine oils that have the designation CJ-4 for the diesel engine. Failure to use the recommended oil can result in engine damage not covered by your warranty.

RECOMMENDED SAE VISCOSITY GRADE ENGINE OILS

SELECT THE SAE GRADE OIL BASED ON
THE EXPECTED TEMPERATURE RANGE
BEFORE NEXT OIL CHANGE

HOT
WEATHER



COLD
WEATHER

LOOK
FOR THIS
SYMBOL



SAE 5W-40

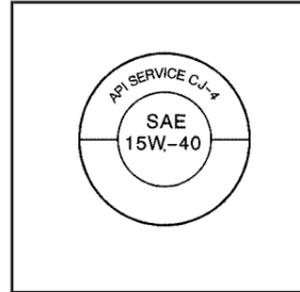
SAE 15W-40
PREFERRED
above 0°F
(-18°C)

DO NOT USE ANY OTHER
GRADE OIL NOT RECOMMENDED

- SAE 15W-40

As shown in the viscosity chart, SAE 15W-40 is best for your vehicle. When it is very cold, below 0°F (-18°C), you should use SAE 5W-40 to improve cold starting.

These numbers on the oil container show its viscosity, or thickness. Do not use other viscosity oils such as SAE 10W-30, SAE 10W-40, or SAE 20W-50.



This doughnut-shaped logo (symbol) is used on most oil containers to help you select the correct oil. It means that the oil has been certified by the American Petroleum Institute.

Look for this on the oil container, and use only those oils that display this logo.

Engine Oil Additives

Do not add anything to the oil. The recommended oils with the API service symbol are all you need for good performance and engine protection.

Engine Oil Life System

When to Change Engine Oil

Your vehicle has a computer system that lets you know when to change the engine oil and filter. This is based on engine timing, engine load, and engine temperature, and not on mileage. Based on driving conditions, the mileage at which an engine oil change will be indicated can vary considerably. For the oil life system to work properly, you must reset the system every time the oil is changed.

When the system has calculated that oil life has been diminished, it will indicate that an oil change is necessary. A CHANGE ENGINE OIL SOON message will come on. Change the oil as soon as possible within the next 600 miles (1 000 km). It is possible that, if you are driving under the best conditions, the oil life system might not indicate that an oil change is necessary for over a year. However, the engine oil and filter must be changed at least once a year and at this time the system must be reset. Your dealer/retailer has trained service people who will perform this work using genuine parts and reset the system. It is also important to check the oil regularly and keep it at the proper level.

If the system is ever reset accidentally, you must change the oil at 3,000 miles (5 000 km) since your last oil change. Remember to reset the oil life system whenever the oil is changed.

How to Reset the Engine Oil Life System

The Engine Oil Life System calculates when to change the engine oil and filter based on vehicle use. Whenever the oil is changed, reset the system so it can calculate when the next oil change is required. If a situation occurs where you change the oil prior to a CHANGE ENGINE OIL SOON message being turned on, reset the system.

Pickup Models

Always reset the engine oil life to 100% after every oil change. It will not reset itself. To reset the Engine Oil Life System:

1. Display the OIL LIFE REMAINING on the DIC.
If your vehicle does not have DIC buttons, the vehicle must be in PARK (P) to access this display. See “DIC Operation and Displays” in the owner manual.
2. Press and hold the SET/RESET button on the DIC, or the trip odometer reset stem if your vehicle does not have DIC buttons, for more than five seconds.
The oil life will change to 100%.

If the CHANGE ENGINE OIL SOON message comes back on when you start your vehicle, the Engine Oil Life System has not reset. Repeat the procedure.

Van Models

To reset the CHANGE ENGINE OIL SOON message:

1. Turn the ignition key to ON/RUN with the engine off.
2. Fully press and release the accelerator pedal slowly three times within five seconds.
3. Turn the key to LOCK/OFF.

If the message comes back on when you start your vehicle, the engine oil life system has not reset. Repeat the procedure. If it still does not reset, see your dealer/retailer for service.

What to Do with Used Oil

Used engine oil contains certain elements that can be unhealthy for your skin and could even cause cancer. Do not let used oil stay on your skin for very long. Clean your skin and nails with soap and water, or a good hand cleaner. Wash or properly dispose of clothing or rags containing used engine oil. See the manufacturer's warnings about the use and disposal of oil products.

Used oil can be a threat to the environment. If you change your own oil, be sure to drain all the oil from the filter before disposal. Never dispose of oil by putting it in the trash, pouring it on the ground, into sewers, or into streams or bodies of water. Instead, recycle it by taking it to a place that collects used oil. If you have a problem properly disposing of used oil, ask your dealer/retailer, a service station, or a local recycling center for help.

Engine Air Cleaner/Filter

Pickup Models



The air cleaner/filter assembly may have an air cleaner/filter restriction indicator that lets you know when the engine air cleaner/filter is dirty and needs to be serviced.

The air cleaner/filter restriction indicator is located on the air cleaner box.

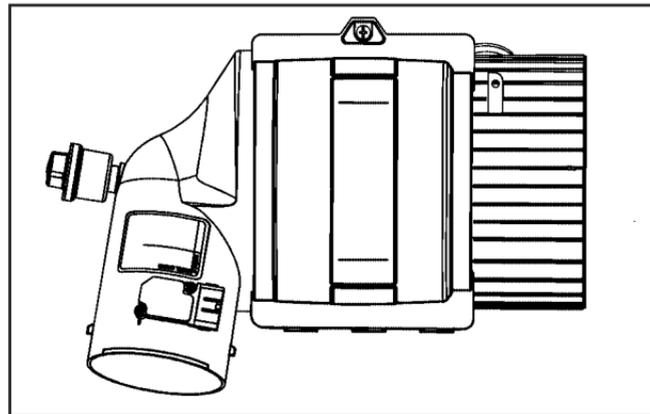
When to Inspect

Inspect the air cleaner/filter every 15,000 miles (25 000 km) and replace the filter if necessary.

How to Inspect

When the restriction indicator turns black, or is in the red/orange “change” zone, replace the filter and reset the restriction indicator.

To inspect and replace the filter and reset the restriction indicator, do the following:



The air cleaner/filter assembly is located on the front corner of the engine compartment on the passenger’s side of the vehicle.

1. Loosen the screw on the cover of the housing and lift up the cover.

2. Remove the air cleaner/filter from the housing. Care should be taken to dislodge as little dirt as possible.
3. Clean the filter sealing surface and the housing.
4. Install the new engine air cleaner/filter.
5. Reinstall the cover and tighten the screw.
6. Reset the air cleaner/filter restriction indicator, if equipped, by pressing the top button on the indicator.

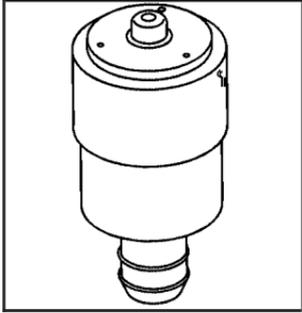
See *Scheduled Maintenance on page 6-4* to determine when to replace the engine air cleaner/filter.

 **CAUTION:**

Operating the engine with the air cleaner/filter off can cause you or others to be burned. The air cleaner not only cleans the air; it helps to stop flames if the engine backfires. If it is not there and the engine backfires, you could be burned. Do not drive with it off, and be careful working on the engine with the air cleaner/filter off.

Notice: If the air cleaner/filter is off, a backfire can cause a damaging engine fire. And, dirt can easily get into your engine, which will damage it. Always have the air cleaner/filter in place when you are driving.

Van Models



The air cleaner/filter assembly may have an air cleaner/filter restriction indicator that lets you know when the engine air cleaner/filter is dirty and needs to be serviced.

The air cleaner/filter restriction indicator is located on the air cleaner resonator.

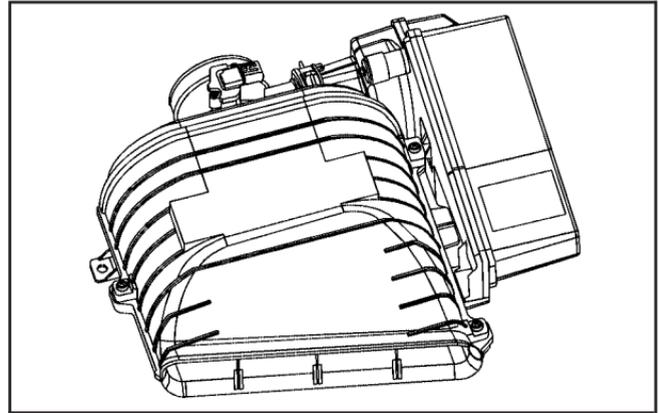
When to Inspect

See *Scheduled Maintenance on page 6-4* for more information.

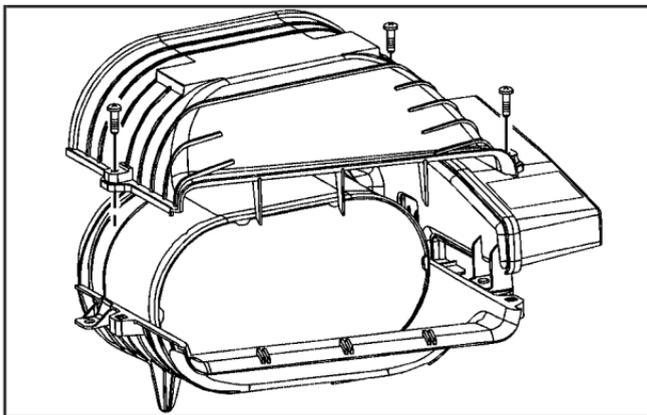
How to Inspect

When the restriction indicator is in the red/orange “change” zone, replace the filter and reset the restriction indicator.

