RAM

2019

RAM TRUCK
2500/3500/4500/5500

DIESEL SUPPLEMENT

VEHICLES SOLD IN CANADA

With respect to any Vehicles Sold in Canada, the name FCA US LLC shall be deemed to be deleted and the name FCA Canada Inc. used in substitution therefore.

DRIVING AND ALCOHOL

Drunken driving is one of the most frequent causes of accidents.

Your driving ability can be seriously impaired with blood alcohol levels far below the legal minimum. If you are drinking, don't drive. Ride with a designated non-drinking driver, call a cab, a friend, or use public transportation.

WARNING!

Driving after drinking can lead to an accident. Your perceptions are less sharp, your reflexes are slower, and your judgment is impaired when you have been drinking. Never drink and then drive.

This manual illustrates and describes the operation of features and equipment that are either standard or optional on this vehicle. This manual may also include a description of features and equipment that are no longer available or were not ordered on this vehicle. Please disregard any features and equipment described in this manual that are not on this vehicle.

FCA US LLC reserves the right to make changes in design and specifications, and/or make additions to or improvements to its products without imposing any obligation upon itself to install them on products previously manufactured.

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INTRODUCTION

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A MESSAGE FROM FCA US LLC

FCA US LLC and Cummins welcome you as a Cummins turbocharged diesel-powered truck owner. Your diesel truck will sound, feel, drive, and operate differently from a gasoline-powered truck. It is important that you read and understand this manual.

Almost 100% of the heavy duty trucks in the United States and Canada are diesel-powered because of the fuel economy, rugged durability, and high torque which permits pulling heavy loads. Cummins engines power well over half of these trucks. Now this same technology and proven performance is yours in your truck equipped with the Cummins turbocharged diesel engine.

You may find that some of the starting, operating, and maintenance procedures are different. However, they are simple to follow and careful adherence to them will ensure that you take full advantage of the features of this engine.

NOTE: Some aftermarket products may cause severe engine/transmission and/or exhaust system damage. Your vehicle's Powertrain Control Systems can detect and store information about vehicle modifications that increase horsepower and torque output such as whether or not performance-enhancing powertrain components, commonly referred to as downloaders, power boxes, or performance chips have been used.

This information cannot be erased and will stay in the system's memory even if the modification is removed. This information can be retrieved by FCA US LLC, and service and repair facilities, when servicing your vehicle. This information may be used to determine if repair will be covered by the New Vehicle Limited Warranty.

There is a probability that the use of a "performance chip" will prohibit the engine from starting. In this instance, the vehicle will need to be serviced by a authorized dealer in order to return the vehicle to its factory settings.

When it comes to service, remember that your authorized dealer knows your vehicle best, has factory-trained technicians and genuine MOPAR® parts, and cares about your satisfaction.

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REMOTE STARTING SYSTEM — IF EQUIPPED

This system uses the key fob to start the engine conveniently from outside the vehicle while still maintaining security. The system has a range of approximately 300 ft (91 m).

NOTE:

- The vehicle must be equipped with an automatic transmission to be equipped with Remote Start.
- The Remote Start system will wait for the "Wait To Start" telltale to extinguish before cranking the engine. This allows time for the intake heater to pre-heat the incoming air, and is normal operation in cold weather. Refer to "Wait To Start," located in "Warning Lights And Messages" within "Getting To Know Your Instrument Panel" for more information.
- Obstructions between the vehicle and the key fob may reduce this range.

How To Use Remote Start

All of the following conditions must be met before the engine will remote start:

- Transmission in PARK
- Doors closed
- Hood closed
- HAZARD switch off
- BRAKE switch inactive (brake pedal not pushed)
- Battery at an acceptable charge level
- PANIC button not pushed
- Fuel meets minimum requirement
- Water In Fuel Indicator Light is not illuminated
- Wait To Start Light is not illuminated

WARNING!

- **Do not start or run an engine in a closed garage or confined area. Exhaust gas contains Carbon Monoxide (CO) which is odorless and colorless. Carbon**

(Continued)

WARNING! ***(Continued)***

Monoxide is poisonous and can cause serious injury or death when inhaled.

- **Keep Remote Keyless Entry key fobs away from children. Operation of the Remote Start System, windows, door locks or other controls could cause serious injury or death.**

Remote Start Abort Message

The following messages will display in the instrument cluster display if the vehicle fails to remote start or exits remote start prematurely:

- Remote Start Aborted - Door Open
- Remote Start Aborted - Hood Open
- Remote Start Aborted - Fuel Low
- Remote Start Aborted - System Fault

The instrument cluster display message stays active until the ignition is placed in the ON/RUN position.

To Enter Remote Start Mode

Push and release the Remote Start button on the key fob twice, within five seconds. The parking lights will flash and the horn will chirp twice (if programmed). In cold ambient temperature conditions, the diesel vehicle may delay crank up to 30 seconds for the fuel and grid heater. Once the vehicle has started, the engine will run for 15 minutes or 75 seconds in extreme cold and high elevation.

NOTE:

- The park lamps will turn on and remain on during Remote Start mode.
- For security, power window and power sunroof operation (if equipped) are disabled when the vehicle is in the Remote Start mode.
- The engine can be started two consecutive times (two 15-minute cycles) with the key fob. However, the ignition switch must be cycled to the ON position before you can repeat the start sequence for a third cycle.

To Exit Remote Start Mode Without Driving The Vehicle

Push and release the Remote Start button one time or allow the engine to run for the entire fifteen minute cycle.

NOTE: To avoid unintentional shut downs, the system will disable the one time push of the Remote Start button for two seconds after receiving a valid Remote Start request.

To Exit Remote Start Mode And Drive The Vehicle

To exit Remote Start Mode and drive the vehicle before the end of the 15-minute cycle, push and release the unlock button on the key fob to unlock the door and disarm the vehicle security alarm System (if equipped). Then, prior to the end of the 15-minute cycle, place the ignition to the ON/RUN position.

NOTE: The ignition switch must be in the ON/RUN position in order to drive the vehicle.

Remote Start Comfort Systems — If Equipped

When remote start is activated, the heated steering wheel, and driver heated seat features will automatically turn on in cold weather. In warm weather, the driver vented seat feature will automatically turn on when the remote start is activated. These features will stay on through the duration of remote start or until the ignition switch is turned to the ON/RUN position.

The Remote Start Comfort System can be activated and deactivated through the instrument cluster display. For more information on Remote Start Comfort System operation, refer to your Owner's Manual.

GETTING TO KNOW YOUR INSTRUMENT PANEL

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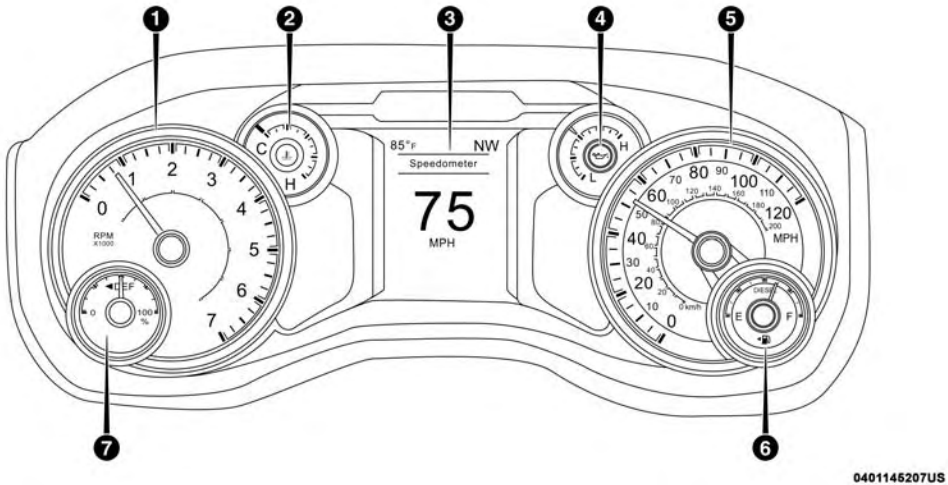
INSTRUMENT CLUSTER



Base Instrument Cluster

1. Tachometer
   - Indicates the engine speed in revolutions per minute (RPM x 1000).
2. Engine Coolant Temperature
   - This gauge shows the engine coolant temperature. The gauge pointer will likely show higher temperatures when driving in hot weather, up mountain grades, or in heavy stop and go traffic. If the red Warning Light turns on while driving, safely bring the vehicle to a stop, and turn off the engine. DO NOT operate the vehicle until the cause is corrected.

WARNING!

A hot engine cooling system is dangerous. You or others could be badly burned by steam or boiling coolant. You may want to call an authorized dealer for service if your vehicle overheats. If you decide to look under the hood yourself, refer to "Dealer Service" in "Servicing And Maintenance". Follow the warnings under the "Cooling System Pressure Cap" paragraph.

WARNING!

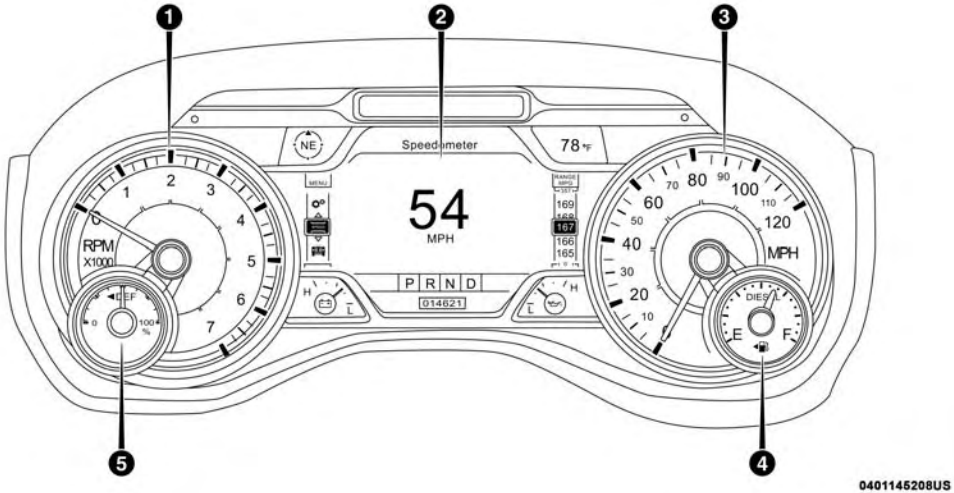
Driving with a hot engine cooling system could damage your vehicle. If the temperature gauge reads "H" pull over and stop the vehicle. Idle the vehicle with the air conditioner turned off until the pointer drops back into the normal range. If the pointer remains on the "H", turn the engine off immediately and call an authorized dealer for service.

3. Instrument Cluster Display
   - When the appropriate conditions exist, this display shows the instrument cluster display messages. Refer to "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information.
4. Oil Pressure Gauge
   - The pointer should always indicate some oil pressure when the engine is running. A continuous high or low reading under normal driving conditions may indicate a lubrication system malfunction. Immediate service should be obtained from an authorized dealer.

5. Speedometer
   - Indicates vehicle speed.
6. Fuel Gauge
   - The pointer shows the level of fuel in the fuel tank when the ignition switch is in the ON/RUN position.
   - The fuel pump symbol points to the side of the vehicle where the fuel filler door is located.
7. DEF Gauge
   - The DEF Gauge displays the actual level of Diesel Exhaust Fluid in the DEF tank. Diesel Exhaust Fluid (DEF) is required to maintain normal vehicle operation and emissions compliance. If something is wrong with the gauge, a DEF Warning Message or Malfunction Indicator Light (MIL) will be displayed. More information is available in the instrument cluster display section under the heading of Diesel Exhaust Fluid (DEF) Warning Messages.

NOTE:

- The gauge may take up to five seconds to update after adding a gallon or more of Diesel Exhaust Fluid (DEF) to the DEF tank. If you have a fault related to the DEF system, the gauge may not update to the new level. See your authorized dealer for service.
- The DEF gauge may also not immediately update after a refill if the temperature of the DEF fluid is below 12F (-11C). The DEF line heater will possibly warm up the DEF fluid and allow the gauge to update after a period of run time. Under very cold conditions, it is possible that the gauge may not reflect the new fill level for several drives.
- Outside temperature can affect DEF consumption. In cold conditions, 12° F (-11° C) and below, the DEF gauge needle can stay on a fixed position and may not move for extended periods of time. This is a normal function of the system.



Premium Instrument Cluster

1. Tachometer
   - Indicates the engine speed in revolutions per minute (RPM x 1000).
2. Instrument Cluster Display
   - When the appropriate conditions exist, this display shows the instrument cluster display messages. Refer to “Instrument Cluster Display” in “Getting To Know Your Instrument Panel” for further information.
3. Speedometer
   - Indicates vehicle speed.
4. Fuel Gauge
   - The pointer shows the level of fuel in the fuel tank when the ignition switch is in the ON/RUN position.
   - The fuel pump symbol points to the side of the vehicle where the fuel filler door is located.
5. DEF Gauge
   - The DEF Gauge displays the actual level of Diesel Exhaust Fluid in the DEF tank. Diesel Exhaust Fluid (DEF) is required to maintain normal vehicle operation and emissions compliance. If something is wrong with the gauge, a DEF Warning Message or Malfunction Indicator Light (MIL) will be displayed. More information is available in the instrument cluster display section under the heading of Diesel Exhaust Fluid (DEF) Warning Messages.

WARNING!

A hot engine cooling system is dangerous. You or others could be badly burned by steam or boiling coolant. You may want to call an authorized dealer for service if your vehicle overheats. If you decide to look under the hood yourself, refer to “Dealer Service” in “Servicing And Maintenance”. Follow the warnings under the “Cooling System Pressure Cap” paragraph.

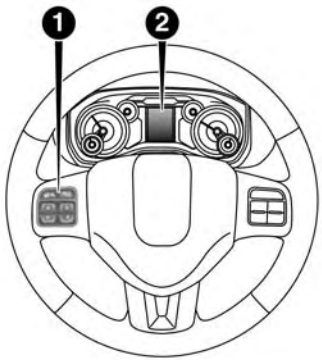
WARNING!

Driving with a hot engine cooling system could damage your vehicle. If the temperature gauge reads “H” pull over and stop the vehicle. Idle the vehicle with the air conditioner turned off until the pointer drops back into the normal range. If the pointer remains on the “H”, turn the engine off immediately and call an authorized dealer for service.

NOTE:

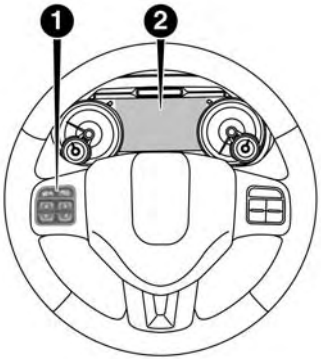
- The DEF tank on these vehicles is designed with a large amount of full reserve. So the level sensor will indicate a full reading even before the tank is completely full. To put it another way, there's additional storage capacity in the tank above the Full mark that's not represented in the gauge. You may not see any movement in the reading – even after driving up to 2,000 miles in some cases.
- The gauge may take up to five seconds to update after adding a gallon or more of Diesel Exhaust Fluid (DEF) to the DEF tank. If you have a fault related to the DEF system, the gauge may not update to the new level. See your authorized dealer for service.
- The DEF gauge may also not immediately update after a refill if the temperature of the DEF fluid is below 12F (-11C). The DEF line heater will possibly warm up the DEF fluid and allow the gauge to update after a period of run time. Under very cold conditions, it is possible that the gauge may not reflect the new fill level for several drives.
- Outside temperature can affect DEF consumption. In cold conditions, 12° F (-11° C) and below, the DEF gauge needle can stay on a fixed position and may not move for extended periods of time. This is a normal function of the system.

INSTRUMENT CLUSTER DISPLAY



Instrument Cluster Display — Base

1 – Instrument Cluster Display Controls
2 – Instrument Cluster Display Screen



Instrument Cluster Display — Premium

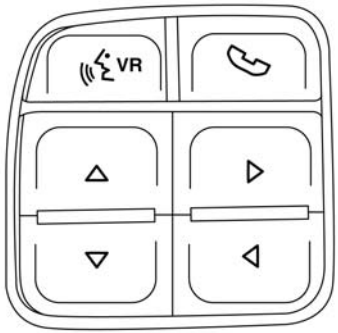
1 – Instrument Cluster Display Controls
2 – Instrument Cluster Display Screen

The instrument cluster display features a driver-interactive display that is located in the instrument cluster.

This system allows the driver to select a variety of useful information by pushing the switches mounted on the steering wheel. The instrument cluster display may consist of the following:

- Digital Speedometer
- Vehicle Info
- Fuel Economy Info
- Trip A
- Trip B
- Trailer Tow
- Audio
- Stored Messages
- Screen Setup
- Vehicle Settings (Not Equipped with a Uconnect 3 With 5-inch Display, Uconnect 4C/4C NAV With 8.4-inch Display or Uconnect 4C NAV With 12-inch Display radio)
- Settings
- Turn Menu Off

The system allows the driver to select information by pushing the following buttons mounted on the steering wheel:



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Steering Wheel Buttons

- *Up Arrow Button*

△ Push and release the **up** arrow button to scroll upward through the main menu and submenus (Fuel Economy, Trip A, Trip B, Audio, Stored Messages, Screen Set Up).

- *Down Arrow Button*

▽ Push and release the **down** arrow button to scroll downward through the main menu and submenus (Fuel Economy, Trip A, Trip B, Audio, Stored Messages, Screen Set Up).

- *Right Arrow Button*

▷ Push and release the **right** arrow button to access/select the information screens or submenu screens of a main menu item. Push and hold the **right** arrow button for two seconds to reset displayed/selected features that can be reset.

- *Left Arrow Button*

◁ Push the **left** arrow button to access/select the information screens or submenu screens of a main menu item or to return to the main menu from an info screen or submenu item.

Oil Life Reset

Your vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message will display in the instrument cluster display after a single chime has sounded, to indicate the next scheduled oil change interval.

NOTE: Use the steering wheel instrument cluster display controls for the following procedure.

Oil Life Reset Procedure

1. Without pushing the brake pedal, push the ENGINE START/STOP button and place the ignition to the ON/RUN position (do not start the engine).
2. Push and release the **down** arrow button to scroll downward through the main menu to "Vehicle Info."
3. Push and release the **right** arrow button to access the "Vehicle Info" screen, then scroll up or down to select "Oil Life."
4. Push and hold the **right** arrow button to select "Reset".
5. Push and release the **down** arrow button to select "Yes," then push and release the **right** arrow button to reset the Oil Life to 100%.
6. Push and release the **up** arrow button to exit the instrument cluster display screen.

Secondary Method Of Resetting Engine Oil Life

1. Without pressing the brake pedal, push the ENGINE START/STOP button and place the ignition to the ON/RUN position (do not start the engine).
2. Fully press the accelerator pedal, slowly, three times within ten seconds.
3. Without pushing the brake pedal, push the ENGINE START/STOP button once to return the ignition to the OFF/LOCK position.

NOTE: If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure.

Fuel Filter Life Reset

The cluster will display the "Service Fuel Filter" message when the fuel filter maintenance life is less than 5%. To check the remaining fuel filter life, go to the "Fuel Filter Life" screen in the "Vehicle Info" menu. When this message appears, dealers should replace the fuel filter.

NOTE: Use the steering wheel button controls for the following procedure.

1. Without pushing the brake pedal, push the ENGINE START/STOP button and cycle the ignition to the ON/RUN position (do not start the engine.)
2. Push and release the **down** arrow button to scroll downward through the main menu to "Vehicle Info".
3. Push and release the **right** arrow button to access the "Fuel Filter Life" screen.
4. Push and release the **right** arrow button to access the "Reset" screen.
5. Push and release the **right** arrow button to select the reset of the Fuel Filter Life.
6. Push and release the **up** arrow button to exit the instrument cluster display screen.

NOTE: If the indicator message illuminates when you start the vehicle, the Fuel Filter indicator system did not reset. If necessary, repeat this procedure.

Diesel Particulate Filter (DPF) Messages

The Cummins diesel engine meets all diesel emissions standards, resulting in one of the lowest emitting diesel engines ever produced. To achieve these emissions standards, your vehicle is equipped with a state-of-the-art engine and exhaust system. These systems are seamlessly integrated into your vehicle and managed by the Powertrain Control Module (PCM). The PCM manages engine combustion to allow the exhaust system's catalyst to trap and burn Particulate Matter (PM) pollutants, with no input or interaction on your part.

WARNING!

A hot exhaust system can start a fire if you park over materials that can burn. Such materials might be grass or leaves coming into contact with your exhaust system. Do not park or operate your vehicle in areas where your exhaust system can contact anything that can burn.

Your vehicle has the ability to alert you to additional maintenance required on your vehicle or engine. The following messages may display in your instrument cluster display:

- **Perform Service** — Your vehicle will require emissions maintenance at a set interval. To help remind you when this maintenance is due, the instrument cluster display will display "Perform Service". When the "Perform Service" message is displayed in the instrument cluster display it is necessary to have the emissions maintenance performed. Emissions maintenance may include

replacing the Closed Crankcase Ventilation (CCV) filter element. The procedure for clearing and resetting the "Perform Service" indicator message is located in the appropriate Service Information.

- **Exhaust System — Regeneration Required Now** — "Exhaust Filter XX% Full Safely Drive at Highway Speeds to Remedy" will be displayed in the instrument cluster display if the exhaust particulate filter reaches 80% of its maximum storage capacity. Under conditions of exclusive short duration and low speed driving cycles, your Cummins diesel engine and exhaust after-treatment system may never reach the conditions required to remove the trapped PM. If this occurs, the "Exhaust Filter XX% Full Safely Drive at Highway Speeds to Remedy" message will be displayed in the instrument cluster display. If this message is displayed, you will hear one chime to assist in alerting you of this condition
- By simply driving your vehicle at highway speeds for as little as 45 minutes, you can remedy the condition in the particulate filter system and allow your Cummins diesel engine and exhaust after-treatment system to remove the trapped PM and restore the system to normal operating condition.
- **Exhaust System — Regeneration In Process Exhaust Filter XX% Full** — Indicates that the Diesel Particulate Filter (DPF) is self-cleaning. Maintain your current driving condition until regeneration is completed.
- **Exhaust System — Regeneration Completed** — This message indicates that the Diesel Particulate Filter (DPF) self-cleaning is completed. If this message is displayed, you will hear one chime to assist in alerting you of this condition.
- **Exhaust Service Required — See Dealer Now** — This message indicates regeneration has been disabled due to a system malfunction. At this point the engine Powertrain Control Module (PCM) will register a fault code, the instrument panel will display a MIL light.

CAUTION!

See your authorized dealer, as damage to the exhaust system could occur soon with continued operation.

- **Exhaust Filter Full — Power Reduced See Dealer** — This message indicates the PCM has derated the engine to limit the likelihood of permanent damage to the after-treatment system. If this condition is not corrected and a dealer service is not performed, extensive exhaust

after-treatment damage can occur. To correct this condition it will be necessary to have your vehicle serviced by your local authorized dealer.

NOTE: Failing to follow the oil change indicator, changing your oil and resetting the oil change indicator by 0 miles remaining will prevent the diesel exhaust filter from performing it's cleaning routine. This will shortly result in a Malfunction Indicator Light (MIL) and reduced engine power. Only an authorized dealer will be able to correct this condition.

CAUTION!

See your authorized dealer, as damage to the exhaust system could occur soon with continued operation.

Manual DPF Regeneration — Chassis Cab Models Only (If Equipped)

In an event that the vehicle cannot be driven in a manner that will allow an effective automatic DPF regeneration cycle, a manual regeneration of the DPF can be started through the instrument cluster display. Manual DPF regeneration allows the filter to be cleaned while the vehicle is at a stationary position in an idle state.

A manual regeneration may be required if your vehicle meets one of the following criteria:

- The vehicle is frequently operated in a stationary position.
- The vehicle is frequently driven at speeds less than 25 mph (40 km/h).
- The vehicle is frequently driven for short drive cycles averaging between 10-15 minutes.
- The vehicle is frequently operated and turned off before warming up completely.

WARNING!

Failure to follow the appropriate instructions for a manual regeneration may result in injury, death, or serious damage to the vehicle.

