2016

Low Cab Forward

chevrolet.com

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Introduction

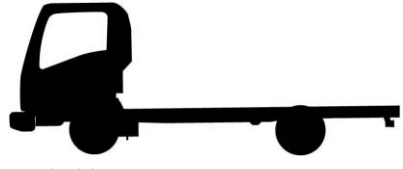
The names, logos, emblems, slogans, vehicle model names, and vehicle body designs appearing in this manual including, but not limited to, GM, the GM logo, CHEVROLET, and the CHEVROLET Emblem are trademarks and/or service marks of General Motors LLC, its subsidiaries, affiliates, or licensors.

This manual has been prepared to acquaint you with the operation and maintenance of your vehicle, and to provide important safety information. It includes a Maintenance Schedule and is supplemented with a Warranty and Owner Assistance Information booklet. We urge you to read these publications carefully. The following recommendations will help ensure the most enjoyable, safe, and trouble-free operation of your vehicle. When it comes to service, keep in mind that your commercial truck dealer knows your vehicle best and is interested in your complete satisfaction. Your dealer invites you to return for all of your service needs both during and after the warranty period. Remember, if you have a concern that has not been handled to your satisfaction, follow the steps in the separate Warranty and Owner Assistance Information booklet. We thank you for choosing our product, and want to assure you of our continuing interest in your motoring pleasure and satisfaction.

Model Reference

The models covered in this manual are:

Single Cab:



- 3500
- 3500HD
- 4500

Crew Cab:

- 3500
- 4500

Litho in U.S.A.
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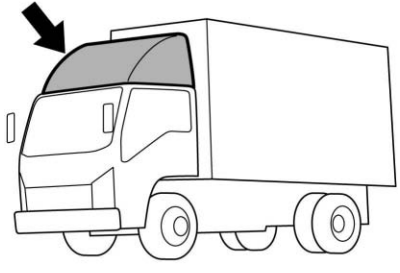
Using this Manual

To quickly locate information about the vehicle, use the Index in the back of the manual. It is an alphabetical list of what is in the manual and the page number where it can be found.

About Driving the Vehicle

Air Deflector



For vehicles with a frontal area less than 79.9 ft2, an air roof fairing sold by Chevrolet is not required. Any vehicle with a frontal area between 79.9 ft2 to 84.8 ft2 will require an air roof fairing sold by Chevrolet to be installed.

Any vehicle with a frontal area greater than 79.9 ft2 without an air roof fairing sold by Chevrolet will be in violation of the Clean Air Act, and subject to civil penalties.

Any vehicle with a frontal area greater than 84.8 ft2, with or without an air roof fairing sold by Chevrolet, will be in violation of the Clean Air Act, and subject to civil penalties. See your dealer for assistance.

Danger, Warning, and Caution

Warning messages found on vehicle labels and in this manual describe hazards and what to do to avoid or reduce them.

⚠ Danger

Danger indicates a hazard with a high level of risk which will result in serious injury or death.

⚠ Warning

Warning indicates a hazard that could result in injury or death.

Caution

Caution indicates a hazard that could result in property or vehicle damage.

A circle with a slash through it is a safety symbol which means “Do Not,” “Do not do this,” or “Do not let this happen.”

Warning/Caution Labels in Your Vehicle

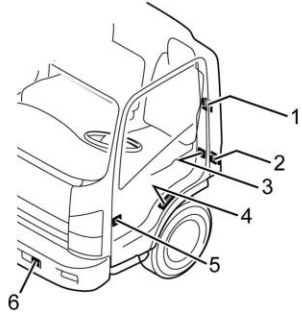
The warning/caution labels in your vehicle indicate very important instructions and information that you should respect to ensure safe and proper use of the vehicle. Be sure to read them before using the vehicle.

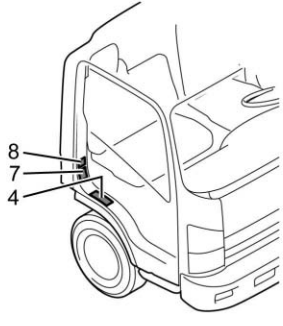
If any of these labels are peeling or illegible due to wear or scratches, please contact your dealer for a replacement.

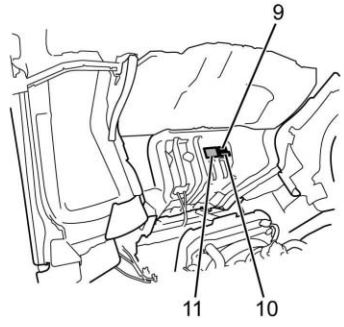
Some examples of warning/caution labels are indicated on the following pages, but there are many others not shown. Also, the contents of these labels may vary from model to model.

The warning/caution labels shown may be located differently in your vehicle.

Warning/Caution Labels (Diesel Engines)

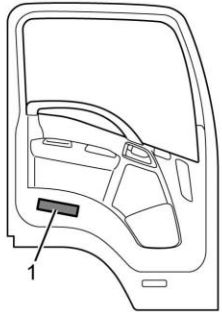


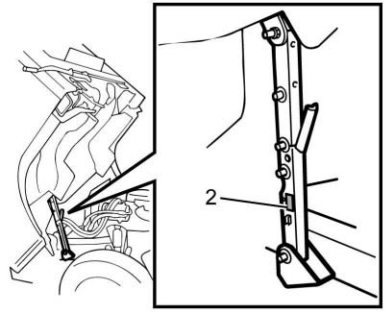


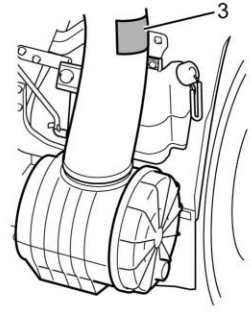


No.	Description
1	Cab tilt instruction
2	Automatic transmission fluid level
3	Vehicle identification number
4	NO STEP instruction
5	Certified clean idle label
6	Towing
7	Vehicle noise emission control information
8	ID plate

No.	Description
9	Engine cooling
10	Fan blade
11	Vehicle emission control information

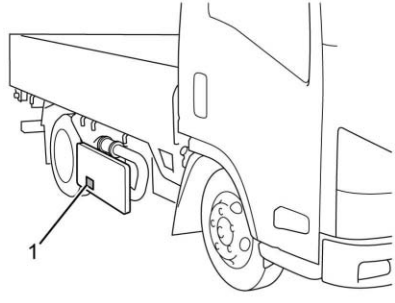


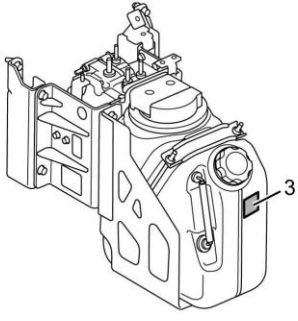


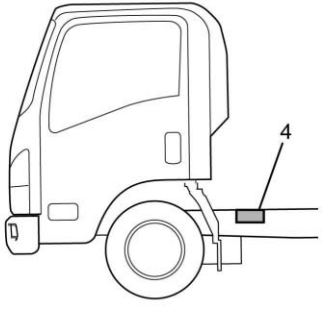


No.	Description
1	Engine shutdown instruction
2	Safety lock pin

No.	Description
3	Starting aids



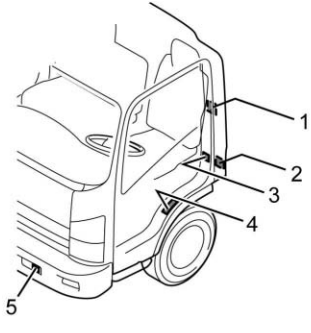


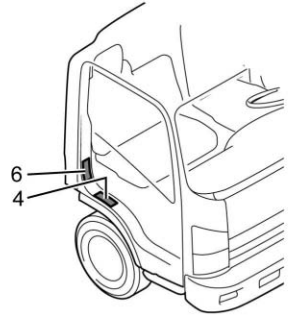


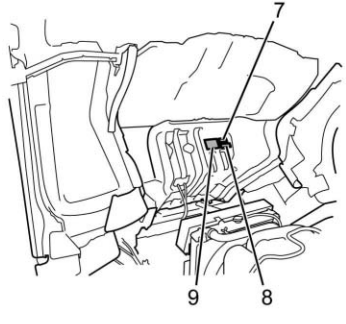
No.	Description
1	Safety
2	Radiator cap
3	Diesel exhaust fluid (DEF)
4	Body

Warning/Caution Labels (Gasoline Engines)

Single cab model

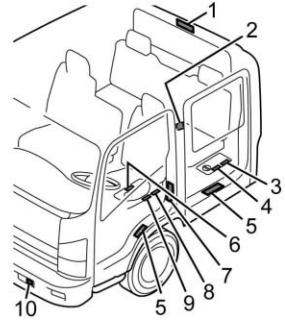


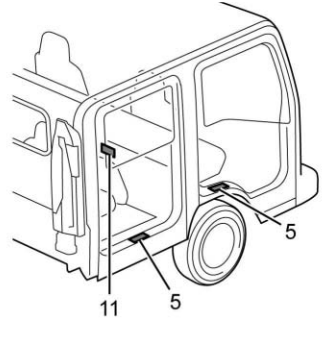




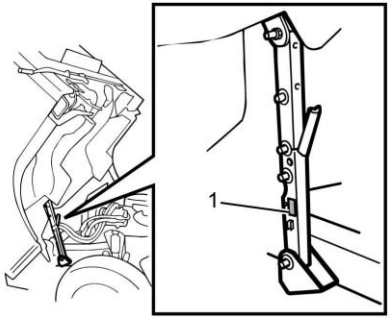
No.	Description
1	Cab tilt instruction
2	Automatic transmission fluid level
3	Vehicle certification and Greenhouse Gas (GHG) emissions
4	NO STEP instruction
5	Towing
6	Vehicle noise emission control information
7	Engine cooling
8	Fan blade
9	Vehicle emission control information

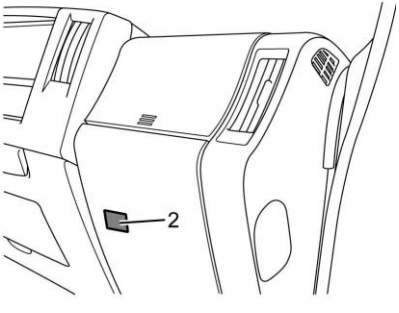
Crew cab model

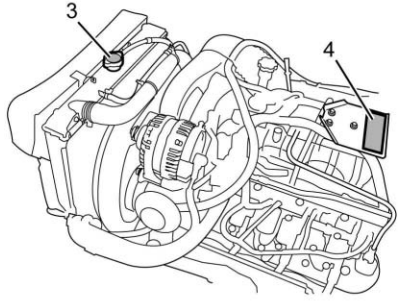


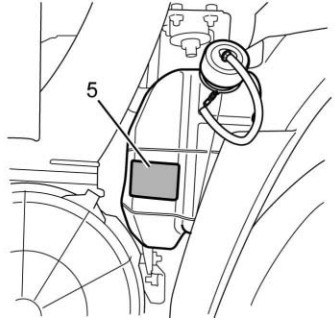


No.	Description
1	Vehicle emission control information
2	Vehicle certification and Greenhouse Gas (GHG) emissions
3	Engine coolant check
4	Engine coolant level
5	NO STEP instruction
6	Power steering fluid
7	Vehicle noise emission control information
8	Engine cooling
9	Fan blade
10	Towing
11	Automatic transmission fluid level









No.	Description
1	Safety lock pin (Single cab)
2	Engine cover notice (Crew cab)
3	Radiator cap
4	Engine emission control information
5	Engine coolant (Single cab)

In Brief

Instrument Panel

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Cruise Control (Gas) 24
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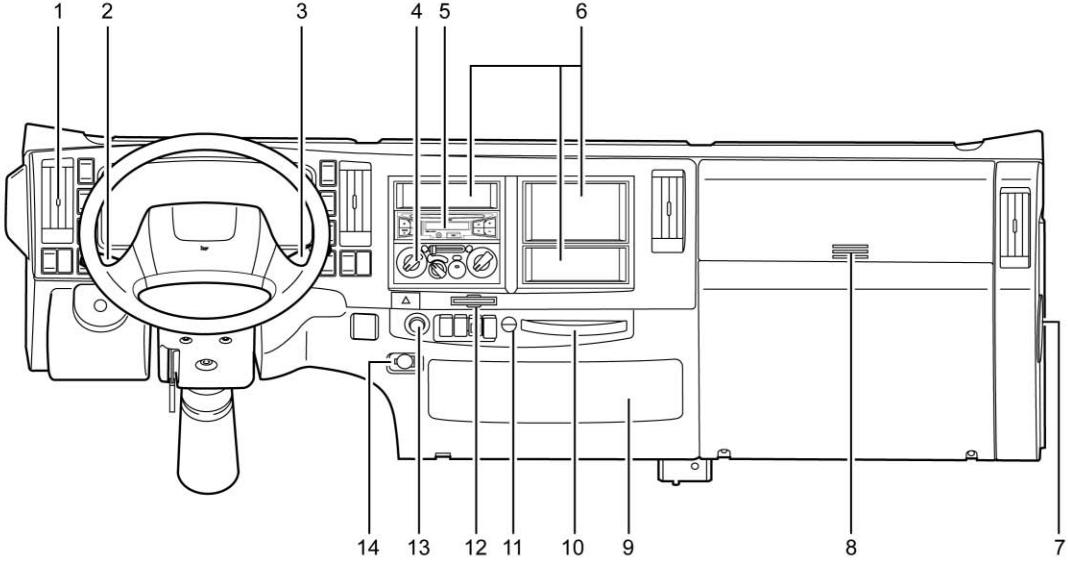
Instrument Panel

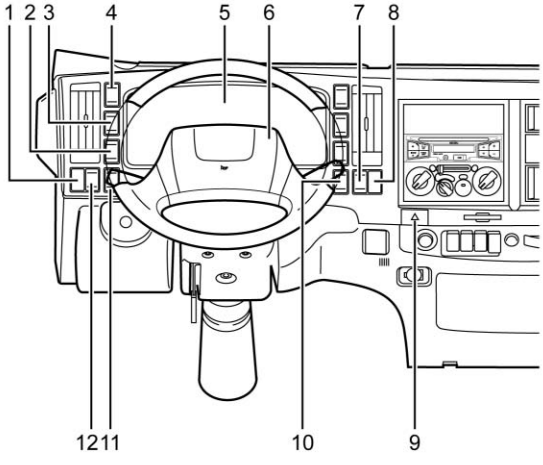


1. Air Flow Direction Control Lever. See *Air Vents* ⇨ *123*.
2. *Exterior Lamp Controls* ⇨ *97*.

   Cruise Control Set Switch. See *Cruise Control (Gas)* ⇨ *220* or *Cruise Control (Diesel)* ⇨ *216*.
3. Windshield Wiper and Windshield Washer Switch. See *Windshield Wiper/ Washer* ⇨ *69*.

   Exhaust Brake Switch (Diesel Only). See *Exhaust Brake (Diesel Only)* ⇨ *215*.
4. Heater and Manual Air Conditioner. See *Climate Control Systems* ⇨ *120*.
5. Radio with CD/USB. See *AM-FM Radio* ⇨ *102*.
6. Small Article Storage Pocket. See *Instrument Panel Storage* ⇨ *58*.
7. Windshield Washer Fluid Tank. See *Washer Fluid* ⇨ *265*.
8. *Glove Box* ⇨ *58*.
9. Relay Box. See *Electrical System Overload* ⇨ *285*.
10. *Cupholders* ⇨ *59*.
11. Hook. See *Shopping Bag Hooks* ⇨ *61*.
12. Card Holder. See *Instrument Panel Storage* ⇨ *58*.
13. *Cigarette Lighter* ⇨ *71*.
14. Accessory Power Outlet. See *Power Outlets* ⇨ *70*.

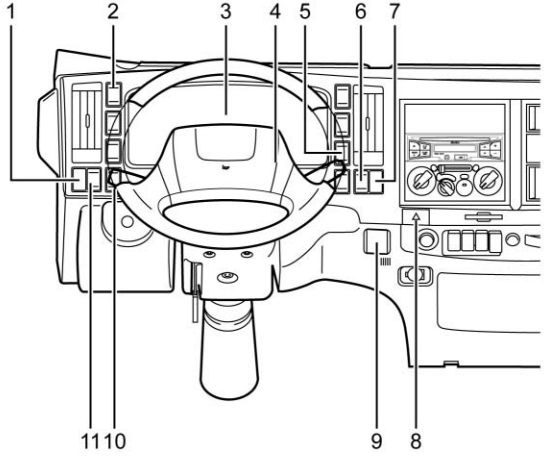
Instrument Panel (Driver Side - Diesel)



1. Instrument Panel Light Level Control. See *Instrument Panel Illumination Control* ⇨ *100*.
2. Power Take Off (PTO) Main Switch. See *Power Take-Off (PTO)* ⇨ *235*.
3. Power Take Off (PTO) Engine Speed Control Switch. See *Power Take-Off (PTO)* ⇨ *235*.
4. Rear Body Interior Light Switch. See *Cargo Lamp* ⇨ *101*.
5. Instruments, Warning Lights and Indicator Lights. See *Instrument Cluster* ⇨ *73*.
6. Horn Button. See *Horn* ⇨ *68*.
7. Outside Rearview Mirror Heater Switch. See *Heated Mirrors* ⇨ *37*.
8. Cruise Control Main Switch. See *Cruise Control (Gas)* ⇨ *220* or *Cruise Control (Diesel)* ⇨ *216*.
9. Hazard Warning Flasher Switch. See *Hazard Warning Flashers* ⇨ *99*.
10. Diesel Particulate Filter (DPF) Switch. See *Diesel Particulate Filter* ⇨ *173*.
11. Odometer Check Switch. See *Odometer* ⇨ *75*.

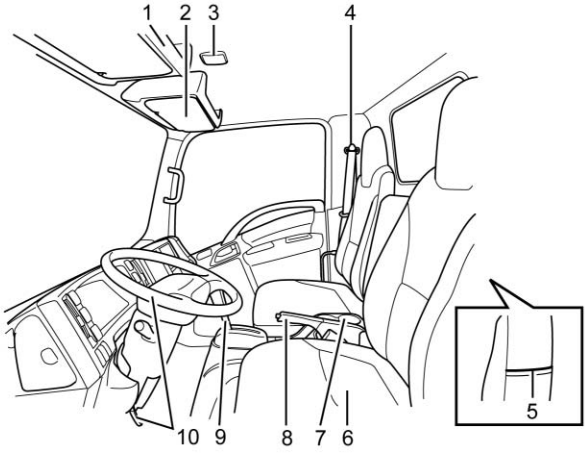
    Engine Oil Level Check Switch. See *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*.
12. Door Lock Switch. See *Power Door Locks* ⇨ *35*.

Instrument Panel (Driver Side - Gas)



1. Instrument Panel Light Level Control. See *Instrument Panel Illumination Control* ⇨ *100*.
2. Rear Body Interior Light Switch. See *Cargo Lamp* ⇨ *101*.
3. Instruments, Warning Lights and Indicator Lights. See *Instrument Cluster* ⇨ *73*.
4. Horn Button. See *Horn* ⇨ *68*.
5. Rear Power Window Lock Switch. See *Power Windows* ⇨ *37*.
6. Outside Rearview Mirror Heater Switch. See *Heated Mirrors* ⇨ *37*.
7. Cruise Control Main Switch. See *Cruise Control (Gas)* ⇨ *220* or *Cruise Control (Diesel)* ⇨ *216*.
8. Hazard Warning Flasher Switch. See *Hazard Warning Flashers* ⇨ *99*.
9. Rear Power Window Switch. See *Power Windows* ⇨ *37*.
10. Odometer Check Switch. See *Odometer* ⇨ *75*.
11. Door Lock Switch. See *Power Door Locks* ⇨ *35*.

Instrument Panel (Vehicle Interior)



1. Overhead Tray. See *Storage Compartments* ⇨ *57*.
2. Sun Visor. See *Sun Visors* ⇨ *39*.
3. *Dome Lamps* ⇨ *101*.
4. Seatbelt. See *Three-Point Seat Belt* ⇨ *48*.
5. Seat Back Pocket (Driver's Side). See *Storage Compartments* ⇨ *57*.
6. Seat. See *Seat Position* ⇨ *41*.
7. *Cupholders* ⇨ *59*.
8. Parking Brake Lever. See *Parking Brake* ⇨ *214*.
9. *Selector Lever* ⇨ *207*.
10. Fully Adjustable Steering. See *Steering Wheel Adjustment* ⇨ *68*.

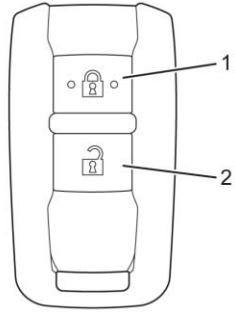
Initial Drive Information

This section provides a brief overview about some of the important features that may or may not be on your specific vehicle.

For more detailed information, refer to each of the features which can be found later in this owner manual.

Remote Keyless Entry (RKE) System

Unlocking and Locking the Doors



Unlocking

Press the unlock button (2) of the remote control unit for 1 second or longer. The vehicle's keyless entry system causes the right and left turn signal lights to simultaneously flash twice upon receiving the signals from the remote control unit.

Locking

Press the lock button (1) of the remote control unit for 1 second or longer. The vehicle's keyless entry system causes the right and left turn signal lights to simultaneously flash once upon receiving the signals from the remote control unit.

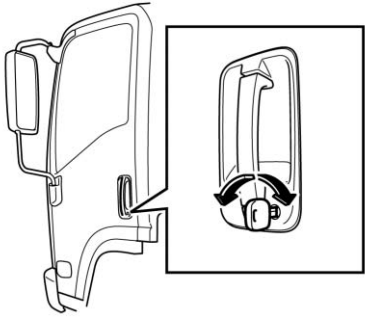
Getting In and Out of the Vehicle

Carefully check that the area around the vehicle is safe, hold the grip, and place your foot on the step when getting in or out of the vehicle.

See *Getting In and Out of the Vehicle* ⇨ *31*.

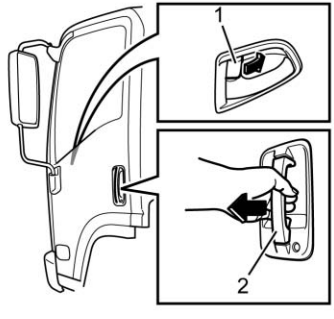
Door Locks

Locking and Unlocking the Door from Outside Using the Key



Turn the key toward the front of the vehicle to lock the door and turn it toward the rear of the vehicle to unlock it. The doors can be opened by pulling the outside door handle.

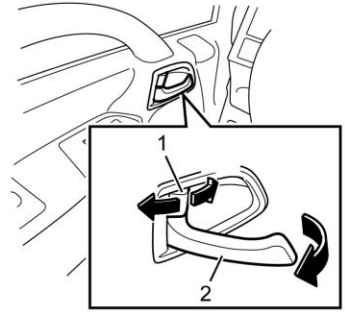
Locking the Door from Outside without Using the Key



First, push the lock button (1) on the inside door handle forward and then close the door while keeping the outside door handle (2) raised.

Before closing the door, be sure to check that you have the key with you.

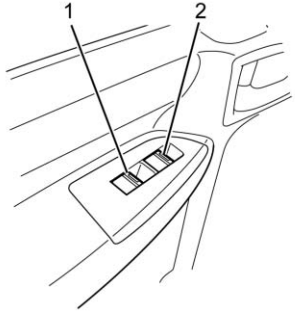
Locking and Unlocking the Door from Inside



Push the lock button (1) forward to lock the door; pull the lock button backward to unlock it. After unlocking the door, open it by pulling the inside door handle (2). If the door is locked, the lock mechanism overrides operation of the door handle.

Windows

Window Switches on Driver's Door



The power window switch on the driver's door can operate both driver's (2) and passenger's (1) power windows.

To Open the Driver's Window

Lightly pressing the driver-side window switch will lower the driver's window until the switch is released (manual mode operation). When the switch is firmly pressed, the window will lower completely without the need to press the switch continuously (automatic mode operation). If you want to stop the automatic movement of the window before it lowers completely, raise the switch lightly.

To Close the Driver's Window

Lightly raising the driver-side window switch will cause the driver's window to move up until the switch is released.

To Open the Passenger's Window

The passenger's window continues to lower while the passenger-side switch on the driver's door is being pressed.

To Close the Passenger's Window

The passenger's window continues to move up while the passenger-side switch on the driver's door is being raised.

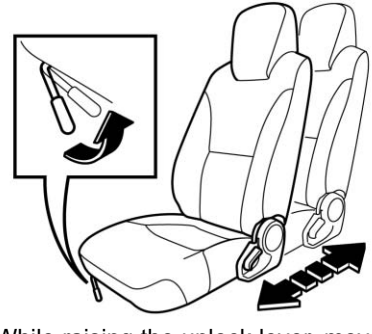
Window Switches on Passenger's Door

The power window switch on the passenger's door can raise and lower the passenger's side window only and rear doors, if equipped. The window continues to lower while the window switch is being pressed and continues to rise while the switch is being raised. It will stop moving at any position when the switch is released.

Seat Adjustment

Driver's Seat

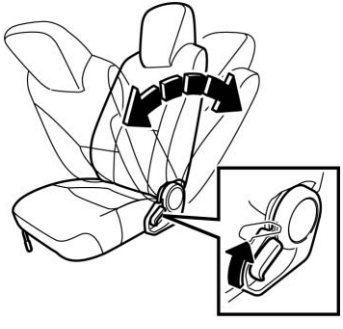
Forward/backward Adjustment



While raising the unlock lever, move the seat forward or backward. Release the lever when the seat is in the desired position. After making

adjustments, try to move the seat back and forth to check that it is fully locked.

Reclining Adjustment



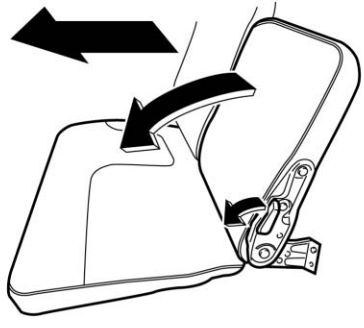
To recline the seatback, raise the seatback tilt lever and gently lean back to the desired position.

To move the seatback forward, lean forward with your back slightly clear of the seatback and raise the lever. After making adjustments, check that the seatback is fully locked.

See *Seat Position* ⇨ *41*.

Passenger's Seat/Center Seat

Passenger's Seat



Center Seat

You can tip the seatback forward if you pull forward the lever at the side of the seatback. Normally, you should keep the seatback in the raised position.

See *Seat Position* ⇨ *41*.

Seat Belts

Refer to the following sections for important information on how to use safety belts properly:

- *Seat Belts* ⇨ *46*.
- *Three-Point Seat Belt* ⇨ *48*.
- *Infants and Young Children* ⇨ *54*.
- *Child Restraint Systems* ⇨ *54*.

Mirror Adjustment

Sit in the correct driving position with the seat adjusted properly. Then, check each mirror to ensure that a proper view of the rear and sides of the vehicle are provided. Make adjustments and clean mirrors if necessary.

Outside Rearview Mirrors

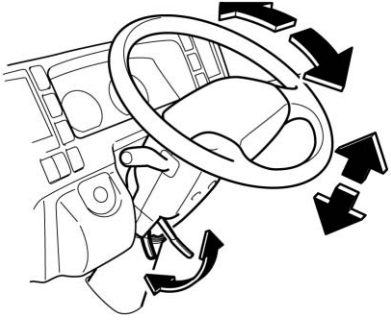
After properly adjusting your seat for proper driving position, adjust the mirrors so that they provide adequate views for checking the rear and the sides of the vehicle. Adjust the outside rearview mirrors by hand before vehicle operation. This helps you determine the location of objects seen in the mirror. If the outside mirror fogs up, warm up the outside rearview mirror's face to defog.

See *Mirrors* ⇨ *36*.

Steering Wheel Adjustment

⚠ Warning

- Adjust the position of the steering wheel before you start driving.
- To reduce the risk of personal injury, apply force to the steering wheel to make certain the steering column is firmly locked before driving. Also, do not try to tilt or adjust the steering wheel while the vehicle is moving. If these steps are not followed, the steering column could move suddenly while the vehicle is in motion which could cause a temporary loss of steering control which may result in personal injury or death.



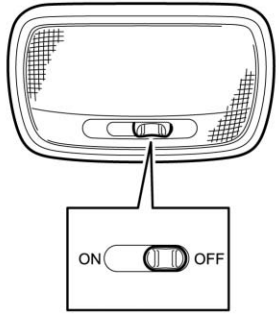
The steering wheel is adjustable up and down as well as forward and backward.

Before adjusting, position the seat as desired.

1. Lift the lock lever toward you to unlock the steering column.
2. Sit in the correct driving position, and then move the steering wheel up and down and forward and backward to select the optimum steering wheel position.
3. Firmly lock the steering wheel at the selected position by moving the lock lever to the lock position.

Interior Lighting

Front Light



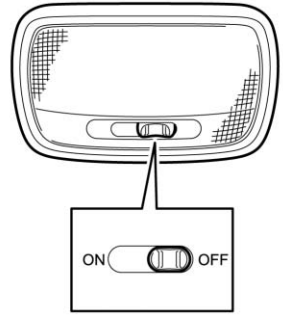
The dome light operates regardless of the engine control switch position. The switch has three positions.

ON : The light stays on regardless of the doors being open or closed.

OFF : The light stays off regardless of the doors being open or closed.

Between ON and OFF, the light comes on when the driver's door is opened.

Rear Light (Crew Cab Model Only)



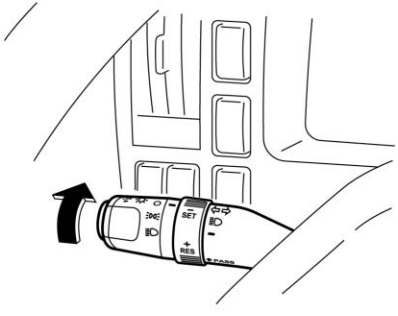
The dome light operates regardless of the engine control switch position. The switch has three positions.

ON : The light stays on regardless of the doors being open or closed.

OFF : The light stays off regardless of the doors being open or closed.

Between ON and OFF, the light comes on when the driver's door is opened.

Exterior Lighting



Turning the light control switch to the following positions will cause the relevant lights to illuminate.

The light control switch can be used when the engine control switch is placed in the LOCK or ACC position. Do not operate the combination lights for an extended time period with the engine stopped. Otherwise, the battery may go dead, making it impossible to restart the engine.

◯ **:** Turns off all exterior lamps.

: Turns on the parking lamps including all lamps, except the headlamps.

: Turns on the headlamps together with the parking lamps, sidemarker lamps, roofmarker lamps, taillamps, license plate lamp, and instrument panel lights.

- *Exterior Lamp Controls* ⇨ *97*.

Windshield Wiper/Washer

To use the windshield wiper and washer switches, the engine control switch must be in the ON position.

The windshield wiper switch has the following positions, which correspond to the states of the wiper.

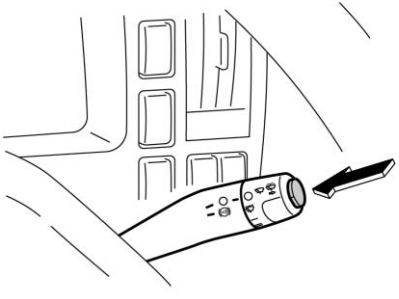
◯ **:** Stopped.

: Intermittent, light rain.

Low Speed : Low speed, moderate rain.

High Speed : High speed, heavy rain.

Windshield Washer



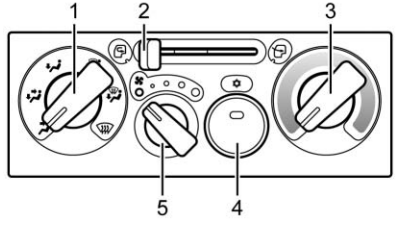
Windshield washer fluid is sprayed over the windshield when this switch is pressed. At the same time, the windshield wiper operates.

To spray washer fluid on the windshield, push the button on the end of the combination switch lever. The spray will continue as long as you hold in the button.

See *Windshield Wiper/Washer* ⇨ *69*.

Climate Controls

The heating, cooling, and ventilation for the vehicle can be controlled with this system.



Climate Control System w/Air Conditioning shown, Heater Only similar

1. Outlet Selector Knob
2. Air Selector Lever
3. Temperature Control Knob
4. Air Conditioning (A/C) Switch, if equipped
5. Fan Speed Control Knob

See *Climate Control Systems* ⇨ *120*.

Vehicle Features

Radio(s)

Turning the Power On

Press the "MODE/Power" button ("⏻") to turn the power on. Press and hold it for 1 second or more to turn the power off.

Volume Adjustment

Press the "Volume control" button ("+ —") to adjust the volume.

+ : Volume will increase 1 step every time the button is pressed. Volume will continuously increase when the button is pressed continuously.

— : Volume will decrease 1 step every time the button is pressed. Volume will continuously decrease when the button is pressed continuously.

Tuning

1. Press the "MODE" button when the power is on to select either AM radio or FM radio.

   It is switched to AM radio when "AM" is displayed, and FM radio when "FM" is displayed.

2. Press the "TUNE" button ("∧ ∨ ") for less than 2 seconds to select a radio station manually.

   Press the "TUNE" button ("∧ ∨ ") for 2 seconds or longer to select a radio station automatically. The automatic tuning will stop after detecting a receivable station. Press the "TUNE" button ("∧ ∨ ") again to cancel this function.

Settings

Adjustment of bass, treble, fader, and balance, and setting of clock display and time can be performed. See “Function Setting Mode” in *AM-FM Radio* ⇨ *102*.

CD Player

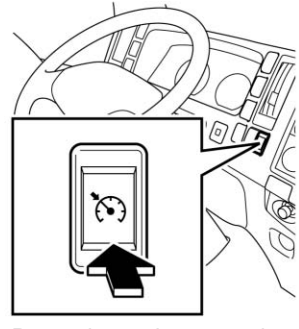
To play a CD, see *CD Player* ⇨ *108*.

Portable Audio Devices

This vehicle is equipped with a 3.5 mm (1/8 in) auxiliary input jack and a USB port in the radio faceplate. External devices such as iPods®, laptop computers, MP3 players, and USB storage devices may be connected.

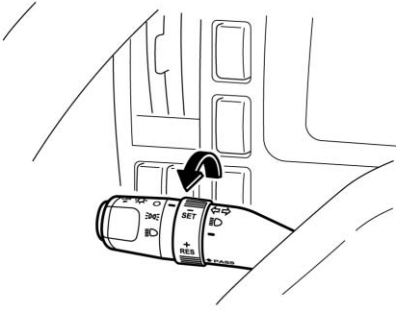
See *USB Port* ⇨ *115* and *Auxiliary Devices* ⇨ *118*.

Cruise Control (Diesel)



1. Press the cruise control main switch to turn it on.

At this time, the cruise main indicator light comes on simultaneously.

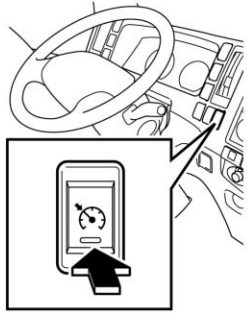


2. Use the accelerator pedal to adjust the vehicle to the desired speed. Upon reaching the desired speed, turn the cruise control set switch. The vehicle speed at the moment you operate the switch is set in the system, enabling you to drive with the set speed automatically maintained without using the accelerator pedal.

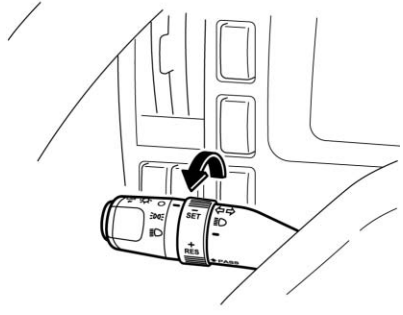
At the same time the cruise set indicator light comes on.

See *Cruise Control (Gas)* ⇨ *220* or *Cruise Control (Diesel)* ⇨ *216*.

Cruise Control (Gas)



1. Press the cruise control main switch to set it to on. At this time, the operation indicating light will turn to green.



2. Use the accelerator pedal to adjust the vehicle to the desired speed. Upon reaching the desired speed, turn the cruise control set switch. The vehicle speed at the moment you operate the switch is set in the system, enabling you to drive with the set speed automatically maintained without using the accelerator pedal.

At the same time the cruise set indicator light comes on.

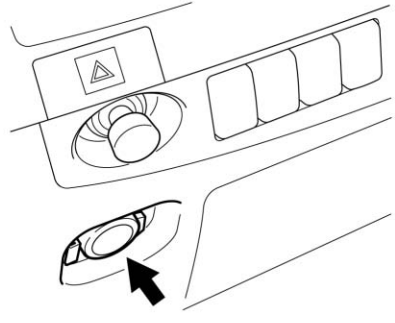
See *Cruise Control (Gas)* ⇨ *220* or *Cruise Control (Diesel)* ⇨ *216*.

Driver Information Center (DIC)

The DIC display is in the instrument cluster. It shows the status of many vehicle systems.

See *Instrument Cluster* ⇨ *73* and *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

Power Outlets



You can plug in auxiliary electrical equipment. Just flip the outlet cover open from the left edge of the cover and follow the proper installation instructions that are included with any electrical equipment you install. These circuits are protected by a fuse and have maximum current loads.

See *Power Outlets* ⇨ *70*.

Performance and Maintenance

Driving for Better Fuel Economy

Economical Driving

How you drive, where you drive and when you drive all affect fuel economy.

For diesel vehicles, driving too fast, driving so slowly that the engine knocks, driving with the exhaust brake switched on all the time, and frequently using the exhaust brake to adjust your speed can lead to poor fuel economy.

Drive at a constant speed as much as possible. When accelerating, increase your speed gently and slowly, and up-shift early.

Maintain a constant cruising speed, as traffic allows, and avoid sudden stops.

Frequent short trips, excessive idling and use of the air conditioner in cool weather when "Vent" would provide adequate comfort, can all lead to decreased fuel economy.

Warming up the engine for longer than necessary, driving with the vehicle overloaded and revving the engine are a waste of fuel.

Overcooling of the engine not only accelerates wear of the vital engine parts but also hurts fuel economy.

The careful attention you give your vehicle, as far as maintenance is concerned, will also help fuel economy.

Protection of Engine against Overcooling

Overcooling of the engine not only accelerates wear of the vital engine parts but also hurts fuel economy.

Diesel Exhaust Fluid

Diesel Exhaust Fluid (DEF) is used with diesel engines to reduce the amount of regulated emissions produced. The DEF system must be maintained for the vehicle to run properly.

DEF is not a fuel additive. For refilling instructions, see *Diesel Exhaust Fluid* ⇨ *182*. DEF should not be mixed with or added to diesel fuel. DEF freezes when exposed to temperature below −11 °C (12 ° F).

Locating Diesel Exhaust Fluid

DEF can be purchased at a dealer. It can also be purchased at authorized vehicle and truck dealerships. Additionally, some diesel truck fueling stations or retailers may have DEF for purchase. See *Recommended Fluids and Lubricants* ⇨ *358*.

When the remaining level of DEF becomes excessively low the DEF gauge will change color from green to amber. In addition, warning and indicator lights will come on as shown in the table and engine power will be reduced so the vehicle speed will not exceed 89 km/h (55 MPH). See *Diesel Exhaust Fluid* ⇨ *182*.

Keys, Doors, and Windows

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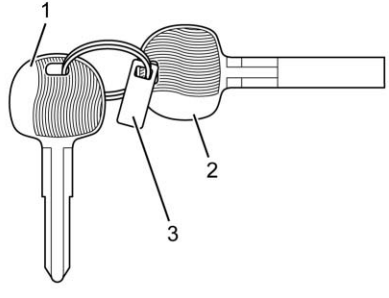
Keys and Locks

Keys



1. Main Key
2. Spare Key
3. Metal plate with key code

One key (1) can operate all the locks on the vehicle. Keep one of the two keys provided as a spare (2). Record the key code numbers.

Both sides of the key are identical, so you can insert the key in the engine control switch without worrying about which way you insert it.

The key code is indicated on a separate metal plate (3) in order to prevent it from being acquired by an unauthorized person.

Where is the Key Used?

Where	For What
Engine Control Switch	Starting and stopping the engine
Front doors	Locking and unlocking the doors.

Wipe off the key to remove any dirt or dust, etc. before using it.

To prevent theft, store the metal plate with key code in a safe place other than the vehicle.

Should you lose the key, please give the key number to the nearest dealer. The dealer will be able to duplicate your key.

If you resell the vehicle, be sure to hand over the plate with key code to the new owner together with the vehicle.

Remote Keyless Entry (RKE) System

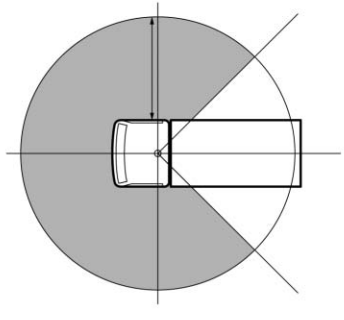
See *Radio Frequency Statement* ⇨ *381*.

If there is a decrease in the Remote Keyless Entry (RKE) operating range:

- Check the distance. The transmitter may be too far from the vehicle.
- Check the location. Other vehicles or objects may be blocking the signal.
- Check the transmitter's battery. See “Replacing the Battery in the Remote Control Unit” later in this section.
- If the transmitter is still not working correctly, see your dealer or a qualified technician for service.

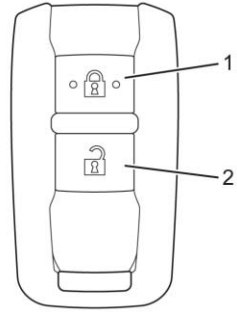
Remote Keyless Entry (RKE) System Operation

The keyless entry system allows you to lock/unlock the doors by simply pressing the remote control button rather than inserting the key into the lock.



The remote control unit works within a 10 m (33 ft) radius of the cab center as indicated in the figure. The actual distance over which the unit operates may vary depending on conditions.

Unlocking and Locking the Doors



Remote Control Unit

Unlocking

Press the unlock button (2) of the remote control unit for 1 second or longer. The vehicle's keyless entry system causes the right and left turn signal lights to simultaneously flash twice upon receiving the signals from the remote control unit.

Locking

Press the lock button (1) of the remote control unit for 1 second or longer. The vehicle's keyless entry system causes the right and left turn signal lights to simultaneously flash once upon receiving the signals from the remote control unit.

Should you lose the remote control unit, please contact your dealer.

After locking the doors using the remote control unit, be sure to check that they are locked by pulling the door handles.

Avoid getting water on the remote control unit, dropping it, hitting it against another object, or stepping on it; otherwise, the remote control unit could malfunction.

Do not leave the remote control unit on the dashboard or any other surface where the unit might be exposed to high temperatures (exceeding 60°C/140°F). Doing so may result in shorter battery life or malfunction of the remote control unit.

If the keyless entry system fails to operate normally, lock and unlock the doors using the key and have the system inspected by your dealer.

The lock or unlock buttons on the remote control unit must be fully pressed for more than 1 second to work.

If you do not open any doors within about 30 seconds after pressing the unlock button to unlock the doors, the automatic locking function of the system will lock the doors again to prevent theft.

In areas near a TV tower, electric power plant, radio station, etc. or under any conditions involving strong electrical disturbances, the remote control unit operating range might change or the keyless entry system might not work.

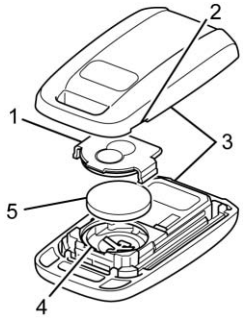
The keyless entry system does not operate in the following cases:

- The engine control switch is in the "ON" position.
- The key is inserted in the engine control switch.
- One of the doors is open.

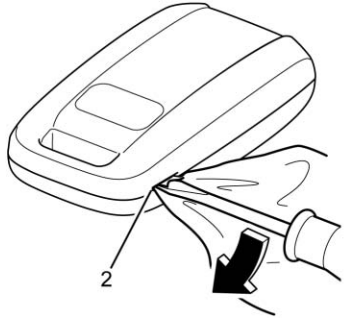
Replacing the Battery in the Remote Control Unit

When the battery runs down, replace it. Battery life is approximately two years.

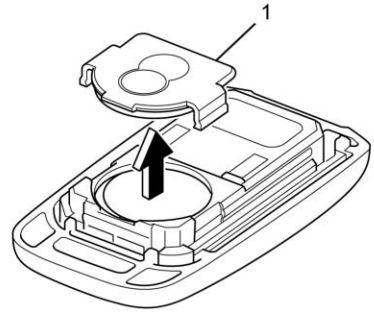
Battery Used	Number of Battery
Lithium battery	1
Model number: CR 2032	
Voltage: DC3V	



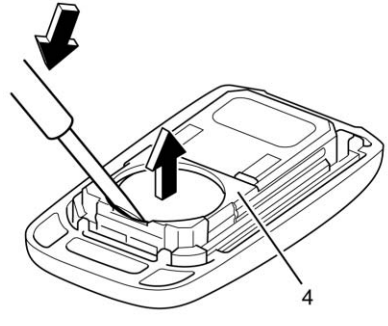
1. Battery Cover
2. Remote Control Cover Notch
3. Remote Control Unit Cover
4. Transmission Unit
5. Battery



1. Pry open the remote control unit cover (3) by inserting a flat head screwdriver or similar tool into the notch of the remote control unit cover (2). Wrap a piece of cloth or tape around the tip of the screwdriver so as not to damage the remote control unit cover (3).



2. Remove the battery cover (1).



3. Insert a flat head screwdriver or similar tool into the recess of the transmission unit (4) to remove the old battery.
4. Insert the new battery into the transmission unit (4) with its positive side visible, and press the battery downward until fully seated.
5. Install the transmission unit (4), battery (5), and battery cover (1) in their original positions inside the remote control unit cover (3).
6. Close the remote control unit cover (3).

When closing the remote control unit cover (3), check that there is no dust, hair, or anything else caught underneath it. A poorly sealed remote control unit could become deteriorated.

Please comply with the collection system available in your country for the disposal of old batteries. In addition, take special care to prevent any danger to children.

⚠ Warning

When changing the battery, use only a battery of the same type as the original battery, or an equivalent. Otherwise, there is a risk of explosion.

Do not place the battery in direct sunlight, or near a fire or other sources of heat.

Be sure to install the battery with the "+" and "-" sides correctly oriented. Incorrect installation will result in leakage of chemicals from inside the battery or other operational problems.

You and others could be seriously injured.

The battery life varies depending on how the remote control unit is used.

The battery has reached its end of life when the remote control unit works intermittently or does not work at all. Replace the battery as soon as this happens.

Getting In and Out of the Vehicle

Carefully check that the area around the vehicle is safe, hold the grip (1), and place your foot on the step (2) when getting in or out of the vehicle.

⚠ Warning

When getting in or out of the vehicle, make sure you use the step and grips to support yourself

(Continued)

Warning (Continued)

at 3 points. It is very dangerous to stand on the tire or wheel when getting in or out of the vehicle.

Furthermore, do not try to jump in or out of the vehicle, as doing so could cause unexpected accidents or injuries.

Getting in or out of the vehicle with oily or greasy hands or shoes could cause you to slip. Always thoroughly clean grease, etc. from your hands and shoes before getting in or out of the vehicle.

Rain and snow can cause the step to become very slippery. Therefore, always remove snow and ice from your shoes and the step, and be careful not to slip when getting in and out of the vehicle.

(Continued)

Warning (Continued)

Exercise caution when opening or closing doors, as strong winds or steep slopes may cause doors to open or close suddenly.

Do not hold parts other than the grip when getting in or out of the vehicle. Doing so may cause damage to the vehicle or injuries to yourself or others.

You and others could be seriously injured.

Door Locks

⚠ Warning

Be sure to do the following whenever you leave the vehicle:

1. Fully engage the parking brake.
2. Stop the engine.
3. Lock the doors.

When you close the door after sitting behind the wheel, check that the door is fully closed. Driving with any door ajar is very dangerous.

Before opening the door when climbing into or out of the cab, carefully check all areas around the vehicle for safety, especially the area at the rear of the vehicle. If you suddenly open a door without checking the surrounding area, the door could be hit by a vehicle behind you or a pedestrian.

(Continued)

Warning (Continued)

Never leave the key in the vehicle.

Tilt the cab only after fully closing the doors.

To help reduce the risk of personal injury in an accident, always lock the doors when driving. Along with using the seat belts properly, locking the doors helps prevent people from being thrown from the vehicle. It also helps prevent unintended opening of the doors and helps keep out intruders.

You and others could be seriously injured.

⚠ Warning

To protect the child from the danger of getting his/her hands and head trapped, an adult must open, close and lock the door for the child.

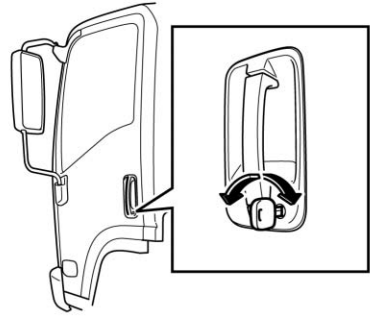
Be careful that the child does not interfere with the power window switches and get his/her hands or head trapped in the window. While a child is in the cab, be sure to control the power windows using the power window switches beside the driver's seat.

You and others could be seriously injured.

Overriding door locks are a standard safety feature. When the doors are locked, the inside handles will not open them. This is to prevent accidental opening of the doors.

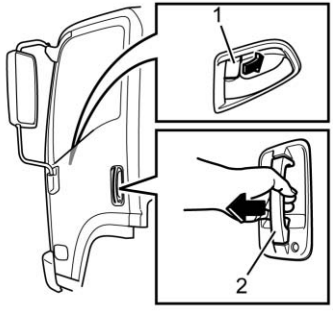
Front Doors

Locking and Unlocking the Door from Outside Using the Key



Turn the key toward the front of the vehicle to lock the door and turn it toward the rear of the vehicle to unlock it. The doors can be opened by pulling the outside door handle.

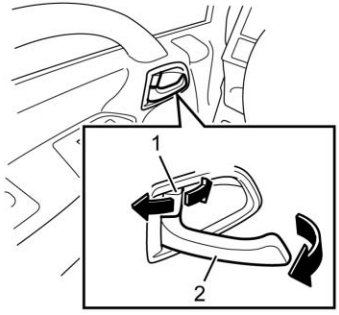
Locking the Door from Outside without Using the Key



First, push the lock button (1) on the inside door handle forward and then close the door while keeping the outside door handle (2) raised.

Before closing the door, be sure to check that you have the key with you.

Locking and Unlocking the Door from Inside



Push the lock button (1) forward to lock the door; pull the lock button backward to unlock it. After unlocking the door, open it by pulling the inside door handle (2). If the door is locked, the lock mechanism overrides operation of the door handle.

Rear Doors (Crew Cab Model)

Outside Door Handles

A handle for opening each cab door from outside the cab is located at the rear edge of the door's outer panel. To open the door from outside the vehicle, pull up on the handle.

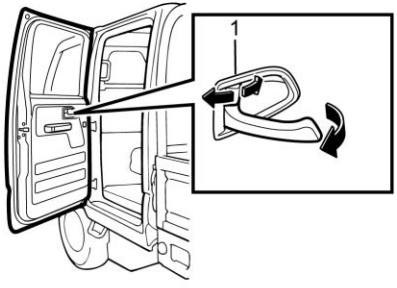
Locking the Door from the Outside

Push the door lock button forward and then close the door; the door will be locked.

Inside Door Handles

An inside handle for opening each cab door is located in the recessed area at the front of the door. To open the door, pull on the handle. If the door is locked, the lock mechanism overrides operation of the door handle. The door must first be unlocked before the handle can be used to open the door.

Locking and Unlocking Doors from the Inside



Push the door lock button (1) forward to lock the door and pull the lock button backward to unlock it.

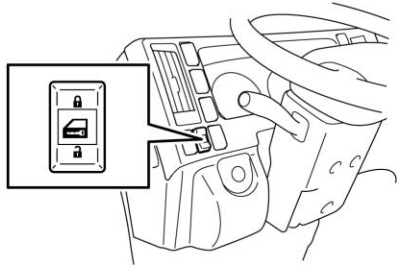
Power Door Locks

Power Door Lock (Central Door Lock)

How the Power Door Lock System Operates

When you lock the driver's door using the key or by operating the lock button, the power door lock system will automatically lock all doors simultaneously.

Door Lock Switch



Both doors can be locked and unlocked by pressing the power door lock switch.

Vehicle Security

Guard Against Theft

Your new vehicle has many features to help prevent theft of the vehicle, its equipment and contents. But these anti-theft features depend upon you to work.

The time to be most on guard is when leaving the vehicle:

- Park in a lighted spot when you can.
- Turn the engine control switch to "LOCK" and remove the key. This locks the switch and the steering controls. The selector lever is not locked.
- Keep items that may appear to be of value out of sight and locked up when possible.
- Fully close all windows and lock all doors.

Exterior Mirrors

Mirrors

Sit in the correct driving position with the seat adjusted properly. Then, check each mirror to ensure that a proper view of the rear and sides of the vehicle are provided. Make adjustments and clean mirrors if necessary.

Outside Rearview Mirrors

After properly adjusting your seat for proper driving position, adjust the mirrors so that they provide adequate views for checking the rear and the sides of the vehicle. Adjust the outside rearview mirrors by hand before vehicle operation. This helps you determine the location of objects seen in the mirror. If the outside mirror fogs up, warm up the outside rearview mirror's face to defog.

See *Heated Mirrors* ⇨ *37*.

⚠ Warning

Before driving, be sure to adjust the seat and mirrors to positions that give you a correct driving posture.

Do not adjust the outside mirrors while operating the vehicle. Adjust the mirrors when the vehicle is stationary, not while the vehicle is in motion.

When checking the rear of the vehicle with mirrors, be careful that this does not distract your attention from the traffic ahead.

Rearview mirrors may make the vehicle behind you appear farther away than it really is. Use these mirrors very carefully until you are able to correctly determine distances from the images.

(Continued)

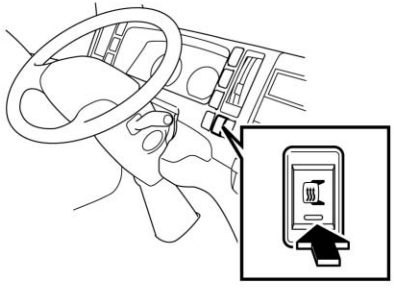
Warning (Continued)

Keep the mirrors in mind when passing another vehicle on a narrow road, moving the vehicle into a garage or driving near pedestrians.

Do not drive with the mirrors folded.

You and others could be seriously injured.

Heated Mirrors



If the outside mirrors fog up, press the outside rearview mirror heater switch to defog them. When the switch is pressed the indicating light will illuminate. If the switch is pressed once again, it will switch to “OFF”, and the operation indicating light will go out.

Do not use this switch while the engine is stopped. Due to high power consumption, the battery can be discharged.

Turn off the switch as soon as defogging is complete.

Windows

Power Windows

⚠ Warning

If you are traveling with a child, do not leave the child alone in the vehicle. If the child touches the controls or equipment, an accident could occur. (For example, the vehicle could move or a fire could start.) Also, the cab inside could become dangerously hot in hot weather.

⚠ Warning

Before closing the windows, make sure that there is no risk of a hand, head or amything else being trapped in the moving window.

You and others could be seriously injured.

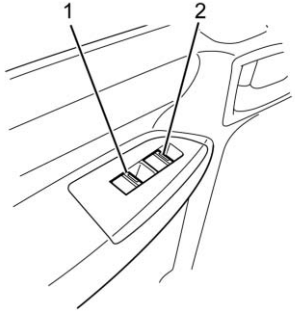
⚠ Warning

Regardless of whether the vehicle is moving or stationary, you must never allow a child to put his/her head, hands, or other body part out of the window. Allowing such behavior would be dangerous because the child could hit an obstacle.

You and others could be seriously injured.

The power windows operate only when the engine control switch is in the ON position. Open each door window by pressing the power window switch; close each one by raising the switch.

Window Switches on Driver's Door



The power window switch on the driver's door can operate both driver's (2) and passenger's (1) power windows.

To Open the Driver's Window

Lightly pressing the driver-side window switch will lower the driver's window until the switch is released (manual mode operation). When the switch is firmly pressed, the window will lower completely without the need to press the switch continuously (automatic mode operation). If you want to stop the automatic movement of the window before it lowers completely, raise the switch lightly.

To Close the Driver's Window

Lightly raising the driver-side window switch will cause the driver's window to move up until the switch is released.

To Open the Passenger's Window

The passenger's window continues to lower while the passenger-side switch on the driver's door is being pressed.

To Close the Passenger's Window

The passenger's window continues to move up while the passenger-side switch on the driver's door is being raised.

Window Switches on Passenger's Door and Rear Doors (If equipped)

The power window switch on the passenger's door can raise and lower the passenger's side window only, while, if equipped, the rear power window switches can raise and lower the rear door windows.

⚠ Warning

Be sure to warn passengers not to let any part of the body become trapped or caught in a moving window.

You and others could be seriously injured.

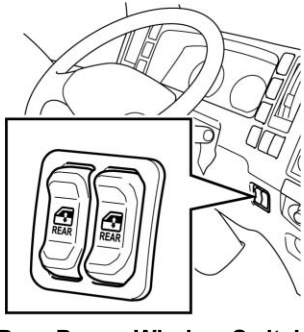
The window continues to lower while the window switch is being pressed and continues to rise while the switch is being raised. It will stop moving at any position when the switch is released.

When the rear power window lock switch is in the "LOCK" position, it is not possible to open and close the rear windows.

Window Switches on Center of Dashboard (Crew Cab Model)

The power window switch on the instrument panel and rear door can raise and lower the rear door window.

To Open a Rear Window



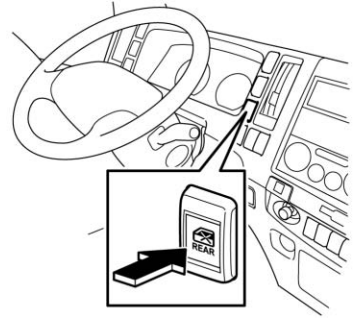
Rear Power Window Switch

The window glass will move downward while you are pushing the bottom part of the switch.

To Close a Rear Window

The window glass will move upward while you are pushing the top part of the switch.

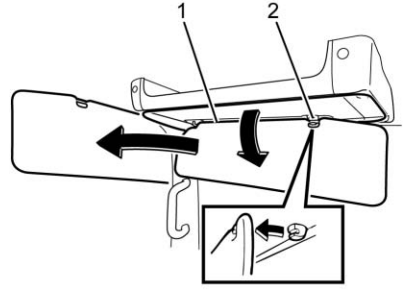
To Lock Rear Power Windows



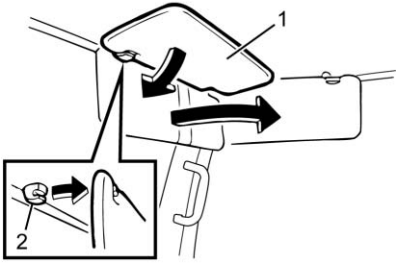
Rear Power Window Lock Switch

If you push the rear power window lock switch, only the driver's window and front passenger's window will open. To cancel the rear power window lock, push the switch again. Use the rear power window lock switch to "LOCK" the rear power windows. By doing so, you can prevent passengers from operating the rear power windows.

Sun Visors



Driver's Side



Passenger's Side

The sun visor (1) protects your eyes in strong sunlight. Use it when sunlight is too bright. To reduce side glare, unhook (2) the sun visor (1) and swing it around to the side.

Make sure to fold up the sun visor after use.

Seats and Restraints

Front Seats
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Front Seats

Seat Position

⚠ Warning

Use caution when adjusting the seat, as failure to do so could cause injury. You and others could be seriously injured.

⚠ Warning

Never allow children to adjust their seats themselves; an adult should adjust the seat for occupants who are children. You and others could be seriously injured.

⚠ Warning

Adjust the seat only before you start driving. Adjusting the seat while the vehicle is in motion must be avoided not only because the unlocked seat will move back and forth unstably, preventing you from taking the correct position, but might also cause you to lose control of the vehicle, possibly resulting in an accident. You and others could be seriously injured.

⚠ Warning

Try to move the seat without unlatching it after making adjustments to check that it is completely locked. A loosely locked seat may move unexpectedly and your position might then become unstable; this could lead to an accident. Take the vehicle to your dealer for

(Continued)

Warning (Continued)

service if you find that your seat adjusters do not latch. In addition, the seat belt will not operate properly if the seatback is not completely locked. You and others could be seriously injured.

⚠ Warning

Driving with the seat excessively reclined could be very dangerous in the event of a collision or sudden stop. Raise the seatback, and apply the seat belt correctly while sitting straight in the seat. You and others could be seriously injured.

⚠ Warning

Do not place a cushion or similar object between your back and the seatback. Doing so not only affects the stability of your driving position but also prevents the seat belt from working effectively in the event of a collision. You and others could be seriously injured.

⚠ Warning

Do not place any objects under the seat. If there are any objects under the seat, the seat could be locked in an improper position. You and others could be seriously injured.

⚠ Warning

Before making adjustments, check that the seat rails are free of anything that could obstruct the locking of the seat. Be careful that your hand or foot does not become trapped in the seat or rails when adjusting the seat. You and others could be seriously injured.

⚠ Warning

When adjusting the seat, be careful that the seat does not hit passengers or objects. Doing so could cause injury to passengers, or damage objects. You and others could be seriously injured.

⚠ Warning

Make sure not to hit passengers or luggage when adjusting your seat. You and others could be seriously injured.

Driver's Seat

The driver's seat must be adjusted so that when you sit well back in the seat, you can fully press the pedals without moving your back from the seatback, and you can operate the steering wheel easily and freely. After making adjustments, check that the seat is completely locked.

Adjusting the seat for a correct driving posture is a fundamental part of safe driving.

Forward/backward Adjustment

While raising the unlock lever, move the seat forward or backward. Release the lever when the seat is in the desired position. After making adjustments, try to move the seat back and forth to check that it is fully locked.

Reclining Adjustment

⚠ Warning

To reduce the risk of sliding under the lap belt during a collision, an occupied reclining seat should not

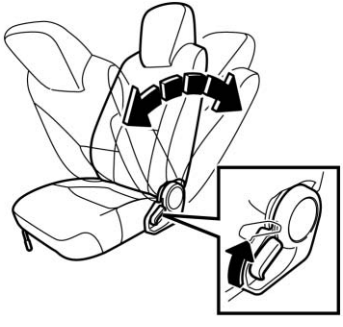
(Continued)

Warning (Continued)

be reclined any more than needed for comfort. The seatback and seat belts provide best restraint only when the rider is sitting well back and straight up in the seat. (The lap belt is designed to spread the force of a collision over the hipbone. If you are reclined, the lap belt may slide past your hips and apply restraint forces directly to the abdomen. Therefore, in the event of a collision, the risk of personal injury will increase with increasing recline of the seatback). You and others could be seriously injured.

⚠ Warning

Do not adjust the reclining seatback on the driver's seat while the vehicle is moving. The seatback could jerk and cause a loss of control. You and others could be seriously injured.

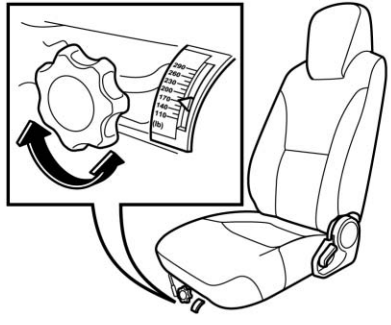


To recline the seatback, raise the seatback tilt lever and gently lean back to the desired position.

To move the seatback forward, lean forward with your back slightly clear of the seatback and raise the lever. After making adjustments, check that the seatback is fully locked.

Suspension Adjustment

Avoid making any kind of contact with the pointer on the scale. Doing so may result in damage to the pointer, preventing appropriate weight adjustments from being possible.



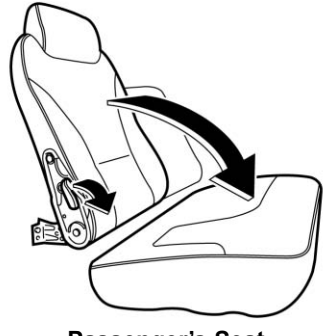
Before sitting on the seat, use the knob to adjust the suspension to suit your weight. Turn the knob clockwise to move the pointer down the scale and counterclockwise to move it up the scale. The pointer should be alongside your weight on the scale.

The range of adjustment is 50-130 kg (110-290 lbs). If your weight is outside this range, the suspension may not be fully effective. However, you will be able to sit in the correct position for driving.

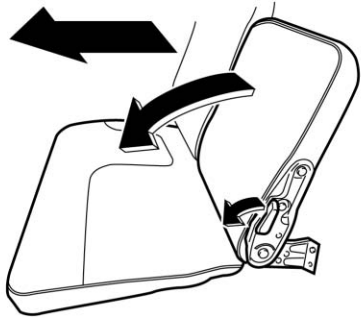
Passenger's Seat/Center Seat

⚠ Warning

Baggage must not be placed on the center seat. If the baggage falls on the floor when braking, it may prevent the driver from operating the pedals. You and others could be seriously injured.



Passenger's Seat



Center Seat

You can tip the seatback forward if you pull forward the lever at the side of the seatback. Normally, you should keep the seatback in the raised position.

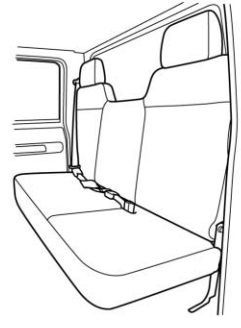
Rear Seats

Rear Seats (Crew Cab Only)

Do not remove the seat cushion except when taking out or stowing onboard tools.

⚠ Warning

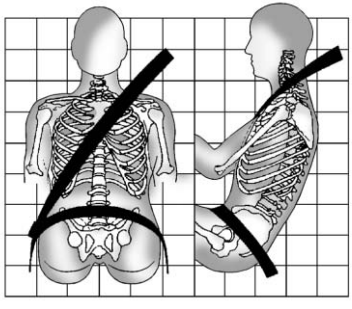
Do not drive with the seat cushion removed. The seat would not be stable, which could lead to an accident. You and others could be seriously injured.



The rear seat headrests are not adjustable.

Do not use the rear seats with the headrests removed during driving.

Seat Belts



The protection provided by seat belts might be significantly reduced if they are not fastened properly; in certain cases, improperly fastened seat belts can even play a role in causing injury to the wearer. Seat belts must be worn not only by the driver but also by the passenger(s) before the vehicle starts moving. You should be fully acquainted with the proper use of seat belts and important points to be respected as described in the following pages.

Familiarizing yourself with the correct use of seat belts is essential for your safety.

⚠ Warning

To help reduce the risk of personal injury in collisions or sudden maneuvers, use the seat belts following these instructions on their proper use, maintenance, and use with child restraint systems.

Seat belts must always be fastened BEFORE starting to drive.

Seat belts provide full protection only when the driver and passenger(s) fasten them while sitting upright and fully back on the seat.

Wearing a seat belt with the seatback excessively reclined could be very dangerous in a collision or sudden stop since the occupant may slide under the belt

(Continued)

Warning (Continued)

and be seriously injured. Seat belts work best only when the occupant is sitting well back and straight up in the seat.

Be sure to insert the latch plate into the buckle until a click is heard. An incompletely inserted latch plate is dangerous in the event of a collision or sudden stop.

Do not run the seat belt over your face, chin or neck.

Wear the seat belt as low as possible around the hips, not around the waist. A seat belt running over the waist would press the abdomen with a strong force and could increase the likelihood of injuries in a collision or sudden stop.

Do not use a seat belt for a small child if the belt is on or very close to the child's neck or chin. Also,

(Continued)

Warning (Continued)

do not use a seat belt if it does not fit snugly over the child's hips because restraining the child under those conditions could be dangerous in the event of a collision or sudden stop. Instead, use an appropriate child restraint system available on the market. For further details, please contact your dealer.

Use a child restraint system that fits the size of the infant or child. Install the system according to the manufacturer's instructions.

Children who have outgrown child restraint systems should use the vehicle's seat belts.

Remove any twists in the seat belt before fastening it. A seat belt with twists will not provide full protection because it cannot disperse shocks efficiently in the event of a collision or sudden stop.

(Continued)

Warning (Continued)

Too much slack could increase the amount of injury because the belt would not be able to properly restrain you in an accident.

Do not put the lap portion of a seat belt over any armrest.

Do not wear a shoulder belt under your arm nearest the door.

Do not let a buckle release button face downward or inward.

Expectant mothers or people suffering from chest or abdominal conditions should check with their doctor for specific recommendations about wearing seat belts.

Do not use one seat belt for more than one person. If worn by more than one person, the seat belt would not work effectively in a collision or sudden stop.

(Continued)

Warning (Continued)

Have seat belts inspected and, if necessary, replaced by the nearest dealer when the webbing becomes frayed or worn and/or when the buckle or other mechanical parts fail to work properly.

If your vehicle has been involved in a collision, the seat belts worn at the time may have lost their original strength due to impact even if they appear intact. These seat belts must be inspected and, if necessary, replaced by the nearest dealer.