To inspect and replace the filter and reset the restriction indicator, do the following:



The air cleaner/filter assembly is located at the front of the engine compartment.



1. Loosen the screws on the cover of the housing and lift up the cover.
2. Remove the air cleaner/filter from the housing. Care should be taken to dislodge as little dirt as possible.
3. Clean the filter sealing surface and the housing.
4. Install the new engine air cleaner/filter.
5. Reinstall the cover and tighten the screws.
6. Reset the air cleaner/filter restriction indicator, if equipped, by pressing the top button on the indicator.

See *Scheduled Maintenance* on page 6-4 to determine when to replace the engine air cleaner/filter.

⚠ CAUTION:

Operating the engine with the air cleaner/filter off can cause you or others to be burned. The air cleaner not only cleans the air; it helps to stop flames if the engine backfires. If it is not there and the engine backfires, you could be burned. Do not drive with it off, and be careful working on the engine with the air cleaner/filter off.

Notice: If the air cleaner/filter is off, a backfire can cause a damaging engine fire. And, dirt can easily get into your engine, which will damage it. Always have the air cleaner/filter in place when you are driving.

Automatic Transmission Fluid

When to Check and Change (Pickup Models)

A good time to check your automatic transmission fluid level is when the engine oil is changed.

Change both the fluid and filter every 25,000 miles (41 500 km) if the vehicle is mainly driven under one or more of these conditions:

- In heavy city traffic where the outside temperature regularly reaches 90°F (32°C) or higher.
- In hilly or mountainous terrain.
- When doing frequent trailer towing.
- Uses such as found in taxi, police or delivery service.

If you do not use your vehicle under any of these conditions, change the fluid and filter every 50,000 miles (83 000 km).

See *Scheduled Maintenance on page 6-4*.

How to Check

Because this operation can be a little difficult, you may choose to have this done at the dealership service department.

If you do it yourself, be sure to follow all the instructions here, or you could get a false reading on the dipstick.

Notice: Too much or too little fluid can damage your transmission. Too much can mean that some of the fluid could come out and fall on hot engine parts or exhaust system parts, starting a fire. Too little fluid could cause the transmission to overheat. Be sure to get an accurate reading if you check your transmission fluid.

Wait at least 30 minutes before checking the transmission fluid level if you have been driving:

- When outside temperatures are above 90°F (32°C).
- At high speed for quite a while.
- In heavy traffic — especially in hot weather.
- While pulling a trailer.

Checking the Fluid Level

Prepare your vehicle as follows:

- Park your vehicle on a level place. Keep the engine running.
- With the parking brake applied, place the shift lever in PARK (P).
- With your foot on the brake pedal, run the engine for at least one minute and shift to DRIVE (D). Then shift to NEUTRAL (N) and then REVERSE (R) to fill the hydraulic system. Then, put the shift lever in PARK (P).
- Allow the engine to run at idle (500 – 800 rpm). Slowly release the brake pedal.

Then, without shutting off the engine, follow these steps:

Cold Check Procedure

The purpose of the cold check is to determine if the transmission has enough fluid to be operated safely until a hot check can be made. The fluid level rises as fluid temperature increases.

DO NOT fill above the COLD CHECK band if the transmission fluid is below normal operating temperatures.

1. Pull out the dipstick and wipe it with a clean rag or paper towel. The transmission dipstick is located near the center of the engine compartment. See *Engine Compartment Overview on page 5-20* for more information on location.
2. Push it back in all the way, wait three seconds and then pull it back out again.
3. Check the fluid level reading. Repeat the check procedure to verify the reading.
4. If the fluid level is within the COLD CHECK band, the transmission may be operated until the fluid is hot enough to perform a hot check. If the fluid level is not within the COLD CHECK band, add or drain fluid as necessary to bring the level into the middle of the COLD CHECK band.
5. Perform a hot check at the first opportunity after the normal operating temperature of 160°F (71°C) to 200°F (93°C) is reached.
6. If the fluid level is in the acceptable range, push the dipstick back in all the way.

Hot Check Procedure

The fluid must be hot to ensure an accurate check. The fluid level rises as temperature increases.

1. Operate the transmission in DRIVE (D) until the normal operating temperature of 160°F (71°C) to 200°F (93°C) is reached.
2. Pull out the dipstick and wipe it with a clean rag or paper towel.
3. Push it back in all the way, wait three seconds and then pull it back out again. Repeat the check procedure to verify the reading.
4. Safe operating level is within the HOT RUN band on the dipstick. The width of the HOT RUN band represents approximately 1.06 quart (1.0 liter) of fluid at normal operating temperature.
5. If the fluid level is not within the HOT RUN band, add or drain fluid as necessary to bring the fluid level to within the HOT RUN band.
6. If the fluid level is in the acceptable range, push the dipstick back in all the way.

Consistency of Readings

Always check the fluid level at least twice using the procedures described previously. Consistency (repeatable readings) is important to maintaining proper fluid level. If inconsistent readings persist, check the transmission breather to be sure it is clean and unclogged. If readings are still inconsistent, contact your dealer.

How to Add Fluid

In cold operation, Allison recommends using Synthetic Transmission Fluid approved to Allison Transmission specification TES-295 in areas where the minimum ambient temperatures are below -40°C (-40°F).

Refer to the Maintenance Schedule to determine what kind of transmission fluid to use. See *Recommended Fluids and Lubricants on page 6-15*.

Add fluid only after checking the transmission fluid while it is hot. A cold check is used only as a reference. If the fluid level is low, add only enough of the proper fluid to bring the level up to the HOT area for a hot check. It doesn't take much fluid, generally less than one pint (0.5 L). *Don't overfill.*

Notice: Use of the incorrect automatic transmission fluid may damage your vehicle, and the damages may not be covered by your warranty. Always use the automatic transmission fluid listed in *Recommended Fluids and Lubricants on page 6-15*.

- After adding fluid, recheck the fluid level as described under “How to Check.”
- When the correct fluid level is obtained, push the dipstick back in all the way.

When to Check and Change (Van Models)

A good time to check your automatic transmission fluid level is when the engine oil is changed.

Change the fluid and filter at the intervals listed in “Additional Required Services”. See *Additional Required Services on page 6-7*.

And be sure to use the transmission fluid listed in “Recommended Fluids and Lubricants”. See *Recommended Fluids and Lubricants on page 6-15* for more information.

How to Check

Because this operation can be a little difficult, you may choose to have this done at the dealership service department.

If you do it yourself, be sure to follow all the instructions here, or you could get a false reading on the dipstick.

Notice: Too much or too little fluid can damage your transmission. Too much can mean that some of the fluid could come out and fall on hot engine parts or exhaust system parts, starting a fire. Too little fluid could cause the transmission to overheat. Be sure to get an accurate reading if you check your transmission fluid.

Wait at least 30 minutes before checking the transmission fluid level if you have been driving:

- When outside temperatures are above 90°F (32° C).
- At high speed for quite a while.
- In heavy traffic — especially in hot weather.
- While pulling a trailer.

To get the right reading, the fluid should be at normal operating temperature, which is 180°F to 200°F (82°C to 93°C). Get the vehicle warmed up by driving about 15 miles (24 km) when outside temperatures are above 50°F (10°C). If it is colder than 50°F (10°C), drive the vehicle until the engine temperature gage moves and then remains steady for 10 minutes.

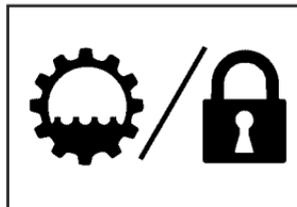
A cold check can be made after the vehicle has been sitting for eight hours or more with the engine off, but this is used only as a reference. Let the engine run at idle for five minutes if outside temperatures are 50°F (10°C) or more. If it is colder than 50°F (10°C), you may have to idle the engine longer. Should the fluid level be low during this cold check, you must check the fluid hot before adding fluid. Checking the fluid hot will give you a more accurate reading of the fluid level.

Checking the Fluid Level

Prepare your vehicle as follows:

- Park your vehicle on a level place. Keep the engine running.
- With the parking brake applied, place the shift lever in PARK (P).
- With your foot on the brake pedal, move the shift lever through each gear range, pausing for about three seconds in each range. Then, position the shift lever in PARK (P).
- Let the engine run at idle for three minutes or more.

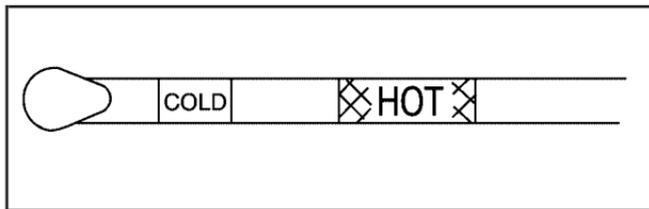
Then, without shutting off the engine, follow these steps:



The transmission dipstick is located near the center of the engine compartment and will be labeled with the graphic shown.