Before Starting The Regeneration

It is important to make sure that all of the below criteria are met before beginning a manual DPF regeneration:

- The exhaust is free of obstruction.
- The vehicle is parked a minimum of 15 ft away from any obstruction or material that can melt or combust.

- The engine must be on.
- The vehicle fuel is at a proper level and is not low.
- All vehicle fluids are at proper levels.
- The vehicle must be allowed at least 70 minutes uninterrupted to complete the regeneration.
- No pedals can be pressed.
- The PTO must not be active.
- The vehicle must be parked in a safe location.

WARNING!

A hot exhaust system can start a fire if you park over materials that can burn. Such materials might be grass or leaves coming into contact with your exhaust system. Do not park or operate your vehicle in areas where your exhaust system can contact anything that can burn.

NOTE: Failure to meet any one of the above criteria before or during the regeneration will cancel the process. If a regeneration is canceled, a message confirming the cancellation will display in the instrument cluster.

Accessing The DPF Submenu

Once the vehicle is ready for the regeneration process, the regeneration can be initiated through the instrument cluster display in the DPF submenu of the "Commerical Settings" menu option.

Use the **up** and **down** arrow steering wheel controls to scroll to the "Commerical Settings" menu in the instrument cluster display. Use the **right** and **left** arrow buttons to navigate to the "DPF" submenu, which will display the DPF gauge. Below the gauge, a prompt will be displayed with the direction to hold the **right** arrow button to begin the manual regeneration process.

NOTE: The manual regeneration process will not be available to activate if the filter is not sufficiently full. If the filter is not at the appropriate fill level, the option to initiate a manual regeneration will not be present in the instrument cluster display.

Starting The Manual DPF Regeneration

From the DPF submenu, hold the **right** arrow button to begin setting up the manual regeneration. The instrument cluster display will ask for confirmation that the exhaust system is in a safe location.

NOTE: Ensure that the vehicle meets the appropriate criteria for manual DPF regeneration before starting the process. This list of criteria is outlined above in the "Before Starting The Regeneration" section. All criteria must be met before starting the regeneration process.

WARNING!

Failure to follow the appropriate instructions for a manual regeneration may result in injury, death, or serious damage to the vehicle.

WARNING!

Do not approach the exhaust tailpipe during the regeneration process. Hot exhaust gases can cause severe burns.

Use the instrument cluster display controls on the steering wheel to confirm that the vehicle is in a safe location by highlighting "Yes", and using the **right** arrow button to select.

The instrument cluster will then ask for confirmation the process is ready to begin. Use the arrow buttons to highlight "Yes" when ready, and use the **right** arrow button to initiate the manual DPF regeneration.

NOTE: White smoke may be seen exiting the vehicle tailpipe during the regeneration process. This is normal.

Completing The Manual DPF Regeneration

The instrument cluster will display a message signaling that the regeneration is in progress, and will take up to 70 minutes to complete. This message will take the place of the DPF gauge in the DPF submenu.

NOTE: Please allow the vehicle this allotted time to finish the procedure without interruption to ensure that the full regeneration process takes place.

When the regeneration has completed, a message will appear in the instrument cluster display indicating that the manual exhaust system regeneration has completed.

Manual DPF Regeneration Errors

If the manual regeneration of the DPF is cancelled or is unavailable, a corresponding message will appear in the instrument cluster to indicate the specific problem.

A manual regeneration of the DPF can be cancelled or unavailable for several reasons, including:

- Engine turned off
- Pedal pressed

- PTO activated
- Low fuel level
- Insufficient time
- DPF System fault
- Additional vehicle fault

NOTE: If a fault is preventing a manual regeneration, please see an authorized dealer.

Instrument Cluster Display Messages

When the appropriate conditions exist, the instrument cluster display displays the following messages:

- System Setup Unavailable – Vehicle Not in Park
- System Setup Unavailable – Vehicle in Motion
- Service Air Filter
- Perform Service
- Exhaust Filter Full Safely Drive at Highway Speeds To Remedy
- Exhaust Filter XX% Full – Power Reduced See Dealer
- Exhaust Service Required – See Dealer Now
- Exhaust System – Filter XX% Full Service Required See Dealer
- Exhaust System – Regeneration In Process Exhaust Filter XX% Full
- Exhaust System – Regeneration Completed
- Coolant Low
- Engine Power Reduced During Warm-up
- Engine Power Reduced up to 30-sec During Warmup
- Engine Power Reduced up to 2-min During Warmup

Cold Ambient Derate Mode Messages

The vehicle will display messages when a derate (engine power reduction) is activated to protect the engine during start up in cold ambient temperatures.

- **Engine Power Reduced During Warmup** — This message will display during start up when the ambient temperature is between 10° F (-12° C) and -10° F (-23° C).
- **Engine Power Reduced Up To 30 Sec (Seconds) During Warmup** — This message will display during start up when the ambient temperature is between -10° F (-23° C) and -25 F (-32° C).

- **Engine Power Reduced Up To 2 Min (Minutes) During Warmup** — This message will display during start up when the ambient temperature is -25° F (-32° C) and below.
- Your vehicle is equipped with an engine warm up protection feature that may limit engine performance after cold starting at low ambient temperatures. The length of time engine speed is limited is dependent upon engine coolant temperature. Engine speed may be briefly limited to 1000 RPM after starting with coolant temperature below freezing conditions, and may be limited to 1000 RPM for up to approximately 2 minutes under more severe cold conditions.
- **Coolant Low** — This telltale will turn on to indicate the vehicle coolant level is low. Refer to "Dealer Service" in "Servicing And Maintenance" for more information.

Diesel Exhaust Fluid (DEF) Warning Messages

There are four different messages which are displayed if the vehicle detects that the DEF system has been filled with a fluid other than DEF, has experienced component failures, or when tampering has been detected. The vehicle may be limited to a maximum speed of 5 MPH (8 km/H) if the DEF system is not serviced within less than 200 miles (322 km) of the fault being detected.

When the DEF system needs to be serviced the following warnings will display:

- **DEF Low Refill Soon** — This message will display when the low level is reached, during vehicle start up, and with increased frequency during vehicle operation. It will be accompanied by a single chime. Approximately 5 gallons (19 Liters) of DEF is required to refill the tank when this message is initially displayed. on pickup applications, and approximately 7 gallons (26 Liters) are required on chassis-cab applications.
- **Speed Limited to 5 MPH in XXX mi Refill DEF** — This message will continuously display if the "DEF Low Refill Soon" message is ignored, and the frequency of occurrence of the chime will increase unless up to 2 gallons (7.5 Liters) of DEF is added to the tank.
- **5 MPH Max Speed on Restart, Long Idle or Refuel Refill DEF** — This message will continuously display when the counter reaches zero, and will be accompanied by a periodic chime.
- The vehicle will only be capable of a maximum speed of 5 MPH upon the first of the following conditions to occur:
  - If the vehicle is shutoff and restarted.
  - If the vehicle is idled for an extended period of time, approximately one hour or greater.

  - If the system detects that the level of fuel in the tank has increased.
- Add a minimum of 2 gallons (7.5 Liters) of DEF to the tank in order to avoid vehicle operation at a maximum speed of 5 MPH (8 km/H).

NOTE: A minimum of 2 gallons (7.5 Liters) may be required to restore normal vehicle operation. Although the vehicle will start normally and can be placed in gear after this message has been initially displayed, extreme caution should be utilized since the vehicle will only be capable of maneuvering at a maximum speed of 5 MPH (8 km/H).

Diesel Exhaust Fluid (DEF) Fault Warning Messages

There are five different messages which are displayed if the vehicle detects that the DEF system has been filled with a fluid other than DEF, has experienced component failures, or when tampering has been detected. The vehicle may be limited to a maximum speed of 5 MPH (8 km/H) if the DEF system is not serviced within less than 200 miles (322 km) of the fault being detected.

When the DEF system needs to be serviced the following warnings will display:

- **Service DEF System See Dealer** — This message will display when the fault is initially detected, each time the vehicle is started, and periodically during driving. The message will be accompanied by a single chime. We recommend you drive to your nearest authorized dealer and have your vehicle serviced as soon as possible.
- **5 MPH Max Speed in 150 mi Service DEF System See Dealer** — This message will display if the DEF system has not been serviced after the "Service DEF System – See Dealer" message is displayed. This message will continuously display until the mileage counter reaches zero, and will be accompanied by a periodic chime. The message will continue to countdown until it reaches zero unless the vehicle is serviced. We recommend you drive to your nearest authorized dealer and have your vehicle serviced immediately.

NOTE: Under some circumstances this mileage counter may start with a value of less than 150 miles (241 km). For example, if recurring faults are detected in a time interval of less than 40 hours, the counter may restart at the value where it stopped when a previous fault was temporarily remedied, or at a minimum of 50 miles (80 km).

- **5 MPH Max Speed on Restart, Long Idle or Refuel Service DEF See Dealer** — This message will continuously display when the mileage counter reaches zero, and will be accompanied by a periodic chime.
- The vehicle will only be capable of a maximum speed of 5 MPH upon the first of the following conditions to occur:
  - If the vehicle is shutoff and restarted.
  - If the vehicle is idled for an extended period of time, approximately one hour or greater.
  - If the system detects that the level of fuel in the tank has increased.
- **5 MPH Max Speed Service DEF System See Dealer** — This message will continuously display, and will be accompanied by a periodic chime. Although the vehicle can be started and placed in gear, the vehicle will only operate at a maximum speed of 5 MPH. Your vehicle will require towing, see your authorized dealer for service.

NOTE: When this message is displayed, the engine can still be started. However, the vehicle will only operate at a maximum speed of 5 MPH.

- **Incorrect DEF Detected See Dealer** — This message will display when the fault is initially detected, each time the vehicle is started, and periodically during driving. The message will be accompanied by a single chime. We recommend you drive to your nearest authorized dealer and have your vehicle serviced as soon as possible.

WARNING LIGHTS AND MESSAGES

The warning/indicator lights will illuminate in the instrument panel together with a dedicated message and/or acoustic signal when applicable. These indications are indicative and precautionary and as such must not be considered as exhaustive. Always refer to the information in this chapter in the event of a failure indication. All active telltales will display first if applicable. The system check menu may appear different based upon equipment options and current vehicle status. Some telltales are optional and may not appear.

Yellow Indicator Lights

— Cold Ambient Derate Mode Indicator Light — If Equipped

This indicator light will illuminate when a derate (engine power reduction) is activated for protection of the turbocharger in cold ambient temperatures.

For further information, refer to “Instrument Cluster Display” in “Getting To Know Your Instrument Panel”.

— Diesel Exhaust Brake Indicator Light — If Equipped

This indicator light will illuminate when the Diesel Exhaust Brake has been activated, and is in full strength mode.

Refer to “Diesel Exhaust Brake (Engine Braking)” in “Starting And Operating” for further information.

— Low Diesel Exhaust Fluid (DEF) Indicator Light — If Equipped

The Low Diesel Exhaust Fluid (DEF) Indicator will illuminate if the vehicle is low on Diesel Exhaust Fluid (DEF). Refer to “Starting And Operating” for further information.

— Wait To Start Light — If Equipped

This indicator light will illuminate for approximately two seconds when the ignition is turned to the RUN position. Its duration may be longer based on colder operating conditions. Vehicle will not initiate start until telltale is no longer displayed.

Refer to “Starting The Engine” in “Starting And Operating” for further information.

NOTE: The “Wait To Start” telltale may not illuminate if the intake manifold temperature is warm enough.

— Water In Fuel Indicator Light — If Equipped

The “Water In Fuel Indicator Light” will illuminate when there is water detected in the fuel filter. If this light remains on, DO NOT start the vehicle before you drain the water from the fuel filter to prevent engine damage.

Refer to the “Draining Fuel/Water Separator Filter” section in “Dealer Service” in “Servicing And Maintenance” for further information.

Green Indicator Lights

— Automatic Diesel Exhaust Brake Indicator Light — If Equipped

This indicator light will illuminate when the Diesel Exhaust Brake has been activated, and has switched to Automatic mode.

Refer to “Diesel Exhaust Brake (Engine Braking)” in “Starting And Operating” for further information.

STARTING AND OPERATING

CONTENTS

STARTING THE ENGINE — 6.7L DIESEL ENGINE

Before starting your vehicle, adjust your seat, adjust both inside and outside mirrors, and fasten your seat belts.

The starter should not be operated for more than 15-second intervals. Waiting a few minutes between such intervals will protect the starter from overheating.

WARNING!

- **Do not leave children or animals inside parked vehicles in hot weather. Interior heat build up may cause serious injury or death.**
- **When leaving the vehicle, always make sure the keyless ignition node is in the "OFF" mode, remove the key fob from the vehicle and lock the vehicle.**
- **Never leave children alone in a vehicle, or with access to an unlocked vehicle. Allowing children to be in a vehicle unattended is dangerous for a number of reasons. A child or others could be seriously or**

(Continued)

WARNING! ***(Continued)***

fatally injured. Children should be warned not to touch the parking brake, brake pedal or the gear selector.

- **Do not leave the key fob in or near the vehicle, or in a location accessible to children, and do not leave the ignition of a vehicle equipped with Keyless Enter-N-Go in the ACC or ON/RUN mode. A child could operate power windows, other controls, or move the vehicle.**

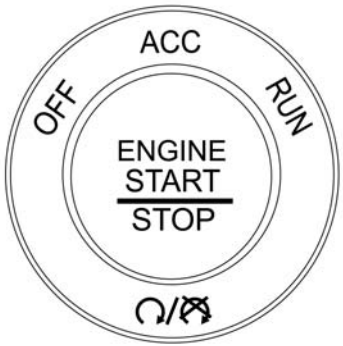
Automatic Transmission

Start the engine with the transmission in the NEUTRAL or PARK position. Apply the brake before shifting to any driving range.

Tip Start Feature

Do not press the accelerator. Cycle the ignition switch briefly to the START position and release it. The starter motor will continue to run and will automatically disengage when the engine is running.

Keyless Enter-N-Go — Ignition



Keyless Push Button Ignition

This feature allows the driver to operate the ignition switch with the push of a button, as long as the Remote Start/ Keyless Enter-N-Go key fob is in the passenger compartment.

Normal Starting

Using The ENGINE START/STOP Button

1. The transmission must be in PARK or NEUTRAL.
2. Press and hold the brake pedal while pushing the ENGINE START/STOP button once.
3. The system takes over and attempts to start the vehicle. If the vehicle fails to start, the starter will disengage automatically after 25 seconds.
4. If you wish to stop the cranking of the engine prior to the engine starting, remove your foot from the brake pedal and push the button again.

NOTE:

- Normal starting of either a cold or a warm engine is obtained without pumping or pressing the accelerator pedal.
- Under cold weather conditions, the engine may not immediately crank if the ″Wait To Start″ telltale is illuminated. This is normal operation. For vehicles equipped with Keyless Enter-N-Go, the vehicle will automatically crank when the ″Wait To Start″ time has elapsed. See the section ″Starting Procedure Engine Manifold Air Temperature 0°F to 66°F (18° C to 19°C)″ for more information.

To Turn Off The Engine Using ENGINE START/STOP Button

1. Place the gear selector in PARK, then push and release the ENGINE START/STOP button.
2. The ignition will return to the OFF mode.
3. If the gear selector is not in PARK and the ENGINE START/STOP button is pushed once, the instrument cluster will display a "Vehicle Not In Park" message and the engine will remain running. Never leave a vehicle out of the PARK position, or it could roll.
4. If the gear selector is in NEUTRAL, and the vehicle speed below 5 mph (8 km/h), pushing the START/STOP button once will turn the engine off. The ignition will remain in the ACC mode.
5. If the vehicle speed is above 5 mph (8 km/h), the ENGINE START/STOP button must be held for two seconds (or three short pushes in a row) to turn the engine off. The ignition will remain in the ACC mode (NOT the OFF mode) if the engine is turned off when the transmission is not in PARK.

NOTE: If the ignition is left in the ACC or ON/RUN (engine not running) mode and the transmission is in PARK, the system will automatically time out after 30 minutes of inactivity and the ignition return to the OFF mode.

ENGINE START/STOP Button Functions — With Driver's Foot OFF The Brake Pedal (In PARK Or NEUTRAL Position)

The ENGINE START/STOP button operates similar to an ignition switch. It has three positions, OFF, ACC, RUN. To change the ignition switch positions without starting the vehicle and use the accessories follow these steps:

1. Starting with the ignition in the OFF position:
2. Push the ENGINE START/STOP button once to change the ignition to the ACC position.
3. Push the ENGINE START/STOP button a second time to change the ignition to the RUN position.
4. Push the ENGINE START/STOP button a third time to return the ignition to the OFF position.

Keyless Enter-N-Go Starting Procedure — Engine Manifold Air Temperature 0° F To 66° F (–18° C to 19° C)

NOTE: The temperature displayed in the instrument cluster does not necessarily reflect the engine manifold air temperature. Refer to "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information. When engine temperatures fall below 66°F (19°C) the "Wait To Start Light" will remain on indicating the intake manifold heater system is active.

Follow the steps in the "Normal Starting" procedure except:

1. Pushing the engine start button with the driver's foot on the brake will move the ignition from OFF or ACC to RUN, and will illuminate the "Wait To Start" telltale. The engine will not immediately crank, this is normal operation.
2. The "Wait To Start" telltale will remain on for a period of time that varies depending on the engine temperature.
3. While the "Wait to Start" telltale is on, the instrument cluster will additionally display a gauge or bar whose initial length represents the full "Wait to Start" time period. Its length will decrease until it disappears when the "Wait to Start" time has elapsed.

CAUTION!

If the "Water in Fuel Indicator Light" remains on, DO NOT START the engine before you drain the water from the fuel filters to avoid engine damage. Refer to "Draining Fuel/Water Separator Filter" in "Servicing And Maintenance" for further information.

4. After the engine "Wait To Start" telltale goes off, the engine will automatically crank.

CAUTION!

Do not crank engine for more than 15 seconds at a time or starter motor damage may result. Turn the ignition switch to the OFF position and wait at least two minutes for the starter to cool before repeating start procedure.

5. After engine start-up, check to see that there is oil pressure.
6. Allow the engine to idle about three minutes until the manifold heaters have completed the post-heat cycle.

7. Release the parking brake and drive.

NOTE:

- Engine idle speed will automatically increase to 1,000 RPM and engage the Variable Geometry Turbocharger at low coolant temperatures to improve engine warm-up.
- The engine may not automatically crank after the engine "Wait To Start" telltale goes off if a door or the hood is ajar.
- If the engine stalls, or if the ignition switch is left ON for more than two minutes after the "Wait To Start Light" goes out, reset the grid heaters by turning the ignition switch to the OFF position for at least five seconds and then back ON. Repeat steps 1 through 7 of "Keyless Enter-N-Go Starting Procedure – Engine Manifold Air Temperature Below 66° F (19° C)."

Extreme Cold Weather

The Cummins diesel engine is equipped with several features designed to assist cold weather starting and operation:

- The engine block heater is a resistance heater installed in the water jacket of the engine just above and behind the oil filter. It requires a 110–115 Volt AC electrical outlet with a grounded, three-wire extension cord.

NOTE: The engine block heater cord is a factory installed option. If your vehicle is not equipped, heater cords are available from your authorized Mopar dealer.

- A 12 Volt heater built into the fuel filter housings aid in preventing fuel gelling. It is controlled by a built-in thermostat.
- A heated intake air system both improves engine starting and reduces the amount of white smoke generated by a warming engine.

Normal Starting Procedure — Engine Manifold Air Temperature Above 66° F (19° C)

Observe the instrument panel cluster lights when starting the engine.

1. Always apply the parking brake.
2. Shift into PARK for an automatic transmission.
3. Turn the ignition switch to the ON position and watch the instrument panel cluster lights.

CAUTION!

If the "Water in Fuel Indicator Light" remains on, DO NOT START the engine before you drain the water from the fuel filters to avoid engine damage. Refer to "Draining Fuel/Water Separator Filter" in "Servicing And Maintenance" for further information.

4. Turn the ignition switch to the START position and crank the engine. Do not press the accelerator during starting.

CAUTION!

Do not crank engine for more than 15 seconds at a time or starter motor damage may result. Turn the ignition switch to the OFF position and wait at least two minutes for the starter to cool before repeating start procedure.

5. When the engine starts, release the key fob.
6. Check that the oil pressure warning light has turned off.
7. Release the parking brake.

Starting Procedure — Engine Manifold Air Temperature 0°F To 66°F (–18°C to 19°C)

NOTE: The temperature displayed in the instrument cluster does not necessarily reflect the engine manifold air temperature. Refer to "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information. When engine temperatures fall below 66°F (19°C) the "Wait To Start Light" will remain on indicating the intake manifold heater system is active.

Follow the steps in the "Normal Starting" procedure except:

1. The "Wait To Start" telltale will remain on for a period of time that varies depending on the engine temperature.
2. While the "Wait To Start" telltale is on, the instrument cluster will additionally display a gauge or bar whose initial length represents the full "Wait To Start" time period. Its length will decrease until it disappears when the "Wait To Start" time has elapsed.

CAUTION!

If the "Water in Fuel Indicator Light" remains on, DO NOT START the engine before you drain the water from the fuel filters to avoid engine damage. Refer to "Draining Fuel/Water Separator Filter" in "Servicing And Maintenance" for further information.

3. After the "Wait To Start" telltale goes off, turn the ignition switch to the START position. Do not press the accelerator during starting.

CAUTION!

Do not crank engine for more than 15 seconds at a time or starter motor damage may result. Turn the ignition switch to the OFF position and wait at least two minutes for the starter to cool before repeating start procedure.

4. After engine start-up, check that the oil pressure warning light has turned off.
5. Allow the engine to idle about three minutes until the manifold heaters have completed the post-heat cycle.
6. Release the parking brake and drive.

NOTE:

- Engine idle speed will automatically increase to 1,000 RPM and engage the Variable Geometry Turbocharger at low coolant temperatures to improve engine warm-up.
- Automatic equipped vehicles with optional Keyless Enter-N-Go – If the start button is pushed once while in park with the ignition off and driver's foot on the brake pedal, the vehicle will automatically crank and start after the Wait to Start time has elapsed. If it is desired to abort the start process before it completes, the driver's foot should be fully removed from the brake pedal prior to pushing the start button again in order for the ignition to move directly to off.
- If the engine stalls, or if the ignition switch is left ON for more than two minutes after the "Wait To Start" telltale goes out, reset the grid heaters by turning the ignition switch to the OFF position for at least five seconds and then back ON. Repeat steps 1 through 5 of "Starting Procedure – Engine Manifold Air Temperature Below 66°F (19°C)."

Starting Procedure — Engine Manifold Air Temperature Below 0°F (-18°C)

In extremely cold weather below 0°F (-18°C) it may be beneficial to cycle the manifold heaters twice before attempting to start the engine. This can be accomplished by turning the ignition OFF for at least five seconds and then back ON after the "Wait To Start" telltale has turned off, but before the engine is started. However, excessive cycling of the manifold heaters will result in damage to the heater elements or reduced battery voltage.

NOTE:If multiple pre-heat cycles are used before starting, additional engine run time may be required to maintain battery state of charge at a satisfactory level.

1. If the engine stalls after the initial start, the ignition must be turned to the OFF position for at least five seconds and then to the ON position to recycle the manifold heaters.

NOTE: Excessive white smoke and poor engine performance will result if manifold heaters are not recycled.

2. Heat generated by the manifold heaters dissipates rapidly in a cold engine. If more than two minutes pass between the time the "Wait To Start" telltale turns off and the engine is started, recycle the manifold heaters by turning the ignition switch to the OFF position for at least five seconds and then back ON.
3. If the vehicle is driven and vehicle speed exceeds 19 mph (31 km/h) before the manifold heater post-heat (after start) cycle is complete, the manifold heaters will shut off.
4. If the engine is started before the "Wait To Start" telltale turns off, the preheat cycle will turn off.
5. If the engine is cranked for more than 10 seconds, the post-heat cycle will turn off.

NOTE:

- Engine idle speed will automatically increase to 1,000 RPM and engage the Variable Geometry Turbocharger at low coolant temperatures to improve engine warm-up.
- When a diesel engine is allowed to run out of fuel or the fuel gels at low temperatures, air is pulled into the fuel system. If your engine has run out of fuel, refer to "Dealer Service/Priming If The Engine Has Run Out Of Fuel" in "Servicing And Maintenance" for further information.