Be careful to keep the buckles and retractors free of dust and foreign matter. (This may jam the retractor or damage the belt.)

Do not let the belt system become damaged by the door or seat.

(Continued)

Warning (Continued)

Do not let the belt twist while it is rewinding: it may cause the retractor to jam so it will not rewind further. If it is not fully rewound, the belt cannot be pulled out. Should the belt jam, you may be able to release it by working the belt in and out until the belt rewinds far enough to unlock. However, if the belt remains jammed or other parts of the restraint system do not work properly, have your dealer service it.

Wearing seat belts is a legal requirement. All other passengers must wear seat belts. The driver is responsible not only for wearing a seat belt himself/herself but also for prompting all passengers to wear their seat belts. It is necessary, however, to check with a doctor about the appropriateness of a seat belt for

(Continued)

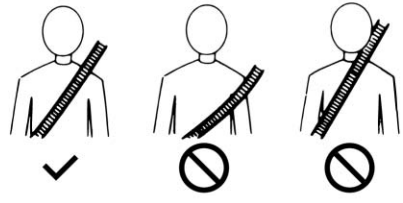
Warning (Continued)

an expectant mother or a passenger with a chest/abdominal condition.

Three-Point Seat Belt

⚠ Warning

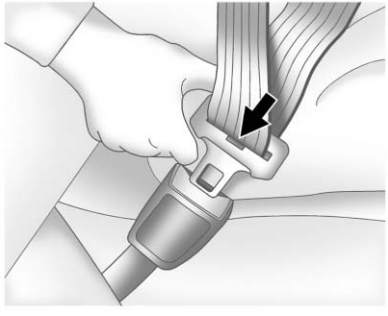
The shoulder belt should be adequately positioned on your shoulder but should not touch your neck and/or face. The shoulder belt could harm you in a collision or sudden stop if it is in contact with your neck and/or face.



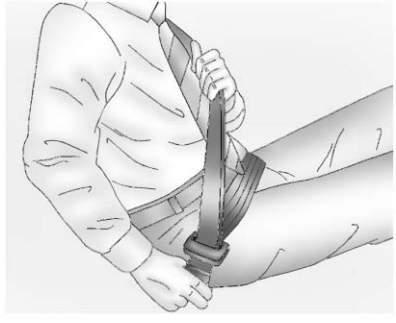
Every seat except the center seat on your vehicle is equipped with a three-point seat belt. The seat belt extends or retracts freely if the wearer moves slowly, but it locks and restrains the occupant during forward force caused by the occupant's body following a strong shock.

To Fasten:

1. Sit on the seat in the correct driving position.



2. Pull out the seat belt holding the latch plate. After checking that there are no twists in the belt, insert the latch plate into the buckle until it clicks. If the retractor locks before the latch plate reaches the buckle, let the belt retract slightly, then withdraw it slower than before.



3. To reduce the risk of sliding under the belt during a collision, position the belt across your lap as low on your hips as possible and adjust it to a snug fit by pulling the "shoulder" portion upward through the latch plate.

   The lap-shoulder belt is designed to lock during a sudden stop or impact. At other times it should move freely.

To Unfasten:

Push the button on the buckle. As the belt automatically retracts, let it be taken up slowly by holding on to the latch plate until the belt is fully retracted.

While being automatically retracted, the seat belt could damage a nearby window or interior trim unless the latch plate is properly held. Hold the latch plate to ensure that the belt is taken up slowly.

Before closing the door, check that the retracted seat belt is taut. A slack belt could become trapped in the door or seat rail.

When the passenger's seat belt is fully taken up (or not pulled out), check that the stopper is holding the belt in a fully taut state.

Emergency Locking Retractor (ELR) Function

The three-point seat belts are provided with an Emergency Locking Retractor (ELR) function.

The ELR normally allows the seat belt to move in and out freely as the occupant moves. However, it locks the seat belt to restrain the occupant when a forward force resulting from a collision or sudden stop acts on the occupant.

The ELR also locks the seat belt when the belt is pulled out quickly. If this happens, allow it to retract once and then pull it out slowly.

Seat Belt Use During Pregnancy

⚠ Warning

Unless the seat belt is correctly worn, it may dig into the abdomen in the event of hard braking or a collision, harming not only the expectant mother but also the unborn child, putting them both in danger of serious injuries or death.

An expectant mother or a person who is ill riding in the vehicle must also wear a seat belt. In light of the risk that the seat belt will apply pressure to the abdomen, chest and shoulders in the event of a collision, however, an expectant mother or person who is ill should get advice from a physician beforehand.

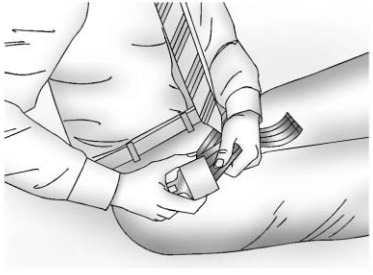
- An expectant mother should use a three-point seat belt.
- An expectant mother should position the lap belt snugly as low as possible on the hips (not across the abdomen). Also, she should fasten the shoulder belt so it rests on her chest, not on her abdomen.

Lap Belt

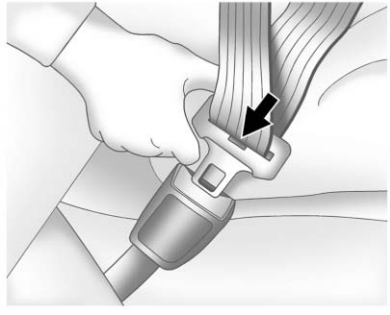
The center seat lap belt has no retractor, but should be positioned, worn, and released as described below.

To Fasten:

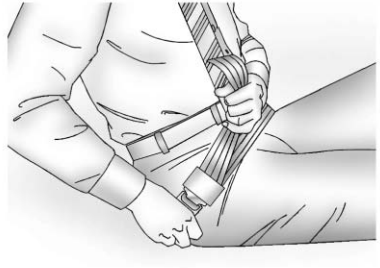
1. Sit on the seat in the correct position.



2. Pull out the latch plate side of the belt a little longer than necessary. Placing the latch plate at right angles with the belt makes this easier.

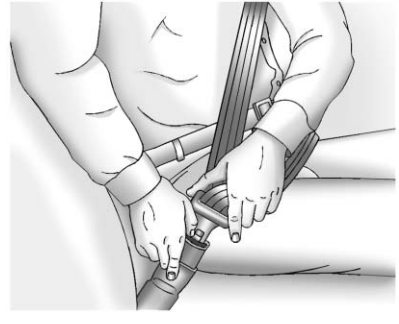


3. After checking that there are no twists in the belt, insert the latch plate into the buckle until it clicks.



4. Position the seat belt across the lap as low as possible on the hips. Pull the fold-back end of the belt (upper side) until the belt is adjusted to a snug fit.

To Unfasten:



Push the button on the buckle to unfasten the belt.

The center seat belt (length-adjustable two-point belt) is designed so that it cannot be connected with any of the windowside seat belts (three-point seat belts with ELR).

Seat Belt Extender

If the vehicle's seat belt will fasten around you, you should use it. But if a seat belt isn't long enough to fasten, your dealer can order you an extender. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. The extender will be just for you, and just for the seat in your vehicle that you choose. Do not let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular seat belt.

Safety System Check

Now and then check that the belts, buckles, latch plates, retractors, anchorages and guide loops work properly; look for loose parts or damage (without disassembly) that could keep the restraint system from doing its job. Have a belt assembly replaced if the webbing has been cut or otherwise damaged. Replace belts, retractors, and hardware used in all but a minor collision. Also, restraint systems should be replaced and anchorages properly repaired if they were in areas damaged by a collision, whether the belt was in use or not. If there is any question, replace the belt system. Damage, whether visible or not, could result in a serious personal injury in the event of an accident.

Seat Belt Care

⚠ Warning

Keep belts clean and dry.

Clean seat belts only with mild soaps and lukewarm water.

Do not bleach or dye belts since this may severely weaken them.

Seat belt webbing can lose its strength when bleached or redyed, or when cleaned using gasoline, paint thinners or other volatile substances.

Do not disassemble the seat belt mechanism in order to remove any foreign material or objects

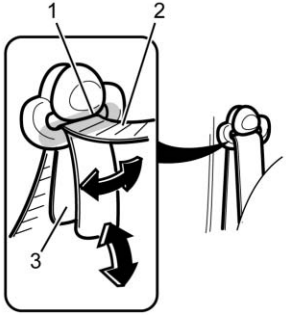
(Continued)

Warning (Continued)

that may have entered the buckle. Instead, arrange for inspection and maintenance to be carried out by your dealer. You and others could be seriously injured.

A dirty seat belt can develop retracting problems, and for this reason, regular inspection and upkeep are required.

Cleaning a Seat Belt Fold-Back Fitting Portion



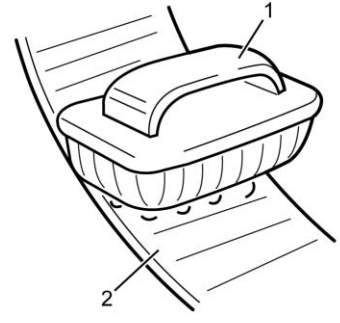
1. Seat belt fold-back fitting portion
2. Seat belt
3. Cloth

Cleaning a Seat Belt Fold-Back Fitting Portion:

1. Fold a piece of cotton cloth, absorbent gauze, or the like of approximately 50 mm (2 in) in width into a rectangle.
2. Mix one part neutral detergent into approximately twenty parts warm water.
3. Wet the cloth in the detergent mixture, pass it through the fold-back fitting portion of the belt, and slide it back and forth and laterally until dirt can no longer be seen.
4. Remove the cloth, remove moisture from the fitting portion of the belt using a dry cloth, and then allow it to dry naturally out of direct sunlight.
5. Check to be sure the seat belt retracts and pulls out correctly.

Avoid using anything like a tool to pass the cloth through the fold-back fitting portion or try to remove stubborn dirt. Using such an object can result in plastic parts or seat belt webbing damage.

Cleaning a Belt Webbing



1. Brush
2. Seat belt

Cleaning a Belt Webbing:

1. Fully extract the belt and examine for any difference in color between the front and back surfaces.
2. Mix one part neutral detergent into approximately twenty parts warm water.

3. Wet a nail brush or another similar brush having soft bristles (of nylon or the like) in warm water, and use this to clean away dirt.
4. Wipe the seat belt dry using a dry cloth, and then allow it to dry naturally out of direct sunlight.
5. Check to be sure the seat belt retracts and pulls out correctly.

If the above-described upkeep operations do not improve the operation of the seat belt through the retractor, there is a possibility that the belt is making contact with the door pillar trim. In this case, arrange for inspection and maintenance to be carried out by your dealer.

If the belt is not winding and unwinding correctly, or if inspection reveals problems such as loose mountings, metal parts deformation, webbing damage, fraying or discoloration, arrange for replacement to be carried out by your dealer.

Child Restraints

Infants and Young Children

⚠ Warning

The vehicle's seat belts are designed for adults. If a seat belt touches a child's neck or chin, or does not rest across his/her hips, use a baby seat, child seat or junior seat. If the seat belt were used as it is, it could apply intense pressure to the child's abdomen in the event of a collision. A small child who is not able to sit up by him/herself must be placed in a child seat.

Do not fit a baby seat, child seat or junior seat on the center seat. It could hinder your driving.

The appropriate type of baby seat, child seat or junior seat and the proper installation for it depend upon the weight and height of the child. It may not be possible to correctly fit certain child seats depending on their shapes. Be sure to use a child seat that is suitable for the vehicle.

For detailed instructions, see the instruction manual supplied with the baby seat, child seat or junior seat.

Child Restraint Systems

⚠ Warning

Children small enough for child restraints (as indicated on the label of such restraints), including booster seats, should always be transported in them. Children who have outgrown child restraint systems should wear seat belts. The lap belt should be snug and positioned low on the abdomen so that it is below the top of the hipbone. Otherwise, the belt could intrude into the child's abdomen during an accident and cause personal injury. When a child has grown enough so that the

(Continued)

Warning (Continued)

shoulder belt can be worn, a seating position with a shoulder belt should be chosen whenever possible.

Any unrestrained child could be injured by striking the vehicle's interior or by ejection from the vehicle during an accident or driving maneuver. Never allow a child to be held by another occupant instead of being properly restrained. If not properly restrained, the child could strike the vehicle interior or be crushed by the person holding the child, or by other occupants.

Be sure to follow all installation and use instructions that come with any child restraint system.

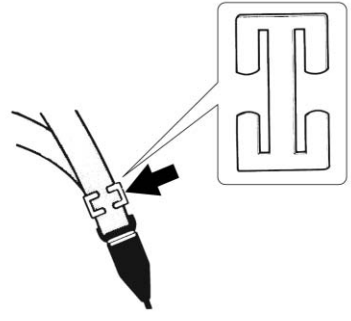
Child restraint systems are designed to be secured in vehicle seats either by the lap belt, or the lap portion of the lap-shoulder belt at that seating position. The child must also be secured within the restraint by the means provided by the child restraint manufacturer. If the child or the child restraint is not properly secured, the child risks personal injury in the event of a collision.

Using a Lap Belt That Has No Retractor

When securing a child restraint with the center seat lap belt, pull the excess webbing through the belt's adjustment feature, then take these steps:

- Once installed, push and pull the child restraint in all directions to be sure it is secure. If it comes loose, flip the end of the belt with the adjustment feature over before rebuckling.
- If the child restraint is still not secure, use the outboard seating position in the vehicle and contact your dealer and the child restraint manufacturer for help.
- Secure the child in the restraint in accordance with the child restraint manufacturer's instructions.

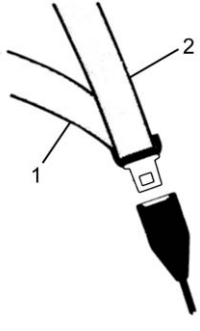
Installation on Outboard Seat



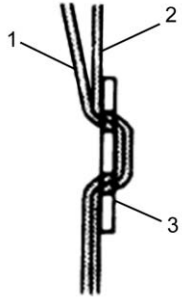
A seat belt locking clip is required for installation of a child restraint system on the outboard seat of this vehicle. A locking clip may usually be obtained where child restraints are sold, or by contacting your dealer for assistance. Make sure the locking clip is identical to the one shown on this page. Until you have the clip, use the child restraint system only in the center seat.

⚠ Warning

To help avoid personal injury or death during a collision or sudden maneuver, always thread both the lap and shoulder belt through the locking clip when securing a child restraint on the outboard seat.
If the clip is not used or installed properly, the child restraint may move or tip over when your vehicle turns or stops abruptly.



Secure the child restraint with the lap belt portion (1) of the seat belt in accordance with the restraint manufacturer's instructions. Then thread both the lap (1) and shoulder belt (2) portions through the locking clip. Push and pull the child restraint in all directions to be sure it is secure.



Locking Clip Attached to Seat Belt – Side View

1. Lap Belt
2. Shoulder Belt
3. Locking Clip

When your child restraint is not installed, remove the locking clip to permit normal use of the lap-shoulder belt. Keep the locking clip in the glove box to help prevent its loss.

Child Restraint with Top Strap

⚠ Warning

We do not recommend using a child restraint that requires the use of a top strap. There is no appropriate place to attach a top strap anchor behind the seat in this vehicle.

Storage

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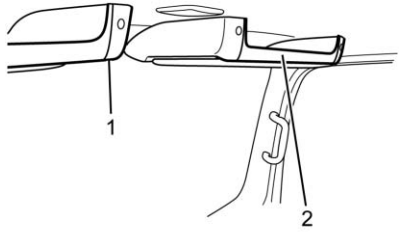
Storage Compartments

Overhead Trays



Use the overhead trays (1) and (2) as shelves.

⚠ Warning

Do not use either overhead tray to hold an object weighing more than 2 kg (4 lbs) or an object that may fly out or fall down during vehicle operation. Doing so would

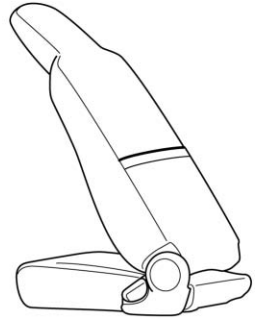
(Continued)

Warning (Continued)

be dangerous. Items may fly out or fall down when the cab is lowered after being tilted.

You and others could be seriously injured.

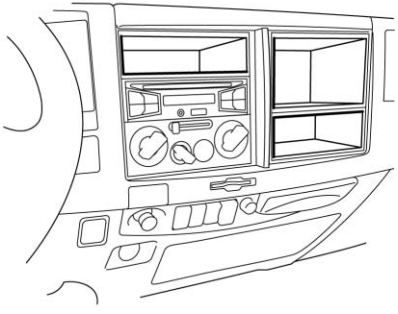
Seat Back Pocket



Use the seat back pocket for storing items such as vehicle registration documents or owner manuals.

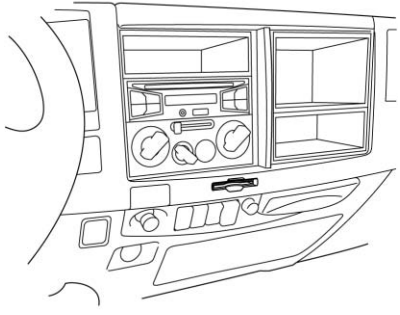
Instrument Panel Storage

Small Article Storage Pockets



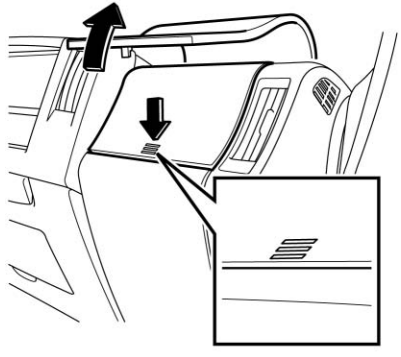
Use the storage pockets for storing small articles.

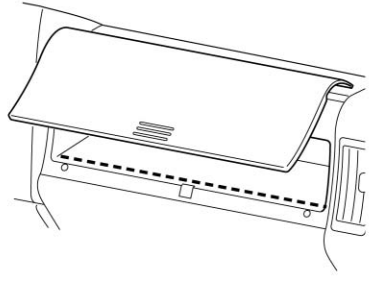
Card Holder



Use this to hold your cards.

Glove Box





Press on the central mark to lock and unlock the lid.

⚠ Warning

For safety, close the glove box during driving. There is a risk of injury from the open lid or items stored in the glove box.

You and others could be seriously injured.

The glove box lid will automatically spring open when it is unlocked. Do not put your face or head near the lid.

⚠ Warning

Do not leave eyeglasses or a lighter in the vehicle. Lighters may explode and plastic lenses or frames may deform or crack if the interior temperature becomes very hot.

You and others could be seriously injured.

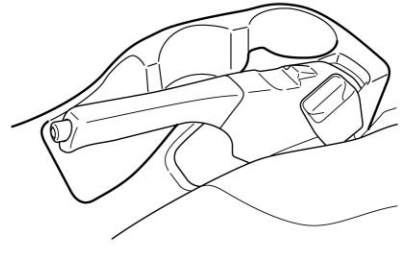
Caution

When closing the glove box lid, do not allow stored items to pass the line shown in the illustration. The glove box lid may break if it is closed when items inside have passed the line and are sticking out from the box.

Do not place items such as vehicle registration documents or owner manuals in the glove box, but store them in the seat back pocket located on the back side of the driver seat.

Refer to *Storage Compartments* ⇨ *57*.

Cupholders



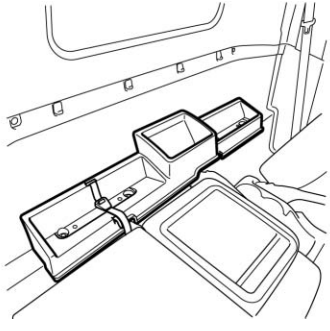
Pull the cupholder towards you to open it.

Do not place a cup that is too full in the cupholder. Spillages could cause damage to the radio and other electrical circuits. If there is a spill, wipe it up immediately with a dry cloth.

Do not tilt the cab with a filled cup in the cupholder. There may be a danger of the cupholder breaking if the weight on each holder exceeds 0.75 kg (1.65 lbs). Doing so may also result in damage to the radio or other electronic components.

Use the cupholders for storing small articles or cups.

Rear Storage



Single Cab Model Only

⚠ Warning

Do not use the back panel tray to hold any object that may fly or fall out during vehicle operation. Doing so would be dangerous.

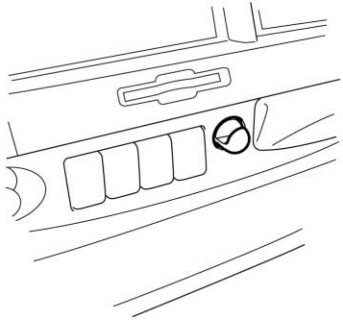
Items may fly or fall out when the cab is tilted.

You and others could be seriously injured.

The center area of the back panel tray can be used as a storage receptacle. The warning triangle and fire extinguisher can be carried in both sides.

Additional Storage Features

Shopping Bag Hooks



This can be used to hold plastic shopping bags. Do not hang anything weighing over 3 kg (6.6 lbs) or the hook will break.

Information on Loading the Vehicle

Overloading

⚠ Warning

Overloading can result in loss of vehicle control and personal injury or death, either by causing component failures or by affecting vehicle handling. It can also shorten the service life of your vehicle.

The components of your truck are designed to provide satisfactory service if the vehicle is not loaded in excess of either the gross vehicle weight rating (GVWR) or the maximum front and rear gross axle weight ratings (GAWRs). For diesel engines, these ratings are listed on the vehicle identification number (VIN) plate, which is located on the left side rear pillar panel below the striker. For gas engines, these ratings are listed on the “Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate”, which is located on the left side rear pillar panel below the striker (single cab) or on the left center pillar panel beside the shoulder seat belt anchor (crew cab).

Gross vehicle weight (GVW) is the weight of the originally equipped vehicle and all items added to it after it has left the factory. This would include bodies, liftgates, refrigeration systems, etc., winches, booms, etc., the driver and all occupants, and the load the vehicle is carrying. The GVW must not exceed the GVWR. Also, gross weight on each of the front and rear axles must not exceed the front and rear GAWRs respectively.

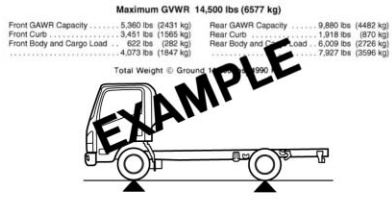
Your dealer can advise you of the proper loading conditions for your vehicle. Using selected heavier suspension components for added durability may not increase any of the weight ratings shown on the VIN and weight rating plate for diesel engines and on the “Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate” for gas engines.

Diesel Engine

Maximum GVWR kg (lb.)	Front GAWR Capacity kg (lb.)	Rear GAWR Capacity kg (lb.)
5 897 (13,000)	2 431 (5,360)	4 482 (9,880)

Gas Engine

Model	Maximum GVWR kg (lb.)	Front GAWR Capacity kg (lb.)	Rear GAWR Capacity kg (lb.)
3500/ 3500HD	5 443 (12,000)	2 204 (4,860)	4 010 (8,840)
4500	6 577 (14,500)	3 007 (6,630)	4 482 (9,880)



Maximum Front and Rear Axle Weights

The weight of the cargo load must be properly distributed over both the front and rear axles. For diesel engines, the VIN and weight rating plate shows the maximum weight that the front axle can carry (front GAWR). For gas engines, the “Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate” shows the maximum weight that the front axle can carry (front GAWR). It also shows the maximum weight that the rear axle can carry (rear GAWR). The GVWR is the maximum permissible loaded weight of the vehicle and takes into

account the capabilities of the engine, transmission, frame, springs, brakes, axles and tires. Actual loads at the front and the rear axles can only be determined by weighing the vehicle. This can be done at highway weigh stations or other such places. See your dealer for help. The cargo load should be distributed on both sides of the center line as equally as possible.

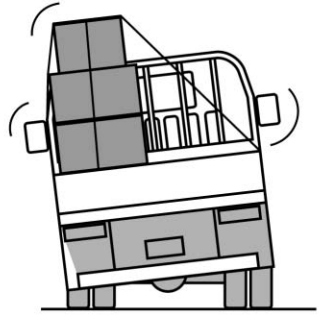
Tires

The tires on your truck must be of the proper size and properly inflated for the load that you are carrying. For diesel engines, the VIN and weight rating plate shows the originally equipped tire size and recommended inflation pressures. For gas engines, the “Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate” shows the originally equipped tire size and recommended inflation pressures. The tire inflation tables show the load limits for various size tires at various inflation pressures.

For the vehicle plate location, see *Vehicle Identification Number (VIN)* ⇨ *362*.

See “Tire Load and Inflation Table” under *Tire Pressure* ⇨ *306*.

Load Cargo Correctly



⚠ Warning

Overloading can result in an accident because it places too much strain on the wheel studs with the result that they break and the wheels come off.

(Continued)

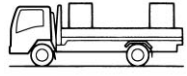
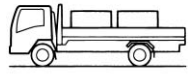
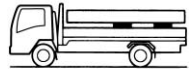
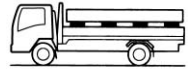
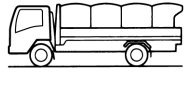
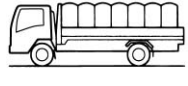
Warning (Continued)

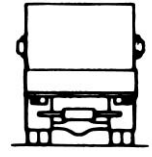
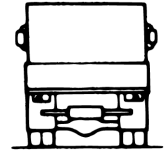
The weight of the payload must be limited within the gross vehicle weight (GVW) rating and distributed over the front and rear axles so as not to exceed the axle capacities.

It is extremely dangerous to overload the vehicle or to load the vehicle with the cargo positioned on one side. Load the vehicle correctly, observing the maximum loading capacity.

Incorrect loading can make the cargo unstable. It can also cause an overload condition confined to a small area, resulting in damage to the cargo bed and frame.

Overloading places undue strain on vehicle parts. It can shorten the vehicle's service life and cause an accident.

Cargo loading caution	Incorrect	Correct
Do not place cargo only at the front or only at the rear. Distribute it evenly.		
When using supports under cargo, position them uniformly along the cargo.		
To the greatest extent possible, do not allow long cargo to protrude beyond the rear edge of the cargo bed. Rather, use supports to raise it at an angle. Avoid supporting it using just the front guard frame and the rear edge of the cargo bed.		
Use ropes and tarpaulins to secure the cargo so it does not fall off the cargo bed. Use rubber bands or bungee cords to prevent the tarpaulins from flapping in the wind.		

Cargo loading caution	Incorrect	Correct
Avoid loading cargo too high. It can cause the vehicle to tip sideways when it catches sidewinds and when turning the vehicle.		

Loading Farm Equipment

Do not load farm equipment from the rear of the cargo bed. The frame may become deformed when farm equipment is loaded from the rear of the cargo bed. In addition, the frame may become deformed even when loading farm equipment that has a weight under the maximum loading capacity.

When loading farming equipment, a device for securing the cargo bed is required. Use a car carrier or attach a rear support stand. If you have any questions, contact your dealer.

Make Sure There is No Flammable Material between the Cab and Cargo Bed

Caution
Be careful not to allow the ends of ropes or edges of tarpaulins to come lower than the heat protector at the back of the cab. During vehicle operation, the engine's heat could set them on fire. Carefully secure the ends of ropes and edges of tarpaulins.

Do not Carry Fuel and Spray Cans in the Cab

⚠ Warning

It is extremely dangerous to carry fuel and spray cans in the cab. If such a container were to ignite or rupture, it could cause a fire or explosion.

Instruments and Controls

Controls

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Information Displays

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Vehicle Messages

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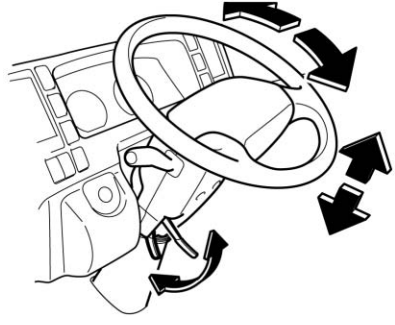
Controls

Steering Wheel Adjustment

⚠ Warning

- Adjust the position of the steering wheel before you start driving.
- To reduce the risk of personal injury, apply force to the steering wheel to make certain the steering column is firmly locked before driving. Also, do not try to tilt or adjust the steering wheel while the vehicle is moving. If these steps are not followed, the steering column could move suddenly while the vehicle is in motion which could cause a temporary loss of steering control which may result in personal injury or death.

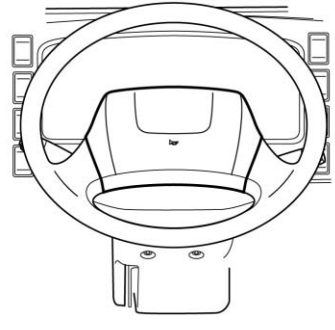


The steering wheel is adjustable up and down as well as forward and backward.

Before adjusting, position the seat as desired.

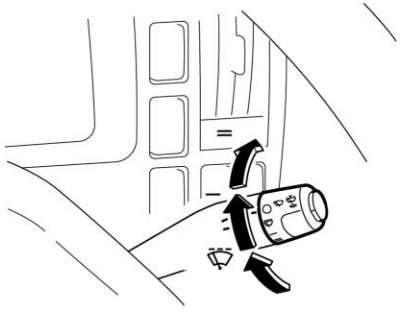
1. Lift the lock lever toward you to unlock the steering column.
2. Sit in the correct driving position, and then move the steering wheel up and down and forward and backward to select the optimum steering wheel position.
3. Firmly lock the steering wheel at the selected position by moving the lock lever to the lock position.

Horn



To sound the horn, press the pad with a horn symbol on the steering wheel.

Windshield Wiper/Washer



To use the windshield wiper and washer switches, the engine control switch must be in the ON position.

The windshield wiper switch has the following positions, which correspond to the states of the wiper.

◯ **:** Stopped.

: Intermittent, light rain.

Low Speed : Low speed, moderate rain.

High Speed : High speed, heavy rain.

If the wiper frequently stops during operation, contact your nearest Dealer.

Before operating the wiper, ensure that the wiper rubber is not stuck on to the windshield. If the wiper rubber is stuck to the windshield and you still operate the wiper, the wiper may break or the wiper motor may fail.

Clear ice or packed snow from the wiper blades before using the wipers. Carefully loosen or thaw wipers that are frozen to the windshield.

Do not operate the wiper on a dry windshield surface. Otherwise, the windshield surface may sustain damage.

Windshield Washer

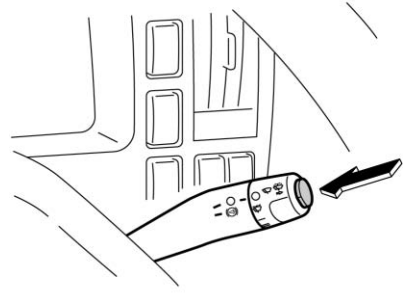
⚠ Warning

At extremely low temperatures, washer fluid may freeze on the windshield after being sprayed, obstructing your forward view. In

(Continued)

Warning (Continued)

such a case, warm up the windshield before using the windshield washer.



Windshield washer fluid is sprayed over the windshield when this switch is pressed. At the same time, the windshield wiper operates.

To spray washer fluid on the windshield, push the button on the end of the combination switch lever. The spray will continue as long as you hold in the button.

If windshield washer fluid does not come out in sufficient quantity, immediately release the switch. Otherwise, the windshield surface may sustain damage.

If windshield washer fluid does not come out, release the windshield washer switch immediately. Otherwise the motor may seize up.

Do not hold the switch pressed for more than 30 seconds. Otherwise, the washer pump may sustain damage.

Check the washer fluid level regularly. Do it often when the weather is bad.

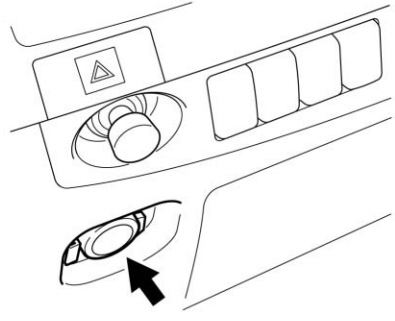
Use a good quality windshield antifreeze to help prevent freezing damage, and for better cleaning.

When the vehicle is used in a cold-climate region or during the winter:

- Use washer fluid with appropriate concentration for the season to prevent frozen fluid.
- Fill the washer fluid reservoir only 3/4 full to allow for expansion if the temperature should fall low enough to freeze the solution.

See *Washer Fluid* ⇨ *265* for information on filling the windshield washer fluid reservoir.

Power Outlets



You can plug in auxiliary electrical equipment. Just flip the outlet cover open from the left edge of the cover and follow the proper installation instructions that are included with any electrical equipment you install. These circuits are protected by a fuse and have maximum current loads.

When using accessory power outlets, total maximum electrical load must not exceed 120W. Always turn off any electrical equipment when not in use.

Leaving electrical equipment on for extended periods will drain your battery.

Cigarette Lighter

The cigarette lighter can be used when the engine control switch is in the ACC or ON position.

1. Push the lighter in until it locks.
2. When the heater element becomes hot, the lighter pops out to the original position. Pull out and use it.

⚠ Warning

- As the lighter's element can become extremely hot, take due precautions against burns.
- Do not leave your finger on the cigarette lighter once it has been pushed in. The lighter will overheat and be damaged or cause a fire.
- If the cigarette lighter does not pop out after more than 20 seconds, the lighter is defective. Pull out the lighter by hand immediately.
- Do not bend the cigarette lighter. A bent lighter does not function properly and is dangerous.
- You and others could be seriously injured.

Do not use the cigarette lighter as an accessory outlet.

If the cigarette lighter has to be replaced, use a Chevrolet genuine GM part. Do not use other cigarette lighters.

When cleaning the cigarette lighter, do not use too much force. It may become bent.

Keep the cigarette lighter socket and the heater free of ash and dirt.

Ashtrays

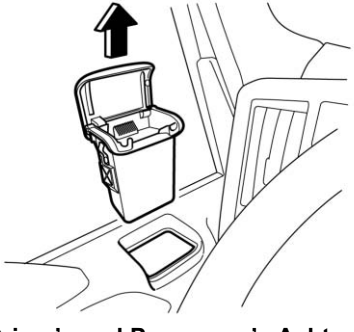
⚠ Warning

- Do not put any paper trash or other flammable material in the ashtray.
- After using the ashtray, be sure to close it. If a cigarette butt has not been extinguished completely, other butts in the ashtray may catch fire.
- Do not leave the ashtray full of cigarette butts.

(Continued)

Warning (Continued)

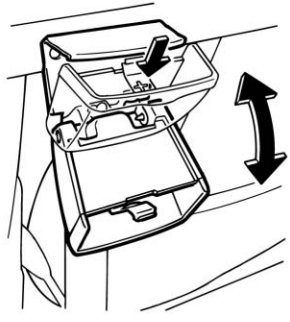
- Put matches and cigarette butts in the ashtray only after they are fully extinguished.
- You and others could be seriously injured.



Driver's and Passenger's Ashtray

Open the lid to use the ashtray.

Put out lit cigarettes on the crush-out tab. To empty the ashtray, hold the lid and pull the ashtray up and out.



Rear Ashtray (Crew Cab Model Only)

Pull the ashtray towards you to use it. Put out lit cigarettes on the crush-out tab. The ashtray cannot be removed. To empty the ashtray, turn it down while pushing the crush-out tab to remove cigarette butts into an appropriate container.

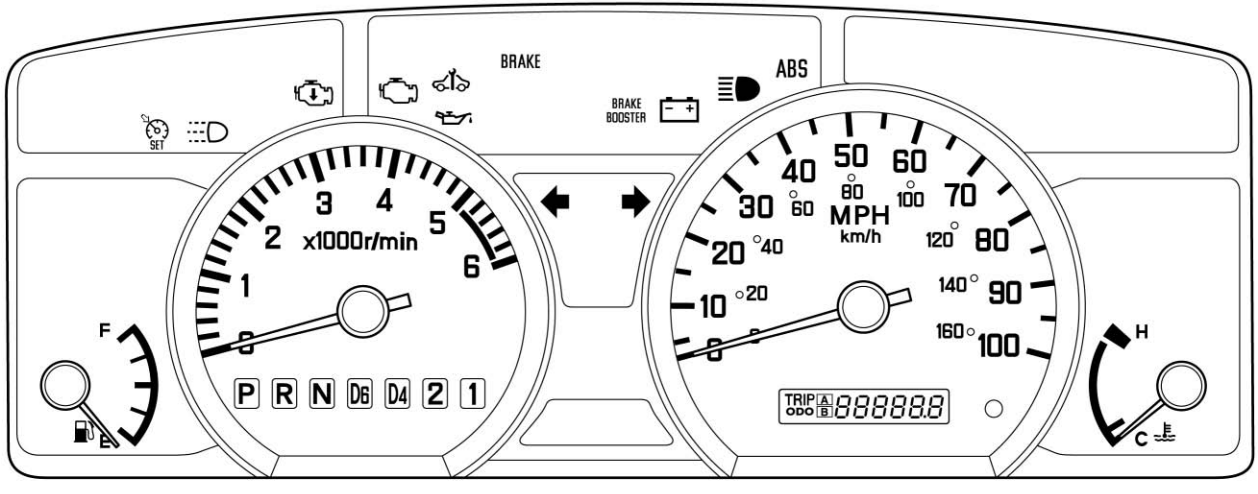
Warning Lights, Gauges, and Indicators

Warning lights and gauges can signal that something is wrong before it becomes serious enough to cause an expensive repair or replacement. Paying attention to the warning lights and gauges could prevent injury.

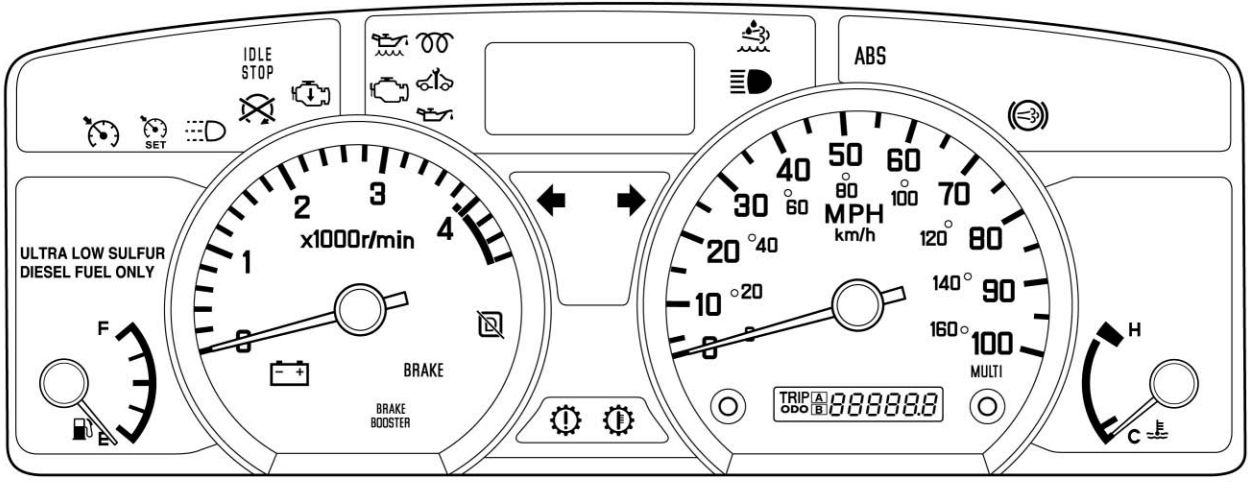
Some warning lights come on briefly when the engine is started to indicate they are working. When one of the warning lights comes on and stays on while driving, or when one of the gauges shows there may be a problem, check the section that explains what to do. Waiting to do repairs can be costly and even dangerous.

For safety reasons, do not place packages, tools, or other items in the driver's area that may restrict access to the controls or sight of the gauges.

Instrument Cluster



Gas Engine Cluster



Diesel Engine Cluster

Speedometer

The speedometer shows the vehicle's speed in either kilometers per hour (km/h) or miles per hour (mph).

Odometer

The odometer shows how far the vehicle has been driven, in either kilometers or miles.

Each time the reset knob is pressed with the engine control switch in the ON position, the odometer/trip meter shows ODO, TRIP A, and TRIP B in this sequence. With the key removed, the odometer and trip meter continue to indicate for about five minutes.

Odometer Check Switch

Press the Odometer Check switch to display the odometer and trip meter mileage after the key is turned off. The fuel gauge will also operate when this switch is pressed. For diesel vehicles, the DIC and some lights will illuminate on the instrument panel.

Trip Odometer

The trip odometer shows how far the vehicle has been driven since the trip odometer was last reset. Press the trip odometer reset stem next to the odometer to switch between the odometer and trip odometer.

To reset the trip odometer to zero, press and hold the trip odometer reset stem while TRIP A or TRIP B is displayed. The engine control switch should be in the ON position.

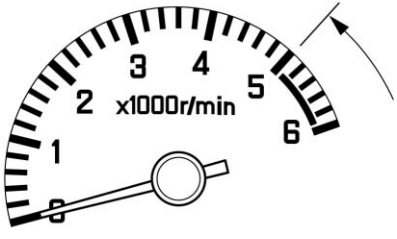
When the battery is disconnected, TRIP A and TRIP B will be reset to zero. The per trip fuel economy is also reset by the TRIP B reset. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

When you turn the engine control switch to the ON position, the odometer/trip odometer shows what was displayed the last time the engine control switch was turned to LOCK or ACC.

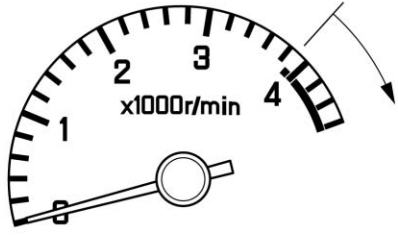
To set the odometer to display each time you turn the engine control switch to the ON position, turn the engine control switch to LOCK or ACC while the odometer is displayed. With the reset stem pressed, turn the engine control switch to the ON position and then within three seconds, turn the engine control switch back to the

LOCK or ACC position. Follow the same procedure to cancel the setting.

Tachometer



Gas Engine



Diesel Engine

The tachometer displays the engine speed in revolutions per minute (rpm). The red zone indicates a range of dangerous engine speeds beyond permissable levels. Do not drive your vehicle with the needle in the red zone.

Caution
Excercise extreme care when shifting down on a steep downslope. The engine speed may exceed the critical speed, which can damage the vehicle.

Fuel Gauge

With the engine control switch in the ON position, the fuel gauge indicates about how much fuel is left in the tank.

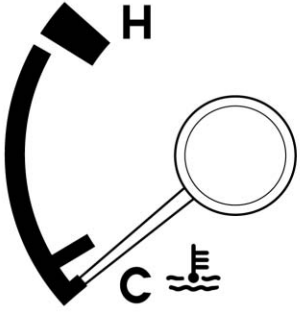
To check the fuel level with the engine control switch in the LOCK position, press the Odometer Check switch.

Fill the tank well before it approaches empty. After filling up the fuel tank, it takes awhile for the fuel gauge needle to stabilize after the engine control switch is turned to the ON position. If the fuel tank is filled while the engine is off, but the

engine control switch is in the ON position, the fuel gauge needle takes awhile to show the correct reading.

See “ Low Fuel Warning Light” in *Driver Information Center (DIC) (Diesel Only)* ⇨ *87* and *Running Out of Fuel (Diesel)* ⇨ *231*.

Engine Coolant Temperature Gauge



With the engine control switch in the ON position, this gauge shows the engine coolant temperature. During operation, the needle should stay out of the H zone.

If the pointer moves toward the upper limit and enters the H zone while driving, the engine is too hot.

If the vehicle has been operating under normal driving conditions, pull off the road, stop the vehicle, and turn off the engine as soon as possible. See *Engine Overheating* ⇨ *260*.

⚠ Warning

If the engine coolant temperature gauge shows an overheat condition or you have any other reason to suspect the engine may be overheating, continued operation of the engine, even for a short time, may result in a fire and the risk of personal injury and severe vehicle damage. Take immediate action as outlined in Engine Overheating. See *Engine Overheating* ⇨ *260*.

Caution

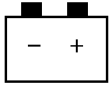
If the needle goes up above the upper limit and enters the H zone, the engine is likely to overheat. Immediately pull safely off the road out of the way of traffic and take the necessary actions to deal with engine overheating.
If the needle nears the H zone but does not cross into it, this is not a problem, but check the engine coolant level in the reservoir. Add engine coolant as necessary.

See “Engine Overheat Warning Light” under *Driver Information Center (DIC) (Diesel Only)* ⇨ *87* and *Engine Coolant* ⇨ *254*.

Diesel Exhaust Fluid (DEF) Gauge

The DEF gauge is part of the Driver Information Center (DIC). See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

Battery Warning Light



This light comes on briefly when the ignition is turned on, but the engine is not running, as a check to show the light is working. It should go out when the engine is started.

If the light stays on, or comes on while driving, there may be a problem with the electrical charging system (such as a loose or broken fan belt). Pull off to a safe place well clear of traffic and contact your dealer. Driving while this light is on could drain the battery.

Check and Corrective Action

1. Check to see if the fan belt is broken or loose.
2. If the fan belt is loose, adjust the tension.
3. If the fan belt is broken or there is no abnormality in the fan belt, see your dealer for service.

See *Battery* ⇨ *270*, *Jump Starting - North America* ⇨ *310*, and *Engine Drive Belt Routing* ⇨ *373*.

Malfunction Indicator Lamp (Check Engine Light)

This light should come on to show that it is working when the engine control switch is turned to the ON position, and then should go out after the engine is started.

If this light stays on or comes on while the engine is running, it indicates a malfunction with the engine electronic emission control system. Avoid driving at high speeds and have the vehicle inspected by your dealer.

If this light comes on when the fuel tank is empty, you do not need to have your vehicle serviced. See *Running Out of Fuel (Diesel)* ⇨ *231*.

If this light comes on intermittently or continuously while driving, service is required. Even if the vehicle is drivable and does not require towing, see your dealer as soon as possible. Continued driving without having the system serviced could cause damage to the emission control system. It could also affect fuel economy and drivability.

Service Vehicle Soon Light

This light comes on briefly when the engine control switch is in the ON position, but the engine is not running, as a check to show the light is working. It should go out when the engine is started.

If the light stays on, or comes on while driving, the vehicle control system may be malfunctioning. Take the vehicle to your dealer for service as soon as possible.

Brake System Warning Light

This light should come on briefly when the engine control switch is turned to the ON position, and then should go out after the engine is started.

Brake System Warning Light

If the light remains on after engine start up or comes on during operation of the vehicle, it means that there is something wrong with part of the brake system.

The brake system warning light comes on while the engine is running (after startup) in the following situations:

- Drop in the level of brake fluid (due to brake lining wear or fluid leakage).
- Abnormality in the charging system (such as an alternator malfunction or loose or split fan belt).
- Abnormality in the anti-lock brake system (ABS) and EBD functions. (The ABS warning light and brake system warning light will illuminate at the same time.) See *Antilock Brake System (ABS) Warning Light* ⇨ *81*.

To serve as a reminder, the light should stay on when the parking brake is not fully released, and the engine control switch is on. Have the system repaired if the light does not come on when it should. If this warning light does not go away, brake inspection and maintenance should be performed.

Check and Corrective Action

1. Check to see that the parking brake has been fully released. If it has, check the following:
2. For diesel vehicles, turn on the exhaust brake to help slow the vehicle.
3. Pull off the road and stop carefully. Remember that stopping distances may be longer, the pedal may be harder to push and go down farther than normal.
4. Check the brake fluid reservoir on the left side of the instrument panel. If low, add fluid as needed.
5. If the brake fluid is not low: Try out the brakes by starting and stopping on the shoulder of the road, then either drive cautiously at a safe speed to the nearest dealer for repair, if you judge driving to be safe; or have the vehicle towed to the nearest dealer for repair.

Continued driving without the necessary repairs could be dangerous.

If this warning light stays on, see your dealer.

The regular braking system is a split system designed so that one part will provide some braking if there is a loss of hydraulic pressure in the other part of the system.

⚠ Warning

If this warning light comes on while the engine is running, immediately stop the vehicle at a safe place well clear of traffic and contact your dealer for inspection. When the brake system warning light is illuminated, brake effectiveness may be decreased. When this happens, strongly depress the brake pedal.

See *Brakes* ⇨ *266*.

Parking Brake Light

This indicator light comes on when the parking brake lever is pulled with the engine control switch on.

This light also stays on when the parking brake is not fully released and the engine control switch is on. If this warning light stays on, see your dealer.

The illumination of the parking brake light does not necessarily ensure firm application of the parking brake. The parking brake lever must be sufficiently pulled up and locked.

Be careful not to drive the vehicle with the parking brake lever still pulled up.

Brake Low Vacuum Warning Light

This light should come on briefly when the engine control switch is turned to the ON position, and then should go out after the engine is started. If the light does not come on when the engine control switch is turned to ON, it could indicate a burned out bulb or a blown fuse. Have the system repaired if the light does not come on during this check.

The warning light and buzzer will come on simultaneously when the brake booster's vacuum becomes insufficient either during driving or when the engine control switch is in the ON position, or when there is an abnormality in the charging system, such as an alternator malfunction or loosening or splitting of the fan belt.

The warning buzzer will stop sounding when the parking brake is engaged.

On diesel vehicles the brake low vacuum warning light and warning buzzer should come on to indicate low vacuum reserve for brake power assist. At the same time, the Back up Electric Vacuum Pump operates.

4500 models are equipped with a Back up Electric Vacuum Pump that will turn on if brake booster vacuum becomes insufficient.

If this happens while driving:

- Do not pump the brakes. The system is designed to stop the truck with reserve power assist if the pedal is held down. This reserve is greatly reduced each time you apply and release the brakes.
- Stopping distance may be longer.
- You may have to push much harder on the brake pedal.
- Have the vehicle repaired before you continue driving.

The buzzer stops when the selector lever is shifted to the N or P positions.

⚠ Warning

Do not drive while the buzzer sounds as the brakes are not operating to their full capacity. You and others could be seriously injured.

Antilock Brake System (ABS) Warning Light

ABS

This light comes on briefly when the engine control switch is turned to the ON position, and then should go out after approximately three seconds. If the light does not come on, have it fixed so it will be ready to warn if there is a problem.

This warning light comes on together with the brake system warning light whenever there is a problem in the Anti-lock Brake System (ABS). In this case, the ABS stops working but the brakes still function as ordinary service brakes.

⚠ Warning

If this warning light comes on while driving, immediately stop your vehicle at a safe place well clear of traffic and take the following actions.

1. Stop the engine.
2. Restart the engine. Check if the ABS warning light comes on and then goes out. If it does, there is no problem. The ABS operates normally.
3. Move the vehicle slowly forward. Gradually increase the speed to 15 km/h (9 mph). If the light goes off, the ABS is normal.

(Continued)

Warning (Continued)

If the light does not come on or go out, or comes on frequently, contact your dealer immediately and have the system repaired.

Even if a problem has occurred in the ABS, the brakes will still work as normal brakes. In this case, the ABS has no influence on the operation of the brake system.

See *Brake System Warning Light* ⇨ *79* and *Antilock Brake System (ABS)* ⇨ *210*.

Exhaust Brake Light

For diesel vehicles, this light comes on when the exhaust switch is pulled and the engine is running. See *Exhaust Brake (Diesel Only)* ⇨ *215*.

Service Transmission Warning Light

For diesel vehicles, this light comes on briefly when the engine control switch is in the ON position, as a check to show the light is working. It should go out when the engine is started.

If the warning light starts to blink while driving, it indicates that there is a malfunction in the automatic transmission's electronic control system. If the warning light is blinking, see your dealer for service.

Automatic Transmission Fluid Temperature Warning Light

For diesel vehicles, this light comes on briefly when the engine control switch is in the ON position, but the engine is not running, as a check to show the light is working. It should go out when the engine is started.

The Automatic Transmission Fluid (ATF) Temperature warning light comes on if the ATF temperature is high. This usually occurs when the transmission is overfilled and may be accompanied by leakage of fluid from the transmission breather hose.

If the light stays on, or comes on while driving, slow down and pull off the road. Stop the vehicle at a safe place and put the vehicle in P (Park). With the engine idling, wait until the light goes off. If the light goes off, you can drive the vehicle again. If the light does not go off, have the automatic transmission lubricating system checked by your dealer.

Caution
Driving with the ATF warning light constantly on can cause serious mechanical damage to the automatic transmission.

See *Automatic Transmission* ⇨ *198*.

Overdrive Off Light (Diesel Only)

This light should come on briefly when the engine control switch is turned on as a check to make sure the light is working. It should go out automatically.

This light comes on when the overdrive off switch on the selector lever is turned on. Overdrive will not operate even when the automatic transmission is in D, unless engine speed is excessive.

Wait-to-Start Light

For diesel vehicles, this light comes on when the engine control switch is turned to the ON position and goes out when preheating is complete.

See *Starting and Stopping the Vehicle (Gasoline Only)* ⇨ *158* or *Starting and Stopping the Vehicle (Diesel Only)* ⇨ *161*.

Engine Oil Pressure Light

This light should come on briefly when the engine control switch is turned to the ON position, and then should go out after the engine is started.

This light comes on when the engine oil pressure has fallen below the normal level while the engine is running or the oil pressure across the oil filter rises above the normal level while the engine is running.

If the warning light comes on while driving, immediately pull off to a safe place and stop the engine. Check the oil level in the engine crankcase. If the oil level is normal, restrictions are in the oil filter or within the lubricating system. Have the vehicle inspected at your dealer. Do not run the engine with this light on. It could damage the engine. When this light comes on while driving, a warning tone also sounds.

The oil level varies while the engine is running right after it has stopped or if the vehicle is on uneven ground. As a result, the red engine oil pressure warning light may light up.

When checking the oil level for Diesel engines, press the engine oil level check switch on level ground while the engine is cool. The red engine oil pressure warning light in combination with the green engine oil level indicator light can indicate if the engine oil level is OK or low.

For gasoline vehicles, when this warning light comes on, and the oil level is correct, the lubrication system may be faulty. See your dealer for service.

See *Engine Oil Level Indicator Light (Diesel Only)* ⇨ *84* and *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*.

Engine Oil Level Indicator Light (Diesel Only)

When the engine oil level check switch is pushed with the engine control switch in LOCK, the green engine oil level indicator light will come on if the engine oil level is OK.

See *Engine Oil Pressure Light* ⇨ *84* and *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*.

Diesel Exhaust Fluid (DEF) Warning Light

This light should come on briefly when the engine control switch is turned to the ON position, and go off when the engine has started.

This light comes on as a warning related to the selective catalytic reduction (SCR) system. If this light comes on, check the DEF gauge. Add DEF if necessary. If DEF level is OK, have your vehicle serviced by your dealer.

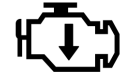
Also see *Diesel Exhaust Fluid* ⇨ *182*.

Engine Shutdown Warning Light

The Engine Shutdown Warning light comes on briefly when the engine control switch is turned to the ON position, as a check to show the light is working. The light turns off when the engine is started.

This light will come on when the engine alarm and automatic shutdown system is active. See *Engine Alarm and Automatic Shutdown (Diesel Only)* ⇨ *166*.

Reduced Engine Power Light



This light comes on briefly when the engine control switch is turned to the ON position, and then should go out after the engine is started.

Diesel Engines

If this light comes on while the engine is running, it indicates power is being reduced due to one or more of the following conditions:

- Malfunction of the engine or exhaust electronic control system.
- DEF level is too low or empty.

If this light comes on with the malfunction indicator lamp, see your dealer immediately.

If this light comes on with the Refill Diesel Exhaust Fluid (DEF) warning light and the DEF warning light, refill DEF as soon as possible.

See “Refill Diesel Exhaust Fluid (DEF) Warning Light” under *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*. See *Malfunction Indicator Lamp (Check Engine Light)* ⇨ *78* and *Diesel Exhaust Fluid (DEF) Warning Light* ⇨ *85*.

Gas Engines

If this light comes on while the engine is running, this means the engine is overheating and in overheat protection mode. The overheat protection mode alternates firing groups of cylinders in order to prevent engine damage. In this mode, the engine loses power and performance. This operating mode allows your vehicle to be driven to a safe place in an emergency. Driving extended miles (km) and/or towing a trailer in the overheat protection mode should be avoided.

After driving in the overheated engine protection mode, allow the engine to cool before attempting any repair to avoid engine damage. The engine oil will be severely degraded. Repair the cause of coolant loss and change the oil. See *Engine Overheating* ⇨ *260*.

High-Beam On Light

This light comes on when the high-beam headlamps are in use or the headlamps are cycled between high and low beams (passing signal).

See *Headlamp High/Low-Beam Changer* ⇨ *98*.

Daytime Running Lamps (DRL) Indicator Light

This light comes on when the DRL are on. If the vehicle is started during the daytime with the lighting switch off and the parking brake released, the low beam headlamps will come on at a reduced brightness. The light will go out when the lighting switch is turned on.

See *Exterior Lamp Controls* ⇨ *97*.

Cruise Control Light

This light should come on briefly when the engine control switch is turned to the ON position, and then should go out after the engine is started.

For vehicles with cruise control, this light comes on when cruise control is turned on.

This light should come on briefly when the engine control switch is turned to the ON position, and then should go out after the engine is started.

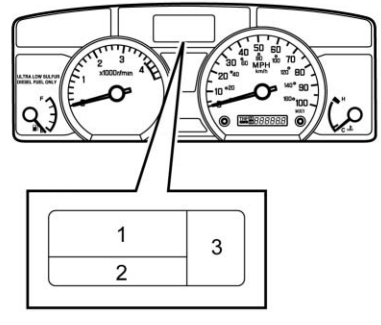
This light comes on when the vehicle enters the cruise control mode after the cruise control set switch is operated to set the vehicle speed.

For gasoline vehicles, the light will flash slowly when the high idle mode is active.

See *Cruise Control (Gas)* ⇨ *220* or *Cruise Control (Diesel)* ⇨ *216*.

Information Displays

Driver Information Center (DIC) (Diesel Only)



The DIC display is in the center of the instrument cluster. The displays show the status of many vehicle systems. There are three parts to the DIC display:

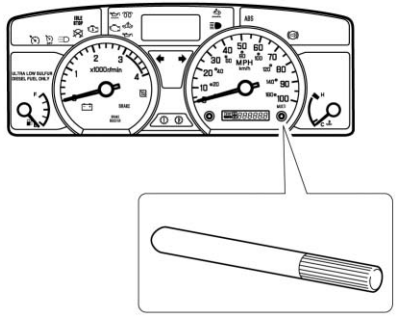
1. DIC menu items and warning lights and messages (includes operation related information, diesel particulate filter (DPF) status, maintenance data, and errors)

2. Automatic transmission shift indicator
3. Diesel Exhaust Fluid (DEF) gauge

⚠ Warning

Warning or indicator lights indicated on the DIC can be temporarily cleared (for 60 seconds) by pressing the DIC selector once. However, if the warning light you have cleared is an engine overheat warning or other critical circumstance, never continue driving without taking the necessary actions. Otherwise, you will be in danger of vehicle breakdown or accident. Should any of the critical warning lights come on, immediately contact the nearest dealer.

DIC Menu Items



Use the DIC selector to access the following menu items.

Language

Select English, French, or Spanish by turning the DIC selector clockwise or counterclockwise.

Fuel Economy

The system calculates and stores the distance traveled and fuel consumption while driving to encourage the operator to drive the vehicle economically. Press the DIC selector once or more to select fuel economy. Turn the selector clockwise or counterclockwise to toggle through the items: average fuel economy, per trip fuel economy, and instantaneous fuel economy.

- Average Fuel Economy: Indicates the average fuel economy over the total distance traveled.
- Per Trip Fuel Economy: Indicates the per trip fuel economy based on the mileage in the TRIP B.
- Instantaneous Fuel Economy: Indicates the fuel economy at a given moment while driving.

How to Reset the Per Trip Fuel Economy

Per trip fuel economy is also cleared when you reset the TRIP B to zero.

Voltmeter

The voltmeter shows the current status of the charge of the battery.

Green indicates the current status of the charge of the battery.

Red means the battery voltage is too low or too high. If the voltmeter sign appears in red, have the vehicle checked and serviced at your dealer. During or immediately after the engine is started, a red abnormal L voltage may display on the DIC. If the warning disappears after the engine has started, there is no problem with the battery voltage.

Calendar and Clock

⚠ Warning

The calendar and clock can be set only while the vehicle is stationary. When setting the calendar or clock, park your vehicle in a safe place where stopping or parking is permitted and that is well clear of traffic.

Press the DIC selector once or more to select the calendar. Press and hold the DIC selector to enter the clock setting screen. The year segment will flash. Turn the DIC selector clockwise or counterclockwise to increase or decrease the year. While in the year setting screen, press the DIC selector once to switch to the month setting screen. The month segment will flash. Use the same method to set the month. While in the month setting screen, press the DIC selector again to switch to the day setting mode. Adjust the day using the selector.

Press and hold the DIC selector to complete the calendar setting. When complete, the normal calendar display will resume. Use this same method to set the hour and minute when in the clock setting screen.

Dimmer

The brightness of the DIC can be adjusted while the light control switch is off. Select this screen and turn the DIC selector clockwise or counterclockwise to brighten or dim the illumination. The brightness is linked to the adjustment of the instrument panel light level control while the light control switch is on. See *Instrument Panel Illumination Control* ⇨ *100*.

Warning Lights and Messages

- Engine Overheat Warning Light
- Low Coolant Warning Light
- Water Separator Warning Light
- Air Cleaner Light
- Low Fuel Warning Light
- Regeneration Warning Lights
- Exhaust System Warning Light
- Refill DEF Warning Light
- DIC Errors
- Maintenance Data
- Hour Meter

See *Vehicle Messages (Diesel Only)* ⇨ *91*.

Maintenance Data Functions

Display/Not Display the Maintenance Data Function

Maintenance Light: On the DIC, go to the Maintenance Indicator Light. Switch the display by pressing and holding the DIC selector for more than two seconds. Turn the DIC selector clockwise or counterclockwise to switch the display. Complete the resetting by pressing and holding the DIC selector for more than two seconds.

To cancel the setting procedure, press the DIC selector once. The display will go back to the previous screen.

Resetting/Setting the Change Interval (Odometer Reading)

Engine Oil and Filter Light : On the DIC, go to the engine oil and filter light. Enter the resetting screen by pressing and holding the DIC selector for more than two seconds. Complete the resetting by pressing and holding the DIC selector for more than two seconds.

Transmission and Differential Gear Oil Light, Fuel Filter Light, Power Steering Fluid Light, and Tire Rotation Light : On the DIC, go to the particular maintenance item to reset/adjust. Enter the setting change screen by pressing and holding the DIC selector. Set the change interval by turning the DIC selector. (Transmission and Differential Oil, Steering Fluid, and Tire Rotation Only). Turn clockwise to increase distance and counterclockwise to decrease distance. The distance increases and decreases by 4,000 km (2,500 mi) increments. Complete the resetting by pressing and holding the DIC selector.

Transmission and Differential Gear Oil and Power Steering Fluid: Initial value: 48,000 km (30,000 mi). Adjustable minimum value: 32,000 km (20,000 mi). Adjustable maximum value: 48,000 km (30,000 mi).

Tire Rotation: Initial value: OFF. Adjustable minimum value: 6,000 km (4,000 mi). Adjustable maximum value: 62,000 km (39,000 mi).

Starter Indicator Light : On the DIC, go to the starter indicator light. Enter the resetting screen by pressing and holding the DIC selector for more than ten seconds. Complete the resetting by pressing and holding the DIC selector for more than ten seconds.

If you want to cancel the setting procedure, press the DIC selector once. The display will go back to the previous screen.

Diesel Exhaust Fluid (DEF) Gauge

With the engine control switch in the ON position, this gauge indicates the approximate quantity of DEF remaining in the DEF tank. F means the tank is full and E means the tank is almost empty. When only one green bar is showing, the DEF tank is almost empty and should be refilled soon. If the vehicle is driven too long with only one bar, the green will change to amber and additional warnings and indicators will display.

Vehicle speed will be severely limited when the DEF tank is empty. Be sure to add DEF in advance of the empty status. See *Diesel Exhaust Fluid* ⇨ *182*.

Vehicle Messages

Vehicle Messages (Diesel Only)

The Driver Information Center (DIC) will display warnings, messages, and other operation-related information to alert of system failures or other necessary checks that should be performed. Use the DIC selector to choose the desired screen page or function.

Engine Overheat Warning Light

OVERHEAT

This message displays and a warning light appears when the engine has overheated and the engine coolant temperature gauge needle reaches the red zone. At the same time a buzzer sounds. Immediately pull off to a safe place to take the necessary actions and check the vehicle. Do not shut down an overheating engine immediately. Otherwise, the engine may seize up. Take appropriate actions for engine overheating. See *Engine Overheating* ⇨ *260*, *Engine Coolant* ⇨ *254*, and *Engine Coolant Temperature Gauge* ⇨ *77*.

⚠ Warning

When the engine coolant is still hot, do not remove the radiator cap. Hot vapor will come out and you may be scalded. Add engine coolant only when the engine coolant temperature has dropped.

If this light comes on and stays on while you are driving, your engine coolant might have overheated and your engine may be too hot. You should pull off the road, stop your vehicle and take appropriate actions for engine overheating.

Low Coolant Warning Light

LOW COOLANT

If this message and light come on, the system is low on engine coolant and the engine may overheat. A warning tone also sounds. If this light comes on while driving, stop the vehicle immediately and check the cooling system for leaks. See *Engine Coolant* ⇨ *254* and have the vehicle serviced by your dealer. This light will also activate the engine alarm and automatic shutdown system. See *Engine Alarm and Automatic Shutdown (Diesel Only)* ⇨ *166* and *Engine Shutdown Warning Light* ⇨ *85*.

Water Separator (Fuel Filter) Warning Light

WATER SEPARATOR

This message displays and a warning light appears when the level in the water separator on the fuel line is beyond the specified level. Drain water following the instructions in the Water in Fuel section and make sure the warning light goes out. See *Water in Fuel (Diesel)* ⇨ *229*.

If you continue driving with the message displayed, the fuel injection system may fail. See *Water in Fuel (Diesel)* ⇨ *229*.

Air Cleaner Light

CHECK AIR FILTER

This message displays and a warning light appears when the next air cleaner element service interval is near or has already been reached.

Replace the air cleaner element. See *Engine Air Cleaner/Filter* ⇨ *254*.

Low Fuel Warning Light

LOW FUEL

This message displays and a warning light appears when the fuel level in the tank becomes too low while the engine is running. Add fuel at the earliest possible time. If the vehicle runs out of fuel, air bleeding procedure must be performed. See *Fuel for Diesel Engines* ⇨ *225*, *Fuel Gauge* ⇨ *76*, and *Running Out of Fuel (Diesel)* ⇨ *231*.

Regeneration Required Warning Light

REGEN. REQUIRED

This light (amber) comes on when Running regeneration or Switch regeneration is required. When this light comes on, perform DPF regeneration soon. If the engine continues to run without performing DPF regeneration, this light will change color from amber to red. If this light turns red, perform DPF regeneration immediately. If you do not perform DPF regeneration, the check engine malfunction indicator light and reduced engine power indicator light will come on, imposing performance restriction on the vehicle. If this happens, the vehicle must be serviced at your dealer. See *Diesel Particulate Filter* ⇨ *173*.

If your vehicle is equipped with a power take-off (PTO), monitor the DIC for DPF related indicators. PTO and other slow speed applications may require more attention.

Selectable (Switch) Regeneration Required Warning Light

SEL REGEN. REQUIRED

Performing the “Selectable” regeneration: After the Checking PM Level Light is shown, this light comes on in amber when “Selectable” regeneration is possible. When the DPF switch is pressed with this light ON, "Selectable" regeneration starts.

When the selectable regeneration or switch regeneration is interrupted: This light (amber) comes on when the "Selectable" regeneration or "Switch" regeneration is interrupted. When this light comes on, perform DPF regeneration promptly by following the procedure for the "Switch" regeneration. If you continue to operate the vehicle without performing DPF regeneration, the color of this light changes to red from amber. When this light comes on in red, perform DPF regeneration immediately by following the procedure for the switch regeneration. If you do not perform DPF regeneration, the check engine malfunction indicator light and reduced engine power indicator light will come on, imposing performance restriction on the vehicle. If this situation happens, the vehicle must be serviced. See *Diesel Particulate Filter* ⇨ *173*.

If your vehicle is equipped with a power take-off (PTO), monitor the DIC for DPF related indicators. PTO and other slow speed applications may require more attention.

Regeneration in Progress Light

REGEN. IN PROGRESS

When this light is ON, DPF regeneration is in progress. When the vehicle is stationary, the exhaust sound changes as the engine speed increases. Also, operating sounds of the exhaust throttle may be heard. Keep people and flammable objects away from the exhaust pipe, because the exhaust temperature becomes high during regeneration. When regeneration is completed, the light goes out automatically. See *Diesel Particulate Filter* ⇨ *173*.

During extended engine idling, this light may appear on the DIC and the DPF may be automatically regenerated.