See *Engine Compartment Overview* on page 5-20 for more information on location.

1. Flip the handle up and then pull out the dipstick and wipe it with a clean rag or paper towel.
2. Push it back in all the way, wait three seconds and then pull it back out again.



Check both sides of the dipstick, and read the lower level. The fluid level must be in the COLD area for a cold check or in the HOT or cross-hatched area for a hot check. Be sure to keep the dipstick pointed down to get an accurate reading.

3. If the fluid level is in the acceptable range, push the dipstick in all the way, then flip the handle down to lock the dipstick in place.

How to Add Fluid

Refer to the Maintenance Schedule to determine what kind of transmission fluid to use. See *Recommended Fluids and Lubricants* on page 6-15.

Using a funnel, add fluid down the transmission dipstick tube only after checking the transmission fluid while it is hot. A cold check is used only as a reference. If the fluid level is low, add only enough of the proper fluid to bring the level up to the HOT area for a hot check. It does not take much fluid, generally less than one pint (0.5L). Do not overfill.

Notice: Use of the incorrect automatic transmission fluid may damage your vehicle, and the damages may not be covered by your warranty. Always use the automatic transmission fluid listed in *Recommended Fluids and Lubricants* on page 6-15.

- After adding fluid, recheck the fluid level as described under “How to Check” earlier in this section.
- When the correct fluid level is obtained, push the dipstick back in all the way. Then flip the handle down to lock the dipstick in place.

Engine Coolant

Pickup Models

The cooling system in your vehicle is filled with DEX-COOL[®] engine coolant. This coolant is designed to remain in your vehicle for 5 years or 150,000 miles (240 000 km), whichever occurs first, if you add only DEX-COOL[®] extended life coolant.

The following explains your cooling system and how to add coolant when it is low. If you have a problem with engine overheating, see *Engine Overheating* on page 5-44.

A 50/50 mixture of clean, drinkable water and DEX-COOL[®] coolant will:

- Give freezing protection down to -34°F (-37°C)
- Give boiling protection up to 265°F (129°C)
- Protect against rust and corrosion
- Help keep the proper engine temperature
- Let the warning lights and gages work as they should

Notice: Using coolant other than DEX-COOL[®] can cause premature engine, heater core, or radiator corrosion. In addition, the engine coolant may require changing sooner, at the first maintenance service after each 30,000 miles (50 000 km) or 24 months, whichever occurs first. Any repairs would not be covered by the vehicle warranty. Always use DEX-COOL[®] (silicate-free) coolant in the vehicle.

What to Use

Use a mixture of one-half *clean, drinkable water* and one-half DEX-COOL[®] coolant which won't damage aluminum parts. If you use this coolant mixture, you don't need to add anything else.

CAUTION:

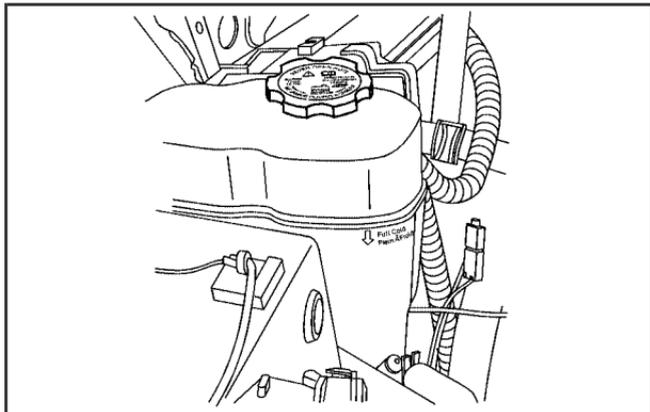
Adding only plain water to the cooling system can be dangerous. Plain water, or some other liquid such as alcohol, can boil before the proper coolant mixture will. The vehicle's coolant warning system is set for the proper coolant mixture. With plain water or the wrong mixture, the engine could get too hot but would not get the overheat warning. The engine could catch fire and you or others could be burned. Use a 50/50 mixture of clean, drinkable water and DEX-COOL[®] coolant.

Notice: If an improper coolant mixture is used, the engine could overheat and be badly damaged. The repair cost would not be covered by the vehicle warranty. Too much water in the mixture can freeze and crack the engine, radiator, heater core, and other parts.

If you have to add coolant more than four times a year, have your dealer check your cooling system.

Notice: If you use extra inhibitors and/or additives in your vehicle's cooling system, you could damage your vehicle. Use only the proper mixture of the engine coolant listed in this manual for the cooling system. See *Recommended Fluids and Lubricants on page 6-15* for more information.

Checking Coolant



The coolant surge tank is located in the engine compartment on the passenger side of the vehicle. See *Engine Compartment Overview* on page 5-20 for more information on its location.

⚠ CAUTION:

Turning the surge tank pressure cap when the engine and radiator are hot can allow steam and scalding liquids to blow out and burn you badly. Never turn the surge tank pressure cap — even a little — when the engine and radiator are hot.

The vehicle must be on a level surface. When your engine is cold, the coolant level should be at the FULL COLD mark.

If your vehicle has a low coolant sensor and the COOLANT LEVEL LOW ADD COOLANT Driver Information Center (DIC) message comes on, and stays on, it means the vehicle is low on engine coolant. See COOLANT LEVEL LOW ADD COOLANT under “DIC Warnings and Messages” in the Index of your vehicle’s owner manual.

Adding Coolant

If you need more coolant, add the proper DEX-COOL[®] coolant mixture *at the surge tank*, but only when the engine is cool. If the surge tank is empty, see *Engine Overheating on page 5-44*.

CAUTION:

You can be burned if you spill coolant on hot engine parts. Coolant contains ethylene glycol, and it will burn if the engine parts are hot enough. Do not spill coolant on a hot engine.

When replacing the pressure cap, make sure it is hand-tight.

Van Models

The cooling system in your vehicle is filled with DEX-COOL[®] engine coolant. This coolant is designed to remain in your vehicle for 5 years or 150,000 miles (240 000 km), whichever occurs first, if you add only DEX-COOL[®] extended life coolant.

The following explains your cooling system and how to add coolant when it is low. If you have a problem with engine overheating, see *Engine Overheating on page 5-44*.

A 50/50 mixture of clean, drinkable water and DEX-COOL[®] coolant will:

- Give freezing protection down to -34°F (-37°C).
- Give boiling protection up to 265°F (129°C).
- Protect against rust and corrosion.
- Help keep the proper engine temperature.
- Let the warning lights and gages work as they should.

Notice: Using coolant other than DEX-COOL may cause premature engine, heater core, radiator and fuel operated heater (FOH) corrosion. In addition, the engine coolant may require changing sooner, at 30,000 miles (50 000 km) or 24 months, whichever occurs first. Any repairs would not be covered by your warranty. Always use DEX-COOL (silicate-free) coolant in your vehicle.

What to Use

Use a mixture of one-half *clean, drinkable water* and one-half DEX-COOL[®] coolant which won't damage aluminum parts. If you use this coolant mixture, you don't need to add anything else.

CAUTION:

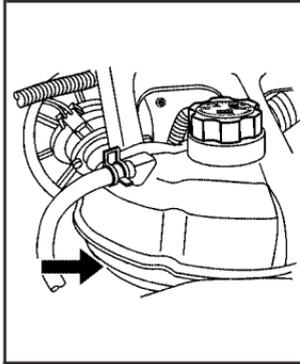
Adding only plain water to the cooling system can be dangerous. Plain water, or some other liquid such as alcohol, can boil before the proper coolant mixture will. The vehicle's coolant warning system is set for the proper coolant mixture. With plain water or the wrong mixture, the engine could get too hot but would not get the overheat warning. The engine could catch fire and you or others could be burned. Use a 50/50 mixture of clean, drinkable water and DEX-COOL[®] coolant.

Notice: If an improper coolant mixture is used, the engine could overheat and be badly damaged. The repair cost would not be covered by the vehicle warranty. Too much water in the mixture can freeze and crack the engine, radiator, heater core, and other parts.

If you have to add coolant more than four times a year, have your dealer check your cooling system.

Notice: If you use extra inhibitors and/or additives in your vehicle's cooling system, you could damage your vehicle. Use only the proper mixture of the engine coolant listed in this manual for the cooling system. See *Recommended Fluids and Lubricants on page 6-15* for more information.

Checking Coolant



The surge tank is located near the center of the engine compartment. See *Engine Compartment Overview* on page 5-20 for more information on its location.

CAUTION:

Turning the surge tank pressure cap when the engine and radiator are hot can allow steam and scalding liquids to blow out and burn you badly. Never turn the surge tank pressure cap — even a little — when the engine and radiator are hot.

The vehicle must be on a level surface. When your engine is cold, the coolant level should be at the COLD FILL mark.

Adding Coolant

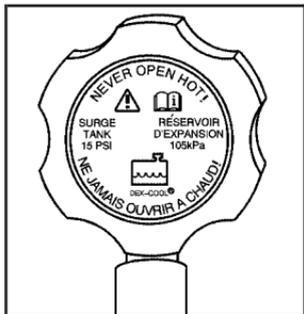
If you need more coolant, add the proper DEX-COOL[®] coolant mixture *at the surge tank*, but be careful not to spill it.

CAUTION:

You can be burned if you spill coolant on hot components in the engine compartment. Coolant contains ethylene glycol, and it will burn if the engine parts are hot enough. Do not spill coolant on a hot engine or components in the engine compartment.