- If the engine stalls, or if the ignition switch is left ON for more than two minutes after the "Wait To Start" telltale goes out, reset the grid heaters by turning the ignition switch to the OFF position for at least five seconds and then back ON. Repeat steps 1 through 5 of "Starting Procedure – Engine Manifold Air Temperature Below 66°F (19°C)."

Starting Fluids

WARNING!

Starting fluids or flammable liquids must never be used in the Cummins diesel engine (see Warning label). Never pour diesel fuel, flammable liquid, starting fluids (ether) into the air cleaner canister, air intake piping, or turbocharger inlet in an attempt to start the vehicle. This could result in a flash fire and explosion causing serious personal injury and engine damage.

The engine is equipped with an automatic electric air preheating system. If the instructions in this manual are followed, the engine should start in all conditions.

WARNING!

- **Do not leave children or animals inside parked vehicles in hot weather. Interior heat build up may cause serious injury or death.**
- **When leaving the vehicle, always make sure the keyless ignition node is in the "OFF" mode, remove the key fob from the vehicle and lock the vehicle.**
- **Never leave children alone in a vehicle, or with access to an unlocked vehicle. Allowing children to be in a vehicle unattended is dangerous for a number of reasons. A child or others could be seriously or fatally injured. Children should be warned not to touch the parking brake, brake pedal or the gear selector.**
- **Do not leave the key fob in or near the vehicle, or in a location accessible to children, and do not leave the ignition of a vehicle equipped with Keyless Enter-N-Go in the ACC or ON/RUN mode. A child could operate power windows, other controls, or move the vehicle.**

NORMAL OPERATION — 6.7L DIESEL ENGINE

Observe the following when the engine is operating.

- All message center lights are off.
- Malfunction Indicator Light (MIL) is off.
- Engine oil pressure is above 10 psi (69 kPa) at idle.
- Voltmeter operation:

The voltmeter may show a gauge fluctuation at various engine temperatures. This cycling operation is caused by the post-heat cycle of the intake manifold heater system. The number of cycles and the length of the cycling operation is controlled by the engine control module. Post-heat operation can run for several minutes, and then the electrical system and voltmeter needle will stabilize.

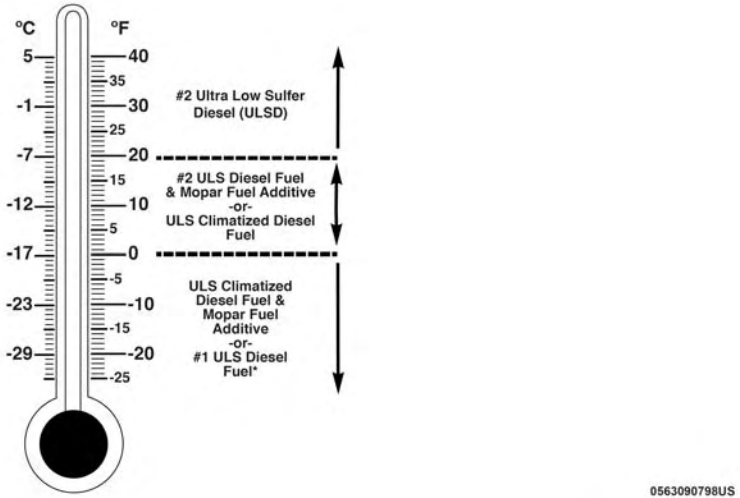
The cycling action will cause temporary dimming of the headlamps, interior lamps, and also a noticeable reduction in blower motor speed.

Cold Weather Precautions

Operation in ambient temperature below 32°F (0°C) may require special considerations. The following charts suggest these options:

Fuel Operating Range

NOTE: Use “Ultra Low Sulfur Diesel Fuels” **ONLY.**



Fuel Operating Range Chart

*No. 1 Ultra Low Sulfur Diesel Fuel should only be used where extended arctic conditions (0°F/-18°C) exist".

NOTE:

- Use of Climatized Ultra Low Sulfur Diesel Fuel or Number 1 Ultra Low Sulfur Diesel Fuel results in a noticeable decrease in fuel economy.
- Climatized Ultra Low Sulfur Diesel Fuel is a blend of Number 2 Ultra Low Sulfur and Number 1 Ultra Low Sulfur Diesel Fuels which reduces the temperature at which wax crystals form in fuel.
- The fuel grade should be clearly marked on the pump at the fuel station.

- The engine requires the use of **"Ultra Low Sulfur Diesel Fuel"**. Use of incorrect fuel could result in engine and exhaust system damage. Refer to "Fuel Requirements" in "Technical Specifications" for further information.
- If climatized or diesel Number 1 ULSD fuel is not available, and you are operating below (20°F/-6°C), in sustained arctic conditions, Mopar Premium Diesel Fuel Treatment (or equivalent) is recommended to avoid gelling (see Fuel Operating Range Chart).

Engine Oil Usage

Refer to "Dealer Service" in "Servicing And Maintenance" for the correct engine oil viscosity.

Winter Front Cover Usage

A winter front or cold weather cover is to be used in ambient temperatures below 32°F (0°C), especially during extended idle conditions. This cover is equipped with four flaps for managing total grille opening in varying ambient temperatures. If a winter front or cold weather cover is to be used the flaps should be left in the full open position to allow air flow to the charge air cooler and automatic transmission oil cooler. When ambient temperatures drop below 0°F (-17°C) the four flaps need to be closed. A suitable cold weather cover is available from your Mopar dealer.

Battery Blanket Usage

A battery loses 60% of its cranking power as the battery temperature decreases to 0°F (-18°C). For the same decrease in temperature, the engine requires twice as much power to crank at the same RPM. The use of 120 VAC powered battery blankets will greatly increase starting capability at low temperatures. Suitable battery blankets are available from your authorized Mopar dealer.

Engine Warm-Up

Avoid full throttle operation when the engine is cold. When starting a cold engine, bring the engine up to operating speed slowly to allow the oil pressure to stabilize as the engine warms up.

NOTE: High-speed, no-load running of a cold engine can result in excessive white smoke and poor engine performance. No-load engine speeds should be kept under 1,000 RPM during the warm-up period, especially in cold ambient temperature conditions.

Your vehicle is equipped with an engine warm up protection feature that may limit engine performance after cold starting at low ambient temperatures. The length of time engine speed is limited is dependent upon engine coolant temperature. Engine speed may be briefly limited to 1000 RPM after

starting with coolant temperature below freezing conditions, and may be limited to 1000 RPM for up to approximately 2 minutes under more severe cold conditions.

NOTE: If ambient temperatures are low and the coolant temperature is below 180°F (82°C), the engine idle speed will slowly increase to 1,000 RPM after two minutes of idle, if the following conditions are met:

- Foot is off brake pedal and throttle pedal.
- Automatic transmission is in PARK.
- Vehicle speed is 0 mph (0 km/h).
- Applying the throttle will cancel fast idle.
- Operating the exhaust brake at idle will greatly improve warm up rate and will help keep the engine close to operating temperature during extended idle.

Engine Idling

Avoid prolonged idling, long periods of idling may be harmful to your engine because combustion chamber temperatures can drop so low that the fuel may not burn completely. Incomplete combustion allows carbon and varnish to form on piston rings, engine valves, and injector nozzles. Also, the unburned fuel can enter the crankcase, diluting the oil and causing rapid wear to the engine.

If the engine is allowed to idle or the truck is driven on low engine speed drive cycles for more than 2 hours, the system will automatically enter an emissions operating mode that will increase the engine idle speed to 900 RPM (1050 RPM for Chassis Cab). While in this mode, which is designed to help maintain the diesel particulate filter, the engine idle speed will return to normal when the brake pedal is applied. A small change in engine tone or a slight change in engine performance while accelerating may also be noticeable at speeds below 20 mph (32 kmh). This operating mode may last for up to an hour of idle time, or around 20 minutes of driving time.

Your truck may have been ordered with an optional voltage monitoring idle up feature. If a load is placed on the electrical system while the truck is in park, this feature will attempt to maintain normal system voltage by automatically increasing engine idle speed. You may notice several consecutive increases in idle speed, up to a maximum of 1450 RPM, as the system will attempt to utilize the smallest increase in idle speed necessary to maintain normal system voltage. The idle speed will return to normal when either the electrical load is removed, or when the brake pedal is applied.

NOTE: For instrument cluster display messages related to the vehicle's exhaust system, refer to "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information.

Idle-Up Feature

The driver-controlled high idle speed feature will help increase cylinder temperatures and provide additional cab heat, however, excessive idling may still cause the exhaust aftertreatment system to not properly regenerate. Extended periods of idle time should be avoided.

The Idle-Up feature uses the speed control switches to increase engine idle speed and quickly warm the vehicle's interior.

1. With the transmission in PARK, the parking brake applied, and the engine running, push the speed control switch to the ON position, then push the SET switch.
2. The engine RPM will go up to 1100 RPM. To increase the RPM, push and hold the ACCEL/RESUME switch and the idle speed will increase to approximately 1500 RPM. To decrease the RPM, push and hold the DECEL switch and the idle speed will decrease to approximately 1100 RPM.
3. To cancel the Idle–Up feature, either push the CANCEL switch, push the ON/OFF switch, or press the brake pedal.

Noise

Diesel engines can create noises that may seem as a concern. The nature of a diesel engine is compression ignition where compressed air and fuel are mixed and ignited. Weather, Barometric Pressure, Altitude and Temperature will affect how fuel is ignited in the engine. Engine's will sound different from day to day or previous model years. Clicking, ticking, or light knocking is normal and will change from day to day, as the engine breaks in, and can vary with changes in ambient temperature, this is normal. Diesel equipped vehicles also have an exhaust aftertreatment system to reduce emissions utilizing a DPF and a Selective Reduction Catalyst (SCR). The SCR reduces Nox using the Diesel Exhaust Fluid (DEF) system. DEF is injected directly into the SCR through an dosing module. This process will create a clicking sound and at times, will make noise even with the vehicle shut off. This is normal as the DEF dosing module is purging DEF. Fuel pump noise may increase during low speed/light load conditions when ambient temperature is above 100°F (38°C), and when fuel tank level is below 10%. This is a normal condition of the fuel system and controls strategy. If at any time the check engine light is on, please visit an authorized dealer.

Stopping The Engine

Idle the engine a few minutes before routine shutdown. After full load operation, idle the engine three to five minutes before shutting it down. This idle period will allow the lubricating oil and coolant to carry excess heat away from the combustion chamber, bearings, internal components, and turbocharger. This is especially important for turbocharged, charge air-cooled engines.

NOTE:

- Refer to the following chart for proper engine shutdown.

Driving Condition	Load	Turbocharger Temperature	Idle Time (min.) Before Engine Shutdown
Stop and Go	Empty	Cool	Less than One
Stop and Go	Medium	-	One
Highway Speeds	Medium	Warm	Two
City Traffic	Maximum GCWR	-	Three
Highway Speeds	Maximum GCWR	-	Four
Uphill Grade	Maximum GCWR	Hot	Five

Idle Shutdown

This feature can be enabled so that the truck will automatically shutdown when the truck has been idling for a set period of time when the engine is at operating temperature. Idle time can be set in 5 minute increments between 5 and 60 minutes. See your local authorized dealer to enable this feature.

NOTE: The idle shut down timer is disabled while the PTO is active.

Programmable Maximum Vehicle Speed

This feature allows the owner to set a maximum vehicle speed for the vehicle. The 2500 and 3500 Series maximum vehicle speed can be set between 40 mph (64 km/h) and 87 mph (140 km/h). The 4500/5500 Series maximum vehicle speed can be set between 40 mph (64 km/h) and 85 mph (136 km/h). See an local authorized dealer to enable this feature.

NOTE: DO NOT set the maximum vehicle speed to a value greater than what the vehicle tires are rated for.

Operating Precautions

Avoid Overheating The Engine

The temperature of the engine coolant (antifreeze) (a mixture of 50% ethylene-glycol and 50% water) must not exceed the normal range of the temperature gauge 240°F (116°C) with a 21 psi (145 kPa) coolant pressure cap.

Usually the engine coolant (antifreeze) temperature indicated during operation will be to the left of center in the normal range of the gauge.

Avoid Low Coolant Temperature Operation

Continual operation at low engine coolant (antifreeze) temperature below the normal range on the gauge 140°F (60°C) can be harmful to the engine. Low engine coolant (antifreeze) temperature can cause incomplete combustion which allows carbon and varnish to form on piston rings and injector nozzles. Also, the unburned fuel can enter the crankcase, diluting the lubricating oil and causing rapid wear to the engine.

Cooling System Tips

To reduce potential for engine and transmission overheating in high ambient temperature conditions, take the following actions:

- City Driving — When stopped, shift the transmission into NEUTRAL and increase engine idle speed.
- Highway Driving — Reduce your speed.
- Up Steep Hills — Select a lower transmission gear.
- Air Conditioning — Turn it off temporarily.

Do Not Operate The Engine With Low Oil Pressure

When the engine is at normal operating temperature, the minimum oil pressures required are:

Idle 700 to 800 RPM	10 psi (69 kPa)
Full speed and load	30 psi (207 kPa)

CAUTION!

If oil pressure falls to less than normal readings, shut the engine off immediately. Failure to do so could result in immediate and severe engine damage.

Do Not Operate The Engine With Failed Parts

All engine failures give some warning before the parts fail. Be on the alert for changes in performance, sounds, and visual evidence that the engine requires service. Some important clues are:

- Engine misfiring or vibrating severely.
- Sudden loss of power.
- Unusual engine noises.
- Fuel, oil or coolant leaks.
- Sudden change, outside the normal operating range, in the engine operating temperature.
- Excessive smoke.
- Oil pressure drop.

Diesel Particulate Filter (DPF) Manual Regeneration - If Equipped (Chassis Cab Only)

On equipped chassis cabs, a manual regeneration can be enable through the instrument cluster. The manual regeneration will allow the DPF to complete a regeneration, lowering the soot level without having to drive the vehicle. The vehicle must be in park to access this feature, and the fuel level must be over 12.5% full. A message displaying the time left on the regeneration will appear on the instrument cluster, and the EVIC will display the soot level. Refer to "Instrument Cluster Display" in "Getting to Know Your Instrument Panel" for further information.

ENGINE BLOCK HEATER — IF EQUIPPED

The engine block heater warms engine coolant and permits quicker starts in cold weather. Connect the heater cord to a ground-fault interrupter protected 110–115 Volt AC electrical outlet with a grounded, three-wire extension cord.

The engine block heater cord is routed under the hood to the right side and can be located just behind the grille near the headlamp.

NOTE: The engine block heater cord is a factory installed option. If your vehicle is not equipped, heater cords are available from your authorized Mopar dealer.

The block heater must be plugged in at least one hour to have an adequate warming effect on the coolant.

WARNING!

Remember to disconnect the cord before driving. Damage to the 110–115 Volt electrical cord could cause electrocution.

NOTE: The block heater will require 110 Volts AC and 6.5 Amps to activate the heater element.

Block Heater Usage

For ambient temperatures below 0°F (-18°C), engine block heater usage is recommended.

For ambient temperatures below –20°F (-29°C), engine block heater usage is required.

ENGINE BREAK-IN RECOMMENDATIONS — 6.7L DIESEL

The Cummins turbocharged diesel engine does not require a break-in period due to its construction. Normal operation is allowed, providing the following recommendations are followed:

- Warm up the engine before placing it under load.
- Do not operate the engine at idle for prolonged periods.
- Use the appropriate transmission gear to prevent engine lugging.
- Observe vehicle oil pressure and temperature indicators.
- Check the coolant and oil levels frequently.
- Vary throttle position at highway speeds when carrying or towing significant weight.

NOTE: Light duty operation such as light trailer towing or no load operation will extend the time before the engine is at full efficiency. Reduced fuel economy and power may be seen at this time.

For additional vehicle break-in requirements, refer to "Trailer Towing" in "Starting And Operating" of the Owners Manual.

Because of the construction of the Cummins turbocharged diesel engine, engine run-in is enhanced by loaded operating conditions which allow the engine parts to achieve final finish and fit during the first 6,000 miles (10 000 km).

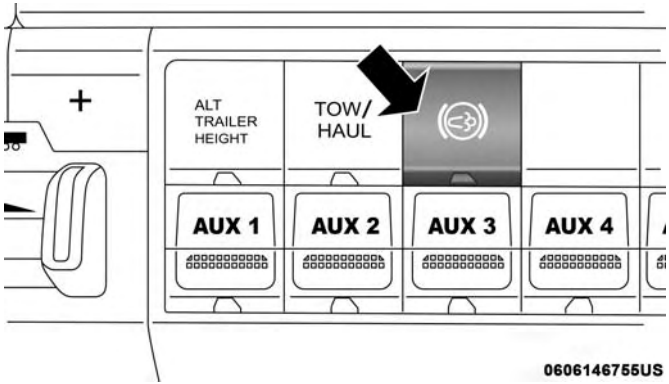
DIESEL EXHAUST BRAKE (ENGINE BRAKING)

The purpose of the exhaust brake (engine braking) feature is to supply negative (braking) torque from the engine. Typically, the engine braking is used for, but not limited to, vehicle towing applications where vehicle braking can be achieved by the internal engine power, thereby sparing the mechanical brakes of the vehicle.

Benefits of the exhaust brake are:

- Vehicle driving control.
- Reduced brake fade.
- Longer brake life.
- Faster cab warm-up.

The exhaust brake feature will only function when the driver toggles it on by pushing the exhaust brake button until the ″Exhaust Brake Indicator″ is illuminated. Normal (Full Strength) exhaust brake mode is indicated by a yellow ″Exhaust Brake Indicator″.



Exhaust Brake Switch

Once the "Exhaust Brake Indicator" is illuminated and the vehicle is moving faster than 5 mph (8 km/h); the exhaust brake will automatically operate when the driver removes pressure from the accelerator pedal. Exhaust braking is most effective when the engine RPM is higher. The automatic transmission will downshift more aggressively in TOW/HAUL mode when the exhaust brake is enabled to increase brake performance.

WARNING!

Do not use the exhaust brake feature when driving in icy or slippery conditions as the increased engine braking can cause the rear wheels to slide and the vehicle to swing around with the possible loss of vehicle control, which may cause an accident possibly resulting in personal injury or death.

CAUTION!

Use of aftermarket exhaust brakes is not recommended and could lead to engine damage

NOTE: For optimum braking power it is recommended to use the exhaust brake while in TOW/HAUL mode.

The exhaust brake feature can also be used to reduce the engine warm up time. To use the exhaust brake as a warm-up device, the vehicle must be stopped or moving less than 5 mph (8 km/h), the "Exhaust Brake Indicator" must be on, and the coolant temperature must be below 180°F (82°C) and ambient temperature below 60°F (16°C).

Automatic Smart Exhaust Brake (Auto)

Automatic Exhaust Brake technology delivers smoother, less aggressive exhaust braking characteristics during downhill descents. Although it can apply full exhaust braking force if needed, Automatic Exhaust Brake may not apply obvious braking if the vehicle speed is not increasing. Automatic Exhaust Brake is intended to maintain vehicle speed, while Full Exhaust Brake is intended to reduce vehicle speed.

Automatic Exhaust Brake can be enabled by pushing the exhaust brake button again anytime after the normal Full Exhaust Brake has been turned on. The "Exhaust Brake Indicator" in the instrument cluster display will change from Yellow to Green when Automatic Exhaust Brake is enabled. Pushing the exhaust brake button again will toggle the exhaust brake mode to off.

AUTOMATIC TRANSMISSION

WARNING!

- **It is dangerous to shift out of PARK or NEUTRAL if the engine speed is higher than idle speed. If your foot is not firmly pressing the brake pedal, the vehicle could accelerate quickly forward or in reverse. You could lose control of the vehicle and hit someone or something. Only shift into gear when the engine is idling normally and your foot is firmly pressing the brake pedal.**
- **The transmission may not engage PARK if the vehicle is moving. Always bring the vehicle to a complete stop before shifting to PARK, and verify that the transmission gear position indicator solidly indicates PARK (P) without blinking. Ensure that the vehicle is completely stopped, and the PARK position is properly indicated, before exiting the vehicle.**
- **Unintended movement of a vehicle could injure those in or near the vehicle. As with all vehicles, you should never exit a vehicle while the engine is running. Before exiting a vehicle, always come to a complete stop, then apply the parking brake, shift**

(Continued)

WARNING! *(Continued)*

the transmission into PARK, turn the engine OFF, and remove the key fob. When the ignition is in the LOCK/OFF (key removal) position, (or, with Keyless Enter-N-Go, when the ignition is in the OFF mode) the transmission is locked in PARK, securing the vehicle against unwanted movement.

- **When leaving the vehicle, always make sure the ignition is in the OFF mode, remove the key fob from the vehicle, and lock the vehicle.**
- **Never use the PARK position as a substitute for the parking brake. Always apply the parking brake fully when exiting the vehicle to guard against vehicle movement and possible injury or damage.**
- **Your vehicle could move and injure you and others if it is not in PARK. Check by trying to move the gear selector out of PARK with the brake pedal released. Make sure the transmission is in PARK before exiting the vehicle.**
- **Never leave children alone in a vehicle, or with access to an unlocked vehicle. Allowing children to be in a vehicle unattended is dangerous for a number of reasons. A child or others could be seriously or**

(Continued)

WARNING! *(Continued)*

fatally injured. Children should be warned not to touch the parking brake, brake pedal or the transmission gear selector.

- **Do not leave the key fob in or near the vehicle (or in a location accessible to children), and do not leave the ignition (in a vehicle equipped with Keyless Enter-N-Go) in the ACC or ON/RUN mode. A child could operate power windows, other controls, or move the vehicle.**

CAUTION!

Damage to the transmission may occur if the following precautions are not observed:

- **Shift into or out of PARK or REVERSE only after the vehicle has come to a complete stop.**
- **Do not shift between PARK, REVERSE, NEUTRAL, or DRIVE when the engine is above idle speed.**
- **Before shifting into any gear, make sure your foot is firmly pressing the brake pedal.**

NOTE: You must press and hold the brake pedal while shifting out of PARK.

Ignition Park Interlock

Vehicles With Pushbutton Start:

This vehicle is equipped with an Ignition Park Interlock which requires the transmission to be in PARK before the ignition can be turned to the OFF mode. This helps the driver avoid inadvertently leaving the vehicle without placing the transmission in PARK. This system also locks the transmission in PARK whenever the ignition is in the OFF mode.

NOTE: The transmission is NOT locked in PARK when the ignition is in the ACC mode (even though the engine will be off). Ensure that the transmission is in PARK, and the ignition is OFF (not in ACC mode) before exiting the vehicle.

Vehicles With Mechanical Key:

This vehicle is equipped with a Key Ignition Park Interlock which requires the transmission to be in PARK before the ignition can be turned to the OFF (key removal) position. The key can only be removed from the ignition when the ignition is in the OFF position, and the transmission is locked in PARK whenever the ignition is in the OFF position. If the vehicle's battery becomes discharged, the key will be trapped in the ignition even when the gear selector is in PARK. Recharge the battery to allow key removal.

NOTE: If a malfunction occurs, the system will trap the key fob in the ignition to warn you that this safety feature is inoperable. The engine can be started and stopped but the key fob cannot be removed until you obtain service.

Brake/Transmission Shift Interlock System

This vehicle is equipped with a Brake Transmission Shift Interlock system (BTSI) that holds the transmission gear selector in PARK unless the brakes are applied. For vehicles with 8-speed transmission, to shift the transmission out of PARK, the engine must be running and the brake pedal must be pressed. The brake pedal must also be pressed to shift from NEUTRAL into DRIVE or REVERSE when the vehicle is stopped or moving at low speeds. For vehicles with 6-speed transmission, to shift the transmission out of PARK, the ignition must be in the ON/RUN mode (engine running or not) and the brake pedal must be pressed.

Six-Speed Automatic Transmission

Chassis Cab models use the AS69RC transmission (which is equipped with a Power Take-Off [PTO] access cover on

the side of the transmission case). Pickup models may use either the AS69RC transmission, or the 68RFE transmission (which has no PTO access cover).

The transmission gear position display (located in the instrument cluster) indicates the transmission gear range. The gear selector is mounted on the right side of the steering column. You must press the brake pedal to move the gear selector out of PARK (refer to "Brake/ Transmission Shift Interlock System" in this section). To drive, move the gear selector from PARK or NEUTRAL to the DRIVE position. Pull the gear selector toward you when shifting into REVERSE or PARK, or when shifting out of PARK.