Checking PM Level Light

CHECKING PM LEVEL

In the case of performing the "Selectable" regeneration, this light comes on when the DPF switch is kept held down. While this light is ON, the system is checking whether or not the "Selectable" regeneration is possible. If the "Selectable" regeneration is possible, the light changes to the selectable (switch) regeneration required warning light. If the indication does not change to the selectable (switch) regeneration required warning light, the "Selectable" regeneration is not possible.

Exhaust System Warning Light

EXH. SYSTEM

This light comes on when the SCR system detects a malfunction or incorrect DEF. SCR system will turn on other indicator lights and reduce engine power in progressive stages to encourage you to have the malfunction corrected. Continuing to drive for too long after this light turns on will eventually result in a severe vehicle speed limitation.
If this light turns on, promptly have the vehicle inspected and serviced at your dealer. See *Diesel Exhaust Fluid* ⇨ *182*.

Refill Diesel Exhaust Fluid (DEF) Warning Light

REFILL DEF

This message displays and a warning light appears when the DEF tank is almost empty. Add DEF as soon as possible.

Engine power will be reduced and vehicle speed will be limited when this light is activated. Failure to promptly refill the DEF tank will result in a severe vehicle speed limitation. See *Diesel Exhaust Fluid* ⇨ *182*.

When DIC ERROR is Displayed

ERROR

If the system has not yet been able to access maintenance data, ERROR is shown on the DIC.

If ERROR does not change automatically to a distance or other maintenance indication, have your vehicle serviced at your dealer.

Maintenance Data Indicator Lights

Maintenance data indicator lights appear on the DIC when the each maintenance item is selected or when the next change or service interval of the item is near or has been reached.

The distance or time shown is the remaining or excess of them to / from the change or service timing. The positive distance or time shows the remaining of that and the negative distance or time shows the excess of that. For the items listed below, the displayed color will change from green to amber when remaining distance is below 1,000 km (1,000 mi) and the screen is selected.

These screens are also displayed when the engine control switch turns to the ON position after above notification timing. The message remains on the display until the DIC selector is pressed once or the vehicle is started.

The maintenance data function indicates the distance remaining before the next scheduled maintenance. Scheduled maintenance time is approaching when the display turns from green to amber. Have the vehicle checked and serviced at your dealer as soon as possible.

The vehicle needs to be maintained more often if it driven in severe conditions.

MAINTENANCE ON or MAINTENANCE OFF

This indicator displays and hides maintenance items. When MAINTENANCE ON is displayed, maintenance items will be displayed. When MAINTENANCE OFF is displayed, maintenance items will not be displayed.

When MAINTENANCE OFF is displayed, there will be no display of maintenance items such as rotation intervals or replacement intervals even when such intervals arrive.

ENG OIL & FILTER

When this message and light display green, it shows the distance remaining until the next engine oil and filter change. When this message displays amber, the next change of engine oil and filter is near or has been reached.

T/M & DIFF OIL

When this message and light display green, it shows the distance remaining until the next transmission oil and differential oil change. When this message displays amber, the next change of transmission oil and differential oil is near or has been reached.

FUEL FILTER

When this message and light display green, it shows the distance remaining until the next fuel filter change. When this message displays amber, the next change of fuel filter is near or has been reached.

STEERING OIL

When this message and light display green, it shows the distance remaining until the next power steering fluid change. When this message displays amber, the next change of power steering fluid is near or has been reached.

TIRE ROTATION

When this message and light show green with OFF, it means the vehicle has been shipped from the factory with no tire rotation interval set. When this message displays green it has the distance until the next tire rotation displayed. When this message displays amber the next tire rotation is near or has already been reached.

STARTER

When this message and light is green, it displays the number of engine starts remaining until a starter motor is replaced. When this message and light is amber, it displays when the time for a starter motor replacement is near or has already been reached.

For the starter indicator light, the displayed color will change from green to amber when remaining time is below 0 times and the screen is selected.

For resetting or setting maintenance data intervals, see *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

Hour Meter

Hour Meter

This message and light indicate how many hours the engine has been run. The figure(s) on the left side of the decimal point indicate hours while the figure on the right side indicates 1/10 of an hour.

Warning Buzzers

A warning buzzer may not sound if there is a problem with the buzzer system. If this occurs, the system needs to be inspected. See your dealer.

Gasoline Vehicles

A warning buzzer sounds under the following conditions:

- Brake booster — continuous beep. See *Brake System Warning Light* ⇨ *79*.

Diesel Vehicles

A warning buzzer sounds under the following conditions:

- Brake booster — continuous beep. See *Brake System Warning Light* ⇨ *79*
- Engine overheat — continuous beep
- Low engine coolant — beep
- Engine alarm and automatic shutdown — beep
- Diesel particulate filter (DPF) switch regeneration — Three short beeps or three long beeps
- Selective catalytic reduction (SCR) system — one short beep, three short beeps, nine quick beeps, continuous beep

See *Diesel Exhaust Fluid* ⇨ *182* and *Engine Alarm and Automatic Shutdown (Diesel Only)* ⇨ *166*.

Lighting

Exterior Lighting
Exterior Lamp Controls 97
Headlamp High/Low-Beam Changer 98
Flash-to-Pass 98
Hazard Warning Flashers 99
Turn and Lane-Change Signals 99
Cornering Lamps 100

Interior Lighting
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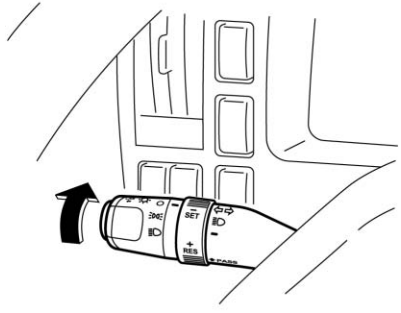
Exterior Lighting

Exterior Lamp Controls



Turning the light control switch to the following positions will cause the relevant lights to illuminate.

The light control switch can be used when the engine control switch is placed in the LOCK or ACC position. Do not operate the combination lights for an extended time period with the engine stopped. Otherwise, the battery may go dead, making it impossible to restart the engine.

◯ : Turns off all exterior lights.

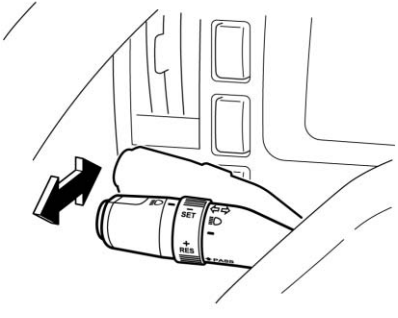
: Turns on the parking lights including all exterior lights, except the headlights.

: Turns on the headlights together with the parking lights, sidemarker lights, roofmarker lights, taillights, license plate light, and instrument panel lights.

When you start the engine in daytime, with the lighting switch off, and release the parking brake, the daytime running lights will come on.

See *Daytime Running Lamps (DRL) Indicator Light* ⇨ *86* and *Turn and Lane-Change Signals* ⇨ *99*.

Headlamp High/ Low-Beam Changer



With the headlights on, move the lever forward and backward to switch between the high beam and low beam.

Moving the lever forward selects high beam; moving the lever backward selects low beam.

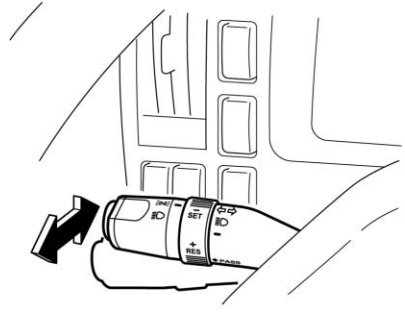
While the headlights are on high beam, the headlights high beam indicator light on the instrument panel remains on.

This indicator light comes on when high beam is selected or the headlights are cycled between high and low beams.

Use low beam whenever there are vehicles ahead in the same lane or oncoming vehicles in the opposite lane.

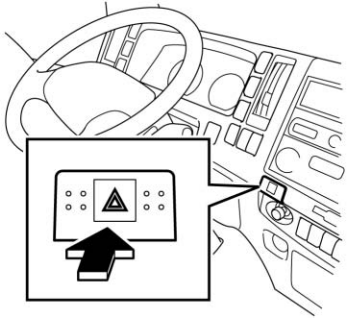
See *Bulb Replacement* ⇨ *276*.

Flash-to-Pass



By lightly pulling the light control switch lever and releasing it, the high beam comes on and off. At the same time, the headlights high beam indicator light on the instrument panel comes on and off. Use this function as a signal for flash-to-pass a vehicle or other purposes.

Hazard Warning Flashers



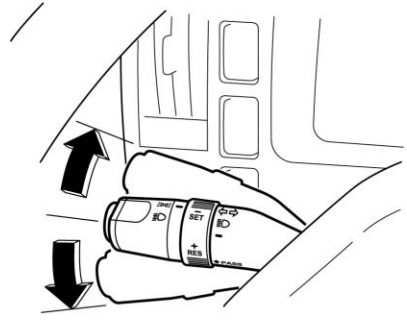
Use the hazard warning light flasher to warn other drivers any time your vehicle becomes a traffic hazard, day or night. With the engine control switch in any position or the key removed, when this switch is pressed, all of the turn signal lights and the turn signal indicator lights flash to signal an emergency. To turn off the hazard lights, press the switch again.

Do not leave the hazard warning light flasher operating for an extended time period with the engine stopped. Otherwise, the battery may go dead, making it impossible to restart the engine.

Both indicator lights flash when the hazard warning flasher switch is operated irrespective of the position of the engine control switch.

The individual turn signals do not work when the hazard flasher is turned on.

Turn and Lane-Change Signals



When turning left or right, move the lever up or down to flash the turn signal light.

When the turn is completed, the signal will cancel and the lever will return to horizontal.

If the steering wheel is only turned a small amount, turn off the signal manually. Lightly press and hold the lever up or down when overtaking or changing lanes. The turn signal light continues flashing as long as the

lever is held up or down. The lever moves back to neutral as soon as it is released.

A green light on the instrument panel is designed to flash to tell you that the front and rear turn signal lights are working. If the light stays on, but does not flash, check for a burned-out turn signal bulb. If the green light does not come on when you move the lever, check the fuse and indicator bulb.

Either of these indicator lights flashes when the turn signal switch is operated with the engine control switch in the ON position.

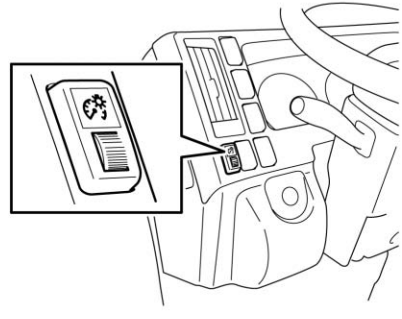
Cornering Lamps

The cornering light illuminates the area to which the vehicle is turning. With the headlights or marker lights on, the cornering lights come on in coordination with the turn signal lights.

See *Exterior Lamp Controls* ⇨ *97* and *Bulb Replacement* ⇨ *276*.

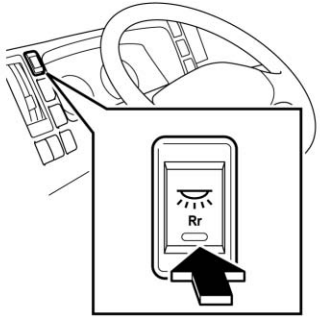
Interior Lighting

Instrument Panel Illumination Control



The control will change the light level of the instrument panel.

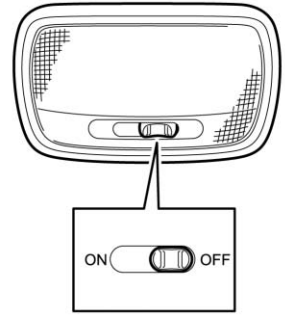
Cargo Lamp



When this switch is pressed, the rear body interior light comes on and the indicator light on the switch comes on.

Dome Lamps

Front Light



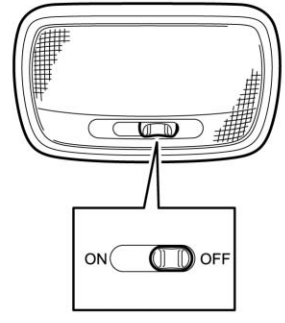
The dome light operates regardless of the engine control switch position. The switch has three positions.

ON : The light stays on regardless of the doors being open or closed.

OFF : The light stays off regardless of the doors being open or closed.

Between ON and OFF, the light comes on when the driver's door is opened.

Rear Light (Crew Cab Model Only)



The dome light operates regardless of the engine control switch position. The switch has three positions.

ON : The light stays on regardless of the doors being open or closed.

OFF : The light stays off regardless of the doors being open or closed.

Between ON and OFF, the light comes on when the driver's door is opened.

Infotainment System

Radio
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USB Port 115
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Trademarks and License Agreements
Trademarks and License Agreements 119

Radio

AM-FM Radio

Control Panel

⚠ Warning

Adjust the radio or CD player only while the vehicle is stationary. Adjusting them while the vehicle is moving could cause an accident. You and others could be seriously injured.

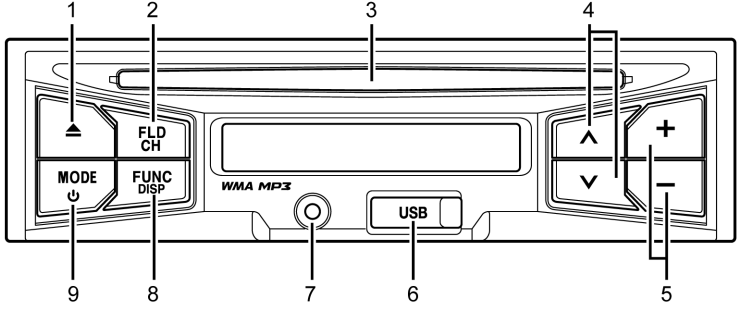
Adjust the volume so that sound outside of the vehicle can be heard. If outside sound cannot be heard, accidents may be harder to avoid.

Do not install a radio equipment antenna near the vehicle's radio antenna. This could cause unwanted noise on the radio or while playing a CD.

The radio or CD/USB player can be used when the engine control switch is in the "ACC" or "ON" position. Continued use while engine is stopped may cause the battery to discharge.

Take care not to spill liquids, etc. on the radio or CD player. It may cause damage to the player.

Do not disassemble or apply oil to radio or CD player.



(1) Eject button
(2) FLD/CH button
(3) CD slot
(4) TUNE/TRACK button
(5) Volume control button
(6) USB terminal
(7) Mini jack
(8) FUNC/DISP button
(9) MODE/Power button

Turning the Power On

Press the "MODE/Power" button to turn the power on. Press and hold it for 1 second or more to turn the power off.

Volume Adjustment

Press the "Volume control" button to adjust the volume.

+ : Volume will increase 1 step every time the button is pressed. Volume will continuously increase when the button is pressed continuously.

— : Volume will decrease 1 step every time the button is pressed. Volume will continuously decrease when the button is pressed continuously.

It can be adjusted between 63 (maximum) and 0.

Default setting is 19.

Turning the power on or off with the volume set to maximum will damage the equipment and your hearing. Set the volume to a moderate level.

Function Setting Mode

Adjustment of bass, treble, fader, and balance, and setting of clock display and time can be performed.

Adjustment of Bass Level

1. Press the "FUNC" button to display "BAS."
2. Press the "TUNE/TRACK" button ("∧ ∨ ") while "BAS" is displayed to adjust the bass level.

   ∧: Level will increase every time the button is pressed.

   ∨: Level will decrease every time the button is pressed.

   It can be adjusted in the range of -5 . -4 . -3 . -2 . -1 . 0 . 1 . 2 . 3 . 4 . 5.

   Default setting is 0.

Adjusting Treble

1. Press the "FUNC" button to display "TRE."
2. Press the "TUNE/TRACK" button ("∧ ∨ ") while "TRE" is displayed to adjust the treble level.

   ∧: Level will increase every time the button is pressed.

   ∨: Level will decrease every time the button is pressed.

   It can be adjusted in the range of -5 . -4 . -3 . -2 . -1 . 0 . 1 . 2 . 3 . 4 . 5.

   Default setting is 0.

Adjusting Fader

1. Press the "FUNC" button to display "FAD."
2. Press the "TUNE/TRACK" button ("∧ ∨ ") while "FAD" is displayed to adjust the front and rear speaker volume.

   ∧: Front speaker volume will increase every time the button is pressed.

   ∨: Rear speaker volume will increase every time the button is pressed.

   It can be adjusted in the range of R7 . R6 . R5 . R4 . R3 . R2 . R1 . 0 . F1 . F2 . F3 . F4 . F5 . F6 . F7.

   Default setting is 0.

Adjustment of rear speaker volume is not possible if there are no rear speakers installed.

Adjusting Balance

1. Press the "FUNC" button to display "BAL."
2. Press the "TUNE/TRACK" button ("∧ ∨ ") while "BAL" is displayed to adjust the balance of volume from the left and right speakers.

   ∧: Right speaker volume will increase every time the button is pressed.

   ∨: Left speaker volume will increase every time the button is pressed.

   It can be adjusted in the range of L7 . L6 . L5 . L4 . L3 . L2 . L1 . 0 . R1 . R2 . R3 . R4 . R5 . R6 . R7.

   Default setting is 0.

Switching the Time Display

1. Press the "FUNC" button for less than 1 second to display "CLK."
2. Press the "TUNE/TRACK" button ("∧ ∨ ") while “CLK” is displayed and select “ON"/"OFF."

   "ON": Clock is displayed.

   "OFF": Clock is not displayed.

When the clock display is "ON," it is displayed prioritized over the audio display (radio frequency, song number, or elapsed time).

When the power source is interrupted by battery disconnection, the time of the clock will be reset.

Setting the Hour

1. Press the "FUNC" button to display "CLK" and make the clock display (hours) blink.
2. Press the "TUNE/TRACK" button ("∧ ∨ ") while the clock display (hours) is blinking to adjust the time (hours).

   ∧: Time (hours) will increase every time the button is pressed.

   ∨: Time (hours) will decrease every time the button is pressed.

Setting the Minutes

1. Press the "FUNC" button to display "CLK" and make the clock display (minutes) blink.
2. Press the "TUNE/TRACK" button ("∧ ∨ ") while the clock display (minutes) is blinking to adjust the time (minutes).

   ∧: Time (minutes) will increase every time the button is pressed.

   ∨: Time (minutes) will decrease every time the button is pressed.

Tuner Mode Operations

Tuning

1. Press the "MODE" button when the power is on to select either AM radio or FM radio.

   It is switched to AM radio when "AM" is displayed, and FM radio when "FM" is displayed.

2. Press the "TUNE" button ("∧ ∨ ") for less than 2 seconds to select a radio station manually. The display should be checked in order to adjust the frequency because AM radio frequency will range from 10 kHz or FM radio frequency will range from 0.2 MHz.

   Press the "TUNE" button ("∧ ∨ ") for 2 seconds or longer to select a radio station automatically. The automatic tuning will stop after detecting a receivable station. Press the "TUNE" button ("∧ ∨ ") again to cancel this function.

When the displayed frequency reaches the highest frequency, it will return to the lowest frequency. When the lowest frequency has been reached, it will return to the highest frequency.

Program your preferred radio stations to the preset channels in advance to conveniently use while driving.

Reception frequency :

AM 530 - 1710 kHz (10 kHz step)

FM 87.7 - 107.9 MHz (0.2 MHz step)

Calling Out Preset Channels

A maximum of 6 stations can be programmed and called out in the "Preset" channels for each of the FM radio and AM radio.

1. Press the "CH" button for less than 2 seconds.

2. Press the "TUNE" button ("∧ ∨ ") and select the station programmed in the preset channels.

   As an example, "CH1" is displayed.

The radio stations in memory are erased when the power supply is interrupted to replace the battery or fuses.

Programming Preset Channels

1. Display the channel number you wish to program.
2. Press the "CH" button for 2 seconds or longer.

   The frequency display will blink.
3. Press the "TUNE" button ("∧ ∨ ") to select the frequency you wish to program.
4. Press the "CH" button for 2 seconds or longer.

   Once it has been set as a preset channel, the frequency display will stop blinking.

Radio Reception

Usually, a problem with radio reception does not mean there is a problem with your radio - it is just the normal result of conditions outside the vehicle. For example, nearby buildings and terrain can interfere with FM reception. Power lines or telephone wires can interfere with AM signals.

And of course, radio signals have a limited range. The farther you are from a station, the weaker its signal will be. In addition, reception conditions change constantly as your vehicle moves.

Here are some common reception problems that probably do not indicate a problem with your radio.

FM Transmissions

Fading and drifting stations - Generally, the effective range of FM is about 40 km (25 miles). Once outside this range, you may notice fading and drifting, which increase with the distance from the radio transmitter. They are often accompanied by distortion.

Multi-path - FM signals are reflective, making it possible for two signals to reach your antenna at the same time. If this happens, the signals will cancel each other out, causing a momentary flutter or loss of reception.

Static and fluttering - These occur when signals are blocked by buildings, trees, or other large objects. Increasing the bass level may reduce static and fluttering.

Station swapping - If the FM signal you are listening to is interrupted or weakened, and there is another strong station nearby on the FM band, your radio may tune in the second station until the original signal can be picked up again.

AM Transmissions

Fading - AM broadcasts are reflected by the upper atmosphere - especially at night. These reflected signals can interfere with those received directly from the radio station, causing the radio station to sound alternately strong and weak.

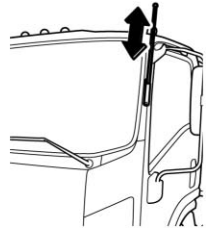
Station interference - When a reflected signal and a signal received directly from a radio station are very nearly the same frequency, they can interfere with each other, making it difficult to hear the broadcast.

Static - AM is easily affected by external sources of electrical noise, such as high tension power lines, lightning, or electrical motors. This results in static.

Certification

For Federal Communications Commission (FCC) compliance information for this device, see *Radio Frequency Statement* ⇨ *381*.

Fixed Mast Antenna



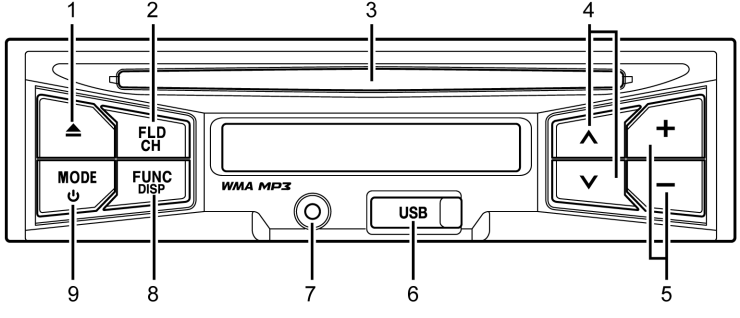
Pull the antenna out to its full length when using it.

To prevent breaking the antenna, shorten it when passing through areas with low clearance or through a car wash.

Audio Players

CD Player

CD Operations



(1) Eject button
(2) FLD/CH button
(3) CD slot
(4) TUNE/TRACK button
(5) Volume control button
(6) USB terminal
(7) Mini jack
(8) FUNC/DISP button
(9) MODE/Power button

Playing CDs (When There is No CD Inserted)

Insert a CD into the CD slot with the label side (printed side) facing up. The power will switch on and playback will start automatically.

At the start of the playback of a CD, track (music file) number will be indicated on the display.

Playing CDs (When There is a CD Inserted)

Press the "MODE" button when the power is on. "DISC" will appear and playback will resume from where it was stopped.

Switching the Displayed Items on the Display

Every time the "DISP" button is pressed for 1 second or more, the track (file) number and elapsed time is switched.

Check that there is no CD in the player before inserting a CD. Forcibly inserting a CD could damage the CD or cause the player to malfunction.

Fast Forwarding/Fast Reversing

Press and hold the "TRACK" button ("∧ ∨ ") during playback to advance the music forward or backward quickly. Fast forward or fast reverse is stopped and the music is played back when the "TRACK" button ("∧ ∨ ") is released.

∧: Fast forward.

⋁: Fast reverse.

Replaying the Same Track

Press the "TRACK" button ("⋁ ") for less than 1 second to start playback of the current track from the beginning.

Track Selection

Press the "TRACK" button ("⋀ ⋁ ") for less than 1 second to select the desired track number.

⋀: Advance to the next track.

⋁ (press twice or more): Return to a previous track.

Selecting a Song Inside a Folder

For CD (MP3/WMA):

1. Press the "FLD" button for less than 1 second. Folder number is displayed. As an example, "F100" for folder number 100.
2. Press the "TRACK" button ("⋀ ⋁ ") to select the folder number.

   ⋀: Increase folder number.

   ⋁: Decrease folder number.

Repeat Playback

For CD:

1. Press the "FUNC" button for less than 1 second to display "RPT."
2. Every time the "TRACK" button ("⋀ ⋁ ") is pressed, it will switch between "OFF" and "ON."

   "OFF": Repeat playback is off.

   "ON": Music being played back will be repeatedly played back.

For CD (MP3/WMA):

1. Press the "FUNC" button for less than 1 second to display "RPT."
2. Playback method can be selected between "RPT OFF," "RPT ON," and "FLD RPT ON" every time the "TRACK" button ("⋀ ⋁ ") is pressed.

   "RPT OFF": Repeat playback is off.

   "RPT ON": File being played back will be repeatedly played back.

   "FLD RPT ON": Files in the folder being played back will be repeatedly played back.

Random Playback

For CD:

1. Press the "FUNC" button for less than 1 second to display "RDM."
2. Press the "TRACK" button ("⋀ ⋁ ") to switch between "OFF" and "ON."

   "OFF": Random playback is off.

   "ON": Music will be played back in random order.

For CD (MP3/WMA):

1. Press the "FUNC" button for less than 1 second to display "RDM."

2. Playback method can be selected between "RDM OFF," "RDM ON," and "FLD RDM ON" every time the "TRACK" button ("∧ ∨ ") is pressed.

   "RDM OFF": Random playback is off.

   "RDM ON": Files in the disc are randomly played back.

   "FLD RDM ON": The files stored inside the folder are randomly played back.

Root Directory

For CD (MP3/WMA):

When the "FLD" button is pressed for 1 second or more, the first folder in the disc is selected to start playback.

Ejecting the CD

Press the “Eject” button ("⏏ ") to stop playback and eject the CD.

Stopping CD Playback

To stop the playback of a CD:

- Eject the CD.
- Switch to another audio mode.
- Turn off the power.

If an Error Appears in the Display

If a problem occurs with the CD during playback, an error appears in the display.

Message/Description	
E1	This message appears when the disc is stained or damaged. Check if the inserted disc is stained or upside-down. When the disc is dirty, clean the disc. The upside-down disc must be taken out and inserted correctly. Do not use a scratched or bent disc.
E2	This message appears when the player cannot be operated because of some problems. The disc must be ejected from the player.
E6	This message appears when there is no playable music data recorded on the CD-R/RW disc or it is recorded in a format that is not playable. Insert a CD-R/RW disc that contains playable music data.

Using the Audio System

⚠ Warning

Adjust the radio or CD player only while the vehicle is stationary. Adjusting them while the vehicle is moving could cause an accident. You and others could be seriously injured.

Adjust the volume so that sound outside of the vehicle can be heard. If outside sound cannot be heard, accidents may be harder to avoid.

Do not install a radio equipment antenna near the vehicle's radio antenna. This could cause unwanted noise on the radio or while playing a CD.

The radio or CD/USB player can be used when the engine control switch is in the "ACC" or "ON" position. Continued use while the engine is stopped may cause the battery to discharge.

Take care not to spill liquids, etc. on the radio or CD player. It may cause damage to the player.

Do not disassemble or apply oil to the radio or CD player.

Disc

When it is cold or when it is raining, the car windows will fog up and cause dew (water drops) to form in the vehicle compartment (condensation). When this happens, the audio may skip, and playback will stop. Ventilate the vehicle compartment and dehumidify before resuming use.

The audio may skip due to violent vibrations when the car is traveling across harsh roads.

Never insert foreign objects into the disc insertion slot.

Do not insert a wet disc into the player.

This player uses an invisible laser beam which could cause hazardous radiation exposure if directed outside the player. Be sure to operate the player correctly.

Playback may not be possible due to recording conditions or disc characteristics, scratches, dirt, or deterioration.

Usable Discs

Most music CDs can be used. CD-R and CD-RW discs recorded according to the CD-DA format can also be played.

CD-R (CD-Recordable), CD-RW (CD-ReWritable) may not be able to play back due to the recording condition, characteristics of the disc, damage, dirt or deterioration due to long exposure to the environment of the vehicle compartment. CD-R, CD-RW that are not finalized and CD-R and CD-RW that are saved in the UDF format cannot be played (excluding MP3/WMA).

CD-TEXT function is only compatible with commercial CD compatible with CD-TEXT. Characters may not display accurately in CD-R and CD-RW.

CD, C-thru Disc with transparent or translucent recorded parts may not be inserted and ejected accurately. Please do not use them.

SACD (Super Audio CD) can only be played in the CD level of a hybrid disc.

CCCD (Copy Control CD) may not play as it does not meet the standard CD requirements.

CD-EXTRA can be played as a music CD. The sound of a data track of a Mixed Mode CD cannot be played. Only music tracks can be played. A Mixed Mode CD mixed with DTS can also not be played accurately. This device accepts 8 cm (3 in) CD. Plug in the device directly without using an adapter, etc. to avoid damage.

When Removing a Disc

Do not leave discs inside the player or partially inserted for a long time. This may scratch the discs and make them unusable. Remove the disc horizontally from the main device. Do not pull it violently towards the top. Also do not pull it down hard while removing. The disc may become damaged and the audio may skip.

Do not insert objects other than discs into the disc slot or insert more than one disc at a time.

Handling a Disc

Avoid exposing the disc to direct sunlight and always keep it in a case. Otherwise, the disc will bend and become unusable.

Do not stick any paper tape to the recording side or the label side as it may lead the disc to malfunction.

Do not use a disc with cracks or if it is severely bent as it may lead to damage.

Hold the disc without touching the recording side as this may make the disc dirty and lead to the audio skipping.

Using benzene, record disc cleaner, or anti-static fluids may damage the disc. Using a dirty disc will damage the disc and lead to audio skipping. When the disc is dirty, use a commercial disc cleaner to gently clean it from the inside to the outside. Do not use lens cleaner.

Do not use the types of disc described below because such discs may cause a breakdown.

- Adapters or discs with special properties, such as Dual Discs and printable discs.
- Discs with transparent or semitransparent sections on the recording side.
- Discs with copy protection.

New Disc

Some new discs may have burrs found in the center hole or at the edges. Remove these burrs with a ballpoint pen, etc. before using the disc.

If they are not removed, the disc may not be read accurately and cause improper operation.

Rental Discs

Do not use any disc that has cellophane tape or any rental disc that has glue from the label exposed or some of the removed label still attached to it. Using the disc like this may cause the disc to not eject properly and damage the disc.

Discs with Special Shapes

Heart-shaped or octagon-shaped discs cannot be played. Do not use them as they may cause damage.

Disc Accessories

Do not use commercially available accessories (such as stabilizers, protective seals, etc.) that are said to improve sound quality or protect the discs, and CD labels, etc. They may change the thickness of the disc and external specifications and lead to damage.

Do not use commercially available accessories (such as CD rings, protectors) that are said to improve sound quality or are effective against vibrations. They may come off inside the device, causing the disc to become unplayable or unretrievable and lead to malfunction.

Supported MP3/WMA File Standards

MP3 (MPEG Audio LAYER 3) is a standard format for sound compression technology.

MP3 can compress a file to one-tenth of its original size.

WMA (Windows Media™ Audio) is a Microsoft sound compression format. It can compress sounds to a smaller size than the MP3.

MP3/WMA files recorded in the CD-ROM, CD-R, and CD-RW can be played.

Discs formatted in the ISO9660 level 1 and 2, Romeo and Joliet file system can be used.

Files with extensions compatible to MP3 and WMA can be played (.mp3, .wma).

CD-R and CD-RW compatible to multisessions and also have MP3/WMA files can be played.

Compatible with ID3 tag ver.1.0, ver.1.1, ver.2.2 and ver.2.3.

Compatible to WMA tag.

The sampling frequency and bit rate corresponds as follows.

MP3 file:

- MPEG1 LAYER3 - 32/44.1/48(kHz).
- MPEG2 LAYER3 - 16/22.05/24(kHz).
- MPEG2.5 LAYER3 - 8/11.025/12(kHz).
- MPEG1 LAYER3 - 32/40/48/56/64/80/96/112/128/160/192/224/256/320 kbps.
- MPEG2/2.5 LAYER3 - 16/24/32/40/48/56/64/80/96/112/128/160 kbps.

WMA file:

- 32/44.1/48 (kHz).
- Ver.7,8,9 - 48/64/80/96/128/160/192 kbps.

WMA files are only compatible with 2ch playback.

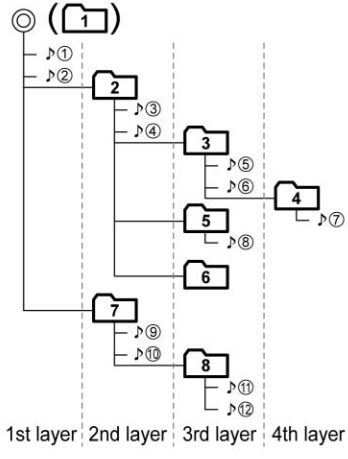
MP3 files are compatible to the respective modes of stereo, joint stereo, dual channel, monaural.

MP3 files are compatible to VBR (variable bit rate).

Not compatible to M3u playlists.

When the FAST UP/DOWN functions on the MP3 file recorded on the VBR are operated, the playback time may not synchronize.

MP3/WMA files are compatible with up to 8 levels of folders. However, when there are many levels, it may take some time before the first file is played. Therefore, a two-level folder is recommended.



◎ ROOT

Folder

♪ MP3/WMA file

Supplement

6 Since there is no tune contained in the folder 6, the folder is not displayed. It is assigned with a folder number.

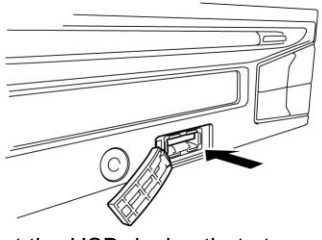
Play back in the following order.

①→②→③→④→⑤→⑥→⑦→⑧→⑨→⑩→⑪→⑫

USB Port

USB Memory Operations

Playing Music Downloaded in USB Flash Memory



Insert the USB device that stores music data into the USB terminal. After the music data is recognized, the playback will start.

Connect the USB device in a way that will not impede your driving. The improper way of connecting the device may disturb your driving and cause a traffic accident.

Do not connect, disconnect, or operate the USB device while driving. Stop the vehicle in a safe location and perform these operations.

When removing the USB flash memory, turn off ("LOCK") the engine control switch or select the other mode (e.g. FM or AM mode).

Selecting the USB Mode

Pressing the "MODE" button and displaying "USB" when the USB device is connected allows you to switch from another audio mode to the USB mode.

When playback of the music file is started, the file number in the folder being played back is shown on the display.

When switching to another mode from the USB mode, then returning to the USB mode, it allows you to return to the music file that was played last.

Fast Forwarding/Fast Reversing

Press and hold the "TRACK" button ("∧ ∨ ") during playback to advance the file forward or backward quickly. Fast forward or fast reverse is stopped and the file is played back when the "TRACK" button ("∧ ∨ ") is released.

∧: Fast forward.

∨: Fast reverse.

Replaying the Same File

Press the "TRACK" button ("∨ ") for less than 1 second to start playback of the current file from the beginning.

File Selection

Press the "TRACK" button ("∧ ∨ ") for less than 1 second to select the desired file number.

∧: Advance to the next file.

∨ (press twice or more): Return to a previous file.

Selecting a Track Inside a Folder

1. Press the "FLD" button for less than 1 second. Folder number is displayed. As an example, "F100" for folder number 100.
2. Press the "TRACK" button ("∧ ∨ ") to select the folder number.

   ∧: Increase folder number.

⋁: Decrease folder number.

Repeat Playback

1. Press the "FUNC" button for less than 1 second to display "RPT."
2. Playback method can be selected between "RPT OFF," "RPT ON," and "FLD RPT ON" every time the "TRACK" button ("⋀ ⋁ ") is pressed.

   "RPT OFF": Repeat playback is off.

   "RPT ON": File being played back will be repeatedly played back.

   "FLD RPT ON": Files in the folder being played back will be repeatedly played back.

Random Playback

1. Press the "FUNC" button for less than 1 second to display "RDM."
2. Playback method can be selected between "RDM OFF," "RDM ON," and "FLD RDM ON" every time the "TRACK" button ("⋀ ⋁ ") is pressed.

   "RDM OFF": Random playback is off.

   "RDM ON": Files in the USB device are randomly played back.

   "FLD RDM ON": The files stored inside the folder being played back are randomly played back.

Root Directory

When the "FLD" button is pressed for 1 second or more, the first folder in the USB device is selected to start playback.

Switching the Displayed Items on the Display

Every time the "DISP" button is pressed for 1 second or more, the file number and elapsed time is switched.

If an Error Appears in the Display

If a problem occurs with the USB device during playback, an error appears in the display.

	Message/Description
E1	An unsupported USB device is connected. Connect a supported USB device.
E2	This message appears when operation of some problem is not possible due to the player. Remove the connected USB device.
E3	This message appears when the temperature inside the player is too high or another extreme condition is detected. Wait a while before trying to operate the player again.
E4	This message appears when failed playback or difficulty in transmission is detected. Reconnect the USB device.

	Message/Description
E5	This message appears when there is no file recorded or no playable music file on the USB device. Connect a USB device that contains playable music data.
E7	This message appears when there is a music file that is not in a playable format recorded on the USB device. Connect a USB device that contains playable music data.

USB Devices

USB Memory Standards

Supported file formats:

FAT 12/16/32

- Supported audio formats: MP3/WMA.
- Maximum current: 1 A.
- Compatibility: USB 1.1/2.0 (maximum transfer speed is same as USB 1.1).
- Mass memory support: Supports USB mass storage class.
- Does not support USB hubs or multi card readers.

Supported MP3/WMA File Standards

Discs formatted in the FAT 12/16/32 file system can be used.

Files with extensions compatible to MP3 and WMA can be played (.mp3, .wma).

Compatible with ID3 tag ver.1.0, ver.1.1, ver.2.2 and ver.2.3.

Compatible to WMA tag.

The sampling frequency corresponds as follows.

MP3 file:

- MPEG1 LAYER3 - 32/44.1/48(kHz).
- MPEG2 LAYER3 - 16/22.05/24(kHz).
- MPEG2.5 LAYER3 - 8/11.025/12(kHz).
- MPEG1 LAYER3 - 32/40/48/56/64/80/96/112/128/160/192/224/256/320(kbps).
- MPEG2/2.5 LAYER3 - 16/24/32/40/48/56/64/80/96/112/128/160(kbps).

WMA file:

- 32/ 44.1/48 (kHz).
- Ver.7,8,9 - 48/64/80/96/128/160/192 kbps.

WMA files are only compatible with 2ch playback.

MP3 files are compatible to the respective modes of stereo, joint stereo, dual channel, monaural.

MP3 files are compatible to VBR (variable bit rate).

Not compatible to M3u playlists.

When the FAST UP/DOWN functions on the MP3 file recorded on the VBR are operated, the playback time may not synchronize.

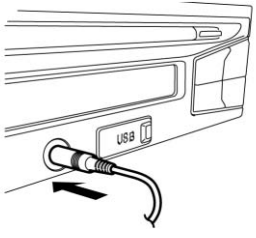
MP3/WMA files are compatible with up to 8 levels of folders. However, when there are many levels, it may take some time before the first file is played. Therefore, a two-level folder is recommended.

Maximum characters for a folder/file name: 64 (including extension).

A maximum of 700 folders and 3,000 files can be played in a single memory device.

Auxiliary Devices

AUX Operations



Connecting Your Portable Audio Device to Play Music

1. Open the cover and connect your portable audio device to mini jack.

   Either place the portable audio device and mini plug cable somewhere where they will not interfere with driving or temporarily secure them at a location where they are not in the way. They could impede driving and cause a traffic accident.

   Take care that the terminals of the mini plug cable do not catch your hands. Do not connect, adjust or remove the portable audio device while driving.

2. To power the portable audio device, use the battery or other power source supplied with the device.

   AUX device cannot be controlled from audio player.

   AUX volume is reduced to prevent speaker damage.

Switching from Other Audio Mode to the AUX Mode

When a portable audio device is connected to play back music, press the "MODE" button and display "AUX" to listen to the audio played back from the device.

Adjusting AUX Volume

Press the "Volume control" button to adjust the volume.

+ : Volume will increase 1 step every time the button is pressed. Volume will continuously increase when the button is pressed continuously.

—: Volume will decrease 1 step every time the button is pressed. Volume will continuously decrease when the button is pressed continuously.

It can be adjusted between 63 (maximum) and 0.

Default setting is 19.

Trademarks and License Agreements

WMA

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Climate Controls

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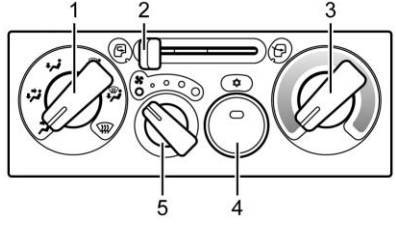
Climate Control Systems

The heating, cooling, and ventilation for the vehicle can be controlled with this system.



Climate Control System w/Air Conditioning shown, Heater Only similar

1. Outlet Selector Knob
2. Air Selector Lever
3. Temperature Control Knob
4. Air Conditioning (A/C) Switch, if equipped
5. Fan Speed Control Knob

Outlet Selector Knob : The Air Selector Knob regulates air flow from the upper, floor and defroster outlets.

(Face) : Air flows through the upper outlets.

(Bi-Level) : Air flows through the upper and floor outlets.

(Feet) : Air is flows through the floor outlets.

(Feet and Defroster) : Air flows through the floor outlets, with some air coming from the door window and windshield outlets.

(Defrost) : Air flows through the door window and windshield outlets.

Air Selector Lever : The intake of outside air and the circulation of inside air is controlled by sliding this lever right or left.

(Outside Air Ventilation) : Use this position to ventilate the interior of the cab. This position should be normally selected.

(Inside Air Recirculation) : Use this position to prevent dusty or otherwise contaminated outside air from entering the cab, such as in a tunnel or in congested traffic.

Extended use of the inside air recirculation position causes the windshield and windows to fog up easily, making visibility poor. For good ventilation, switch to outside air as soon as possible.

Temperature Control Knob : Use this knob to select the preferred cab interior temperature. Turn the knob counterclockwise to lower the outlet air temperature and clockwise to raise it.

Fan Speed Control Knob : The fan speed can be adjusted to any of the four speeds available.

Air Conditioning (A/C) Switch : Press this switch to use the air conditioning system. The indicator light inside the switch will come on to show that the air conditioning system is in operation. The air conditioning system can also be used for dehumidifying while the heater is being used. To turn off the air conditioning, push this switch in again.

When the defrost mode is selected, the air conditioner compressor will be on.

Even if the A/C switch is turned on, the air conditioning system will not operate when the fan speed control knob is placed in the stop position. Make sure that the fan speed control knob is in a position other than the stop position.

Even in seasons when the air conditioning system is not used, occasionally operate the system for a few minutes with the engine running at a low speed in order to keep the system's components lubricated.

Ventilation

Outside Air Ventilation : Press the A/C switch to the off position. Turn the outlet selector knob to the preferred position. Move the air selector lever to the position.

Set the temperature control knob to the desired position. Adjust the fan speed control knob to the preferred speed.

How to Use the Heater

Normal Heating : Set the outlet selector knob to the or position. Use the position for warming your feet while defogging the windshield.

Set the air selector lever to the position. Adjust the temperature control knob and the fan speed control knob to the desired positions.

To dehumidify the cab interior while heating, press the A/C switch to the on position.

As the heater uses the heat from the engine coolant, its heating effect is weak when the engine coolant temperature is low.

Maximum Heating : Turn the outlet selector knob to the position, set the air selector lever to the

position, and turn the temperature control knob fully towards the high temperature direction.

Set the fan speed control knob to the maximum speed position.

Bi-Level Heating : Set the outlet selector knob to the position. Set the air selector lever to the position. Set the temperature control knob to the middle position.

Adjust the fan speed control knob as desired. The air from the floor outlets is warmer than the air from the upper outlets in this position.

However, when the temperature control knob is moved to either the full hot or the full cold position, the air from the floor outlets and the air from the upper outlets will be the same temperature. This position can give cool upper level air and warm floor level air when the temperature control is adjusted in between cold and hot. This is useful in cool weather with bright sunlight conditions.

Defogging and Defrosting the Windshield

Defogging : Set the outlet selector knob to the position. Set the air selector lever to the position.

Turn the temperature control knob to a high-temperature position according to your preference. For defogging in the summer months, set the temperature control knob to any desired position.

Set the fan speed control knob to any speed position, except the off position. The A/C compressor automatically operates when the position is selected. Defogging is performed very effectively with the dehumidifying effect.

Defrosting : Set the outlet selector knob to the position. Set the air selector lever to the position.

Turn the temperature control knob fully towards the high-temperature direction. Set the fan speed control knob to the maximum speed position.

After defrosting, be certain to return the air selector lever to the position. Failure to do so will cause the windshield to fog up, impeding forward visibility.

Cooling

Normal/Moderate Cooling : This setting is suitable for extended periods of cooling or moderate cooling. Press the A/C switch to the on position.

Set the outlet selector knob to the position for normal cooling or set it to the position for moderate cooling. Adjust the temperature control knob to the desired position. Adjust the fan speed control knob as desired

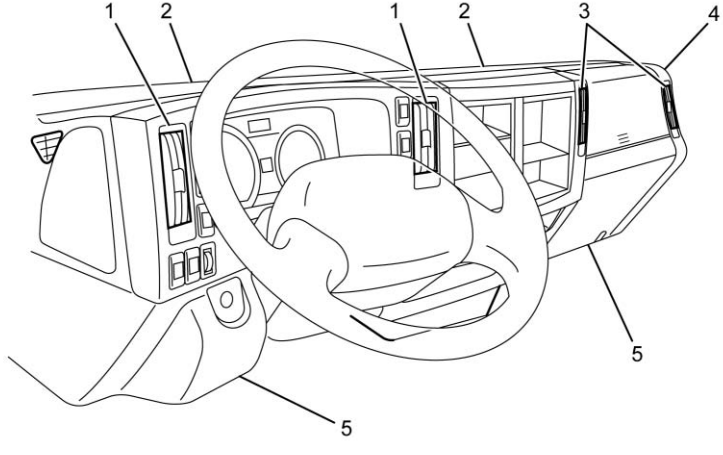
Maximum Cooling : Set the outlet selector knob to the position. Press the A/C switch to the on position. Move the air selector lever to the position

Turn the temperature control knob fully towards the low-temperature direction. Set the fan speed control knob to the maximum speed position.

After prolonged parking in direct sunlight, open the windows or doors to ventilate the interior of the cab and release the heat.

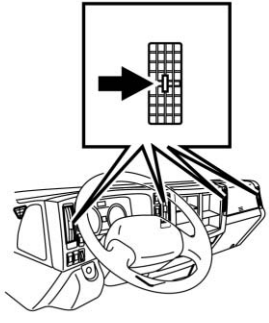
During cooling operation, mist may come out of the air outlets. This results from quick cooling of humid air, and does not indicate any problem.

Air Vents



1. Driver Side Outlets. Airflow direction is adjustable.
2. Windshield Outlets. Air is delivered towards the windshield.
3. Passenger Side Outlets. Airflow direction is adjustable.
4. Door Windows Outlet. Air is delivered towards the door windows
5. Foot Outlets. Air is delivered towards the feet.

Air Flow Direction Control Lever

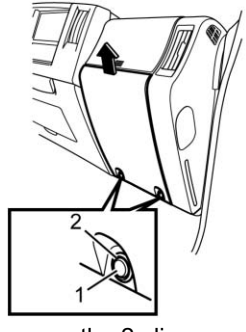


Use the tab to adjust the airflow direction from the outlet. To close the outlet, move the tab fully down.

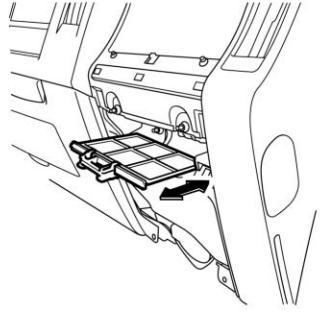
Maintenance

Passenger Compartment Air Filter

Removing the Inside Air Filter



1. Remove the 2 clips securing the cover. Remove the clips in the order of the inner clip (1) followed by the outer clip (2).
2. Remove the cover by pushing it upwards.



3. Remove and clean the filter. Use a vacuum cleaner or the like to clean dust and dirt from its surface.

Avoid interference with electric harnesses when removing the filter.

In order to avoid filter damage, hard brushes should not be used for filter cleaning.

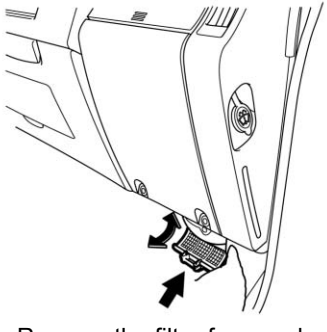
Installing the Inside Air Filter

Install the filter in the reverse order to removal.

Ensure that the filter is returned securely to its original position. Failure to observe this precaution can lead to rattling during travel.

The vehicle must not be used with the filter removed or incorrectly installed. Failure to observe this precaution can lead to air conditioning system damage as a result of dust, dirt and the like entering the system.

Removing the Outside Air Filter



1. Remove the filter from under the instrument panel on the passenger side. While pressing in the filter lock, on both sides, pull out the filter.
2. Use a vacuum cleaner or the like to clean dust and dirt from its surface.

In order to avoid filter damage, hard brushes should not be used for filter cleaning.

Installing the Outside Air Filter

Install the filter in the reverse order to removal.

Ensure that the filter is returned securely to its original position. Failure to observe this precaution can lead to rattling during travel.

The vehicle must not be used with the filter removed or incorrectly installed. Failure to observe this precaution can lead to air conditioning system damage as a result of dust, dirt, water, snow, and the like entering the system.

Service

The air conditioning system will not be able to cool the cab interior effectively if the refrigerant level is low. Accordingly, the refrigerant level must be topped up whenever necessary.

Please contact your dealer whenever refrigerant must be added.

Operation Tips

Operating the air conditioning while the refrigerant level is too low leads not only to poor cooling performance but also to air conditioning system damage.

This vehicle uses the new refrigerant HFC134a (R134a) in the air conditioning system. No other type of refrigerant can be used. In order to protect the environment, care must be taken to ensure that refrigerant gas is never released into open air. When refrigerant must be replaced, therefore, please contact your dealer or other service facility equipped with a gas recovery installation system.

Driving and Operating

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Driving Information

Driver Behavior

Napping in the Vehicle

⚠ Warning

Before taking a nap in the vehicle, be sure to shut off the engine and place the engine control switch in the "LOCK" position. Otherwise, any unintended contact with the accelerator pedal while you are asleep could cause the vehicle to move, resulting in an accident.

- If you leave the engine running and unintentionally keep the accelerator pedal pressed while asleep, the engine and exhaust pipe could become abnormally hot, resulting in a fire.
- If you leave the engine running while taking a nap with the vehicle parked in a place where exhaust gases

(Continued)

Warning (Continued)

could get into the cab (for example, a place that is poorly ventilated), you could suffer carbon monoxide poisoning.

- You and others could be seriously injured.

Distracted Driving

Do Not Use a Mobile Phone While Driving

⚠ Warning

Drivers should never use mobile telephones or car phones in any mode other than Hands Free while driving. Doing so is dangerous. Using a mobile telephone while driving could result in an accident because you would not be paying full attention to your surroundings. If you are

(Continued)

Warning (Continued)

driving and you wish to use a mobile telephone, first stop the vehicle in a safe place.

You and others could be seriously injured.

Control of a Vehicle

Warnings for Driving

⚠ Warning

Concentrate on driving safely, obeying all legally designated speed limits, road signs and traffic signals.

If you notice any abnormal noise, abnormal smell or abnormal vibration from any part of the vehicle, immediately stop the vehicle in a safe place and perform checks.

(Continued)

Warning (Continued)

If a warning light comes on or a buzzer sounds while you are driving, immediately stop the vehicle in a safe place and perform checks.

Slow down sufficiently when approaching a curve. Applying the brakes or sharply turning the steering wheel while turning the curve could cause the cargo to shift, the tires to slip and the vehicle to tip onto its side.

Avoid scraping the tire sidewalls against curbstones or driving over dips and protrusions in the road surface. You could damage the tires, resulting in a blowout or flat tire.

You and others could be seriously injured.

Pulling Away After Stopping and Parking

Before pulling away, check that there are no children or obstructions around the vehicle and confirm that it is safe to pull away.

If you cannot see the area behind your vehicle well enough to confirm it is safe to back up, get out of the vehicle and check behind it.

Make it a habit to look around and confirm that it is safe to pull away after a temporary stop (at traffic lights, for example).

If the Windshield Fogs Up

Use the heater to blow hot air on the windshield or dehumidify the cabin using the air conditioner and place the outlet selector knob in the or position.

Place the air selector lever in the outside air position.

Nighttime Visibility

If there is an old film on the windshield, the lights of oncoming traffic will be reflected in many directions, making it hard for you to see ahead. Use glass cleaner to clean the glass and the wiper blades.

Worn wiper blades cannot wipe the windshield clean and thus cannot maintain visibility. When the wiper blades become worn, replace them with new ones.

Do Not Attach Accessories to the Windshield or Windows

⚠ Warning

Do not attach ornaments, films or other accessories to the windshield or windows. They would impair visibility. Also, any plastic suction cups used to attach accessories could cause a fire or other accident by acting as lenses.

You and others could be seriously injured.

Never Stop the Engine While Driving

⚠ Warning

Do not move the engine control switch away from the "ON" position while the vehicle is being driven.

If the engine stops while the vehicle is moving, the brake booster does not work, and the brakes would not work properly. The engine could also be damaged.

Stopping the engine while driving would be extremely dangerous because the power steering would stop working, making the steering wheel extremely hard to turn.

Stopping the engine while driving would be extremely dangerous because the warning lights,

(Continued)

Warning (Continued)

indicator lights and other electrical circuitry would completely stop working.

Placing the engine control switch in the "LOCK" position while driving would be extremely dangerous because the key could come out, causing the steering wheel to lock so that you could not turn it.

You and others could be seriously injured.

Avoid Unnecessary Idling of the Engine

If the engine idles too long, the engine coolant temperature will fall below the operating range. Low engine operating temperature causes several conditions that are harmful to engine operation and life. Incomplete combustion of fuel in an engine that is not fully warmed-up causes crankcase dilution and forms lacquer and gummy deposits on valves, pistons, and rings. It also causes rapid accumulation of sludge within the engine.

Driving at Night

Nighttime driving is more dangerous than daytime driving because the field of view is narrower. Keep your speed down, and maintain an ample headway distance.

Metallic Plinking Sound from the Muffler

Immediately after stopping the engine, you may hear a metallic plinking sound from the muffler. This sound occurs as the muffler cools down and contracts. It does not indicate an abnormality or breakdown.

When the Silencer and Exhaust Pipe are Hot

⚠ Warning

When the engine is running and immediately after vehicle operation, the DPF, silencer, and

(Continued)

Warning (Continued)

exhaust pipe are extremely hot. Be careful not to inadvertently touch them when working near them (for example, tilting the cab or operating an attachment). You and others could be seriously injured.

Recommendations for Driving in Hot Regions

The engine is more likely to overheat in an environment where the ambient temperature is high. To prevent the engine from overheating, pay attention to the following points:

- If the engine does not contain the appropriate concentration of engine coolant, overheating is likely to occur.

  Refer to *Engine Coolant* ⇨ *254*.

- Do not put well water, river water or other hard water in the engine cooling system. It would hasten the formation of rust and scale.
- If foreign matter (insects, mud, etc.) gets stuck in the radiator's air passages, the cooling system's performance will deteriorate. Check the air passages for clogging, and remove any foreign matter using water under low pressure.

  Refer to *Exterior Care* ⇨ *317*.

When Turning, the Rear Wheels will Follow Tighter Curves than the Front Wheels

Use the mirrors to confirm safety.

Sidewinds

If the vehicle catches a sidewind and drifts sideways, firmly grip the steering wheel, decelerate to a speed that allows you to stay completely in control, and make a directional correction. The vehicle may catch strong sidewinds in the following situations:

- Emerging from a tunnel
- Driving over a bridge
- Driving on an embankment
- Driving through a cutting
- Being overtaken by a large truck or bus
- Overtaking a large truck or bus

Flat Tire

If a blowout or flat tire occurs while you are driving, calmly grip the steering wheel and gradually apply the brakes to decelerate. (Hard braking would be dangerous because it could cause the steering wheel to be pulled to one side.) Stop the vehicle in a safe place, and change the tire.

Hard Bump Under Vehicle

If the underside of the vehicle receives a hard bump, stop in a safe place where the vehicle will not obstruct traffic and check for brake fluid leakage, fuel leakage and component damage. If any part of the vehicle is damaged or broken, promptly have the vehicle inspected and repaired.

Highways

- Speeds on highways are higher than those on regular roads, so there is more danger. Also, a breakdown on a highway represents a hazard to other vehicles and can cause an accident. Concentrate on safe driving. Remember to perform daily pre-operation inspections and use highway driving techniques. When performing daily pre-operation inspections, perform the checks shown in the table on the left with particularly great care.

  Refer to *Owner Checks and Services* ⇨ *347*.

- When merging with traffic on a highway, use the turn signal lights to indicate your intentions ahead of time. Speed up sufficiently when you are in the acceleration lane. Pay attention to vehicles behind you and to conditions in the lane you are joining. Merge in such a way that you do not obstruct vehicles in the lane.
- Your sense of how fast you are traveling becomes distorted on long highway drives. Constantly keep an eye on the speedometer, and maintain a suitable headway distance.
- During high-speed driving, even a little turn of the steering wheel causes a big movement of the vehicle. Turn the steering wheel slowly.
- Excessive use of the brake pedal is extremely dangerous because it rapidly wears the brake linings and causes brake fade. Make effective use of the engine brake and the exhaust brake when you want to decelerate.
- When you want to turn off a highway, use the turn signal lights to indicate your intentions ahead of time. Paying attention to vehicles behind you, turn off the highway smoothly so as not to obstruct other vehicles.

Brake Fade : Frequent use of the brakes can cause the brakes to overheat so that the frictional force of the brake linings decreases and the brakes become less effective than normal. This phenomenon is called brake fade.

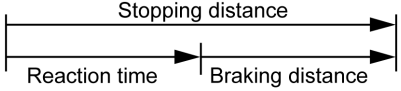
Braking

Brake Operation

The brakes give strong braking force with only light pressure on the pedal. Do not press the brake pedal hard except in the event of an emergency.

Actual stopping distances vary greatly. Your ability to stop safely will be greatly affected by the surface of the road, whether it is pavement or gravel; the condition of the road, whether it is wet, dry or icy; tire tread; the condition of the brakes; the weight of the vehicle; the weight of the load; and the amount of brake force applied. Please allow for realistic stopping distances to avoid unnecessary heavy braking. That means better braking, longer brake life and safer driving.

Stopping Distance



The stopping distance of a vehicle involves reaction time and braking distance. Deciding to push the brake pedal is reaction time. Applying the brake pedal until the vehicle comes to a complete stop is braking distance. Average reaction time is about three-fourths of a second. But that is only an average. It might be less with one driver and as long as two or three seconds or more with another. Age, physical condition, alertness, coordination and eyesight all play a part. Braking distance will vary based reaction time, the amount of force applied to the brake pedal and the speed of the vehicle.

When driving, bear the stopping distance in mind. Maintain a speed and headway distance that allow you to stop safely even if a hazard occurs.

Overriding Accelerator with Brakes (Gasoline Only)

In the unlikely event the accelerator pedal becomes stuck, apply the brakes firmly and steadily to reduce engine power and bring your vehicle to a safe stop. Turn the engine off, move the selector lever to the “P” (Park) position, and apply the parking brake. In a safe location, inspect the accelerator pedal for any interference and remove the item causing the interference, if any is found. If none is found and the condition persists, have your vehicle towed.

Braking Techniques

For the most effective braking and for maximum life from brake system components, follow these suggestions when possible:

- Apply the brakes gradually as road and load conditions permit. Reduce pedal pressure as speed drops so that a very light pressure is used at the end of the stop.
- Do not pump the brake pedal as this will only deplete the vacuum reserve.
- To get maximum braking while maintaining vehicle control, use a "squeeze" braking technique. Do this by pushing on the brake pedal with steadily increasing pressure. If possible, steer around obstacles when there is not enough room to stop.

Brake System Warning Light

If brake system warning light (or low vacuum warning light and buzzer on gasoline vehicles) comes on during operation, have brake system checked immediately.

Refer to *Warning Lights, Gauges, and Indicators* ⇨ *72*.

When the Brakes Do Not Work

⚠ Warning

It is very dangerous to suddenly pull the parking brake lever all the way while moving at high speed. Reduce speed first by shifting down and then gradually pull the parking brake lever.

You and others could be seriously injured.

(Diesel Only) The exhaust brake should be turned on as soon as service brake malfunction is detected. This will slow the engine speed. With the engine speed under control and providing the grade conditions permit, the transmission can be progressively downshifted using the exhaust brake in each gear. Eventually the exhaust brake should slow the vehicle to a controllable “crawl.” Gradually pull the parking brake lever while firmly holding on to the steering wheel. Stop the vehicle on the side of the road. The vehicle should not be driven further until corrective measures are taken.

See *Exhaust Brake (Diesel Only)* ⇨ *215* and *Parking Brake* ⇨ *214*.

(Gasoline Only) If the brakes do not work in an unexpected situation, promptly shift down from D6, D4, 2nd and then to 1st gear using the selector lever to reduce the speed and gradually pull the parking brake lever to stop the vehicle on the side of the road while firmly holding on to the steering wheel.

See *Parking Brake* ⇨ *214*.

Riding the Brake

⚠ Warning

"Riding the brake" by resting your foot on the pedal, when you do not intend to brake, can overheat the brakes and wear out the brake linings faster. This may also

(Continued)

Warning (Continued)

damage the brakes and will waste fuel. It can also result in reduced braking performance.

You and others could be seriously injured.

Applying the Parking Brake

Except in an emergency, do not apply the parking brake until the vehicle has come to a complete stop. Applying the parking brake before the vehicle has stopped can cause a breakdown.

Refer to *Parking Brake* ⇨ *214*.

Parking Safely on a Slope

Avoid parking your vehicle on a slope as much as possible and choose a level and flat place. If you must park your vehicle on a slope, be sure to set the parking brake fully. Make sure that the vehicle does not move, and block the wheels with chocks for added safety. Also, leave the vehicle in gear to further ensure that it will not

move. Leave the steering wheel turned such that the vehicle will be stopped by an obstruction (for example, the curb) in the unlikely event that it moves.

Stopping and Parking with the Engine Running

⚠ Warning

When parking with the engine running, first come to a complete stop, then firmly apply the parking brake, then move the selector lever to the "P" (Park) position. Unless you take these steps, any unintended pressure on the accelerator pedal could cause an accident.

To reduce the chance of personal injury and/or vehicle damage due to engine overheating, never leave the engine idling without an alert driver present. If the engine should overheat, as indicated by the engine coolant temperature gauge, immediate action is

(Continued)

Warning (Continued)

required to correct the condition. Continued operation of the engine, even for a short time, may result in a fire. Do not engage the exhaust brake while the engine is idling as this may cause engine overheating.

The diesel particulate filter (DPF) may automatically start regeneration when the vehicle is stopped and parked with the engine running. To prevent a fire, make sure there is no flammable material near the muffler, DPF, and exhaust pipe. Be careful not to get burned by hot exhaust gases.

You and others could be seriously injured.

Do Not Forget to Release the Parking Brake

Pulling away with the parking brake still applied can damage the brake system.

Before pulling away, make sure the parking brake is not set by checking that the parking brake indicator light is not on.

Be Sure to Have the Engine Running When the Vehicle is Moving

⚠ Warning

When the engine is not running, the power steering system does not work so the steering wheel is hard to turn. Also, the brake booster does not work so there is little braking ability. If you coast down a slope without the engine running, you would not be able to properly control the vehicle and could have an accident.

Parking, or Leaving Driver's Seat

⚠ Danger

It can be dangerous to get out of your vehicle if the selector lever is not fully in "P" (Park) or the parking brake is not applied all the way. Your vehicle can roll or move suddenly.

To be sure your vehicle will not move, even when you are parking on level ground, follow the steps below. (If you have to park on a hill, also turn your front wheels so the vehicle will roll away from traffic.)

You and others could be seriously injured or killed.

1. Hold the regular brake pedal down with your right foot and apply the parking brake all the way before shifting the transmission. Follow the Parking Brake instructions in this manual for your vehicle.
2. To move the selector lever to "P" (Park), hold in the button on the lever and push the lever all the way toward the front of your vehicle.
3. Turn the key to "LOCK".
4. Remove the key and take it with you.
5. Before you leave the driver's seat, be sure the vehicle is not moving, or check that your vehicle is in Park by trying to pull the selector lever out of "P" (Park) by pulling the selector lever toward you without pushing the button. If you can do this, it means that the selector lever was not fully locked into "P" (Park).

Do Not Touch the Selector Lever While the Vehicle is Stationary with the Engine Idling (Gasoline Only)

Do not touch the selector lever while the vehicle is stationary with the engine idling. If you touch the selector lever at this time, a gear could be selected and the vehicle could move even with the parking brake applied. The risk of knocking against the selector lever and causing an accident is particularly great when you move in or out of your seat.

Driving Down a Long Slope

When driving down a long slope, use the exhaust brake (diesel) or engine brake (gasoline) together with the foot brakes. Using the exhaust brake (diesel) or engine brake (gasoline) and low-gears reduces the work load on the foot brakes and yields greater braking force. Even so, use the foot brakes appropriately to prevent the engine over-revving.

Frequent use of the foot brakes can cause vapor lock and brake fade, resulting in reduced brake effectiveness.

Brake Fade : Frequent use of the brakes can cause the brakes to overheat so that the frictional force of the brake linings decreases and the brakes become less effective than normal. This phenomenon is called brake fade.

Vapor Lock : If the brakes overheat due to frequent use, the heat can cause the brake fluid to boil so that air bubbles are created in the brake fluid. Pressing the brake pedal simply compresses the air bubbles; pressure is not transmitted to the wheel cylinders, so the brakes' effectiveness sharply deteriorates. This phenomenon is called vapor lock.

Even so, you should be very careful when using engine braking in a low gear because the engine is likely to over-rev. See *Exhaust Brake (Diesel Only)* ⇨ *207* and *Selector Lever* ⇨ *207*.

On diesel vehicles, do not adjust the exhaust brake valve.

The engine should never be allowed to exceed the governed speed. Supplement the exhaust brake with vehicle service brakes intermittently and/or shift to higher transmission gear to prevent engine overspeed. A rule of thumb for gear selection is that the vehicle should be driven down a grade in the same gear that would be used to climb that grade.

⚠ Warning

To reduce the risk of personal injury, before going down a steep or long grade, reduce speed, turn on the exhaust brake and shift the transmission to the next lower gear. This will help control your speed. Do not hold the brake pedal down too long or too often while going down a steep or long grade. This could cause the brakes to get hot and not to work as well. As a result, the truck will not slow down at the usual rate. Failure to take these steps could result in loss of vehicle control.

You and others could be seriously injured.

Brake Effectiveness When the Vehicle Has Been Driven on a Flooded Road or Washed

⚠ Warning

When the vehicle is driven on a flooded road, parked on a flooded road or washed, water can get into the brakes and reduce their effectiveness. If the brakes do not work well afterward, drive slowly and gently press the brake pedal several times until the brakes dry out and start working normally. Always do this after driving through water or washing the vehicle to help reduce the risk of personal injury. Before parking the vehicle in winter, press the brake pedal several times in the same way to get rid of moisture in the brakes. Otherwise, the moisture in the brakes may freeze and make the vehicle immovable.

You and others could be seriously injured.

If the vehicle must be driven on a flooded road or is parked in an area that becomes flooded, promptly perform a check for the following points:

- Effectiveness of the brakes
- Water-ingress or damage to drum brakes, disc brakes
- Engine damage due to water-ingress
- Shorting of electrical components
- Oil level and degradation (cloudiness) of the engine, transmission, differential
- Greasing of each components (lubrication)

Steering

Do Not Leave the Steering Wheel Fully Turned for a Long Time

⚠ Warning

If you leave the steering wheel fully turned for a long time, the oil in the power steering oil pump will become extremely hot. This would cause poor lubrication, oil tank damage and seal deterioration, leading to power steering oil pump damage, power steering unit damage and power steering hose damage. As a result the steering wheel could become extremely hard to turn and a fire or other accident could occur.

You and others could be seriously injured.

Steering Wheel

If the steering parts have excess play or looseness or if any abnormal condition is noted, have the steering system checked immediately.