When replacing the pressure cap, make sure it is hand-tight.

Coolant Surge Tank Pressure Cap



The surge tank pressure cap must be tightly installed.

Notice: If the pressure cap is not tightly installed, coolant loss and possible engine damage may occur. Be sure the cap is properly and tightly secured.

Engine Overheating

You will find an engine coolant temperature gage on the instrument panel cluster. For pickup models, the ENGINE OVERHEATED message may appear in the Driver Information Center (DIC). See your owner's manual for more information.

If Steam Is Coming From Your Engine

CAUTION:

Steam from an overheated engine can burn you badly, even if you just open the hood. Stay away from the engine if you see or hear steam coming from it. Just turn it off and get everyone away from the vehicle until it cools down. Wait until there is no sign of steam or coolant before you open the hood.

If you keep driving when your engine is overheated, the liquids in it can catch fire. You or others could be badly burned. Stop your engine if it overheats, and get out of the vehicle until the engine is cool.

Notice: If the engine catches fire because of being driven with no coolant, your vehicle can be badly damaged. The costly repairs would not be covered by the vehicle warranty.

If No Steam Is Coming From Your Engine

The ENGINE OVERHEATED STOP ENGINE, or ENGINE OVERHEATED IDLE ENGINE Driver Information Center (DIC) message, along with a low coolant condition can indicate a serious problem.

If you get an engine overheat warning and do not have a low coolant condition, but see or hear no steam, the problem may not be too serious. Sometimes the engine can get a little too hot when you:

- Climb a long hill on a hot day.
- Stop after high-speed driving.
- Idle for long periods in traffic.
- Tow a trailer. See “Driving on Grades” in the Index of the vehicle’s owner manual.

If you get the ENGINE OVERHEATED STOP ENGINE, or ENGINE OVERHEATED IDLE ENGINE Driver Information Center (DIC) message with no sign of steam, try this for a minute or so:

1. In heavy traffic, let the engine idle in NEUTRAL (N) while stopped. If it is safe to do so, pull off the road, shift to PARK (P) or NEUTRAL (N), and let the engine idle.
2. Turn on your heater to full hot at the highest fan speed and open the window as necessary.

If you no longer have the overheat warning, you can drive. Just to be safe, drive slower for about 10 minutes. If the warning does not come back on, you can drive normally.

If the warning continues, pull over, stop, and park your vehicle right away.

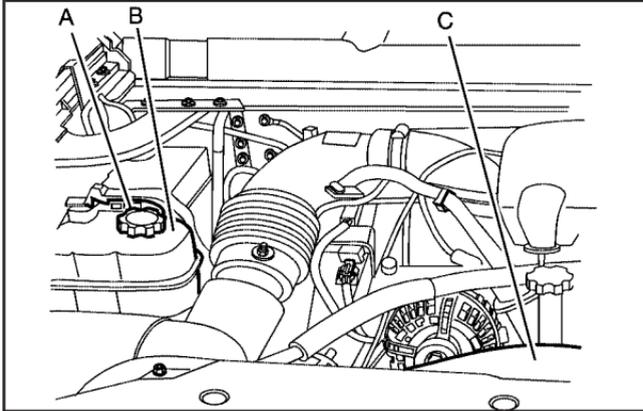
If there is still no sign of steam and your vehicle is equipped with an engine driven cooling fan, push down the accelerator until the engine speed is about twice as fast as normal idle speed for at least five minutes while you are parked. If you still have the warning, *turn off the engine and get everyone out of the vehicle* until it cools down.

You may decide not to lift the hood but to get service help right away.

Cooling System

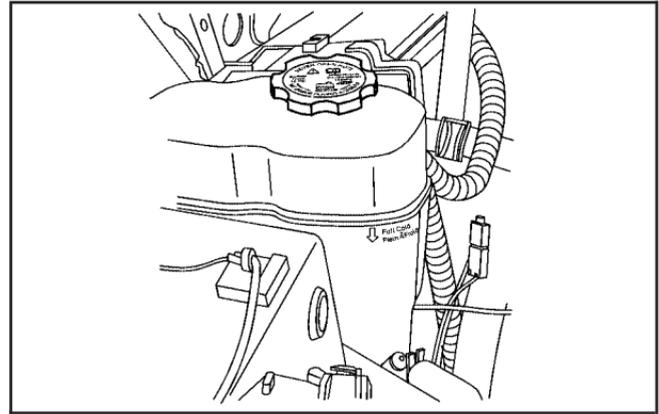
Pickup Models

When you decide it is safe to lift the hood, here is what you will see:



- A. Coolant Surge Tank Pressure Cap
- B. Coolant Surge Tank
- C. Engine Fan

If the coolant inside the coolant surge tank is boiling, do not do anything else until it cools down. The vehicle should be parked on a level surface.



The coolant level should be at or above the FULL COLD mark. If it isn't, you may have a leak at the pressure cap or in the radiator hoses, heater hoses, radiator, water pump or somewhere else in the cooling system.

 **CAUTION:**

Heater and radiator hoses, and other engine parts, can be very hot. Do not touch them. If you do, you can be burned.

Do not run the engine if there is a leak. If you run the engine, it could lose all coolant. That could cause an engine fire, and you could be burned. Get any leak fixed before you drive the vehicle.

If there seems to be no leak, start the engine again. If your vehicle is equipped with an engine driven cooling fan, the engine cooling fan speed should increase when idle speed is doubled by pushing the accelerator pedal down. If it does not, your vehicle needs service. Turn off the engine.

Notice: Engine damage from running the engine without coolant is not covered by the warranty.

Notice: Using coolant other than DEX-COOL[®] can cause premature engine, heater core, or radiator corrosion. In addition, the engine coolant could require changing sooner, at 30,000 miles (50 000 km) or 24 months, whichever occurs first. Any repairs would not be covered by the vehicle warranty. Always use DEX-COOL[®] (silicate-free) coolant in the vehicle.

How to Add Coolant to the Coolant Surge Tank

Notice: The diesel engine has a specific coolant fill procedure. Failure to follow this procedure could cause your engine to overheat and be severely damaged.

If you have not found a problem yet, check to see if coolant is visible in the surge tank. If coolant is visible but the coolant level is not at or above the FULL COLD mark, add a 50/50 mixture of *clean, drinkable water* and DEX-COOL[®] coolant at the coolant surge tank, but be sure the cooling system, including the coolant surge tank pressure cap, is cool before you do it. See *Engine Coolant on page 5-38* for more information.

If no coolant is visible in the surge tank, add coolant as follows:

CAUTION:

Steam and scalding liquids from a hot cooling system can blow out and burn you badly. They are under pressure, and if you turn the coolant surge tank pressure cap — even a little — they can come out at high speed. Never turn the cap when the cooling system, including the coolant surge tank pressure cap, is hot. Wait for the cooling system and coolant surge tank pressure cap to cool if you ever have to turn the pressure cap.

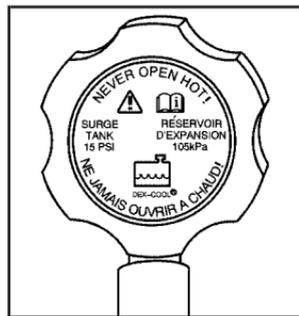
CAUTION:

Adding only plain water to the cooling system can be dangerous. Plain water, or some other liquid such as alcohol, can boil before the proper coolant mixture will. The vehicle's coolant warning system is set for the proper coolant mixture. With plain water or the wrong mixture, the engine could get too hot but you would not get the overheat warning. The engine could catch fire and you or others could be burned. Use a 50/50 mixture of clean, drinkable water and DEX-COOL® coolant.

Notice: In cold weather, water can freeze and crack the engine, radiator, heater core and other parts. Use the recommended coolant and the proper coolant mixture.

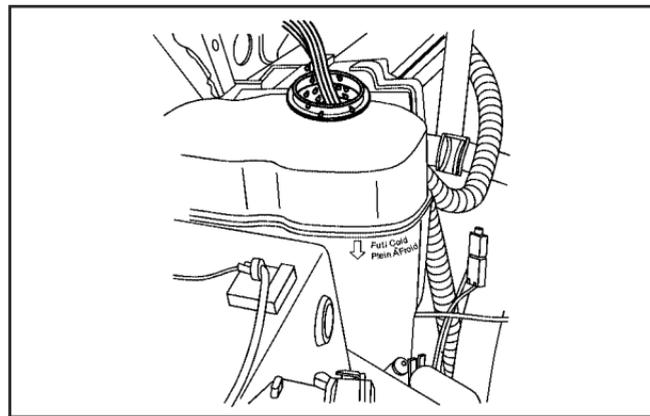
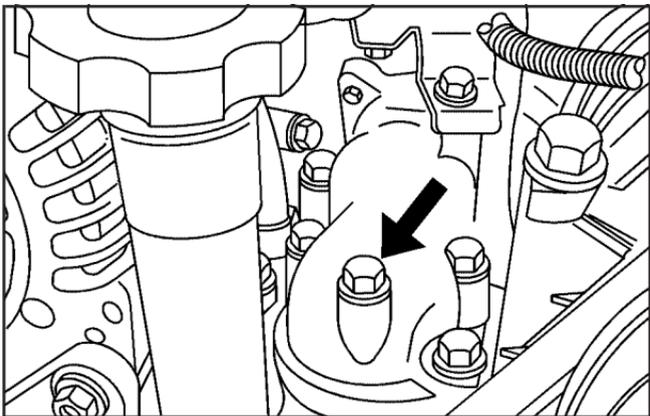
CAUTION:

You can be burned if you spill coolant on hot engine parts. Coolant contains ethylene glycol and it will burn if the engine parts are hot enough. Do not spill coolant on a hot engine.