The electronically-controlled transmission provides a precise shift schedule. The transmission electronics are self-calibrating; therefore, the first few shifts on a new vehicle may be somewhat abrupt. This is a normal condition, and precision shifts will develop within a few hundred miles (kilometers).

Only shift from DRIVE to PARK or REVERSE when the accelerator pedal is released and the vehicle is stopped. Be sure to keep your foot on the brake pedal when shifting between these gears.

The transmission gear selector has only PARK, REVERSE, NEUTRAL, and DRIVE shift positions. Manual downshifts can be made using the Electronic Range Select (ERS) shift control. Pressing the ERS (-/+) switches (on the steering wheel) while in the DRIVE position will select the highest available transmission gear, and will display that gear limit in the instrument cluster as 1, 2, 3, etc. Refer to ″Electronic Range Select (ERS) Operation″ in this section for further information. Some models will display both the selected gear limit, and the actual current gear, while in ERS mode.

Gear Ranges

Do not depress the accelerator pedal when shifting from PARK or NEUTRAL into another gear range.

NOTE: After selecting any gear range, wait a moment to allow the selected gear to engage before accelerating. This is especially important when the engine is cold.

PARK (P)

This range supplements the parking brake by locking the transmission. The engine can be started in this range. Never attempt to use PARK while the vehicle is in motion. Apply the parking brake when exiting the vehicle in this range.

When parking on a level surface, you may shift the transmission into PARK first, and then apply the parking brake.

When parking on a hill, apply the parking brake before shifting the transmission to PARK, otherwise the load on the transmission locking mechanism may make it difficult to move the gear selector out of PARK. As an added precaution, turn the front wheels toward the curb on a downhill grade and away from the curb on an uphill grade.

When exiting the vehicle, always:

- Apply the parking brake.
- Shift the transmission into PARK.
- Turn the engine OFF.
- Remove the key fob.

NOTE: On four-wheel drive vehicles be sure that the transfer case is in a drive position.

WARNING!

- **Never use the PARK position as a substitute for the parking brake. Always apply the parking brake fully**

(Continued)

WARNING! ***(Continued)***

when exiting the vehicle to guard against vehicle movement and possible injury or damage.

- **Your vehicle could move and injure you and others if it is not in PARK. Check by trying to move the gear selector out of PARK with the brake pedal released. Make sure the transmission is in PARK before exiting the vehicle.**
- **It is dangerous to shift out of PARK or NEUTRAL if the engine speed is higher than idle speed. If your foot is not firmly pressing the brake pedal, the vehicle could accelerate quickly forward or in reverse. You could lose control of the vehicle and hit someone or something. Only shift into gear when the engine is idling normally and your foot is firmly pressing the brake pedal.**
- **Unintended movement of a vehicle could injure those in or near the vehicle. As with all vehicles, you should never exit a vehicle while the engine is running. Before exiting a vehicle, always come to a complete stop, then apply the parking brake, shift the transmission into PARK, turn the engine OFF, and remove the key fob. When the ignition is in the**

(Continued)

WARNING! *(Continued)*

LOCK/OFF (key removal) position (or, with Keyless Enter-N-Go, when the ignition is in the OFF mode), the transmission is locked in PARK, securing the vehicle against unwanted movement.

- **When leaving the vehicle, always make sure the ignition is in the OFF mode, remove the key fob from the vehicle, and lock the vehicle.**
- **Never leave children alone in a vehicle, or with access to an unlocked vehicle. Allowing children to be in a vehicle unattended is dangerous for a number of reasons. A child or others could be seriously or fatally injured. Children should be warned not to touch the parking brake, brake pedal or the transmission gear selector.**
- **Do not leave the key fob in or near the vehicle (or in a location accessible to children), and do not leave the ignition (in a vehicle equipped with Keyless Enter-N-Go) in the ACC or ON/RUN mode. A child could operate power windows, other controls, or move the vehicle.**

CAUTION!

- **Before moving the transmission gear selector out of PARK, you must turn the ignition to the ON/RUN mode, and also press the brake pedal. Otherwise, damage to the gear selector could result.**
- **DO NOT race the engine when shifting from PARK or NEUTRAL into another gear range, as this can damage the drivetrain.**

The following indicators should be used to ensure that you have properly engaged the transmission into the PARK position:

- When shifting into PARK, pull the gear selector toward you and move it all the way counterclockwise until it stops.
- Release the gear selector and make sure it is fully seated in the PARK gate.
- Look at the transmission gear position display and verify that it indicates the PARK position (P).
- With brake pedal released, verify that the gear selector will not move out of PARK.

REVERSE (R)

This range is for moving the vehicle backward. Shift into REVERSE only after the vehicle has come to a complete stop.

NEUTRAL (N)

Use this range when the vehicle is standing for prolonged periods with the engine running. The engine may be started in this range. Apply the parking brake and shift the transmission into PARK if you must exit the vehicle.

WARNING!

Do not coast in NEUTRAL and never turn off the ignition to coast down a hill. These are unsafe practices that limit your response to changing traffic or road conditions. You might lose control of the vehicle and have a collision.

CAUTION!

Towing the vehicle, coasting, or driving for any other reason with the transmission in NEUTRAL can cause severe transmission damage. Refer to "Recreational

(Continued)

CAUTION! ***(Continued)***

Towing" in "Starting And Operating" and "Towing A Disabled Vehicle" in "In Case Of Emergency" for further information.

DRIVE (D)

This range should be used for most city and highway driving. It provides the smoothest upshifts and downshifts, and the best fuel economy. The transmission automatically upshifts through underdrive first, second, and third gears, direct fourth gear and overdrive fifth and sixth gears. The DRIVE position provides optimum driving characteristics under all normal operating conditions.

When frequent transmission shifting occurs (such as when operating the vehicle under heavy loading conditions, in hilly terrain, traveling into strong head winds, or while towing a heavy trailer), use the Electronic Range Select (ERS) shift control (refer to "Electronic Range Select (ERS) Operation" in this section for further information) to select a lower gear range. Under these conditions, using a lower gear range will improve performance and extend transmission life by reducing excessive shifting and heat buildup.

If the transmission temperature exceeds normal operating limits, the powertrain controller will modify the transmission shift schedule and expand the range of torque converter clutch engagement. This is done to prevent transmission damage due to overheating.

If the transmission becomes extremely hot or is in danger of overheating, the "Transmission Temperature Warning Light" may illuminate and the transmission may operate differently until the transmission cools down.

NOTE: Use caution when operating a heavily loaded vehicle at low speeds (such as towing a trailer up a steep grade, or in stop-and-go traffic) during hot weather. In these conditions, torque converter slip can impose a significant additional heat load on the cooling system. Downshifting the transmission to the lowest possible gear (when climbing a grade), or shifting to NEUTRAL (when stopped in heavy traffic) can help to reduce this excess heat generation.

During cold temperatures, transmission operation may be modified depending on engine and transmission temperature as well as vehicle speed. This feature improves warm up time of the engine and transmission to achieve maximum efficiency. Engagement of the torque converter clutch is inhibited until the transmission fluid is warm (refer to the "Note" under "Torque Converter Clutch" in this section). On Pickup models with 68RFE transmission, top overdrive gear is also inhibited until the transmission fluid is warm, and during extremely cold temperatures (-16°F [-27°C] or below), operation may briefly be limited to first and direct gears only. On trucks with AS69RC transmission, fifth and sixth gears may be inhibited briefly on cold starts below 41°F (5°C), and during very cold temperatures (-4°F [-20°C] or below), operation may briefly be limited to third gear only. During this condition, the ability of the vehicle to accelerate under heavily loaded conditions may be reduced. In all cases, normal operation will resume once the transmission temperature has risen to a suitable level.

Transmission Limp Home Mode

Transmission function is monitored electronically for abnormal conditions. If a condition is detected that could result in transmission damage, Transmission Limp Home Mode is activated. In this mode, the transmission remains in fourth gear (for 68RFE transmission) or third gear (for AS69RC transmission) regardless of which forward gear is selected. If an AS69RC-equipped truck enters Limp Home Mode at highway speeds, it will initially engage fifth gear, until the vehicle slows to a speed where third gear can be engaged. PARK, REVERSE, and NEUTRAL will continue to operate. The Malfunction Indicator Light (MIL) may be

illuminated. Limp Home Mode allows the vehicle to be driven to an authorized dealer for service without damaging the transmission.

In the event of a momentary problem, the transmission can be reset to regain all forward gears by performing the following steps:

1. Stop the vehicle.
2. Shift the transmission into PARK.
3. Turn the ignition OFF.
4. Wait approximately 10 seconds.
5. Restart the engine.
6. Shift into the desired gear range. If the problem is no longer detected, the transmission will return to normal operation.

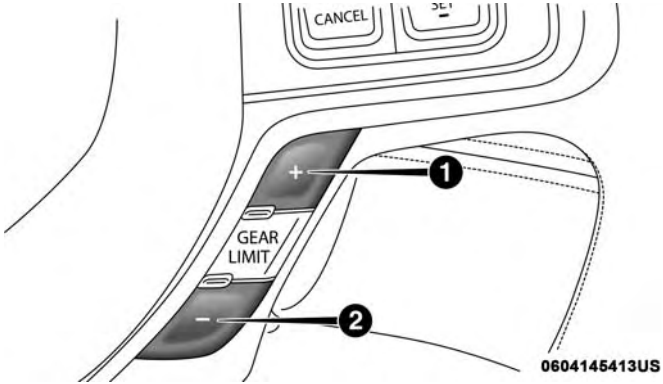
NOTE: Even if the transmission can be reset, we recommend that you visit your authorized dealer at your earliest possible convenience. Your authorized dealer has diagnostic equipment to assess the condition of your transmission.

If the transmission cannot be reset, authorized dealer service is required.

Electronic Range Select (ERS) Operation

The Electronic Range Select (ERS) shift control allows the driver to limit the highest available gear when the transmission is in DRIVE. For example, if you set the transmission gear limit to 4 (fourth gear), the transmission will not shift above fourth gear, but will shift through the lower gears normally.

You can switch between DRIVE and ERS mode at any vehicle speed. When the gear selector is in the DRIVE position, the transmission will operate automatically, shifting between all available gears. Tapping the ERS (-) switch will activate ERS mode, display the current gear in the instrument cluster, and set that gear as the top available gear. Once in ERS mode, tapping the ERS (-) or (+) switch will change the top available gear.



Electronic Range Select

1 — GEAR + Switch 2 — GEAR – Switch

To exit ERS mode, simply push and hold the ERS (+) switch until the gear limit display disappears from the instrument cluster.

WARNING!

Do not downshift for additional engine braking on a slippery surface. The drive wheels could lose their grip and the vehicle could skid, causing a collision or personal injury.

Transmission Gear Limit Display	1	2	3	4	5	6	D
Actual Gear(s) Allowed	1	1-2	1-3	1-4	1-5	1-6	1-6

NOTE: To select the proper gear position for maximum deceleration (engine braking), simply push and hold the ERS (-) switch. The transmission will shift to the range from which the vehicle can best be slowed down.

CAUTION!

When using ERS for engine braking while descending steep grades, be careful not to overspeed the engine. Apply the brakes as needed to prevent engine overspeed.

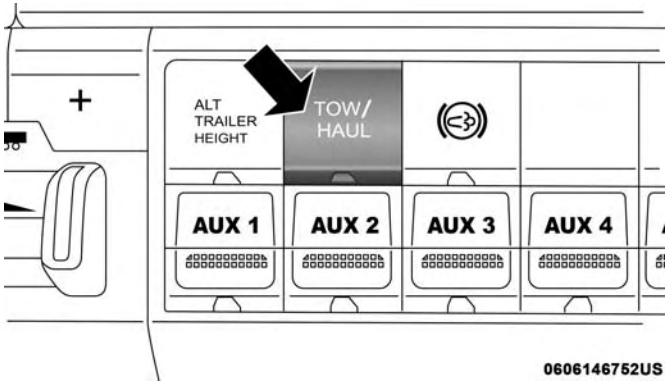
Overdrive Operation

The automatic transmission includes an electronically controlled Overdrive (fifth and sixth gears). The transmission will automatically shift into Overdrive if the following conditions are present:

- The gear selector is in the DRIVE position.
- The transmission fluid has reached an adequate temperature.
- The engine coolant has reached an adequate temperature.
- The vehicle speed is sufficiently high.
- The driver is not heavily pressing the accelerator.

When To Use TOW/HAUL Mode

When driving in hilly areas, towing a trailer, carrying a heavy load, etc., and frequent transmission shifting occurs, push the TOW/HAUL switch to activate TOW/HAUL mode. This will improve performance and reduce the potential for transmission overheating or failure due to excessive shifting. When operating in TOW/HAUL mode, transmission upshifts are delayed, and the transmission will automatically downshift (for engine braking) when the throttle is closed and/or during steady braking maneuvers.



TOW/HAUL Switch

The "TOW/HAUL Indicator Light" will illuminate in the instrument cluster to indicate that TOW/HAUL mode has been activated. Pushing the switch a second time restores normal operation. Normal operation is always the default at engine start-up. If TOW/HAUL mode is desired, the switch must be pushed each time the engine is started.

WARNING!

Do not use the "TOW/HAUL" feature when driving in icy or slippery conditions. The increased engine braking can cause the rear wheels to slide, and the vehicle to swing around with the possible loss of vehicle control, which may cause an accident possibly resulting in personal injury or death.

Torque Converter Clutch

A feature designed to improve fuel economy has been included in the automatic transmission on your vehicle. A clutch within the torque converter engages automatically at calibrated speeds. This may result in a slightly different feeling or response during normal operation in the upper gears. When the vehicle speed drops or during some accelerations, the clutch automatically disengages.

NOTE:

- The torque converter clutch will not engage, until the transmission fluid and engine coolant are warm [usually after 1 to 3 miles (2 to 5 km) of driving]. Because engine speed is higher when the torque converter clutch is not engaged, it may seem as if the transmission is not shifting properly when cold. This is normal. Using the Electronic Range Select (ERS) shift control, when the transmission is sufficiently warm, will demonstrate that the transmission is able to shift into and out of Overdrive.
- If the vehicle has not been driven for several days, the first few seconds of operation after shifting the transmission into gear may seem sluggish. This is due to the fluid partially draining from the torque converter into the transmission. This condition is normal and will not cause damage to the transmission. The torque converter will refill within five seconds after starting the engine.

AUXILIARY SWITCHES — IF EQUIPPED

There can be up to five auxiliary switches located in the lower switch bank of the instrument panel which can be used to power various electronic devices and PTO (Power Take Off) – If Equipped. If Power Take Off is equipped, it will take the place of the fifth Auxiliary switch. Connections to the switches are found under the hood in the connectors attached to the auxiliary Power Distribution Center.

You have the ability to configure the functionality of the auxiliary switches via the instrument cluster display. All switches can now be configured for setting the switch type

operation to latching or momentary, power source of either battery or ignition, and ability to hold last state across key cycles.

NOTE: Holding last state conditions are met when switch type is set to latching and power source is set to ignition.

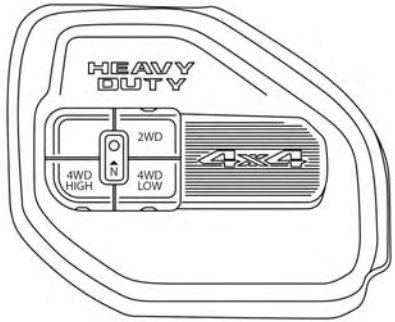
For further information on using the auxiliary switches, please refer to the Ram Body Builders Guide by accessing www.rambodybuilder.com and choosing the appropriate links.

FOUR-WHEEL DRIVE OPERATION — IF EQUIPPED

Four-wheel drive trucks are equipped with either a manually shifted transfer case or an electronically shifted transfer case. Refer to the operating instructions for your transfer case, located in this section for further information.

Electronically Shifted Transfer Case (Four-Position Switch) — If Equipped

The electronic shift transfer case is operated by the 4WD Control Switch (Transfer Case Switch), which is located on the instrument panel.



Four-Position/On-Demand Transfer Case

This electronically shifted transfer case provides four mode positions:

- Two-Wheel Drive High Range (2WD)
- Four-Wheel Drive High Range (4WD HIGH)
- Four-Wheel Drive Low Range (4WD LOW)
- Neutral (NEUTRAL)

For additional information on the appropriate use of each transfer case mode position, see the information below:

2WD

Rear Wheel Drive High Range — This range is for normal street and highway driving on dry, hard surfaced roads.

4WD HIGH

Four-Wheel Drive High Range — This range maximizes torque to the front driveshaft, forcing the front and rear wheels to rotate at the same speed. This range provides additional traction for loose, slippery road surfaces only.

4WD LOW

Four-Wheel Drive Low Range — This range provides low speed four-wheel drive. It maximizes torque to the front driveshaft, forcing the front and rear wheels to rotate at the same speed. This range provides additional traction and maximum pulling power for loose, slippery road surfaces only. Do not exceed 25 mph (40 km/h).

NEUTRAL (N)

Neutral — This range disengages both the front and rear driveshafts from the powertrain. To be used for flat towing behind another vehicle. Refer to "Recreational Towing" in this section for further information.

WARNING!

You or others could be injured or killed if you leave the vehicle unattended with the transfer case in the NEUTRAL position without first fully engaging the parking brake. The transfer case NEUTRAL position disengages both the front and rear drive shafts from the powertrain and will allow the vehicle to roll, even if the transmission is in PARK. The parking brake should always be applied when the driver is not in the vehicle.

This electronically shifted transfer case is designed to be driven in the two-wheel drive position (2WD) for normal street and highway conditions on dry, hard surfaced roads.

When additional traction is required, the transfer case 4WD HIGH and 4WD LOW positions can be used to maximize torque to the front driveshaft, forcing the front and rear wheels to rotate at the same speed. This is accomplished by rotating the 4WD Control Switch to the desired position.

Refer to "Shifting Procedure" in this section for specific shifting instructions.

The 4WD HIGH and 4WD LOW positions are designed for loose, slippery road surfaces only. Driving in the 4WD HIGH and 4WD LOW positions on dry hard surfaced roads may cause increased tire wear and damage to the driveline components.

NOTE: The transfer case NEUTRAL button is located on the lower left hand corner of the 4WD Control Switch. The transfer case NEUTRAL position is to be used for recreational towing only. Refer to "Recreational Towing" in "Starting And Operating" for further information.

Transfer Case Position Indicator Lights

The Transfer Case Position Indicator Lights (4WD and 4LOW) are located in the instrument cluster and indicate the current and desired transfer case selection. When you select a different transfer case position, the indicator lights will do the following:

If All Of The Following Shift Conditions Are Met:

1. The current position indicator light will turn OFF.
2. The selected position indicator light will flash until the transfer case completes the shift.
3. When the shift is complete, the indicator light for the selected position will stop flashing and remain ON.

If One Or More Of The Following Shift Conditions Are Not Met:

1. The indicator light for the current position will remain ON.
2. The newly selected position indicator light will continue to flash.
3. The transfer case **will not** shift.

NOTE: Before retrying a selection, make certain that all the necessary requirements for selecting a new transfer case position have been met. To retry the selection, turn the control switch back to the current position, wait five seconds, and retry selection. To find the shift requirements, refer to the "Shifting Procedure" for your transfer case, located in this section.

The "SVC 4WD Warning Light" monitors the electronic shift four-wheel drive system. If this light remains on after engine start up or illuminates during driving, it means that the four-wheel drive system is not functioning properly and that service is required.

WARNING!

Always engage the parking brake when powering down the vehicle if the "SVC 4WD Warning Light" is illuminated. Not engaging the parking brake may allow the vehicle to roll, which may cause personal injury.

NOTE: Do not attempt to make a shift while only the front or rear wheels are spinning, as this can cause damage to driveline components.

When operating your vehicle in 4WD LOW, the engine speed is approximately three times that of the 2WD or 4WD HIGH positions at a given road speed. Take care not to overspeed the engine and do not exceed 25 mph (40 km/h).

Proper operation of four-wheel drive vehicles depends on tires of equal size, type and circumference on each wheel. Any difference in tire size can cause damage to the drivetrain.

Because four-wheel drive provides improved traction, there is a tendency to exceed safe turning and stopping speeds. Do not go faster than road conditions permit.

Shifting Procedure

NOTE:

- If any of the requirements to select a new transfer case position have not been met, the transfer case will not shift. The position indicator light for the previous position will remain ON and the newly selected position indicator light will continue to flash until all the requirements for the selected position have been met. To retry a shift: return the control switch back to the original position, make certain all shift requirements have been met, wait five seconds and try the shift again.
- If all the requirements to select a new transfer case position have been met, the current position indicator light will turn OFF, the selected position indicator light will flash until the transfer case completes the shift. When the shift is complete, the position indicator light for the selected position will stop flashing and remain ON.

2WD To 4WD HIGH

Push the desired position on the 4WD control switch to shift the transfercase. Shifts between 2WD and 4WD HIGH can be done with the vehicle stopped or in motion. With the vehicle in motion, the transfer case will engage/

disengage faster if you momentarily release the accelerator pedal after turning the control switch. If the vehicle is stopped, the ignition switch must be in the ON position with the engine either running or off. This shift cannot be completed if the ignition switch is in the ACC position.

NOTE: The four-wheel drive system will not allow shifts between 2WD/4WD HIGH if the front and/or rear wheels are spinning (no traction). In this situation, the selected position indicator light will flash and the original position indicator light will remain ON. At this time, reduce speed and stop spinning the wheels to complete the shift.

2WD Or 4WD HIGH To 4WD LOW

NOTE: When shifting into or out of 4WD LOW some gear noise may be heard. This noise is normal and is not detrimental to the vehicle or occupants.

Shifting can be performed with the vehicle rolling 2 to 3 mph (3 to 5 km/h) or completely stopped. You can use either of the following procedures:

Preferred Procedure

1. With the engine running, slow the vehicle to 2 to 3 mph (3 to 5 km/h).
2. Shift the transmission into NEUTRAL.
3. While still rolling, push the desired position on the transfer case control switch.
4. After the desired position indicator light is ON (not flashing), shift the transmission back into gear.

Alternate Procedure

1. Bring the vehicle to a complete stop.
2. With the ignition switch in the ON position and the engine running, shift the transmission into NEUTRAL.
3. Push the desired position on the transfer case control switch.
4. After the desired position indicator light is ON (not flashing), shift the transmission back into gear.

NOTE:

- If Steps 1 or 2 of either the Preferred or Alternate Procedure are not satisfied prior to attempting the shift, then the desired position indicator light will flash continuously while the original position indicator light is ON, until all requirements have been met.
- The ignition switch must be in the ON position for a shift to take place and for the position indicator lights to

be operable. If the ignition switch is not in the ON position, the shift will not take place and no position indicator lights will be on or flashing.

POWER TAKE OFF OPERATION — IF EQUIPPED (CHASSIS CAB ONLY)

This vehicle when equipped with PTO Prep and the AS69RC automatic six-speed transmission, will allow for an aftermarket upfit with a transmission driven PTO (power take off). The customer will have the ability to operate the PTO in either a “stationary” or “mobile” mode. The vehicles will be factory set to the “stationary” mode. To select ’mobile mode’ You will need to enter the commercial vehicle menu on the instrument cluster display and select mobile PTO mode. Details of the PTO selection modes and further PTO information is available at the Ram Truck Bodybuilders web site: **www.rambodybuilder.com.**

AS69RC Six-Speed Automatic Transmission Only

The PTO drive gear (part of the AS69RC) operates at torque converter turbine speed. The turbine speed will be less than engine speed when the torque converter clutch is not engaged and will be same as engine speed when the torque converter clutch is engaged.

Stationary Mode

To operate the PTO in this mode the vehicle must meet the following conditions:

- Transmission in PARK position.
- PTO switch has been activated.
- Brake pedal must not be applied.
- Vehicle engine must be running.
- No vehicle, or brake faults present.
- PTO must be correctly installed using the vehicle provided circuits.

The instrument cluster will display a ″PTO On″ message for five seconds if the above conditions are met. Otherwise, the instrument cluster will display a message ″To Operate PTO Shift To Park″ indicating what operator action should be taken to engage the PTO mode.