Driving on Wet Roads

Driving on Slippery Surface or Driving in Bad Weather (Rain, Icy Roads, Snowy Roads, etc.)

In bad weather, visibility is reduced and slippery road surfaces increase stopping distances. Drive more slowly than you would in good weather. Also, avoid sharp turns of the steering wheel and hard braking. Use engine brakes together with the foot brakes to decelerate.

For diesel vehicles, using the exhaust brake on a slippery road surface could cause the tires to slip.

You may not realize the surface is slippery until the vehicle is skidding. Learn to recognize warning clues—such as enough water or ice on the road to make a "mirrored surface"—and slow down when there is any doubt.

There is a risk of hydroplaning, particularly where water tends to collect on the road surface. Drive at speeds that allow you to stay in complete control.

If you cannot avoid driving on a flooded road, first check the depth of the water and then drive through the water at a slow, constant speed. There is a risk that water will get into the engine's cylinders and cause engine damage (water hammering). Keep your speed down, and drive with great care.

Hydroplaning : If a vehicle is driven at high speed on a road that is covered with water, a layer of water can form between the tires and road surface, causing the tires to lose their grip and slide across the water. This phenomenon is called hydroplaning. It is dangerous because it makes the steering wheel and brakes useless.

Refer to *Wheels and Tires* ⇨ *294*.

Hill and Mountain Roads

Narrow or Congested Roads

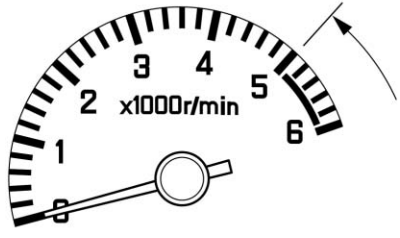
When passing or overtaking a vehicle on a narrow mountain road or on a narrow or congested urban road, pay careful attention to obstacles on either side and to the condition of the shoulder of the road.

When turning, the rear wheels will follow tighter curves than the front wheels. Use the mirrors to confirm safety.

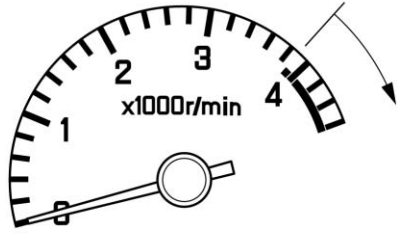
Driving Uphill or Downhill

Downshifts are performed for two main purposes:

- For engine braking on a steep and/or long downward slope
- For responsiveness and economy on an uphill slope



6.0L Gasoline



3.0L Diesel

Drive at a speed that does not cause the tachometer needle to enter the red zone.

Uphill

Shift down well ahead of time in order to avoid a heavy load to the engine.

Downhill

- Be careful not to drive too fast on a downhill road.
- Use the same gear(s) that you used to drive up the hill. Also, use the exhaust brake in order to avoid going too fast.
- Do not let the engine overrun.
- When going down on a steep slope, avoid driving the vehicle backward as much as possible. Drive it forward slowly on the down slope.
- Compared with forward movement, the braking distance of backward movement is longer, and the steering response of that is worse.
- If you must drive the vehicle backward, drive it very carefully and gradually by moving and stopping repeatedly in order to stop it any time.

Engine Brake : Engine brake is the braking effect that occurs when you release the accelerator pedal while driving. The lower the gear, the stronger the engine brake.

Exhaust Brake : The exhaust brake is a system that closes the exhaust pipe and uses the force of the exhaust emissions to enhance the effectiveness of engine brake.

Overrunning : An engine overrun is an engine-speed increase that causes the tachometer needle to enter the red zone. It is dangerous because it can cause engine failure.

Winter Driving

Recommendations for Driving in Cold Regions

The following recommendations apply to snowbound regions and to mountainous regions, ski resorts and other areas of extreme cold and/or snowfall. Please follow them also for reference in winter in other regions.

For the sake of your vehicle, make the winter preparations described in the links below. Also have these preparations made before driving to a cold region.

See *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*.

See *Engine Coolant* ⇨ *254*.

See *Washer Fluid* ⇨ *265*.

See *Battery* ⇨ *270*.

When Ice Prevents You from Putting Your Key in the Door or Opening the Door

If you try to force the key into the door, you could bend it. And if you try to pull the door open with undue force, the rubber seal around the door could come unstuck or become damaged. Use warm water to melt the ice, then quickly wipe it away and open the door.

If the wipers, electric door mirrors, or power windows freeze up, also use warm water to melt the ice and then operate the system. Otherwise,

you could damage the mechanism and drain the battery. After that, wipe the water away.

Before Driving in Cold Regions

Getting In and Out of the Vehicle

The step can get icy in cold regions. Be careful not to slip when getting in and out of the vehicle.

Before Sitting in the Driver's Seat

Remove snow and ice from your shoes when getting into the vehicle. If you try to drive with snow on your shoes, your shoes would slip on the pedals and you would not be able to press the pedals properly, meaning that your driving would be inconsistent. Also, the cabin could become more humid, causing the glass to fog up.

Check Fuel Level

Fuel consumption increases when tire chains are used. Determine how much fuel you need to reach your destination and fill up the tank in advance. Refer to *Fuel for Diesel Engines* ⇨ *225* or *Fuel* ⇨ *224*.

Removing Snow from Glass and Underbody

Do not use a sharp implement to remove snow. Sharp edges could damage rubber parts.

To maintain an adequate field of view, use a plastic scraper to remove snow and frost from the glass surfaces. By using a plastic scraper, you can remove the snow and frost without scratching the glass. At this time, check whether the wiper blades are frozen onto the glass.

Also, look under the vehicle and remove any lumps of ice that are stuck to the underbody. Be careful not to damage components.

Driving on Snowy or Frozen Roads

On slippery roads, never accelerate rapidly, brake hard, decelerate rapidly or make sharp turns of the steering wheel.

There is a risk of reduced grip between the tires and road surface and of increased braking distances.

The danger of icy road surfaces is particularly great on bridges, in shady places and where there are puddles.

Keep your speed down and be sure to use tire chains or winter tires on snowy or frozen road surfaces.

For diesel vehicles, use engine brakes together with the foot brakes to decelerate. Using the exhaust brake on a slippery road surface could cause the tires to slip.

For gasoline vehicles, use lower gears to overcome the retardation effect of the engine. Apply the foot brakes lightly.

Pay Attention to the Way the Steering Wheel Turns and Feels

On snowy roads, water and snow splashed up by the tires can freeze and accumulate inside the fenders, making the steering wheel hard to turn. From time to time, get out of the vehicle and remove any accumulated snow.

Check the Brakes from Time to Time

When the vehicle is driven or parked on a snowy surface, ice can form on the brakes, decreasing their effectiveness. From time to time while you are driving, press the brake pedal lightly and check the effectiveness of the brakes. Pay attention to vehicles both ahead of and behind you when checking the brakes in this way.

Also, check the effectiveness of the brakes as soon as possible when starting to drive the vehicle after it has been parked. If the brakes do not work well, drive slowly and gently press the brake pedal several times until the brakes dry out and start working normally.

Parking in Cold Regions

When snow collects around the wheels and the lights, try to remove it before night falls.

Do not apply the parking brake in extremely cold weather, such as in temperatures or at below 0 °C (32 °F). If you leave the parking brake applied, the wires and brake shoes could freeze up, making it impossible for you to release the parking brake. Be sure to park the vehicle in gear.

Be sure to put chocks against the tires.

Whenever possible, park in a garage to help prevent parts from freezing up and to help make the engine easy to start.

⚠ Warning

If you park in a place where there is a lot of snowfall, snow accumulating around the vehicle could limit ventilation. Running the engine with the vehicle in these conditions could cause exhaust gases to enter the cabin, resulting in carbon monoxide poisoning. Take preventive action by, for example, clearing the snow around the vehicle.

You and others could be seriously injured.

Do not park under trees or under the eaves of a building. Chunks of ice could fall on the vehicle if you park in such a place.

Cleaning the Vehicle after Driving on Snowy Roads

- The vehicle speed sensors are fitted on the wheels. When removing snow, ice, and other incrustation, take great care not to damage the components.
- Do not use a sharp implement to remove snow. Sharp edges could damage rubber parts. Refer to *Antilock Brake System (ABS)* ⇨ *210*.

Remove snow that has stuck to the inside of the fenders and to the brake hoses. Otherwise, it may damage components. After driving on a salted road, wash the underside of the vehicle as soon as possible to prevent the salt from causing rust. Spraying water under high pressure is an effective way to get the salt off.

After washing the vehicle, wipe the door openings dry.

If the Vehicle Is Stuck

When Driving on Bad Roads

Freeing the Vehicle from Sand, Mud, Snow, and Ice

If your vehicle gets stuck in sand, mud, snow or ice, move the selector lever from "Second" to "Reverse". Apply a light pressure to the accelerator pedal while the transmission is in gear. Remove your foot from the accelerator and press the brake pedal while shifting. Do not race the engine. For best traction, avoid spinning the wheels. When you cannot avoid driving through deep mud, using tire chains is an effective way to avoid getting stuck.

Do not allow wheels to spin freely in mud, sand, snow, ice or other poor road conditions. This free spinning will damage the rear axle. Even vehicles equipped with LSD (Limited Slip Differential) have traction limitations. If your vehicle gets stuck and it is difficult to extricate, immediately stop driving and have the vehicle towed. Spinning wheels for an extended period of time may cause abnormal noises or malfunction to LSD.

Do not spin wheels faster than 32 km/h (20 MPH). Damage may result from excessive wheel spinning, including tire, transmission and/or rear axle malfunction.

When driving in sand or mud, avoid hard braking, sudden acceleration and sharp turns of the steering wheel. Such actions could get the vehicle stuck and make it difficult to extricate.

After driving through deep mud: any mud stuck to the vehicle can harm the steering, brakes and powertrain. Wash the vehicle and remove all mud and other incrustation.

The vehicle speed sensors are fitted on the wheels. When removing mud and other incrustation, take great care not to damage the components.

Do not use a sharp implement to remove mud. Sharp edges could damage rubber parts.

Refer to *Antilock Brake System (ABS)* ⇨ *210* and *Exterior Care* ⇨ *317*.

Emergencies (Troubleshooting)

Troubleshooting

Performing regular inspections and maintenance prevents damage. Be sure to perform inspections and maintenance at regular intervals. Also, quickly rectify any fault in the vehicle (even a small fault) to prevent it from becoming more serious. If a symptom shown in the following table occurs, perform inspections and take corrective action in accordance with the table. If you are unable to perform a repair, the corrective action shown in the table does not eliminate a symptom or you cannot locate a fault, contact the nearest dealer.

Any item for which there is a ◎ in the "Corrective action" column requires repairs and adjustments. Contact the nearest dealer.

Symptom		Cause	Corrective Action	Reference
Engine does not start	Starter does not turn over, or weak	Discharged batteries	Recharge or replace	See *Battery* ⇨ *270*
		Battery terminals detached, loose, or corroded	After repairing corroded section, connect the terminals firmly	-
		Starter ground wire terminal detached, loose, or corroded	After repairing corroded section, connect the terminals firmly	-
		Engine oil viscosity too high	Change to an oil with proper viscosity	See *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*
		Starter or electrical system is faulty	◎	-

Symptom		Cause	Corrective Action	Reference
Engine does not start	Starter turns over (Diesel)	No fuel	Make sure there are no fuel leaks, and then add fuel	-
		Air in the fuel system	Bleed fuel system	See *Running Out of Fuel (Diesel)* ⇨ *231*
		Fuel filter clogged	◎	-
		Fuel is frozen	Warm fuel pipe with hot water or wait until it gets warmer	-
		Common rail system is faulty	◎	-
		Preheating system is faulty	◎	-

Symptom		Cause	Corrective Action	Reference
Engine does not start	Starter turns over (Gasoline)	No fuel	Make sure there are no fuel leaks, and then add fuel	-
		Fuel pump clogged	◎	-
		Pressure regulator is faulty	◎	-
		Ignition system is faulty	◎	-
		Engine control (electrical system) is faulty	◎	-
Engine starts, but immediately stops		Idling speed too low	◎	-
		Fuel filter is clogged (Diesel)	◎	-
		Air cleaner is clogged	◎	-
		Common rail system is faulty	◎	-
		Fuel pump is clogged (Gasoline)	◎	-
		Fuel system is faulty	◎	-
		Engine control (electrical system) is faulty (Gasoline)	◎	-

Symptom	Cause	Corrective Action	Reference
Unsteady engine speed (Diesel)	There is water or air in the fuel system	Drain water from fuel filter or bleed the system	See *Running Out of Fuel (Diesel)* ⇨ *231* or *Water in Fuel (Diesel)* ⇨ *229*
	Fuel system is faulty	◎	-
Unsteady engine speed (Gasoline)	Fuel system is faulty	◎	-
	Ignition system is faulty	◎	-
	Engine control (electrical system) is faulty	◎	-

Symptom	Cause	Corrective Action	Reference
White exhaust smoke (Diesel)	Engine not sufficiently warming up	Allow the engine to warm up	-
	Too much engine oil	Correct the oil level	See *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*
	Engine Control system faulty	◎	-
	Fuel system faulty	◎	-
	Continuous idling for a long period (more than two hours)	With the vehicle stationary in a place where it will not obstruct traffic, hold down the accelerator pedal and check that white smoke is not emitted	-

Symptom	Cause	Corrective Action	Reference
Black exhaust smoke (Diesel)	Engine Control system faulty	◎	-
	The air cleaner clogged	◎	-
	Fuel system faulty	◎	-
	Exhaust system clogged	◎	-
	Diesel particulate filter (DPF) faulty	◎	-
Engine is overheating	No engine coolant	Add engine coolant	See *Engine Coolant* ⇨ *254*
	Front of radiator is clogged with dirt	Wash clean with tap water	See *Exterior Care* ⇨ *317*
	Radiator cap not sufficiently tightened	Make sure it is firmly tightened or replace the radiator cap	-
	Fan belt loose	Adjust the tension or replace the belt	See *Engine Drive Belt Routing* ⇨ *373*
	Engine coolant dirty	◎	-
	Fan clutch is faulty	◎	-
	Radiator cap dirty or faulty	Clean or replace	-

Symptom	Cause	Corrective Action	Reference
Oil pressure is low	Improper engine oil viscosity	Change to an oil with proper viscosity	See *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*
	Engine oil level too low	Add engine oil	See *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*
	Engine inner components are faulty	◎	-
	Meter, indicator/warning lights or switches faulty	◎	-

Symptom	Cause	Corrective Action	Reference
Not enough engine power	Parking brake not fully released	Make sure it is fully released	-
	Brake dragging	◎	-
	Air cleaner clogged	◎	-
	Fuel filter clogged	◎	-
	Engine control system faulty	◎	-
	Common rail system faulty	◎	-
	Engine faulty	◎	-
	DPF clogged (Diesel)	◎	-
Brakes not effective	Drum-to-lining gap too large	◎	-
	Air in brake fluid	◎	-
	Brake system failure	◎	-

Symptom	Cause	Corrective Action	Reference
Uneven braking	Unbalanced air pressure in tires	Adjust to proper air pressure	See *Wheels and Tires* ⇨ *294*
	Tire unevenly worn	Replace tire	See *Wheels and Tires* ⇨ *294*
	Drum brake out of adjustment	◎	-
	Poor wheel alignment	◎	-
Exhaust brake not working (Diesel)	The electrical system is faulty	◎	-
Steering wheel hard to turn	Loaded too far forward	Load properly	-
	Power steering fluid level too low	Add fluid	See *Power Steering Fluid* ⇨ *263*
	Insufficient air in front tires	Adjust to proper inflation pressure	See *Wheels and Tires* ⇨ *294*

Symptom	Cause	Corrective Action	Reference
Excessive play in the steering wheel	Wheel studs and nuts loose	Tighten to the specified torque	See *Wheels and Tires* ⇨ *294*
	Unbalanced inflation pressure in the tires	Adjust to proper inflation pressure	See *Wheels and Tires* ⇨ *294*
	Unbalanced tires	◎	-
	Excessive steering wheel free play	◎	-
Poor steering wheel return	Poor lubrication in the steering mechanisms	Lubricate the mechanism	-
	Poor wheel alignment	◎	-

Symptom		Cause	Corrective Action	Reference
Loud or abnormal noises	From the transmission	Insufficient transmission oil	Add oil	See *Automatic Transmission Fluid* ⇨ *251*
		Transmission inner components faulty	◎	-
	From differential	Insufficient differential gear oil	Add oil	See *Rear Axle (Gear Oil Viscosity Chart)* ⇨ *271* or *Rear Axle (Oil Level Check)* ⇨ *272*
		Differential inner components faulty	◎	-
	From the suspension	Spring pins, shackles, or stoppers worn	◎	-
	From the driveshaft	Poor lubrication in each component	Lubricate them	See *Owner Checks and Services* ⇨ *347*
		Splines or bearings worn	◎	-

Emergencies (Disabled Vehicle)

When the Vehicles Breaks Down

When the Vehicle Stops While Driving

The brake booster will no longer operate, brake effectiveness will be reduced. If the engine cannot be started, promptly have the vehicle inspected and repaired.

If the engine stopped because the vehicle ran out of fuel while driving, refueling alone will not be enough to restart the engine. Bleed the fuel system after refueling the vehicle.

When the Fuel Tank is Empty

See *Running Out of Fuel (Diesel)* ⇨ *231*.

When the Engine Stalls and Cannot Be Restarted

Move the selector lever to the "N" position and push the vehicle to a safe place.

⚠ Warning

Vehicle operations will change, so stop the vehicle in a safe place with the following in mind.

The power steering system will not work so the steering wheel will be hard to turn. It will require more strength than during normal operation.

As the brake booster will no longer be functional, brake effectiveness will be greatly reduced. Be sure to apply more pressure than usual to the brake pedal.

If the power assist steering system goes out because the engine has stopped or the assist system has malfunctioned, the vehicle can still be steered. However, much greater effort is needed, especially in sharp turns or at low speeds.

You or others could be seriously injured.

When the Vehicle Breaks Down During Driving

1. Use the hazard warning flasher any time to warn other drivers, day or night, and pull the vehicle immediately over to a safe place that does not impede traffic (shoulder). Place the triangle reflectors to alert other traffic to the presence of your vehicle.
2. If the vehicle can be exited safely, have the other passengers get out and wait in a safe place.
3. If the vehicle can be exited safely, walk to a safe place and take appropriate measures by using the closest telephone, etc.

See *Hazard Warning Flashers* ⇨ *99*.

If There is a Fuel Leak

⚠ Danger

Leaking fuel from the vehicle is dangerous due to possible combustion or explosion. Stop the engine immediately.

You or others could be seriously injured or killed.

Starting and Operating

New Vehicle Break-In

Good vehicle care begins with proper break-in. While every new vehicle goes through rigid factory and dealer inspection and tests before delivery, the care you give your vehicle during the initial break-in period can pay off in longer life, better performance and more economical operation.

It is therefore always recommended that during the initial 1 000 km (600 mile) break-in period, the following few simple precautions are carefully observed.

Follow the recommendations listed below for gasoline and diesel engines:

- Warm up the engine by driving easily for the first few minutes before placing it under load.
- Do not drive for extended periods at any one constant speed, either fast or slow, during the first 800 km (500 miles).
- Use the correct gear to maintain the desired road speed without lugging the engine.
- Avoid racing the engine, full-throttle starts and aggressive application of brakes when stopping.
- Keep tires properly inflated for the load carried.
- Check lubricant levels in the engine and transmission weekly.
- For vehicles with gasoline engines, keep speeds below 121 km/h (75 MPH) for the first 800 km (500 miles).

Follow the additional diesel only recommendations listed below:

- Keep speeds below 80 km/h (50 MPH) for the first 800 km (500 miles).

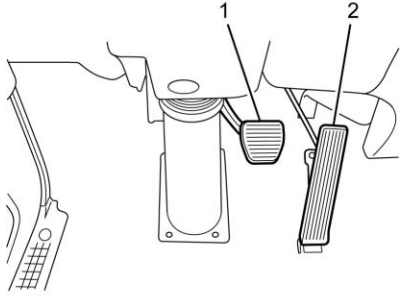
- Use the lowest gear ratio available when starting a loaded vehicle and when climbing slopes to avoid lugging the engine.
- It is recommended that the engine speed is restricted to 2,400 r/min.

Mechanical Driveshaft Brake Burnish Procedure

It is recommended that the driveshaft mounted parking brake be burnished as part of the new vehicle break-in procedure. Increased parking brake performance will result when the parking brake is burnished as specified below:

- Make 10 moderate stops, using the hand brake, from 16 km/h (10 MPH) while spacing the stops a minimum of 4 km (2.5 miles) apart.
- Operate the vehicle at 32 km/h (20 MPH) between stops.

Pedals



Sit in a correct driving position on the seat and operate the brake pedal (1) and accelerator pedal (2) with your right foot. To avoid accidentally pressing the wrong pedal, check the pedal positions and practice putting your foot on the desired pedal.

⚠ Warning

A can or bottle rolling on the floor may prevent brake pedal operation if it is caught under the

(Continued)

Warning (Continued)

pedal. This is very dangerous. A floor mat must be placed correctly. An incorrectly installed floor mat may hinder the free movement of each pedal. You and others could be seriously injured.

Ignition Positions

Engine Control Switch

⚠ Warning

While driving, never turn the engine control switch to the LOCK position. The key could be removed from the switch, which then locks the steering wheel. This is extremely dangerous.

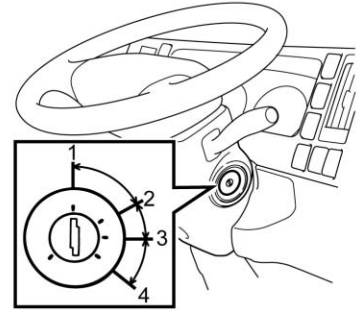
You and others could be seriously injured.

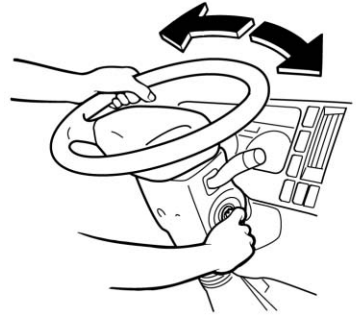
Caution

After starting the engine, do not turn the engine control switch to the START position. Otherwise, the starter motor may be damaged.

Using electrical devices such as the audio system for an extended time period with the engine stopped can completely discharge the battery.

The starting circuit, engine alarm circuits and accessory circuits are all controlled by the engine control switch.





1 LOCK : Lock is in the position fully counterclockwise. In this position, the key can be inserted or removed. To place the engine control switch in the LOCK position, press and hold the key in the ACC position and then turn it to the LOCK position. If you will leave the vehicle, remove the key and turn the steering wheel until it locks. The steering wheel will be locked to help prevent theft.

2 ACC : Accessory is in the first position clockwise. In this position, the audio and other accessories can be used with the engine stopped.

3 ON : This ON position is in the second position clockwise. The key stays in this position while the engine is running. Engine control, warning circuits, gauge circuits, and accessory circuits are energized.

For diesel engines only, the engine cylinder heaters or glow plugs are also turned on when the switch is in the ON position. The wait-to-start light will come on and stay on until the glow plugs are heated enough. When this light goes off, turn the switch to the START position.

4 START : On all engines, start is in the position furthest clockwise. The engine is started in this position.

Turn the key against spring pressure to energize the starter. When key is released, spring pressure returns it to the ON position. Release the key as soon as the engine has started.

If the key cannot be turned from the LOCK position to the ON position, lightly move the steering wheel clockwise and counterclockwise while trying to turn the key.

Starting and Stopping the Vehicle (Gasoline Only)

Check around the Vehicle before Starting the Engine

Proper care and operation will not only extend the service life of your vehicle but also improve fuel economy.

Before pulling away, perform a thorough safety check, making sure there are no children or obstructions around the vehicle. Take off the chocks after confirming that the parking brake is securely applied.

Sit behind the wheel, adjust the seat position, and buckle up the seat belt. The passengers are also required to buckle up the seat belts.

Adjust the positions of the steering wheel and mirrors. Lock the doors. Turn the power of the dome light or accessories OFF before starting the engine. See *Seat Position* ⇨ *41*, *Seat Belts* ⇨ *46*, *Steering Wheel Adjustment* ⇨ *68*, and *Mirrors* ⇨ *36*.

Keep the Floor Around the Driver's Seat Clean and Tidy

⚠ Warning

It is extremely dangerous to have empty cans, empty bottles or other items rolling around on the floor because they could get trapped under the brake pedal and prevent brake application. For proper pedal operation, it is also essential to lay floor mats properly. Incorrectly installed floor mats would hinder free movement of the pedals.

(Continued)

Warning (Continued)

Do not use the dashboard pocket or the top of the dashboard as a place to put items that could roll, which could interfere with your driving. You and others could be seriously injured.

Choose Your Footwear Suitable for Driving

⚠ Warning

Choose footwear that ensures proper operation of pedals when driving the vehicle. Use of footwear unsuitable for driving may cause an accident.

Checks Before Operating

Allow the engine to warm up before driving. While the engine is warming up, the following checks should be made:

1. Observe the engine oil pressure warning light. The light should go out when the

engine is running. If it stays on, shut the engine off and find the cause.

2. Look at the engine coolant temperature gauge. If the gauge reaches the H (HOT) area, stop the engine and find the cause of the overheating.
3. Check that the battery warning light has gone out. The light should go off and stay off at normal idle speeds. If the light does not go out or comes on during normal operation, have the charging system checked.
4. Check that the brake low vacuum warning light is out and that the vacuum buzzer is not sounding. It is normal for the warning buzzer to sound for a few seconds after the engine starts. If the light and buzzer remain on, do not drive the vehicle until the cause has been found and corrected.
5. Look at the brake system warning light. It should be out when the parking brake is released and the engine is running. If it stays on, it could mean that the brake fluid level is low. Check the brake fluid reservoir. This condition must be corrected before moving the vehicle.

Caution

To reduce the chance of personal injury and/or vehicle damage due to engine overheating, never leave the engine idling without an alert driver present. If the engine should overheat, as indicated by the engine coolant temperature gauge, immediate action is required to correct the condition.

Continued operation of the engine, even for a short time, may result in a fire.

Starting the Engine

Do not keep the engine control switch in the START position for more than about 10 seconds. Operating the starter for too long might cause starter and battery failure or may result in overheating. When the engine does not start, wait for 20 to 30 seconds and then turn the engine control switch again.

Before starting the engine sit in the driver seat, check that the parking brake is firmly engaged, the selector lever is in the P or N (P is preferred) position and the shift indicator also shows P or N, and firmly press the brake pedal to start the engine. See *Ignition Positions* ⇨ *156*.

⚠ Warning

Do not keep the starter motor engaged for more than 10 seconds at a time, or the starter motor and the battery will be adversely affected. Also, fire may occur due to overheating. Repeat the steps after a 20 to 30 seconds break.

1. Shift your selector lever to P (Park) or N (Neutral). Your engine will not start in any other position-that's a safety

feature. To restart when you're already moving, use N (Neutral) only.

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

2. Do not push the accelerator pedal before starting your engine. In some other vehicles you might need to do this, but because of your vehicle's computer systems, you do not need to.
3. Turn your ignition key to Start. When the engine starts, let go of the key. The idle speed will go down as your engine gets warm.
4. If it does not start right away, hold your key in START. If it doesn't start in 3 seconds, push the accelerator pedal about one-quarter of the way down for 12 more seconds, or until it starts.
5. If your engine still will not start (or starts but then stops), it could be flooded with too much gasoline. Try this: Wait 20 to 30 seconds to let the starter motor cool down. Then push your accelerator pedal all the way to the floor. Hold it there. Then, hold the key in START for no more than 10 seconds. This clears the extra gasoline from the engine.

If the engine still does not start, wait another 20 to 30 seconds and do Step 5 again.

Hot Engine Restart

If your engine is already hot and then stalls, turn your ignition key to ACC. Then, turn your key to ON, and wait about 20 to 30 seconds before you restart your engine.

When the engine starts, let go of the key and the accelerator pedal.

Your engine is designed to work with the electronics in your vehicle. If you add electrical parts or accessories, you could change the way the fuel injection system operates. Before adding electrical equipment, check with your dealer. If you do not, your engine might not perform properly.

If you ever have to have your vehicle towed, see the part of this manual that tells how to do it without damaging your vehicle. See *Towing the Vehicle* ⇨ *315*.

Recommendations for Warming Up the Engine

The engine is sufficiently warmed up when the needle of the engine coolant temperature gauge starts to move.

- Do not race the engine or quickly accelerate before the engine has sufficiently warmed up. Oil would not have adequately reached and lubricated components, and a breakdown may result.
- The exhaust pipe becomes extremely hot while the engine is idling. Before warming up the engine, make sure there is no

flammable material, such as grass, waste paper, oil, or old tires near the exhaust pipe.

Cold Weather Starting

If you plan ahead for cold weather, starting and driving your vehicle should be no problem.

Oil gets thicker as it gets colder, which slows down the engine cranking speed.

To be sure the engine can turn fast enough to start, use SAE 0W-30 viscosity engine oil when prevailing temperatures drop below 0 °C (32 °F). See the oil quality and oil viscosity recommendations. Using the proper viscosity oil will make starting easier down to -23 °C (-10 °F). When prevailing temperatures drop below -23 °C (-10 °F), the optional engine block heater may be needed for starting.

Stopping the Engine

When stopping the gasoline engine, take the following steps:

1. Bring the vehicle to a complete stop.
2. Firmly apply the parking brake.
3. Move the selector lever to the P position and make sure that the shift indicator shows P.
4. Allow the engine to idle for approximately 3 minutes.
5. Turn the engine control switch to the ACC or LOCK position.

To prevent the battery from going dead, turn the engine control switch to the ACC or LOCK position after stopping the engine. If you leave the vehicle for an extended period of time, place the engine control switch in the LOCK position.

If the Vehicle Has Not Been Used for a Long Period

If the vehicle is to be placed in storage for a prolonged period of time, certain precautions must be taken to prevent deterioration. See your authorized dealer for more detailed information.

- Before using a vehicle that has not been driven for a long period, check the engine and transmission for oil leakage, and make sure the oil is at the required levels. If there is insufficient oil, it will not adequately reach and lubricate components, and a breakdown will result.
- Start the engine and allow it to idle for at least 5 minutes. Check for abnormal noises.
- For instructions on warming up the engine, refer to “Starting the Engine” previously in this section.

Starting and Stopping the Vehicle (Diesel Only)

Check around the Vehicle before Starting the Engine

Proper care and operation will not only extend the service life of your vehicle but also improve fuel economy.

Before pulling away, perform a thorough safety check, making sure there are no children or obstructions around the vehicle. Take off the chocks after confirming that the parking brake is securely applied.

Sit behind the wheel, adjust the seat position, and buckle up the seat belt. The passengers are also required to buckle up the seat belts.

Adjust the positions of the steering wheel and mirrors. Lock the doors. Turn the power of the dome light or accessories OFF before starting the engine. See *Seat Position* ⇨ *41*, *Seat Belts* ⇨ *46*, *Steering Wheel Adjustment* ⇨ *68*, and *Mirrors* ⇨ *36*.

Keep the Floor Around the Driver's Seat Clean and Tidy

⚠ Warning

It is extremely dangerous to have empty cans, empty bottles or other items rolling around on the floor because they could get trapped under the brake pedal and prevent brake application. For proper pedal operation, it is also essential to lay floor mats properly. Incorrectly installed floor mats would hinder free movement of the pedals.

(Continued)

Warning (Continued)

Do not use the dashboard pocket or the top of the dashboard as a place to put items that could roll, which could interfere with your driving. You and others could be seriously injured.

Choose Your Footwear Suitable for Driving

⚠ Warning

Choose footwear that ensures proper operation of pedals when driving the vehicle. Use of footwear unsuitable for driving may cause an accident.

Starting the Engine

Do not keep the engine control switch in the START position for more than about 10 seconds. Operating the starter for too long might cause starter and battery failure or may result in overheating.

When the engine does not start, wait for 20 to 30 seconds and then turn the engine control switch again.

Before starting the engine sit in the driver seat, check that the parking brake is firmly engaged, the selector lever is in the P or N (P is preferred) position and the shift indicator also shows P or N, and firmly press the brake pedal to start the engine. See *Ignition Positions* ⇨ *156*.

1. Make sure that the selector lever is in the P or N position and firmly press the brake pedal.

2. When the engine control switch is turned to the ON position, the wait-to-start light comes on and it goes out in about 1 second when the engine is warm, to about 10 seconds when the engine is cold.

3. After confirming that the wait-to-start light has gone out, turn the engine control switch to the START position to start the engine. Release the engine control switch as soon as the engine starts.
4. Do not crank the engine for more than 10 seconds at a time. If the engine does not start, wait 20 to 30 seconds with the engine control switch in the LOCK or ACC position before trying to start again.

It is normal for the vacuum warning buzzer to sound for a few seconds after the engine has started.

After the engine has started, check to be sure the selector lever is still in the P position.

This engine has an automatic warm-up system that increases engine idle speed and applies the exhaust brake. Allow sufficient time to let the engine circulate lubricant oil before driving. This usually requires 30 seconds to 2 minutes depending on ambient conditions. See *Brake System Warning Light* ⇨ *79*.

The turbocharged engine should be started in a way which ensures the bearings supporting the rotating parts of the turbocharger are sufficiently lubricated. Do not race a cold engine.

At low ambient temperatures, a cold engine may emit more smoke than usual.

Do not drive the truck until the engine has had sufficient time to circulate the lubricant oil. This usually requires 30 seconds to 2 minutes depending on ambient conditions. This will help reduce white start-up smoke.

Preheating : Diesel engines are compression ignited, which makes them difficult to start when they are cold because the compression alone cannot create a temperature high enough for fuel to ignite.

Preheating means warming the compressed air inside the combustion chambers to facilitate engine starting. Be sure to start the engine after the wait-to-start light has gone out.

Start : Do not press the accelerator pedal at the engine start. The accelerator opening degree at the engine start is electronically controlled.

Warm-up : Do not race the engine to speed warm-up.

Cold Weather Starting

If you plan ahead for cold weather, starting and driving your vehicle should be no problem. The following tips will help ensure good starting in cold weather.

Oil gets thicker as it gets colder, which slows down the engine cranking speed. For diesel vehicles, the diesel engine functions by the heat of compression (and glow plugs when cold), rather than through the use of spark plugs as in a gasoline engine. So, your engine must crank faster than a gasoline engine before it will start.

To be sure the engine can turn fast enough to start, use SAE 10W-40 viscosity engine oil when prevailing temperatures drop below 0 °C (32 °F). See the oil quality and oil viscosity recommendations. Using the proper viscosity oil will make starting easier down to -23 °C (-10 °F). When prevailing temperatures drop below -23 °C (-10 °F), the optional engine block heater may be needed for starting.

Maintenance Items to Aid Cold Weather Starting

Since the basic principle of diesel engine ignition is based on compression, the diesel engine is somewhat harder to start than a gasoline engine when the temperature is below freezing.

To help prevent hard starting problems, special attention should be given to following normal maintenance items:

1. Neglecting to have the fuel filter and water separator serviced can be one of the major contributors to hard starting. If water is permitted to accumulate in the primary filter, it will freeze and make starting the engine impossible.
2. Make sure the fuel tank vent is open.
3. Always refuel at the end of a day's operation. Moisture will condense in an empty tank; therefore, the tank should be filled before leaving the vehicle standing for an extended period.

Do not use starting aids in the air intake system. Such aids can cause immediate engine damage. See *Fuel for Diesel Engines* ⇨ *225*.

Stopping the Engine

When stopping the diesel engine, take the following steps:

1. Bring the vehicle to a complete stop.
2. Firmly apply the parking brake.
3. Move the selector lever to the P position and make sure that the shift indicator shows P.
4. Allow the engine to idle for approximately 3 minutes.
5. Turn the engine control switch to the ACC or LOCK position.

Do not shut down the engine immediately after driving the vehicle. Otherwise, a seizure or other failures may result.

To prevent the battery from going dead, turn the engine control switch to the ACC or LOCK position after stopping the engine. If you leave the vehicle for an extended period of time, place the engine control switch in the LOCK position.

Let the engine idle for 3 minutes before shutting off the engine. This allows the turbocharger to slow down while keeping the bearings lubricated.

If the Vehicle Has Not Been Used for a Long Period

If a diesel vehicle has been standing for an extended period of time, the turbocharger bearings should be pre-lubricated prior to starting. See your authorized dealer for more detailed information.

Before using a vehicle that has not been driven for a long period, check the engine and transmission for oil leakage, and make sure the oil is at the required levels. If there is insufficient oil, it will not adequately reach and lubricate components, and a breakdown will result.

Start the engine and allow it to idle for at least five minutes. Check for abnormal noises.

For instructions on warming up the engine, refer to “Starting the Engine” previously in this section.

For diesel vehicles, if 1 year has passed since the diesel exhaust fluid (DEF) in the DEF tank was added, the DEF in the tank should be replaced. Be careful not to inhale the ammonia odor when replacing the DEF. Also, please contact your nearest dealer about the replacement work.

Operating Temperature

Recommendations for Warming Up the Engine

The engine is sufficiently warmed up when the needle of the engine coolant temperature gauge starts to move.

Do not race the engine or quickly accelerate before the engine has sufficiently warmed up. Oil would not have adequately reached and lubricated components, and a breakdown may result.

The exhaust pipe becomes extremely hot while the engine is idling. Before warming up the engine, make sure there is no flammable material, such as grass, waste paper, oil, or old tires near the exhaust pipe.

Engine Warm-up System

During cold ambient conditions, the automatic engine warm-up system operates to reduce engine warm-up time during idling.

Automatic Engine Warm-up :
When the engine is idling with the engine coolant temperature below 62 °C (144 °F), the engine warm-up system automatically closes the exhaust brake and increases engine idle speed so that the engine is warmed more quickly. Warm-up is cancelled when the accelerator pedal is depressed, and resumed when the pedal is released. Warm-up is automatically cancelled entirely after the engine coolant temperature rises above 65 °C (149 °F).

Winter Cover

- Do not cover the front of the radiator with newspapers, cardboard or any other flammable material to raise the engine coolant temperature.
- If you allow the engine to warm up but the engine coolant temperature does not rise, have the nearest dealer inspect the thermostat.

Radiator Grille Covers

⚠ Warning

Radiator shutters, winter fronts, or grille covers are not to be used and may cause the engine's radiator cooling fan to fatigue from the alternate unloading and loading of the blades as they pass by the masked area followed by the unmasked area. After the fan has been fatigued, it may suddenly break apart while rotating, possibly causing personal injury to anyone standing nearby, and equipment damage. You and others could be seriously injured.

Engine Heater

Engine Block and Oil Pan Heater

If the vehicle is parked in a garage, the block and pan heaters should not be needed until the garage temperature drops below −23°C (−10°F) regardless of outside temperature.

The engine block and oil pan heaters are designed to warm the block and oil pan areas that will let the engine run faster. To use the heaters:

1. On single cab vehicles, tilt the cab.
2. Unwrap the electrical cord and remove the protective cap.
3. Plug the cord into any three-prong 110 volt outlet (normal household current). It may require several hours to sufficiently heat the engine. Outside temperature, oil viscosity, etc., will affect how long the block and oil pan heater should remain plugged in. Contact your dealer for the conditions in your area.
4. After using the heater(s), be sure to restore the cord properly, to help keep it away from moving engine parts.

If the cord is too short, use a heavy duty, three-prong extension cord. Do not use an extension cord such as you would use for a lamp, because the cord may overheat.

The engine should go through a warm-up period to warm up the engine oil before placing engine under load. This will ensure proper lubrication of the engine. See *Cab Tilting* ⇨ *240*.

Engine Alarm and Automatic Shutdown (Diesel Only)

If the system senses any of the following conditions: high engine temperature, low engine oil pressure or low engine coolant, the corresponding warning light and engine alarm (shutdown) warning light will come on. If the engine alarm (shutdown) warning light comes on, you will also hear a tone alarm.

If your vehicle has the engine shutdown feature, your engine will shut down in 30 seconds.

Pull safely off the road and shut off the engine. Do not start it until the cause of the problem is known, and the problem is fixed. However, if the engine shuts down when you are still in traffic, you can restart the engine and get another 30 seconds of operation. Do this only if you have to, since there is a problem that can harm the engine if it is not fixed. See *Engine Shutdown Warning Light* ⇨ *85*.

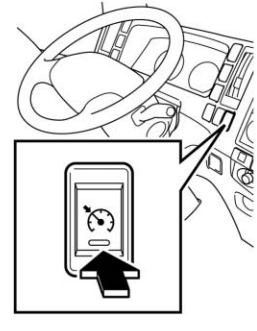
Idle Shutdown

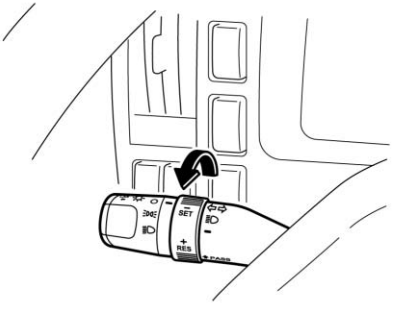
On vehicles with a diesel engine, Idle Stop is a dealer programmable function which will automatically turn off the engine, at idle, when specific programmed conditions are met. See your dealer for details. When the Idle Stop light comes on, it alerts you that programmed conditions have been met and the engine is about to shut down. This light stays on after the engine has stopped. This indicator light will come on when the engine control switch is turned to the ON position and then should go out after approximately 3 seconds.

If the idling stop function does not initiate, a transmission related problem may have occurred. Please contact your dealer. (There is a Diagnostic Trouble Code (DTC) that inhibits the idling stop function when the Check Trans warning light is not illuminated).

High Idle System (Gasoline Only)

Use high idle mode to increase engine idle speed to 1,200 r/min when the vehicle is stationary.





Activating High Idle Mode

Follow the below procedure to activate the high idle mode:

1. Set the parking brake.
2. Set the selector lever in P (Park) or N (Neutral) position.
3. Do not press the brake pedal.
4. Press the cruise control main switch to set it to ON. At this time, the operation indicating light will turn to green.
5. Turn and hold the cruise control set switch in the SET position. After approximately 3 seconds the cruise control set indicator light will begin to flash slowly and the engine idle will increase to 1,200 r/min.

Canceling High Idle Mode

Any of the following actions will cancel high idle mode.

- The cruise control main switch is set to OFF.
- The brake pedal is pressed.
- The parking brake is released.
- The selector lever is moved from P (Park) or N (Neutral) position.
- The accelerator pedal is pressed, accelerating the engine beyond the engine speed threshold.

The cruise set indicator light will stop flashing and the engine speed will return to normal.

Engine Checks Before Operating

Checks Before Operating

Allow the engine to warm up before placing the engine under heavy load driving. While the engine is warming up under light load, the following checks should be made:

1. Observe the red engine oil pressure warning light. The light should go out when the engine is running. If it stays on, shut the engine off and find the cause.
2. Look at the engine coolant temperature gauge. If the gauge reaches the H (HOT) area, stop the engine and find the cause of the overheating.
3. Check that the battery warning light has gone out. The light should go off and stay off at normal idle speeds. If the light does not go out or comes on during normal operation, have the charging system checked.

4. Check that the brake low vacuum warning light is out and that the vacuum buzzer is not sounding. It is normal for the warning buzzer to sound for a few seconds after the engine starts. If the light and buzzer remain on, do not drive the vehicle until the cause has been found and corrected.
5. Look at the brake system warning light. It should be out when the parking brake is released and the engine is running. If it stays on, it could mean that the brake fluid level is low. Check the brake fluid reservoir. This condition must be corrected before moving the vehicle.

⚠ Warning

To reduce the chance of personal injury and/or vehicle damage due to engine overheating, never leave the engine idling without an alert driver present. If the engine

(Continued)

Warning (Continued)

should overheat, as indicated by the engine coolant temperature gauge, immediate action is required to correct the condition. Continued operation of the engine, even for a short time, may result in a fire.

For vehicles with a diesel engine, do not engage the exhaust brake while the engine is idling as this may cause engine overheating. You and others could be seriously injured.

Avoid Unnecessary Idling of the Diesel Engine

If the diesel engine idles too long, the engine coolant temperature will fall below the operating range. Low engine operating temperature causes several conditions that are harmful to engine operation and life.

Incomplete combustion of fuel in an engine that is not fully warmed-up causes crankcase dilution and forms lacquer and gummy deposits on valves, pistons, and rings. It also causes rapid accumulation of sludge within the engine.

Parking over Things That Burn

⚠ Warning

Exhaust parts and gases become very hot when the DPF is being regenerated.

Parking over flammable items could allow them to touch hot exhaust parts under your vehicle and cause them to ignite. Do not park over papers, leaves, grass or other things that can burn. You and others could be seriously injured.

Keep Flammable Material Away from the Vehicle

The exhaust pipe is extremely hot immediately after vehicle operation. Before parking, make sure the area is free of flammable material (for

example, grass, waste paper, oil or old tires). Take particular care when parking in a garage.

Use caution concerning exhaust gases while the engine is idling. For diesel vehicles, be particularly careful when the power take-off (PTO) is operating (if your vehicle is equipped with a PTO) or the DPF is regenerating while the engine is idling. See *Diesel Particulate Filter* ⇨ *173*.

⚠ Warning

It is not recommended that this vehicle be parked, idled or operated over combustible materials such as grass or leaves. They could touch the hot exhaust system and start a fire. This is particularly important if the exhaust system has not been properly maintained. Combustible materials could catch fire from hot exhaust gases, soot, or sparks that could escape through

(Continued)

Warning (Continued)

corrosion holes or cracks. You and others could be seriously injured.

If operating, parking or idling your vehicle off-road is unavoidable, such as in farming, lumbering, commercial or recreational use:

- The driver should be aware that combustible materials could catch fire from the vehicle's hot exhaust system.
- Carry a fire extinguisher with the vehicle at these times.
- Avoid driving your vehicle through or over combustible materials such as leaves, grass vegetation or stubble high enough to touch, catch or collect on its hot exhaust system.

(Continued)

Warning (Continued)

- Parking or idling should be done only in an area where there are no combustible materials under the vehicle. Failure to follow these instructions could damage your vehicle or nearby property.

Engine Exhaust

Engine Exhaust Emissions Caution (Carbon Monoxide)

⚠ Warning

Do not breathe exhaust gas because it contains carbon monoxide, which by itself has no color or odor. Carbon monoxide is a dangerous gas. It can cause unconsciousness and can be lethal.

Do not keep the engine running for any length of time in a place that is poorly ventilated. It is particularly dangerous to run the engine in a garage or other indoor place that could easily fill with exhaust gases because you could suffer carbon monoxide poisoning.

Inspect the exhaust pipe from time to time. If you notice any defect (for example, a damaged joint, or a hole or crack caused by

(Continued)

Warning (Continued)

corrosion), have checks and maintenance performed by the nearest dealer. Continuing to use the vehicle without having the defect repaired would be dangerous because exhaust gases could get into the cab and cause carbon monoxide poisoning.

If at any time you think exhaust fumes are entering the cab, have the cause determined and corrected as soon as possible. If you must drive under these conditions, drive only with all windows fully open. Prevent carbon monoxide from entering the cab. The best way is to keep the engine exhaust system, cab and cab ventilation system properly maintained.

We recommend that the exhaust system and cab be inspected by a competent technician:

(Continued)

Warning (Continued)

- Each time the vehicle has an oil change.
- Whenever a change is noticed in the sound of the exhaust system.
- Whenever the exhaust system, underbody or cab is damaged or becomes corroded.

To allow proper operation of your vehicle's ventilation system, keep the air inlet grille clear of snow, leaves or other obstructions at all times. Do not park with the engine running or idle this vehicle for more than 10 minutes with the ventilation system control switch in the OFF position. Even with the ventilation system on, running the engine while parked or stopped for longer periods of time is not recommended. Entry of carbon monoxide into the cab is possible with a poorly repaired, damaged,

(Continued)

Warning (Continued)

or corroded exhaust system or cab. Do not run the engine in confined areas (such as garages, next to a building or near another stopped vehicles with engine running) any more than needed to move the vehicle.

When the vehicle has to be stopped in an unconfined area with the engine running for any more than a few minutes, take the following steps:

- Adjust the heating or cooling system to force outside air into the cab.
- With temperature and outlet selector knob in any position:
- Set the air selector lever to the fresh air position.
- Set the fan speed control knob to the maximum speed position.

(Continued)

Warning (Continued)

- Keep the exhaust tailpipe area clear of snow and other material to help reduce the buildup of exhaust gases under the vehicle.

This is particularly important when parked in blizzard conditions. You and others could be seriously injured.

See *Climate Control Systems* ⇨ *120* and *Maintenance Schedule* ⇨ *328*.

Running the Vehicle While Parked

Caution

To reduce the chance of personal injury and/or vehicle damage due to engine overheating, never leave the engine idling without an alert driver present. If the engine

(Continued)

Caution (Continued)

should overheat, as indicated by the engine coolant temperature gauge, immediate action is required to correct the condition. Continued operation of the engine, even for a short time, may result in a fire. Do not engage the exhaust brake while the engine is idling as this may cause engine overheating.

Avoid Unnecessary Idling of the Diesel Engine

If the engine idles too long, the engine coolant temperature will fall below the operating range. Low engine operating temperature causes several conditions that are harmful to engine operation and life. Incomplete combustion of fuel in an engine that is not fully warmed-up causes crankcase dilution and forms lacquer and gummy deposits on valves, pistons, and rings. It also causes rapid accumulation of sludge within the engine.

Diesel Particulate Filter

Diesel Particulate Filter (DPF)

The DPF purifies diesel exhaust gases of particulate matter (PM). PM is filtered from the exhaust gas and collected in the DPF. When PM is collected to the predetermined level by the engine control module, the DPF automatically burns the PM in a process called regeneration.

Regeneration may not be completed under certain driving conditions. If this occurs, the multi-information display (DIC) will provide prompts to properly complete DPF regeneration.

The following sections will provide details on DPF regeneration. Follow the steps carefully to keep the DPF in good working order. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*, *Recommended Fluids and Lubricants* ⇨ *358*, and *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*.

⚠ Warning

Exhaust parts and gases become very hot when the DPF is being regenerated.

Parking over flammable items could allow them to touch hot exhaust parts under your vehicle and cause them to ignite. Do not park over papers, leaves, grass or other things that can burn. You and others could be seriously injured.

This content is to restore the function of the DPF and it is not a malfunction. However, the check engine malfunction indicator light and reduced engine power indicator light may come on and the power output may be limited if driving or power take-off (PTO) operation is continued for a long time with the regeneration required warning light or selectable (switch) regeneration required warning light (amber/red) on.

This is to prevent the DPF from being damaged. When operating PTO during parking, check to ensure that the regeneration required warning light or selectable (switch) regeneration required warning light (amber/red) on the DIC is not on.

Engine oil that supports DPF (low ash oil) is recommended. Use of low ash oil extends the maintenance interval of the DPF filter.

Do not modify the DPF or exhaust pipe. Changing the alignment, length or diameter of the exhaust pipe would adversely affect the exhaust system's exhaust emission reduction function. If any modification is necessary to install a component to the rear of the vehicle, consult your dealer.

Although the DPF filter automatically undergoes regeneration (burning of the accumulated PM) when a certain amount of PM has accumulated, driving conditions can prevent completion of regeneration.

The selectable (switch) regeneration required warning light (amber) will turn on when regeneration cannot be completed automatically. Perform Running or Switch regeneration in accordance with the proper procedure. This is to restore DPF function and is normal.

The exhaust pipe mixes air with the exhaust gas to lower its temperature before it leaves the exhaust pipe.

The frequency of regeneration increases especially under the following environments:

- Midwinter.
- Continuous low-speed driving for long hours (The frequency of regeneration increases particularly with special equipment vehicles such as sweeper vehicles which mainly travel at low speed. The frequency of regeneration is higher as compared to delivery vehicles which mainly travel at standard high speed).

Automatic regeneration is performed under normal driving conditions (DPF soot accumulation status level 5, and in rare cases, may be performed at continuously low-speeds for long hours, except PM level 5); however, the regeneration required warning light (amber) may be displayed in the DIC under the following driving conditions:

- When only low-speed driving at/ under vehicle speed of 15 km/h (9 MPH) is performed.
- When frequent engine start and stop are performed.
- When the engine stops every time before the engine is warmed up.
- When continuous idling (over 1 hour) is frequently performed.

If the vehicle is stationary with the engine idling during DPF regeneration, the exhaust brake or exhaust throttle operates. Operating sounds will be heard when the exhaust brake or exhaust throttle is activated or deactivated. The sounds do not indicate a fault.

White smoke could be emitted briefly from the exhaust pipe in the following situations, but it is not indicating a fault.

- Combustion of PM during DPF regeneration.
- During DPF regeneration of a new vehicle which has been driven a certain distance. The vehicle may not emit white smoke during its initial operation when new.
- Long continuous idling.

The exhaust brake may automatically be activated in order to prevent emission of white smoke if the engine idles continuously over an extended period of time.

White smoke may be produced during switch regeneration; do not perform switch regeneration in any poorly ventilated indoor place.

DPF PM Accumulation Level

This green display only indicates DPF soot accumulation status. The DIC can display the PM accumulation level in green. The L indicates Low accumulation of PM and the H indicates High accumulation of PM in the DPF.

As PM accumulation increases inside the DPF, the DIC will display additional bars increasing from L to H to show the approximate level of PM accumulation. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

DPF Regeneration Status

This amber display indicates the DPF is regenerating. During DPF regeneration, the DIC can display the status of PM reduction in amber. The highest accumulation level bar will be flashing as indication of the regeneration process.

As PM levels decrease in the DPF during the regeneration process, the DIC will decrease the number of bars from H to L. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

Automatic Regeneration of DPF

The DPF will regenerate itself as part of normal operation.

The engine control module (ECM) controls this function based on several factors including hours of operation and mileage. When automatic regeneration starts, the regeneration in progress indicator light (amber) is displayed on the DIC.

During regeneration the engine idle speed will increase and the exhaust brake may activate when the vehicle is idling while stopped or parked. Regeneration is normally completed in about 20 minutes. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

⚠ Warning

To prevent fire, ensure that there is no combustible material near the muffler, the DPF or the exhaust pipe. Also, be careful not to burn yourself on the hot exhaust gas. You and others could be seriously injured.

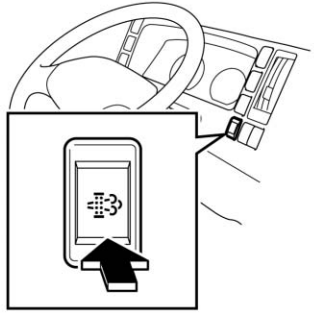
The DPF performs regeneration automatically when a certain quantity of PM accumulates in the filter.

Depending upon running conditions, however, the regeneration may sometimes not be completed. In this case, the regeneration required warning light (amber) will come on, so promptly operate the emergency regeneration according to the Emergency Regeneration Procedure. This operation recovers the function of the DPF. It does not mean that a breakdown has occurred.

The engine speed may increase and the exhaust brake may activate while the vehicle is stopped with the engine idling. When this occurs, the DPF is automatically regenerated. This does not indicate a failure.

The system generates a sound during the automatic regeneration and its cancellation. This does not indicate a failure.

DPF Switch



The DPF switch is used to burn PM (regenerate the filter). You can initiate regeneration when the regeneration required warning light or selectable (switch) regeneration required warning light turns on with short repeated beeps.

Continuing driving without performing the regeneration will cause the check engine malfunction indicator light and reduced engine power indicator light to come on. The DPF then must be repaired at the nearest dealer.

Emergency Regeneration Procedure

If the regeneration required warning light (amber) or selectable (switch) regeneration required warning light (amber) turns on the DIC, the DPF could not satisfactorily complete automatic regeneration and driver action is required. If the regeneration required warning light (Not selectable (switch) regeneration warning light) is turned on, you can choose from Running regeneration or Switch regeneration in order to complete the DPF regeneration.

If the selectable (switch) regeneration required warning light turns on, you have to perform Switch regeneration in order to complete the DPF regeneration. If you continue driving too long with the regeneration required warning light (amber) or selectable (switch) regeneration required warning light (amber) displayed on the DIC without performing one of the possible regenerations, the message will change to red Regeneration Required warning light or selectable (switch) regeneration required warning light.

The red regeneration required warning light or selectable (switch) regeneration required warning light indicates the DPF filter is nearly full of PM, a condition which may be damaging to the filter.

DPF regeneration should be completed immediately if the red regeneration required warning light or selectable (switch) regeneration required warning light is displayed on the DIC.

Continuing to drive without performing DPF regeneration will cause the check engine malfunction indicator light and reduced engine power indicator light to come on, an engine power reduction, and may cause damage to the DPF filter. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

Running Regeneration Procedure

Use this option for completing DPF regeneration, if driving conditions and traffic allow you to maintain a relatively constant speed above 48 km/h (30 MPH) for about 20 minutes.

Follow the steps below to use Running regeneration:

1. Determine if road and traffic conditions allow for relatively constant speeds above 48 km/h (30 MPH).
2. Increase the vehicle speed above 48 km/h (30 MPH) and keep a constant speed.
3. When vehicle speed, engine coolant temperature and other factors are met the engine control module (ECM) will begin DPF regeneration and the regeneration in progress indicator light (amber) will appear on the DIC.
4. Continue driving until the regeneration in progress indicator light (amber) goes off. When this indicator light goes off the DPF regeneration is complete.

See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

While the vehicle is at a stop with engine idling, the engine speed increases.

Switch Regeneration Procedure

⚠ Warning

To prevent a fire, make sure that there is no flammable material near the muffler, DPF and exhaust pipe. Remember that the temperature of exhaust gases is high enough to burn you. You and others could be seriously injured.

Select Switch regeneration procedure if the Running regeneration procedure is not possible, or if the selectable (switch) regeneration required warning light (amber or red) is displayed on the DIC.

1. Stop the vehicle at a safe place free of flammable material such as dead grass, leaves or waste paper.
2. Move the selector lever into the P position and firmly engage the parking brake.
3. Let the engine idle. Be sure the accelerator pedal is not pressed and the PTO switch (if equipped) is OFF.
4. Press and release the DPF switch.
5. The regeneration required warning light (amber or red) or selectable (switch) regeneration required warning light (amber or red) on the DIC will turn off and the regeneration in progress indicator light will appear.
6. Do not leave the vehicle during the regeneration. Regeneration normally completes in about 20 minutes.
7. When the regeneration in progress indicator light (amber) goes out, regeneration is completed. Normal driving is then possible.

If the Switch regeneration is interrupted, a selectable (switch) regeneration required warning light (amber) will appear on the DIC. You must complete the DPF regeneration by performing the Switch regeneration once again as soon as possible.

If you continue driving too long with the selectable (switch) regeneration required warning light (amber) displayed on the DIC, the message will change to red. The selectable (switch) regeneration required warning light (red) indicates the DPF filter is nearly full of PM, a condition which may be damaging to the filter.

DPF regeneration should be completed immediately if the selectable (switch) regeneration required warning light (red) is displayed on the DIC.

Continued driving without performing DPF regeneration will cause the check engine malfunction indicator light and reduced engine power indicator light to come on, an engine power reduction, and may cause damage to the DPF filter. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

When operating the PTO for a long time if your vehicle is so equipped, make sure that the regeneration required warning light or selectable (switch) regeneration required warning light (amber) is not turning on.

Once the Switch regeneration is started, it cannot be switched to the Running regeneration if interrupted.

When the Switch regeneration is selected, end regeneration in a single operation if possible.

During the regeneration, the engine speed may vary, causing the exhaust brake valve to be deactivated. However, while the regeneration in progress indicator light (amber) appears, regeneration is still taking place, so continue to perform regeneration until the message goes off.

The time needed to complete regeneration differs depending on the outside temperature.

The exhaust brake or exhaust throttle is activated during DPF regeneration. The exhaust brake or exhaust throttle starting to operate or being disengaged will produce a sound, but this does not indicate a failure.

During regeneration, white smoke may be temporarily produced from the exhaust pipe. This results from combustion of PM, it does not indicate a failure.

Switch regeneration will complete earlier immediately after driving than when the engine is cold.

The engine coolant temperature may rise during switch regeneration.

Interruption of Switch Regeneration

If you must interrupt regeneration for an unavoidable reason, press the DPF switch again.

The regeneration in progress indicator light (amber) changes to the selectable (switch) regeneration required warning light (amber). Then, you can drive the vehicle. If you interrupt regeneration, you need to perform regeneration again.

Perform switch regeneration beginning with Step 1 as soon as possible.

Switch regeneration will be interrupted in the following circumstances:

- Accelerator pedal is pressed.
- Gear-in.
- Vehicle speed is above 0 km/h (0 MPH).
- Engine speed increases.

Operation noise caused by interruption is louder when pressing the accelerator pedal than other operations. This is not a failure.

Selectable Regeneration Procedure

Your vehicle is equipped with Selectable Regeneration. This procedure is designed for vehicles that do not normally operate in conditions that make automatic regeneration possible. This function allows the driver to check the status of the PM level and, when available, perform Switch regeneration at a convenient time for the driver.

Selectable regeneration may only be performed when no other DPF message is present on the DIC. Be sure to follow any DPF messages present on the DIC to properly complete a DPF regeneration.

It is recommended to use the procedure during breaks in PTO operation (if equipped) and other low speed applications.

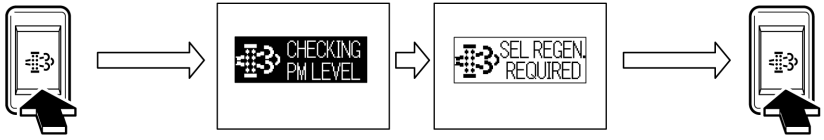
⚠ Warning

Do not leave the vehicle during the regeneration.

Make sure that there are no flammables near the muffler, DPF and exhaust pipe which may result in a fire.

Remember that the temperature of exhaust gases is high enough to burn you. You and others could be seriously injured.

1. Stop the vehicle at a safe place free of flammable material such as dead grass, leaves or waste paper.
2. Move the selector lever into the P position and firmly engage the parking brake.



3. Run the engine at idle. Be sure the accelerator pedal is not pressed and the PTO switch (if equipped) is OFF.
4. Press and hold the DPF switch until the amber checking PM Level indicator light appears on the DIC.
5. If Selectable regeneration is available, the selectable (switch) regeneration required warning light (amber) will appear on the DIC. If this indicator light does not appear on the DIC, the PM level in the DPF filter is OK and DPF regeneration is not needed at this time.
6. Press and release the DPF switch to begin regeneration.
7. The selectable (switch) regeneration required warning light (amber) will change to regeneration in progress indicator light.
8. Do not leave the vehicle during the regeneration. Regeneration normally completes in about 20 minutes, if the engine is at operating temperature. Regeneration may take longer if the engine is cold.
9. When the regeneration in progress indicator light goes out, the Selectable regeneration is complete.

If the Selectable regeneration is interrupted, a selectable (switch) regeneration required warning light (amber) will appear on the DIC. You must complete the DPF regeneration by performing the Switch regeneration as soon as possible when Selectable regeneration is interrupted.

If you continue driving too long with the selectable (switch) regeneration required warning light (amber) displayed on the DIC, the warning light will change to red. The selectable (switch) regeneration required warning light (red) indicates the DPF filter is nearly full of PM, a condition which may be damaging to the filter. DPF regeneration should be completed immediately if

the selectable (switch) regeneration required warning light (red) is displayed on the DIC.

Continued driving without performing DPF regeneration will cause the check engine malfunction indicator light and reduced engine power indicator light to come on, an engine power reduction, and may cause damage to the DPF filter. See *Vehicle Messages (Diesel Only)* ⇨ *91*.

The time needed to complete regeneration differs depending on the outside temperature.

The exhaust brake is activated during DPF regeneration. The exhaust brake starting to operate or being disengaged will produce a sound, but this does not indicate a failure.

During regeneration, white smoke may be temporarily produced from the exhaust pipe. This results from combustion of PM, it does not indicate a failure.

Regeneration is finished earlier immediately after driving than when the engine is cold.

The engine coolant temperature may rise during regeneration.

DPF Regeneration during Prolonged Idling

DPF regeneration may be initiated automatically during prolonged idling. If regeneration is initiated, the regeneration in progress indicator light (amber) comes on but this is normal and does not indicate a failure.

If driving is started or the PTO is connected during DPF regeneration by prolonged idling, the selectable (switch) regeneration required warning light (amber) comes on and regeneration is suspended. Perform Switch regeneration procedure in order to complete the DPF regeneration.

Prolonged idling may require more frequent DPF regeneration.

See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

Diesel Exhaust Fluid

Diesel exhaust fluid (DEF) is used exclusively for the selective catalytic reduction (SCR) system. Be sure to use only API certified DEF. When the SCR system detects DEF level is nearly empty or incorrect fluids (such as water or low concentrated DEF.) are added, the SCR system will turn on warning and indicator lights and reduce engine power in progressive stages to encourage you to have the condition corrected. Continuing to drive for too long after these lights come on will eventually result in a severe vehicle speed limitation. See *Vehicle Messages (Diesel Only)* ⇨ *91*

The DEF freezes below −11 °C (12 °F). The SCR system is equipped with a heating function which utilizes the engine coolant, so the engine can be started even when DEF is frozen.

Handling of DEF

Use only API certified DEF (or ISO: AUS 32). DEF is a colorless, transparent solution. It may smell depending on the conditions, but this is not abnormal.

DEF is available from your local authorized dealer. In addition, the U.S. Department of Energy has created an on-line DEF locator that can be accessed at http://www.afdc.energy.gov/afdc/locator/def/. The American Petroleum Institute (API) also maintains a list of API-certified distributors of DEF on its web page at http://www.apidef.org/searchresults.asp.

⚠ Warning

Though DEF should be harmless for physical contact, in the rare case in which it induces make sure to take following actions:

In the event that DEF does come into contact with your skin, wash it off with water and/or soap. Although it is rare, a person with sensitive skin may suffer from irritation. If you come into contact with DEF, flush the affected area with water and/or soap. If irritation or redness develops or persists, seek medical attention.

If it is accidentally swallowed, drink 1-2 glasses of water or milk and seek immediate medical attention.

If it does come into contact with an eye, immediately rinse it off with a large amount of water for at least 15 minutes, and then seek medical attention.

(Continued)

Warning (Continued)

You and others could be seriously injured.

See *Winter Driving* ⇨ *139*, and *Recommended Fluids and Lubricants* ⇨ *358*.

Adding DEF Before Driving the Vehicle

Add DEF regularly to maintain an adequate supply. If the DEF level becomes too low the DEF low level warning system may activate. The vehicle speed will be severely limited when the DEF tank is empty.

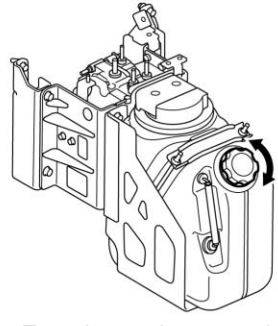
Be sure to obey the following instructions when refilling the vehicle:

- Stop the engine before adding DEF.
- When filling, place the nozzle deeply into the DEF tank. If you try to fill more DEF by pulling out the nozzle from the DEF tank, DEF may spill out.

- Obey all cautions posted in filling stations.
- When DEF is spilled, wash it away with water and wipe the area clean.
- Add API certified DEF only (or ISO: AUS 32). Do not fill the DEF tank with any substance other than the DEF.
- Any substance other than the DEF may cause a breakdown to the SCR system.
- Use the DEF handling equipment made of correct materials (Polyethylene or Stainless-steel).
- Avoid contamination from using dirty funnel for filling.
- If a fluid other than the specified DEF is mistakenly added, incorrect fluid may cause a failure. Have it inspected and serviced at a dealer immediately.
- Ammonia odor may be generated when the DEF is exposed to high temperature.
- Do not add DEF above the F position on the level gauge. DEF may leak from the breather hose while driving. Also, the sensor may be broken when DEF freezes.
- Do not put your feet on or stand on the DEF tank. The tank, pipe or sensors may be damaged.
- After stopping the engine, a flow sound may be heard from the DEF tank or DEF supply pump. This sound occurs as the DEF in the piping is returning to the tank, and does not indicate an abnormality.

See *Winter Driving* ⇨ *139*.

Adding DEF



1. Turn the engine control switch to the ACC or LOCK position and make sure to stop the engine.
2. Wipe off dust or dirt from around the filler port of the DEF tank.
3. Turn and remove the filler cap.
4. Refill the tank up to the F position in the level gauge on the front face of the tank. The DEF may overflow from the filler port if it is added in excess of the F position.

5. Tighten the cap after refilling is completed.
6. Wipe off DEF that is spilled at refilling.

⚠ Warning

On occasion, you may notice an odor when the DEF tank is opened. Do not sniff the filler port, etc.

When refilling the DEF tank: Failure to follow the above instructions could result in a fire or a breakdown of the selective catalytic reduction (SCR) system.

Do not dilute DEF with water.

Do not add substances such as gasoline or diesel fuel to the DEF tank. You and others could be seriously injured.

Caution

When opening the DEF tank cap, be careful not to let dirt or other foreign matter enter inside the DEF tank. Intrusion of foreign matter can cause a clogging of the filter or affect the quality of DEF, which may result in a SCR system failure.