Park the vehicle on a level surface. You can remove the coolant surge tank pressure cap when the cooling system, including the coolant surge tank pressure cap and upper radiator hose, is no longer hot.

1. Turn the pressure cap slowly counterclockwise. If you hear a hiss, wait for that to stop. A hiss means there is still some pressure left.
2. Then keep turning the pressure cap slowly, and remove it.



3. After the engine cools, open the air bleed valve on the thermostat housing.

Fill with the proper mixture. Add coolant until you see a steady stream of coolant coming from the bleed valve.

4. Close the bleed valve.
5. Wipe the spilled coolant from the engine and compartment.

6. Then fill the coolant surge tank with the proper mixture, to the FULL COLD mark.

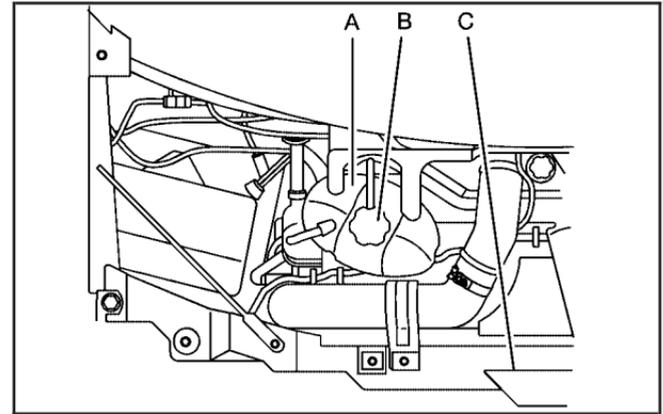
7. With the coolant surge tank pressure cap off, start the engine and let it run until the engine coolant temperature gage indicates approximately 195°F (90°C).

By this time, the coolant level inside the coolant surge tank may be lower. If the level is lower, add more of the proper mixture to the coolant surge tank until the level reaches the FULL COLD mark.

8. Then replace the pressure cap. Be sure the pressure cap is hand-tight and fully seated.
9. Check the coolant level after the engine is shut off and the coolant is cold. If necessary, repeat coolant fill Steps 6 through 9.

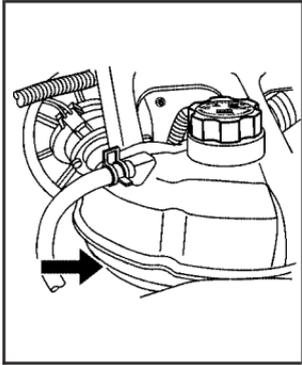
Van Models

When you decide it is safe to lift the hood, here is what you will see:



- A. Coolant Surge Tank
- B. Coolant Surge Tank Pressure Cap
- C. Engine Cooling Fan

If the coolant inside the coolant surge tank is boiling, do not do anything else until it cools down.



When the engine is cold, the coolant level should be at or above the COLD FILL mark.

If it is not, you may have a leak at the pressure cap or in the radiator hoses, heater hoses, radiator, water pump, fuel operated heater (FOH) or somewhere else in the cooling system.

⚠ CAUTION:

Heater and radiator hoses, the fuel operated heater (FOH) and other engine parts, can be very hot. Do not touch them. If you do, you can be burned.

Do not run the engine if there is a leak. If you run the engine, it could lose all coolant. That could cause an engine fire, and you could be burned. Get any leak fixed before you drive the vehicle.

If there seems to be no leak, start the engine again. See if the engine cooling fan speed increases when idle speed is doubled by pushing the accelerator pedal down. If it does not, your vehicle needs service. Turn off the engine.

Notice: Engine damage from running the engine without coolant is not covered by the warranty.

Notice: Using coolant other than DEX-COOL may cause premature engine, heater core, radiator and fuel operated heater (FOH) corrosion. In addition, the engine coolant may require changing sooner, at 30,000 miles (50 000 km) or 24 months, whichever occurs first. Any repairs would not be covered by your warranty. Always use DEX-COOL (silicate-free) coolant in your vehicle.

How to Add Coolant to the Coolant Surge Tank

Notice: The diesel engine has a specific coolant fill procedure. Failure to follow this procedure could cause your engine to overheat and be severely damaged.

If you have not found a problem yet, but the coolant level is not at the COLD FILL mark, add a 50/50 mixture of clean, drinkable water and DEX-COOL[®] engine coolant at the coolant surge tank. See *Engine Coolant* on page 5-38 for more information.

If no coolant is visible in the surge tank, add coolant as follows:

CAUTION:

Steam and scalding liquids from a hot cooling system can blow out and burn you badly. They are under pressure, and if you turn the coolant surge tank pressure cap — even a little — they can come out at high speed. Never turn the cap when the cooling system, including the coolant surge tank pressure cap, is hot. Wait for the cooling system and coolant surge tank pressure cap to cool if you ever have to turn the pressure cap.

 **CAUTION:**

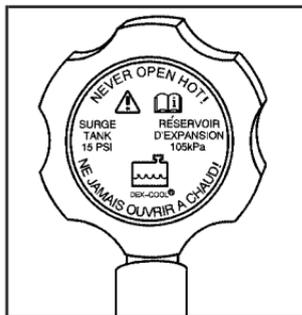
Adding only plain water to the cooling system can be dangerous. Plain water, or some other liquid such as alcohol, can boil before the proper coolant mixture will. The vehicle's coolant warning system is set for the proper coolant mixture. With plain water or the wrong mixture, the engine could get too hot but you would not get the overheat warning. The engine could catch fire and you or others could be burned. Use a 50/50 mixture of clean, drinkable water and DEX-COOL[®] coolant.

Notice: In cold weather, water can freeze and crack the engine, radiator, fuel operated heater (FOH), heater core and other parts. Use the recommended coolant and the proper coolant mixture.

 **CAUTION:**

You can be burned if you spill coolant on hot components in the engine compartment or on the fuel operated heater (FOH). Coolant contains ethylene glycol, and it will burn if the engine parts are hot enough. Do not spill coolant on a hot engine or components in the engine compartment.

When the coolant in the coolant surge tank is at the COLD FILL mark, start your vehicle.



1. You can remove the coolant surge tank pressure cap when the cooling system, including the coolant surge tank pressure cap and upper radiator hose, is no longer hot.

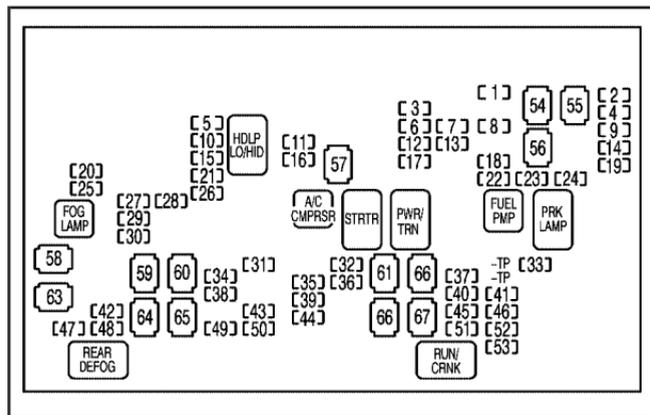
Turn the pressure cap slowly counterclockwise about one full turn. If you hear a hiss, wait for that to stop. A hiss means there is still some pressure left.

2. Then keep turning the pressure cap slowly, and remove it.

3. Fill the coolant surge tank with the proper mixture, up to the FULL COLD mark. See *Engine Coolant on page 5-38*
4. With the coolant surge tank pressure cap off, start the engine and let it run until you can feel the upper radiator hose getting hot. Watch out for the engine cooling fan. By this time, the coolant level inside the coolant surge tank may be lower. If the level is lower, add more of the proper mixture to the coolant surge tank until the level reaches the FULL COLD mark.
5. Then replace the pressure cap. Be sure the pressure cap is hand-tight and fully seated.

Electrical System

Underhood Fuse Block



Pickup Models

The underhood fuse block is located in the engine compartment, on the driver side of the vehicle. Lift the cover to access the fuse block.

To remove fuses, hold the end of the fuse between your thumb and index finger and pull straight out.