The customer has the choice to operate the PTO by utilizing the cruise control switches or by utilizing a remote control (provided by the PTO supplier). To operate the feature using the cruise control switches, the customer must first activate the PTO switch which will turn on the PTO. In order to increase or decrease the engine idle speed, to optimize the PTO function, the “RESUME/ACCEL” and

"DECEL" cruise switches can be used respectively. To disengage PTO operation and return to "standard vehicle operation" simply toggle the PTO switch to the OFF position.

The torque converter clutch (TCC) will automatically engage at engine speeds above 1,200 RPM (engine speed) in PTO stationary mode. Once engaged, the TCC will remain applied and will not disengage until the engine speed falls below 1,000 RPM. TCC engagement is desirable for certain types of PTO applications (Automatic Transmission Only).

To operate the PTO via a remote switch, the customer must make sure the above conditions are met. It is vital for proper operation that the PTO and remote have been installed correctly, paying special attention to ensure the vehicle provided wiring has been connected properly. This is the responsibility of the installer of the PTO and switches/remote system. It is the responsibility of the PTO manufacturer to ensure that their electrical (switches and remote) system is compatible with the vehicle's electrical architecture and software functionality.

NOTE: Single set speed can be programmed via the PTO menu on the instrument cluster display. Further details are available at the Ram Truck Bodybuilders web site located at **rambodybuilder.com**

Mobile Mode

To operate the PTO in this mode the vehicle must meet the following conditions:

- Mobile mode is activated via the menu on the instrument cluster display.
- (ON/OFF) switch has been activated.
- Transmission must be in PARK or DRIVE.
- Parking brake must not be applied.
- Brake pedal must not be applied.
- No vehicle or brake faults present.
- Vehicle engine must be running.
- PTO must be correctly installed using the vehicle provided circuits.

The customer may choose to use the PTO while the vehicle is moving. To do so, the PTO function must be activated prior to taking the vehicle out of PARK. This is accomplished by activating the upfitter-provided PTO on/off switch. At this point, the customer may place the vehicle in a forward or reverse gear and have PTO operation once the

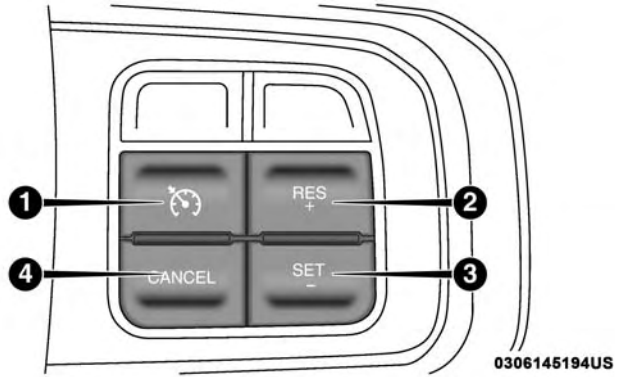
vehicle begins to move. To disengage PTO operation and return to "standard vehicle operation" simply toggle the on/off switch to the OFF position.

NOTE: For application specific information with respect to PTO and pump requirements and additional vehicle information (wiring schematics, preset idle values, engine speed limits, and vehicle hardware and software requirements) please refer to the Body Builders Guide by accessing **rambodybuilder.com and choosing the appropriate links.**

SPEED CONTROL

When engaged, the Speed Control takes over accelerator operations at speeds greater than 25 mph (40 km/h).

The Speed Control buttons are located on the right side of the steering wheel.



Speed Control Buttons

1 — On/Off	3 — SET (-)
2 — RES (+)	4 — CANCEL

NOTE: In order to ensure proper operation, the Speed Control System has been designed to shut down if multiple speed control functions are operated at the same time. If this occurs, the Speed Control System can be reactivated by pushing the Speed Control On/Off button and resetting the desired vehicle set speed.

To Activate

Push the On/Off button to activate the Speed Control. The cruise indicator light in the instrument cluster display will illuminate. To turn the system off, push the On/Off button a second time. The cruise indicator light will turn off. The system should be turned off when not in use.

WARNING!

Leaving the Speed Control system on when not in use is dangerous. You could accidentally set the system or cause it to go faster than you want. You could lose control and have an accident. Always leave the system off when you are not using it.

To Set A Desired Speed

Turn the Speed Control on. When the vehicle has reached the desired speed, push the SET (-) button and release. Release the accelerator and the vehicle will operate at the selected speed.

NOTE: The vehicle should be traveling at a steady speed and on level ground before pushing the SET (-) button.

To Vary The Speed Setting

To Increase Speed

When the Speed Control is set, you can increase speed by pushing the RES (+) button.

The driver's preferred units can be selected through the instrument panel settings if equipped. Refer to "Getting To Know Your Instrument Panel" for more information. The speed decrement shown is dependant on the chosen speed unit of U.S. (mph) or Metric (km/h):

U.S. Speed (mph)

- Pushing the RES (+) button once will result in a 1 mph increase in set speed. Each subsequent tap of the button results in an increase of 1 mph.
- If the button is continually pushed, the set speed will continue to increase until the button is released, then the new set speed will be established.

Metric Speed (km/h)

- Pushing the RES (+) button once will result in a 1 km/h increase in set speed. Each subsequent tap of the button results in an increase of 1 km/h.

- If the button is continually pushed, the set speed will continue to increase until the button is released, then the new set speed will be established.

To Decrease Speed

When the Speed Control is set, you can decrease speed by pushing the SET (-) button.

The driver's preferred units can be selected through the instrument panel settings if equipped. Refer to "Getting To Know Your Instrument Panel" for more information. The speed decrement shown is dependant on the chosen speed unit of U.S. (mph) or Metric (km/h):

U.S. Speed (mph)

- Pushing the SET (-) button once will result in a 1 mph decrease in set speed. Each subsequent tap of the button results in a decrease of 1 mph.
- If the button is continually pushed, the set speed will continue to decrease until the button is released, then the new set speed will be established.

Metric Speed (km/h)

- Pushing the SET (-) button once will result in a 1 km/h decrease in set speed. Each subsequent tap of the button results in a decrease of 1 km/h.
- If the button is continually pushed, the set speed will continue to decrease until the button is released, then the new set speed will be established.

To Accelerate For Passing

Press the accelerator as you would normally. When the pedal is released, the vehicle will return to the set speed.

Using Speed Control On Hills

The transmission may downshift on hills to maintain the vehicle set speed.

NOTE: The Speed Control system maintains speed up and down hills. A slight speed change on moderate hills is normal.

On steep hills, a greater speed loss or gain may occur so it may be preferable to drive without Speed Control.

WARNING!

Speed Control can be dangerous where the system cannot maintain a constant speed. Your vehicle could go too fast for the conditions, and you could lose control and have an accident. Do not use Speed Control in heavy traffic or on roads that are winding, icy, snow-covered or slippery.

To Resume Speed

To resume a previously set speed, push the RES (+) button and release. Resume can be used at any speed above 20 mph (32 km/h).

To Deactivate

A soft tap on the brake pedal, pushing the CANCEL button, or normal brake pressure while slowing the vehicle will deactivate the Speed Control without erasing the set speed from memory.

Pushing the On/Off button, or returning the ignition to OFF, erases the set speed from memory.

ENGINE RUNAWAY

Diesel engine runaway is a rare condition affecting diesel engines, where the engine consumes its own lubrication oil and runs at higher and higher RPM until it overspeeds to a point where it destroys itself due to either mechanical failure or engine seizure through lack of lubrication.

WARNING!

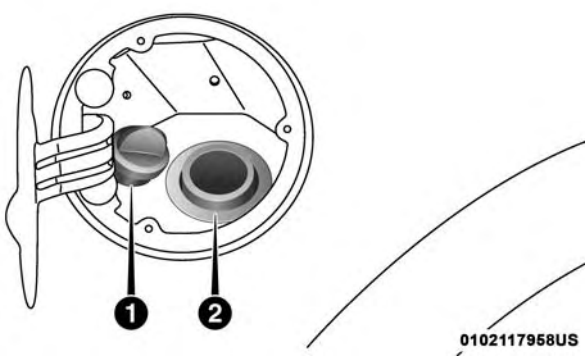
In case of engine runaway due to flammable fumes from fuel spills or turbocharger oil leaks being sucked into the engine, do the following to help avoid personal injury and/or vehicle damage:

Turn the ignition switch to the OFF position.

Using a CO2 or dry chemical type fire extinguisher, direct the spray from the fire extinguisher into the grille on the passenger side so that the spray enters the engine air intake.
The inlet for the engine air intake is located behind the passenger side headlamp and receives air through the grille.

REFUELING THE VEHICLE — 2500/3500 DIESEL MODELS

1. Open the fuel filler door.



Diesel Fuel And Diesel Exhaust Fluid Fill Location

1 — Diesel Exhaust Fluid (DEF) Fill Location
2 — Diesel Fuel Fill Location

NOTE: There is no fuel filler cap. A flapper door inside the filler pipe seals the system.

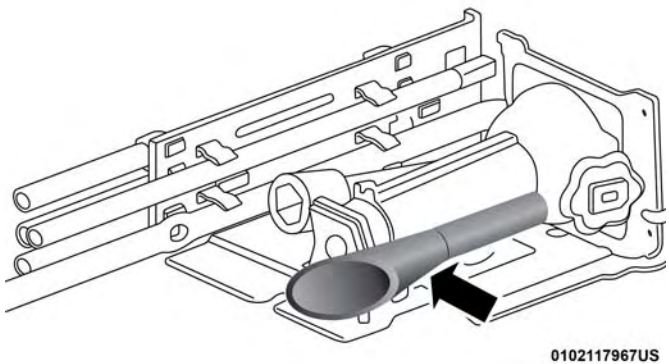
2. Insert the fuel nozzle fully into the filler pipe – the nozzle opens and holds the flapper door while refueling.
3. Fill the vehicle with fuel – when the fuel nozzle "clicks" or shuts off the fuel tank is full.
4. Remove the fuel nozzle and close the fuel door.

Emergency Fuel Can Refueling

Most fuel cans will not open the flapper door.

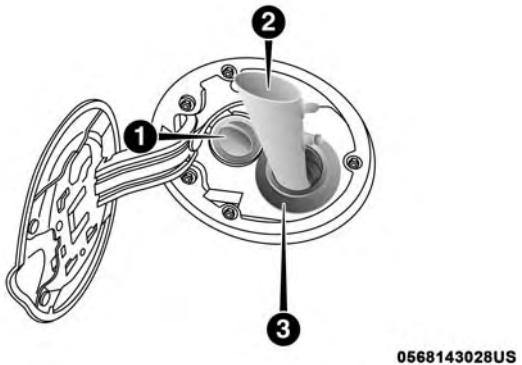
A funnel is provided to open the flapper door to allow emergency refueling with a fuel can.

1. Retrieve fuel funnel from the jack kit located under the front passenger seat.



Fuel Fill Funnel Location 2500/3500 Models

2. Insert funnel into same filler pipe opening as the fuel nozzle.



Emergency Fuel Fill Location

1 — Diesel Exhaust Fluid (DEF) Fill Location
2 — Emergency Diesel Fuel Fill Funnel
3 — Diesel Fuel Fill Location

NOTE: Ensure funnel is inserted fully to hold flapper door open.

3. Pour fuel into funnel opening.

4. Remove funnel from filler pipe, clean off prior to putting back in the jack kit.

WARNING!

- **Never have any smoking materials lit in or near the vehicle when the fuel door is open or the tank is being filled.**
- **Never add fuel when the engine is running. This is in violation of most state and federal fire regulations and may cause the "Malfunction Indicator Light" to turn on.**
- **A fire may result if fuel is pumped into a portable container that is inside of a vehicle. You could be burned. Always place fuel containers on the ground while filling.**

CAUTION!

To avoid fuel spillage and overfilling, do not "top off" the fuel tank after filling.

REFUELING THE VEHICLE — DIESEL CHASSIS CAB MODELS

CAUTION!

To avoid fuel spillage and overfilling, do not "top off" the fuel tank after filling.

NOTE:

- When the fuel nozzle "clicks" or shuts off, the fuel tank is full.
- Tighten the fuel filler cap until you hear a "clicking" sound. This is an indication that the fuel filler cap is properly tightened.
- Make sure that the fuel filler cap is tightened each time the vehicle is refueled.

WARNING!

A fire may result if gasoline is pumped into a portable container that is inside of a vehicle. You could be burned. Always place gas containers on the ground while filling.

Fuel Filler Cap

If the fuel filler cap is lost or damaged, be sure the replacement cap is for use with this vehicle.

WARNING!

- **Never have any smoking materials lit in or near the vehicle when the fuel filler cap is removed or the tank filled.**
- **Never add fuel to the vehicle when the engine is running.**

CAUTION!

Damage to the fuel system or emission control system could result from using an improper fuel tank filler tube cap. A poorly fitting cap could let impurities into the fuel system.

Avoid Using Contaminated Fuel

Fuel that is contaminated by water or dirt can cause severe damage to the engine fuel system. Proper maintenance of the engine fuel filter and fuel tank is essential. Refer to "Dealer Service" in "Servicing And Maintenance" for further information.

Bulk Fuel Storage — Diesel Fuel

If you store quantities of fuel, good maintenance of the stored fuel is also essential. Fuel contaminated with water will promote the growth of "microbes." These microbes form "slime" that will clog the fuel filtration system and lines. Drain condensation from the supply tank and change the line filter on a regular basis.

NOTE: When a diesel engine is allowed to run out of fuel, air is pulled into the fuel system.

If the vehicle will not start, refer to "Dealer Service / Priming If The Engine Has Run Out Of Fuel" in "Servicing And Maintenance" for further information.

WARNING!

Do not open the high pressure fuel system with the engine running. Engine operation causes high fuel pressure. High pressure fuel spray can cause serious injury or death.

Diesel Exhaust Fluid

Your vehicle is equipped with a Selective Catalytic Reduction system to meet the very stringent diesel emissions standards required by the Environmental Protection Agency.

The purpose of the SCR system is to reduce levels of NOx (oxides of nitrogen emitted from engines) that are harmful to our health and the environment to a near-zero level. A small quantity of Diesel Exhaust Fluid (DEF) is injected into the exhaust upstream of a catalyst where, when vaporized, it converts smog-forming nitrogen oxides (NOx) into harmless nitrogen (N2) and water vapor (H2O), two natural components of the air we breathe. You can operate with the comfort that your vehicle is contributing to a cleaner, healthier world environment for this and generations to come.

System Overview

This vehicle is equipped with a Diesel Exhaust Fluid (DEF) injection system and a Selective Catalytic Reduction (SCR) catalyst to meet the emission requirements.

The DEF injection system consists of the following components:

- DEF tank
- DEF pump
- DEF injector
- Electronically-heated DEF lines
- DEF control module
- NOx sensors
- Temperature sensors
- SCR catalyst
- UQS Sensor

Refer to “Instrument Cluster Display” in “Getting To Know Your Instrument Panel” for system messages and warnings.

NOTE:

- Your vehicle is equipped with a DEF injection system. You may occasionally hear an audible clicking noise. This is normal operation.
- The DEF pump will run for a period of time after engine shutdown to purge the DEF system. This is normal operation.

Diesel Exhaust Fluid Storage

Diesel Exhaust Fluid (DEF) is considered a very stable product with a long shelf life. If DEF is kept in temperatures between 10° and 90°F (-12° and 32°C), it will last a minimum of one year.

DEF is subject to freezing at the lowest temperatures. For example, DEF may freeze at temperatures at or below 12° F (-11° C). The system has been designed to operate in this environment.

NOTE: When working with DEF, it is important to know that:

- Any containers or parts that come into contact with DEF must be DEF compatible (plastic or stainless steel). Copper, brass, aluminum, iron or non-stainless steel should be avoided as they are subject to corrosion by DEF.
- If DEF is spilled, it should be wiped up completely.

Adding Diesel Exhaust Fluid

The DEF gauge (located on the instrument cluster) will display the level of DEF remaining in the tank. Refer to "Instrument Cluster" and "Instrument Cluster Descriptions" in "Getting To Know Your Instrument Panel" for further information.

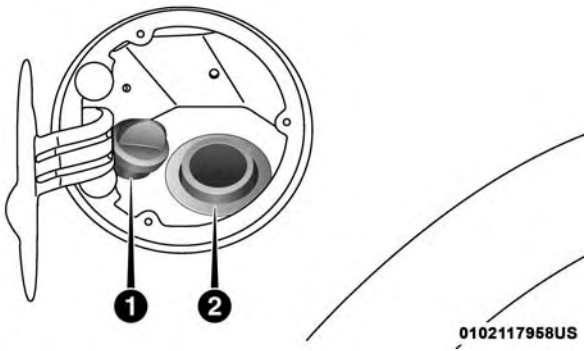
NOTE:

- Driving conditions (altitude, vehicle speed, load, etc.) will effect the amount of DEF that is used in your vehicle.
- Another factor is that outside temperature can affect DEF consumption. In cold conditions, 12° F (-11° C) and below, the DEF gauge needle can stay on a fixed position and may not move for extended periods of time. This is a normal function of the system.
- There is an electric heater inside the DEF tank that automatically works when necessary. And if the DEF supply does freeze, the truck will operate normally until it thaws.

DEF Fill Procedure

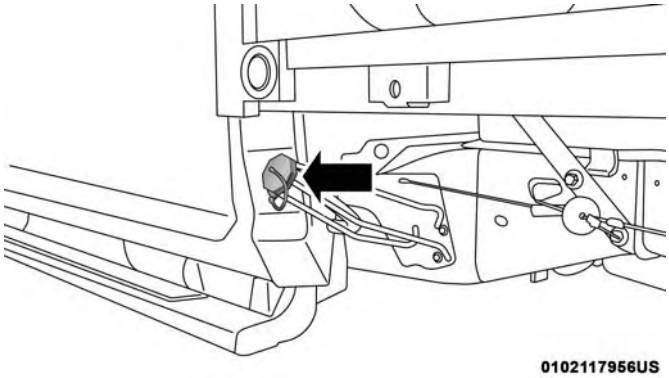
NOTE: Refer to "Fluids And Lubricants" in "Technical Specifications" for the correct fluid type.

1. Remove cap from DEF tank (located on drivers side of the vehicle or in fuel door).



DEF Filler Cap And Fuel Fill Pick Up Models

1 — Diesel Exhaust Fluid (DEF) Fill Location
2 — Diesel Fuel Fill Location



DEF Filler Cap Chassis Cab Models

2. Insert DEF fill adapter/nozzle into DEF tank filler neck.

NOTE:

- The DEF gauge may take up to five seconds to update after adding a gallon or more of Diesel Exhaust Fluid (DEF) to the DEF tank. If you have a fault related to the DEF system, the gauge may not update to the new level. See your authorized dealer for service.
- The DEF gauge may also not immediately update after a refill if the temperature of the DEF fluid is below 12F (-11C). The DEF line heater will possibly warm up the DEF fluid and allow the gauge to update after a period of run time. Under very cold conditions, it is possible that the gauge may not reflect the new fill level for several drives.
- Excessive overfilling of the DEF tank can result in a MIL lamp/fault code and inaccurate level readings.

CAUTION!

- **To avoid DEF spillage, and possible damage to the DEF tank from overfilling, do not "top off" the DEF tank after filling.**
- **DO NOT OVERFILL. DEF will freeze below 12°F (-11°C). The DEF system is designed to work in temperatures below the DEF freezing point, however, if the tank is overfilled and freezes, the system could be damaged.**
- **When DEF is spilled, clean the area immediately with water and use an absorbent material to soak up the spills on the ground.**
- **Do not attempt to start your engine if DEF is accidentally added to the diesel fuel tank as it can result in severe damage to your engine, including but not limited to failure of the fuel pump and injectors.**

(Continued)

CAUTION! *(Continued)*

- **Never add anything other than DEF to the tank – especially any form of hydrocarbon such as diesel fuel, fuel system additives, gasoline, or any other petroleum-based product. Even a very small amount of these, less than 100 parts per million or less than 1 oz. per 78 gallons (295 liters) will contaminate the entire DEF system and will require replacement. If owners use a container, funnel or nozzle when refilling the tank, it should either be new or one that is has only been used for adding DEF. Mopar provides an attachable nozzle with its DEF for this purpose.**

Filling The DEF Tank

3. Stop filling the DEF tank immediately when any of the following happen: DEF stops flowing from the fill bottle into the DEF tank, DEF splashes out the filler neck, or a DEF pump nozzle automatically shuts off.
4. Reinstall cap onto DEF tank.

Filling The Def Tank In Cold Climates

Since DEF will begin to freeze at 12°F (-11°C), your vehicle is equipped with an automatic DEF heating system. This allows the DEF injection system to operate properly at temperatures below 12°F (-11°C). If your vehicle is not in

operation for an extended period of time with temperatures below 12°F (-11°C), the DEF in the tank may freeze. If the tank is overfilled and freezes, it could be damaged. Therefore, do not overfill the DEF tank.

Extra care should be taken when filling with portable containers to avoid overfilling. Note the level of the DEF gauge in your instrument cluster. You may safely add a maximum of 2 gallons (7.5 Liters) of DEF from portable containers when your DEF gauge is reading ½ full.

TRAILER TOWING

In this section you will find safety tips and information on limits to the type of towing you can reasonably do with your vehicle. Before towing a trailer, carefully review this information to tow your load as efficiently and safely as possible.

To maintain the New Vehicle Limited Warranty coverage, follow the requirements and recommendations in this manual concerning vehicles used for trailer towing.

Towing Tips — 6 Speed Transmission Only

When towing a loaded trailer up steep grades at low speeds 20 mph (32 km/h) or below, holding your vehicle in first gear (using the ERS shift control) can help to avoid transmission overheating.

If you regularly tow a trailer for more than 45 minutes of continuous operation, then change the transmission fluid and filter(s) as specified for ″police, taxi, fleet, or frequent trailer towing.″ Refer to the “Maintenance Schedule” for the proper maintenance intervals.

NOTE: Check the transmission fluid level before towing (6-speed automatic only).

IN CASE OF EMERGENCY

CONTENTS

JUMP STARTING

WARNING!

- **To prevent personal injury or damage to clothing, do not allow battery fluid to contact eyes, skin or fabrics. Do not lean over a battery when connecting jumper cables or allow cable clamps to touch each other. Keep open flames or sparks away from battery vent holes. Always wear eye protection when working with batteries.**
- **Do not use a booster battery or any other booster source that has a greater than 12 Volt system, i.e., do not use a 24 Volt power source.**

NOTE: Replacement batteries should both be of equal size to prevent damage to the vehicle's charging system.

Your vehicle is equipped with two 12 Volt batteries. If it becomes necessary to use a booster battery with jumper cables to start a vehicle's engine because its batteries are discharged, the following procedure should be used:

1. Apply the parking brake and place the transmission in PARK.
2. Turn off lights, heater and other electrical loads.
3. Observe charge indicator (if equipped) in both batteries. If the indicator (if equipped) is light or yellow on either battery, replace that battery.

CAUTION!

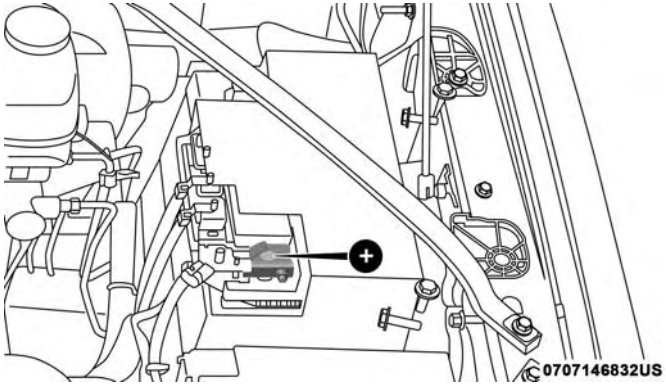
Use the jump start procedure only when the charge indicator (if equipped) in both batteries is dark in the center. Do not attempt jump starting when either battery charge indicator (if equipped) is light or yellow. If the charge indicator (if equipped) has a green dot in the center, failure to start is not due to a discharged battery and cranking system should be checked.

4. Attach one jumper cable to the positive terminal of booster battery and the other end of the same cable to the positive terminal of the discharged battery.

NOTE: Do not connect jumper cables to the fuses. Only use the jump post when connecting jumper cables.

WARNING!