If DEF is spilled on the body or frame, it may cause generation of rust, so wipe it off and then rinse it away with water.

When DEF dries it will leave a crystalline residue, this condition is normal. Wash with water or wipe away the residue to prevent it from entering the DEF tank.

Adding DEF in Cold Weather

DEF freezes at low temperature but the engine coolant circulates to thaw the DEF tank and to prevent DEF from freezing. Vehicle can be driven normally when DEF is frozen.

If the refill diesel exhaust fluid (DEF) warning light is on and the remaining DEF in the DEF tank is frozen, the warning lights, indicator lights and restriction will not be canceled until the DEF thaws even if the DEF tank is refilled.

It is not recommended parking the vehicle for long periods with the refill diesel exhaust fluid (DEF) warning light on in cold weather. The DEF gauge will not register correctly should the DEF freeze in this condition causing the DEF low level warning system not to reset when DEF is added. Take the following actions to avoid this condition in cold weather:

1. Refill the DEF as soon as possible after parking the vehicle.

2. Turn the engine control switch to the ON position from the LOCK position.
3. Wait for the warning buzzers and warning lights to turn off.
4. If the buzzer does not stop, return the engine control switch back to the LOCK position and add more DEF, and then start over from step (2) above.
5. Turn the engine control switch to the LOCK position.

The DEF freezes at approximately −11 °C (12 °F).

In cold weather, when the vehicle is left without performing these actions and the DEF tank freezes, the low DEF level warnings and indicators may not turn off when DEF is added until after the tank defrosts.

Make sure to stop the engine before adding the DEF. See *Warning Buzzers* ⇨ *96*.

When DEF Freezes

Engine coolant circulates through the DEF tank to thaw it when frozen and prevent it from freezing while the engine is running. The vehicle can be driven normally when DEF is frozen in the DEF tank.

If the Refill DEF warning light is on and the remaining DEF in the DEF tank is frozen, the vehicle low level warning system cannot be reset by adding DEF. The DEF gauge will not register correctly should the remaining DEF freeze at this level.

Move the vehicle to a location to allow the DEF to thaw. Once the DEF is thawed the DEF gauge should read correctly allowing the low level warning system to reset. To avoid this condition follow the instructions for Adding DEF in Cold Weather.

⚠ Warning

Do not warm up the DEF tank using a burner, heater, etc. You and others could be seriously injured.

DEF Storage

Seal the container and store it in an indoor place with good ventilation avoiding direct sunlight.

When storing DEF, the shelf life varies depending on the room temperature of the storage place. For details, please contact the distributor of the DEF.

For storage of DEF, seal the container to prevent the moisture from evaporating.

Even when DEF has been frozen, its quality is maintained when it is thawed. It can be used as it is.

To store or carry DEF, use the original container in which the DEF was kept at the time of purchase. Also, if other containers are used, prepare a clean container for exclusive use, which can be a polyethylene resin tank (PE) or stainless steel container, and do not introduce foreign matter such as water or contamination.

DEF Disposal

Do not dispose of DEF and the empty container into lakes, marine areas, rivers, etc. DEF must be disposed of in a method conforming to the regulatory requirements in your state.

Selective Catalytic Reduction (SCR) System

The Selective Catalytic Reduction (SCR) system reduces nitrogen oxide (NOx) emissions emitted from a diesel engine. The SCR system reduces NOx by adding (injecting) Diesel Exhaust Fluid (DEF) into the exhaust system and inducing a reaction converting NOx into water vapor and nitrogen.

The SCR system consists of the DEF tank, DEF Control Unit, DEF Supply Pump and Injector, and the SCR Catalyst. It is important to keep a good supply of DEF in the DEF tank at all times. Monitor the DEF gauge to be sure the DEF tank level does not become too low.

If the DEF level becomes too low or incorrect fluid is added to the DEF tank, the warning buzzer will sound, warning and indicator lights will come on and engine power will be reduced. If you see these warning and indicator lights, add DEF as soon as possible or have your vehicle serviced as soon as possible.

Continuing to drive for too long after these lights come on will result in additional warnings, more engine power reduction and will eventually result in a severe vehicle speed limitation. See “Diesel Exhaust Fluid (DEF) Low Level Warning” and “Incorrect Diesel Exhaust Fluid (DEF)/SCR System Malfunction Warnings” later in this section.

⚠ Warning

Do not touch the water that comes out from the muffler. The water is mildly acidified due to the action of oxidation catalyst inside the muffler. In the event that the fluid does come into contact with your skin, completely wash it off with water. You and others could be seriously injured.

Do not relocate or modify the exhaust pipe, muffler, DPF, SCR, or DEF tank, which may affect the exhaust gas cleaning performance. If any relocation or modification is necessary, consult your dealer.

The SCR system continues to operate for approximately 3 minutes after the engine control switch is turned to the "LOCK" position. It is normal to hear a buzzing type noise from the DEF supply pump (mounted on the left side frame rail behind the cab) during the shutdown process.

If it is necessary to disconnect the batteries for any reason, be sure to wait at least 3 minutes after turning the engine control switch to the "LOCK" position. This will allow the SCR system to properly complete its shutdown processes. See *Winter Driving* ⇨ *139*.

Diesel Exhaust Fluid (DEF) Low Level Warning

Diesel Exhaust Fluid (DEF) is a required fluid for the operation of your diesel engine just as diesel fuel is required. To avoid running out of DEF your vehicle will turn on warning and indicator lights and reduce engine power in progressive stages to encourage adding DEF.

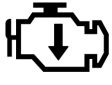
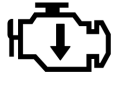
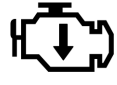
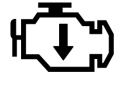
The following is a summary of the diesel exhaust fluid (DEF) low level warning lights, indicator lights and engine power reductions. Continuing to drive for too long after these lights come on will eventually result in a severe vehicle speed limitation.

These warning and indicator lights will go out automatically and engine power will be restored to normal after the SCR system detects that the DEF tank is refilled with DEF.

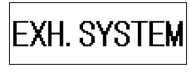
DEF Tank Level is Low/Empty

Stage	Stage 1	Stage 2	Stage 3	Stage 4
DIC main display				
DEF gauge (DIC sub display 2)	 Solid (amber)	 Blinking (amber)	 Solid (red)	 Solid (red)

DEF Tank Level is Low/Empty (cont'd)

Stage	Stage 1	Stage 2	Stage 3	Stage 4
Indicator light(s)	Solid	Slow blinking	Fast blinking	Fast blinking
				
Warning buzzer	1 short beep	3 short beeps *3	3 quick beeps *4	Continuous beeping
Restrictions	Vehicle speed is limited to 89 km/h (55 MPH)	Vehicle speed is limited to 56 km/h (35 MPH)	Vehicle speed is limited to 56 km/h (35 MPH)	Vehicle speed is limited to 8 km/h (5 MPH)
Required action	Refill DEF as soon as possible *1	Refill DEF tank immediately *1	Refill DEF tank immediately *1	Refill DEF tank immediately *1

DEF Tank Level is Low/Empty (cont'd)

Stage	Stage 1	Stage 2	Stage 3	Stage 4
CAUTION	 This message indicates incorrect DEF or an SCR system malfunction. Immediately contact your dealer to have your vehicle serviced *2			

Remarks:

*1 – See Diesel Exhaust Fluid (DEF).

*2 – See Incorrect Diesel Exhaust Fluid (DEF) /SCR System Malfunction Warnings.

*3 – The warning buzzer continues to sound every 5 minutes.

*4 – The warning buzzer continues to sound every 5 minutes and when driving 8 km (5 miles) or more, the buzzer changes its sound to continuous beeping.

DEF tank low stages are as follows:

Stage 1 : When the remaining level of DEF becomes excessively low the DEF gauge will change color from green to amber. In addition, warning and indicator lights will come on as shown in the table and engine power will be reduced so the vehicle speed will not exceed 89 km/h (55 MPH).

Stage 2 : If driving is continued without adding DEF (approximately 320 km (200 miles)) the DEF gauge, warning and indicator lights will begin blinking. Again, engine power will be reduced so the vehicle speed will not exceed 56 km/h (35 MPH).

Stage 3 : If driving is continued until the DEF tank is empty, the DEF gauge will change color from amber to red and the warning and indicator lights will begin to blink faster. Engine power will still be reduced so the vehicle speed will not exceed 56 km/h (35 MPH). The vehicle speed will be limited to 8 km/h (5 MPH) either when the vehicle is stopped after driving further on (approximately 8 km (5 miles)) or when the engine is restarted.

Stage 4 : The DEF gauge is red, the indicator light is blinking and the buzzer is beeping continuously indicates the vehicle speed is limited to 8 km/h (5 MPH). See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*.

Incorrect Diesel Exhaust Fluid (DEF)/SCR System Malfunction Warnings

The SCR system continuously monitors emissions reduction performance and SCR system malfunction (Type A or Type B).

When a malfunction or incorrect fluid (such as water or low concentrated DEF, etc.) is detected, the SCR system will turn on warning and indicator lights to encourage you to have the condition corrected.

In the case of incorrect fluid or if an SCR system malfunction (Type A) is detected, continuing to drive for too long after these lights come on may eventually result in a severe vehicle speed limitation.

The following is a summary of the warning lights, indicator lights and restrictions. When these warning and indicator lights come on the DIC, promptly have the vehicle inspected and serviced at a dealer.

In the case of SCR system malfunction (Type B), have the vehicle inspected and serviced at a dealer.

Incorrect DEF/SCR System Malfunction (Type A) Warnings

Stage	Stage 1	Stage 2	Stage 3	Stage 4
DIC main display	EXH. SYSTEM	EXH. SYSTEM	EXH. SYSTEM	EXH. SYSTEM
DEF gauge (DIC sub display 2)	Various	Various	Various	Various
Indicator light(s)		Slow blinking	Fast blinking	Fast blinking

Incorrect DEF/SCR System Malfunction (Type A) Warnings (cont'd)

Stage	Stage 1	Stage 2	Stage 3	Stage 4
Indicator light(s)	or	or	or	or
Warning buzzer	1 short beep	3 short beeps *1	3 quick beeps *2	Continuous beeping
Restriction	Vehicle speed: 89 km/h (55 MPH)	Vehicle speed: 56 km/h (35 MPH)	Vehicle speed: 56 km/h (35 MPH)	Vehicle speed: 8 km/h (5 MPH)

Remarks:

*1 – The warning buzzer continues to sound every 5 minutes.

*2 – The warning buzzer continues to sound every 5 minutes and when driving 8 km (5 miles) or more, the buzzer changes its sound to continuous beeping.

When the exhaust system warning light comes on DIC, promptly have the vehicle inspected and serviced at a dealer.

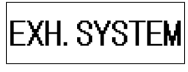
Stage 1 : When incorrect DEF or an SCR system malfunction (Type A) is detected, the warning and indicator lights will come on as shown in the table and engine power will be reduced so the vehicle speed will not exceed 89 km/h (55 MPH).

Stage 2 : If driving is continued for another approximately 160 km (100 miles), the warning and indicator lights will begin blinking. Again, engine power will be reduced so the vehicle speed will not exceed 56 km/h (35 MPH).

Stage 3 : If driving is continued for approximately 105 more km (65 miles), the warning and indicator lights will begin to blink faster. Engine power will still be reduced so the vehicle speed will not exceed 56 km/h (35 MPH). The vehicle speed will be limited to 8 km/h (5 MPH) either when the vehicle is stopped after driving further on (approximately 8 km (5 miles)) or when the engine is restarted.

Stage 4 : DEF indicator light is blinking quickly, the other warning lights are on and the buzzer is beeping continuously indicates the vehicle speed is limited to 8 km/h (5 MPH). See *Vehicle Messages (Diesel Only)* ⇨ *91*, *Malfunction Indicator Lamp (Check Engine Light)* ⇨ *78*, *Diesel Exhaust Fluid (DEF) Warning Light* ⇨ *85*, and *Reduced Engine Power Light* ⇨ *85*.

SCR System Malfunction (Type B) Warning

Stage	Stage 1
Trigger	SCR system malfunction detected
DIC main display	
DEF gauge (DIC sub display 2)	Various

SCR System Malfunction (Type B) Warning (cont'd)

Stage	Stage 1
Indicator light(s)	or
Warning buzzer	1 short beep
Restriction	–

When the exhaust system warning light comes on, promptly have the vehicle inspected and serviced at a dealer.

When a malfunction is detected in the SCR system, the warning and the indicator lights shown in the table come on. See *Vehicle Messages (Diesel Only)* ⇨ *91*, *Malfunction Indicator Lamp (Check Engine Light)* ⇨ *78*, and *Diesel Exhaust Fluid (DEF) Warning Light* ⇨ *85*.

When the Diesel Exhaust Fluid (DEF) Tank is Empty

If the DEF tank is empty and warning and indicator lights are on, you must follow below procedure to cancel the vehicle restriction:

1. Turn the engine control switch to the LOCK or ACC position, and add DEF.
2. After adding DEF, turn the engine control switch to ON position.
3. Wait until buzzer stops, warnings and indicators are turned off.
4. If the buzzer does not stop, return the engine control switch back to the LOCK position and add more DEF, and then start over from step 2 above.
5. Restart the engine.

It may take a while until the warning lights and indicators turn off and the buzzer stops after turning the engine control switch to the ON position.

It is desirable to fill up the tank with DEF to avoid DEF remaining level warning indication from reappearing.

When the outside temperature is low, refer to Adding DEF in Cold Weather. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*, *Brake System Warning Light* ⇨ *79*, *Warning Buzzers* ⇨ *96*, and *Winter Driving* ⇨ *139*.

Automatic Transmission

On an automatic transmission vehicle, the driver does not use a clutch pedal when pulling away, changing gears, or stopping. Only the selector lever, accelerator pedal, and brake pedal are used.

Practice learning the characteristics of the automatic transmission vehicle and how to correctly operate it. When the vehicle is stationary, remember to keep the brake pedal firmly pressed, and if necessary, move the selector lever in the P or N position and apply the parking brake.

Creep : With the engine running and a gear position other than P or N selected with the selector lever, power reaches the wheels even when the accelerator pedal is not pressed, causing the vehicle to tend to move.

Furthermore, the higher the engine speed, the stronger the creep and the greater the vehicle's tendency to move.

Starting

Start the engine in either the P or the N position. The engine should not start in any other selector position. If it does, something is wrong. Have your truck checked by your dealer as soon as possible.

Always apply either the foot brake or the parking brake before shifting into any driving position. This will prevent creeping.

The engine should be running at idle when shifting from P or N to one of the driving positions. See *Selector Lever* ⇨ *207*.

Caution

Do not apply water from a high-pressure washer nozzle directly to the electric connectors. Failure to observe this precaution can lead to faulty operation of the electrical system.

Caution

Never move the selector into the P position when the vehicle is in motion. This will damage the automatic transmission.

Firmly press the brake pedal to prevent the vehicle from moving even if it is stopped on a level road, and move the selector lever into P and firmly apply the parking brake as needed.

The engine speed rises and creeping will be stronger than usual during the conditions noted below. Keep the brake pedal firmly pressed:

- Immediately after engine start up.
- While the air conditioner is running.
- For diesel vehicles, during the diesel particulate filter (DPF) regeneration.

How to Use the Automatic Transmission

⚠ Warning

Before starting the engine, move the selector lever into P or N (P is preferred), make sure the shift indicator indicates P or N, pull up the parking brake lever and firmly press the brake pedal.

When moving the selector lever to any position other than P, be sure to press the brake pedal.

Never leave the driver's seat with the selector lever placed in D, 2, 1 or R (diesel engine), or D6, D4, 2, 1, or R (gasoline engine). The vehicle may start moving. When leaving the driver's seat, be sure to move the selector lever into P and securely set the parking brake.

(Continued)

Warning (Continued)

When you move the selector lever into D, 2, 1 or R (diesel engine), or D6, D4, 2, 1, or R (gasoline engine), creep will cause the vehicle to move.

When pulling away from a standstill, you must control the speed using only the accelerator pedal. Operate the accelerator pedal carefully.

Do not operate the selector lever while pressing the accelerator pedal. The vehicle may make a sudden start, possibly causing an accident.

For gasoline vehicles, do not drive the vehicle with the transmission in neutral. Not only will the engine brake not function, but the transmission will also be damaged.

You and others could be seriously injured.

When pulling away, visually check the position of the selector lever. If you always press the push button while operating the selector lever, the lever may occasionally move to the other gear position against your intentions.

Practice operating the selector lever between the N and D (diesel engine) or D6/D4 (gasoline engine) without pressing the push button.

Do not operate the selector lever while pressing the accelerator pedal. Doing so is dangerous because the vehicle would suddenly move.

Do not operate the automatic transmission at or near stall condition for more than five seconds. Stall condition is when the transmission is in one of the driving ranges, the engine is running at high speed, but the drive wheels are unable to move.

This condition might occur if the vehicle is stuck in deep sand or is pushing against a fixed barrier.

Operating the transmission at stall condition will result in overheating and damage.

Do not hold your vehicle on an upgrade with the accelerator pedal. Doing so will result in automatic transmission overheating and damage. Use the parking brake or foot brake to hold the vehicle on an upgrade.

Even if you plan to move only a short distance, sit in the correct driving position and make sure you can firmly press the brake and accelerator pedals.

When you reverse, you twist to look rearward so pedal operation becomes difficult. Firmly press the brake pedal. Also, practice returning the selector lever immediately to the N position after reversing. When pulling away, visually check the selector lever position and the shift indicator.

When the vehicle is stopped, do not keep pressing the accelerator pedal with the selector lever in a forward

gear or R position while pressing the brake pedal. Doing so may cause a breakdown.

Sit in the correct driving position, and use your right foot to operate the brake and accelerator pedals. To avoid accidentally pressing the wrong pedal, check the pedal positions and practice putting your foot on the desired pedal.

To start your vehicle:

1. Firmly press the brake pedal. After making sure the selector lever is placed into P or N, that P or N is shown in the shift indicator and that the parking brake lever is fully pulled up, place the engine control switch into the ON position.
2. Start the engine and move the selector lever into D (diesel engine) or D6/D4 (gasoline engine) for forward movement, or R for backward movement while firmly pressing the brake pedal with your right foot.
3. Make sure that the shift indicator indicates the correct gear (D (diesel engine) or D6/D4 (gasoline engine) for forward movement, or R for backward movement), release the parking brake, release the brake pedal, and then gradually press the accelerator pedal. The vehicles starts moving as you press the accelerator pedal further.

On a steep slope:

Make sure that the shift indicator indicates the correct gear (D (diesel engine) or D6/D4 (gasoline engine) for forward movement, or R for backward movement), check the area around the vehicle is clear, release the brake pedal with your right foot, and then slowly press the accelerator pedal.

After you feel the vehicle start moving, gradually release the parking brake lever and start driving the vehicle.

See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*, *Starting and Stopping the Vehicle (Gasoline Only)* ⇨ *158* or *Starting and Stopping the Vehicle (Diesel Only)* ⇨ *161*, and *Selector Lever* ⇨ *207*.

Normal Driving

When you move the selector lever from P into D (diesel engine) or D6 (gasoline engine), shifting takes place in the automatic mode. Check that D (diesel engine) or D6 (gasoline engine) is displayed in the shift indicator.

If the automatic transmission fluid temperature is too low, the transmission may not initially make automatic shift to the 4th, 5th, and 6th gear. This condition is normal and will be resolved as the fluid temperature rises.

To Accelerate

To accelerate when the accelerator pedal is pressed further, kickdown operates and the speed increases. The transmission will downshift at speeds below 88 km/h (55 MPH) for diesel vehicles, and below 112 km/h (70 MPH) for gasoline vehicles, to provide greater acceleration.

Kickdown

If you press the accelerator pedal fully while driving, in accordance with the current speed the gear automatically shifts down and the engine speed rises, enabling sufficient acceleration. This is called kickdown.

You can easily accelerate to the required speed when overtaking other vehicles or when joining traffic on a highway. In order to maintain speed when driving on an uphill road, as you gradually press the accelerator pedal the engine may automatically shift down in accordance to the current speed (shifts to a lower speed gear), increasing the engine speed and increasing vehicle speed.

Driving Uphill or Downhill

Uphill driving:

With the selector lever in D (diesel engine) or D6/D4 (gasoline engine), if you press down on the accelerator pedal, kickdown (change to a low speed gear) may operate causing the engine revolutions to suddenly increase (increasing the speed).

Driving for a prolonged duration on an uphill road with the selector lever in D (diesel engine) or D6/D4 (gasoline engine) may cause the automatic transmission fluid to overheat.

For vehicles with a diesel engine, drive with the overdrive off switch ON to keep the engine revolutions constant to enable smoother driving with fewer changes in engine revolutions.

For vehicles with a gasoline engine, drive with the selector lever in the D4 position to keep the engine revolutions constant to enable smoother driving with fewer changes in engine revolutions.

Driving conditions	Selector lever position
Normal uphill road	Diesel engine – D (overdrive off switch ON) Gasoline engine – D4
Steep uphill, steep slope, mountain road with many sharp curves	2 or 1
Long uphill road	2

Downhill driving:

Do not overuse the foot brake. This will cause the brakes to overheat, reducing their effectiveness. On long downward slopes or sharp downhill sections of road, use the engine brake together with the foot brakes to control the speed.

On vehicles with a diesel engine, when the selector lever is in the D position, you can drive with the overdrive off switch ON to allow a gentle engine brake to be applied.

On vehicles with a diesel engine, push the overdrive off switch to the ON position at speeds below 135 km/h (84 MPH) to increase engine braking action when traveling downgrade.

On vehicles with a gasoline engine, with the selector lever in the D4 position at speeds below 121 km/h (75 MPH) to increase engine braking action when traveling downgrade.

You can increase engine braking by driving with the selector lever in the 2 position.

To apply a stronger engine brake on sharp downhill sections, shift the selector lever to the 1 position when required.

See *Control of a Vehicle* ⇨ *127*.

Driving at Low Speeds for Sustained Periods

On vehicles with a diesel engine, any low speed applications such as sweeper, road marking machinery, trash collectors, highway striping or moving, etc. require the following treatment to prevent the automatic transmission fluid (ATF) from overheating:

Select 1 position during low speed operation under 28 km/h (17 MPH).

Select 2 position during low speed operation under 53 km/h (33 MPH).

On vehicles with a gasoline engine, any low speed applications such as sweeper, road marking machinery, trash collectors, highway striping or moving, etc. require the following treatment to prevent the automatic transmission fluid (ATF) from overheating:

Select 1 position during low speed operation under 36 km/h (22 MPH).

Select 2 position during low speed operation under 61 km/h (38 MPH).

See *Automatic Transmission Fluid Temperature Warning Light* ⇨ *82*.

To Stop Your Vehicle

1. To temporarily stop the vehicle, press the brake pedal firmly while the selector lever is in D (diesel engine) or D6/D4 (gasoline engine).
2. Use the parking brake as required. Press the brake pedal firmly, and firmly apply the parking brake.

   If the vehicle is stationary for a long time, move the selector lever into the N or P position. If the selector lever is kept in D (diesel engine) or D6/D4 (gasoline engine), the temperature of the automatic transmission fluid increases due to heat from the torque converter.

To ensure reliable brake application, be sure to use your right foot to press the brake pedal.

When leaving the driver's seat, follow the When Parking Your Vehicle procedure.

To Start After Stopping

To start again after stopping your vehicle, visually check that the selector lever is in D (diesel engine) or D6/D4 (gasoline engine), and gradually press the accelerator pedal to pull away.

When Parking Your Vehicle

⚠ Warning

Do not leave your vehicle while the engine is still running. Do not park with the selector lever in a position other than P or N the vehicle may begin moving by itself due to creeping. You may accidentally press the accelerator

(Continued)

Warning (Continued)

pedal when getting into the vehicle causing it to start moving suddenly.

When parking the vehicle, always apply the parking brake and move the selector lever to the P position.

When parking on a slope, move the selector lever in the P position and block the wheels with chocks. You and others could be seriously injured.

1. Keep pressing the brake pedal firmly with your right foot, then apply the parking brake.
2. Move the selector lever in the P position, check that the shift indicator is indicating P, and slowly ease your right foot off the brake pedal.
3. Stop the engine, and remove the key.

See *Starting and Stopping the Vehicle (Gasoline Only)* ⇨ *158* or *Starting and Stopping the Vehicle (Diesel Only)* ⇨ *161*, and *Parking Brake* ⇨ *214*.

If you cannot move the selector lever from the P position after starting the engine, perform the following necessary checks:

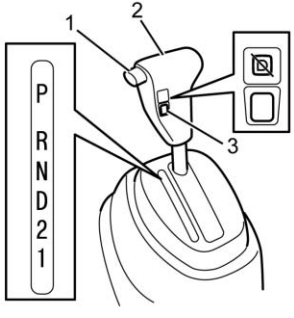
- Check that you are firmly pressing the brake pedal.
- Check if the area where your vehicle is parked is not a slope.
- If your vehicle is parked on a downhill slope, the push operation of the selector lever may become heavy to move. In this case, you can operate the selector lever more smoothly by pushing the selector lever towards the front of the vehicle while pushing the button.

Actions that Can Lead to a Breakdown with an Automatic Transmission

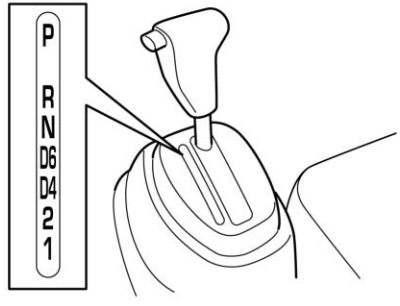
Actions that can lead to a breakdown	Breakdown symptoms
Stopping the vehicle on an uphill road with the selector lever in a position other than N or P, the accelerator pedal pressed, and the brakes not applied. Pressing the accelerator pedal and brake pedal at the same time.	The transmission fluid overheats.
Placing the selector lever with the accelerator pedal pressed and the engine speed high.	The transmission gears are overloaded.
Operating the selector lever into P before the vehicle has completely stopped.	The parking mechanism will be damaged.
Turning off the engine control switch while driving. Driving with the selector lever in the N position on a long downward slope. (This is dangerous due to the lack of engine brake).	The transmission is not properly lubricated.

Selector Lever

Move the selector lever (2) to make a shift into each gear position.



Diesel Engine Selector Lever



Gasoline Engine Selector Lever

P (Parking) : Used when the vehicle is parked or when starting the engine. The P position is to be used with the parking brake. The P and N positions are the two positions in which the engine can be started.

R (Reverse) : Used when backing up the vehicle. Bring the truck to a complete stop before moving the selector to the R position.

N (Neutral) : Can be used when starting the engine, but for safety, get in the habit of starting the engine in the P position. The N position is used should it become necessary to tow your truck.

D (Drive – Diesel Engine Only) : The D position is for all normal forward driving. The system automatically selects the gear according to the vehicle speed. Press the overdrive off switch (3) to switch to the overdrive ON position for greater fuel economy.

D6 (Drive D6 Gear – Gasoline Engine Only) : The D6 position is for all normal forward driving. The shifting of 1st - 2nd - 3rd - 4th - 5th - 6th takes place according to the vehicle speed and accelerator pedal pressing rate. It is recommended that this range be used to improve fuel economy and reduce vehicle noise.

D4 (Drive D4 Gear – Gasoline Engine Only) : The D4 position is when you feel shifting between 4th and 5th troublesome while climbing a long hill. Shifting of 1st - 2nd - 3rd - 4th takes place according to the vehicle speed and accelerator pedal pressing rate.

2 (Second) : May be used when driving on downhill roads or when the engine brake is required. Select the 2 position at speeds below 40 km/h (25 MPH) when traveling down a moderate grade. Return the selector to the D position for normal driving.

1 (Low) : Used on steep downhill roads or when strong engine braking is required. Return the selector to the D position for normal driving.

⚠ Warning

When pulling away, always visually check the position of the selector lever for safety.

Only push the button for gear selection when necessary. Pushing the button unnecessarily may result in unintended gear selection.

Never move the selector to the P position when the truck is in motion.

(Continued)

Warning (Continued)

Do not run the vehicle with the transmission in neutral. Not only will the engine brake not function, but the transmission will also be damaged. You and others could be seriously injured.

When repeatedly shifting between forward and reverse gears for a multiple-point turn, firmly press the brake pedal and confirm that the vehicle is completely stopped before operating the selector lever.

When pulling away, be sure to operate the selector lever while keeping the brake pedal pressed. See *Driver Information Center (DIC) (Diesel Only)* ⇨ *87*, *Overdrive Off Light (Diesel Only)* ⇨ *83*, and *Automatic Transmission* ⇨ *198*.

Overdrive Off

Overdrive Off Switch

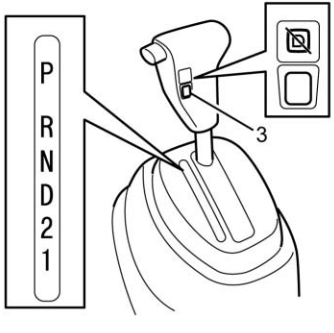
Diesel vehicles have two overdrive gears (5th and 6th). These two high speed gears provide increased road speed, low running noise and outstanding fuel efficiency.

Take advantage of overdrive whenever possible.

Use the overdrive during normal driving. When driving down long downhill roads that require the engine brake, or when driving on mountain roads or through city centers, release the overdrive. Doing so will reduce the number of gear changes making the ride smoother.

If your vehicle is traveling at a speed exceeding 135 km/h (84 MPH), it is not possible to downshift from 6th gear to 5th gear.

If your vehicle is traveling at a speed exceeding 104 km/h (65 MPH), it is not possible to downshift from 5th gear to 4th gear.



Overdrive Off Switch : Under normal circumstances, press the overdrive off switch (3) to turn the overdrive OFF (the overdrive off indicator light comes on).

Press the switch again to release the overdrive off (the overdrive off indicator light goes off). See *Overdrive Off Light (Diesel Only)* ⇨ *83*.

Overdrive Off Indicator Light

Indicator light	Function	Usage conditions
Goes Off.	6-Speed (4-speed + overdrive) automatic change (Overdrive ON).	Use under normal driving conditions.
Comes On.	4-speed automatic change, but no change to overdrive (overdrive OFF).	Used when a light engine brake is required. Doing so will reduce the number of gear changes making the ride smoother on roads that have many hills.

When the automatic transmission fluid is cold:

During cold weather, the transmission may not shift to the 5th or 6th gear (overdrive) until the engine warms up.

Even if the engine is stopped with the overdrive OFF, the overdrive will be ON the next time the engine is started.

Brakes

Antilock Brake System (ABS)

Wheels may be locked and slip during sudden braking or braking on a slippery road surface such as a snowy road. ABS is a device to prevent the wheels from locking by detecting a slippery condition during braking and securing the directional stability and handling stability of the vehicle. ABS only assists in limited road conditions and will not prevent an accident if you exceed safe driving speeds for road conditions. Always drive safely.

⚠ Warning

The braking distance on slippery road surfaces is longer than that on a normal dry paved road even with an ABS-equipped vehicle. In addition the braking distance can be slightly longer in deep snow and on a gravel road when ABS is activated. Therefore, always keep in mind the road condition and tire condition (type of tires and worn condition), observe safe driving habits and drive the vehicle while keeping a proper distance between vehicles.

(Continued)

Warning (Continued)

ABS does not prevent accidents if you do not drive safely. Drive the vehicle at a safe speed.

Install tires of the specified size, same brand and same tread design (including winter tires) on all wheels. If different tires are installed, the braking distance becomes longer and directional control stability of the vehicle decreases. This is very dangerous.

Steering during sudden braking (when the ABS is working) will feel slightly different than it does when the brakes are not applied. Operate the steering wheel carefully keeping this in mind.

Driving in sand or on a muddy road may adversely affect the brakes and ABS sensors. Wash the vehicle to remove sand and mud after operating the vehicle in sandy or muddy conditions.

Before washing the vehicle, provide necessary protection to prevent water from being splashed on the ABS components (sensors and actuators). Especially when using high-pressure washing, be careful not to allow water to be directly sprayed onto the ABS components and their harness connectors.

These are not signs of ABS malfunction:

- Soon after you start the engine and the vehicle starts moving, the sound of motor or valve working may be heard from the rear of the vehicle or underside of the cab. This sound is from a self-check by the ABS system and is normal. In addition, you may also feel some vibration if the brake pedal is pressed at this time.
- When ABS is operating, vibration is felt on the brake pedal and steering wheel and you may hear the system operating. This is normal when ABS is properly operating.
- On diesel vehicles, the exhaust brake may release when ABS is activated and the exhaust brake is in operation.
- ABS is more likely to be activated when the brake is applied during cornering or driving over a bump. This is because inside wheels or wheels that have gone over a bump tend to lock.
- ABS is not activated immediately after starting the vehicle. It is activated only when the vehicle speed reaches approx. 10 km/h (6 MPH). ABS operation is inactive when the vehicle speed reduces to approx. 5 km/h (3 MPH).

ABS Operation Indications and Signs

ABS warning light

Operation Indications of ABS

When the engine control switch is placed into the "ON" position, the ABS warning light comes on and then goes out in approx. 3 seconds. The ABS is normal if the warning light goes out.

Operation Signs of ABS

When ABS is activated, slight vibration is generated on the brake pedal (hydraulic brake model) and steering wheel, and an operating sound can be heard from the ABS equipment.

If the ABS warning light does any of the following, the ABS may be faulty. Please contact the nearest dealer.

- If the ABS warning light comes on during driving
- The light does not come on when the engine control switch is placed into the "ON" position

See *Antilock Brake System (ABS) Warning Light ⇨ 81*.

Even if a problem has occurred with the ABS, the regular brakes will still work normally. However, ABS will not operate.

Precautions for Driving an ABS-Equipped Vehicle

ABS is not a device that enables driving and stopping under conditions exceeding safe driving limits. Always drive safely.

⚠ Warning

When braking suddenly, continue pressing brake pedal hard so that the ABS can take effect.

(Continued)

Warning (Continued)

When braking suddenly, do not pump the brakes (pushing and releasing the brake pedal little by little). Pumping brakes will increase the braking distance.

The braking distance on slippery road surfaces is longer than that on a normal dry paved road even with an ABS-equipped vehicle. When ABS is activated in the following road surface conditions, the braking distance may be slightly longer compared to that of vehicles not equipped with an ABS. Therefore, always be aware of the road and tire condition (tire type and wear condition), observe safe driving habits and drive the vehicle while keeping a safe following distance.

- When driving on a gravel road, or a road with a deep snow covering.
- When tire chains are used.

(Continued)

Warning (Continued)

- When driving over road joints or bumps such as light reflectors on the road.
- When driving on a bumpy road, stone-paved road or track.
- When driving over an iron plate or manhole lid.

ABS does not work for wheel skid during a standing start, acceleration and cornering which do not involve braking. On a very slippery icy road, tires may lose grip and steering wheel operation may not be able to control the vehicle's direction, resulting in very unstable driving. Always drive the vehicle observing a safe speed well matched with both road surface and tire conditions, and avoid sudden braking.

If powerful engine braking is applied on a very slippery icy road, the drive wheels may be

(Continued)

Warning (Continued)

locked (the ABS then does not work), resulting in loss of vehicle control.

When ABS is activated, a slight vibration (especially when the road surface is different between right and left wheels) and pulling may be felt on the brake pedal and steering wheel. In addition, an operating sound is produced from the ABS actuators. This does not indicate any abnormal condition. Stay calm and operate the steering wheel properly.

Electronic Braking force Distribution (EBD)

EBD is a function that uses the ABS to distribute braking force ideally between the front and rear wheels in order to compensate for changes in load conditions or any shift of the load due to acceleration or deceleration, thus preventing premature locking of the rear wheels.

⚠ Warning

If a problem should occur with the EBD function, the ABS warning light and the brake system warning light will come on simultaneously.

The rear wheels will lock more easily if there is a problem with the EBD function. Have it checked and serviced at the nearest dealer as soon as possible. You and others could be seriously injured.

When the EBD operates, the brake pedal may push back slightly or you may hear a sound similar to that generated by the ABS when operational. Neither of them indicates any abnormal condition.

Parking Brake

Parking Brake Lever

⚠ Warning

Although the parking brake indicator light will come on if the parking brake is engaged while the engine control switch is in the ON position, this does not mean the parking brake is fully engaged, so always make sure the lever is fully pulled up.

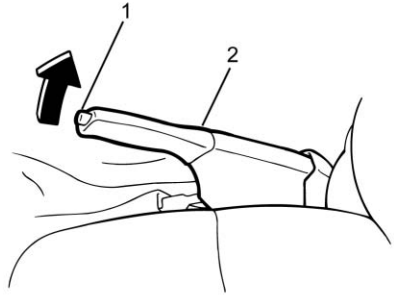
Never drive the vehicle with the parking brake set as this will cause excessive wear, reduce parking brake effectiveness and increase fuel consumption.

Choose a flat place where stopping and parking are permitted and where the vehicle will not obstruct traffic.

Remove all dirt from the vehicle's light lenses and reflectors to ensure that the vehicle can be seen from other vehicles. You and others could be seriously injured.

Avoid parking for long periods with cargo on the vehicle.

Operation of Parking Brake



The parking brake lever is located to the right of the driver's seat.

To set the parking brake, completely stop the vehicle. Then, without pressing the release button (1), hold the brake pedal down while pulling the parking brake lever (2) all the way up.

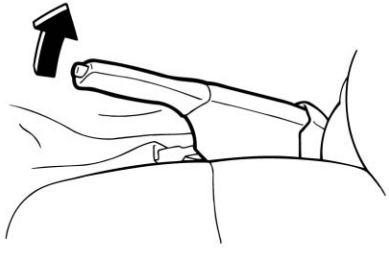
The parking brake indicator light in the instrument panel will come on when the lever is pulled up. Before you leave the driver's seat, follow the steps under “Parking, or Leaving Driver's Seat”. See *Braking* ⇨ *131*.

To release the parking brake, hold the brake pedal down while pushing the release button of the parking brake lever and lower the lever. The parking brake indicator light in the instrument panel will go out.

The parking brake indicator light is designed to remind you if the parking brake is not released when the engine control switch is on.

If you notice the parking brake lever travel has increased over time, this means the cable adjustment must be checked by a qualified technician. Adjustment may be required due to parking brake shoe wear. See *Control of a Vehicle* ⇨ *127*.

Inspection



Pull the parking brake lever slowly from the fully released position while counting the clicks produced as the lever engages ratchet plate notches to check that it can be raised the proper amount and the lever is held firmly.

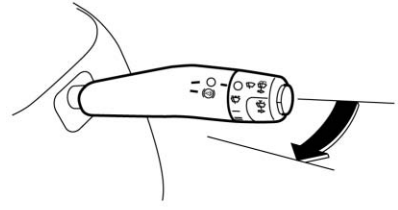
If the number of notches is not within the standard value range below, adjust it to the standard value. Lever stroke is 6 to 8 notches.

Number of notches before parking brake is set when lever is pulled slowly from released position with pull force of about 147 N (15 kgf/ 33 lbs). See *Maintenance Schedule* ⇨ *328* and *Additional Maintenance and Care* ⇨ *355*.

Exhaust Brake (Diesel Only)

Exhaust Brake Switch

When turned on, the system increases the amount of power absorbed by the engine while coasting in gear. Whenever slowing down the vehicle, such as on down grades, in city traffic or approaching stop signals, this brake system may be used.



To turn on the exhaust brake system while driving, pull the lever backward. The exhaust brake indicator light comes on. The exhaust brake will engage automatically when the accelerator pedal is released and vehicle speed is above 5 km/h (3 MPH).

The exhaust brake will disengage when the accelerator pedal or brake pedal is pressed. Releasing the

pedal reengages the exhaust brake. Push the lever forward to turn the exhaust brake off during idling.

⚠ Warning

It is extremely dangerous to apply the exhaust brake on slippery roads as the tires can skid.

You and others could be seriously injured.

Even if the selector lever is placed in the N position, the exhaust brake does not disengage until the engine is warmed up if the warm-up system is on.

Conditions for Inoperable Exhaust Brake

Under the following conditions, the exhaust brake does not engage even if the exhaust brake indicator light comes on:

- The accelerator pedal is pressed.
- The selector lever is in the N position.
- The vehicle is traveling at 5 km/h (3 MPH) or lower speeds.

If your vehicle is equipped with an anti-lock brake system (ABS), the exhaust brake may disengage during ABS operation even when the exhaust brake switch is in the ON position and the exhaust brake indicator light is on. The exhaust brake may disengage temporarily as the vehicle passes over a bump even when the brake pedal is not depressed.

It is advisable to operate the exhaust brake when descending a slope or when stop and go driving is involved.

The selection of transmission gears and engine speed when operating the brake system is important. The exhaust brake is more effective in the lower gears and at the higher engine speeds. See *Exhaust Brake Light* ⇨ *82*.

Cruise Control

Cruise Control (Diesel)

The cruise control function allows you to drive the vehicle at a constant speed without operating the accelerator pedal. Use this function when the vehicle speed is between 48 and 121 km/h (30 and 75 MPH) for vehicles with a disesel engine. This function should only be used when driving without frequent starts and stops.

⚠ Warning

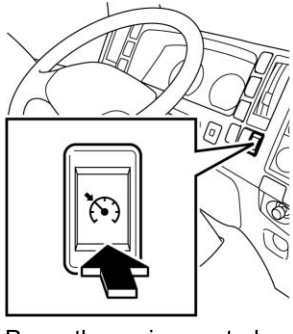
Cruise control can be dangerous where you cannot drive safely at a steady speed. Do not use cruise control on winding roads or in heavy traffic. You and others could be seriously injured.

Cruise control can be dangerous on slippery roads. On such roads, fast changes in tire traction can cause needless wheel spinning, and you could lose control. Do

(Continued)

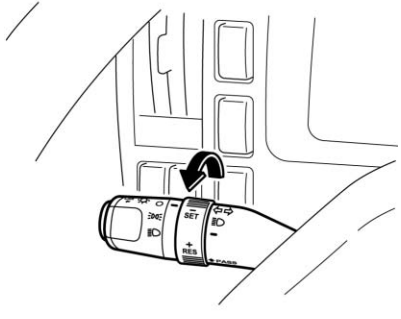
Warning (Continued)

not use cruise control on slippery roads. You and others could be seriously injured.



1. Press the cruise control main switch to turn it on.

At this time, the cruise main indicator light comes on simultaneously.



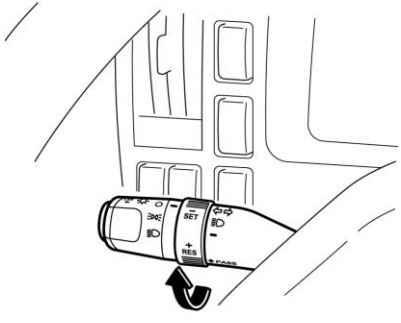
2. Use the accelerator pedal to adjust the vehicle to the desired speed. Upon reaching the desired speed, turn the cruise control set switch. The vehicle speed at the moment you operate the switch is set in the system, enabling you to drive with the set speed automatically maintained without using the accelerator pedal.

At the same time the cruise set indicator light comes on.

Accelerating during Cruise Control Driving

If you want to accelerate temporarily to pass another vehicle while driving using the cruise control, press the accelerator pedal. When you release the accelerator pedal, the speed returns to the original set vehicle speed.

When Increasing Vehicle Speed



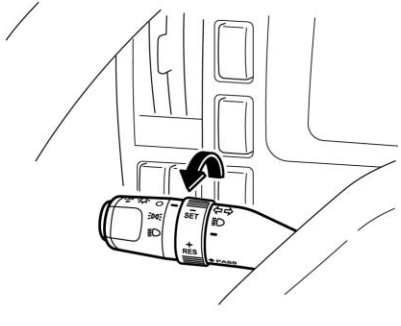
When the cruise control resume switch is operated, the speed increases while the switch is held.

After the speed is increased to the desired vehicle speed, and the switch is released, the speed is set at the increased vehicle speed. If you want to increase the speed quickly, press the accelerator pedal and accelerate to the desired vehicle speed. Then, operate the cruise control set switch.

When Increasing Vehicle Speed Slightly

If the cruise control resume switch is operated and released immediately, the set vehicle speed increases 1.6 km/h (1MPH) per operation. This operation can be performed 6 times consecutively.

When Decreasing Vehicle Speed



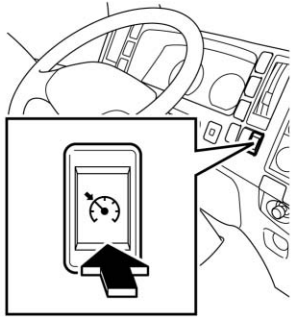
When the cruise control set switch is operated, the speed decreases while the switch is held.

After the speed is decreased to the desired vehicle speed, and the switch is released, the speed is set at the decreased vehicle speed. If you want to decrease the speed quickly, press the brake pedal to cancel cruise control and decelerate to the desired vehicle speed. Then, operate the cruise control set switch

When Decreasing Vehicle Speed Slightly

If the cruise control set switch is operated and released immediately, the set vehicle speed decreases 1.6 km/h (1 MPH) per operation. This operation can be performed 6 times consecutively.

When Canceling Cruise Control



Press the cruise control main switch again to turn the cruise control system off. The cruise control main indicator light will go out.

The cruise control set speed is canceled in the following cases:

- When the brake pedal is pressed.
- When the selector lever is shifted to the N position.
- When cruising speed is approximately 40 km/h (25 MPH) or lower for a diesel engine. *
- When the vehicle speed decreases more than 20% below your set speed.
- When the cruise control main switch is turned off. *
- When the engine control switch is turned to the LOCK position. *
- When trouble develops in the system. *

Memory speed is eliminated. *

When you do not use the cruise control, be sure to place the cruise control main switch into off.

When you place the engine control switch into ACC, place the cruise control main switch into off, then reset the cruise control if you want to use the cruise control again.

Using Cruise Control on Hills

How well your cruise control will work on hills depends upon your speed, load and the steepness of the hills. When going up steep hills, you may want to step on the accelerator pedal to maintain your speed. When going downhill, you may have to brake or shift to a lower gear to keep your speed down. Of course, applying the brake takes you out of cruise control. Many drivers find this to be too much trouble and do not use cruise control on steep hills.

When Returning to Cruise Control Driving

If you have canceled cruise control under the following conditions, you can return to the cruise control driving condition before cancellation when you operate and release the cruise control resume switch. The moment the resume switch is released, the cruise set indicator light comes on.

- When pressing the brake pedal.
- When the selector lever is shifted to the N position.

When the vehicle speed decreases to 30 km/h (19 MPH) or less or less, it is not possible to return to the cruise control driving. You must reset the cruise control.

If the cruise control is turned back on while the vehicle speed exceeds what is set prior to the cancellation

of cruise control, the set vehicle speed cannot be changed until the vehicle reaches to the set speed. Also, the vehicle speed must be 1 MPH below the previously set vehicle speed.

Exhaust Brake Function

Diesel Vehicles Equipped with Exhaust Brake-interlocked Cruise

Automatic activation of the exhaust brake during cruise control driving suppresses an increase in the speed on a downhill slope, decreasing the need for the driver to apply the regular brake pedal. The exhaust brake does not activate when the exhaust brake switch is turn off.

The maximum slope angle at which the system can control the vehicle speed increase is different depending on the load the vehicle is carrying.

Automatic Activation and Automatic Release of Exhaust Brake

The exhaust brake is engaged when the vehicle speed exceeds the set speed on a downhill slope.

The exhaust brake is disengaged when the vehicle slows down close to the set.

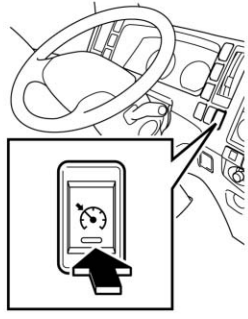
Cruise Control (Gas)

The cruise control function allows you to drive the vehicle at a constant speed without operating the accelerator pedal. Use this function when the vehicle speed is between 48 and 117 km/h (30 and 73 MPH) (48 and 97 km/h (30 and 60 MPH) for vehicles equipped with 105 km/h (65 MPH) speed limiting option code EEQ). This function should only be used when driving without frequent starts and stops.

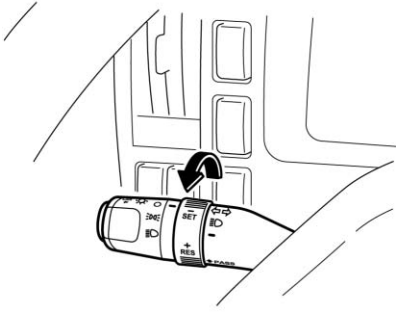
⚠ Warning

Cruise control can be dangerous where you cannot drive safely at a steady speed. Do not use cruise control on winding roads or in heavy traffic. You and others could be seriously injured.

Cruise control can be dangerous on slippery roads. On such roads, fast changes in tire traction can cause needless wheel spinning, and you could lose control. Do not use cruise control on slippery roads. You and others could be seriously injured.



1. Press the cruise control main switch to set it to on. At this time, the operation indicating light will turn to green.



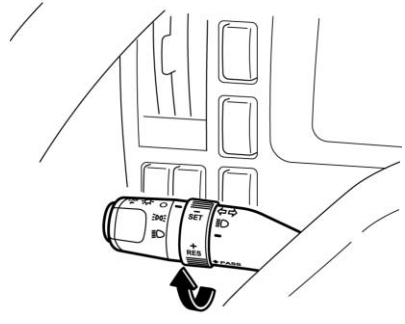
2. Use the accelerator pedal to adjust the vehicle to the desired speed. Upon reaching the desired speed, turn the cruise control set switch. The vehicle speed at the moment you operate the switch is set in the system, enabling you to drive with the set speed automatically maintained without using the accelerator pedal.

At the same time the cruise set indicator light comes on.

Accelerating during Cruise Control Driving

If you want to accelerate temporarily to pass another vehicle while driving using the cruise control, press the accelerator pedal. When you release the accelerator pedal, the speed returns to the original set vehicle speed.

When Increasing Vehicle Speed



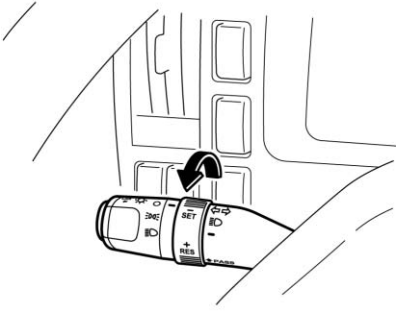
When the cruise control resume switch is operated, the speed increases while the switch is held.

After the speed is increased to the desired vehicle speed, and the switch is released, the speed is set at the increased vehicle speed.
If you want to increase the speed quickly, press the accelerator pedal and accelerate to the desired vehicle speed. Then, operate the cruise control set switch.

When Increasing Vehicle Speed Slightly

If the cruise control resume switch is operated and released immediately, the set vehicle speed increases 1.6 km/h (1 MPH) per operation. This operation can be performed 6 times (3500 model) or 10 times (4500 model) consecutively.

When Decreasing Vehicle Speed



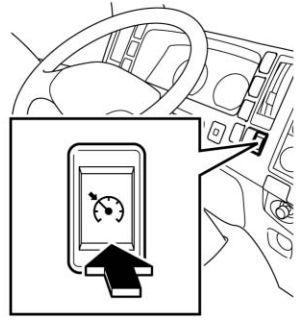
When the cruise control set switch is operated, the speed decreases while the switch is held.

After the speed is decreased to the desired vehicle speed, and the switch is released, the speed is set at the decreased vehicle speed. If you want to decrease the speed quickly, press the brake pedal to cancel cruise control and decelerate to the desired vehicle speed. Then, operate the cruise control set switch

When Decreasing Vehicle Speed Slightly

If the cruise control set switch is operated and released immediately, the set vehicle speed decreases 1.6 km/h (1 MPH) per operation. This operation can be performed 6 times (3500 model) or 10 times (4500 model) consecutively.

When Canceling Cruise Control



Press the cruise control main switch again to turn the cruise control system off. The cruise control main indicator light will go out.

The cruise control set speed is canceled in the following cases:

- When the brake pedal is pressed.
- When the selector lever is shifted to the N or 1st position.
- When cruising speed is approximately 40 km/h (25 MPH) or lower.

- When the vehicle speed decreases more than 20% below your set speed (3500 model only).
- When the cruise control main switch is turned off.
- When the engine control switch is turned to the LOCK position.
- When trouble develops in the system.
- Memory speed is eliminated.

When you do not use the cruise control, be sure to place the cruise control main switch into off.

When you place the engine control switch into ACC, place the cruise control main switch into off, then reset the cruise control if you want to use the cruise control again.

Using Cruise Control on Hills

How well your cruise control will work on hills depends upon your speed, load and the steepness of the hills. When going up steep hills, you may want to step on the accelerator pedal to maintain your speed. When going downhill, you may have to brake or shift to a lower gear to keep your speed down. Of course, applying the brake takes you out of cruise control. Many drivers find this to be too much trouble and do not use cruise control on steep hills.

When Returning to Cruise Control Driving

If you have canceled cruise control under the following conditions, you can return to the cruise control driving condition before cancellation when you operate and release the cruise control resume switch. The moment the resume switch is released, the cruise set indicator light comes on.

- When pressing the brake pedal.
- When the selector lever is shifted to the N or 1st position.

When the vehicle speed decreases to 30 km/h (19 MPH) or less, it is not possible to return to the cruise control driving. You must reset the cruise control.

For 3500 models, if the cruise control is turned back on while the vehicle speed exceeds what is set prior to the cancellation of cruise control, the set vehicle speed cannot be changed until the vehicle reaches to the set speed. Also, the vehicle speed must be 1 MPH below the previously set vehicle speed.

For 4500 models, if you hold the switch at the +RES position, the vehicle will keep going faster until you release the switch or apply the brake. So unless you want to go faster, do not hold the switch at the +RES position.

Driver Assistance Systems

Speed Limiter (Gasoline Vehicle)

Speed limiting restricts the vehicle's speed by controlling the fuel injection volume. It prevents the speed from exceeding 105 km/h (65 mph) regardless of the pressure on the accelerator pedal.

Speed limiting does not control braking, so it is possible for the vehicle to exceed the set speed on downhill slopes. If the tire size is changed, the speed limiting may not work normally. Be sure to use the correct tire size specified for your vehicle.

See *Cruise Control (Gas)* ⇨ *220* or *Cruise Control (Diesel)* ⇨ *216*.

Fuel

Regular unleaded gasoline with a posted octane rating of 87 or higher should be used. It should meet ASTMD4814 in the U.S. and CGSB 3.5-M87 in Canada. These fuels should contain the proper additives and in most cases nothing should have to be added to the fuel. Pumps in the U.S. and Canada will be labeled UNLEADED. Only unleaded nozzles will fit into this vehicle's filler neck.

Gasoline with a posted octane rating of less than 87 should not be used in this vehicle. Using such gasoline may cause a heavy knocking noise when driving, which can result in damage to the engine. It is normal to hear a slight pinging noise while accelerating or driving up a hill. However, if a constant knocking noise is heard while using fuel rated at 87 octane or higher, the engine should be serviced.

Some gasolines contain an octane enhancing additive called methylcyclopentadienyl manganese tricarbonyl (MMT). It is not recommended to use gasoline containing MMT. Some gasolines contain an additive called methyl tertiary butyl ether (MTBE). Gasoline containing more than 15% MTBE should not be used in this vehicle.

Gasoline containing ethanol or methanol may be available in your area. Ethanol is ethyl or grain alcohol. Methanol is methyl or wood alcohol.

Fuels containing more than 5% methanol or more than 10% ethanol, such as E15 or E85, should not be used in this vehicle. These fuels can corrode metal parts in the fuel system. They can also damage plastic and rubber parts. This damage would not be covered under your warranty.

Fuels containing 5% methanol or less must contain cosolvents and corrosion prevention additives to avoid damage to the fuel system.

Gasoline for Cleaner Air

Gasolines with detergent additives help to prevent deposits from forming in your engine. This helps to keep the engine in tune and the emission control system working properly. These additives as well as gasoline blends containing oxygen, such as MTBE or alcohol, promote cleaner air. This is important in locations that have high carbon monoxide and ozone levels.

Fuels in Foreign Countries

Foreign Operation

If you plan on driving in another country outside the U.S. or Canada, unleaded fuel may be hard to find. Do not use leaded gasoline. If you use even one tankful, your emission controls won't work well or at all. With continuous use, spark plugs can get fouled, the exhaust system can corrode, and your engine oil can deteriorate quickly. Your vehicle's oxygen sensor will be damaged. All of that means costly repairs that would not be covered by your warranty.

To check on fuel availability, ask an auto club, or contact a major oil company that does business in the country where you'll be driving.

Fuel for Diesel Engines

Diesel Fuel Requirement and Fuel System

Fuel Requirements

Use of fuels other than ultra low-sulfur fuel may not conform to emission regulations.

The fuel supply pump, injector or other parts of the fuel system and engine can be damaged if you use any fuel or fuel additive other than those specifically recommended by the dealer.

To help avoid fuel system or engine damage, pay attention to the following:

- Some service stations mix used engine oil with diesel fuel. Some manufacturers of large diesel engines allow this; however, for your diesel engine, do not use diesel fuel which has been contaminated with engine oil. Besides causing engine damage, such fuel can also affect emission control. Before using any diesel fuel, check with the service station operator to see if the fuel has been mixed with engine oil.
- Do not use any fuel additive (other than as recommended under "Biocides" in *Water in Fuel (Diesel)* ⇨ *229*). At the time this manual was printed, no other fuel additive was recommended. (See your authorized dealer to find out if this has changed.)
- Take care not to run out of diesel fuel. If you do run out of fuel, you may need to bleed air out of the supply pump to re-start the engine after fuel has been filled.

Your vehicle is designed to use either Number 1-D or Number 2-D diesel fuel. However, for better fuel economy, use Number 2-D diesel

fuel whenever possible. At temperatures below -7 °C (20 °F), Number 2-D fuel may pose operating problems (see "Cold Weather Operation" which follows). At colder temperatures, use Number 1-D fuel (if available) or use a "winterized" Number 2-D (a blend of Number 1-D and Number 2-D). This blended fuel is usually called Number 2-D also, but can be used in colder temperatures than Number 2-D fuel which has not been "winterized". Check with the service station operator to be sure you get the properly blended fuel.

Do not use fuels other than those recommended in this manual. Doing so may adversely affect the engine.

DIESEL FUEL/APPLICABLE STANDARD (Sulfur content below 15ppm)	
JIS (JAPANESE INDUSTRIAL STANDARDS)	Based on K2204 Diesel Fuel Type 2 or Type 3 (SPL)
DIN (DEUTSCHE INDUSTRIE NORMEN)	Based on EN590
ASTM (AMERICAN SOCIETY FOR TESTING and MATERIALS)	Based on D975 Number 1–D S15 or Number 2-D S15 (below 15 ppm)
BS (BRITISH STANDARDS)	Based on EN590

Biodiesel

Biodiesel, may also be referred to as FAME blended (Fatty-acid methyl ester) fuel is a renewable fuel produced from vegetable oils or animal fats that have been chemically modified to make it compatible with diesel fuel.

Caution

Do not use home-made biodiesel or home test kits because the quality cannot be verified by approved scientific methods. Do not use raw vegetable oil or other unmodified bio-oils, fats, or blends of vegetable oil with diesel. They could damage the fuel system and engine, and damages would not be covered by the vehicle warranty.

Caution

Do not use blends containing more than 20% biodiesel. Any engine, fuel system, or exhaust after-treatment system damage would not be covered by the vehicle warranty.

As a renewable fuel, biodiesel provides some environmental benefits. However, biodiesel has unique properties and needs to be handled differently than diesel fuel. Its use presents additional risks and may not be appropriate in all situations. Certain vehicle operating modes increase these risks and should be avoided. Read further to determine if your driving habits are compatible with the use of biodiesel.

Biodiesel fuel quality degrades with time and exposure to high temperature quicker than Ultra Low Sulfur Diesel fuel. More frequent refueling provides the best opportunity to have a supply of fresh fuel. Storage at hot ambient temperatures will accelerate biodiesel degradation.

Owners who use very little fuel, or who have vehicles or fuel stored for extended periods of time, should avoid the use of biodiesel blended fuels above 5% by volume. When vehicles are stored for longer than one month, they should be run out of biodiesel to below one-quarter tank, refueled with Ultra Low Sulfur Diesel fuel, and driven several miles before storage.

At temperatures below 0 °C (32 °F), it is recommended to switch to Ultra Low Sulfur Diesel fuel with no biodiesel content, or to blends with biodiesel containing less than 5% by volume. At these extreme cold temperatures, biodiesel blends higher than 5% by volume may cause fuel filter plugging and system gelling, which can lead to vehicle operability problems.

Fuels improperly blended for cold temperature operation may result in restricted fuel filters and degraded vehicle performance. The vehicle is equipped with a fuel heating system to provide a level of protection against filter plugging from gelling or waxing of conventional diesel fuel and biodiesel blends. If the operating temperature is far below the temperature at which gelling or waxing of the fuel occurs, the system will not prevent all cases of filter plugging.

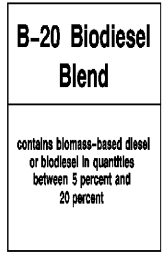
If the vehicle experiences a fuel filter restriction, the on-board monitoring system will alert the driver that the fuel filter requires service. The fuel filter, however, will not prevent all damage caused by poor quality biodiesel.

Biodiesel Blends

Use biodiesel blends that meet the ASTM specification D6751.

Retail pumps dispensing blends containing up to 5% biodiesel (B5) are not required to be labeled with the concentration of biodiesel. Blends up to B5 must meet ASTM D975 (Grades No. 2-D or No. 1-D S15 Ultra Low Sulfur Diesel). When refueling with a biodiesel blend above B5, one of the following labels should appear on the dispenser:

Caution
Do not use blends containing more than 20% biodiesel. Any engine, fuel system, or exhaust after-treatment system damage would not be covered by the vehicle warranty.



Blends containing more than 5% and up to 20% biodiesel must meet ASTM specification D7467 (Biodiesel blend, B6 - B20) and are labeled with an orange or blue label.

To reduce the risk of poor quality fuel, purchase biodiesel blends from a fuel supplier or fueling station which sells BQ-9000 certified biodiesel. See www.bq-9000.org for a list of certified marketers.

Biodiesel Blends in Canada

Biodiesel blends that meet the CAN/CGSB-3.522 specifications up to 20% (B20) can be used. Do not use biodiesel blends above 20%, as they may damage the engine and fuel system.

Cold Weather Operation (Diesel)

Diesel fuel is sensitive to temperature. All diesel fuel has a certain amount of paraffin components, which are high in energy value and help improve fuel economy. But, when temperatures are below -7 °C (20 °F), the paraffin components begin turning into wax flakes. If temperatures are low enough, these flakes can obstruct the fuel filters and stop fuel from reaching the engine.

At low temperatures, wax flakes are more likely to form in Number 2-D fuel than in Number 1-D (or "winterized" Number 2-D) fuel. For best operation at temperatures below -7 °C (20 °F), use Number 1-D, or Number 2-D which has been blended with Number 1-D for winter use. When temperatures are consistently below (or near) -18 °C (0 °F), use Number 1-D if at all possible. Bear in mind, however, that even Number 1-D fuel will form wax flakes when temperatures are extremely low.

Do not use home heating oil or gasoline in your diesel engine; either may cause engine damage.

The addition of kerosene will not unplug a filter plugged with wax. Warming a "waxed" filter to a temperature of 0 °C to 10 °C (32 °F to 50 °F) will return the wax to solution. Filter replacement is not normally required.

Water in Fuel (Diesel)

During refueling, it is possible for water (and other contaminants) to be pumped into your fuel tank along with the diesel fuel. This can occur if a service station does not regularly inspect and clean its fuel tanks, or if a service station receives contaminated fuel from its supplier(s).

To protect your engine from contaminated fuel, there is a water separator system on the engine which allows you to drain excess water from the fuel.

⚠ Warning

The drained water/diesel fuel mixture is flammable, and could be hot. To help avoid personal injury or death and/or property damage, do not touch the fuel coming from the water separator drain valve, and do not expose the fuel to open flames or sparks.

(Continued)

Warning (Continued)

Be sure you do not overfill the drain pan. Heat (such as from the engine) can cause the fuel to expand. If the container is too full, fuel could be forced out of the pan. This could lead to a fire and the risk of personal injury and/or vehicle damage.

Biocides

In warm or humid weather, fungus, and/or bacteria may form in diesel fuel if there is water in the fuel.

Fungus or bacteria can cause fuel system damage by plugging the fuel lines, fuel filters or injector. They can also cause fuel system corrosion.

If fungus or bacteria has caused fuel system problems, you should have your authorized dealer correct these problems. Then, use a diesel fuel biocide to sterilize the fuel system (follow the biocide manufacturer's instructions). Biocides are available from your dealer, service stations,

parts stores and other automotive places. See your authorized dealer for advice on using biocides in your area and for recommendations on which biocides you should use.

Smoke Suppressants

Because of extensive testing of treated fuel versus untreated fuel, the use of a smoke suppressant additive is not recommended because of the greater possibility of stuck rings and guttered valves, resulting from excessive ash deposits.

Water Separator

The purpose of the water separator is to separate any water from the fuel that may have formed in the fuel tank due to condensation.

The water separator is located on the bottom of the fuel filter.

Caution

Remaining water that is not discharged from the water separator could freeze and damage the vehicle.

If the warning light comes on while the engine is in operation, promptly drain the water from the water separator (fuel filter). Continuing to drive with the light remaining on could damage the fuel injection system. If this happens, have the vehicle checked and serviced by the nearest dealer.

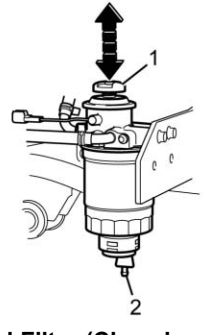
Draining Water from the Fuel Filter

Clean off any fuel that has adhered to the vehicle body.

Starting the engine immediately after draining the water from the fuel filter requires a little more time than usual. If the engine does not start in 10 seconds, wait for a while and try again.

Fuel will be mixed in the drained water. Dispose of it in a method conforming to the regulatory requirements in your state.

If the water separator (fuel filter) requires frequent draining, have the fuel system inspected at your dealer.

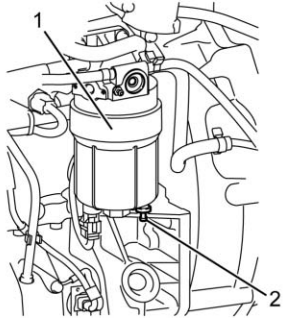


Pre Fuel Filter (Chassis-side)

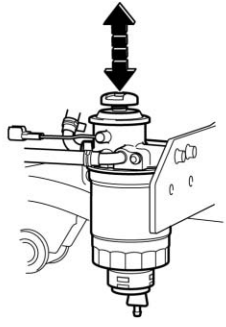
1. Attach a plastic hose to the drain plug (2) on the bottom of the chassis-side fuel filter and put the other end of the hose in a container placed beneath the filter.

2. Loosen the drain plug and move the priming pump (1) up and down by hand between 10 and 20 times.
3. Fully tighten the drain plug (2) and move the priming pump (1) several times.

Fuel Filter (Engine-side)



1. Attach a plastic hose to the drain plug (2) on the bottom of the engine-side fuel filter (1) and put the other end of the hose in a container placed beneath the filter.



2. Loosen the drain plug and move the priming pump up and down by hand between 10 and 20 times.
3. Fully tighten the drain plug and move the priming pump several times.
4. Test run the engine and check that there are no fuel leaks from the drain plug of the engine-side fuel filter. Also check that the water separator (fuel filter) warning light stays off.

Running Out of Fuel (Diesel)

When the Fuel Tank is Empty

When the fuel tank is empty, air will enter the fuel system, so refueling alone will not be enough to restart the engine. Use the following methods to bleed the fuel system.

Bleeding the Fuel System

Step in Refueling

1. Follow the directions in "Parking Brake Lever" under *Parking Brake ⇨ 214*.

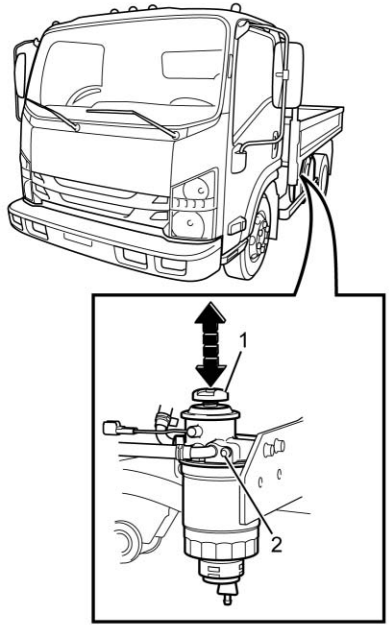
2. Select the correct fuel (See "Diesel Fuel Requirement and Fuel System"). Follow any posted safety rules. Stand to the side, never above or opposite the filler opening.
3. Check that the fuel cap is tight, and see to it that engine oil, engine coolant in the reservoir, and washer fluid, etc. are at proper levels. Then do the Driver Daily Checklist.

See *Owner Checks and Services* ⇨ *347*.