Fuses	Usage
1	Electronic Stability Suspension Control, Automatic Level Control Exhaust
2	Left Trailer Stop/Turn Lamp
3	Engine Controls
4	Right Trailer Stop/Turn Lamp
5	Front Washer
6	Fuel heater
7	Transmission Control Module (Battery)
8	Anti-lock Brakes System 2
9	Trailer Back-up Lamps
10	Driver Side Low-Beam Headlamp
11	Engine Control Module (Battery)
12	Diesel Electronic Control Module
13	Transmission Ignition 1
14	Vehicle Back-up Lamps
15	Passenger Side Low-Beam Headlamp
16	Air Conditioning Compressor

Fuses	Usage
17	Electronic Control Module/ Throttle Control
18	Fuel Pump
19	Integrated Trailer Brake Control
20	Headlamp Washer
21	Rear Windshield Washer
22	Trailer Park Lamps
23	Driver Side Park Lamps
24	Passenger Side Park Lamps
25	Fog Lamps
26	Horn
27	Passenger Side High-Beam Headlamp
28	Daytime Running Lamps
29	Driver Side High-Beam Headlamp
30	Daytime Running Lamp 2
31	Sunroof
32	Key Ignition System, Theft Deterrent System
33	Windshield Wiper

Fuses	Usage
34	SEO B2 Upfitter Usage (Battery)
35	Electric Adjustable Pedals
36	Climate Controls (Battery)
37	Airbag System (Ignition)
38	Amplifier
39	Audio System
40	Miscellaneous (Ignition), Cruise Control
41	Tailgate Open/Close Assist
42	Airbag System (Battery)
43	Instrument Panel Cluster
44	Power Take-Off
45	Auxiliary Climate Control (Ignition), Compass-Temperature Mirror
46	Center High-Mounted Stoplamp (CHMSL)
47	Rear Defogger
48	Heated Mirrors
49	SEO B2 Upfitter Usage (Battery)
50	Cigarette Lighter, Auxiliary Power Outlet

Fuses	Usage
51	Automatic Level Control Compressor Relay, SEO Upfitter Usage
52	Climate Controls (Ignition)
53	Engine Control Module, Secondary Fuel Pump (Ignition)

J-Case Fuses	Usage
65	Climate Control Blower
66	Tailgate Open/Close Assist
67	Left Bussed Electrical Center 2

J-Case Fuses	Usage
54	Automatic Level Control Compressor
55	Heavy Duty Anti-lock Brake System
56	Anti-lock Brake System 1
57	Starter
58	Stud 2 (Trailer Brakes)
59	Left Bussed Electrical Center 1
60	Electric Running Boards
61	Heated Windshield Washer System
62	Four-Wheel Drive System
63	Stud 1 (Trailer Connector Battery Power)
64	Mid-Bussed Electrical Center 1

Relays	Usage
HDLP LO/HID	Low-Beam Headlamp
FOG LAMP	Front Fog Lamps
A/C CMPRSR	Air Conditioning Compressor
STRTR	Starter
PWR/TRN	Powertrain
FUEL PMP	Fuel Pump
PRK LAMP	Parking Lamps
REAR DEFOG	Rear Defogger
RUN/CRNK	Switched Power

Capacities and Specifications

Specification Charts

The following approximate capacities are given in English and metric conversions. See *Recommended Fluids and Lubricants on page 6-15* for more information.

Application	Capacities	
	English	Metric
Cooling System (Pickup Models)	24.7 quarts	23.4 L
Cooling System (Van Models)		
Front Heat or AC Only	21.0 quarts	20.0 L
Front Heat or AC Plus Fuel Operated Heater (FOH)	22.0 quarts	20.5 L
Front and Rear Heat or AC Only	22.5 quarts	21.5 L
Front and Rear Heat or AC Plus Fuel Operated Heater (FOH)	23.5 quarts	22.5 L
Engine Oil With Filter	10.0 quarts	9.5 L
All quantities are approximate. When adding, be sure to fill to the appropriate level, as recommended in this manual. Recheck fluid level after filling.		

Engine Specifications

Engine	VIN Code	Type
6.6L V8 Turbo Diesel (LMM Engine)	6	V8

Section 6 Maintenance Schedule

Maintenance Schedule	6-2	Owner Checks and Services	6-12
Introduction	6-2	At Each Fuel Fill	6-12
Maintenance Requirements	6-2	At Least Once a Month	6-12
Your Vehicle and the Environment	6-2	At Least Once a Year	6-13
Using the Maintenance Schedule	6-2	Recommended Fluids and Lubricants	6-15
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Maintenance Footnotes	6-9	Maintenance Record	6-20

Maintenance Schedule

Introduction

Important: Keep engine oil at the proper level and change as recommended.



Have you purchased the GM Protection Plan? The Plan supplements your new vehicle warranties. See your Warranty and Owner Assistance booklet or your dealer/retailer for details.

Maintenance Requirements

Notice: Maintenance intervals, checks, inspections, replacement parts, and recommended fluids and lubricants as prescribed in this manual are necessary to keep your vehicle in good working condition. Any damage caused by failure to follow scheduled maintenance might not be covered by warranty.

Your Vehicle and the Environment

Proper vehicle maintenance not only helps to keep your vehicle in good working condition, but also helps the environment. All recommended maintenance is important. Improper vehicle maintenance can even affect the quality of the air we breathe. Improper fluid levels or the wrong tire inflation can increase the level of emissions from your vehicle. To help protect our environment, and to keep your vehicle in good condition, be sure to maintain your vehicle properly.

Using the Maintenance Schedule

We want to help you keep your vehicle in good working condition. But we do not know exactly how you will drive it. You might drive very short distances only a few times a week. Or you might drive long distances all the time in very hot, dusty weather. You might use your vehicle in making deliveries. Or you might drive it to work, to do errands, or in many other ways.

Because of all the different ways people use their vehicles, maintenance needs vary. You might need more frequent checks and replacements. So please read the following and note how you drive. If you have any questions on how to keep your vehicle in good condition, see your dealer/retailer.

This schedule is for vehicles that:

- carry passengers and cargo within recommended limits. You will find these limits on the Tire and Loading Information label. See “Loading Your Vehicle” in your owner manual.
- are driven on reasonable road surfaces within legal driving limits.
- are driven off-road in the recommended manner, pickup models only. See “Off-Road Driving” in your owner manual.
- use the recommended fuel. See *Diesel Engine Fuel* on page 5-3.

The services in *Scheduled Maintenance on page 6-4* should be performed when indicated. See *Additional Required Services on page 6-7* and *Maintenance Footnotes on page 6-9* for further information.

CAUTION:

Performing maintenance work on a vehicle can be dangerous. In trying to do some jobs, you can be seriously injured. Do your own maintenance work only if you have the required know-how and the proper tools and equipment for the job. If you have any doubt, see your dealer/retailer to have a qualified technician do the work. See “Doing Your Own Service Work” in your owner manual.

Some maintenance services can be complex. So, unless you are technically qualified and have the necessary equipment, you should have your dealer/retailer do these jobs.

When you go to your dealer/retailer for your service needs, you will know that trained and supported service technicians will perform the work using genuine parts.

If you want to purchase service information, see “Service Publications Ordering Information” in your owner manual.

Owner Checks and Services on page 6-12 tells you what should be checked, when to check it, and what you can easily do to help keep your vehicle in good condition.

The proper replacement parts, fluids, and lubricants to use are listed in *Recommended Fluids and Lubricants on page 6-15* and *Maintenance Replacement Parts on page 6-18*. When your vehicle is serviced, make sure these are used. All parts should be replaced and all necessary repairs done before you or anyone else drives the vehicle. We recommend the use of genuine parts from your dealer/retailer.

Scheduled Maintenance

When the CHANGE ENGINE OIL message (pickup models) or the change engine oil light (van models) comes on, it means that service is required for your vehicle. Have your vehicle serviced as soon as possible within the next 600 miles (1 000 km). It is possible that, if you are driving under the best conditions, the engine oil life system may not indicate that vehicle service is necessary for over a year. However, your engine oil and filter must be changed at least once a year and at this time the system must be reset. Your dealer/retailer has trained service technicians who will perform this work using genuine parts and reset the system.

If the engine oil life system is ever reset accidentally, you must service your vehicle within 3,000 miles (5 000 km) since your last service. Remember to reset the oil life system whenever the oil is changed. See *Engine Oil Life System on page 5-26* for information on the Engine Oil Life System and resetting the system.

When the message or light appears, certain services, checks, and inspections are required. Required services are described in the following for “Maintenance I” and “Maintenance II.” Generally, it is recommended that your first service be Maintenance I, your second service be Maintenance II, and that you alternate Maintenance I and Maintenance II thereafter. However, in some cases, Maintenance II may be required more often.

Maintenance I — Use Maintenance I if the message or light comes on within 10 months since the vehicle was purchased or Maintenance II was performed.

Maintenance II — Use Maintenance II if the previous service performed was Maintenance I. Always use Maintenance II whenever the message or light comes on 10 months or more since the last service or if the message or light has not come on at all for one year.