Do not allow vehicles to touch each other as this could establish a ground connection and personal injury could result.



Positive Battery Post

5. Connect one end of the other jumper cable to negative (-) post of booster battery. Connect the other end of the jumper cable to a good ground on the engine block of the vehicle with the discharged battery. Make sure a good connection is made, free of dirt and grease.

NOTE:

- Take care that the clamps from one cable do not inadvertently touch clamps from the other cable.
- Do not lean over the battery when making connection.
- The negative connection must provide good electrical conductivity and current carrying capacity.

WARNING!

- **Do not connect the cable to the negative post of the discharge battery. The resulting electrical spark could cause the battery to explode.**
- **During cold weather when temperatures are below freezing point, electrolyte in a discharged battery may freeze. Do not attempt jump starting because the battery could rupture or explode. The battery temperature must be brought up above freezing point before attempting to jump start.**

6. After the engine is started or if the engine fails to start, cables must be disconnected in the following order:
   - Disconnect the negative cable at the engine ground.
   - Disconnect the negative cable at the negative post on booster battery.
   - Disconnect the cable from the positive post of both batteries.

WARNING!

Any procedure other than above could result in:
- **Personal injury caused by electrolyte squirting out the battery vent.**
- **Personal injury or property damage due to battery explosion.**
- **Damage to charging system of booster vehicle or of immobilized vehicle.**

With Portable Starting Unit

There are many types of these units available. Follow the manufacturer's instructions for necessary precautions and operation.

CAUTION!

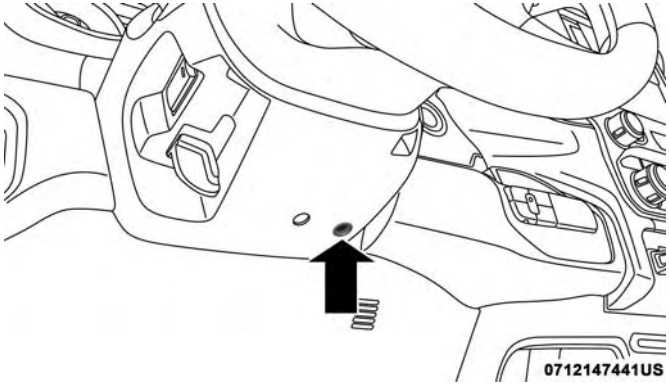
It is very important that the starting unit operating voltage does not exceed 12 Volts DC or damage to battery, starter motor, alternator, or electrical system may occur.

GEAR SELECTOR OVERRIDE — 6-SPEED TRANSMISSION

If a malfunction occurs and the gear selector cannot be moved out of the PARK position, you can use one of the following procedures to temporarily move the gear selector.

Column Gear Selector — If Equipped

1. Turn the engine OFF.
2. Firmly apply the parking brake.
3. Tilt the steering wheel to the full up position.
4. Press and maintain firm pressure on the brake pedal.
5. Insert a screwdriver or similar tool into the access port (ringed circle) on the bottom of the steering column, and push and hold the override release lever up.



Gear Selector Override Access Port

6. Move the gear selector to the NEUTRAL position.
7. The vehicle may then be started in NEUTRAL.

TOWING A DISABLED VEHICLE

This section describes procedures for towing a disabled vehicle using a commercial towing service.

If the transmission and drivetrain are operable, disabled vehicles may also be towed as described under "Recreational Towing" in the "Starting And Operating" section of the Owner's Manual.

NOTE: Vehicles equipped with the Air Suspension System must be placed in Transport mode, before tying them down (from the body) on a trailer or flatbed truck. If the vehicle cannot be placed in Transport mode (for example, engine will not run), tie-downs must be fastened to the axles (not to the body). Failure to follow these instructions may cause fault codes to be set and/or cause loss of proper tie-down tension.

Refer to ″Air Suspension System — If Equipped″ in ″Starting And Operating″ in the Owner's Manual for more information.

Towing Condition	Wheels OFF The Ground	2WD Models	4WD Models
Flat Tow	NONE	**If transmission is operable:** • Transmission in **NEUTRAL** • 30 mph (48 km/h) **max speed** • 15 miles (24 km) **max** distance (6–speed transmission)	**See instructions in "Recreational Towing" under "Starting And Operating" in the Owner's Manual.** • Automatic Transmission in **PARK** • Transfer Case in **NEUTRAL (N)** • Tow in **forward** direction
Wheel Lift Or Dolly Tow	Front		**NOT ALLOWED**
	Rear	OK	**NOT ALLOWED**
Flatbed	**ALL**	**BEST METHOD**	**BEST METHOD**

Proper towing or lifting equipment is required to prevent damage to your vehicle. Use only tow bars and other equipment designed for this purpose, following equipment manufacturer's instructions. Use of safety chains is mandatory. Attach a tow bar or other towing device to main structural members of the vehicle, not to bumpers or associated brackets. State and local laws regarding vehicles under tow must be observed.

If you must use the accessories (wipers, defrosters, etc.) while being towed, the ignition must be in the ON/RUN mode, not the ACC mode.

If the key fob is unavailable or the vehicle's battery is discharged, refer to "Gear Selector Override" in this section for instructions on shifting the transmission out of PARK for towing.

CAUTION!

- **Do not use sling type equipment when towing. Vehicle damage may occur.**
- **When securing the vehicle to a flat bed truck, do not attach to front or rear suspension components. Damage to your vehicle may result from improper towing.**

Two-Wheel Drive Models

The manufacturer recommends towing your vehicle with all four wheels **OFF** the ground using a flatbed.

If flatbed equipment is not available, and the transmission is operable, the vehicle may be towed (with rear wheels on the ground) under the following conditions:

- The transmission must be in NEUTRAL.
- The towing speed must not exceed 30 mph (48 km/h).
- The towing distance must not exceed 15 miles (24 km) for 6–speed transmission.

If the transmission is not operable, or the vehicle must be towed faster than 30 mph (48 km/h) or farther than 15 miles (24 km) for 6–speed transmission, tow with the rear wheels **OFF** the ground. Acceptable methods are to tow the vehicle on a flatbed, or with the front wheels raised and the rear wheels on a towing dolly, or (when using a suitable steering wheel stabilizer to hold the front wheels in the straight position) with the rear wheels raised and the front wheels on the ground.

CAUTION!

Towing this vehicle in violation of the above requirements can cause severe transmission damage. Damage from improper towing is not covered under the New Vehicle Limited Warranty.

Four-Wheel Drive Models

The manufacturer recommends towing with all wheels **OFF** the ground. Acceptable methods are to tow the vehicle on a flatbed or with one end of vehicle raised and the opposite end on a towing dolly.

If flatbed equipment is not available, and the transfer case is operable, the vehicle may be towed (in the forward direction, with **ALL** wheels on the ground), **IF** the transfer case is in NEUTRAL (N) and the transmission is in PARK.

Refer to “Recreational Towing” in “Starting And Operating” in the Owner’s Manual for further information and detailed instructions.

CAUTION!

- **Front or rear wheel lifts must not be used (if the remaining wheels are on the ground). Internal damage to the transmission or transfer case will occur if a front or rear wheel lift is used when towing.**
- **Towing this vehicle in violation of the above requirements can cause severe transmission and/or transfer case damage. Damage from improper towing is not covered under the New Vehicle Limited Warranty.**

Emergency Tow Hooks — If Equipped

Your vehicle may be equipped with emergency tow hooks.

NOTE: For off-road recovery, it is recommended to use both of the front tow hooks to minimize the risk of damage to the vehicle.

WARNING!

- **Do not use a chain for freeing a stuck vehicle. Chains may break, causing serious injury or death.**
- **Stand clear of vehicles when pulling with tow hooks. Tow straps may become disengaged, causing serious injury.**

CAUTION!

Tow hooks are for emergency use only, to rescue a vehicle stranded off road. Do not use tow hooks for tow truck hookup or highway towing. You could damage your vehicle.

SERVICING AND MAINTENANCE

CONTENTS

SCHEDULED SERVICING— DIESEL ENGINE

CAUTION!

Failure to perform the required maintenance items may result in damage to the vehicle.

At Each Stop For Fuel

Check the engine oil level at least 30 minutes after a fully warmed engine is shut off. Checking the oil level while the vehicle is on level ground will improve the accuracy of the oil level reading. Add oil only when the level is at or below the ADD or MIN mark.

Once A Month

- Inspect the batteries, and clean and tighten the terminals as required.
- Check the fluid levels of the coolant reservoir, brake master cylinder, and automatic transmission, and add as needed.

At Each Oil Change

- Change the engine oil filter.
- Inspect the exhaust system.
- Inspect engine air filter.
- Check the coolant level, hoses, and clamps.
- Inspect front end, and lubricate — If equipped with serviceable fittings.
- Lube the front drive shaft fitting (4X4 models only).

Inspection and service should also be performed anytime a malfunction is observed or suspected. Retain all receipts.

Oil Change Indicator System — Cummins Diesel

Your vehicle is equipped with an engine oil change indicator system. This system will alert you when it is time to change your engine oil by displaying the words “Oil Change Due” in your instrument cluster display. The oil change reminder will remind the owner to change the engine oil every 15,000 miles (24,000 km) or 500 hours, whichever comes first, except for the Chassis Cab models configured with optional B20 capability that are using greater than 5% levels of biodiesel, which are 12,500 miles

(20,000 km) or 400 hours, whichever comes first. Failure to change the engine oil per the maintenance schedule can result in internal engine damage.

Your authorized dealer will reset the oil change indicator message after completing the scheduled oil change. If a scheduled oil change is performed by someone other than your authorized dealer, the message can be reset by referring to the steps described under "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information.

Replace the engine oil and oil filter every 15,000 miles (24,000 km) or 12 months, or sooner if prompted by the oil change indicator system. Under no circumstances should oil change intervals exceed 15,000 miles (24,000 km) or 12 months, whichever comes first.

NOTE:

- Under no circumstances should oil change intervals exceed 15,000 miles (24,000 km) or 12 months or 500 Hours, whichever comes first.
- Replace the engine oil and oil filter every 12,500 miles (20,000 km) or 400 hours, whichever comes first when running greater than 5% levels of biodiesel (Chassis Cab models configured with optional B20 capability).

If Chassis Cab models configured with optional B20 capability are operated with greater than 5% levels of biodiesel, the oil change interval must not exceed 12,500 miles (20,000 km) or 400 hours, whichever comes first under any circumstances. See the Fuel Requirements section for more information regarding operation with biodiesel blend (B6-B20) fuel meeting ASTM specification D-7467.

Perform Service Indicator — Cummins Diesel

Your vehicle will require emissions maintenance at a set interval. To help remind you when this maintenance is due, the instrument cluster will display "Perform Service". When the "Perform Service" message is displayed on the instrument cluster it is necessary to have the emissions maintenance performed. Emissions maintenance may include replacing the Closed Crankcase Ventilation (CCV) filter element. The procedure for clearing and resetting the "Perform Service" indicator message is located in the appropriate Service Information.

Maintenance Plan — Cummins Diesel Engine

Mileage or time passed (whichever comes first):	7,500	15,000	22,500	30,000	37,500	45,000	52,500	60,000	67,500	75,000	82,500	90,000	97,500	105,000	112,500	120,000	127,500	135,000	142,500	150,000
Or Months:	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**66**	**72**	**78**	**84**	**90**	**96**	**102**	**108**	**114**	**120**
Or Kilometers:	**12,000**	**24,000**	**36,000**	**48,000**	**60,000**	**72,000**	**84,000**	**96,000**	**108,000**	**120,000**	**132,000**	**144,000**	**156,000**	**168,000**	**180,000**	**192,000**	**204,000**	**216,000**	**228,000**	**240,000**
Change engine oil every 15,000 miles (24,000 km) or 12 months or 500 Hours or sooner if prompted by the oil change indicator system, whichever comes first.*		X		X		X		X		X		X		X		X		X		X
Additional Inspections																				
Check the Diesel Exhaust Fluid (DEF) tank, refill if necessary.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rotate the tires.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lubricate front drive shaft fitting (4x4).	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Inspect front end, and lubricate — If equipped with serviceable fittings.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Inspect engine air filter, replace if necessary. ****		X		X		X		X		X		X		X		X		X		X

Mileage or time passed (whichever comes first):	7,500	15,000	22,500	30,000	37,500	45,000	52,500	60,000	67,500	75,000	82,500	90,000	97,500	105,000	112,500	120,000	127,500	135,000	142,500	150,000
Or Months:	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
Or Kilometers:	12,000	24,000	36,000	48,000	60,000	72,000	84,000	96,000	108,000	120,000	132,000	144,000	156,000	168,000	180,000	192,000	204,000	216,000	228,000	240,000
Inspect the front suspension, tie rod ends and boot seals for cracks or leaks and all parts for damage, wear, improper looseness or end play; replace if necessary.		X		X		X		X		X		X		X		X		X		X
Inspect the brake linings.			X			X			X			X			X			X		
Inspect and adjust parking brake.			X			X			X			X			X			X		
Inspect drive belt; replace as necessary.			X			X			X			X			X			X		
Inspect wheel bearings.				X				X				X				X				X
Additional Maintenance																				
Replace cabin air filter.			X			X			X			X			X			X		
Replace engine fuel filter element.		X		X		X		X		X		X		X		X		X		X
Replace chassis mounted fuel filter element.		X		X		X		X		X		X		X		X		X		X

Mileage or time passed (whichever comes first):	7,500	15,000	22,500	30,000	37,500	45,000	52,500	60,000	67,500	75,000	82,500	90,000	97,500	105,000	112,500	120,000	127,500	135,000	142,500	150,000
Or Months:	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
Or Kilometers:	12,000	24,000	36,000	48,000	60,000	72,000	84,000	96,000	108,000	120,000	132,000	144,000	156,000	168,000	180,000	192,000	204,000	216,000	228,000	240,000
Inspect the front and rear axle surfaces. If gear oil leakage is suspected, check the fluid level. If using your vehicle for police, taxi, fleet, off-road or frequent trailer towing change the axle fluid. **																				
Inspect the transfer case fluid (4x4), change for any of the following: police, taxi, fleet, or frequent trailer towing.				X				X				X				X				X
Change the transfer case fluid (4x4).								X								X				
Change automatic transmission fluid (AS69RC transmission only).				X				X				X				X				X
Change the automatic transmission fluid and sump filter (AS69RC transmission only).								X								X				

Mileage or time passed (whichever comes first):	7,500	15,000	22,500	30,000	37,500	45,000	52,500	60,000	67,500	75,000	82,500	90,000	97,500	105,000	112,500	120,000	127,500	135,000	142,500	150,000
Or Months:	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
Or Kilometers:	12,000	24,000	36,000	48,000	60,000	72,000	84,000	96,000	108,000	120,000	132,000	144,000	156,000	168,000	180,000	192,000	204,000	216,000	228,000	240,000
Change automatic transmission fluid and filter(s) if using your vehicle for any of the following: police, fleet, or frequent trailer towing (68RFE transmission only).								X								X				
Change automatic transmission fluid and filter(s).																X				
Replace Crankcase Ventilation Filter (CCV).										X										X
Flush and replace power steering fluid.													X							
Flush and replace engine coolant. ***																				X

Inspection and service should also be performed anytime a malfunction is observed or suspected. Retain all receipts.

* Under no circumstances should oil change intervals exceed 15,000 miles (24,000 km) or 12 months or 500 Hours, whichever comes first.

** Inspect the front and rear axle surfaces every 20,000 miles (32,000 km). If gear oil leakage is suspected, check the fluid level. If using your vehicle for police, taxi, fleet, off-road or frequent trailer towing change the axle fluid every 20,000 miles (32,000 km).

*** The manufacturer highly recommends that all cooling system service, maintenance, and repairs be performed by your local authorized dealer.

**** Under no circumstances should the air cleaner filter element exceed 30,000 miles (48,000 km) or 24 months, whichever comes first.

WARNING!

- **You can be badly injured working on or around a motor vehicle. Do only service work for which you have the knowledge and the right equipment. If you have any doubt about your ability to perform a service job, take your vehicle to a competent mechanic.**

(Continued)

WARNING! *(Continued)*

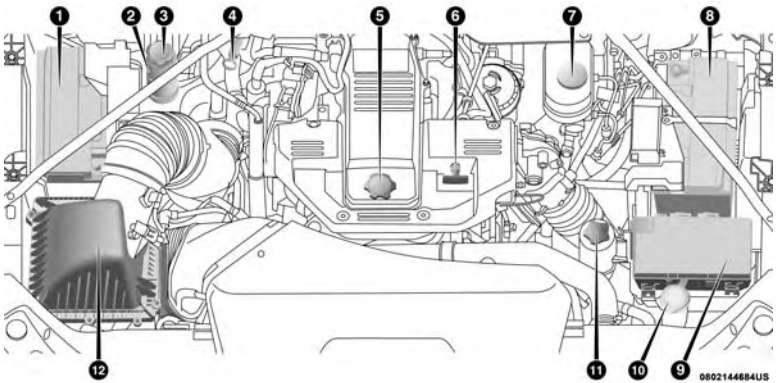
- **Failure to properly inspect and maintain your vehicle could result in a component malfunction and effect vehicle handling and performance. This could cause an accident.**

CAUTION!

*****The manufacturer highly recommends that all cooling system service, maintenance, and repairs be performed by your local authorized dealer.**

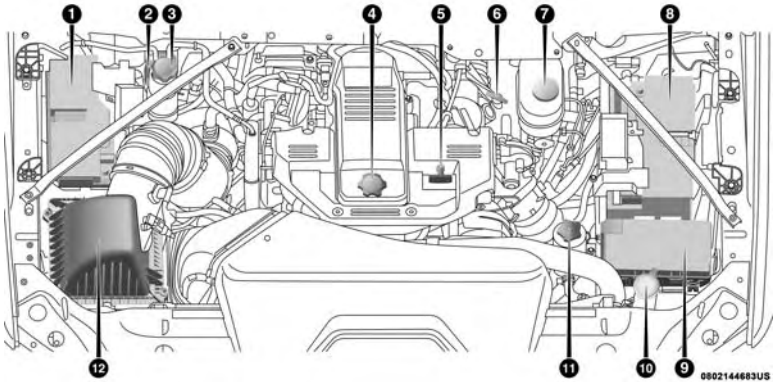
ENGINE COMPARTMENT

6.7L Diesel Engine — Six-Speed 68RFE (2500/3500 Models)



1 — Battery
2 — Engine Coolant Reservoir
3 — Engine Coolant Pressure Cap
4 — Automatic Transmission Dipstick
5 — Engine Oil Fill
6 — Engine Oil Dipstick
7 — Brake Fluid Reservoir
8 — Battery
9 — Power Distribution Center
10 — Washer Fluid Reservoir
11 — Power Steering Fluid Reservoir
12 — Air Cleaner Filter

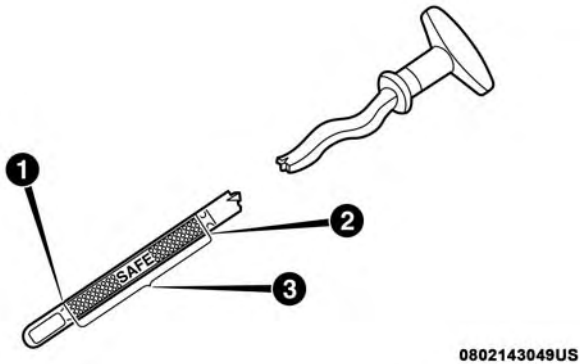
6.7L Diesel Engine — Six-Speed AS69RC HD (3500/Chassis Cab Models)



1 — Battery
2 — Engine Coolant Reservoir
3 — Engine Coolant Pressure Cap
4 — Engine Oil Fill
5 — Engine Oil Dipstick
6 — Automatic Transmission Dipstick
7 — Brake Fluid Reservoir
8 — Battery
9 — Power Distribution Center
10 — Washer Fluid Reservoir
11 — Power Steering Fluid Reservoir
12 — Air Cleaner Filter

Checking Oil Level — 6.7 Diesel Engine

To assure proper lubrication of your vehicle's engine, the engine oil must be maintained at the correct level. Check the oil level at regular intervals. The best time to check the oil level is before starting the engine after it has been parked overnight. When checking oil after operating the engine, first ensure the engine is at full operating temperature, then wait for 30 minutes after engine shutdown to check the oil.



Engine Oil Dipstick

1 — ADD Range
2 — Full Mark
3 — SAFE Range

Checking the oil while the vehicle is on level ground will improve the accuracy of the oil level readings. Add oil only when the level on the dipstick is below the "ADD" mark. The total capacity from the ADD mark to the Full mark is 2 qts (1.9L).

CAUTION!

Overfilling or underfilling the crankcase will cause oil aeration or loss of oil pressure. This could damage your engine.

Never operate the engine with oil level below the "ADD" mark or above the upper "SAFE" mark.

DEALER SERVICE — 6.7L DIESEL ENGINE

Your authorized dealer has the qualified service personnel, special tools, and equipment to perform all service operations in an expert manner. Service Manuals are available which include detailed service information for your vehicle. Refer to these Service Manuals before attempting any procedure yourself.

NOTE: Intentional tampering with emissions control systems may void your warranty and could result in civil penalties being assessed against you.

WARNING!

You can be badly injured working on or around a motor vehicle. Only do service work for which you

(Continued)

WARNING! ***(Continued)***

have the knowledge and the proper equipment. If you have any doubt about your ability to perform a service job, take your vehicle to a competent mechanic.

Engine Oil

Change Engine Oil — Diesel Engine

Refer to the "Scheduled Servicing" for the proper maintenance intervals.

Engine Oil Selection

For best performance and maximum protection under all types of operating conditions, the manufacturer only recommends engine oils that are API CK-4 certified and meet the requirements of FCA LLC. Use Mopar or an equivalent oil meeting FCA Material Standard MS-10902. Products meeting Cummins CES 20081 may also be used. The identification of these engine oils are typically located on the back of the oil container.

American Petroleum Institute (API) Engine Oil Identification Symbol

This symbol means that the oil has been certified by the American Petroleum Institute (API). The manufacturer only recommends API Certified engine oils.

Oils with a high ash content may produce damaging deposits on cylinder head valves and/or aftertreatment system damage. A maximum sulfated ash content of 1.00 mass % is recommended for all oil used in the engine.

The same oil change interval is to be followed for synthetic oil as for petroleum based oil. Also, synthetic oil must meet the same performance specifications as petroleum oil.

CAUTION!

Do not use chemical flushes in your engine oil as the chemicals can damage your engine. Such damage is not covered by the New Vehicle Limited Warranty.

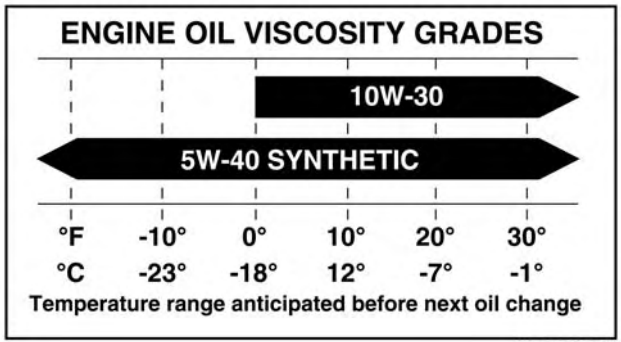
Engine Oil Viscosity (SAE Grade)

In ambient temperatures above 0°F (-18°C), we recommend you use SAE 10W-30 engine oil such as Mopar, Shell Rotella and Shell Rimula that meets FCA Material Standard MS-10902 and the API CK-4 engine oil category is required. Products meeting Cummins CES 20081 may also be used. The identification of these engine oils is typically located on the back of the oil container.

In ambient temperatures below 0°F (-18°C), we recommend you use SAE 5W-40 **synthetic** engine oil such as Mopar, Shell Rotella and Shell Rimula that meets FCA Material Standard MS-10902 and the API CK-4 engine oil category is required.

CAUTION!

Failure to use SAE 5W-40 synthetic engine oil in ambient temperatures below 0°F (-18°C) could result in severe engine damage.



Engine oil not designated by the FCA or Cummins Material Standards and API CK-4 should not be used, as engine and exhaust system durability may be compromised. The engine oil filler cap also shows the recommended engine oil viscosity for your engine. For information on engine oil filler cap location, refer to "Engine Compartment" in "Servicing And Maintenance" for further information.