Driving your vehicle until the fuel tank is empty may activate the check engine malfunction indicator light. You do not need to have your vehicle checked. After refueling, perform the following:

- Bleed the fuel system.
- Start, turn off and restart the engine three or four times.
- The check engine malfunction indicator light will be cancelled.

Before Starting the Engine



1. The priming pump (1) is located on the outboard side of the left frame rail, in front of the batteries. Place a container beneath the air bleed plug (2) to receive fuel, and then fully loosen the plug.
2. Operate the priming pump (1) up and down about 20 times until the fuel from the air bleed plug (2) no longer contains air bubbles.
3. Fully retighten the air bleed plug (2) and wipe off any fuel that may have adhered to the plug or surrounding area.
4. Operate the priming pump up and down about 10 times.
5. Start the engine.

After Starting the Engine

1. Without pressing the accelerator pedal, start the engine.
2. After the engine has started, allow it to idle for about 5 seconds.

3. Fully press the accelerator pedal and increase the engine speed to the maximum speed for 10 seconds. (Repeat this operation several times.)

Insufficient air bleeding can result in faulty engine operation. Be sure, therefore, to always carry out the previous steps under "After starting the engine".

Filling the Tank

Be sure to obey the following instructions when refueling the vehicle:

- Stop the engine and close the vehicle's doors and windows.
- Keep cigarettes and other flames away from the vehicle.
- Before opening the fuel tank filler cap, touch a metallic object to discharge static electricity from your body.
- When filling, place the nozzle deeply into the fuel tank. If you try to fill more fuel by pulling out the nozzle from the fuel tank, the fuel may spill out, thus causing danger.
- Be sure to wipe off the fuel that is spilled at refueling.

⚠ Warning

Fuel vapor is highly flammable.

Be careful not to inhale fuel vapor when refueling the vehicle.

If you have a static charge buildup on your body while refueling the vehicle, a spark caused by its discharge could ignite the fuel, resulting in burns.

All parts of the refueling procedure (from opening the fuel tank filler cap to completing the refueling and closing the fuel tank filler cap) must be performed by the same person.

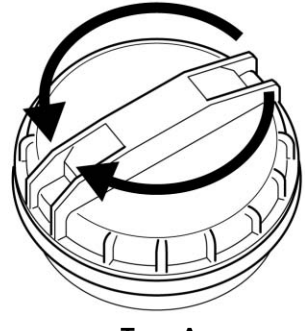
Other people may be carrying static electricity. Do not allow them to approach the fuel filler.

(Continued)

Warning (Continued)

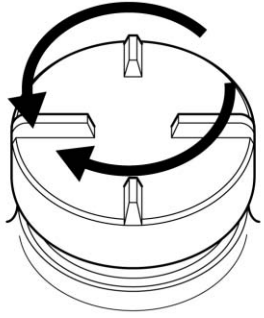
The person performing the refueling procedure must not return to the seat in the cab part-way through the procedure. He/she could pick up another charge of static electricity by doing so.

Obey all cautions posted in filling stations.



Type A

In the case of Type A, grip the tab of the fuel tank filler cap when turning the cap to open or close.



Type B

After refueling, make sure that the fuel tank filler cap is tightly closed.

Do not use any fuel tank filler cap that is not a genuine GM part.

The use of an improper fuel tank filler cap could cause fuel spillage in the event of an accident. The use of an improper fuel tank filler cap could also affect the fuel system and the emission control system.

Be sure to wipe off the fuel that is spilled at refueling.

⚠ Warning

Fuel may be under pressure. Be sure to slowly open the fuel tank filler cap. If you open it quickly, fuel may spurt out. You and others could be seriously injured.

Caution

Care must be taken when filling the fuel tank to prevent entry of dirt and water.

Conversions and Add-Ons

Add-On Electrical Equipment

Installing Electrical Equipment

⚠ Warning

Inappropriate installation or removal of audio, radio or other electrical equipment can adversely affect other electrical equipment and cause a breakdown or fire. Be sure to have electrical equipment installed or removed by your dealer. You and others could be seriously injured.

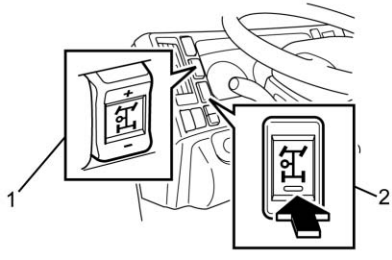
Do not install any unauthorized radio set, or any radio set or antenna that does not comply with relevant standards. Noise from the radio set could cause electromagnetic interference with the vehicle's electronic equipment

and other systems, resulting in a vehicle breakdown or in a malfunction of electronic equipment. Consult your dealer if you wish to install radio equipment.

Power Take-Off (PTO)

If equipped, the PTO is a device that is used to provide engine power to special equipment directly from the engine or through the transmission. For details about the PTO operation, refer to the separate instruction manual provided by its maker.

If the optional PTO function is used for long periods of time, make sure to regularly check the diesel particulate filter (DPF) indicator. Automatic DPF regeneration will not take place while the PTO function is active.



1. Engine Speed Control Switch
2. Main Switch

⚠ Warning

In PTO mode, Cruise Set/Resume Switch can be used exactly the same as PTO Engine Speed Control Switch. Improper operation of these switches may cause personal injury or damage.

When Operating the PTO

For operation of special equipment, see the manufacturer's instructions.

Installations, or alterations to the original equipment vehicle or chassis, as manufactured and assembled by General Motors, are not covered by this warranty. The body company, assembler, or equipment installer is solely responsible for warranties on the body or equipment and any alterations to any of the parts, components, systems, or assemblies installed by GM. Examples include, but are not limited to, special body installation, such as recreational vehicles, the installation of any non-GM part, cutting, welding, or the disconnecting of original equipment vehicle or chassis parts and components, extension of the wheelbase, suspension, and driveline modifications, and axle additions.

The engine control module (ECM) has the ability to accommodate one of three different PTO modes. Each

mode can be programmed to accommodate many PTO devices. Optional PTO switches are available from your dealer to ease installation of a PTO.

The optional PTO main switch and PTO engine speed control switch can be used increase the engine idle r/min without additional programming. Pressing the PTO main switch once will activate the PTO mode and raise the idle up speed up to the preset 800 r/min. Once in PTO mode the PTO engine speed control switch can be used to adjust the idle speeds between the preset 1,300 and 1,700 r/min. Moving the shift lever from park or neutral, applying the brake pedal or releasing the parking brake will cancel PTO mode and return the engine idle speed to normal. For additional details about PTO programming, contact your dealer.

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General Information

Your authorized dealer has trained technicians and genuine parts to service your vehicle properly. For expert advice and quality service, see your authorized dealer.

California Proposition 65 Warning

Most motor vehicles, including this one, as well as many of its service parts and fluids, contain and/or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Engine exhaust, many parts and systems (including some inside the vehicle), many fluids and some component wear by-products contain and/or emit these chemicals.

California Perchlorate Materials Requirements

Certain types of automotive applications, such as airbag initiators, seat belt pretensioners, and lithium batteries contained in remote keyless transmitters, may contain perchlorate materials. Special handling may be necessary. For additional information, see www.dtsc.ca.gov/hazardouswaste/perchlorate.

Accessories and Modifications

Factory-Approved Accessories

Your dealer can furnish a wide range of comfort, convenience, and safety accessories, especially designed for you and your new truck. They can install all of the safety accessories you will need to comply with local, state and D.O.T. regulations and advise you how to comply with these regulations.

Be sure to ask your authorized dealer about the accessories.

Vehicle Checks

Doing Your Own Service Work

Precautions for Checking and Adjustments

Your authorized dealer has trained technicians and genuine parts to service your vehicle properly. For expert advice and quality service, see your authorized dealer.

⚠ Warning

To help avoid personal injury, take care when doing any maintenance or making any check or repair. Follow manufacturer's instructions for all materials used during service and maintenance of this vehicle. If used or handled improperly, they may be hazardous. Improper or incomplete service can also affect the vehicle and result in personal injury, or damage to the

(Continued)

Warning (Continued)

vehicle or its equipment. If you have any questions about carrying out some service, have the work done by a skilled technician.

To prevent personal injury, keep hands, tools and clothing clear of the engine cooling fan when the engine is running.

The engine, exhaust pipe and radiator will be hot immediately after the vehicle is driven. Be careful around these parts to prevent burns. Perform all checks when the engine is cold.

Do not perform work near an open flame or other heat sources.

Do not let the engine run in poorly ventilated garages or sheds. This could cause carbon monoxide poisoning.

(Continued)

Warning (Continued)

Performing maintenance work on a truck or chassis can be dangerous. In trying to do some jobs, you can be seriously injured. Do your own maintenance work only if you have the required know-how and the proper tools and equipment for the job. If you have any doubts, contact your dealer.

You and others could be seriously injured.

For gasoline vehicles, pull firmly on the parking brake lever and put the transmission in neutral. Move the selector lever to “P” and make sure the shift indicator displays "P".

For diesel vehicles, pull firmly on the parking brake lever and move the selector lever to "P" and make sure the shift indicator displays "P".

Make sure to turn off the engine and remove the key from the engine control switch before performing any checks.

Select a place with a solid and level surface to perform the checking and maintenance work. Make sure to chock the wheels. It would be very dangerous if the vehicle started to move.

For gasoline vehicles, when performing work on the electrical system, be sure to remove the cable from the negative terminal on the battery.

For diesel vehicles, when performing work on the electrical system, begin by turning the engine control switch to the "LOCK" position, wait at least 3 minutes, and then disconnect the negative cable from the negative terminal on battery. If the negative cable is disconnected within 3 minutes, the engine control module may malfunction.

For gasoline vehicles, when working on the fuel line or fuel pump, remove the fuel tank filler cap. The fuel system is under pressure and the fuel will overspill unless the pressure is relieved, possibly leading to combustion or a fire.

For diesel vehicles, when working on the fuel line or fuel filter, remove the fuel tank filler cap. The fuel system is under pressure and the fuel will overspill unless the pressure is relieved, possibly leading to combustion or a fire.

Do not make engine adjustments yourself. Be sure to consult your dealer.

Use only appropriate tools.

Oils, brake fluid and engine coolant have lubrication, cooling and rust prevention functions. If these liquids deteriorate through loss or contamination, it will cause a decline in the performance of the parts and such problems as seizure or malfunctioning. Replenish or change these liquids when performing the checks (daily and periodic checks) as required by the relevant regulations or in accordance with the Maintenance Schedule (when either the specified driving distance or period of time, whichever comes first, has expired).

Confirm that all systems and components are normal after performing the work.

Do not leave the removed parts or tools in the engine compartment. They could damage the equipment if caught in the belts or other moving components.

Dirty water, dirt and other impurities seriously impair the effectiveness of the oil, grease and fluids, and damage the parts. Exercise all due caution to prevent waste or other refuse from coming in contact with parts or materials that have been removed when changing or replenishing them.

Do not step on the engine or climb onto it. You could cause an engine failure by, for example, damaging the cylinder head cover or various connectors.

Electric Welding

Careless electric welding of vehicle parts can cause welding current to flow back through the vehicle's ground circuit and damage electrical and electronic parts so that they do not function normally. Whenever electric welding is necessary, consult your dealer.

Cab Tilting

Before Tilting the Cab (Single Cab Model)

⚠ Warning

To help avoid personal injury and property damage:

- Park the vehicle on level ground and check that there is enough space in front of and above the cab.
- Set the parking brake firmly and block the front wheels.
- Move the selector lever in the "P" position.
- Secure loose articles in the cab.
- Stop the engine.
- Close the cab door.

(Continued)

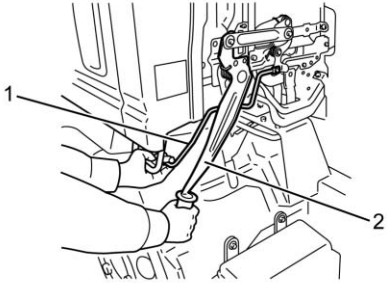
Warning (Continued)

- Keep the area surrounding the cab clear.

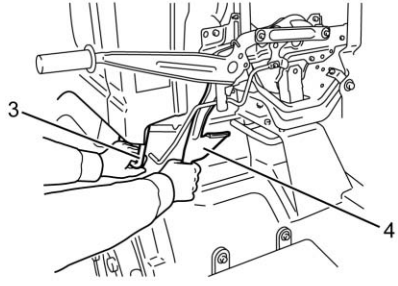
You and others could be seriously injured.

Tilting the Cab Single Cab Model

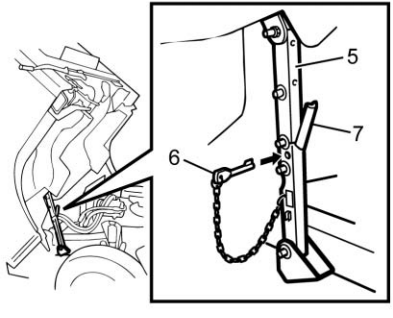
1. Check that all personnel are clear of the cab.
2. Read the label on the rear of the cab.



3. Unlock the handle (2) while pulling the lever (1).



4. Hold the assist handle (3) and pull the safety hook (4).



5. Raise the cab fully and be sure the cab support (5) is locked by the support lock lever (7).
6. Insert the safety lock pin (6).

Always be sure the safety lock pin is installed when the cab is tilted.

⚠ Warning

To help avoid personal injury or death, keep hands, tools, and clothing clear of the engine cooling fan when the engine is running.

You and others could be seriously injured.

Lowering the Cab Single Cab Model

1. Have all personnel stand clear of the cab.
2. Remove the safety lock pin (6).
3. Hold the assist handle (3) and unlock the cab support by pulling the support rearward while pressing the support lock lever (7).

4. Lower the cab and push the handle (2) down firmly to lock.

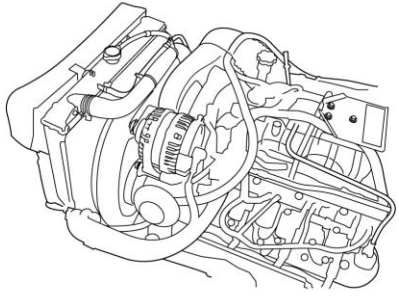
⚠ Warning

To help avoid personal injury or death, be sure the tilt cab is securely locked in the lowered position before operating the vehicle.

You and others could be seriously injured.

Engine Compartment Overview

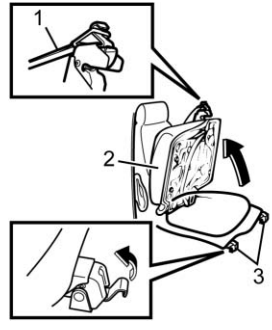
3.0L L4 Diesel Engine



6.0L V8 Gasoline Engine

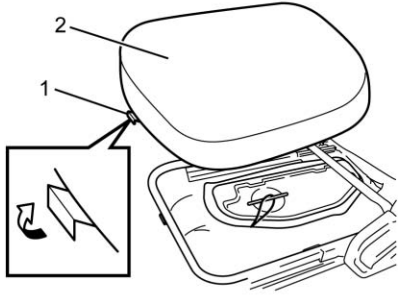
Engine Cover

Engine Inspection Cover (Crew Cab Model)



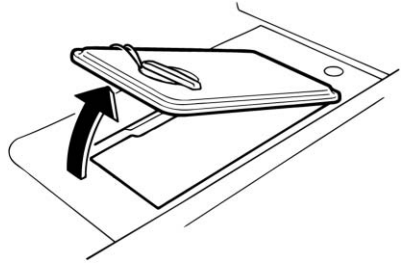
To gain access to the engine, release the catch hooks (3) and raise the passenger's seat cushion (2). The cover can be held up by a strap (1), permitting engine inspection and adjustment.

Engine Inspection Sub Cover (Crew Cab Model)



To gain access to the engine compartment, pull the lock lever (red) (1) on the driver's seat cushion (2) to unlock it, raise the driver's seat cushion and remove the sub cover.

Engine Coolant Reserve Tank Inspection Cover (Crew Cab Model)



To gain access to the engine coolant reserve tank, remove the inspection cover located under the rear left seat.

Engine Oil (Diesel)

Engine oil is an important factor determining engine performance and longevity. Be sure to use only the specified oil and oil filters. The engine oil level must be checked and the oil should be changed regularly according to the Maintenance Schedule.

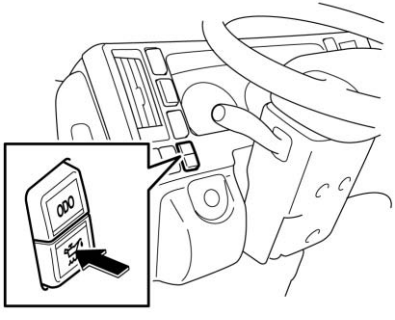
The engine oil performs the following important functions:

- It prevents engine parts from becoming worn.
- It cools engine parts.
- It cleans engine parts.
- It seals the combustion chambers and prevents rust.

  Replace the engine oil at regular intervals.

When particulate matter (PM) has accumulated to a preset level in the diesel particulate filter (DPF), the filter is automatically regenerated through combustion. To make this regeneration (combustion) possible, a small amount of fuel is injected into the engine combustion chamber after firing. This causes fuel to gradually become mixed with the engine oil, and the engine oil level may rise beyond the original level. This does not indicate a malfunction of the engine.

Checking the Engine Oil Level

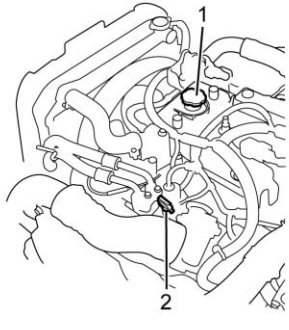


Press the engine oil level check switch. If engine oil level is low the red oil pressure warning light will turn on. If the engine oil level is above the "OK", the green oil level indicator will turn on.

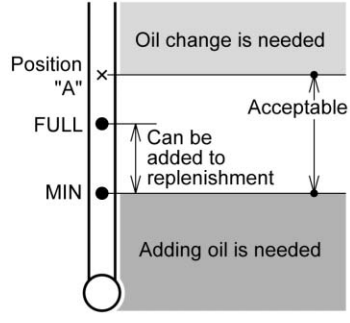
The oil level varies while the engine is running, right after it is stopped, and on sloping ground. When checking the oil level, be sure the vehicle is on level ground while the engine is cool.

The engine oil level must be kept at the right level to help assure proper lubrication of your vehicle's engine.

It is the owner's responsibility to check the oil level at regular intervals (such as every fuel stop), according to the following instructions. Park the vehicle on a level surface and check the engine oil level before starting or at least 30 minutes after turning off the engine.



1. Remove the oil dipstick (2) and wipe off any oil on the oil dipstick.



2. Reinsert the oil dipstick fully and then gently remove it.

   The oil is at the correct level if the oil level is between the "Position A" and "MIN" marks.

3. If the oil level is too low, add oil to the "FULL" mark.

   If the oil level is beyond the "Position A" mark, the oil needs to be changed.

4. Reinstall the oil dipstick into position after checking the oil level.

Any oil level above the "Position A" mark on the oil dipstick may cause engine malfunctions. Change with

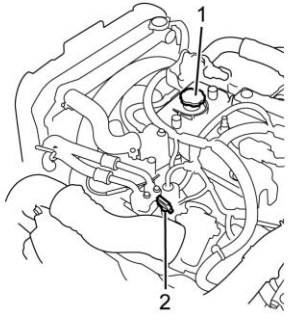
oil of the correct grade and quality whenever its level exceeds the "Position A" mark.

Fuel will gradually become mixed with the engine oil, thinning it out. Be sure to change the oil at the specified intervals.

The oil level cannot be checked correctly when the engine is running.

If the engine has been running, wait at least 30 minutes before checking.

Adding the Engine Oil



When the engine oil level is near or below the "MIN" mark on the oil dipstick, remove the oil filler cap (1) and add the oil. Remove the oil dipstick (2) at this time. Use only the specified engine oil.

Caution

When adding oil, be careful not to spill any, but keep a workshop rag handy just in case there are any spills. If any oil should spill onto the engine, carefully wipe it away. If this precaution is not taken, the spilled oil could ignite and a fire could spread.

Do not leave flammable items, such as rags or gloves, in the engine compartment. They could cause a fire. You and others could be seriously injured.

Engine oil lubricates and cools the engine's internal components. The quality of the oil is degraded and the quantity of oil is reduced by evaporation, discharge and combustion during the operation of the engine. Continually using the same oil without checking the level, or without replenishing and changing it could cause seizure or damage to the engine.

Prevent dirt from entering the filler port when adding the oil. If foreign matter mixes with the oil, it could damage the engine.

Adding oil above the "Position A" mark on the oil dipstick could result in faulty engine operation. Be sure to check the oil level by using the oil dipstick.

Failure to use the recommended engine oil could result in engine or DPF breakdown, or in poor fuel efficiency. Be sure to use the recommended engine oil.

Choosing the Right Quality Oil

If you do not use the oil intended for a vehicle equipped with a Diesel Particulate Filter (DPF), both the engine and the DPF may break down and fuel economy may decrease. Be sure, therefore, to use the oil intended for vehicles equipped with DPF.

GM recommends engine oil that supports DPF (Low ash oil). Use of engine oil that does not support low ash will increase the PM produced by engine combustion. Consequently, the maintenance interval of the DPF filter will be reduced.

Oil Identification Logo

A logo (symbol) is used on most oil containers to help you select the oil you should use. The top portion of the logo shows the oil quality by API designations such as CJ4 or others. The center portion of the logo shows the SAE viscosity grade, such as SAE *W-40 (* indicates viscosity on the low temperature side). You should look for this logo on the oil container, and use ONLY oil containing the logo.

Change Intervals

The oil and oil filter change intervals for your engine are based on the use of recommended oil quality and viscosity, as well as high-quality filters such as genuine GM oil filters. Using oil other than recommended, or oil and filter change intervals longer than recommended, could reduce engine life. Damage to engines due to improper maintenance or use of incorrect oil quality and/or viscosity is not covered by the new vehicle warranty.

Your engine was filled with a high-quality engine oil when it was built. You do not have to change this oil before the first recommended change interval. Oil and filter change intervals depend on how you use your vehicle. For information on the proper oil and filter change intervals. See *Maintenance Schedule* ⇨ *328*.

Engine Oil Additives

Engine oils contain a variety of additives. Your engine should not need any extra additives if you use the recommended oil quality and change intervals.

⚠ Warning

Used engine oil contains harmful contaminants that have caused skin cancer in laboratory animals. Avoid prolonged skin contact. Clean skin and nails thoroughly using soap and water–not mineral oil, fuels or solvents. Launder or discard clothing, shoes or rags containing used engine oil.

Engine Oil and Gear Oil Viscosity Charts

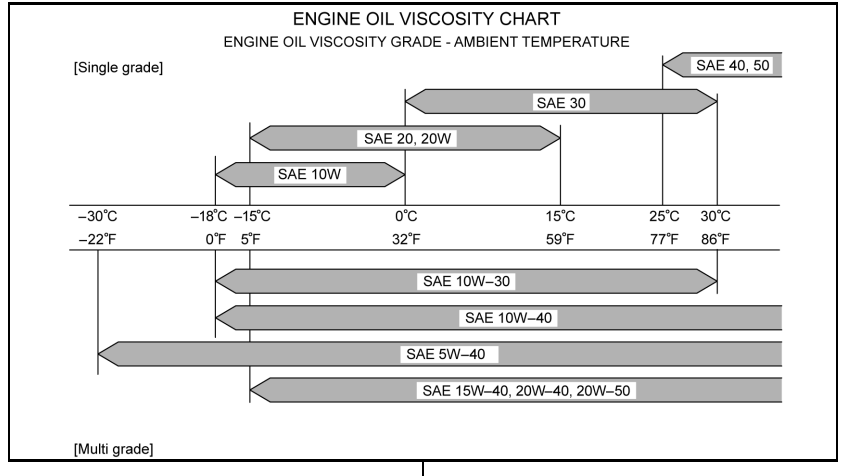
Select appropriate engine oil in accordance with the table below. It is also important to select the viscosity appropriate for the temperature at which your vehicle operates. Use the following table for making correct selections.

Engine Oil

Engine oil viscosity (thickness) has an effect on fuel economy and cold-weather starting. Lower viscosity engine oils can provide better fuel economy; however, higher temperature weather conditions require higher viscosity engine oils for satisfactory lubrication.

When choosing an oil, consider the range of temperature your vehicle will be operated in before the next oil change. Then, select the recommended oil viscosity from the chart.

Do not use any viscosity of oil not recommended. Such oils could cause engine damage.



This Engine Oil Viscosity Grade Chart shows general information.

For this vehicle, oil with *W-40 viscosity is recommended.

Changing the Engine Oil and Oil Filter

Engine oil and the oil filter are important factors in engine performance and lifespan. Be sure to use only the specified oil and oil filters. The engine oil level must be checked and the oil should be changed regularly according to the Maintenance Schedule.

Use the indicated oil quantities only as guidelines when changing the engine oil. After changing the oil, make sure the oil is at the required level. See *Capacities and Specifications* ⇨ *367*.

Failure to use the recommended engine oil could result in engine or DPF breakdown, or in poor fuel efficiency. Be sure to use the recommended engine oil.

Engine oil change precaution:

- When adding oil, remove the dipstick.
- After adding oil, wait for at least 5 minutes before starting the engine. Be sure to reinstall the dipstick.

Discarded Parts, Oils and Other Liquids

When changing oils, filters, engine coolant or other liquids, be sure to have a container ready in advance for their disposal.

Use methods conforming to legal requirements for discarding or disposing of parts, oils, filters or engine coolant after change or replacement.

Do not dispose of used engine oil, fuel or any other oil in a careless manner such as pouring it on the ground, into sewers, or into streams or bodies of water. Instead, recycle it by taking it to a used oil collection facility which may be found in your community.

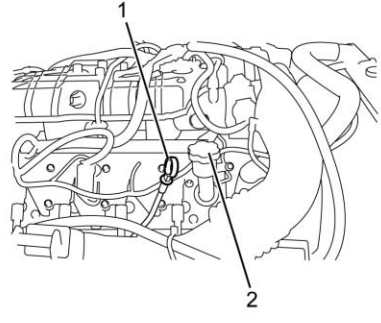
Engine Oil (Gasoline)

To ensure proper engine performance and long life, careful attention must be paid to engine oil. Following these simple, but important steps will help protect your investment:

- Use engine oil approved to the proper specification and of the proper viscosity grade. See “Selecting the Right Engine Oil” in this section.
- Check the engine oil level regularly and maintain the proper oil level. See “Checking Engine Oil” and “When to Add Engine Oil” in this section.
- Change the engine oil at the appropriate time. See *Maintenance Schedule* ⇨ *328*.
- Always dispose of engine oil properly. See “What to Do with Used Oil” in this section.

Dipstick Access

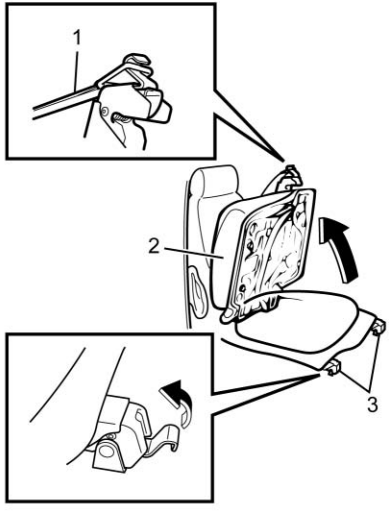
Single Cab Model



1. Engine Oil Dipstick
2. Oil Filler Cap

Access to the engine oil dipstick is located on the engine left side after tilting the cab.

Crew Cab Model



1. Strap
2. Seat Cushion
3. Catch Hooks

The engine oil dipstick is under the engine inspection sub cover located beneath the passenger's seat.

Checking Engine Oil

Check the engine oil level regularly (every 650 km (400 mi), especially prior to a long trip. The engine oil dipstick handle is a loop. See *Engine Compartment Overview* ⇨ *242* for the location.

⚠ Warning

The engine oil dipstick handle may be hot; it could burn you. Use a towel or glove to touch the dipstick handle.

Follow these guidelines:

- To get an accurate reading, park the vehicle on level ground. Check the engine oil level after the engine has been off for at least two hours. Checking the engine oil level on steep grades or too soon after engine shutoff can result in incorrect readings. Accuracy improves when checking a cold engine prior to starting. Remove the dipstick and check the level.
- If unable to wait two hours, the engine must be off for at least 15 minutes if the engine is warm, or at least 30 minutes if the engine is not warm. Pull out the dipstick, wipe it with a clean paper towel or cloth, then push it back in all the way. Remove it again, keeping the tip down, and check the level.

When to Add Engine Oil

If the oil is below the cross-hatched area at the tip of the dipstick and the engine has been off for at least 15 minutes, add 1 L (1 qt) of the recommended oil and then recheck

the level. See “Selecting the Right Engine Oil” later in this section for an explanation of what kind of oil to use. For engine oil crankcase capacity, see *Capacities and Specifications* ⇨ *367*.

Caution

Do not add too much oil. Oil levels above or below the acceptable operating range shown on the dipstick are harmful to the engine. If you find that you have an oil level above the operating range, i.e., the engine has so much oil that the oil level gets above the cross-hatched area that shows the proper operating range, the engine could be damaged. You should drain out the excess oil or limit driving of the vehicle and seek a service professional to remove the excess amount of oil.

See *Engine Compartment Overview* ⇨ *242* for the location of the engine oil fill cap.

Add enough oil to put the level somewhere in the proper operating range. Push the dipstick all the way back in when through.

Any oil level above the "FULL" mark on the oil dipstick may cause engine malfunctions.

Selecting the Right Engine Oil

Selecting the right engine oil depends on both the proper oil specification and viscosity grade. See *Recommended Fluids and Lubricants* ⇨ *358*.

Specification

Ask for and use engine oils that meet the dexos1™ specification. Engine oils that have been approved by GM as meeting the dexos1 specification are marked with the dexos1 approved logo. See www.gmdexos.com.

dexos1™ APPROVED

Caution

Failure to use the recommended engine oil or equivalent can result in engine damage not covered by the vehicle warranty.

Viscosity Grade

Use SAE 5W-30 viscosity grade engine oil.

Cold Temperature Operation: In an area of extreme cold, where the temperature falls below −29 °C (−20 °F), an SAE 0W-30 oil may be used. An oil of this viscosity grade will provide easier cold starting for the engine at extremely low temperatures.

When selecting an oil of the appropriate viscosity grade, it is recommended to select an oil of the correct specification. See “Specification” earlier in this section.

Engine Oil Additives/Engine Oil Flushes

Do not add anything to the oil. The recommended oils meeting the dexos1 specification are all that is needed for good performance and engine protection.

Engine oil system flushes are not recommended and could cause engine damage not covered by the vehicle warranty.

What to Do with Used Oil

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

Used oil can be a threat to the environment. If you change your own oil, be sure to drain all the oil from the filter before disposal. Never dispose of oil by putting it in the trash or pouring it on the ground, into sewers, or into streams or bodies of water. Recycle it by taking it to a place that collects used oil.

Automatic Transmission Fluid

⚠ Warning

Overfilling of the automatic transmission can cause the fluid to be "PURGED" out of the breather hose onto the hot engine parts and can cause a fire.

You and others could be seriously injured.

Both quality and quantity of fluid are important factors that have a significant influence on the performance and durability of the automatic transmission. Be sure to use only the dealer recommended fluid for replenishment, and observe the specified fluid level

Too much or too little transmission oil could damage your transmission. Too much could cause your transmission to overheat and fluid to spill out from the breather hose. Be sure to get an accurate reading if you check your transmission fluid.

When cleaning around the dipstick and guide tube, make sure that you thoroughly wipe away all of the dirt and dust etc. Failure to do so may cause a fault in the transmission.

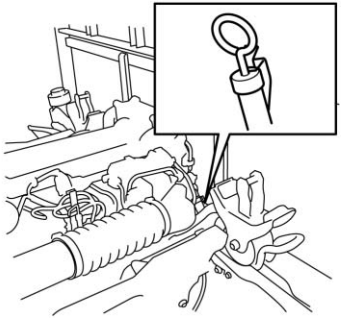
Do not let coolants (ethylene glycol type), water based substances, or other fluids etc., mix with the fluid. Otherwise, degraded performance and faulty operation of the system will result.

Checking the Automatic Transmission Oil level

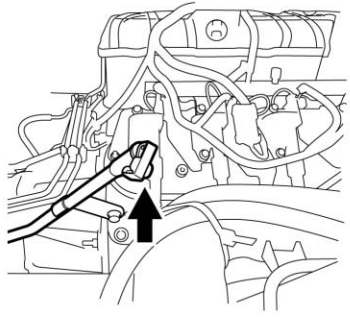
This operation could be difficult and you may choose to have this done at your dealer.

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

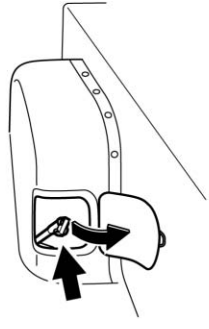
Position of the Dipstick



For the single cab diesel vehicle, the dipstick is located to the left side of the automatic transmission at the rear of the engine. Tilt the cab up to inspect it.



For the single cab gasoline vehicle, the dipstick is located to the right side of the automatic transmission at the rear of the engine. Tilt the cab up to inspect it.



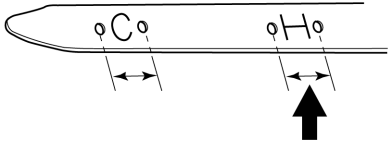
For the crew cab gasoline vehicle, the dipstick is located beneath the rear-of-engine inspection panel. After unlatching the A/T fluid inspection cover, the dipstick will be visible.

Inspection

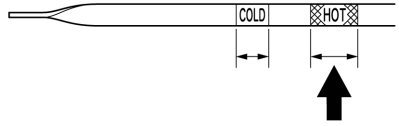
Wait at least 30 minutes before checking the transmission fluid if you have been driving at high speed for a long period of time, in city/heavy traffic or while pulling a trailer.

1. Start the engine, and drive the vehicle for approximately 10 minutes to warm up the engine. During 10 minutes, the automatic transmission fluid should reach a temperature of approximately 70 - 80 °C (158 - 176 °F). During the winter when temperatures are low, adjust the amount of driving time according to the actual conditions.
2. Park the vehicle on level ground, and firmly apply the parking brake.

3. With the engine idling, move the selector lever from the “P” position to the “1” position while pressing the brake pedal, and then return the lever from the “1” position to the “P” position.
4. With the engine still idling, pull out the dipstick and wipe it with a clean cloth.



Transmission Dipstick (Diesel Engines)



Transmission Dipstick (Gasoline Engines)

5. Reinsert the dipstick into position, pull out the dipstick slowly, and check whether the fluid level is within the “H” marked range for the diesel engine or within the “HOT” marked range for the gasoline engine. Always check the fluid level at least twice. Consistently is important in maintaining accuracy. If inconsistent readings persist, check the transmission breather to ensure that it is clean and free of debris.
   - Gasoline Engine Dipstick COLD — Transmission fluid temperature Approx. 19 - 25 °C (66 - 77 °F).
   - Gasoline Engine Dipstick H (HOT) — Transmission fluid temperature Approx. 70 - 80 °C (158 - 176 °F).
   - For gasoline engines, the “COLD” range on the dipstick is a guide used by your dealer for specialized equipment used to replace or service the automatic transmission fluid. When performing your own inspections, always use the “HOT” range after warming up the vehicle.
   - Diesel Engine Dipstick C (COLD) — Transmission fluid temperature Approx. 20 - 30 °C (68 - 86 °F).

- Diesel Engine Dipstick H (HOT) — Transmission fluid temperature Approx. 70 - 80 °C (158 - 176 °F).
- For diesel engines, the “C (COLD)” range on the dipstick is a guide used by your dealer for specialized equipment used to replace or service the automatic transmission fluid. When performing your own inspections, always use the “H (HOT)” range after warming up the vehicle.

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

6. If the fluid level is too low, add the specified fluid through the dipstick guide tube. Also, check whether there are no fluid leaks.
7. Insert the dipstick securely into position.

⚠ Warning

Be extremely careful not to burn yourself when checking the oil level if the engine temperature is high. Protect yourself with gloves etc.

You and others could be seriously injured.

Discarded parts, oil, grease and fluids could have an adverse effect on the environment. It is difficult to dispose of these, so have your dealer handle all checks and replacements.

Engine Air Cleaner/Filter

Air Cleaner

Use of clogged air cleaner element not only causes a deterioration in the engine output but also increased fuel consumption and dark exhaust smoke.

Be sure to use a genuine air cleaner element. If other air cleaner element is used, it may cause the sensor to output a wrong signal.

See *Maintenance Schedule* ⇨ *328*.

Air Cleaner Indicator Light (Diesel Vehicles Only)

When the air cleaner indicator light comes on, check the air cleaner element. If the air cleaner element is clogged, replace the air cleaner element.

See *Vehicle Messages (Diesel Only)* ⇨ *91*.

See *Maintenance Schedule* ⇨ *328*.

Engine Coolant

Protection of Engine against Overcooling

Overcooling of the engine not only accelerates wear of the vital engine parts but also hurts fuel economy.

Engine Coolant in Cold Weather

To prevent the engine damage due to freezing of the engine coolant, mix the coolant and water at the ratio of 50/50.

Replace rubber hoses whenever they crack or are damaged; even minor cracks allow engine coolant solution to leak.

⚠ Warning

If your engine cooling system overheats, see *Engine Overheating* ⇨ *260*. Continued operation of the engine even for a short time may result in a fire and the possibility of personal injury and/or severe vehicle damage.

You and others could be seriously injured.

Your vehicle an engine coolant recovery system, expansion bottle and/or an engine coolant reserve tank system. Engine coolant in the system expands with heat and overflows into the reserve tank. When the system cools, engine coolant is drawn back into the radiator.

The engine cooling system has been filled at the factory with a quality engine coolant. It is important to use proper engine coolant to prevent damage to engine cooling system components. The engine cooling system is designed to use engine coolant (a mixture of DEX-COOL type antifreeze and water) rather than plain water.

See the Maintenance Schedule to find out when the engine coolant must be replaced. Note that changing the engine coolant is needed to replenish the rust inhibitors to make certain that all parts of the engine cooling system work well.

⚠ Warning

Check, replenish or change the engine coolant only after the engine has sufficiently cooled down.

Do not loosen or remove the cap of the radiator or engine coolant reserve tank cap when the engine coolant is still hot. Hot vapor or boiling water may burst out and cause a burn.

When removing the radiator cap or engine coolant reserve tank cap, use a thick cloth to cover the cap and turn it slowly.

Engine coolant is toxic and must not be ingested. If the engine coolant is mistakenly ingested, seek prompt medical attention.

If the engine coolant gets in your eyes, rinse your eyes immediately with a large amount of water for 15 minutes or longer. Also, if your

(Continued)

Warning (Continued)

eyes are still irritated or otherwise feel abnormal, seek immediate medical attention.

If the engine coolant gets on your skin, rinse it off using a soap with a large amount of water. Also, if abnormality is seen, seek medical attention.

Engine coolant is flammable, and therefore, it must be kept away from flames and other heat sources. Engine coolant also could ignite if it comes in contact with a hot surface, such as the exhaust manifold. Exercise caution to prevent this from happening.

You and others could be seriously injured.

Preparing Engine Coolant

To prevent the engine damage to freezing of the engine coolant and to protect the cooling system from corrosion, a mixture of DEX-COOL type antifreeze and water. If the engine of the vehicle is at −30 °C (−22 °F) or above, the coolant concentration should be 50%. Direct use of “50/50 Pre-diluted” product which is already diluted to 50% concentration is recommended. If the outside temperature engine or vehicle is used at −30 °C (−22 °F) or below, coolant concentration of 55% is recommended.

It is the owner’s responsibility to:

- Maintain the engine cooling system freeze protection at or above −30 °C (−22 °F) (at or below −30 °C (−22 °F) in colder climates to ensure protection against corrosion and loss of engine coolant from boiling. A 50/50 (55/45 for colder climates) mixture of DEX-COOL type antifreeze and water will provide freeze protection to at or above −30 °C (−22 °F), (at or below −30 °C (−22 °F) in colder climates) and boil protection to 128 °C (262 °F). Periodic replacement of engine coolant is needed to replenish the anticorrosion additives that wear out with use. Engine coolant has become dark in color shows that it needs to be changed.
- Use only DEX-COOL type recommended coolant.
- Do not use methanol-base antifreeze, alcohol or plain water alone in your vehicle at any time. They will boil at a lower point than that at which the engine coolant temperature gauge will warn of overheating, and they do not provide proper protection against corrosion.

Engine Coolant Quantity

For the quantity of engine coolant, see *Capacities and Specifications* ⇨ *367*. After changing the engine coolant, check that the engine coolant is up to the specified level.

⚠ Warning

For storage, close the cap of coolant container securely and keep it in a place inaccessible to children.

You and others could be seriously injured.

Using any coolant other than that recommended by your dealer could cause damage to the engine, radiator or heater core. In particular, use of coolants containing borate salts or silicates may result in engine or radiator corrosion, causing engine coolant leaks and other problems.

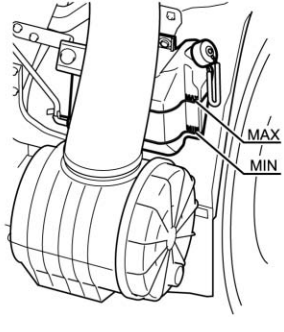
To dilute the coolant, use distilled water or deionized water.

Do not use the coolant at any coolant concentration other than that specified. If the coolant concentration is 60% or higher, overheating is likely to occur, while if it is 30% or lower, anti-corrosion function is not provided sufficiently.

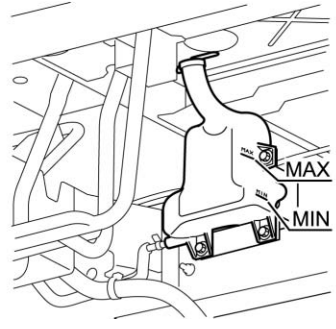
Using coolant at any coolant concentration other than that specified may reduce anti-freezing performance, and engine coolant may freeze.

If the engine coolant decreases rapidly, go immediately to the nearest dealer for a check and repair.

Checking the Engine Coolant Level

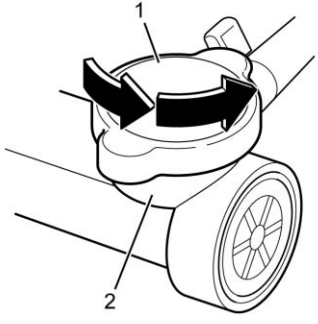


For the single cab model, the engine coolant reserve tank is located behind the front-right wheel. See *Cab Tilting* ⇨ *240*.



For the crew cab model, the engine coolant reserve tank is under the access panel beneath the left rear seat. See *Engine Cover* ⇨ *242*.

When the engine has cooled down, make sure that the fluid level in the engine coolant reserve tank is no lower than the “MIN” line. In addition, carefully remove the radiator cap and check to see if it is damaged. Check that the engine coolant is full to the filler neck. Check the engine coolant level only when it is cold.



The radiator cap (1) opens and closes in double action. When removing the radiator cap, take caution not to damage the cap and the filler neck (2).

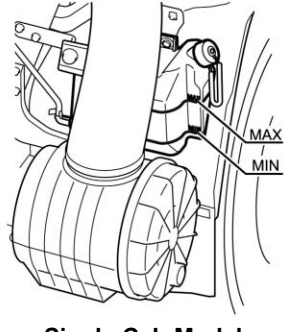
Turn the cap slowly to the left until it reaches a “stop”. Do not press down while turning the cap.

Wait until any remaining pressure (indicated by a hissing sound) is relieved, then press down on the cap and continue turning it to the left.

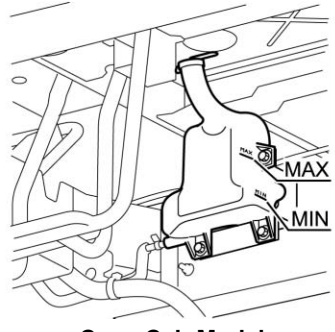
Also, check to make sure there are no leaks from the radiator or radiator hose. Check for fluid or stains on the ground showing leaks where the vehicle is parked. Contact your dealer if you discover leaks.

Using the vehicle when there are leaks can lead to engine seizure.

Adding Engine Coolant

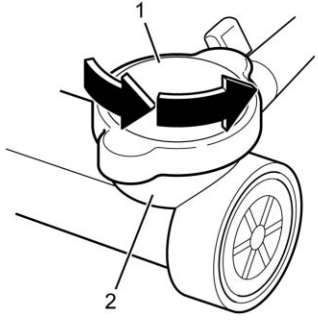


Single Cab Model



Crew Cab Model

When the engine coolant level in the engine coolant reserve tank is below the “MIN” line, open the reserve tank cap and fill to near the “MAX” line with engine coolant. Wash the reserve tank cap and filler neck with clean water. Tighten the cap securely after the engine coolant has been replenished.



1. When the engine is cool, remove the radiator cap (1).
   - Turn the cap slowly to the left until it reaches a “stop”. Do not press down while turning the cap.
   - Wait until any remaining pressure (indicated by a hissing sound) is relieved, then press down on the cap and continue turning it to the left.
2. Fill the radiator to the base of the filler neck (2).
   - Add enough engine coolant to provide the required cooling, freezing and corrosion protection.
   - Install the radiator cap.
3. Run the engine until the engine coolant temperature rises to normal level, and idle the engine for 10 minutes.
4. Turn off the engine. Make sure that the engine is cool. Remove the radiator cap and add engine coolant to the radiator until it reaches the base of the filler neck.
5. Install the radiator cap.

Check, replenish or change the engine coolant only after the engine has sufficiently cooled down.

When the engine is still hot, take care to prevent engine coolant from contact with the exhaust manifold. Any such contact could result in exhaust manifold damage.

If you use the proper quality engine coolant, there is no need to add extra inhibitors or additives which claim to improve the system. They may be harmful to the proper operation of the system.

Do not overfill the engine coolant reserve tank.

If the level of engine coolant changes rapidly, have your vehicle inspected at your dealer.

Thermostat

The engine coolant temperature is controlled by thermostat(s). The thermostats stop engine coolant flow through the radiator until a preset temperature is reached. The thermostats are installed in the engine coolant outlet on the engine block. The same thermostats are used in both winter and summer. When a replacement is needed, genuine GM parts are recommended.

Radiator Pressure Cap

The radiator cap, a 103 kPa (15 psi) pressure type for gasoline vehicles and a 108 kPa (16 psi) for diesel vehicles, must be installed tightly, otherwise engine coolant may be lost and damage to the engine may result from overheating. The radiator pressure cap should be checked periodically for proper operation. If a replacement is required, a genuine GM part is recommended.

Engine Overheating

When the Engine Overheats

The engine cooling system may overheat if the engine coolant level is too low, if there is a sudden loss of engine coolant (such as radiator hose failure), or if other problems occur. It may also temporarily overheat during severe operating conditions such as:

- Climbing a long hill on a hot day.
- Stopping after high-speed driving.
- Idling for long periods in traffic.

If engine power drops and the needle on the engine coolant temperature gauge goes up above the upper limit of the safety zone and enters the "H" zone, the engine is overheating. The engine overheat warning light will come on and on a diesel vehicle, the warning buzzer will sound. Either steam or boiling engine coolant will squirt out of the radiator. The diesel vehicle will also have an “OVER HEAT” message displayed. Take the following corrective actions immediately.

⚠ Warning

To help avoid being burned:

Do not tilt the cab or open the engine access cover if you see or hear steam or engine coolant escaping from the engine compartment. Wait until no steam or engine coolant can be seen or heard before tilting the cab or opening the engine cover.

(Continued)

Warning (Continued)

Do not remove the radiator cap or engine coolant reserve tank cap if the engine coolant in the tank is boiling. Also do not remove the radiator cap while the engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if either cap is taken off too soon.

You and others could be seriously injured.

If Steam is Coming from the Engine Compartment

⚠ Warning

If the engine coolant temperature gauge shows an overheat condition or you have other reasons to suspect the engine may be overheating, continued operation of the engine (other than as described here) even for

(Continued)

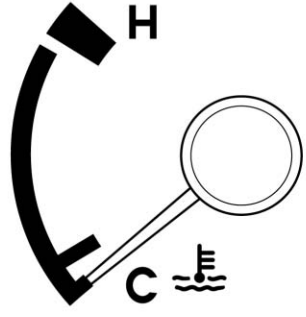
Warning (Continued)

a short period of time may cause a fire and the result in personal injury and severe vehicle damage. Take immediate action as outlined.

You and others could be seriously injured.

If you see or hear escaping steam or have any other reason to suspect there is a serious overheat condition, stop and park the vehicle as soon as it is safe to do so, turn on the hazard warning flasher and then turn off the engine immediately and safely exit the vehicle.

If Steam Is Not Coming from the Engine Compartment



For Diesel Vehicle

If the engine coolant temperature gauge shows an overheat condition, or you have reason to suspect the engine may be overheating, take the following steps:

1. Operate the hazard warning flasher and pull the vehicle immediately over to a safe place that does not impede traffic and park it.
2. For the gasoline engine, if there's no sign of steam, push the accelerator pedal until the engine speed is about twice as fast as normal idle speed. Bring the engine speed

back to normal idle after 2 or 3 minutes. Idle the engine and wait until the engine coolant temperature drops to safety zone. If your air conditioner is on, turn it off. And turn on the heater to help the engine expel heat.

For the diesel engine, idle the engine and wait until the engine coolant temperature drops to safety zone. If your air conditioner (if equipped) is on, turn it off. And turn on the heater to help the engine expel heat.

3. When the needle of the engine coolant temperature gauge returns to the middle of the safety zone, stop the engine. If the needle of engine coolant temperature gauge does not drop inside into the safety zone, turn the engine off and have your vehicle serviced at the nearest dealer.

   When the cooling fan for the radiator is not turning, turn off the engine immediately.

⚠ Warning

Even when the engine has been stopped, the engine coolant in the radiator remains under pressure. Immediately removing the radiator cap could cause steam or hot water to blow out, and you could be scalded as a result. The engine coolant in the reserve tank may also be hot. Immediately removing the cap could cause hot water to blow out, and possibly scald you. Perform inspection, refilling, and replacement of coolant only when its temperature has cooled.

When removing the radiator cap and reserve tank cap, use a thick cloth to cover the cap and turn it little by little.

You and others could be seriously injured.

4. If no steam or engine coolant can be seen or heard from the engine compartment:
   - Tilt the cab or open the engine access cover.
     - If the engine coolant is boiling, wait until it stops before proceeding.
     - Look at the see-through reserve tank. The engine coolant level should be between the "MAX" and "MIN" lines on the reserve tank.
     - If necessary, pour engine coolant (See *Engine Coolant* ⇨ *254* for the proper coolant and water mixture) into the reserve tank only, not directly into the radiator. Also, do not check engine coolant level at the radiator.

- Make sure the fan belts are not broken, or off the pulleys, and that the fan turns when the engine is started. Make sure the fan blade and pulleys are not broken.
- Diesel engine only, check the radiator hoses and connections, heater hoses and connections, radiator, water pump, EGR cooler, and SCR system and hoses for leakage.
- Gasoline engine only, if the engine coolant level in the reserve tank is low, look for leaks at the radiator hoses and connections, heater hoses and connections, radiator, and water pump.

  If the engine coolant level in the reserve tank is at the correct level but there is still an indication on the instrument panel of an overheat condition:

  You must let the engine cool first. You may then add engine coolant directly to the radiator. See "Adding Engine Coolant" under *Engine Coolant* ⇨ *254*.

5. Inspect to see if there is any dirt, etc. attached to the front surface of the radiator. Also, inspect to see if there is anything blocking the core. If there is anything attached, clean and remove it.
6. After the inspection, regardless of the vehicle condition, please contact the nearest dealer.

Once the engine coolant temperature gauge no longer signals an overheat condition, you can resume driving at a reduced speed. Return to normal driving after about 10 minutes if the gauge pointer does not again show an overheat condition.

When tap water only has been used for engine coolant in an emergency, change the engine coolant as soon as possible.

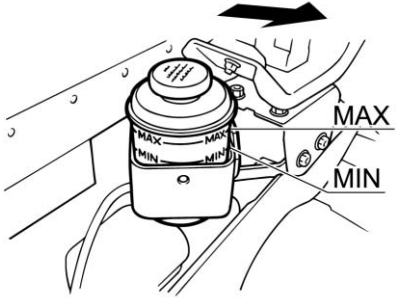
Engine damage may be caused if an overheating engine is suddenly refilled with water. Instead, refill slowly.

Power Steering Fluid

The power steering fluid level must be checked and it must be changed according to the Maintenance Schedule. See *Maintenance Schedule* ⇨ *328*.

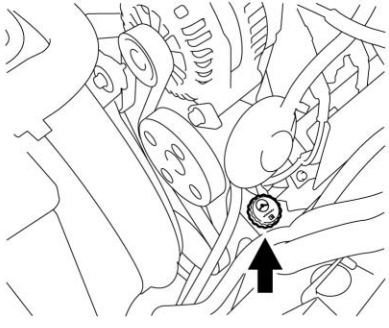
When replenishing power steering fluid or flushing the power steering system, always use ATF (Dexron®-VI). Failure to use the proper fluid may damage the power steering system seals and hoses, leading to fluid leakage.

Checking the Power Steering Fluid Level



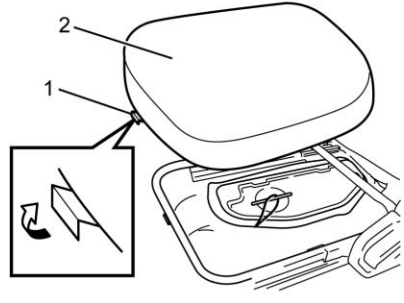
For the diesel vehicles, the fluid level is correct if it is between the “MAX” and “MIN” lines on the reserve tank. If the level is lower that the “MIN” line, add fluid up to the “MAX” line.

The reserve tank is located at the rear of the engine compartment on the right. When you have finished checking the fluid level, securely install the cap and cover.



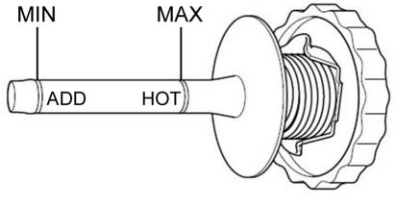
For single cab gasoline vehicles, the fluid level is correct if it is between the "MAX" and "MIN" lines on the oil dipstick. If the level is lower than the "MIN" line, add fluid up to the "MAX" line.

The reserve tank is located at the front left side of the engine.



For crew cab gasoline vehicles, open inspection sub cover, by pulling the lock lever (red) (1) on the driver’s seat cushion (2) to unlock it, raise the cushion and remove the sub cover. See *Engine Cover* ⇨ *242*.

When you have finished checking the fluid level, securely install the cap.



The fluid level is correct if it is between the "MAX" and "MIN" lines on the oil dipstick. If the level is lower than the "MIN" line, add fluid up to the "MAX" line.

⚠ Warning

Before adding fluid, clean the area around the cap and pour fluid from a clean jug or filler. Foreign matter getting in the tank may cause power steering system failure.

(Continued)

Warning (Continued)

Do not mix the recommended power steering fluid with fluids of other brands. Due to chemical reactions, any mixture of differently branded fluids may cause failure of the system.

You and others could be seriously injured.

Washer Fluid

Windshield Washer Fluid

The windshield washer is equipped on the windshield wiper arm.

Check the level of fluid in the windshield washer fluid tank. In addition, spray windshield washer fluid and operate the windshield wipers to check for any areas not properly wiped. At this time, also check the spraying condition of the windshield washer.

Inspect the washer fluid level regularly, especially during bad weather conditions.

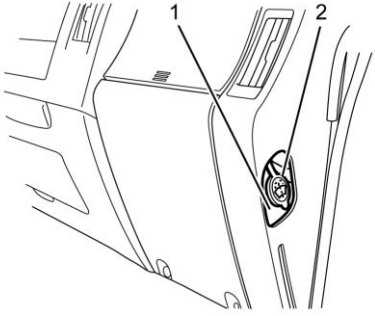
Use a high quality premixed solvent available at most dealers or service stations.

Avoid hard water when mixing Optikleen or other windshield washer solvents. Hard water contaminants may plug orifices in the washer system and reduce performance.

Do not use radiator antifreeze in the windshield washer; it could cause cab paint damage.

In cold weather, warm the windshield with the defrosters before using the washer, to help prevent icing that may block the driver's vision.

Refilling Windshield Washer Fluid



1. The windshield washer fluid tank (1) is located under the instrument panel on the passenger side.
2. Open the cap (2) and fill the tank with windshield washer fluid.

Upon factory shipment, new vehicles contain only tap water in the washer fluid tank. Adjust the concentration of the fluid to suit your own usage.

Follow the instructions provided with the windshield washer fluid regarding the ratio for mixing with tap water.

Poor quality products, engine coolant, and soapy water must not be used. Failure to observe this precaution can result in nozzle blockage or damage to painted surfaces.

The washer should never be used while the tank is empty. Operating the washer with the tank empty can result in motor damage.

Brakes

For the most effective braking and for maximum life from brake system components, follow these suggestions:

- Keep any obstructions from interfering with brake pedal travel.
- Keep tires properly inflated. Improperly inflated tires can reduce the efficiency of the brakes.

Follow the recommendations for brake checks in the Maintenance Schedule.

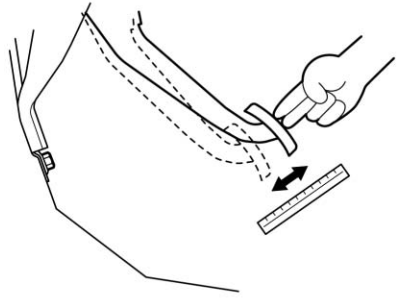
GM replacement brake lining material is recommended for this vehicle to maintain the balance between front and rear brake performance. GM replacement brake parts have been carefully selected to provide the proper brake balance for purposes of both stopping distance and controllability over the full range of operating conditions. Installation of front or rear brake lining material with performance different from that of the replacement parts recommended for this vehicle can change the intended brake balance of this vehicle.

Checking the Brake Electric Vacuum Pump (3500HD/4500 Series)

1. Turn the engine control switch to the "ON" position (do not start the engine), and press the brake pedal several times.
2. Check for the noisy sound of the electric vacuum pump inside the instrument panel at the same time as vacuum warning buzzer sound, and check that the brake low vacuum warning light comes on.
3. Then, start the engine. The main vacuum pump driven by the engine will start running. If the electric vacuum pump operation (noisy sound) and the vacuum warning buzzer stop, and the brake low vacuum warning light goes off thereafter, the operation is normal.
4. If you cannot hear the noisy sound or the noisy sound stays on all the time, have the vehicle inspected by the nearest dealer immediately.

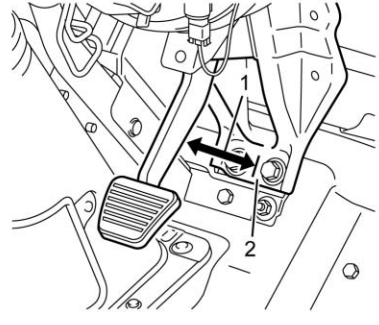
Brake Pedal

Stroke



Shut off the engine and press the brake pedal about 10 times strongly, then check the brake pedal for free play by lightly pushing it by hand until you feel resistance.

Free play (measured at the tip of pedal)
4 - 7 mm (0.16 - 0.28 in) (Gasoline Vehicles)
5 - 10 mm (0.20 - 0.39 in) (Diesel Vehicles)



1. Clearance from the floor.
2. Brake pedal bracket.

Next, start the engine, and wait at least 1 minute. Then press the brake pedal and measure the clearance (1) of the pedal from the

floor (that is, the distance between the brake pedal bracket (2) and the brake pedal arm).

Clearance between the brake pedal and the brake pedal bracket with a pressure of 490 N (110 lbs) applied to the brake pedal
45 mm (1.77 in) or more (Gasoline Vehicles)
35 mm (1.38 in) or more (Diesel Vehicles)

If, after continued pressing of the brake pedal, the clearance slowly decreases or the pedal action feels spongy, air may be trapped in the brake hydraulic circuit. Have your vehicle inspected at the nearest dealer as soon as possible.

If your vehicle's brakes squeak during normal driving or braking, the cause may be one of the following.

- Brake pad wear

  Brake pads are about to wear out. If this happens, have your vehicle inspected at the nearest dealer as soon as possible.

- Adherence of sand, grit or mud

  If sand, grit or mud adheres to the brakes, a screeching sound may be emitted upon contact with rotating components. If this happens, wash the vehicle to remove all such adhering matter. If cleaning alone does not eliminate the squeaking sound, have your vehicle inspected at the nearest dealer.

Brake Hoses and Pipes

Inspection

With the steering wheel turned fully to the left, check the left front brake hose and pipe visually and by touch, making sure that they are free of scratches, cracks and bulging. Also make sure that the hose and pipe do not interfere with any chassis part or wheel, and that their joints are not leaking and are free of any type of damage. Check the right front brake hose and pipe in the same way. The rear left and right brake hoses and pipes should also be checked in the same manner.

Disc Brakes and Drum Brakes

If the brake pads and shoe linings wear out beyond their usable limit, not only will the brake performance be impaired, but brake components could also fail.

⚠ Warning

Do not drive with brake pads and shoe linings worn out beyond the limit. Excessively worn brake pads and shoe linings may cause breakdown of brake components and poor braking performance. You and others could be seriously injured.

Caution

The pad has an embedded wear indicator. A squeaking noise from the indicator means that the pad is approaching the usable limit. If the squeaking noise from the

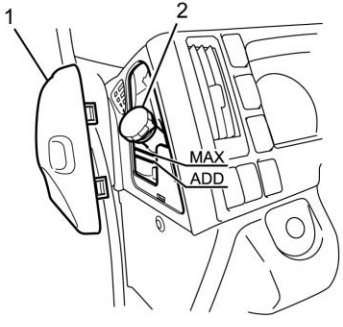
(Continued)

Caution (Continued)

indicator can be heard, contact the nearest dealer for inspection or replacement.

Brake Fluid

Checking the Brake Fluid Level



Remove the inspection cover (1) on the left- hand side of the instrument panel by turning it with your fingers. Check that the fluid level in the reservoir is between the "MAX" and "ADD" lines.

If the fluid surface cannot easily be seen, rock the vehicle gently.

Adding Brake Fluid

If the level of brake fluid has dropped below the "ADD" line, remove the cap (2) and add fluid. Take care to avoid filling beyond the "MAX" line.

Tighten the cap securely after the fluid has been added.

When adding brake fluid to the tank, take care to prevent dirt and water from entering it. Any dirt or water in the system could cause the vehicle to lose braking functions.

Inspect and change brake fluid according to the Maintenance Schedule.

Use the recommended brake fluid when adding brake fluid.

Never mix the specified brake fluid with fluids of another brand.

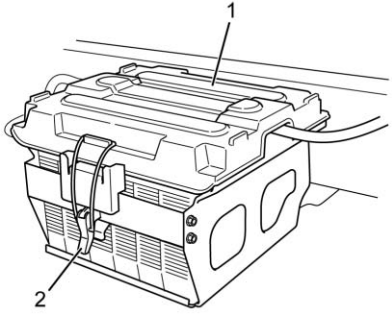
Be careful not to spill brake fluid onto painted surfaces or to let it come in contact with skin. If fluid is spilled onto a painted surface or comes in contact with skin, wash away the fluid with water and immediately wipe the area clean.

Brake fluid readily absorbs moisture. Therefore, it is necessary to close the brake fluid container tightly for storage.

If the brake fluid level decreases rapidly, there may be a problem in the brake system or brake pads or shoe linings may have worn out. Have your vehicle inspected by the nearest dealer immediately.

Battery

Working Near Battery



Diesel Vehicle Shown, Gasoline Vehicle Similar

The batteries are located on the outboard side of the left frame rail, behind the cab. The batteries are in a carrier with the cover (1) retained by spring clips (2).

⚠ Danger

Follow the precautions listed in the jump starting caution (see "When the Battery is Discharged") when working on or near the battery. Personal injury (particularly to eyes) or property damage may result from battery explosion, battery fluid or electrical (short circuit) burns. You and others could be seriously injured or killed.

If the negative cable is disconnected from the negative terminal on the battery within 3 minutes after turning the engine control switch to the "LOCK" position, the engine control module may malfunction.

Checking the Battery

Your new vehicle is equipped with DELKOR (Diesel vehicles) or CHAMPION (Gasoline vehicles) batteries. They need no periodic electrolyte level maintenance. Its top is permanently sealed (except for two small vent holes) and has no filler caps. You will never have to add water. Remember to check and recharge the battery as necessary, as well as keep connection clean.

The hydrometer (green-eye test indicator) in the top of each battery (if equipped) provides information for testing purposes only.

If the vehicle is not going to be driven for 30 days or longer, disconnect the ground cable from the negative (–) terminal of the batteries to prevent discharge.

For full power needs at replacement time, a battery with the same specifications, as shown on the original battery's label, is recommended.

⚠ Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive

(Continued)

Warning (Continued)

harm. Wash hands after handling. You and others could be seriously injured.

Fuel Filter

Change the fuel filter in accordance with the Maintenance Schedule or when the fuel filter indicator light (amber) comes on.

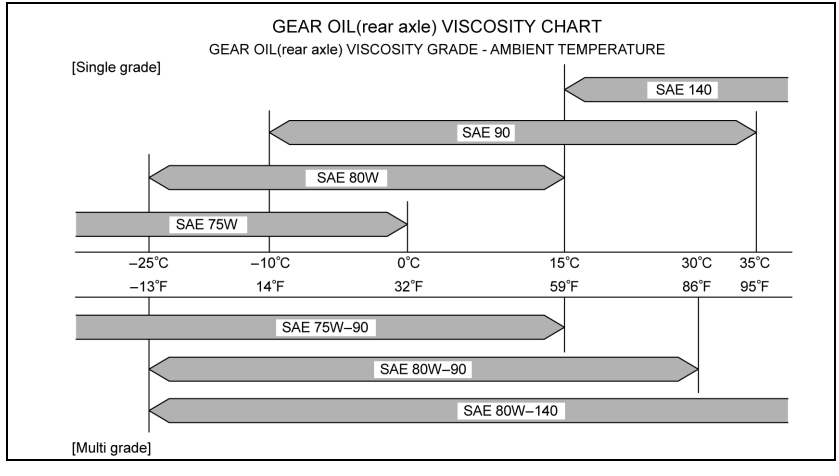
Drain the water when the water separator (fuel filter) warning light comes on. (Drain the water from the chassis-side fuel filter and engine-side fuel filter.)

Failure to replace the fuel filter when needed may lead to fuel system damage. Your authorized dealer can inspect your fuel filter and replace your fuel filter, if needed.

Rear Axle (Gear Oil Viscosity Chart)

Gear Oil Viscosity Chart

Select appropriate gear oil in accordance with the table below. It is important to select the viscosity appropriate for the temperature at which your vehicle operates. Use the following table for making correct selections.



Rear Axle (Oil Level Check)

Rear Axle Differential Gear Oil

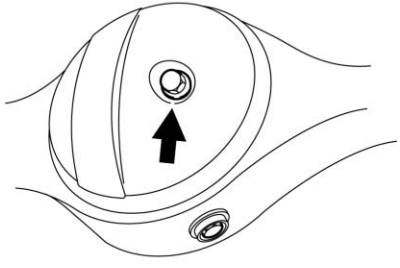
The rear axle differential gear oil level must be checked for its level and it must be changed according to the Maintenance Schedule.

Use the oil quantities indicated later in this section only as guidelines when changing the rear axle differential gear oil.

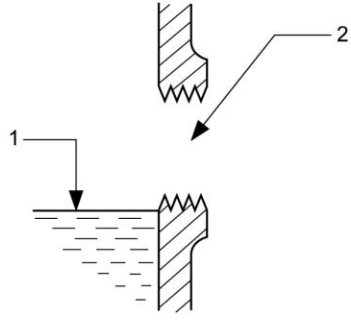
After changing the oil, ensure that it is at the correct level.

Drained oil must be disposed of in a method conforming to the regulatory requirements in your state.

Checking the Oil Level



1. Remove the oil level plug.



2. Check that the oil level (1) is up to the lower edge of the oil level plug hole (2). If the oil level is tool low, add oil through the oil level plug hole.
3. Fasten the oil level plug to the specified torque. Plug tightening torque is 84 Nm (8.6 kgFm/62 lb ft).

Any dirt on the plug should be wiped off before installing it.

Noise Control System

The following information relates to compliance with federal noise emission standards for vehicles with a Gross Vehicle Weight Rating (GVWR) of more than 4 536 kg (10,000 lb). The maintenance schedule provides information on maintaining the noise control system to minimize degradation of the noise emission control system during the life of your vehicle. The noise control system warranty is set forth in your Warranty and Owner Information book.

These standards apply only to vehicles sold in the United States.

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.

Insulation:

Removal of the noise shields or any undercab insulation.

Engine:

Removal or rendering engine speed governor, if so equipped, inoperative so as to allow engine speed to exceed manufacturer specifications.