Scheduled Maintenance

Service	Maintenance I	Maintenance II
Change engine oil and filter. See <i>Engine Oil on page 5-23</i> . Reset oil life system. See <i>Engine Oil Life System on page 5-26</i> . An <i>Emission Control Service</i> .	•	•
Allison Transmission [®] only: Replace external transmission filter at the first maintenance service performed on the vehicle.		
Lubricate chassis components. See <i>footnote #</i> .	•	•
Visually check for any leaks or damage. See <i>footnote (a)</i> .	•	•
Inspect engine air cleaner filter or change indicator, if equipped. If necessary, replace filter. See <i>Engine Air Cleaner/Filter on page 5-28</i> . See <i>footnote (b)</i> .		•
Rotate tires and check inflation pressures and wear. See “Tire Inspection and Rotation” in your owner manual. See “Tire Wear Inspection” in <i>At Least Once a Month on page 6-12</i> .	•	•
Inspect brake system. See <i>footnote (c)</i> .	•	•
Check engine coolant and windshield washer fluid levels and add fluid as needed.	•	•
Perform any needed additional services. See “Additional Required Services” in this section.	•	•
Inspect suspension and steering components. See <i>footnote (d)</i> .		•

Scheduled Maintenance (cont'd)

Service	Maintenance I	Maintenance II
Inspect engine cooling system. <i>See footnote (e).</i>		•
Inspect wiper blades. <i>See footnote (f).</i>		•
Inspect restraint system components. <i>See footnote (g).</i>		•
Lubricate body components. <i>See footnote (h).</i>		•
Check transmission fluid level and add fluid as needed.		•
Van models: Replace both fuel filters. <i>An Emission Control Service. See footnotes † and (i).</i>		•
Pickup models: Fuel filter service. <i>An Emission Control Service. See footnotes † and (j).</i>		•
Inspect shields and underhood insulation, vans with GVWR above 10,000 lbs (4 536 kg) and all pickups. <i>See footnote (k).</i>		•
Check air intake system. <i>See footnote (l).</i>		•
Van models: Inspect throttle system. <i>See footnote (m).</i>		•

Additional Required Services

The following services should be performed at the first maintenance service (I or II) after the indicated miles (kilometers) shown for each item.

Additional Required Services

Service and Miles (Kilometers)	25,000 (40 000)	50,000 (80 000)	75,000 (120 000)	100,000 (160 000)	125,000 (200 000)	150,000 (240 000)
Inspect fuel system for damage or leaks.	•	•	•	•	•	•
Inspect exhaust system, including DPF pressure lines, for loose or damaged components.	•	•	•	•	•	•
Pickup models: Change automatic transmission fluid and external transmission filter (severe service). <i>See footnote (p).</i>	•	•	•	•	•	•
Pickup models: Change automatic transmission fluid and external transmission filter (normal service).		•		•		•
Van models: Change automatic transmission fluid and filter (severe service). <i>See footnote (p).</i>		•		•		•

Additional Required Services (cont'd)

Service and Miles (Kilometers)	25,000 (40 000)	50,000 (80 000)	75,000 (120 000)	100,000 (160 000)	125,000 (200 000)	150,000 (240 000)
Van models: Change automatic transmission fluid and filter (normal service).				•		
Four-wheel drive pickup models: Change transfer case fluid (extreme duty service). <i>See footnotes (n) and (o).</i>	•	•	•	•	•	•
Four-wheel drive: Change transfer case fluid (severe service). <i>See footnotes (n) and (t).</i>		•		•		•
Four-wheel drive: Change transfer case fluid (normal service). <i>See footnote (n).</i>				•		
Engine cooling system service (or every five years, whichever occurs first). <i>An Emission Control Service. See footnote (r).</i>						•
Inspect engine accessory drive belt. <i>An Emission Control Service. See footnote (s).</i>						•

Maintenance Footnotes

† *The U.S. Environmental Protection Agency or the California Air Resources Board has determined that the failure to perform this maintenance item will not nullify the emission warranty or limit recall liability prior to the completion of the vehicle's useful life. We, however, urge that all recommended maintenance services be performed at the indicated intervals and the maintenance be recorded.*

Lubricate the front suspension, steering linkage, rear driveline center splines (van models), and parking brake cable guides. Control arm ball joints on pickup models require lubrication but should not be lubricated unless their temperature is 10°F (-12°C) or higher, or they could be damaged. Vehicles used under severe commercial operating conditions require lubrication on a regular basis every 3,000 miles (5 000 km).

(a) *A fluid loss in any vehicle system could indicate a problem. Have the system inspected and repaired and the fluid level checked. Add fluid if needed.*

(b) *If you drive regularly under dusty conditions, inspect the filter or change indicator, if equipped, at each engine oil change.*

(c) *Visually inspect brake lines and hoses for proper hook-up, binding, leaks, cracks, chafing, etc. Inspect disc brake pads for wear and rotors for surface condition. Inspect drum brake linings/shoes for wear or cracks. Inspect other brake parts, including drums, wheel cylinders, calipers, parking brake, etc.*

(d) *Visually inspect front and rear suspension and steering system for damaged, loose, or missing parts, signs of wear or lack of lubrication. Inspect power steering lines and hoses for proper hook-up, binding, leaks, cracks, chafing, etc. Pickup models: Visually check constant velocity joints, rubber boots, and axle seals for leaks.*

(e) *Visually inspect hoses and have them replaced if they are cracked, swollen, or deteriorated. Inspect all pipes, fittings, and clamps; replace with genuine parts as needed. To help ensure proper operation, a pressure test of the cooling system and pressure cap and cleaning the outside of the radiator and air conditioning condenser is recommended at least once a year.*

(f) *Inspect wiper blades for wear, cracking, or contamination. Clean the windshield and wiper blades, if contaminated. Replace wiper blades that are worn or damaged. See "Windshield and Wiper Blades" and "Windshield Wiper Blade Replacement" in the owner manual for more information.*

(g) *Make sure the safety belt reminder light and safety belt assemblies are working properly. Look for any other loose or damaged safety belt system parts. If you see anything that might keep a safety belt system from doing its job, have it repaired. Have any torn or frayed safety belts replaced. Also see "Checking the Restraint Systems" in the owner manual.*

(h) *Lubricate all key lock cylinders, body door hinges, hood latch assembly, secondary latch, pivots, spring anchor, release pawl, fuel door hinge, locks, latches, and any folding or moving seat hardware. Pickup models: Lubricate tailgate hinges, tailgate linkage, tailgate handle pivot points, and latch bolt. Van models: Lubricate hood hinges and rear compartment hinges. More frequent lubrication may be required when exposed to a corrosive environment. Applying silicone grease on weatherstrips with a clean cloth will make them last longer, seal better, and not stick or squeak.*

(i) *Van Models: If the two chassis mounted fuel filters have not been replaced, or if the vehicle has been driven 20,000 miles (32 000 km) or more since the fuel filters were last replaced, replace both fuel filters.*

(j) *Pickup Models: This vehicle has a CHANGE FUEL FILTER message in the Driver Information Center (DIC) to tell you when to replace the fuel filter.*

See DIC Warnings and Messages on page 3-8 for more information and how to reset the message after the fuel filter is replaced. If the fuel filter has not been replaced, or if the vehicle has been driven 15,000 miles (25 000 km) or more since the fuel filter was last replaced, replace the filter and reset the message.

(k) *Inspect shields and underhood insulation for damage or looseness. Adjust or replace as required. This is a Noise Emission Control Service. Applicable to vehicles sold in the United States and recommended for vehicles sold in Canada.*

(l) *Check the air intake system installation to assure that gaskets are properly sealed and that all hose connections, fasteners, and other components are tight. Also check to be sure that the air cleaner housing is properly seated and the cover fits tightly. Tighten connections and fasteners or replace damaged parts as necessary. This is a Noise Emission Control Service. Applicable to vehicles sold in the United States and recommended for vehicles sold in Canada.*

(m) *Check system for interference or binding and for damaged or missing parts. Replace parts as needed. Replace any components that have high effort or excessive wear. Do not lubricate accelerator or cruise control cables.*

(n) *Check vent hose at transfer case for kinks and proper installation. Check to be sure vent hose is unobstructed, clear, and free of debris. During any maintenance, if a power washer is used to clean mud and dirt from the underbody, care should be taken to not directly spray the transfer case output seals. High pressure water can overcome the seals and contaminate the transfer case fluid. Contaminated fluid will decrease the life of the transfer case and should be replaced.*

(o) *Extreme Duty Service: Change transfer case fluid if the vehicle is mainly driven off-road in four-wheel drive, or is used for heavy trailer towing. Farming, mining, forestry, and Department of Natural Resources (DNR) vehicles meet this definition.*

(p) *Change automatic transmission fluid and external transmission filter if the vehicle is mainly driven under one or more of these conditions:*

- In heavy city traffic where the outside temperature regularly reaches 90°F (32°C) or higher.*
- In hilly or mountainous terrain.*
- When doing frequent trailer towing.*
- Uses such as found in taxi, police, or delivery service.*

(q) *Check vent hose at transfer case for kinks and proper installation.*

(r) *Drain, flush, and refill cooling system. This service can be complex; you should have your dealer/retailer perform this service. See Engine Coolant on page 5-38 for what to use. Inspect hoses. Clean radiator, condenser, van model fuel operated heater (if equipped), pressure cap, and filler neck. Pressure test the cooling system and pressure cap. For van models, see Fuel Operated Heater (FOH) (Van Models Only) on page 2-11.*

(s) *Visually inspect belt for fraying, excessive cracks, or obvious damage. Replace belt if necessary.*

(t) *Severe Service: Change transfer case fluid if the vehicle is mainly used for trailer towing or driven in city traffic, wet environment, or high ambient temperatures.*

Owner Checks and Services

These owner checks and services should be performed at the intervals specified to help ensure vehicle safety, dependability, and emission control performance. Your dealer/retailer can assist with these checks and services.

Be sure any necessary repairs are completed at once. Whenever any fluids or lubricants are added to the vehicle, make sure they are the proper ones, as shown in *Recommended Fluids and Lubricants* on page 6-15.

At Each Fuel Fill

It is important to perform these underhood checks at each fuel fill.

Engine Oil Level Check

Notice: It is important to check the engine oil regularly and keep it at the proper level. Failure to keep the engine oil at the proper level can cause damage to the engine not covered by the vehicle warranty.