Synthetic Engine Oils

You may use synthetic engine oils if the recommended oil quality requirements are met and the recommended maintenance intervals for oil and filter changes are followed.

Materials Added To Engine Oil

The manufacturer strongly recommends against the addition of any additives (other than leak detection dyes) to the engine oil. Engine oil is an engineered product and its performance may be impaired by supplemental additives.

Disposing Of Used Engine Oil And Oil Filters

Care should be taken in disposing of used engine oil and oil filters from your vehicle. Used oil and oil filters, indiscriminately discarded, can present a problem to the environment. Contact an authorized dealer, service station or governmental agency for advice on how and where used oil and oil filters can be safely discarded in your area.

Engine Oil Filter

The engine oil filter should be replaced with a new filter at every engine oil change.

Engine Oil Filter Selection

This manufacturer's engines have a full-flow type disposable oil filter. Use a filter of this type for replacement. The quality of replacement filters varies considerably. Only high quality filters should be used to assure most efficient service. Mopar engine oil filters are high quality oil filters and are recommended.

Engine Air Cleaner Filter

WARNING!

The air induction system (air cleaner, hoses, etc.) provides a measure of protection. Do not remove the air induction system (air cleaner, hoses, etc.) unless such removal is necessary for repair or maintenance. Make sure that no one is near the engine compartment before starting the vehicle with the air induction system (air cleaner, hoses, etc.) removed. Failure to do so can result in serious personal injury.

CAUTION!

All air entering the engine intake must be filtered. The abrasive particles in unfiltered air will cause rapid wear to engine components.

The condition of the air cleaner filter is monitored by the Engine Control Module. The "SERVICE AIR FILTER" message will display in the instrument cluster when service is required. Refer to "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information.

The "SERVICE AIR FILTER" message could be displayed periodically. This is because engine air flow requirements change based on driving conditions. As the filter becomes more restrictive and air flow requirements increase the "SERVICE AIR FILTER" message will be displayed. The message may not be displayed in subsequent drive cycles if the same conditions are not met. The air filter element should be replaced within 250 miles (402 km) from the first time this message is displayed to ensure proper engine operation during all driving conditions.

CAUTION!

Driving with a restricted air filter can cause engine damage. Driving in dusty environments for extended periods will lead to rapid air filter plugging. Action should be taken as soon as the "SERVICE AIR FILTER" message is displayed.

If the vehicle experiences a sudden loss of engine power while being driven in heavy snow or rain, or when plowing snow, and/or the "SERVICE AIR FILTER" message is displayed on the instrument cluster along with a chime that repeats every 60 seconds, visually inspect the air filter for snow/ice build up or extreme water saturation. If

the air filter is not damaged, remove all snow/ice and reinstall air filter. If the air filter is damaged, replace filter element.

NOTE: The air filter housing contains a Mass Air Flow sensor. This sensor is critical to proper engine operation and component longevity. Any damage or modification to this sensor could result in major engine and/or exhaust aftertreatment damage. We recommend you use Mopar brand parts.

Even though your vehicle is equipped with an Air Filter Monitor, a visual inspection of the air cleaner filter element is recommended every 15,000 miles (24,000km) or 12 months – whichever occurs first. **Under no circumstances should the air cleaner filter element exceed 30,000 miles (48,000 km) or 24 months, whichever comes first.**

CAUTION!

Many aftermarket performance air filter elements do not adequately filter the air entering the engine. Use of such filters can severely damage your engine.

Engine Air Cleaner Filter Selection

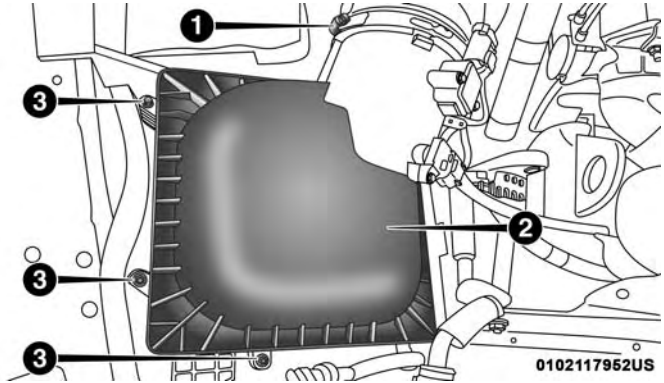
The quality of replacement engine air cleaner filters varies considerably. Only high quality filters should be used to assure most efficient service. Mopar engine air cleaner filters are a high quality filter and are recommended.

Engine Air Cleaner Filter Inspection and Replacement

Inspect engine air cleaner filter for dirt and or debris, if you find evidence of either dirt or debris you should change your air cleaner filter.

Engine Air Cleaner Filter Removal

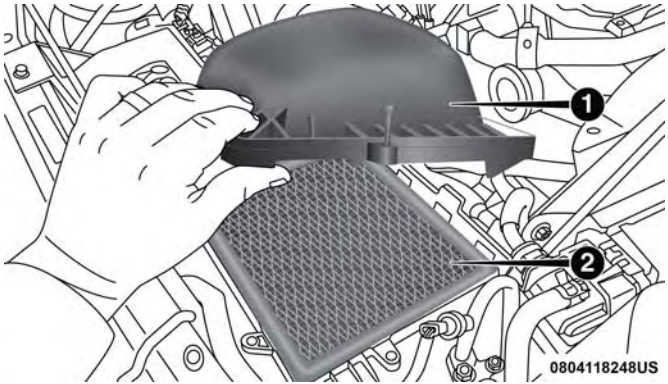
1. Remove the screws from the air cleaner cover.



Air Cleaner Filter Cover

1 — Clean Air Hose Clamp
2 — Air Cleaner Filter Cover
3 — Screws

2. Lift the air cleaner cover to access the air cleaner filter.



Open Air Cleaner Filter Assembly

1 — Air Cleaner Cover
2 — Air Cleaner Filter

3. Remove the air cleaner filter element from the housing assembly.

Air Cleaner Filter

1 — Air Cleaner Filter
2 — Air Cleaner Filter Inspection Surface

Engine Air Cleaner Filter Installation

NOTE: Inspect and clean the housing if dirt or debris is present before replacing the air filter element.

1. Install the air cleaner filter element into the housing assembly with the air cleaner filter inspection surface facing downward.
2. Install the air cleaner cover onto the housing assembly locating tabs.
3. Install screws to secure the air cleaner cover to the housing assembly.

Draining Fuel/Water Separator Filter

There are two fuel filter assemblies. One is located on the driver's side of the engine. The best access to this water drain valve is from under the hood. The second one is on the under body, located in front of the rear axle above the drive shaft on pick-up models. The Chassis Cab models second filter location is on the frame behind the front axle. The best access to this water drain valve is from under the vehicle.

CAUTION!

- **Do not drain the fuel/water separator filter when the engine is running.**
- **Diesel fuel will damage blacktop paving surfaces. Drain the filter into an appropriate container.**

If water is detected in the water separator while the engine is running, or while the ignition switch is in the ON position, the "Water In Fuel Indicator Light" will illuminate and an audible chime will be heard five times. At this

point you should stop the engine and drain the water from both of the filters.

CAUTION!

If the "Water In Fuel Indicator Light" remains on, DO NOT START the engine before you drain water from the fuel filters to avoid engine damage.

If the "Water In Fuel Indicator Light" comes on and a single chime is heard while you are driving, or with the ignition switch in the ON position, there may be a problem with your water separator wiring or sensor. See your authorized dealer for service.

Upon proper draining of the water from both fuel filters, the "Water In Fuel Indicator Light" will remain illuminated for approximately 10 seconds. If the water was drained while the engine was running, the "Water In Fuel Indicator Light" may remain on for approximately three minutes.

NOTE: Care should be taken in disposing of used fluids from your vehicle. Used fluids, indiscriminately discarded, can present a problem to the environment. Contact an authorized dealer, service station, or government agency for advice on recycling programs and for where used fluids and filters can be properly disposed of in your area.

Drain the fuel/water separator filters when the "Water In Fuel Indicator Light" is ON. Within 10 minutes of vehicle shutdown, turn the engine mounted filter drain valve (located on the side of the filter assembly) counterclockwise 1/4 turn, and turn the under body mounted filter drain valve (located on the bottom of the filter assembly) counterclock wise 1 full turn. Then turn the ignition switch to the ON position, and allow any accumulated water to drain. Leave the drain valve open until all water and contaminants have been removed. When clean fuel is visible, close the drain valves by turning them fully clockwise, and turn the ignition switch to OFF.

If more than a couple ounces/milliliters of fuel have been drained, follow the directions for "Priming If The Engine Has Run Out Of Fuel."

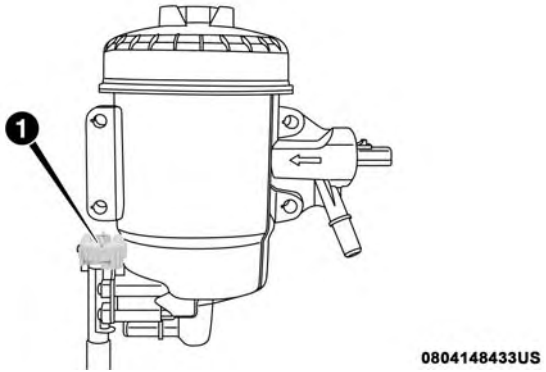
Engine Mounted Fuel Filter Replacement

NOTE:

- Using a fuel filter that does not meet the manufacturer's filtration and water separating requirements can severely impact fuel system life and reliability.
- The engine mounted filter housing is equipped with a No-Filter-No-Run (NFNR) feature. Engine will not run if:

  1. No filter is installed.

2. Inferior/Non-approved filter is used. Use of OEM filter is required to ensure vehicle will run.



Engine Mounted Fuel Filter Assembly

1 — Drain Valve

CAUTION!

- **Diesel fuel will damage blacktop paving surfaces. Drain the filter into an appropriate container.**

(Continued)

CAUTION! *(Continued)*

- **Do not prefill the fuel filter when installing a new fuel filter. There is a possibility debris could be introduced into the fuel filter during this action. It is best to install the filter dry and allow the in-tank lift pump to prime the fuel system.**

1. Ensure engine is turned off.
2. Place drain pan under the fuel filter drain hose.
3. Open the water drain valve 1/4 turn counterclockwise and completely drain fuel and water into the approved container.
4. Close the water drain valve.
5. Remove lid using a socket or strap wrench. Rotate counterclockwise for removal. Remove used o-ring and discard it.
6. Remove the used filter cartridge from the housing and dispose of according to your local regulations.
7. Wipe clean the sealing surfaces of the lid and housing.
8. Install new o-ring back into ring groove on the filter housing and lubricate with clean engine oil.

9. Remove new filter cartridge from plastic bag and install into housing.

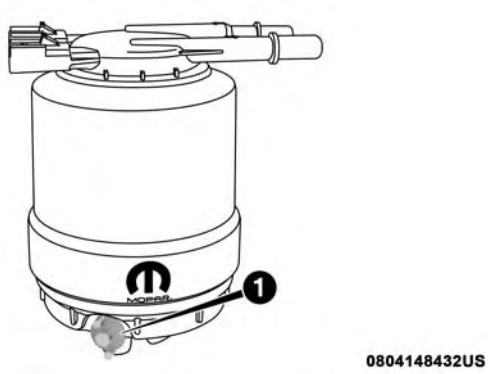
NOTE: Do not remove cartridge from bag until you reach this step in order to keep cartridge clean.

10. Push down on the cartridge to ensure it is properly seated. **Do not pre-fill the filter housing with fuel.**
11. Install lid onto housing and tighten to 22.5 ft lbs (30.5 N.m). Do not overtighten the lid.
12. Prime the engine using the procedure in "Priming If The Engine Has Run Out Of Fuel." Then start the engine and confirm there are no leaks.

Underbody Mounted Fuel Filter Replacement

NOTE:

- Using a fuel filter that does not meet the manufacturer's filtration and water separating requirements can severely impact fuel system life and reliability.
- The underbody mounted filter housing will cause the engine not to run if:
  1. No filter is installed.



Underbody Mounted Fuel Filter Assembly

1 — Drain Valve

CAUTION!

- **Diesel fuel will damage blacktop paving surfaces. Drain the filter into an appropriate container.**
- **Do not prefill the fuel filter when installing a new fuel filter. There is a possibility debris could be introduced into the fuel filter during this action. It is best to install the filter dry and allow the in-tank lift pump to prime the fuel system.**

1. Ensure engine is turned off.
2. Place drain pan under the fuel filter drain hose.
3. Open the water drain valve 1 full turn counterclockwise and completely drain fuel and water into the approved container.
4. Close the water drain valve.
5. Remove lid using a socket or strap wrench. Rotate counterclockwise for removal. Remove used o-ring and discard it.
6. Remove the used filter cartridge from the housing and dispose of according to your local regulations.
7. Wipe clean the sealing surfaces of the lid and housing.
8. Install new o-ring back into ring groove on the filter housing and lubricate with clean engine oil.

NOTE: WIF sensor is re-usable. Service kit comes with new o-ring for filter canister and WIF sensor.

Priming If The Engine Has Run Out Of Fuel

WARNING!

Do not open the high pressure fuel system with the engine running. Engine operation causes high fuel pressure. High pressure fuel spray can cause serious injury or death.

1. Add a substantial amount of fuel to the tank, approximately 2 to 5 gal (8L to 19L).
2. Two priming cycles must be completed. Turn ignition switch to the run position. This will activate the in tank fuel pump for approximately 30 seconds. Turn ignition switch to the off position, and leave off for at least 5 seconds. Turn ignition switch to the run position to complete an additional priming cycle and activate the in tank fuel pump for approximately 30 seconds.
3. Start the engine using the “Normal Starting” procedure. Refer to “Starting Procedures” in “Starting and Operating” for further information.
4. Once the engine starts, allow the engine to idle for a minimum of 30 seconds.

CAUTION!

Do not engage the starter motor for more than 15 seconds at a time. Allow two minutes between the cranking intervals.

NOTE: The engine may run rough until the air is forced from all the fuel lines.

WARNING!

Do not use alcohol or gasoline as a fuel blending agent. They can be unstable under certain conditions and be hazardous or explosive when mixed with diesel fuel.

CAUTION!

Due to lack of lubricants in alcohol or gasoline, the use of these fuels can cause damage to the fuel system.

NOTE:

- A maximum blend of 5% biodiesel, meeting ASTM specification D-975 may be used with your Cummins diesel engine. (Chassis Cab models not configured with B20 capability.)
- A maximum blend of 20% biodiesel, meeting ASTM specification D-7467 may be used with your Cummins diesel engine. (Pickup models and Chassis Cab models configured with B20 capability.)
- Use of biodiesel mixture in excess of 20% can negatively impact the fuel filter's ability to separate water from the fuel, resulting in high pressure fuel system corrosion or damage.
- Ethanol blends are not recommended or approved for use with your Cummins diesel engine.
- In addition, commercially available fuel additives are not necessary for the proper operation of your Cummins diesel engine.

Intervention Regeneration Strategy — Message Process Flow

The Cummins diesel engine meets all EPA Heavy Duty Diesel Engine Emissions Standards, resulting in one of the lowest emitting diesel engines ever produced.

To achieve these emissions standards, your vehicle is equipped with a state-of-the-art engine and exhaust system. The engine and exhaust after-treatment system work together to achieve the EPA Heavy Duty Diesel Engine Emissions Standards. These systems are seamlessly integrated into your vehicle and managed by the Cummins Powertrain Control Module (PCM). The PCM manages engine combustion to allow the exhaust system's catalyst to trap and burn Particulate Matter (PM) pollutants, with no input or interaction on your part.

If the engine is allowed to idle or the truck is driven on low engine speed drive cycles for more than 2 hours, the system will automatically enter an emissions operating mode that will increase the engine idle speed to 900 RPM (1050 RPM for Chassis Cab). While in this mode, which is designed to help maintain the diesel particulate filter, the engine idle speed will return to normal when the brake pedal is applied. A small change in engine tone or a slight change in engine performance while accelerating may also be noticeable at speeds below 20 mph (32 kmh). This operating mode may last for up to an hour of idle time, or around 20 minutes of driving time.

Additionally, your vehicle has the ability to alert you to additional maintenance required on your truck or engine.

Refer to "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information.

WARNING!

A hot exhaust system can start a fire if you park over materials that can burn. Such materials might be grass or leaves coming into contact with your exhaust system. Do not park or operate your vehicle in areas where your exhaust system can contact anything that can burn.

Diesel Exhaust Fluid

Diesel Exhaust Fluid (DEF) sometimes known simply by the name of its active component, UREA—is a key component of selective catalytic reduction (SCR) systems, which help diesel vehicles meet stringent emission regulations. DEF is a liquid reducing agent that reacts with engine

exhaust in the presence of a catalyst to convert smog-forming nitrogen oxides (NOx) into harmless nitrogen and water vapor.

Refer to "Fluids And Lubricants" in "Technical Specification" for further information.

You can receive assistance in locating DEF in the United States by calling 866-RAM-INFO (866-726-4636). In Canada call 1–800–465–2001 (English) or 1–800–387–9983 (French)

Maintenance-Free Batteries

The top of the maintenance-free batteries are permanently sealed. You will never have to add water, nor is periodic maintenance required.

NOTE: Replacement batteries should both be of equal capacity to prevent damage to the vehicle's charging system.

WARNING!

Battery posts, terminals, and related accessories contain lead and lead compounds. Always wash hands after handling the battery.

CAUTION!

It is essential when replacing the cables on the battery that the positive cable is attached to the positive post and the negative cable is attached to the negative post. Battery posts are marked (+) positive and negative (-) and are identified on the battery case. Also, if a "fast charger" is used while the battery is in vehicle, disconnect both vehicle battery cables before connecting the charger to the battery. Do not use a "fast charger" to provide starting voltage.

Cooling System

WARNING!

- **You or others can be badly burned by hot engine coolant (antifreeze) or steam from your radiator. If you see or hear steam coming from under the hood, do not open the hood until the radiator has had time to cool. Never open a cooling system pressure cap when the radiator or coolant bottle is hot.**
- **Keep hands, tools, clothing, and jewelry away from the radiator cooling fan when the hood is raised. The**

(Continued)

WARNING! ***(Continued)***

fan starts automatically and may start at any time, whether the engine is running or not.

- **When working near the radiator cooling fan, disconnect the fan motor lead or turn the ignition to the OFF mode. The fan is temperature controlled and can start at any time the ignition is in the ON mode.**

Engine Coolant Checks

Check the engine coolant (antifreeze) protection every 12 months (before the onset of freezing weather, where applicable). If the engine coolant (antifreeze) is dirty or rusty in appearance, the system should be drained, flushed and refilled with fresh coolant. Check the front of the A/C condenser (if equipped) or radiator for any accumulation of bugs, leaves, etc. If dirty, clean by gently spraying water from a garden hose vertically down the face of the A/C condenser (if equipped) or the back of the radiator core.

Check the engine cooling system hoses for brittle rubber, cracking, tears, cuts and tightness of the connection at the coolant recovery bottle and radiator. Inspect the entire system for leaks.

DO NOT REMOVE THE COOLANT PRESSURE CAP WHEN THE COOLING SYSTEM IS HOT.

Cooling System — Drain, Flush And Refill

NOTE: Some vehicles require special tools to add coolant properly. Failure to fill these systems properly could lead to severe internal engine damage. If any coolant is needed to be added to the system please contact an authorized dealer.

If the engine coolant (antifreeze) is dirty or contains visible sediment, have an authorized dealer clean and flush with OAT coolant (antifreeze) (conforming to MS.90032).

Refer to the “Maintenance Plan” in this section for the proper maintenance intervals.

Selection Of Coolant

Refer to “Fluids And Lubricants” in “Technical Specifications” for further information.

NOTE:

- Mixing of engine coolant (antifreeze) other than specified Organic Additive Technology (OAT) engine coolant (antifreeze), may result in engine damage and may decrease corrosion protection. Organic Additive Technology (OAT) engine coolant is different and should not be mixed with Hybrid Organic Additive Technology

(HOAT) engine coolant (antifreeze) or any "globally compatible" coolant (antifreeze). If a non-OAT engine coolant (antifreeze) is introduced into the cooling system in an emergency, the cooling system will need to be drained, flushed, and refilled with fresh OAT coolant (conforming to MS.90032), by an authorized dealer as soon as possible.

- Do not use water alone or alcohol-based engine coolant (antifreeze) products. Do not use additional rust inhibitors or antirust products, as they may not be compatible with the radiator engine coolant and may plug the radiator.
- This vehicle has not been designed for use with propylene glycol-based engine coolant (antifreeze). Use of propylene glycolbased engine coolant (antifreeze) is not recommended.
- Some vehicles require special tools to add coolant properly. Failure to fill these systems properly could lead to severe internal engine damage. If any coolant is needed to be added to the system please contact an authorized dealer.

Adding Coolant

Your vehicle has been built with an improved engine coolant (OAT coolant conforming to MS.90032) that allows extended maintenance intervals. This engine coolant (antifreeze) can be used up to ten years or 150,000 miles (240,000 km) before replacement. To prevent reducing this extended maintenance period, it is important that you use the same engine coolant (OAT coolant conforming to MS.90032) throughout the life of your vehicle.

Please review these recommendations for using Organic Additive Technology (OAT) engine coolant (antifreeze) that meets the requirements of FCA Material Standard MS.90032. When adding engine coolant (antifreeze):

- We recommend using Mopar Antifreeze/Coolant 10 Year/150,000 Mile (240,000 km) Formula OAT (Organic Additive Technology) that meets the requirements of FCA Material Standard MS.90032.
- Mix a minimum solution of 50% OAT engine coolant that meets the requirements of FCA Material Standard MS.90032 and distilled water. Use higher concentrations (not to exceed 70%) if temperatures below –34°F (–37°C) are anticipated. Please contact an authorized dealer for assistance.

- Use only high purity water such as distilled or deionized water when mixing the water/engine coolant (antifreeze) solution. The use of lower quality water will reduce the amount of corrosion protection in the engine cooling system.

NOTE:

- It is the owner's responsibility to maintain the proper level of protection against freezing according to the temperatures occurring in the area where the vehicle is operated.
- Some vehicles require special tools to add coolant properly. Failure to fill these systems properly could lead to severe internal engine damage. If any coolant is needed to be added to the system, please contact a local authorized dealer.
- Mixing engine coolant (antifreeze) types is not recommended and can result in cooling system damage. If HOAT and OAT coolant are mixed in an emergency, have a authorized dealer drain, flush, and refill with OAT coolant (conforming to MS.90032) as soon as possible.

Cooling System Pressure Cap

The cap must be fully tightened to prevent loss of engine coolant (antifreeze), and to ensure that engine coolant (antifreeze) will return to the radiator from the coolant expansion bottle/recovery tank if so equipped.

The cap should be inspected and cleaned if there is any accumulation of foreign material on the sealing surfaces.

WARNING!

- **Do not open hot engine cooling system. Never add engine coolant (antifreeze) when the engine is overheated. Do not loosen or remove the cap to cool an overheated engine. Heat causes pressure to build up in the cooling system. To prevent scalding or injury, do not remove the pressure cap while the system is hot or under pressure.**
- **Do not use a pressure cap other than the one specified for your vehicle. Personal injury or engine damage may result.**

Disposal Of Used Coolant

Used ethylene glycol-based coolant (antifreeze) is a regulated substance requiring proper disposal. Check with your local authorities to determine the disposal rules for your community. To prevent ingestion by animals or children, do not store ethylene glycol-based coolant in open containers or allow it to remain in puddles on the ground. If ingested by a child or pet, seek emergency assistance immediately. Clean up any ground spills immediately.

Points To Remember

NOTE: When the vehicle is stopped after a few miles/kilometers of operation, you may observe vapor coming from the front of the engine compartment. This is normally a result of moisture from rain, snow, or high humidity accumulating on the radiator and being vaporized when the thermostat opens, allowing hot engine coolant (antifreeze) to enter the radiator.

If an examination of your engine compartment shows no evidence of radiator or hose leaks, the vehicle may be safely driven. The vapor will soon dissipate.