Fan and Drive:

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

Air Intake:

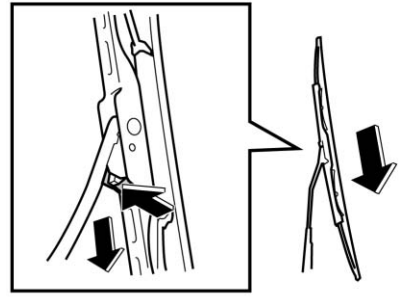
- Removal of air cleaner silencer.
- Reversing air cleaner cover.

Exhaust:

- Removal of muffler, catalytic converter, and/or resonator.
- Removal of exhaust pipes and exhaust pipe clamps.
- For diesel vehicles, removal or modification of diesel particulate filter (DPF).
- For diesel vehicles, removal or modification of selective catalytic reduction (SCR) catalyst.

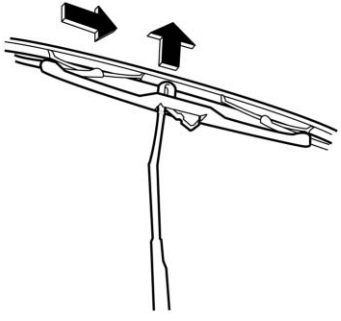
Wiper Blade Replacement

Removal



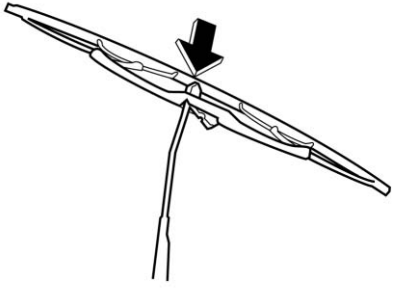
1. Pull the wiper arm up to the vertical

   position.
2. While pressing the wiper-blade hook towards the arm, slide the blade downwards (towards the base of the arm).



3. With the blade and arm almost perpendicular, remove the blade from the arm.

Installation



1. Insert the blade while holding it almost perpendicular to the arm.

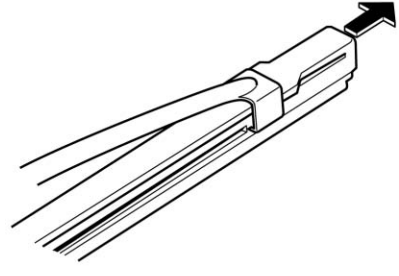
2. With the blade and arm oriented in the same direction, push up the blade until it locks into place on the arm.

Do not lower the wiper arm with its blade removed; the windshield glass may be scratched.

Whenever a wiper blade has been attached, ensure that it is locked into place. Failure to observe this precaution can result in the wiper blade becoming dislocated when the windshield wiper switch is turned on.

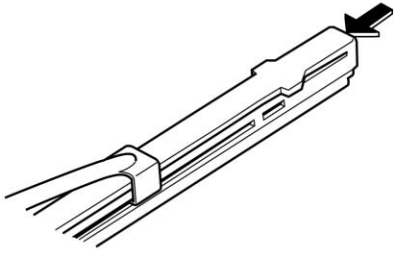
Replacement of Wiper Rubber Insert

Removal

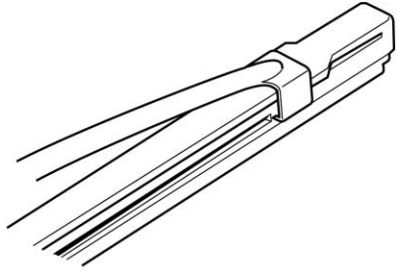


1. Remove the wiper blade from the wiper arm.
2. Pull the wiper rubber insert in the direction indicated by the arrow and extract it from the wiper blade.

Installation

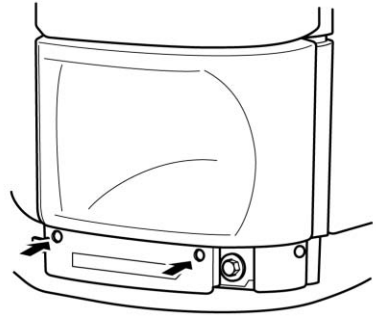


1. Insert a new wiper rubber insert into the wiper blade.



2. Continue pushing in the wiper rubber insert until the wiper blade's hook engages with the hole in it, and then confirm that the rubber insert is securely held in place.
3. Attach the wiper blade to the wiper arm.

Headlamp Aiming



For vertical aiming, turn the two screws indicated by arrows in the diagram.

1. Remove the rubber beneath the headlight.
2. Two screws should be turned in the same direction at the same time to adjust aiming.
3. When the headlamp aiming is out of position, contact your dealer.

Bulb Replacement

Bulbs

1. Check each bulb for blowout.
2. If a bulb has blown out, replace it. Always place the engine control switch in the “LOCK” position and place all the other switches in the “OFF” position before replacing the blown bulbs.
3. If you need assistance replacing any bulbs, contact your dealer.

Turn Signals

The flasher unit activates both the turn signal circuits and the hazard circuit. Should a lamp burn out, the flasher unit will continue to operate. Check the turn signal lamps visually before the vehicle is used.

Bulb Wattage

⚠ Warning

Using bulbs with a wattage other than that specified could cause the bulb or the wiring to become hot. This could result in the warping of the lens and case, and it could also lead to the outbreak of fire.

Bulbs are hot immediately after they go out. When replacing the bulbs, avoid being burned by making sure they are fully cooled.

Never drive the vehicle with the bulbs not working. This could result in an accident.

You and others could be seriously injured.

When one bulb of a pair of lamps, such as a headlamp blows out, the other bulb is approaching the end of its useful life. We recommend that both be changed at the same time.

For the lamps (lighting equipment) such as headlamps, inside of the lens can mist up momentarily when driving in the rain or during the car wash. Also, the temperature difference between inside and outside of the lamps can sometimes cause the water condensation inside the lens. This is not abnormal because this is the same phenomenon as the windshield or door glass fogs up when it rains. If it is demisted minutes after the lamp is turned on, things are normal.

Bulb Wattage

Position	Lights	Bulb Wattage (12V)	Qty.
Front	Headlight Highbeam/Lowbeam	60/55W	2
	Front Turn Signal Lamp	27W (Amber)	2
	Parking Lamp	5W	2
	Cornering Lamp	27W	2
	Side Turn Signal Lamp	5W (Amber)	2
	Sidemarker Lamp	5W (Amber)	2
Rear	Taillamp and Stoplamp	8/27W	2
	Turn Signal Lamp	27W	2
	Back-Up Lamp	27W	2
	License Plate Lamp	7.5W	1
Roof	Roofmarker Lamp (Identification/Clearance Lamp)	5W	5
Interior	Dome Light	10W	1
	Speedometer and Gauge Lights	3.4W	5
	Warning/Indicator Lights	LED	20

Contact your dealer when replacing lights that are not listed here.

Headlamps and Front Turn Signal

Replacing the Headlamps

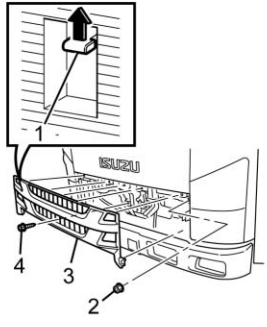
When the bulb has blown out, replace it with a bulb of the specified wattage. Be careful not to excessively tighten the mounting screws when replacing the headlamp bulbs.

Do not replace a bulb with other than the specified wattage.

Proper aiming of the headlamps is important to ensure sufficient of the highway without blinding other motorists. When replacing headlamp bulbs, have the headlamp aim adjusted at your dealer.

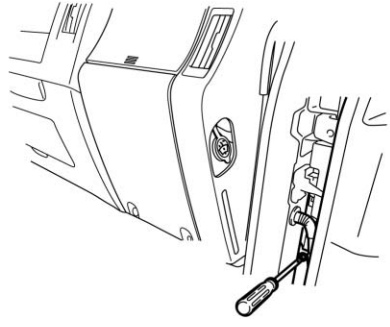
When replacing a bulb, make sure the light switch is “OFF”.

See *Bulb Replacement* ⇨ *276*.



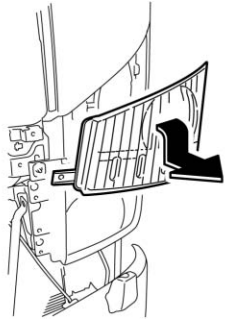
1. Remove the front grille (3).

   Remove the screw (4) from the center of the grille. Push up on the tabs of the five clips (1) on the upper side of the grille and pull the grille toward you to remove it. Loosen the nuts (2) for the turn signal light.

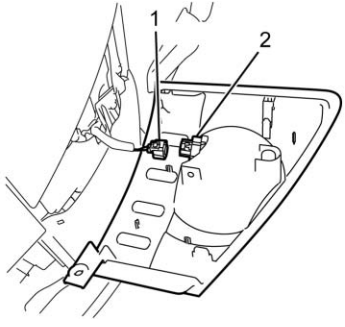


2. Remove the turnsignal lamp.

   Open the front door. Use a phillips head screwdriver to remove the two screws between the door and the cab.

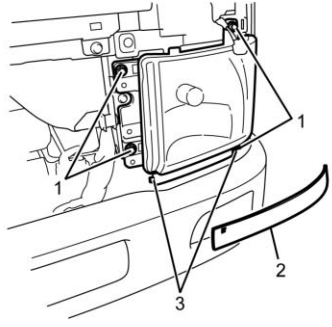


3. Tilt the turnsignal lamp unit down toward the front of the vehicle and remove it.

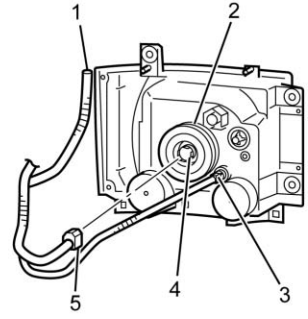


4. Disconnect the connector (1) for the turnsignal lamp from the socket (2) and then remove the lamp.
5. Remove the headlamp.

   Remove the headlamp connectors and parking lamp connectors, followed by removing the headlamp assembly.

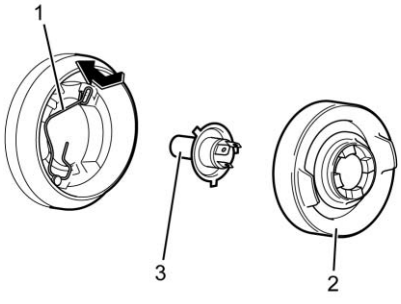


6. Disengage the rubber seals (2) from the two projections (3) at the bottom of the headlamp. Remove the four bolts (1).

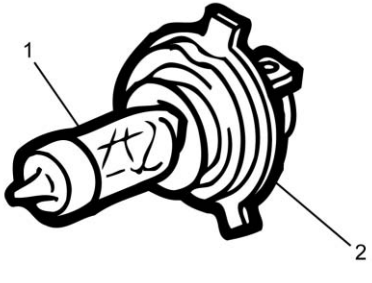


7. Disconnect the headlamp connector (5) and the parking lamp socket (3). Remove the headlamp assembly.

   When removing the headlamp connector, pull out the connector with holding the center portion of the rubber boot. Otherwise, the headlamp bulb will be broken.



8. Remove the rubber boot (2). Push the right side of the clip (1) that holds the bulb (3) in place and slide it upwards to disengage the clip.



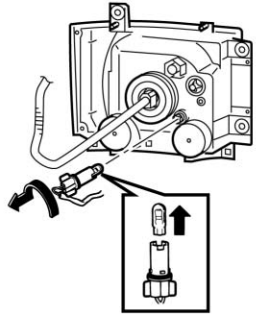
9. Remove the bulb (1) from the socket (2) and replace with a new one.
10. After replacing the bulb, reverse steps 1-8 to install.

Do not touch the glass of the bulb with your hand. Soiling the glass will cause the bulb to blow out.

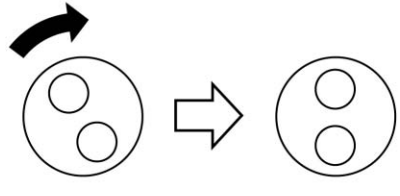
When attaching the rubber boot, press in both the outside and inside circumference of it. Make sure that the rubber boot, the headlamp assembly, and the bulb are securely installed without any raised section. If the rubber boot is not firmly in place, water could get inside the headlamp and lead to a breakdown.

Replacing Parking Lamps

1. Refer to “Replacing the Headlamps” and remove the headlamp assembly.



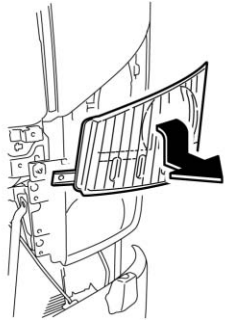
2. Pull the bulb out from the parking lamp socket and replace with a new one.



3. To install the lamps, perform the same sequence of operations in reverse, taking care to turn the connector clockwise to lock it securely.

If the socket is not locked securely, water could get inside the lamp and lead to a breakdown.

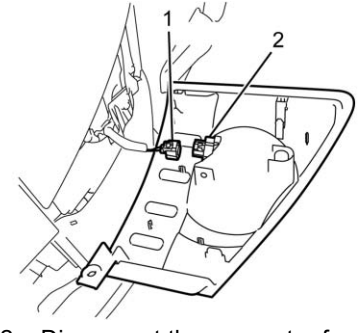
Replacing a Front Turn Signal Lamp



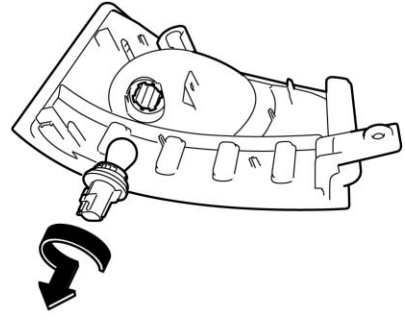
Do not replace a bulb with other than the specified wattage. This will cause abnormal flashing, particularly for turn signal lamps.

When replacing a bulb, make sure the light switch is OFF.

1. While referring to “Replacing the Headlights”, tilt the turn signal lamp assembly down toward the front of the vehicle and remove it.



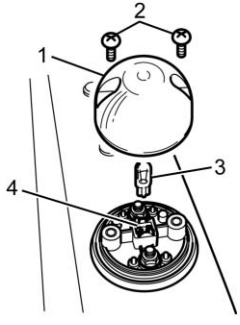
2. Disconnect the connector for the turn signal light and then remove the socket.



3. Pull the bulb from the socket and replace it with a new one.
4. To install the lamps, perform the same sequence of operations in reverse, taking care to turn the connector clockwise to lock it securely.

If the socket is not locked securely, water could get inside the light and lead to a breakdown.

Roofmarker Lamps



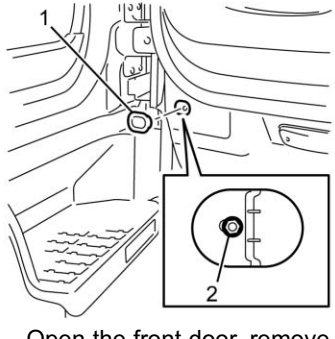
1. Loosen the screws (2) and remove the lens (1).
2. Remove the bulb (3) from the socket (4) and replace it with a new one.
3. To install the lights, follow the removal procedure in reverse.

If the screwing procedure is inadequate, water may infiltrate into the lamp unit.

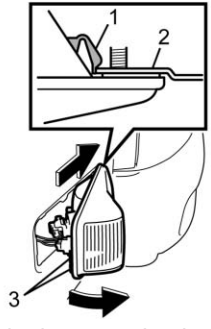
Sidemarker Lamps (Including Turn Signal and Cornering Lamps)

Do not replace a bulb with other than the specified wattage. This will cause abnormal flashing, particularly for turn signal lamps.

When replacing a bulb, make sure the light switch is "OFF".

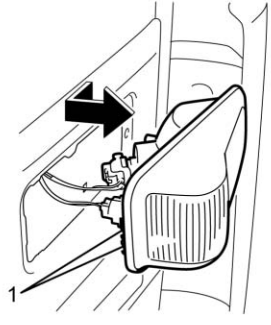


1. Open the front door, remove the rubber cap (1) in the lower part of the door, and loosen the nut (2).

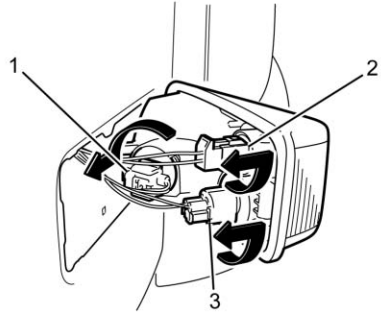


2. Slide the cornering lamp (3) and the side turn signal lamp forward relative to the vehicle. Disconnect the clip (1) on the lamp's rear side from the door panel (2) and pull out the lamp.

   If you pull out the light rear section by too much when removing the clip on the rear side, the clip on the lamp front side may be damaged.

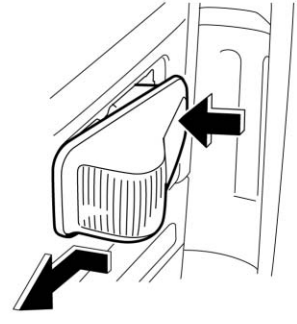


3. When the clip (1) has been removed, pull the lamp out while sliding it out toward the rear of the vehicle.
4. Loosen the socket by turning it counterclockwise.

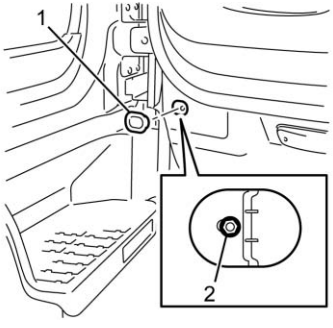


5. Pull the bulb out from the socket and replace it with a new one.
6. To install the lights, perform the same sequence of operations in reverse taking care of the following points:
   A. Turn the socket clockwise to lock securely.

      If the socket is not locked securely, water could get inside the light and lead to a breakdown.

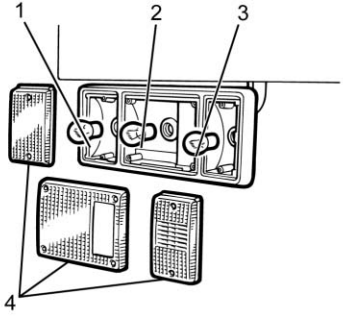


   B. Insert the clip on the back of the rear part of the light into the door panel.
   C. Push the front part of the light into the door panel, and insert the clip on the back of the front part of the light in the door panel.



D. Open the front door, tighten the nut from the inside of the door, and install the rubber cap.

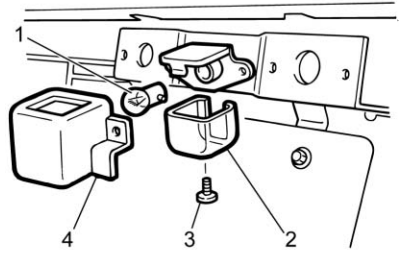
Taillamps, Turn Signal, Stoplamps, and Back-Up Lamps



1. Turn Signal Lamp
2. Taillamp/Stoplamp
3. Back-Up Lamp
4. Lens

1. Loosen the screws and remove the lens.
2. Loosen the bulb by turning it counterclockwise while pressing on it.
3. To install the lights, follow the removal procedure in reverse.

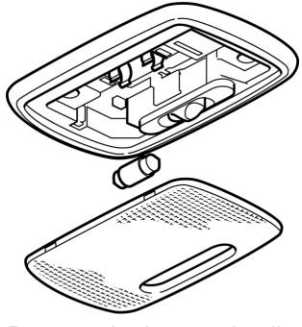
License Plate Lamp



1. Bulb
2. Lens
3. Screw
4. Cover

1. Loosen the screws and remove the cover.
2. Remove the lens.
3. Loosen the bulb by turning it counterclockwise while pressing on it.
4. To install the lights, follow the removal procedure in reverse.

Interior Lamps



1. Remove the lens and pull out the bulb.
2. To install the lights, follow the removal procedure in reverse.

Electrical System

Electrical System Overload

Electrical System

Following the after-delivery service, it is the owner's responsibility to check all wiring periodically for cracked, chafed or oil-soaked insulation and maintain it in a clean and tight condition to ensure satisfactory operation of the electrical system.

Replacing the Fuses and Relays

Your vehicle is equipped with fuses and fusible links to protect your electrical wiring and equipment in case of electrical overload.

When the lights do not come on or flash, or the equipment in the electrical system does not operate, check to see if a fuse has blown.

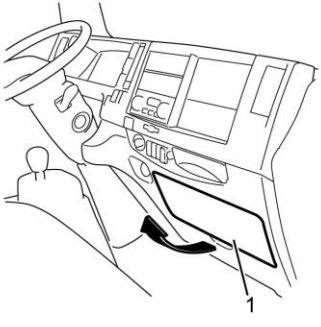
Fuses : In case of an electrical overload, the fuse will blow and stop the flow of current in the circuit before electrical components become damaged.

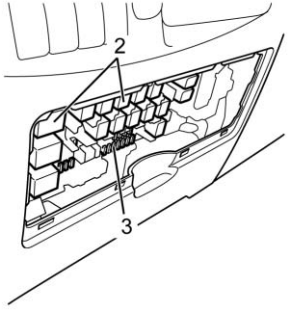
The cause of the circuit overload must be identified and corrected before the blown fuse is replaced, or else the new fuse will also blow. Since different circuits handle different amounts of current, fuses of various ampere ratings are used. Be sure to replace a blown fuse with a fuse of the correct rating.

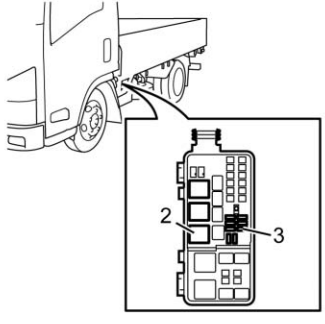
To know if a fuse is blown or not, remove the suspected fuse and look at the wire for a break. If the wire is broken, replace the fuse with one of equal amperage rating.
The amperage rating of each fuse is molded in its head.

Fuses are installed in the fuse panel.

The Location of Fuses and Relays







The fuses (3) and relays (2) are located in the lower part of the instrument panel in the center and in the left rear of the cab.

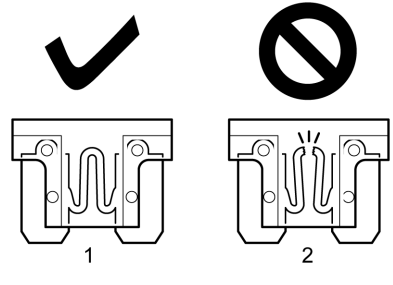
The cover (1) must be opened in order to carry out inspection and replacement. In addition, the cover (1) of the relay box at the left rear of the cab must also be opened at this time.

If you should spill water or a beverage on the cover, wipe it off before opening the cover.

The area around the cover may get warm when the vehicle is being driven, but this is not abnormal.

Replacing Fuses

1. Before replacing fuses, firmly apply the parking brake, move the selector lever to the P (Park) position, and turn the engine control switch to the LOCK position.
2. The fuse puller is stored in the fuse box inside the cab. Place the fuse puller on the fuse and pull it out.



3. If the fuse appears as shown (2), the fuse is blown. Replace with a spare fuse (1). Spare fuses are stored in the fuse box inside the cab.

⚠ Warning

Use fuses of the same rating for replacement. Do not use any other fuses than those designated.

Using fuses other than those specified could result in fire or damage to the equipment.

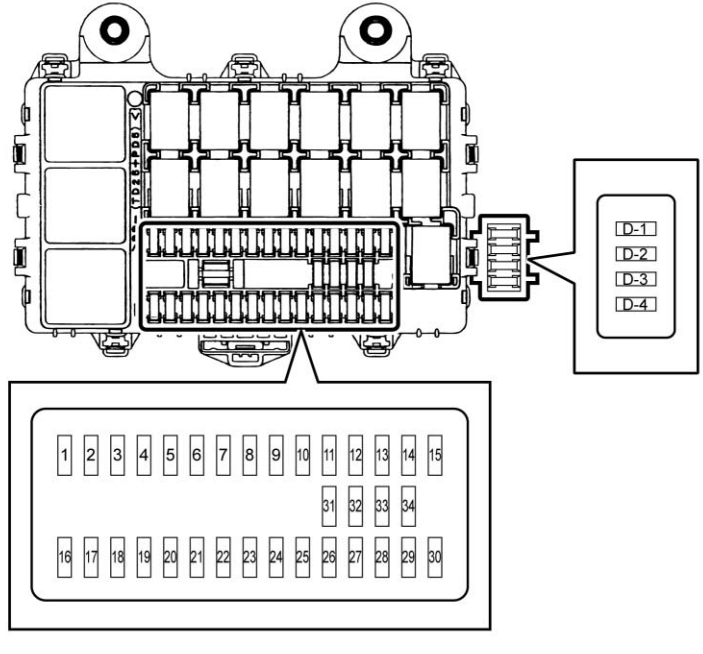
If the new fuses blow right away, contact the nearest dealer. You and others could be seriously injured.

Replacing Relays

Before replacing the relays, contact the nearest dealer.

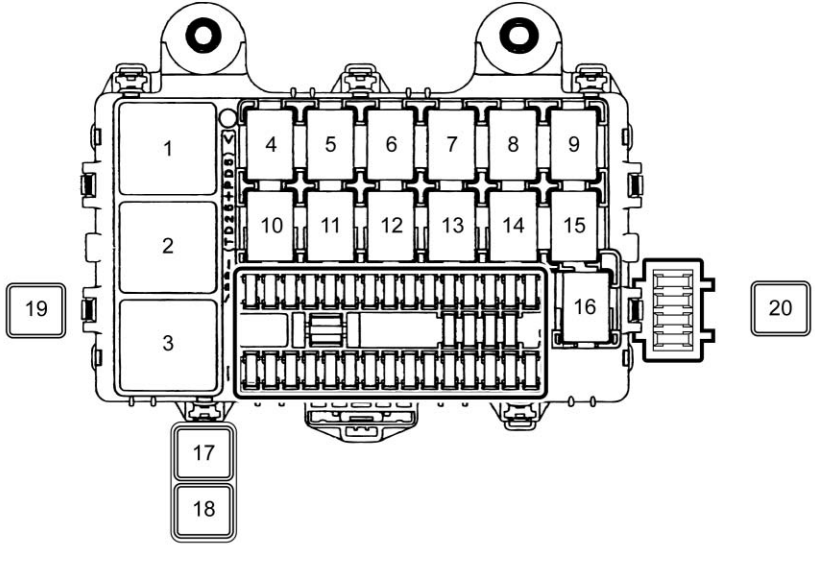
The vehicle may not be equipped with all of the fuses, relays, and features shown.

Fuse and Relay Location – Cab Interior

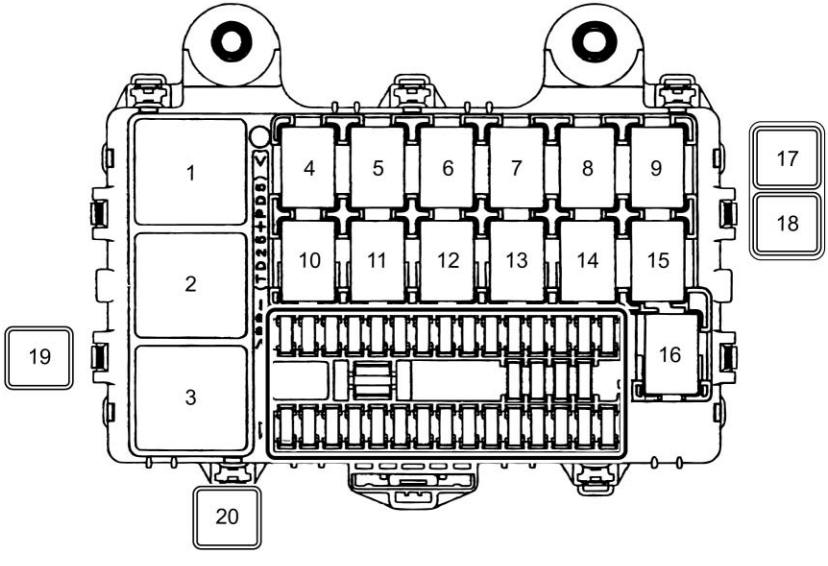


Fuse locations:

No.	Description	Rating
1	RR P / WINDOW	25A
2	–	–
3	ROOM LAMP, AUDIO	10A
4	DOOR LOCK	15A
5	TRAILER BRAKE	15A
6	P/ WINDOW	25A
7	ABS	10A
8	WIPER	25A
9	H / LAMP LO (LH)	10A
10	LAMPS (BATT)	10A
11	H / LAMP LO (RH)	10A
12	BRAKE LAMPS	10A
13	STARTER	10A
14	H / LAMP HI (LH)	10A
15	H / LAMP HI (RH)	10A
16	MIRROR HEATER	15A
17	IGNITION 2	10A
18	IGNITION 1	10A
19	–	–
20	ECM	10A
21	METER	10A
22	ECU (BATT)	10A
23	MIRROR	10A
24	AUDIO, ACC	15A
25	HORN	15A
26	TURN, HAZARD	15A
27	TAIL LAMPS	10A
28	ILLUMINA-TIONS	10A
29	CORNERING LAMPS	10A
30	AIR CONDITIONER	10A
31	–	–
32	–	–
33	–	–
34	–	–
D-1	CIGAR	20A
D-2	ACCESSORIES SOCKET	15A
D-3	POWER SOURCE	20A
D-4	–	–



Diesel Engine Relay Location



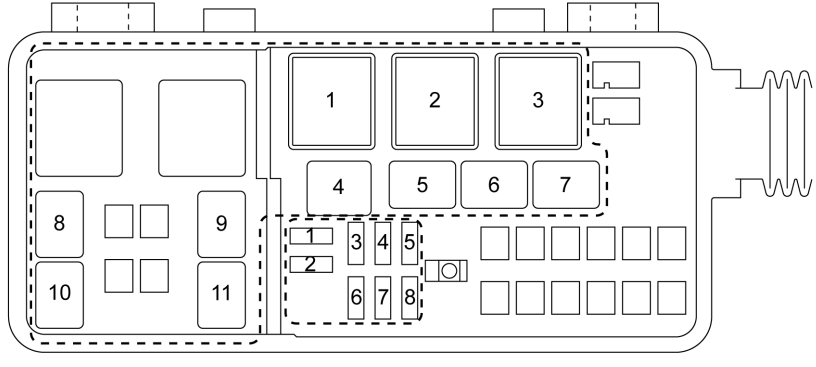
Gasoline Engine Relay Location

Relay locations:

No.	Description
1	STOP LAMP
2	DAYTIME RUNNING LAMP
3	KEY ON
4	TCM
5	PARKING/NEUTRAL
6	WIPER MAIN
7	HORN
8	WIPER HI LO
9	TRAILER BRAKE
10	–/REAR POWER WINDOW (if equipped)
11	–/CHARGE (ENG RUN) - Gasoline
12	POWER WINDOW
13	HEAD LAMP LO
14	VACUUM PUMP
15	HEAD LAMP HI
16	TAIL LAMP
17	CORNERING LAMP

No.	Description
18	CIGAR LIGHTER
19	POWER ACC
20	BLOWER MOTOR

Fuse and Relay Location – Cab Exterior



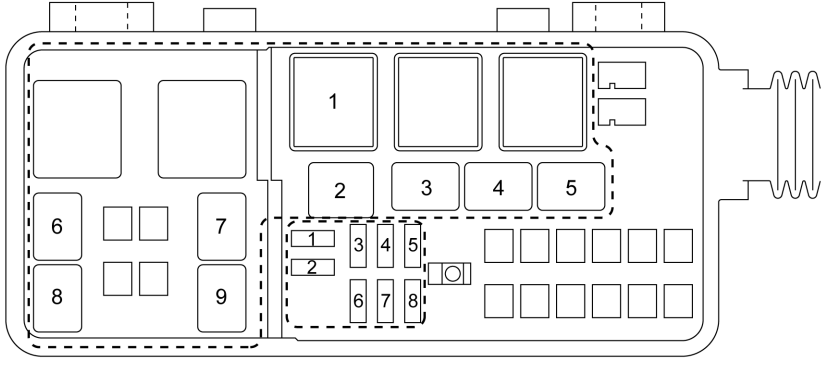
Diesel Engine Fuse and Relay Location

Fuse locations (2):

No.	Description	Rating
1	MARKER LIGHT	20A
2	TAIL MAIN	20A
3	FUEL HEATER	15A
4	SCR	20A
5	PM SENSOR	15A
6	RR DOME LIGHT	15A
7	CONDENSER FAN	20A
8	A/C	10A

Relay locations (1):

No.	Description
1	STARTER
2	PM SENSOR
3	NOX & UREA SENSOR
4	A/C COMPRESSOR
5	CONDENSER FAN
6	RR DOME LIGHT
7	SCR HEATER VALVE
8	MARKER LIGHT
9	–
10	–
11	FUEL HEATER



Gasoline Engine Fuse and Relay Location

Fuse locations (2):

No.	Description	Rating
1	MARKER LIGHT	20A
2	TAIL MAIN	20A
3	PCM 1	15A
4	PCM 2	20A
5	PCM 3	15A
6	POWER SOURCE	15A
7	CONDENSER FAN	20A
8	A/C COMPRESSOR	10A

Relay locations (1):

No.	Description
1	STARTER
2	A/C COMPRESSOR
3	CONDENSER FAN
4	FUEL PUMP
5	RR DOME LAMP
6	MARKER LAMP
7	PCM MAIN

No.	Description
8	–
9	A/C
10	–
11	FUEL HEATER

Wheels and Tires

The operating load and cold inflation pressure on the rim and wheel must not exceed the rim and wheel manufacturer's recommendations even though the tire may be approved for a higher load or inflation. Rim and wheel may be identified (stamped) with maximum load and maximum cold inflation rating. For rims and wheels not so identified or for service conditions exceeding the rate capacities, consult the rim and wheel manufacturer to determine rim and wheel capacities for the intended service. The factory-installed tires on this vehicle were selected to provide the best all-around tire performance for normal operation. When inflated, as shown on the vehicle, they have the load carrying capacity to operate satisfactorily at all loads up to and including the full rated load specified for the vehicle. For more information concerning the differences in capacities of tires and rims, refer to the “Tire and Rim Association Inc. Yearbook,” or your authorized dealer or tire dealer.

Tire Inflation

⚠ Warning

To reduce the risk of loss of vehicle control and personal injury:

Tires must be properly inflated, and your vehicle must not be overloaded (see the information on *Information on Loading the Vehicle* ⇨ *61* and "Tire Load and Inflation Table" under *Tire Pressure* ⇨ *306*).

Be sure to keep tires properly inflated. A tire that is run while seriously underinflated may overheat to the point where the tire may lose air suddenly and/or catch fire, possibly resulting in personal injury and/or property damage.

See “Tire Load and Inflation Table” under *Tire Pressure* ⇨ *306*.

In no case should the front or rear tire load exceed the maximum recommended gross axle weight rating (front GAWR or rear GAWR).

The efficiency of the vehicle will be upset if air pressure in the tires are not equal. Balanced inflation results when the tires on the same axle carry the same air pressure.

A difference in pressure between the front and rear tires may be permissible within certain limitations, however, there should not be a difference in pressures between the right and left tires on the same axle.

Always use a truck tire pressure gauge (a pocket-type gauge is not advised) when checking inflation pressures. Visual inspection of tires for inflation pressures is not enough, especially in the case of radial tires. Underinflated radial tires may look similar to correctly inflated radial tires. If the inflation pressure on a tire is found to be low frequently, have your dealer correct the cause.

Be sure to install the tire inflation valve caps to prevent dirt and moisture from getting into the valve core, which could cause air leakage. An underinflated tire in a dual wheel assembly is harder to notice than one in a single wheel assembly. The properly inflated dual tire carries its own load plus that of the underinflated tire. Both tires can overheat, which may result in property damage and/or personal injury (see previous WARNING).

Tires Used or Stored for a Long Period of Time

Tires are a rubber product and degrade over time, even if they are not being used. If any of your tires is 5 to 7 years old or more, please have them inspected for safe driving. For further information, please check with the tire manufacturer.

Dual Tire Operation

The outer tire of a pair on dual wheel installations generally wears faster than the inner tire. If this occurs, reverse the position of the tires to equalize wear and get better tire life.

In addition, when trucks are driven continuously on high-crown roads, an increase in air pressure of 35 kPa (5 psi) in the outer tire of a dual tire operation will prolong outer tire life. Be sure not to exceed the inflation pressure limits shown on the “VIN and Weight Rating Plate” for diesel engines or the “Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate” for gas engines. See *Vehicle Identification Number (VIN)* ⇨ *362*.

Wheel and Tire Balancing

Proper tire balancing provides the best riding comfort and helps to reduce tire tread wear.
Out-of-balance tires can cause annoying vehicle vibration and uneven tire wear, such as cupping and flat spots. See your authorized dealer for wheel balancing.

Front End Alignment

Proper front end alignment improves tire tread mileage. Your vehicle's front end suspension parts should be inspected often and aligned when needed. (See the Maintenance Schedule for more information.) Improper alignment will not cause the vehicle to vibrate; however, improper toe-in alignment will cause front tires to roll at an angle that will result in faster tire wear. Incorrect caster or camber alignment will cause your front tires to wear unevenly, and may cause the vehicle to "pull" to the left or right.

Tire Traction

A decrease in driving, cornering and braking traction occurs when water, snow, ice, gravel or other material is on the road surface. Driving practices and vehicle speed should be adjusted to the road conditions. When driving on wet or slushy roads, it is possible for a wedge of water to build up between the tire and road surface. This is known as hydroplaning, and may cause partial or complete loss of traction, vehicle control and stopping ability; this condition is also more likely with worn tires.

To reduce the chance of traction loss, follow these tips:

- Slow down during rainstorms or when roads are slushy.
- Slow down if the road has standing water or puddles.
- Replace tires when front tread depth is 3.2 mm (4/32 in.) and rear tread depth is 1.6 mm (2/32 in.).
- Keep tires properly inflated.

Tire Replacement Recommendations

⚠ Warning

Do not mix different construction types of tires on your vehicle such as radial, bias and bias-belted tires except in emergencies, because vehicle handling could be affected and may result in loss of vehicle control, or personal injury or death.

Consult your dealer before replacing wheels. Never use wheels that are not designed for the vehicle. Doing so would impede safe vehicle operation.

You should replace your tires when:

- Your tires are worn to a point where 3.2 mm (4/32 in.) (front) and 1.6 mm (2/32 in.) (rear) or the cord or fabric is exposed.
- Your tire tread or sidewall is cracked, cut or snagged deeply enough to expose the core, fabric or steel components.
- Your tire has a hump, bulge or split.
- Your tire sustains a puncture, cut or other damage that cannot be correctly repaired because of the size or location of the damage.

When replacing tires, you should use the same size, load range and construction type (bias or radial) as the original tires on your vehicle. Use of any other size or type tire may affect load carrying capacity, ride, handling, speedometer/ odometer calibration, vehicle ground clearance and tire clearance to the chassis. If replacing only a single tire, it should be put on the same axle with other tires of equal diameter.

When replacing or rotating tires, all tires on an axle should be of the same tread design and should have the same outside diameter within certain limitations, particularly on LSD models. Consult your authorized dealer or tire dealer.

Recommended replacement tire for Greenhouse Gas (GHG) emissions — Diesel Engines

Tire size	Tire maker	Tire name	Rolling Resistance
LT215/85R16E	BRIDGESTONE CORPORATION	Duravis R250	LRRA
	THE YOKOHAMA RUBBER CO., LTD.	TY213A MC2	LRRA

Recommended replacement tire for Greenhouse Gas (GHG) emissions — Gas Engines

Tire size	Tire maker	Tire name	Rolling Resistance
LT215/85R16E	THE YOKOHAMA RUBBER CO., LTD.	TY213A MC2	LRRA
225/70R19.5F	THE YOKOHAMA RUBBER CO., LTD.	TY213A MC2	LRRA
225/70R19.5G	CONTINENTAL CORPORATION	HSR	LRRA

If the original equipment tires are low rolling tires, it is recommended to use the LRRA tires shown in the above table.

For gas engines, please refer to the emission control identifiers on Greenhouse Gas (GHG) emission plate for your original equipment tires. Also, please refer to “Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate” for the location of the Greenhouse Gas (GHG) emission plate. See *Vehicle Identification Number (VIN)* ⇨ *362*.

Wheel Replacement Recommendations

Wheels must be replaced if they become damaged (for example: bent, heavily rusted, leak air) or if wheel nuts often become loose. Do not use bent wheels that have been straightened and do not use inner tubes in leaking wheels which are designed for tubeless tires. Such wheels may have structural damage and could fail without warning.

When replacing wheels for any reason, the new wheels should be equal in load capacity, diameter, width, offset and mounting types to those originally installed in your vehicle.

A wheel of the wrong size or type may adversely affect wheel and bearing life, brake cooling,

speedometer/odometer calibration, stopping ability, headlight aim, bumper height, vehicle ground clearance and tire or tire chain clearance on the body and chassis. Replacement with "used" wheels is not advised. They may have been subjected to harsh treatment or very high mileage and could fail without warning.

⚠ Warning

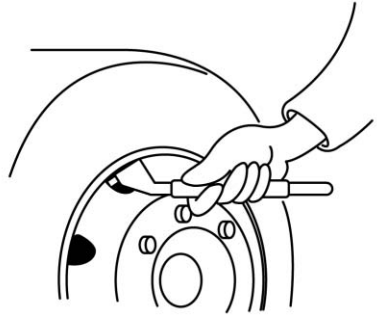
Consult your dealer before replacing wheels. Never use wheels that are not designed for the vehicle. Doing so would impede safe vehicle operation.

The use of wheels and/or tires with higher load carrying limits than originally equipped on your vehicle does not in itself increase the GAWR or the GVWR of the vehicle.

Replacement wheels can be obtained from the authorized dealer or tire dealer.

Checking Tires

Air Pressure



Too low or too high a tire air pressure not only affects the ride or causes damage to the cargo but also causes abnormal heat buildup, premature wear, a tire puncture, or may even cause the tire to burst.

Use an appropriate tire air pressure gauge when measuring the air pressure of a tire. Tire air pressure should be measured when the tire is cold, or before the vehicle is driven. (After driving, tire air pressure increases by about 10%.)

As the tire air pressure varies depending on the vehicle model and tire size, refer to the VIN and weight rating plate for diesel engines or the “Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate” for gas engines on the driver's door opening frame or the tire air pressure information on the following table.

Diesel Engines

Tire size		Tire air pressure kPa (psi)		GVW kg (lb.)
Front	Rear	Front	Rear	
LT215/85R16E	LT215/85R16E	550 (80)	550 (80)	5 897 (13,000)

Gas Engines

Tire size	Tire air pressure kPa (psi)
LT215/85R16E	480 (70)
225/70R19.5F	590 (85)
225/70R19.5G	590 (85)

For diesel engines, see “VIN and Weight Rating Plate” under *Vehicle Identification Number (VIN)* ⇨ *362*.

For gas engines, see “Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate” under *Vehicle Identification Number (VIN)* ⇨ *362*.

See “Tire Load and Inflation Table” under *Tire Pressure* ⇨ *306*.

⚠ Warning

Insufficiently inflated or worn-out tires are highly dangerous as they easily skid and can even burst. Should they burst, the tires may burn and this could cause a fire in the vehicle.

(Continued)

Warning (Continued)

If you drive on under-inflated or flat tires, the wheel studs will be placed under excessive stress. Under such conditions, the bolts may break and the wheel may detach from the vehicle, possibly causing an accident.

(Continued)

Warning (Continued)

Over-inflated tires result in a harsh ride and are likely to cause damage to the cargo.
Under-inflated tires build up heat and could burst. Always keep the tires of your vehicle adjusted at the standard air pressures.

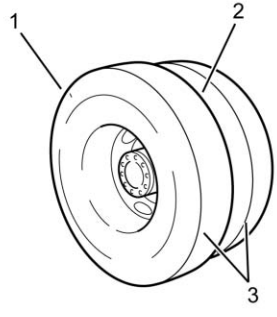
You and others could be seriously injured.

There should not be a difference tires on a dual-tire wheel.

It is not easy to visually identify an under-inflated dual-wheel tire or low aspect ratio tire (aspect ratio at 70%). Always use an appropriate tire air pressure gauge to check the air pressure of any tire.

If your vehicle is equipped with aluminum wheels, use an extension attached to the inner tire valve together with a standard tire air pressure gauge or use a special air pressure gauge when checking the air pressure of a dual-wheel's inner tire.

Cracks and Other Damage

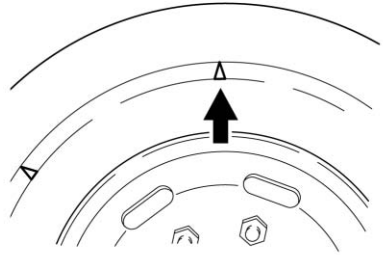


1. Sidewall surface
2. Gap between inner and outer tires
3. Tread

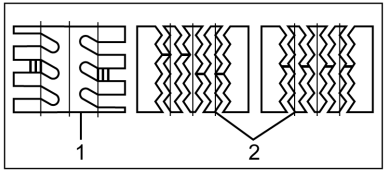
Check the tread and sidewall surfaces of each tire for cracks or other damage. Especially check the tread for nails or other metal pieces embedded in grooves and also the gap between the inner and outer tires of a dual-tire wheel for pebbles lodged in it.

When checking tires, pay special attention to: low air pressure; pebbles or nails in tread grooves; cracks or other damage on tire surfaces; uneven wear; and pebbles lodged in the gap between tires of dual-wheel tires.

Tread Depth and Abnormal Wear



Tread wear indicator position mark (Example)



Tread wear indicator (Example)

1. Lug pattern
2. Rib pattern

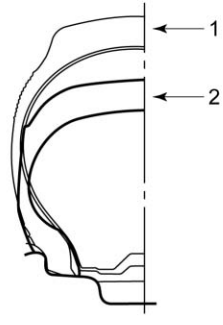
Using worn-out tires is dangerous because they might have an increased chance of getting punctured or bursting while driving. Check all tires to see if tread wear indicators appear on their treads and also check their entire tread for its depth with a depth gauge to make sure that the grooves are deeper than the specified depth. A tire with tread wear indicators appearing must be changed. Also, check the tires for uneven or otherwise abnormal wear.

⚠ Warning

Tires with excessively shallow tread grooves will increase the chance of skidding and, when driving at high speeds, hydroplaning. You and others could be seriously injured.

Hydroplaning occurs when a vehicle is running at high speeds on a wet road and a layer of water forms between the road surface and tires causing the tires to float on it. Hydroplaning prevents the driver from steering correctly and from slowing down the vehicle with the brake pedal.

Use of Low Aspect Ratio Tires



1. Standard tire
2. Low aspect ratio tire

Low aspect ratio tires for truck applications (aspect ratio at 70%) have an air volume 20% to 30% smaller than that of standard tires. When air begins to leak, therefore, low aspect ratio tires adversely affect vehicle operation much faster than standard tires. Check air pressure of low aspect ratio tires more often than standard tires using a tire air pressure gauge.

Damaged Tires

⚠ Warning

It is dangerous to mount the wrong size tire on a wheel. If you do so, the tire/wheel can explode as air is being added. This explosion may result in severe personal injury or death. For diesel engines, to learn which wheels and tires are correct, look at the "VIN and Weight Rating Plate" on the left side rear pillar panel below the striker. For gas engines, to learn which wheels and tires are correct, look at the "Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate" on the left side rear pillar panel below the striker (single cab) or on the left center pillar panel beside the shoulder seat belt anchor (crew cab). Wheel size is also stamped on the side of each wheel.

(Continued)

Warning (Continued)

To help avoid personal injury and property damage if a wheel must be changed, seek expert tire services if you can. If you must remove the wheel without any such help, do the following:

- If the tire looks as if it may be underinflated, stand to the side and check whether the wheel assembly appears normal by comparing it to another wheel assembly on the vehicle.
- Let the air out of the tire by taking out the valve core. If you have a way to put air back in a tire, note that it is good safety practice to let the air out of both tires of a dual assembly before taking off the damaged tire and rim assembly from the vehicle. After letting out the air, take

(Continued)

Warning (Continued)

off the tire and rim assembly and install a spare tire and rim assembly.

If your vehicle is equipped with a differential lock system or limited slip differential (LSD), it might start moving when the engine power is transmitted to the rear axle even when one of the wheels on the axle is raised clear of the ground. Do not start the engine with any rear wheel in contact with the ground.

If you are not fully experienced on the procedures to follow, and/or are not equipped with the proper tools and equipment, again, do not attempt to raise the vehicle, or remove or install the tire and wheel assembly—seek expert tire services.

(Continued)

Warning (Continued)

- Do not put air back in a tire that has been run flat, or is seriously low on air, without first having the tire taken off the wheel and the tire checked for damage.
- Note that taking off and mounting tires on wheels requires proper tools, safety equipment and special training. A person can be severely injured or killed and damage can result from using the wrong service methods. Truck tires and wheels should be serviced only by trained people using the proper equipment.
- Never add air to your tires unless an accurate pressure gauge is also used. When putting air in a tire on the vehicle, stand to the side and use a clip-on chuck and hose extension. In choosing

(Continued)

Warning (Continued)

the right tire pressure, be careful not to exceed the maximum pressure capability shown on the tire; see the tire pressure charts in this manual.

- Tire mounting or repair can result in serious personal injury or death, if not performed correctly. This section has detailed instructions for proper wheel and tire replacement, so be sure to read and follow them. Truck fleet owners and operators: You can get written instructions on truck tire demounting, repair and mounting from Rubber Manufacturers Association (RMA), 1400 K Street N.W., Washington, D.C. 20005, and also from many tire stores.

Wheel Nut Torque

⚠ Warning

Never use oil or grease on studs or nuts. Use the torque specified for the type of wheels on the vehicle. Snug all wheel nuts and then tighten to the specified torque in the numerical sequence shown. Improperly tightened wheel nuts could eventually allow the wheel to come off while the vehicle is moving, possibly causing loss of control and personal injury and property damage.

When the vehicle, wheel or fasteners are new, have a technician tighten wheel stud nuts and rim clamp nuts with a torque wrench at 1 040 km (650 mi). This is necessary because the clamping system used on the wheels must seat before the fastener will hold a uniform clamp load and remain fully tightened. Also have a technician

tighten wheel stud nuts and rim clamp nuts with a torque wrench after installing any wheel.

For diesel engines, in addition, nut tightness on all wheels should be set with a torque wrench every 10 400 km (6,500 mi).

For gas engines, in addition, nut tightness on all wheels should be set with a torque wrench every 12 000 km (7,500 mi).

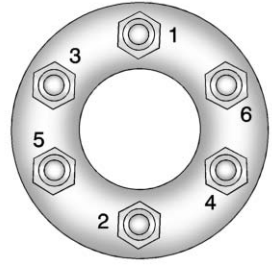
Tightening torque
500 N·m (362 lb·ft)

Wheel Tightening Sequence

Some studs and nuts have left-hand threads. Those studs are marked on their ends with the letter "L".

Install valve stems of dual wheels 180 degrees opposite each other.

1. Finger-tighten the nuts.



2. Tighten all nuts to specified torque in order as shown. Never use oil or grease on the studs or nuts.
3. If a wheel stud and nut has been replaced, stake the stud and nut.

⚠ Warning

To help reduce the risk of losing vehicle control and personal injury or death, if any stud has been damaged as a result of a loose running wheel, all studs for that wheel should be replaced. A loose running wheel may cause only one stud to break but damage to other studs may not be noticeable. If stud holes in a wheel have become elongated or distorted, replace the wheel.

Tire Pressure

Tire Load and Inflation Table

Tire Load and Inflation Table — Diesel Engines

TIRES FOR VEHICLES IN HIGHWAY SERVICE TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES											
Tire Size Designation		Cold Inflation Pressure (psi)									
		50	55	60	65	70	75	80	85	90	95
LT215/85R16E	Dual							2470			
	Single	(lbs)						2680			

Tire Load and Inflation Table — Gas Engines

TIRES FOR VEHICLES IN HIGHWAY SERVICE TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES											
Tire Size Designation		Cold Inflation Pressure (psi)									
		65	70	75	80	85	90	95	100	105	110
LT215/85R16E	Dual Single	(lbs)			2470 2680						
225/70R19.5F	Dual Single	(lbs)						3415 3640			
225/70R19.5G	Dual Single	(lbs)									3750 3970

See *Wheels and Tires* ⇨ *294*.

Tire Rotation

⚠ Warning

Be sure to check the wheel studs, wheel nuts and disc wheel for any abnormality whenever the disc wheel is removed.

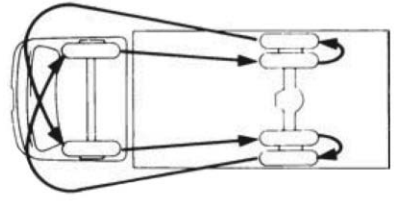
If you find any abnormal condition on the wheel studs, wheel nuts or disc wheel, do not continue to use the wheel. Contact the nearest dealer as soon as possible

Tires at different locations wear differently. For uniform tire wear and longer tire life, you should rotate the tires on your vehicle regularly. Make sure to use tires of the same type on the same axle. If you install tires of different types on the same axle, the vehicle may drift right or left when you apply the brakes.

New tires are more likely to build up heat and wear faster than old tires, so they should be installed on the front axle where the load is smaller.

If there is a difference in diameter between the inner and outer tires of a dual-tire wheel, install the smaller diameter tire inside.

The difference in diameter of the tires for a dual-tire wheel should be within the limit specified in the table below. If the limit is exceeded, the tires wear more rapidly than they should.



Example

⚠ Warning

If differently sized tires are used between the front and rear axles, do not exchange tires between the front and rear axles; otherwise, the tires get loaded beyond their limits. This is highly dangerous because the tires and disc wheels could break down under an excessive load. You and others could be seriously injured.

Permissible diameter difference	
Radial tire	Within 8 mm (0.31 in)

The tightening torque of the wheel nuts may decrease after a tire change due to their initial settlement. Upon driving 50 to 100 km (31 to 62 mi) after a tire change, retighten the wheel nuts to the specified torques according to the instructions in "Retightening Wheel Nuts" following.

See *Maintenance Schedule* ⇨ *328*.

Retightening Wheel Nuts

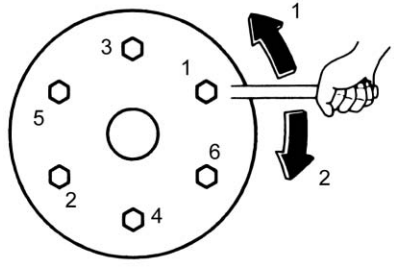
Check the wheel nuts to make sure they are tightened to the specific torque by using a torque wrench.

Use the following methods to check loose wheel nuts. The tightening torque of the wheel nuts may decrease after a tire change or rotation due to their initial settlement. After driving 50 to 100 km (31 to 62 mi), be sure to retighten the wheel nuts to the specified torque.

See *Maintenance Schedule* ⇨ *328*.

Tightening torque
500 N·m (362 lb·ft)

Single Tire

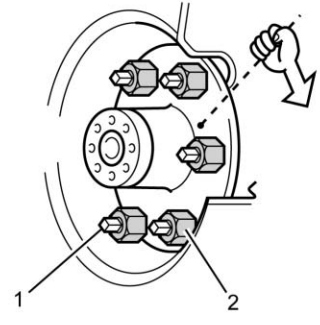


1. Left side tire
2. Right side tire

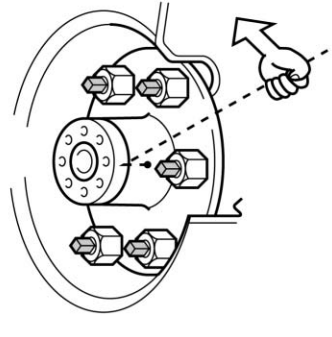
Turn the wheel nuts in the tightening direction to the specified torque.

Retightening of nuts on left rear dual-tire wheel

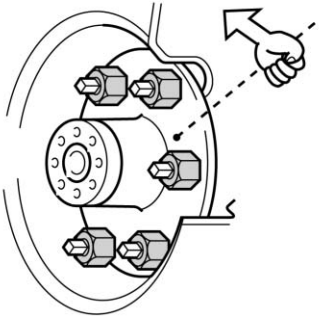
Dual Tire



Of the nuts on the wheel studs, loosen the outer wheel nuts.



Tighten the inner wheel nuts of the same wheel to the specified torque.



Next, tighten the outer wheel nuts to the specified torque.

⚠ Warning

If you find any abnormal conditions with the wheel nuts such as frequent loosening of retightened nuts, have your vehicle checked or serviced at the nearest dealer as soon as possible.

Fully engage the wheel wrench on a wheel nut in order to tighten the nut to the specified torque. However, do not use a pipe as a handle extension or your foot to apply force on the wrench. This would tighten the nut more than required and might damage components.

Both under-tightening and over-tightening of wheel nuts may cause broken wheel studs or cracked disc wheels and could lead to wheel detachment. Adhere to the specified tightening torques.

When replacing a tire with a new one, use only a tire of the same type and size as the replaced tire; otherwise, driving safety could be affected. Avoid mixed use of different types or different size tires at all costs.

If a Tire Goes Flat

When the tire goes flat while driving, ease off the accelerator pedal, avoid hard braking, hold on to the steering wheel firmly, and stop the vehicle. The tire should be changed in a safe, open location to prevent obstructing other vehicles or pedestrians.

⚠ Warning

If you continue to drive on a flat tire, undue force will be applied to the wheel studs, possibly causing the studs to break and the wheel to come off. You and others could be seriously injured.

See “Tire Replacement Recommendations” under *Wheels and Tires* ⇨ *294*.

Jump Starting

Jump Starting - North America

When the Battery is Discharged

Use a jumper cable (sold separately) and the battery of another vehicle to start the engine in the following sequence.

⚠ Danger

Follow the precautions listed in the jump starting instructions when working on or near the battery. Personal injury (particularly to eyes) or property damage may result from battery explosion, battery fluid or electrical (short circuit) burns.

If battery fluid should come in contact with an eye, immediately wash away using a large amount of water and continue washing for

(Continued)

Danger (Continued)

at least 5 minutes. Following this, you should seek medical assistance.

When using tools or other metal objects in the vicinity of the battery, take care to prevent them from coming into contact with the positive terminal. As the vehicle itself will conduct electricity, any such contact can result in a short-circuit and a highly dangerous electric shock.

A vehicle battery generates extremely flammable hydrogen gas. For this reason, operations producing sparks or requiring the usage of an open flame must never be carried out near a vehicle battery. Failure to observe this precaution can result in explosion if the hydrogen gas ignites. Whenever wiping up battery fluid, a damp cloth should be used.

(Continued)

Danger (Continued)

Batteries produce explosive gases, contain corrosive acid, and supply levels of electrical current high enough to cause burns. Therefore, to reduce the risk of personal injury when working near a battery:

- Always shield your eyes and avoid leaning over a battery whenever possible.
- Do not expose a battery to open flames or sparks.
- Do not allow battery acid to contact eyes or skin. Flush any contacted area with water immediately and thoroughly, and get medical help.
- Follow each step in the jump starting instructions.

Always stop the engine whenever the battery is to be inspected.

(Continued)

Danger (Continued)

Dilute sulfuric acid is used as the battery fluid. Special care must be taken to ensure that this fluid does not come into contact with skin, clothing, or metal surfaces.

When disconnecting the cables from the terminals, start with the negative terminal. When connecting them, the negative terminal should be reconnected last.

You and others could be seriously injured.

⚠ Warning

For safety and the protection of the vehicle, do not push-start the vehicle.

Never tow the vehicle to start because a surge forward when the engine starts could cause a collision with the tow vehicle.

Also, this vehicle has a 12-volt battery, 12-volt starting system and a negative ground electrical system; be sure the vehicle or equipment used to jump start your engine is also 12-volt. Use of any other system may damage the vehicle's electrical components.

Under no circumstances should the battery's positive and negative terminals be put in contact with one another.

When connecting the cables, under no circumstances should the clips be allowed to touch each other.

(Continued)

Warning (Continued)

Do not disconnect a battery terminal with the engine running. It could cause a breakdown in the electrical system.

You and others could be seriously injured.

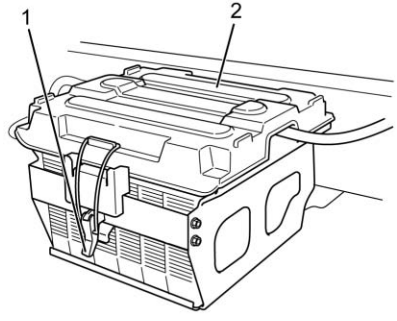
If you notice battery fluid leaking, have an inspection carried out immediately by the nearest dealer.

Diesel engine vehicles have more than one battery because of the higher torque required to start a diesel engine. This procedure can be used to start a single-battery vehicle from any of the diesel vehicle's batteries. However, at low temperatures, it may not be possible to start a diesel engine from a single battery from another vehicle.

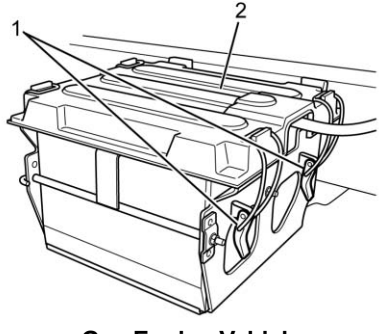
1. Use a vehicle that has a charged battery with the same voltage. Make sure that the other vehicle also has a 12-volt starting system, and that it is

the negative (–) terminal which is grounded (attached to the engine block, or frame rail).

2. Position the vehicle with the good (charged) battery so that the booster (jumper) cables will reach. But never let the vehicles touch. Also, be sure the booster cables to be used do not have loose or missing insulation.
3. In both vehicles, turn off the ignition (engine control) switch and all lights and accessories except the hazard flasher or any lights needed for the work area. In both vehicles, apply the parking brake firmly and move the selector lever to the "P" position.



Diesel Engine Vehicle

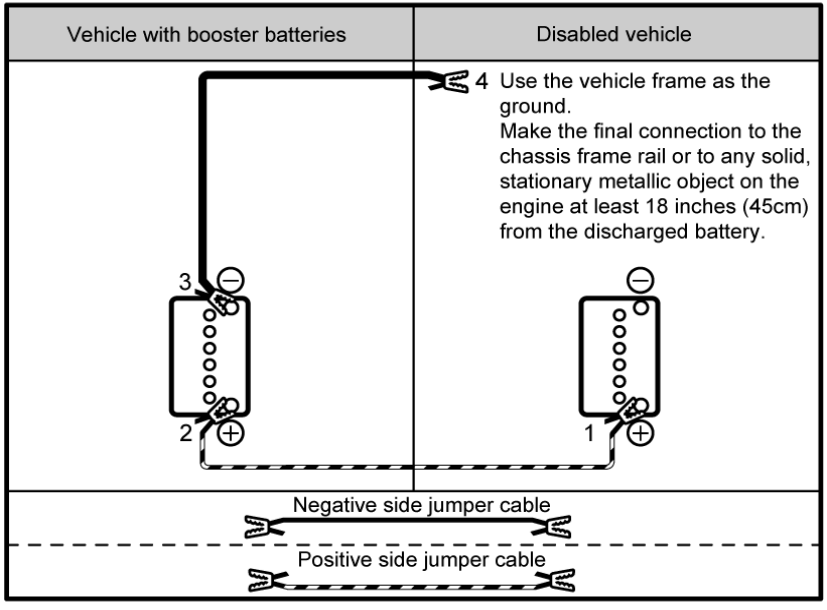


Gas Engine Vehicle

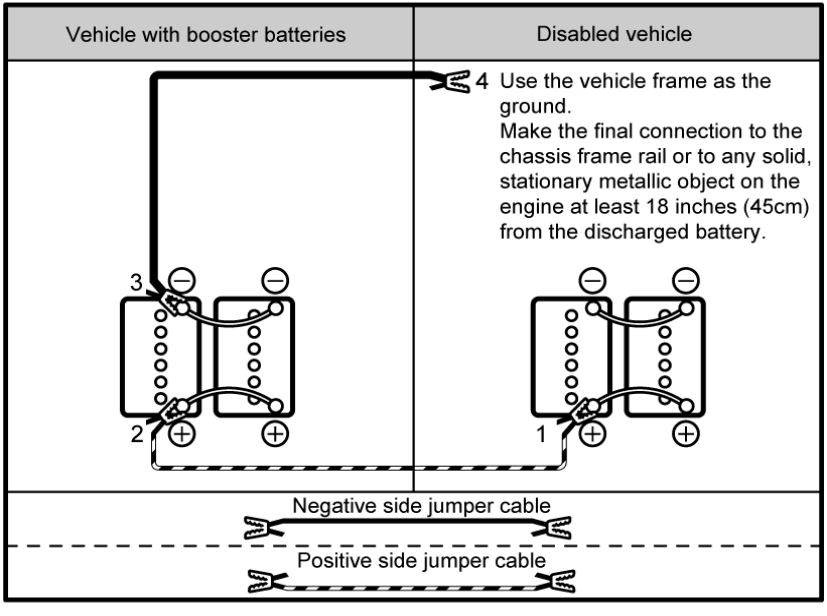
4. For gas and diesel vehicles, unlatch the latches (1) and remove the battery cover (2) and connect the jumper cables in the numbered sequence in the drawing below. Make sure the cable clamps do not touch any other metal parts.

   Make sure the cables are not on or near pulleys, fans or other parts that will move when the engine is started.

   When it is difficult to start the engine in a cold area, first start the engine of the vehicle with the booster battery or batteries and a few minutes after that start the engine of the disabled vehicle.



Gas Engine Vehicle



Diesel Engine Vehicle

5. After connecting the cables, start the engine of the vehicle with the booster battery.
6. Slightly rev up the engine of the vehicle with the booster battery and start the engine of the disabled vehicle.
7. If the engine in the disabled vehicle starts, remove the jumper cables in the reverse sequence as they were connected.

Towing the Vehicle

Consult your dealer or a professional towing service if the disabled vehicle must be towed.

Proper equipment must be used to prevent damage to vehicles during any towing. State and local laws which apply to vehicles in tow must be followed. Vehicles should not be towed at speeds in excess of 88 km/h (55 mph).

Connect to the main structural parts of the vehicle. Do not attach to bumpers, tow hooks or brackets. Use only equipment designed for this purpose. Follow the instructions of the wrecker manufacturer.

A safety chain system must be used.

The procedures below must be followed when towing to prevent possible damage.

Front End Towing (Front Wheels Off Ground)

To prepare a disabled vehicle for front end towing with front wheels raised off theground, the following steps are necessary:

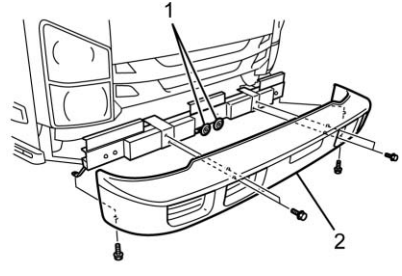
- Block the rear wheels of the disabled vehicle.
- For gasoline vehicles, move the selector lever into "N" position, vehicles can be towed at speeds below 48 km/h (30 mph) and up to distances less than 80 km (50 mi).
- Disconnect the driveshaft at the rear axle. Secure the driveshaft to the frame or crossmember.

When towing, disconnect the driveshaft at the rear axle to ensure the transmission is not damaged.

The rear end of the driveshaft must be disconnected and safely secured if the 80 km (50 mi) or 48 km/h (30 mph) is exceeded.

If there is damage or suspected damage to the rear axle, remove the axle shafts. Cover the hub openings to prevent the loss of lubricant or entry of dirt or foreign objects.

Place a 10 cm (4 in) wood beam against the towing guide behind the bumper. (If no 10 cm (4 in) is available, then remove the bumper.) Ensure towing chains do not come into contact with the horns or the bumper. (If towing chains contact the bumper, then remove the bumper.)



1. Horns
2. Bumper

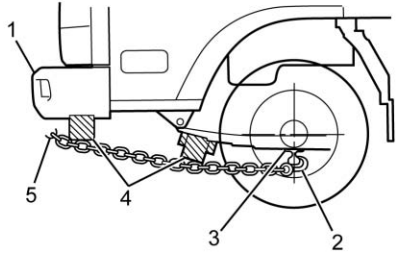
After Towing

After towing the vehicle, block the rear wheels and install axle shafts or driveshaft.

Apply the parking brake before disconnecting from the towing vehicle.

Front End Towing (All Wheels On the Ground)

Your vehicle may be towed on all wheels provided the steering is operable. Remember that power steering and brakes will not have power assist. There must be a tow bar installed between the tow vehicle and the disabled vehicle.



Towing with all wheels on the ground

1. Bumper
2. Tow Hook
3. Front Axle
4. Towing Guide
5. Towing Chain

To prepare a disabled vehicle for front end towing with all wheels on the ground, the following steps are necessary:

- Block the rear wheels of the disabled vehicle.
- For gasoline vehicles, move the selector lever into "N" position, vehicles can be towed at speeds below 48 km/h (30 mph) and up to distances less than 80 km (50 mi).
- Disconnect the driveshaft at the rear axle. Secure the driveshaft to the frame or crossmember.

When towing, disconnect the driveshaft at the rear axle to ensure the transmission is not damaged.