Check the engine oil level and add the proper oil if necessary. See *Engine Oil* on page 5-23.

Engine Coolant Level Check

Check the engine coolant level and add DEX-COOL[®] coolant mixture if necessary. See *Engine Coolant* on page 5-38.

Windshield Washer Fluid Level Check

Check the windshield washer fluid level in the windshield washer fluid reservoir and add the proper fluid if necessary.

At Least Once a Month

Tire Inflation Check

Inspect the vehicle's tires and make sure they are inflated to the correct pressures. Do not forget to check the spare tire. See "Inflation — Tire Pressure" in the owner manual for further details. Check to make sure the spare tire is stored securely. See "Changing a Flat Tire" in the owner manual.

Tire Wear Inspection

Tire rotation may be required for high mileage highway drivers prior to the Engine Oil Life System service notification. Check the tires for wear and, if necessary, rotate the tires. See "Tire Inspection and Rotation" in the owner manual.

At Least Once a Year Starter Switch Check

CAUTION:

When you are doing this inspection, the vehicle could move suddenly. If the vehicle moves, you or others could be injured.

1. Before you start, be sure you have enough room around the vehicle.
2. Firmly apply both the parking brake and the regular brake. See “Parking Brake” in your owner manual.
Do not use the accelerator pedal, and be ready to turn off the engine immediately if it starts.
3. Try to start the engine in each gear. The vehicle should start only in PARK (P) or NEUTRAL (N). If the vehicle starts in any other position, contact your dealer/retailer for service.

Automatic Transmission Shift Lock Control System Check

CAUTION:

When you are doing this inspection, the vehicle could move suddenly. If the vehicle moves, you or others could be injured.

1. Before you start, be sure you have enough room around the vehicle. It should be parked on a level surface.
2. Firmly apply the parking brake. See “Parking Brake” in your owner manual.
Be ready to apply the regular brake immediately if the vehicle begins to move.
3. With the engine off, turn the ignition to ON/RUN, but do not start the engine. Without applying the regular brake, try to move the shift lever out of PARK (P) with normal effort. If the shift lever moves out of PARK (P), contact your dealer/retailer for service.

Ignition Transmission Lock Check

While parked, and with the parking brake set, try to turn the ignition to LOCK/OFF in each shift lever position.

- The ignition should turn to LOCK/OFF only when the shift lever is in PARK (P).
- The ignition key should come out only in LOCK/OFF

Contact your dealer/retailer if service is required.

Parking Brake and Automatic Transmission Park (P) Mechanism Check

CAUTION:

When you are doing this check, your vehicle could begin to move. You or others could be injured and property could be damaged. Make sure there is room in front of your vehicle in case it begins to roll. Be ready to apply the regular brake at once should the vehicle begin to move.

Park on a fairly steep hill, with the vehicle facing downhill. Keeping your foot on the regular brake, set the parking brake.

- To check the parking brake's holding ability: With the engine running and transmission in NEUTRAL (N), slowly remove foot pressure from the regular brake pedal. Do this until the vehicle is held by the parking brake only.
- To check the PARK (P) mechanism's holding ability: With the engine running, shift to PARK (P). Then release the parking brake followed by the regular brake.

Contact your dealer/retailer if service is required.

Exhaust System Inspection

Check to be sure that mud or dirt is not caked on the exhaust system, especially in the area of the diesel particulate filter and tailpipe. Clean the area as needed. See *Diesel Particulate Filter on page 2-13*.

At high mileages, the DPF becomes loaded with ash. This is normal. When the amount of ash loading is high, see your dealer/retailer for DPF cleaning or replacement.

Underbody Flushing Service

At least every spring, use plain water to flush any corrosive materials from the underbody. Take care to clean thoroughly any areas where mud and other debris can collect.

Recommended Fluids and Lubricants

Fluids and lubricants identified below by name, part number, or specification can be obtained from your dealer/retailer.

Usage	Fluid/Lubricant
Engine Oil	Engine oils with the letters CJ-4 are required for your vehicle. The CJ-4 designation can appear either alone or in combination with other American Petroleum Institute (API) designations, such as API CJ-4/SL. These letters show API levels of quality. To determine the preferred viscosity for your vehicle's diesel engine, see <i>Engine Oil on page 5-23</i> .

Usage	Fluid/Lubricant
Engine Coolant	50/50 mixture of clean, drinkable water and use only DEX-COOL® Coolant. See <i>Engine Coolant on page 5-38</i> .
Hydraulic Brake System	Delco® Supreme 11 Brake Fluid or equivalent DOT-3 brake fluid.
Windshield Washer	Optikleen® Washer Solvent.
Van Models: Parking Brake Cable Guides	Chassis Lubricant (GM Part No. U.S. 12377985, in Canada 88901242) or lubricant meeting requirements of NLGI #2, Category LB or GC-LB.
Power Steering System	GM Power Steering Fluid (GM Part No. U.S. 89021184, in Canada 89021186).
Automatic Transmission	DEXRON®-VI Automatic Transmission Fluid. For areas where ambient temperatures are below -40°F (-40°C) use Synthetic Transmission Fluid approved to Allison Transmission specification TES-295 (GM Part No. U.S. 12378515, in Canada 88900701).

Usage	Fluid/Lubricant
Key Lock Cylinders	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Pickup Models: Floor Shift Linkage	Lubriplate Lubricant Aerosol (GM Part No. U.S. 12346293, in Canada 992723) or lubricant meeting requirements of NLGI #2 Category LB or GC-LB.
Chassis Lubrication	Chassis Lubricant (GM Part No. U.S. 12377985, in Canada 88901242) or lubricant meeting requirements of NLGI #2, Category LB or GC-LB.
Van Models: Front Wheel Bearings	Wheel bearing lubricant meeting requirements of NLGI #2, Category GC or GC-LB (GM Part No. U.S. 1051344, in Canada 993037).
Front and Rear Axle	SAE 75W-90 Synthetic Axle Lubricant (GM Part No. U.S. 89021677, in Canada 89021678) or equivalent meeting GM Specification 9986115.

Usage	Fluid/Lubricant
Transfer Case	DEXRON®-VI Automatic Transmission Fluid.
Van Models: One-Piece Propshaft Slip Yoke Spline, Two-Piece Propshaft Slip-in-Tube Spline	Spline Lubricant, Special Lubricant (GM Part No. U.S. 12345879, in Canada 10953511) or lubricant meeting requirements of GM 9985830.
Pickup Models: Front Axle Propshaft Spline	Spline Lubricant, Special Lubricant (GM Part No. U.S. 12345879, in Canada 10953511) or lubricant meeting requirements of GM 9985830.
Pickup Models: Rear Driveline Center Spline	Chassis Lubricant (GM Part No. U.S. 12377985, in Canada 88901242) or lubricant meeting requirements of NLGI #2, Category LB or GC-LB.
Hood Hinges	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).

Usage	Fluid/Lubricant
Pickup Models: Body Door Hinge Pins, Tailgate Hinge and Linkage, Folding Seats, and Fuel Door Hinge	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Pickup Models: Tailgate Handle Pivot Points, Hinges, Latch Bolt, and Linkage	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).

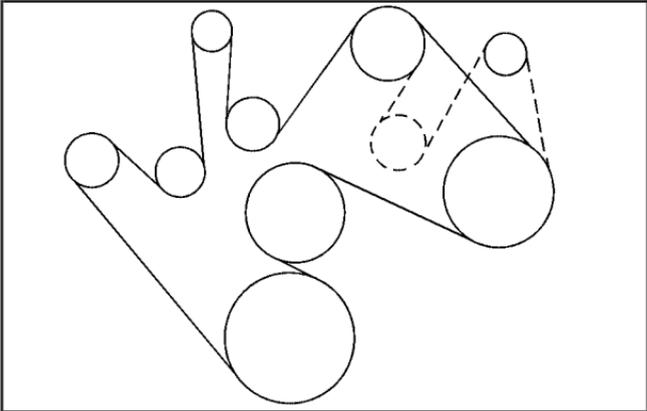
Usage	Fluid/Lubricant
Weatherstrip Conditioning	Weatherstrip Lubricant (GM Part No. U.S. 3634770, in Canada 10953518) or Dielectric Silicone Grease (GM Part No. U.S. 12345579, in Canada 992887).
Weatherstrip Squeaks	Synthetic Grease with Teflon, Superlube (GM Part No. U.S. 12371287, in Canada 10953437).

Maintenance Replacement Parts

Replacement parts identified below by name, part number, or specification can be obtained from your dealer/retailer.

Part	GM Part Number	ACDelco Part Number
Engine Air Cleaner/Filter		
Pickup Models	25839611	A3101C
Van Models	15102546	A2959C
Engine Fuel Filter		
Pickup Models	89060534	TP1298B
Van Models (Primary and Secondary Filter Kit)	19149845	TP1537*
Engine Oil Filter	88917036	PF2232
Use only the specified filters. *Racor service kit includes primary filter, secondary filter and o-rings.		

Engine Drive Belt Routing



Maintenance Record

After the scheduled services are performed, record the date, odometer reading, who performed the service, and the type of services performed in the boxes provided. See *Maintenance Requirements on page 6-2*. Any additional information from *Owner Checks and Services on page 6-12* can be added on the following record pages. You should retain all maintenance receipts.

Maintenance Record

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