- Do not overfill the coolant expansion bottle.
- Check the coolant freeze point in the radiator and in the coolant expansion bottle. If engine coolant (antifreeze) needs to be added, the contents of the coolant expansion bottle must also be protected against freezing.
- If frequent engine coolant (antifreeze) additions are required, the cooling system should be pressure tested for leaks.
- Maintain engine coolant (antifreeze) concentration at a minimum of 50% OAT coolant (conforming to MS.90032) and distilled water for proper corrosion protection of your engine which contains aluminum components.
- Make sure that the coolant expansion bottle overflow hoses are not kinked or obstructed.
- Keep the front of the radiator clean. If your vehicle is equipped with air conditioning, keep the front of the condenser clean.
- Do not change the thermostat for Summer or Winter operation. If replacement is ever necessary, install ONLY the correct type thermostat. Other designs may result in unsatisfactory engine coolant (antifreeze) performance, poor gas mileage, and increased emissions.

Charge Air Cooler — Inter-Cooler

The charge air cooler is positioned below the radiator and the air conditioner condenser. Air enters the engine through the air cleaner and passes through the turbocharger, where it is pressurized. This pressurized air rapidly reaches high temperature. The air is then directed through a hose to the charge air cooler and through another hose to the intake manifold of the engine. The air entering the engine has been cooled by about 50° to 100°F (10° to 38°C). This cooling process enables more efficient burning of fuel resulting in fewer emissions.

To guarantee optimum performance of the system, keep the surfaces of the charge air cooler, condenser and radiator clean and free of debris. Periodically check the hoses leading to and from the charge air cooler for cracks or loose clamps resulting in loss of pressure and reduced engine performance.

Brake System

Brake Master Cylinder — Brake Fluid Level Check

The fluid level of the master cylinder should be checked when performing under the hood service, or immediately if the "Brake System Warning Light" indicates system failure.

The brake master cylinder has a translucent plastic reservoir. On the outboard side of the reservoir, there is a "MAX" mark and a "MIN" mark. The fluid level must be kept within these two marks. Do not add fluid above the full mark because leakage may occur at the cap.

With disc brakes, the fluid level can be expected to fall as the brake linings wear. However, an unexpected drop in fluid level may be caused by a leak and a system check should be conducted.

Refer to "Fluids And Lubricants" in "Technical Specifications" for further information.

WARNING!

- **Use only manufacturer's recommended brake fluid. Refer to "Fluids And Lubricants" in "Technical Specifications" for further information. Using the wrong type of brake fluid can severely damage your brake system and/or impair its performance. The proper type of brake fluid for your vehicle is also identified on the original factory installed hydraulic master cylinder reservoir.**

(Continued)

WARNING! *(Continued)*

- **To avoid contamination from foreign matter or moisture, use only new brake fluid or fluid that has been in a tightly closed container. Keep the master cylinder reservoir cap secured at all times. Brake fluid in a open container absorbs moisture from the air resulting in a lower boiling point. This may cause it to boil unexpectedly during hard or prolonged braking, resulting in sudden brake failure. This could result in a accident.**
- **Overfilling the brake fluid reservoir can result in spilling brake fluid on hot engine parts, causing the brake fluid to catch fire. Brake fluid can also damage painted and vinyl surfaces, care should be taken to avoid its contact with these surfaces.**
- **Do not allow petroleum based fluid to contaminate the brake fluid. Brake seal components could be damaged, causing partial or complete brake failure. This could result in an accident.**

Automatic Transmission

Selection of Lubricant

It is important to use the proper transmission fluid to ensure optimum transmission performance and life. Use only the manufacturer's specified transmission fluid. Refer to "Fluids And Lubricants" in "Technical Specifications" for fluid specifications. It is important to maintain the transmission fluid at the correct level using the recommended fluid.

No chemical flushes should be used in any transmission; only the approved lubricant should be used.

CAUTION!

Using a transmission fluid other than the manufacturer's recommended fluid may cause deterioration in transmission shift quality and/or torque converter shudder, and will require more frequent fluid and filter changes. Refer to "Fluids And Lubricants" in "Technical Specifications" for fluid specifications.

Special Additives

The manufacturer strongly recommends against using any special additives in the transmission. Automatic Transmission Fluid (ATF) is an engineered product and its performance may be impaired by supplemental additives. Therefore, do not add any fluid additives to the transmission. The only exception to this policy is the use of special dyes

for diagnosing fluid leaks. Avoid using transmission sealers as they may adversely affect seals.

CAUTION!

Do not use chemical flushes in your transmission as the chemicals can damage your transmission components. Such damage is not covered by the New Vehicle Limited Warranty.

Fluid Level Check

It is best to check the fluid level when the transmission is at normal operating temperature (170-180°F / 77-82°C for 68RFE transmission, or 158-176°F / 70-80°C for AS69RC transmission). This normally occurs after at least 15 miles (25 km) of driving. At normal operating temperature the fluid cannot be held comfortably between the fingertips. You can read the transmission sump temperature in the instrument cluster display (refer to "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information).

Use the following procedure to check the transmission fluid level properly:

1. Monitor the transmission temperature using the instrument cluster display, and operate the vehicle as required to reach the normal operating temperature. If the transmission is not functioning properly, or the vehicle cannot be driven, see the NOTE and CAUTION below about checking the fluid level at colder temperatures.
2. Park the vehicle on level ground.
3. Run the engine at normal idle speed for at least 60 seconds, and leave the engine running for the rest of this procedure.
4. Fully apply the parking brake and press the brake pedal.
5. Place the gear selector momentarily into each gear position (allowing time for the transmission to fully engage in each position), ending with the transmission in PARK.
6. Remove the dipstick, wipe it clean and reinsert it until seated.
7. Remove the dipstick again and note the fluid level on both sides. The fluid level reading is only valid if there is a solid coating of oil on both sides of the dipstick. Note that the holes in the dipstick will be full of fluid if the actual level is at or above the hole. The fluid level should be between the "HOT" (upper) reference holes on the dipstick at normal operating temperature.If the

fluid level is low, add fluid through the dipstick tube to bring it to the proper level. **Do not overfill.** Use ONLY the specified fluid (see "Fluids And Lubricants" for fluid specifications). After adding any quantity of oil through the dipstick tube, wait a minimum of two minutes for the oil to fully drain into the transmission before re-checking the fluid level.

NOTE: If it is necessary to check the transmission **below** the operating temperature, the fluid level should be between the two "COLD" (lower) holes on the dipstick with the fluid at 60-70°F / 16-21°C for 68RFE transmission, or 68-86°F / 20-30°C for AS69RC transmission. Only use the COLD region of the dipstick as a rough reference when setting the fluid level after a transmission service or fluid change. Re-check the fluid level, and adjust as required, once the transmission reaches normal operating temperature.

CAUTION!

If the fluid temperature is below 50°F (10°C) it may not register on the dipstick. Do not add fluid until the temperature is elevated enough to produce an accurate reading. Run the engine at idle, in PARK, to warm the fluid.

8. Reinsert the dipstick. Check for leaks. Release the parking brake.

NOTE: To prevent dirt and water from entering the transmission after checking or replenishing fluid, make sure that the dipstick cap is properly reseated. It is normal for the dipstick cap to spring back slightly from its fully seated position, as long as its seal remains engaged in the dipstick tube.

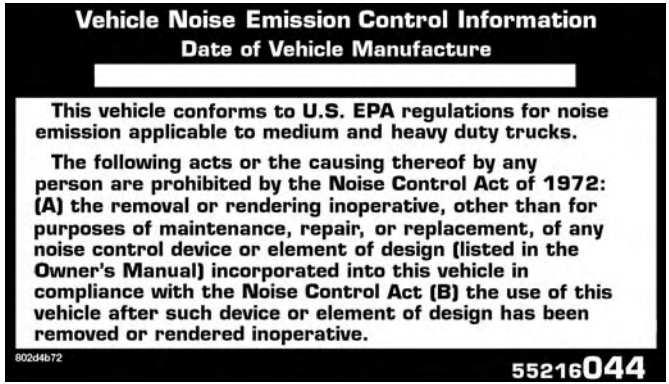
Fluid And Filter Changes

Refer to the "Maintenance Plan" for the proper maintenance intervals.

In addition, change the fluid and filter(s) if the fluid becomes contaminated (with water, etc.), or if the transmission is disassembled for any reason.

Noise Control System Required Maintenance & Warranty

All vehicles built over 10,000 lbs. (4 535 kg) Gross Vehicle Weight Rating and manufactured for sale and use in the United States are required to comply with the Federal Government's Exterior Noise Regulations. These vehicles can be identified by the Noise Emission Control Label located in the operator's compartment.



Required Maintenance For Noise Control Systems

The following maintenance services must be performed every six months or 7,500 miles (12 000 km) whichever comes first, to assure proper operation of the noise control systems. In addition, inspection and service should be performed anytime a malfunction is observed or suspected. Proper maintenance of the entire vehicle will help the effectiveness of the noise control systems.

Exhaust System

Inspect the entire exhaust system for leaks and damaged parts. Devices such as hangers, clamps, and U-bolts should be tight and in good condition. Damaged components, burned or blown out mufflers, burned or rusted out exhaust pipes should be replaced according to the procedures and specifications outlined in the appropriate service manual.

Air Cleaner Assembly

Inspect air cleaner housing for proper assembly and fit. Make certain that the air cleaner is properly positioned and that the cover is tight. Check all hoses leading to the air cleaner for tightness. The air filter element must also be clean and serviced according to the instructions outlined in the Scheduled Maintenance section of this manual.

Tampering With Noise Control System Prohibited

Federal law prohibits the following acts or the causing thereof: (1) the removal or rendering inoperative by any person, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below.

AIR CLEANER

- Removal of the air cleaner.
- Removal of the air cleaner filter element from the air cleaner housing.
- Removal of the air ducting.

EXHAUST SYSTEM

- Removal or rendering inoperative exhaust system components including the muffler or tailpipe.

ENGINE COOLING SYSTEM

- Removal or rendering inoperative the fan clutch.
- Removal of the fan shroud.

Noise Emission Warranty

The manufacturer warrants that this vehicle as manufactured by the manufacturer, was designed, built and equipped to conform at the time it left the manufacturer's control with all applicable U.S. EPA Noise Control Regulations.

This warranty covers this vehicle as designed, built and equipped by the manufacturer, and is not limited to any particular part, component or system of the vehicle manufactured by the manufacturer. Defects in design, assembly or in any part, component or system of the vehicle as manufactured by the manufacturer, which, at the time it left the manufacturer's control, caused noise emissions to exceed Federal standards, are covered by this warranty for the life of the vehicle.

Maintenance Log and Service Chart (Diesel Engines)

Noise Systems Maintenance Chart and Service Log — Insert Month, Day, Year under column mileage closest to the mileage at which service was performed.

MILES	7,500	15,000	22,500	30,000	37,500	45,000	52,500	60,000
KILOMETERS	12 000	24 000	36 000	48 000	60 000	72 000	84 000	96 000
Exhaust system-inspect								
Air cleaner assembly-inspect								
ODOMETER READING								
PERFORMED BY								
PERFORMED AT								

Noise Systems Maintenance Chart and Service Log — Insert Month, Day, Year under column mileage closest to the mileage at which service was performed.

MILES KILOMETERS	67,500 108 000	75,000 120 000	82,500 132 000	90,000 144 000	97,500 156 000	105,000 168 000	112,500 180 000	120,000 192 000
Exhaust system-inspect								
Air cleaner assembly-inspect								
ODOMETER READING								
PERFORMED BY								
PERFORMED AT								

TECHNICAL SPECIFICATIONS

CONTENTS

FUEL REQUIREMENTS

Use good quality diesel fuel from a reputable supplier in your vehicle. Federal law requires that you must fuel this vehicle with Ultra Low Sulfur Highway Diesel fuel (15 ppm Sulfur maximum) and prohibits the use of Low Sulfur Highway Diesel fuel (500 ppm Sulfur maximum) to avoid damage to the emissions control system.

For most year-round service, No. 2 diesel fuel meeting ASTM (formerly known as the American Society for Testing and Materials) specification D-975 Grade S15 will provide good performance. If the vehicle is exposed to extreme cold (below 20°F or -7°C), or is required to operate at colder-than-normal conditions for prolonged periods, use climatized No. 2 diesel fuel or dilute the No. 2 diesel fuel with 50% No. 1 diesel fuel. This will provide better protection from fuel gelling or wax-plugging of the fuel filters.

WARNING!

Do not use alcohol or gasoline as a fuel blending agent. They can be unstable under certain conditions and hazardous or explosive when mixed with diesel fuel.

Diesel fuel is seldom completely free of water. To prevent fuel system trouble, drain the accumulated water from the fuel/water separator using the fuel/water separator drain provided on both fuel filters. If you buy good quality fuel and follow the cold weather advice above, fuel conditioners should not be required in your vehicle. If available in your area, a high cetane "premium" diesel fuel may offer improved cold-starting and warm-up performance.

CAUTION!

If the "Water in Fuel Indicator Light" remains on, DO NOT START engine before you drain the water from the fuel filter(s) to avoid engine damage. Refer to "Draining Fuel/Water Separator Filter" in "Servicing And Maintenance" for further information.

Fuel Specifications

The Cummins diesel engine has been developed to take advantage of the high energy content and generally lower cost No. 2 Ultra Low Sulfur diesel fuel or No. 2 Ultra Low Sulfur climatized diesel fuels. Experience has shown that it also operates on No. 1 Ultra Low Sulfur diesel fuels or other fuels within specification.

NOTE:

- If you accidentally fill the fuel tank with gasoline on your diesel vehicle, Do not start the vehicle. If you restart your vehicle you risk damaging the engine and fuel system. Please call your local dealer for service.
- A maximum blend of 5% biodiesel meeting ASTM specification D-975 may be used with your Cummins diesel engine. (Chassis Cab models not configured with B20 capability.)
- A maximum blend of 20% biodiesel meeting ASTM specification D-7467 may be used with your Cummins diesel engine. (Pickup models and Chassis Cab models configured with B20 Capability.)
- In addition, commercially available fuel additives are not necessary for the proper operation of your Cummins diesel engine. However, if seasonably adjusted fuel is not available and you are operating below 20°F (-6°C), Mopar Premium Diesel Fuel Treatment (or equivalent) may be beneficial to avoid fuel gelling.
- No. 1 Ultra Low Sulfur diesel fuel should only be used where extended arctic conditions (-10°F or -23°C) exist.

Biodiesel Fuel Requirements

Chassis Cab Models

A maximum blend of 5% biodiesel meeting ASTM specification D975 may be used with your Cummins diesel engine. If operation with biodiesel blends greater than 5% but not greater than 20% (B6-B20) is desired, the truck must first be reconfigured by an authorized Ram dealer and the provisions in the following section must be adhered to.

Pickup Models And Chassis Cab Models Ordered With B20 Option

Your vehicle has been validated and approved for the use of biodiesel in blends up to 20% (B20) provided that you comply with the requirements outlined below. It is important that you understand and comply with these requirements. Failure to comply with Oil Change requirements for vehicles operating on biodiesel blends up to B20 will result in premature engine wear. Such wear is not covered by the New Vehicle Limited Warranty.

Biodiesel is a fuel produced from renewable resources typically derived from animal fat, rapeseed oil (Rapeseed Methyl Ester (RME) base), or soybean oil (Soy Methyl Ester (SME or SOME) base). Biodiesel fuel has inherent limitations which require that you understand and adhere to the

following requirements if you use blends of biodiesel greater then 5% but not greater than 20% (B6-B20). There are no unique restrictions for the use of B5. Use of blends greater than 20% is not approved. Use of blends greater than 20% can result in engine damage. Such damage is not covered by the New Vehicle Limited Warranty.

Fuel Quality — Must Comply With ASTM Standards

The quality of biodiesel fuel may vary widely. Only fuel produced by a BQ9000 supplier to the following specifications may be blended to meet biodiesel blend (B6–B20) fuel meeting ASTM specification D-7467:

- Pretrodiesel fuel meeting ASTM specification D-975 and biodiesel fuel (B100) meeting ASTM specification D-6751.

Fuel Oxidation Stability — Must Use Fuel Within Six Months Of Manufacture

Biodiesel fuel has poor oxidation stability which can result in long term storage problems. Fuel produced to approved ASTM standards, if stored properly, provides for protection against fuel oxidation for up to six months.

Fuel Water Separation — Must Use Mopar/Cummins Approved Fuel Filter Elements

You must use Mopar/Cummins approved fuel filter elements in both your engine mounted filter and frame mounted filter.

Biodiesel fuel has a natural affinity to water and water accelerates microbial growth. Your Mopar/Cummins filtration system is designed to provide adequate fuel water separation capabilities.

Bio-Diesel Fuel Properties — Low Ambient Temperatures

Biodiesel fuel may gel or solidify at low ambient temperatures, which may pose problems for both storage and operation. Precautions can be necessary at low ambient temperatures, such as storing the fuel in a heated building or a heated storage tank, or using cold temperature additives.

Fuel In Oil Dilution — Must Adhere To Required Oil Change Interval

Fuel dilution of lubricating oil has been observed with the use of biodiesel fuel. Fuel in oil must not exceed 5%. To ensure this limit is met your oil change interval must be maintained to the following schedule:

- Ram PickUp 2500/3500 Only — 15,000 Miles*
- Ram 3500/4500/5500 Chassis Cab — 12,500 Miles*

(*unless otherwise notified with a oil service message)

CAUTION!

- **Under no circumstances should oil change intervals exceed 15,000 miles (24 000 km) pickup or 12,500 miles (20 000 km) chassis cab if operation occurs with greater than 5% biodiesel blends. Oil change intervals should not exceed 6 months in either case. Failure to comply with these Oil Change requirements for vehicles operating on biodiesel blends up to B20 may result in premature engine wear. Such wear is not covered by the New Vehicle Limited Warranty.**
- **B20 Biodiesel capable: The engine may suffer severe damage if operated with concentrations of Biodiesel higher than 20%.**

FLUID CAPACITIES

	U.S.	Metric
Fuel (Approximate)		
2500/3500 Standard Cab Longbed Models	28 Gallons	106 Liters
2500/3500 Crew/Mega Cab Shortbed Models	31 Gallons	129 Liters
2500/3500 Crew Cab Longbed Models	32 Gallons	132 Liters
Standard Rear Tank – Chassis Cab Only	52 Gallons	197 Liters
Optional Midship Tank – Chassis Cab Only	22 Gallons	83 Liters
Diesel Exhaust Fluid Tank (Approximate) – 2500/3500 Models	5.5 Gallons	21 Liters
Diesel Exhaust Fluid Tank (Approximate) – Chassis Cab	9 Gallons	34 Liters
Engine Oil With Filter		
6.7L Turbo Diesel Engine	12 Quarts	11.4 Liters

	U.S.	Metric
Cooling System		
6.7L Turbo Diesel Engine 2500/3500 with 68RFE (Mopar Engine Coolant/ Antifreeze 10 Year/150,000 Mile Formula)	22.0 Quarts	20.8 Liters
6.7L Turbo Diesel Engine 3500 with AS69RC (Mopar Engine Coolant/ Antifreeze 10 Year/150,000 Mile Formula)	22.5 Quarts	21.3 Liters
6.7L Turbo Diesel Engine Chassis Cab 3500/4500 with AS69RC (Mopar Engine Coolant/Antifreeze 10 Year/ 150,000 Mile Formula)	22.3 Quarts	21.1 Liters
6.7L Turbo Diesel Engine Chassis Cab 5500 with AS69RC (Mopar Engine Coolant/Antifreeze 10 Year/150,000 Mile Formula)	22.8 Quarts	21.6 Liters

FLUIDS AND LUBRICANTS

Engine

Component	Fluid, Lubricant, or Genuine Part
Engine Coolant	We recommend you use Mopar Antifreeze/Coolant 10 Year/150,000 Mile Formula OAT (Organic Additive Technology).
Engine Oil	In ambient temperatures above 0°F (-18°C), we recommend you use 10W-30 engine oil such as Mopar, Shell Rotella and Shell Rimula that meets FCA Material Standard MS-10902 and the API CK-4 engine oil category is required. Products meeting Cummins CES 20081 may also be used. The identification of these engine oils is typically located on the back of the oil container. In ambient temperatures below 0°F (-18°C), we recommend you use 5W-40 **synthetic** engine oil such as Mopar, Shell Rotella and Shell Rimula that meets FCA Material Standard MS-10902 and the API CK-4 engine oil category is required.
Engine Oil Filter	We recommend you use Mopar Engine Oil Filters.
Fuel Filters	We recommend you use Mopar Fuel Filter. Must meet 3 micron rating. **Using a fuel filter that does not meet the manufacturers filtration and water separating requirements can severely impact fuel system life and reliability.**
Crankcase Ventilation Filter	We recommend you use Mopar CCV Filter.

Component	Fluid, Lubricant, or Genuine Part
Fuel Selection	Use good quality diesel fuel from a reputable supplier in your vehicle. Federal law requires that you must fuel this vehicle with Ultra Low Sulfur Highway Diesel fuel (15 ppm Sulfur maximum) and prohibits the use of Low Sulfur Highway Diesel fuel (500 ppm Sulfur maximum) to avoid damage to the emissions control system. For most year-round service, No. 2 diesel fuel meeting ASTM specification D-975 Grade S15 will provide good performance. If climatized or diesel Number 1 ULSD fuel is not available, and you are operating below (20°F/-6°C), in sustained arctic conditions, Mopar Premium Diesel Fuel Treatment (or equivalent) is recommended to avoid gelling. **This vehicle is fully compatible with biodiesel blends up to 5% biodiesel meeting ASTM specification D-975.** Pickup models, and Chassis Cab models configured with optional B20 capability, are additionally compatible with 20% biodiesel meeting ASTM specification D-7467.
Diesel Exhaust Fluid	Mopar Diesel Exhaust Fluid (API Certified) (DEF) or equivalent that has been API Certified to the ISO 22241 standard. Use of fluids not API Certified to ISO 22241 may result in system damage. You can receive assistance in locating DEF in the United States by calling 866-RAM-INFO (866-726-4636). In Canada call 1–800–465–2001 (English) or 1–800–387–9983 (French).

Chassis

Component	Fluid, Lubricant, or Genuine Part
Automatic Transmission – 6.7L Diesel with (Six-Speed 68RFE) – 2500/3500 Pickup models without PTO	Only use ATF+4 Automatic Transmission Fluid. Failure to use ATF+4 fluid may affect the function or performance of your transmission. We recommend Mopar ATF+4 fluid.
Automatic Transmission – 6.7L Diesel with (Six-Speed AS69RC) – Pickup models with PTO and All Chassis Cab models	Only use Mopar ASRC Automatic Transmission Fluid or equivalent. Failure to use the proper fluid may affect the function or performance of your transmission.
Transfer Case	We recommend you use Mopar BW44–44 Transfer Case Fluid.
Front and Rear Axle Fluid (2500/3500)	We recommend you use SAE 75W-85 HD Ram GL-5 Synthetic Axle Lubricant in 9.25 Front & 11.5 Rear Axles. Use Mopar Synthetic Gear Lubricant SAE 75W-140 (MS-8985) in 12.0 Rear axles. Limited slip additive is required for limited slip axles.
Front and Rear Axle Fluid (4500/5500)	We recommend you use SAE 75W-85 HD Ram GL-5 Synthetic Axle Lubricant. Limited slip additive is required for limited slip axles.

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INSTALLATION OF RADIO TRANSMITTING EQUIPMENT

Special design considerations are incorporated into this vehicle's electronic system to provide immunity to radio frequency signals. Mobile two-way radios and telephone equipment must be installed properly by trained personnel. The following must be observed during installation.

The positive power connection should be made directly to the battery and fused as close to the battery as possible. The negative power connection should be made to body sheet metal adjacent to the negative battery connection. This connection should not be fused.

Antennas for two-way radios should be mounted on the roof or the rear area of the vehicle. Care should be used in mounting antennas with magnet bases. Magnets may affect the accuracy or operation of the compass on vehicles so equipped.

The antenna cable should be as short as practical and routed away from the vehicle wiring when possible. Use only fully shielded coaxial cable.

Carefully match the antenna and cable to the radio to ensure a low Standing Wave Ratio (SWR).

Mobile radio equipment with output power greater than normal may require special precautions.

All installations should be checked for possible interference between the communications equipment and the vehicle's electronic systems.

⚠WARNING:

Operating, servicing and maintaining a passenger vehicle or off-road highway motor vehicle can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

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