The rear end of the driveshaft must be disconnected and safely secured if the 80 km (50 mi) or 48 km/h (30 mph) is exceeded.

Provide wood blocking to prevent towing chains and bar from coming into contact with the bumper.

If there is damage or suspected damage to the rear axle, remove the axle shafts.

Cover the hub openings to prevent the loss of lubricant or entry of dirt or foreign objects.

After Towing

After towing the vehicle, block the rear wheels and install axle shafts or driveshaft.

Apply the parking brake before disconnecting from the towing vehicle. Check and fill rear axle with oil, if required.

Rear End Towing

When towing a vehicle with rear wheels raised, secure the steering wheel to maintain straight-ahead position. Make certain that the front axle is not loaded beyond the front axle gross axle weight rating (GAWR) as indicated on the vehicle's VIN and weight rating plate (diesel) or the vehicle's "Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate" (gasoline).

Special Towing Instructions

1. All state and local laws regarding such items as warning signals, night illumination, speed, etc., must be followed.
2. Safety chains must be used.
3. No vehicle should ever be towed over 88 km/h (55 mph).
4. Loose or protruding parts of damaged vehicles should be secured prior to moving.
5. A safety chain system completely independent of the primary lifting and towing attachment must be used.
6. Operators should refrain from going under a vehicle which is being lifted by the towing equipment unless the vehicle is adequately supported by safety stands.
7. No towing operation which for any reason jeopardizes the safety of the wrecker operator or any bystanders or other motorists should be attempted.

Appearance Care

Exterior Care

Exterior Finish

The paint finish on your vehicle provides beauty, depth of color, gloss retention and durability.

While cleaning the vehicle, do not grip the roof marker lights to prevent damage or water leakage.

Washing

The best way to preserve your vehicle's finish is to keep it clean by washing it often.

Wash the vehicle in lukewarm or cold water. Do not use hot water or wash your vehicle in the direct rays of the sun. Do not use strong soap or chemical detergents. All cleaning agents should be flushed promptly from the surface and not allowed to dry on the finish.

These vehicles are designed to operate under normal environmental conditions to withstand natural elements. However, unusual

conditions such as high-pressure car washers may cause water to enter inside the vehicle. If the vehicle is operated with foreign material adhering to the exterior, this material may react chemically with paint, resulting in staining, discoloration, rusting or corrosion of components. Also, the material may become trapped within mechanical components, adversely affecting their functions or forming an aerodynamic resistance. In the following cases, therefore, the vehicle must be washed and all foreign matter removed.

- When soot, iron powder, dead bugs, bird droppings, tree sap or oily matter from coal tar and smoke has adhered to painted surfaces.
- When the vehicle has been driven in coastal areas.
- When the vehicle has been driven on roads where road chemicals have been applied.
- When a large amount of mud or dirt has adhered to the exterior.

To wash the vehicle:

1. Fully turn on the tap, and wash out the undercarriage and suspension.
2. Close all openings and wash the cab and cargo body panels using a neutral detergent.
3. Clean wheels and tires using a brush and detergent.
4. After washing away all remaining detergent, use a shammy or other clean cloth to fully remove all moisture and water droplets

⚠ Warning

Follow the manufacturer's advice whenever cleaning agents or other chemicals are used, inside or outside the vehicle. Some cleaners may be poisonous or flammable, and improper use may cause personal injury or damage. When cleaning the inside or outside of the vehicle, do not use volatile cleaning solvents, such as

(Continued)

Warning (Continued)

acetone, lacquer thinners, enamel reducers, nail polish removers; or such cleaning materials as laundry soaps, bleaches or reducing agents, except as noted in the following fabric cleaning advice on stain removal.

Never use carbon tetrachloride, gasoline, benzene or naphtha for any cleaning purpose. Open all vehicle doors for ventilation when ANY cleaning agents or other chemicals are used in the interior. Overexposure to some vapors may result in a health problem that is more likely to occur in small, unventilated spaces.

You and others could be seriously injured.

Do not apply water directly in order to clean the cab interior. Failure to observe this precaution can result in malfunction or breakdown of electronic control units and electrical components, or in rusting of the cab

floor. Do not apply water from a high-pressure washer nozzle directly to the electric connectors. Failure to observe this precaution can lead to faulty operation of the electrical system. If an automatic car or truck-wash is used with vehicles having dark or metallic coating, the painted surfaces can be damaged by the brushes, lose their luster or be very noticeably scratched.

Do not direct a large amount of water at the air inlet openings. Do not apply water to the engine compartment or at electrical components. Failure to observe this precaution can lead to a poorly starting and operating engine and problems in the electrical system. Ensure that mirrors and the antenna are retracted before washing the vehicle.

If an automatic car or truck-wash must be used, avoid a high-temperature, high pressure type machine. Failure to observe this precaution can lead to heat deformation and breakage of plastic components, or to water leaks into the cab. When using an automatic car or truck-wash, ensure that a distance of at least 0.4 m (15.75 inches) is maintained between the nozzle and the vehicle, and when washing door windows, that the spray is perpendicular to the surface of the glass.

Ensure that all detergent is fully washed and wiped away. Particularly in the case of strong alkaline detergents (typically those for industrial uses), there is a danger that hairline cracks can develop in lighting-cluster lenses if the vehicle is operated without detergent being fully wiped away. Always read the detergent manufacturer's instructions carefully before use. Airborne dirt that adheres to plastic front bumpers as a result of rain, for example, can be difficult to remove. In such a case, use a commercially-available cleaner to clean away the dirt, and then apply a wax for use with plastic components.

Vehicle Storage

In order to maintain your vehicle's attractive appearance as long as possible, special consideration must be given to its storage location.

If the vehicle is stored or kept for an extended period of time in any of the following locations, a chemical change may occur in the paint work, resulting in staining, discoloration, rusting, and corrosion of components.

- Locations where a large amount of oily matter, soot, heavy smoke or metal powder can adhere to the vehicle.
- Areas around pharmaceutical plants and other facilities that discharge chemical matter.
- Coastal areas
- Locations where a large amount of dead bugs, bird droppings or tree sap can adhere to the vehicle.

Polishing and Waxing

Periodic polishing and waxing is recommended to remove built-up residue and eliminate any "weathered" appearance.

Your authorized dealer offers several polishes and cleaners which have proven value in maintaining original finish appearance and durability.

Painted and chrome-plated surfaces should be waxed once or twice a month, or whenever water is being poorly repelled on the surfaces. Ensure that wax is not applied in direct sunlight, and that the temperature of the painted surface is no more than 40 °C (104 °F).

Always follow the instructions provided with your wax product.

Do not use wax containing abrasive material. Failure to observe this precaution can lead to scratching of painted surfaces or plastic components.

The application of wax to rubber component surfaces can result in permanent whitening.

Wax must not be applied to the windshield. Failure to observe this precaution can result in irregular reflection of light, impairing your view.

Protecting Exterior Bright Metal Parts

Bright metal parts should be cleaned regularly to keep their luster. Washing with water is all that is usually needed.

Use special care with aluminum trim. To avoid damaging protective trim, never use auto or chrome polish, steam or caustic soap to clean aluminum. A coating of wax, rubbed to a high polish, is recommended for all bright metal parts.

Weatherstrip Lubrication

All weatherstrips should be periodically lubricated (minimum of every 6 months) with a silicone grease lubricant. A thin film of silicone grease lubricant should be applied using a clean cloth. Silicone grease application will lengthen weatherstrip life, help sealing, and assist in eliminating squeaks.

Windshield Care

Wax must not be applied to the windshield. A layer of wax can impair your view in rainy weather and can also lead to rough movements of the windshield wiper. If engine oil or grease comes into contact with the windshield, staining or discoloration may result. It must be immediately cleaned away.

If not fully cleaned by the windshield wipers, the windshield should be cleaned using glass cleaner. If your windshield is not clear after using the windshield washer, or if the wiper blade chatters when running, wax or other material may be on the blade or windshield.

The windshield wipers on your truck can be pulled out from the windshield to provide easier access for cleaning.

Clean the outside of the windshield with a non-abrasive cleaner. Your windshield is clean if beads do not

form when rinsing with water. Clean the blade by wiping with a cloth soaked in a solution of one-half water and one-half methanol alcohol. Then rinse the blade with water.

The windshield wiper arms may be swung out, away from the glass, to provide easy access for cleaning.

Do not hang on to the roof marker lights while cleaning the windshield or damage may occur (resulting in possible water leakage).

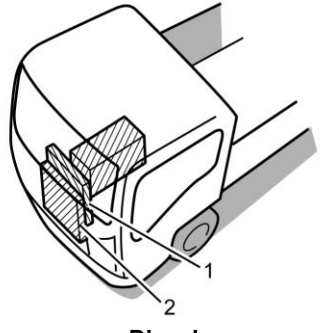
External Diesel Engine Cleaning

The engine does not need periodic cleaning, nor is it recommended.

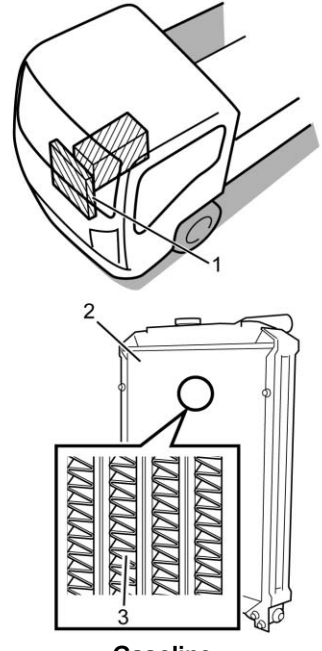
If you insist on cleaning the engine, clean it only when it is cold, never when it is warm or hot, and never when the engine is running. Spraying or pouring water or other fluids on your engine when it is warm or hot, or when it is running, can cause serious damage to the engine and its components, particularly the fuel supply pump.

Handling the Radiator and Charge Air Cooler

Cleaning the Radiator Core and Charge Air Cooler Core



Diesel



Gasoline

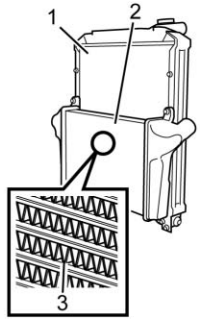
Cooling efficiency is compromised when there is dirt or dust plugging air passages in the radiator core and charge air cooler core (diesel). This can also cause corrosion of these cores. Wash the radiator core with tap water every 24 months.

Make sure to turn the engine off and remove the key from the engine control switch before cleaning cores.

The engine, exhaust pipe, and radiator will be hot immediately after the vehicle is driven. Be careful around these parts to prevent burns.

Clean the engine when it is cold.

Do not clean the radiator, charge air cooler (diesel) and their surrounding areas using water that is supplied under high pressure. Doing so may cause damage.



When cleaning the radiator core (1) and charge air cooler core (2) , do not crush or damage the fins (3). The fins are very fragile so be careful not to bend them out of shape. If they become deformed, their cooling efficiency will be impaired. Before cleaning, take steps to ensure that no water will splash onto the surrounding electrical components and wires. If stubborn dirt still remains even after the radiator core and charge air cooler core (diesel) have been cleaned, have the vehicle inspected and serviced.

Corrosion Protection

Your vehicle has been designed and built to resist corrosion. Special materials and protective finishes were used on most parts of your vehicle when it was built to help maintain good appearance, strength, and reliable operation. However, some parts which normally are not visible (such as those under the vehicle and under the hood) are such that surface rust will not affect their reliability. So corrosion protection is not needed or used on these parts.

Sheet Metal Damage

If your vehicle is damaged and requires sheet metal repair or replacement, make sure the body repair shop applies anti-corrosion material to the parts repaired or replaced so that corrosion protection is restored. (Also see "Finish Damage" which follows.)

Foreign Material Deposits

Calcium chloride and other salts, ice-melting agents, road oil and tar, tree sap, bird droppings, chemicals

from industrial chimneys and other foreign matter may damage vehicle finishes if left on painted surfaces. Prompt washing may not completely remove all of these deposits. Other cleaners may be needed. When using chemical cleaners, be sure they are safe for use on painted surfaces.

Finish Damage

Any stone chips, fractures or deep scratches in the finish should be repaired promptly. Bare metal will corrode quickly and may develop into major repair expense. Minor chips and scratches can be repaired with touch up materials available from your authorized dealer or other service outlets. Larger areas of finish damage can be corrected in your dealer's body and paint shop.

Underbody Maintenance

Corrosive materials used for ice and snow removal, and dust control can collect on the underbody. If these materials are not removed, accelerated corrosion (rust) can occur on underbody parts such as fuel lines, frames, floor pan and exhaust system even though they have been provided with corrosion protection.

At least every spring, flush these materials from the underbody with plain water. Take care to clean well any areas where mud and other debris can collect. Sediment packed in closed areas of the frame should be loosened before being flushed. If desired, your authorized dealer can do this for you.

Interior Care

General

Remove dust and dirt from the interior of the cab using an automotive cleaner or vacuum cleaner, and gently wipe surfaces clean using a cloth wet with warm or cold water.

⚠ Warning

Water should never be sprayed directly into the interior of the cab when cleaning. Failure to observe this precaution can lead to vehicle malfunction and possibly to fire if water should enter the audio system or other electrical components located underneath the floor carpet.

Petroleum ether, gasoline and other organic solvents should not be used to clean safety belts. In addition, safety belt webbing should be neither bleached nor redyed. Failure to observe these precautions can lead to the performance or strength of the safety belts being impaired. In the case of a collision, therefore, the safety belts could be insufficiently effective, and serious life-threatening injuries could result. When cleaning, use warm water in which a small amount of

(Continued)

Warning (Continued)

neutral detergent has been dissolved to gently wipe the safety belts.

Follow the manufacturer's advice whenever cleaning agents or other chemicals are used, inside or outside the vehicle. Some cleaners may be poisonous or flammable, and improper use may cause personal injury or damage. When cleaning the inside or outside of the vehicle, do not use volatile cleaning solvents, such as acetone, lacquer thinners, enamel reducers, nail polish removers; or such cleaning materials as laundry soaps, bleaches or reducing agents, except as noted in the following fabric cleaning advice on stain removal. Never use carbon tetrachloride, gasoline, benzene or naphtha for any cleaning purpose.

(Continued)

Warning (Continued)

Open all vehicle doors for ventilation when ANY cleaning agents or other chemicals are used in the interior. Overexposure to some vapors may result in a health problem that is more likely to occur in small, unventilated spaces.

You and others could be seriously injured.

The interior of the vehicle must never be cleaned using acidic or alkaline solvents, or petroleum ether, gasoline, and other organic solvents. Failure to observe this precaution can result in discoloration and staining. It should be noted that certain types of cleaning products contain these compounds. Be sure to read cleaning product labels carefully.

Air fresheners (liquid, solid, gel or plate types) must not come into direct contact with, or spill onto, interior components such as the air conditioning or audio system. Compounds contained in these products can cause discoloration, staining or peeling of paint.

Glass cleaners that contain these compounds must not be used to clean the inside of the windshield or window glass. To clean the glass, wipe it using a cloth wet with warm or cold water.

To avoid possible permanent discoloration of light colored seats, Do not let materials with non-fast colors come into contact with seat trim materials until these materials are totally dry. This includes certain types of casual clothing, such as colored denims, corduroys, leathers and suedes; also decorative paper,

With the use of modern trim materials, it is very important that you use proper cleaning techniques and cleaners. Failing to do this on the first cleaning may result in water spots, spot rings or setting of stains or soilage - all of which are more difficult to remove in a second cleaning.

Dust and loose dirt that collect on interior fabric should be removed often with a vacuum cleaner or soft bristle brush. Wipe vinyl or leather trim regularly with a clean, damp cloth. Normal trim soils, spots or stains can be cleaned with these cleaners.

Remember these basic steps before cleaning:

- Remove stains as quickly as possible before they become "set".
- Use a clean cloth or sponge, and change to a clean area often. A soft brush maybe used if stains persist.
- Use solvent-type cleaners only in a well ventilated area: also, do not saturate the stained area.
- If a ring forms after spot cleaning, clean the entire area immediately.
- Follow specific instructions on cleaner labels.

General Cleaning of Soiled or Water Spotted Fabric Type Trim with Foam Type Cleaner

Vacuum the area thoroughly to remove any loose dirt.

Always clean a whole trim panel or section. Mask surrounding trim along stitch or welt lines.

Use suds on a clean sponge. Do not brush wet suede. Do not saturate the material or rub it harshly. Immediately after cleaning, remove suds with a sponge and rinse with a clean wet sponge. Wipe off remaining residue with a slightly damp absorbent towel or cloth.

Important — Immediately after wiping, force-dry the fabric with an air hose. A heat dryer or heat lamp may be used. Use caution with a heat dryer or lamp to help prevent damage.

When trim materials with a sheen or luster finish are dry, wipe the fabric lightly with a soft, dry, clean cloth to restore its sheen or luster. For suede, raise nap with dry scrub brush and vacuum to remove any final traces of residue.

Spot Cleaning Fabric Type Trim with Solvent Type Cleaner

Before trying to remove a spot or stain from fabric, try to find out the type and age of the spot or stain. Some spots or stains can be removed with water or a mild soap solution. Spots or stains should always be removed as soon as possible.

Some types of stains or soilage, such as lipstick, inks and grease, are very difficult (sometimes impossible) to remove completely. When cleaning this type of stain or soilage, be sure not to enlarge the soiled area.

- Gently scrape excess stain from the trim material with a clean, dull knife or scraper. Use very little cleaner, light pressure, and clean cloths (preferably cheesecloth). Cleaning should start at the outside of the stain

"feathering" towards the center. Keep changing to a clean section of cloth.

- When you clean a stain from fabric, immediately dry the area with an air hose, heat dryer, or heat lamp to help prevent a cleaning ring. (Use caution with heat dryer or lamp to help prevent fabric damage.)
- If a ring forms, immediately repeat the cleaning operation over a slightly larger area with emphasis on "feathering" towards its center. If a ring still remains, mask off surrounding trim sections and clean the entire soiled area with foam type cleaner.

  See “Removal of Specific Stains.”

Removal of Specific Stains

Greasy or Oily Stains – Includes grease, oil, butter, margarine, shoe polish, coffee with cream, chewing gum, cosmetic creams, vegetable oils, wax crayon, tar and asphalts.

- Carefully scrape off excess stain; then use solvent type cleaner.
- Shoe polish, wax crayons, tar and asphalts will stain if left on trim; they should be removed as soon as possible. Use care as cleaner will dissolve them and may cause them to "bleed".

Non-Greasy Stains – Includes catsup, coffee (black), egg, fruit, fruit juice, milk, soft drinks, wine, vomit and blood.

- Carefully scrape off excess stain; then sponge the stain with cool water.
- If a stain remains, use Multi-Purpose Powdered Cleaner (Foam type) as previously described.
- If an odor lingers after cleaning vomit or urine, treat the area with a water-baking soda solution: 5 milliliters (1 teaspoon) of baking soda to 250 milliliters (1 cup) of lukewarm water.
- Finally, if needed, clean lightly with Fabric Cleaner (Solvent type).

Combination Stains – Includes candy, ice cream, mayonnaise, chili sauce and unknown stains.

- Carefully scrape off excess stain; then clean with cool water and allow to dry.
- If stain remains, clean it with Fabric Cleaner (Solvent type).

Cleaning Vinyl Trim

Ordinary soilage can be removed from vinyl or leather with warm water and mild soap, such as saddle soap or oil soap, or an equivalent.

- Apply a small amount of soap solution and let it soak for a few minutes to loosen dirt; then, rub briskly with a clean, damp cloth to remove dirt and traces of soap. This may be done several times, if needed.

- Soilage such as tars, asphalts, shoe polish, etc., will stain if left on trim. They should be wiped off as quickly as possible and the area cleaned with a clean cloth dampened with solvent type vinyl leather cleaner.

Fabric Seat Covering and Carpet Care

Remove dirt and dust using a home-use electric vacuum cleaner.

Do not remove the carpet. Use standard household cleaning products and methods to remove stains from food, drink and the like.

Be sure to use neutral detergents or cleaning products indicated as higher alcohol based detergents.

Glass Surfaces

Glass surfaces should be cleaned on a regular basis. Use of glass cleaner or a liquid household glass cleaner will remove normal tobacco smoke and dust films sometimes caused by ingredients used in vinyls and interior plastics.

Service and Maintenance

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Maintenance Schedule

Make sure the vehicle is inspected at regular intervals. Inspections and maintenance enable you to use the vehicle with peace of mind. They also extend the vehicle's service life.

For safe and economical driving, we recommend that you have your vehicle inspected and serviced regularly according to the schedule indicated in this chapter.

To drive your vehicle safely and at minimum cost, it is essential to have your vehicle regularly inspected and serviced at your dealer as per the specified maintenance schedule.

Contact your dealer for inspection that requires disassembly and/or special equipment.

The Maintenance Schedule in this manual and a Warranty Information Booklet are supplied with your vehicle. Read all publications for a full understanding of your vehicle's maintenance needs.

The quality of maintenance your new vehicle receives is as important as the regularity with which it is serviced. Authorized dealers provide nationwide quality in customer service. The program includes the training of dealer technicians throughout the country and is supported with a continuous follow-up of publications and other service information. The use of genuine parts and accessories, which have the same high quality standards as original equipment parts, and the use of factory approved tools developed and tested for use by the authorized dealer also contribute to the high quality of service.

If you have any questions on how to keep your truck or chassis in good condition, see your authorized dealer, the place many truck owners choose to have their maintenance work done. Your authorized dealer can be relied upon to use proper parts and practices.

Some of these services can be complex, so unless you are technically qualified and have the

necessary equipment, you should let your authorized dealer's service department or another qualified service center do these jobs.

The schedule includes general maintenance which you or a qualified technician should perform periodically.

Explanation of Vehicle Maintenance and Log

The following is a brief explanation of normal vehicle use.

NORMAL VEHICLE USE—The maintenance instructions contained in this section are based on the assumption that your vehicle will be used as designed:

- To carry passengers and cargo with the limitations indicated on the vehicle VIN and GVW plate.
- On reasonable road surfaces within legal operating limits.
- On a daily basis, as a general rule, for at least several miles/ kilometers.

Unusual operating conditions, such as driving in dusty areas (sweeper, agricultural or off-road vehicles), extended idling (refrigeration vehicles), or vehicles operated for frequent short trips, will require more frequent vehicle maintenance.

The log groups items according to mile/kilometer service intervals. Use the item codes (letter and number) to find the description of the maintenance and the time intervals.

Follow whichever interval comes first, time or miles/kilometers.

After the maintenance services are performed, insert the month, day and mileage/ kilometers in the area provided next to the serviced item.

The services shown up to 176 000 km (110,000 miles) are to be repeated after the initial 176 000 km (110,000 miles) at the same intervals.

Severe Driving Conditions

A vehicle operated under severe conditions (see list below) requires more frequent maintenance.

- Frequent short trips of less than 6 kilometers (4 miles) in moderate temperatures
- Frequent short trips of less than 16 kilometers (10 miles) in sub-freezing temperatures
- Frequent and extended low-speed engine operation (door-to- door deliveries, stop- and- go traffic, etc.)
- Driving on unpaved roads with heavy dust
- Towing a trailer

Preventive Maintenance

As any mechanical device operates, a certain amount of wear occurs. The amount of wear depends on certain variables – type and method of operation and the schedule of maintenance. These variables may be emphasized as critical to malfunction but each is dependent upon the other. For example, if a

vehicle is repeatedly overloaded, driven at excessive speed or improperly shifted, no schedule of maintenance can prevent malfunction. Also, if a preventive maintenance schedule is not followed, or is improperly carried out, no amount of correct vehicle operation will prevent malfunction.

If vehicle application, operation and preventive maintenance schedules and procedures are followed and properly carried out, the life of the vehicle will be greatly extended.

For example, regular attention to the engine oil is essential. The oil level must be periodically checked and oil added whenever needed. Also, the oil should be changed at the intervals specified with the proper quality and viscosity of oil. If your engine should run excessively low on oil or if the oil has lost its lubricating qualities because of old age, serious engine damage could occur.

Maintenance Schedule Table (Gasoline Vehicles)

Letters Used to Indicate Maintenance Service Types

I : Inspect then clean, repair or replace as necessary

R : Replace

T : Tighten to the specified torque

L : Lubricate

No.	Service Interval	12 000 km/7,500 mi	24 000 km/15,000 mi	36 000 km/22,500 mi	48 000 km/30,000 mi	60 000 km/37,500 mi	72 000 km/45,000 mi	84 000 km/52,500 mi	96 000 km/60,000 mi	108 000 km/67,500 mi	120 000 km/75,000 mi	132 000 km/82,500 mi	144 000 km/90,000 mi	156 000 km/97,500 mi	168 000 km/105,000 mi	180 000 km/112,500 mi	192 000 km/120,000 mi	Service intervals months or kilometers (miles) whichever occurs first (1)
1	Engine oil (2) (4)	See Explanation of Complete Vehicle Maintenance Schedule																or every 12 months
2	Engine oil filter (2) (4)	See Explanation of Complete Vehicle Maintenance Schedule																or every 12 months
3	Cooling System Service	-	-	-	I	-	-	-	I	-	-	-	I	-	-	-	I	or every 24 months
4	Engine Coolant (2)	Every 80 000 km (50,000 mi): R																
5	Air Cleaner Filter (2)	Every 48 000 km (30,000 mi): R																
6	PCV System (2)	-	-	-	-	-	-	-	-	I	-	-	-	-	-	-	-	
7	Spark Plugs (2)	Every 160 000 km (100,000 mi): R																
8	Spark Plug Wires (2)	Every 160,000 km (100,000 mi): R																
9	Fuel Tank, Cap, and Lines (2) (6)	-	-	-	-	-	-	-	-	I	-	-	-	-	-	-	-	
10	Engine Accessory Drive Belt(s) (2)	Every 60 000 km (37,500 mi): I Every 160 000 km (100,000 mi): R																
11	Evaporative Control System (2) (6)	-	-	-	-	-	-	-	-	I	-	-	-	-	-	-	-	
12	Shields and Underhood Insulation (5)	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	
13	Air Intake System (5)	-	-	-	I	-	-	-	I	-	-	-	I	-	-	-	I	
14	Thermostatically Controlled Engine Cooling Fan (5)	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	or every 12 months
15	Automatic Transmission Fluid	I	I	I	I	I	I	R	I	I	I	I	I	I	R	I	I	
16	Rotate Tires	Every 12 000 km (7,500 mi)																

No.	Service Interval	12 000 km/7,500 mi	24 000 km/15,000 mi	36 000 km/22,500 mi	48 000 km/30,000 mi	60 000 km/37,500 mi	72 000 km/45,000 mi	84 000 km/52,500 mi	96 000 km/60,000 mi	108 000 km/67,500 mi	120 000 km/75,000 mi	132 000 km/82,500 mi	144 000 km/90,000 mi	156 000 km/97,500 mi	168 000 km/105,000 mi	180 000 km/112,500 mi	192 000 km/120,000 mi	Service intervals months or kilometers (miles) whichever occurs first (1)
17	Brake Lining and Pad for Wear	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
18	Brake drum and rotor for wear and damage	-	-	-	I	-	-	-	I	-	-	-	I	-	-	-	I	or every 12 months
19	Brake Electric Vacuum Pump (4500 Series)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	or every 12 months
20	Brake Fluid	I	I	I	R	I	I	I	R	I	I	I	R	I	I	I	R	or every 24 months
21	Brake Line and Hoses	-	-	-	I	-	-	-	I	-	-	-	I	-	-	-	I	or every 12 months
22	Hydraulic Unit	Every 10 Years: R																
23	Differential Gear Oil	I	I	I	R	I	I	I	R	I	I	I	R	I	I	I	R	or every 24 months
24	Power Steering Fluid	-	-	-	-	R	-	-	-	-	R	-	-	-	-	R	-	or every 24 months
25	Steering Wheel Free Play (3)	Every 10 400 km (6,500 mi): I																
26	Steering Gear Box Torque	-	-	-	T	-	-	-	T	-	-	-	T	-	-	-	T	or every 12 months
27	Driveshaft Flange Torque	I	T	-	T	-	T	-	T	-	T	-	T	-	T	-	T	or every 12 months
28	Leaf spring U-bolt torque (3)	T	-	T	-	T	-	T	-	T	-	T	-	T	-	T	-	
29	Wheel Nut Torque (3)	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
30	King Pins	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	or every 12 months
31	Driveshaft Lubrication	-	L	-	L	-	L	-	L	-	L	-	L	-	L	-	L	or every 12 months
32	Wheel Bearing Grease	-	-	-	R	-	-	-	R	-	-	-	R	-	-	-	R	or every 24 months
33	Accessory Drive Belt	Every 160 000 km (100,000 mi): R																or every 12 months
34	Air Conditioner Blower Filter	Cleaned once a month																

Remarks

(1) In case this column is blank, follow kilometers (miles).

(2) An Emission Control Service.

(3) Initial check at 1 040 km (650 miles) is required.

(4) See Severe Driving Condition.

(5) A Noise Emission Control Service.

(6) The California Air Resources Board has determined that the failure to perform this maintenance item will not nullify the emission warranty or limit recall liability prior to the completion of vehicle useful life. GM, however, urges that all recommended maintenance services be performed at the indicated intervals.

Explanation of Complete Vehicle Maintenance Schedule (Gasoline Vehicles)

The following is a brief explanation of each of the services listed in the preceding Complete Vehicle Maintenance Schedule for gasoline vehicles.

1. ENGINE OIL : Change at intervals noted below depending upon driving conditions.

• NORMAL SERVICE - Change every 12 000 km (7,500 miles) or 12 months whichever occurs first.

• SEVERE SERVICE- Change every 4 800 km (3,000 miles) or 3 months if you often drive under one or more of these conditions (a) driving in dusty areas, (b) frequent idling or idling for long periods, (c) driving 6 km (4 miles) or less in freezing weather, or other short trips in cold weather, where the engine does not thoroughly warm up. Change oil and filter as soon as you can after driving in a dust storm.

2. OIL FILTER : Change at intervals noted below depending upon driving conditions.

• NORMAL SERVICE - Change every 12 000 km (7,500 miles) or 12 months whichever occurs first.

• SEVERE SERVICE- Change every 4 800 km (3,000 miles) or 3 months whichever occurs first.

3. COOLING SYSTEM SERVICE : At 24 months or 48 000 km (30,000 miles) intervals, wash radiator cap and filler neck with clean water, pressure test system and radiator cap for proper pressure holding capacity, tighten hose clamps and inspect condition of all cooling and heater hoses. Replace hoses if cracked, swollen or otherwise deteriorated.

Also each 24 months or 48 000 km (30,000 miles), clean exterior of radiator core.

4. ENGINE COOLANT : Every 80 000 km (50,000 miles), drain the engine coolant by opening the drain plug at the bottom of the radiator core, flush and refill the engine cooling system with a new 50/50 engine coolant solution.

5. AIR CLEANER FILTER : Change every 48 000 km (30,000 miles).

6. POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM : Check that PCV system works properly. Replace the valve and any worn, plugged or collapsed hoses as necessary.

7. SPARK PLUGS : Change every 160 000 km (100,000 miles).

8. SPARK PLUG WIRES : Clean wires and inspect for burns, cracks or other damage. Check the wire boot fit at the coilpack and at the spark plugs. And replace every 160 000 km (100,000 miles).

9. FUEL TANK, CAP AND LINES : Inspect the fuel tank, cap and lines for damage or leaks. Remove fuel cap, inspect gasket for an even filler neck imprint, and any damage. Replace parts as needed.

10. ENGINE ACCESSORY DRIVE BELT(S) : Inspect belts. Look for cracks, fraying, wear, and proper tension. Adjust or replace as needed, and change every 160 000 km (100,000 miles).

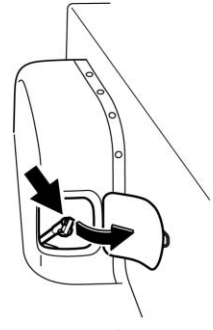
11. EVAPORATIVE CONTROL SYSTEM (ECS) : Visually check all fuel and vapor lines and hoses for proper hookup, routing, and condition. Check that bowl vent and purge valves work properly, if equipped. Replace as needed.

12. SHIELDS AND UNDER HOOD INSULATION : Inspect shields and under hood insulation for damage or looseness. Adjust or replace as required.

13. AIR INTAKE SYSTEM : Check the air intake system installation to see that gaskets are seated properly and all hose connections, fasteners, and other components are tight. Also check to be sure that the air cleaner housing is properly seated, that the cover fits tightly, and the wingnut(s) is/are tight. Tighten connections and fasteners or replace damaged parts as required.

14. THERMOSTATICALLY CONTROLLED ENGINE COOLING FAN : With the engine off and below normal operating temperature, check to see that the fan can be rotated by hand on fluid coupling or viscous drives. Replace as necessary.

15. AUTOMATIC TRANSMISSION FLUID :



Check the automatic transmission fluid level at each engine oil change and replace fluid every 84 000 km (52,500 miles). To check the fluid level, first set the parking brake, then start the engine in "P" position. With the regular brakes applied, move the selector lever through all the gear positions, ending with "P". You must check the fluid level with the engine running at slow idle and the truck must be on a level surface.

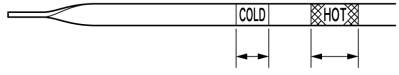
If you have driven for a prolonged period of time or in city traffic in hot weather, wait until the fluid cools down (Approx. 30 minutes) before checking fluid level.

Single cab: Remove the dipstick located at the rear right side of the engine.

Crew cab: Remove the dipstick located beneath the rear-of- engine inspection panel. After unlatching the A/T fluid inspection cover, the dipstick will be visible.

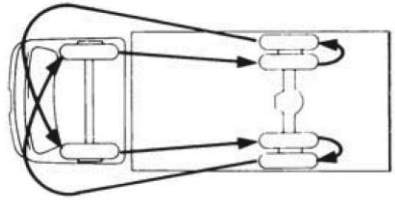
Carefully touch the wet end of the dipstick to find out if the fluid is cool, warm or hot. Wipe it clean and push it back in until the cap seats. Pull out the dipstick and read the fluid level.

If it felt cool, about room temperature, the level should be in the "C" range.



If it felt warm, about normal operating temperature of 70 °C to 80 °C (158 °F to 176 °F), the level should be in the "H" range.

16. ROTATE TIRES :



To equalize wear, rotate tires as shown in the figure and adjust tire pressures at every 12 000 km (7,500 miles).

17. BRAKE LINING AND PAD FOR WEAR : Check drum brake linings and disc brake pads for wear or cracks at every 12 000 km (7,500 miles). Check brakes (including parking brake) more often if conditions and habits result in frequent braking.

Front disc brakes have built-in wear indicators which are designed to make a high pitched squeal or cricket-like warning sound when the brake pads are worn to the point where new pads are needed.

When the truck is in motion, the sound may be constant or it may come and go.

Pressing the brake pedal firmly may cause the sound to stop.

Have the brake linings or the brake pads replaced by your authorized dealer as soon as possible after the warning first becomes evident.

Failure to do so can result in expensive damage to the brake system or a serious accident.

18. BRAKE DRUM AND ROTOR FOR WEAR AND DAMAGE : Check brake drums (rear and parking) and rotors for wear or damage every 48 000 km (30,000 miles) or 12 months whichever occurs first.

19. BRAKE ELECTRIC VACUUM PUMP (4500 Series) : Inspect the brake electric vacuum pump operation every 12 000 km (7,500 miles) or 12 months, whichever occurs first.

How to check: This operation could be difficult and you may choose to have this done at your dealer Service Department.

1. Turn the engine control switch to the "ON" position (not to start the engine), and press the brake pedal several times.

2. Check for the noisy sound of the electric vacuum pump inside the instrument panel at the same time as vacuum warning buzzer sound, and check that the brake low vacuum warning light comes on.

3. Then, after you start the engine, the main vacuum pump driven by the engine will start running. If the electric vacuum pump operation (noisy sound) and the vacuum warning buzzer stop, and the brake low vacuum warning light goes off thereafter, the operation is normal.

4. If you cannot hear the noisy sound of the electric vacuum pump, check the electrical wiring and repair as necessary. If it cannot be repaired, replace the electric vacuum pump.

20. BRAKE FLUID : Check the fluid in the brake fluid reservoir every 12 000 km (7,500 miles) and replace fluid every 48 000 km (30,000 miles).

21. BRAKE LINE AND HOSES : Check lines and hoses for proper hook-up, binding, leaks, cracks, chafing, etc. every 48 000 km (30,000 miles). Any questionable parts should be replaced or repaired at once. When rubbing or wear is noted on lines or hoses, the cause must be corrected at once.

22. HYDRAULIC UNIT : Change every 10 years.

23. DIFFERENTIAL GEAR OIL : Replace lubricant every 48 000 km (30,000 miles) or every 24 months. Check lubricant level every 12 000 km (7,500 miles) or every 12 months, and add lubricant to within 0 to 10 mm (0 to 0.4 inch) of the bottom edge of the filler hole if necessary.

24. POWER STEERING FLUID : Replace power steering fluid every 24 months or 60 000 km (37,500 miles), whichever occurs first.

25. STEERING WHEEL FREE PLAY : Check steering wheel free play after the first 1 040 km (650 miles) and then every 10 400 km (6,500 miles).

Steering wheel free play
10-50 mm (0.39-1.97 in)

26. STEERING GEAR BOX TORQUE : Retighten the fixing bolts of the steering gear box to the specified torque every 48 000 km (30,000 miles). Specified tightening torque.

Steering gear box tightening torque
102 N•m (75 lb·ft)

27. DRIVESHAFT FLANGE TORQUE : Check the fixing bolts of driveshaft flange for looseness or damage first 12 000 km (7,500 miles). Retighten the fixing bolts to the specified torque every 24 000 km (15,000 miles). Specified tightening torque.

Driveshaft flange tightening torque
103 N•m (76 lb·ft)

28. LEAF SPRING U-BOLT TORQUE : Tighten the U-Bolt nuts to the specified torque at 1 040 km (650 miles), 12 000 km (7,500 miles) and thereafter each 24 000 km (15,000 miles). Specified tightening torque.

Leaf spring U-bolt nut tightening torque	
Front	127 N•m (94 lb·ft)
Rear	177 N•m (131 lb·ft)

29. WHEEL NUT TORQUE : Check tires for excessive or abnormal wear, or damage. Also check tire inflation pressures and adjust. Be sure wheels are not bent or cracked and that wheel nuts have been tightened to the specified torque at 1 040 km (650 miles) and then every 12 000 km (7,500 miles).

Wheel nut tightening torque
500 N•m (362 lb·ft)

30. KING PIN : Lubricate the grease fitting on the king pins every 12 months or 12 000 km (7,500 miles) whichever occurs first.

31. DRIVESHAFT : Lubricate the grease fitting on each universal joint and spline coupling at 12 months or 24 000 km (15,000 miles) whichever occurs first.

32. WHEEL BEARING GREASE : Clean and repack front wheel bearings at every brake relining or 48 000 km (30,000 miles) whichever comes first.

33. ACCESSORY DRIVE BELT : Replace the belt that drives the A/C compressor every 160 000 km (100,000 miles).

34. AIR CONDITIONER BLOWER FILTER : The air conditioner blower filter should be removed and cleaned once a month.

Maintenance Schedule Table (Diesel Vehicles)

Letters Used to Indicate Maintenance Service Types

I : Inspect then clean, repair or replace as necessary

A : Adjust

R : Replace

T : Tighten to the specified torque

L : Lubricate

C : Clean

No.	Service Interval	16 000 km/10,000 mi	24 000 km/15,000 mi	32 000 km/20,000 mi	48 000 km/30,000 mi	64 000 km/40,000 mi	72 000 km/45,000 mi	80 000 km/50,000 mi	96 000 km/60,000 mi	112 000 km/70,000 mi	120 000 km/75,000 mi	128 000 km/80,000 mi	144 000 km/90,000 mi	160 000 km/100,000 mi	168 000 km/105,000 mi	176 000 km/110,000 mi	Service intervals months or kilometers (miles) whichever occurs first (1)
1	Engine noise check	I	-	I	I	I	-	I	I	I	-	I	I	I	-	I	
2	Valve lash	-	-	-	A	-	-	-	A	-	-	-	A	-	-	-	or every 12 months
3	Engine oil and oil filter (2)	R	-	R	R	R	-	R	R	R	-	R	R	R	-	R	or every 12 months
4	Fuel filter	-	R	-	R	-	R	-	R	-	R	-	R	-	R	-	or every 24 months
5	Pre-fuel filter/water separator	-	R	-	R	-	R	-	R	-	R	-	R	-	R	-	or every 24 months
6	Air cleaner filter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	indicator (3)
7	Damage to air intake ducts and hoses	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	or every 12 months
8	Drive belts	I	-	I	I	I	-	I	I	I	-	I	I	I	-	I	or every 12 months
9	Engine bolt torques	-	-	-	-	-	-	I	-	-	-	-	-	I	-	-	
10	Rotate tires	Every 10 400 km (6,500 miles)															

No.	Service Interval	16 000 km/10,000 mi	24 000 km/15,000 mi	32 000 km/20,000 mi	48 000 km/30,000 mi	64 000 km/40,000 mi	72 000 km/45,000 mi	80 000 km/50,000 mi	96 000 km/60,000 mi	112 000 km/70,000 mi	120 000 km/75,000 mi	128 000 km/80,000 mi	144 000 km/90,000 mi	160 000 km/100,000 mi	168 000 km/105,000 mi	176 000 km/110,000 mi	Service intervals months or kilometers (miles) whichever occurs first (1)
11	Engine cooling system	I	-	I	I	I	-	I	I	I	-	I	I	I	-	I	or every 12 months
12	Engine coolant	Every 12 months: I Every 24 months: R (when dealer recommended coolant is used)															
13	Exhaust system	I	-	I	I	I	-	I	I	I	-	I	I	I	-	I	
14	DPF (clean filter)	-	-	-	-	-	-	-	-	-	-	-	-	C	-	-	or every 3,000 hours
15	DPF (pressure difference sensor 0 point adjustment)	-	-	-	-	-	-	-	-	-	-	-	-	A	-	-	or every 3,000 hours
16	DPF (pressure difference sensor hose)	Every 160 000 km (100,000 miles): I Every 400 000 km (250,000 miles): R															or every 3,000 hours: I
17	Fuel line system	I	-	I	I	I	-	I	I	I	-	I	I	I	-	I	or every 12 months
18	Brake lining and pad for wear	I	-	I	I	I	-	I	I	I	-	I	I	I	-	I	

No.	Service Interval	16 000 km/10,000 mi	24 000 km/15,000 mi	32 000 km/20,000 mi	48 000 km/30,000 mi	64 000 km/40,000 mi	72 000 km/45,000 mi	80 000 km/50,000 mi	96 000 km/60,000 mi	112 000 km/70,000 mi	120 000 km/75,000 mi	128 000 km/80,000 mi	144 000 km/90,000 mi	160 000 km/100,000 mi	168 000 km/105,000 mi	176 000 km/110,000 mi	Service intervals months or kilometers (miles) whichever occurs first (1)
19	Brake drum and rotor for wear and damage	-	-	I	-	I	-	-	I	-	-	I	-	I	-	I	or every 12 months
20	Brake electric vacuum pump	I	-	I	I	I	-	I	I	I	-	I	I	I	-	I	or every 12 months
21	Brake fluid	I	-	I	R	I	-	I	R	I	-	I	R	I	-	I	or every 12 months: I or every 12 months: R
22	Brake line and hoses	-	-	I	-	I	-	-	I	-	-	I	-	I	-	I	or every 12 months
23	Parking brake cable	I	-	I	I	I	-	I	I	I	-	I	I	I	-	I	or every 12 months
24	Automatic transmission fluid	I	-	I	R	I	-	I	R	I	-	I	R	I	-	I	or every 12 months
25	Differential gear oil	I	-	I	R	I	-	I	R	I	-	I	R	I	-	I	or every 24 months

No.	Service Interval	16 000 km/10,000 mi	24 000 km/15,000 mi	32 000 km/20,000 mi	48 000 km/30,000 mi	64 000 km/40,000 mi	72 000 km/45,000 mi	80 000 km/50,000 mi	96 000 km/60,000 mi	112 000 km/70,000 mi	120 000 km/75,000 mi	128 000 km/80,000 mi	144 000 km/90,000 mi	160 000 km/100,000 mi	168 000 km/105,000 mi	176 000 km/110,000 mi	Service intervals months or kilometers (miles) whichever occurs first (1)
26	Power steering fluid	-	-	-	R	-	-	-	R	-	-	-	R	-	-	-	or every 24 months
27	Power steering oil hoses	-	-	-	-	-	-	R	-	-	-	-	-	R	-	-	or every 24 months
28	Steering wheel free play (4)	Every 10 400 km (6,500 miles): I															
29	Steering gear box torque	-	-	T	-	T	-	-	T	-	-	T	-	T	-	-	or every 12 months
30	Drive shaft flange torque	T	-	T	T	T	-	T	T	T	-	T	T	T	-	T	or every 12 months
31	Drive shaft lubrication	L	-	L	L	L	-	L	L	L	-	L	L	L	-	L	or every 12 months
32	Leaf spring U-bolt torque (4)	T	-	T	T	T	-	T	T	T	-	T	T	T	-	T	
33	Wheel nut torque (4)	Every 10 400 km (6,500 miles)															
34	King pin	L	-	L	L	L	-	L	L	L	-	L	L	L	-	L	or every 12 months

No.	Service Interval	16 000 km/10,000 mi	24 000 km/15,000 mi	32 000 km/20,000 mi	48 000 km/30,000 mi	64 000 km/40,000 mi	72 000 km/45,000 mi	80 000 km/50,000 mi	96 000 km/60,000 mi	112 000 km/70,000 mi	120 000 km/75,000 mi	128 000 km/80,000 mi	144 000 km/90,000 mi	160 000 km/100,000 mi	168 000 km/105,000 mi	176 000 km/110,000 mi	Service intervals months or kilometers (miles) whichever occurs first (1)
35	Wheel bearing grease (5)	-	-	-	R	-	-	-	R	-	-	-	R	-	-	-	or every 24 months
36	Air conditioner blower filter	Cleaned once a month															
37	DEF supply pump filter element	Every 192 000 km (120,000 miles): R															or every 24 months
38	Starter	When the starter indicator light (amber) comes on: R															

Remarks

(1) In case this column is blank, follow kilometers (miles).

(2) Use of oils other than CJ-4 may require shorter maintenance intervals and may cause nonconformity to regulations. Use of oils with other viscosity than *W-40 may also require shorter maintenance intervals and may cause a problem with engine durability.

(3) Refer to "Air Cleaner Indicator Light" under *Engine Air Cleaner/ Filter* ⇨ *254*.

(4) Initial check at 1 040 km (650 miles) is required.

(5) Be sure to discard used grease seal, and always use new grease seal for installation.

Explanation of Complete Vehicle Maintenance Schedule (Diesel Vehicles)

The following is a brief explanation of each of the services listed in the preceding Complete Vehicle Maintenance Schedule for diesel vehicles.

1. Engine Noise : These components have an effect on the control of noise emissions.

Service Interval	Maintenance procedure
Engine Every 16 000 km (10,000 miles)	Inspect sound absorption materials for tears, broken out sections or attachment. Repair or replace as necessary.
Cooling System Every 16 000 km (10,000 miles)	Inspect fan, shroud and radiator for attachment, tears or cleanliness. Replace as necessary.
Air intake system Every 24 000 km (1,500 miles)	Inspect all ducts, hoses and intake silencers for leaks or chafing. Repair or replace as necessary.
Exhaust system Every 16 000 km (10,000 miles)	Inspect silencer, pipes, gaskets, clamps and mounting for exhaust gas leaks or looseness. Repair or replace as necessary.
Cab Every 16 000 km (10,000 miles)	Inspect sound absorption materials for tears, broken out sections or attachment. Repair or replace as necessary.

2. Valve Lash : Incorrect valve clearance will result in increased engine noise and lower engine output, thereby adversely affecting engine performance. Retorque rocker shaft bracket nuts before checking and adjusting valve clearance.

Check and adjust valve clearance every 48 000 km (30,000 miles) or 12 months whichever occurs first.

3. Engine Oil and Oil Filter : Change at interval noted below depending upon driving conditions.

• Normal Service — Change every 16 000 km (10,000 miles) or 12 months whichever occurs first.

• Severe Service — Change every 8 000 km (5,000 miles) or 3 months if you often drive under one or more of these conditions: (a) driving in dusty areas, (b) frequent idling or idling for long periods, (c) driving 6 km (4 miles) or less in freezing weather, or other short trips in cold weather, where the engine does not thoroughly warm up.

Change oil and filter as soon as you can after driving in a dust storm. When recommended oil is used, it conforms to this maintenance schedule. (Recommended oil: CJ-4 (API designations))

4. Fuel Filter : Replace the fuel filter every 24 000 km (15,000 miles) or more frequently if clogged.

5. Pre-Fuel Filter/Water separator : Replace the fuel filter every 24 000 km (15,000 miles) or more frequently if clogged.

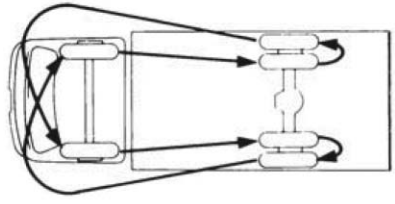
6. Air Cleaner Filter : The level of dirt in the air cleaner element can be checked against the indicator.

Replace the air cleaner filter when the multi-information display (MID) shows "CHECK AIR FILTER".

7. Damage to Air Intake Ducts and Hoses : Check for damage of air intake ducts and hoses and that those are correctly installed every 24 000 km (15,000 miles) or 12 months. Replace or adjust those if necessary.

8. Drive Belts : Check belt driving the fan, alternator or A/C compressor every 16 000 km (10,000 miles). Look for cracks, fraying, wear, and proper tension.

9. Engine Bolt Torques : Loosened bolts result in lower engine output. Check and adjust manifold mounting, and injectors to correct torque every 80 000 km (50,000 miles).



10. Rotate Tires : To equalize wear, rotate tires as shown in the figure and adjust tire pressures every 10 400 km (6,500 miles).

11. Engine Cooling System : At 12 months or 16 000 km (10,000 miles) intervals, wash radiator cap and filler neck with clean water, pressure test system and radiator cap for proper pressure holding capacity, tighten hose clamps and inspect condition of all cooling and heater hoses. Replace hoses if cracked, swollen or otherwise deteriorated. Have the hoses replaced by your authorized dealer.

12. Engine Coolant : Inspect the engine coolant every 12 months. Replace the engine coolant every 24 months, drain the engine coolant by opening the drain plug at the bottom of the radiator core, flush and refill the engine cooling system with a new engine coolant. Refer to "Preparing Engine Coolant" in *Engine Coolant ⇨ 254*. Have the Engine Coolant replaced by your authorized dealer.

13. Exhaust System : Check the complete exhaust system every 16 000 km (10,000 miles). Check body areas near the exhaust system. Look for broken, damaged, missing, or out-of-position parts. Also inspect for open seams, holes, loose connections, or other conditions which could cause heat build-up at the rear body floor pan, or could let exhaust fumes seep into the passenger compartment. Dust or water in the cabin may indicate a leak in that area. Required repairs should be made at once.

14. DPF (Clean Filter) : Clean the filter every 160 000 km (100,000 miles) or 3,000 hours whichever occurs first.

15. DPF (Pressure Difference Sensor 0 Point Adjustment) : Adjust the sensor every 160 000 km (100,000 miles) or 3,000 hours whichever occurs first.

16. DPF (Pressure Difference Sensor Hose) : Inspect the sensor hose every 160 000 km (100,000 miles) or 3,000 hours whichever occurs first. Replace the sensor hose every 400 000 km (250,000 miles).

17. Fuel Line System : Inspect the fuel tank, cap and lines for damage which could cause leakage every 16 000 km (10,000 miles). Inspect fuel cap for correct sealing ability and indications of physical damage. Replace any damaged or malfunctioning parts.

18. Brake Lining and Pad for Wear : Check drum brake lining and disc brake pad for wear or cracks every 16 000 km (10,000 miles). Check brakes (including parking brake) more often if operating conditions or driving habits result in frequent braking.

Front disc brakes have built-in wear noise indicators which are designed to make a high pitched squeal or cricket-like warning sound when the brake pads are worn to the point where new pads are needed.

When the truck is in motion, the sound may be constant or it may come and go. Pressing the brake pedal firmly may cause the sound to stop.

Have the brake linings or the brake pads replaced by your authorized dealer as soon as possible after the warning first becomes evident. Failure to do so can result in expensive damage to the brake system or a serious accident.

19. Brake Drum and Rotor for Wear and Damage : Check brake drums (rear and parking) and rotors (front) for wear or damage every 32 000 km (20,000 miles) or 12 months whichever occurs first.

20. Brake Electric Vacuum Pump : Inspect the brake electric vacuum pump operation every 16 000 km (10,000 miles) or 12 months, whichever occurs first.

21. Brake Fluid : Check the fluid in the brake fluid reservoir every 16 000 km (10,000 miles). Replace the fluid every 48 000 km (30,000 miles).

22. Brake Line and Hoses : Check lines and hoses for proper hook-up, binding, leaks, cracks, chafing, etc. every 32 000 km (20,000 miles). Any questionable parts should be replaced or repaired at once. When rubbing or wear is noted on lines or hoses, the cause must be corrected at once.

23. Parking Brake Cable : Check the parking brake cable every 16 000 km (10,000 miles) or 12 months whichever occurs first.

24. Automatic Transmission Fluid : Check the automatic transmission fluid level at each engine oil change and replace fluid every 48 000 km (30,000 miles). Do not overfill.

25. Differential Gear Oil : Replace lubricant every 48 000 km (30,000 miles). Check lubricant level every 16,000 km (10,000 miles) or every 12 months, and add lubricant to within 0 to 10 mm (0 to 0.4 inch) of the bottom edge of the filler hole if necessary.

26. Power Steering Fluid : Replace power steering fluid every 24 months or 48 000 km (30,000 miles), whichever occurs first.

27. Power Steering Oil Hoses : Replace power steering oil hoses every 24 months or 80 000 km (50,000 miles), whichever occurs first.

28. Steering Wheel Free Play : Check steering wheel free play after the first 1 040 km (650 miles) and then every 10 400 km (6,500 miles).

Steering wheel free play
10-50 mm (0.39-1.97 in)

29. Steering Gear Box Torque : Retighten the attaching bolts of the steering gear box to the specified torque every 12 months or every 32 000 km (20,000 miles) whichever occurs first.

Steering gear box tightening torque
103 N•m (76 lb·ft)

30. Driveshaft Flange Torque : Check the fixing bolts of driveshaft flange for looseness or damage after the first 16 000 km (10,000 miles).

Driveshaft flange tightening torque
103 N•m (76 lb·ft)

31. Driveshaft Lubrication : Lubricate the grease fitting on the center bearing, as well as each universal joint and spline coupling every 12 months or 16 000 km (10,000 miles) whichever occurs first.

32. Leaf Spring U-bolt Torque : Tighten the U-Bolt nuts to the specified torque after the first 1 040 km (650 miles), thereafter every 16 000 km (10,000 miles).

Model	Leaf spring U-bolt nut tightening torque	
	Front	Rear
3500HD	127 N•m (94 lb·ft)	177 N•m (131 lb·ft)

33. Wheel Nut Torque : Check tires for excessive or abnormal wear, or damage. Also check tire inflation pressures and adjust.

Be sure wheels are not bent or cracked and that wheel nuts have been tightened to the specified torque after the first 1,040 km (650 miles) and then every 10 400 km (6,500 miles). Note that there are left and right hand threads.

Wheel nut tightening torque
500 N•m (362 lb·ft)

34. King Pin : Lubricate the grease fitting on the king pins every 12 months or 16 000 km (10,000 miles) whichever occurs first.

35. Wheel Bearing Grease : Clean and repack front wheel bearings every 24 months or 48 000 km (30,000 miles) whichever occurs first.

36. Air Conditioner Blower Filter : The air conditioner blower filter should be removed and cleaned once a month.

37. DEF Supply Pump Filter Element : Replace the DEF supply pump filter element every 192 000 km (120,000 miles) or 24 months whichever occurs first.

38. Starter : The color displayed by the starter indicator light will change from green to amber when the number of times remaining is 0 or below and the screen is selected.

When the indicator light (amber) comes on, have the vehicle inspected/serviced at the nearest dealer.

Owner Checks and Services

Before Driving

Proper care and driving is important not only for extended service life of your vehicle, but also for improved fuel and oil economy. Drive carefully and defensively. Be sure you know how to use your truck and its equipment before operating it.

Starting and Operating

Proper care and operation will not only extend the service life of your vehicle but also improve fuel economy.

Check Around the Vehicle Before Starting the Engine

Before pulling away, perform a thorough safety check, making sure there are no children or obstructions around the vehicle.

Take off the chocks after confirming that the parking brake is securely applied. Sit behind the wheel, adjust the seat position, and buckle up the seat belt. The passengers are also

required to buckle up the seat belts. Adjust the positions of the steering wheel and mirrors. Lock the doors. Turn the power of the dome light or accessories OFF before starting the engine.

Engine Conditions

Checking the Engine for Startability and Abnormal Noises

1. Make sure the parking brake is securely engaged. Step firmly on the brake pedal.
2. Make sure the selector lever is in "P" or "N" position.

   For safety, firmly press the brake pedal before starting the engine.
3. Turn the engine control switch to start the engine.

   Check that the engine starts quickly with no abnormal noises.

Checking Condition of the Engine at Low Speeds and during Acceleration

1. Make sure the transmission is in the "P" or "N" position and the parking brake is securely engaged.
2. Turn the engine control switch to start the engine, and run it to warm up.
3. Check that the engine is running at a speed within the standard idle speed range.

   For diesel vehicles, during regeneration of the diesel particulate filter (DPF), the engine idle speed may increase.
4. Drive the vehicle, making sure the accelerator pedal does not stick when gradually accelerating, the engine speed rises smoothly and it does not knock.

Recommended Daily (Pre-operation) Inspections

These checks are in addition to, not instead of, any legally required daily inspections. See related topics under "Maintenance Schedule", especially if problems are found.

For safe and comfortable driving, keep record of the distances driven and the condition of the vehicle during operation. Perform inspections at appropriate intervals, and perform maintenance in accordance with the findings of the inspections. If an inspection reveals an abnormality or there was an abnormality the previous time the vehicle was driven, have the vehicle repaired by the nearest dealer before it is driven again.

1. Components that showed abnormalities during the previous operation
   - Check components that showed abnormalities during the previous operation

2. Checks performed at the engine
   - Fan belt looseness and damage
   - Engine oil level
   - Engine coolant level
   - Power steering fluid level
3. Checks performed from the driver's seat
   - Brake fluid level
   - Brake pedal free play
   - Operation of meters, gauges and warning/ indicator lights
   - Engine startability, abnormal noise and color of exhaust gases
   - Parking brake lever stroke
   - Windshield washer fluid spray condition and windshield wiper effectiveness
   - Windshield washer fluid level
   - Steering wheel position and free play
   - Operation of horn and turn signal lights
   - Door lock operation
4. Checks performed during a walk around the vehicle
   - Illumination, flashing, contamination, damage and obstruction of lights
   - Contamination, damage ad obstruction of windows, mirrors and reflectors
   - Leaf spring damage
   - Oil, engine coolant, fuel, brake fluid and power steering fluid leaks
   - Water separator
5. Checking wheels and tires
   - Air pressure
   - Cracks and other damage
   - Abnormal wear
   - Tread depth
   - Mounting condition of all wheel nuts
6. Checks performed after the engine startup
   - Oil, engine coolant, fuel, brake fluid and power steering fluid leaks
   - Inspect the exhaust system, checking that the tailpipe is clear
7. Checks performed while driving the vehicle
   - Brake effectiveness
   - Engine abnormal noises

Keep the Floor Around the Driver Seat Clean and Tidy

⚠ Warning

It is extremely dangerous to have empty cans, empty bottles, or other items rolling around on the floor because they could get trapped under the brake pedal and prevent brake application. For proper pedal operation, it is also essential to lay floor mats

(Continued)

Warning (Continued)

properly. Incorrectly installed floor mats would hinder free movement of the pedals.

Do not use the dashboard pocket or the top of the dashboard as a place to put items that could roll, which could interfere with your driving.

Choose Your Footwear Suitable for Driving

⚠ Warning

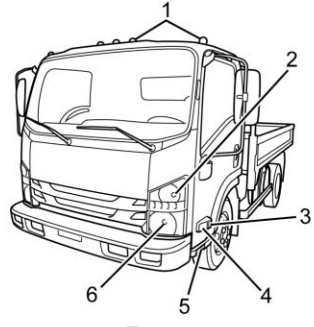
Choose footwear that ensures proper operation of pedals when driving the vehicle. Use of footwear unsuitable for driving may cause an accident. The driver could be seriously injured when not wearing the proper footwear.

Electrical System

Following the after-delivery service, it is the owner's responsibility to check all wiring periodically for cracked, chafed or oil-soaked insulation and maintain it in a clean and tight condition to ensure satisfactory operation of the electrical system.

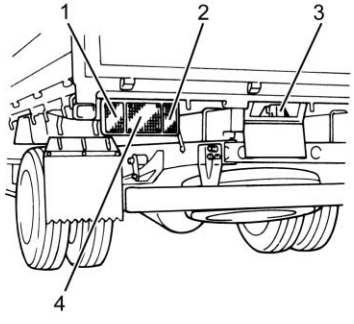
Headlights and Turn Signal Lights

Turn the engine control switch to the "ON" position, and then check the way in which the headlights, turn signal lights, and other exterior lights come on and flash. In addition, press the brake pedal to confirm whether the stop lights come on, and shift the transmission to "R" position to confirm whether the back up lights come on. Also examine the lights for discoloration, damage, and looseness.



Front

1. Roof Marker Lamp (Identification/ Clearance Lamp)
2. Front Turn Signal Lamp
3. Side Turn Signal Lamp/ Sidemarker Lamp
4. Cornering Lamp
5. Side Reflector
6. Headlamp/Parking Lamp



Rear

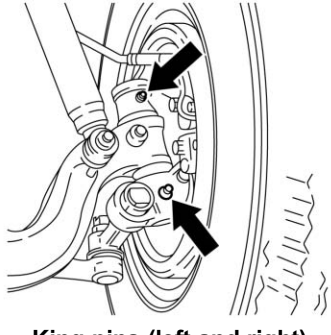
1. Rear Turn Signal Lamp
2. Back-up Lamp
3. License Plate Lamp
4. Taillamp/Stoplamp

Lubrication

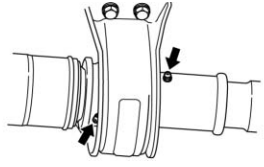
One of the most important items of good vehicle care is the lubrication of all necessary points with the Right Lubricant, at the Right Time and in the Right Way. It is the owner's responsibility to maintain proper lubrication practices as recommended in the following pages.

Greasing Chassis Components

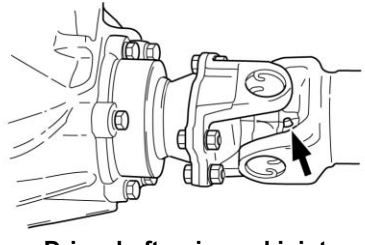
The type (characteristics) of the grease specified for use with a chassis component differs from that of the grease specified for use with another component. Be sure to use only the specified grease for each component and perform greasing according to the Maintenance Schedule.



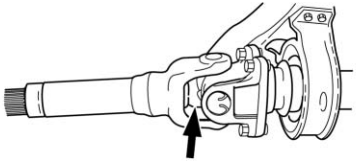
King pins (left and right)



Driveshaft splines and center bearing



Driveshaft universal joint (Single-piece shaft)

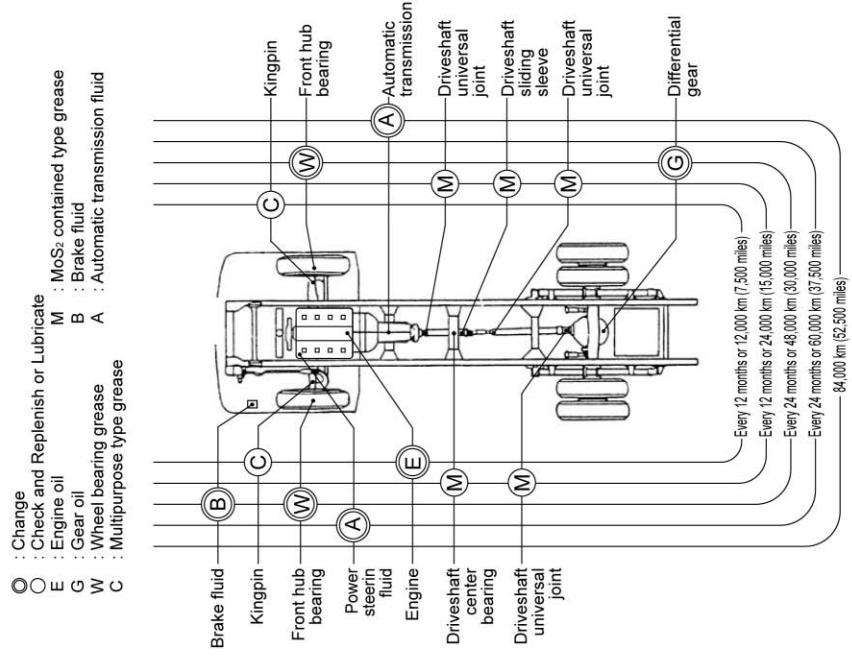


Driveshaft universal joint (Two-piece shaft)

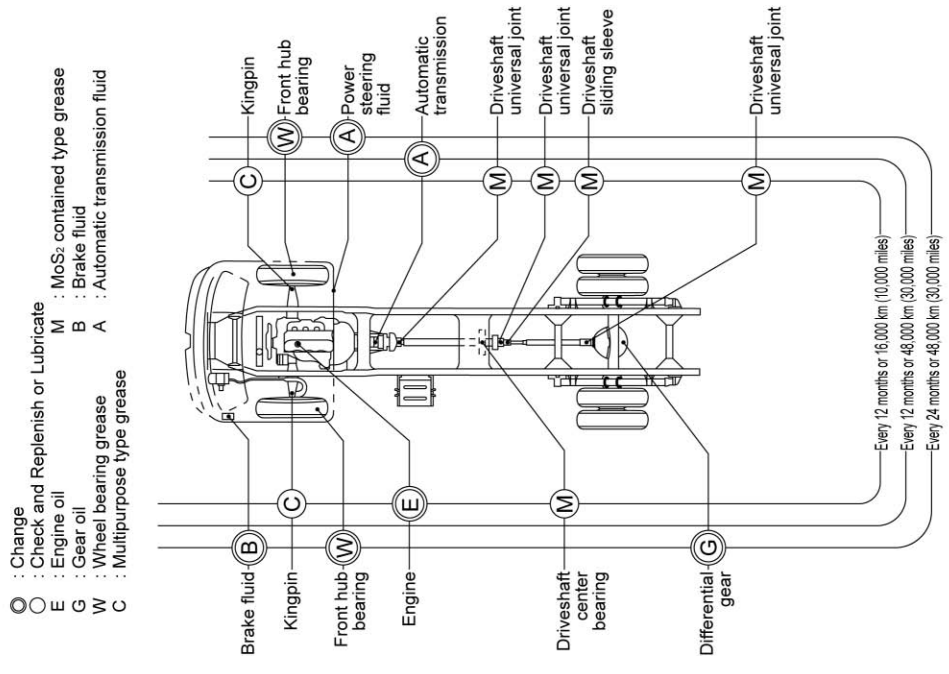
Single-piece driveshaft: 2 points; Two-piece driveshaft: 3 points

Each driveshaft universal joint must be greased heavily until grease oozes at the 4 needle bearing oil seal locations. After greasing, wipe off excess grease.

Lubrication Chart (Gasoline Vehicles)



Lubrication Chart (Diesel Vehicles)



Additional Maintenance and Care

Owner Safety and Routine Maintenance

Listed below are vehicle checks which should be made periodically by either the owner or a qualified technician to ensure proper performance and safety of your vehicle. Take any problems promptly to a technician for service advice.

For your safety and that of others, any of the safety-related components that may have been damaged in an accident should be checked and necessary repairs performed before operating your vehicle.

At the minimum, these routine checks should be made every 6 months or 16,000 km (10,000 miles) for diesel vehicles, or every 9,600 km (6,000 miles) for gasoline vehicles, whichever comes first. Whenever repairs are necessary, have them completed before operating the vehicle.

A: Parking Brake : Park on a fairly steep hill and hold the vehicle with the parking brake only. This checks holding ability.

Before checking item (B) below, be sure to have enough room around the vehicle. Then firmly apply both the parking brake see *Parking Brake ⇨ 214* and the regular brakes. Do not use the accelerator pedal. If the engine starts, be ready to turn off the engine control switch at once. Take these precautions because the vehicle could move without warning and possibly cause injury or property damage.

B: Starter Safety Switch : Check by trying to start the engine in each gear. The starter should crank only at selector position "P" or "N".

C: Transmission Shift Indicator : Check that the indicator points to the gear chosen.

D: Steering : Be alert for any changes in steering action. An inspection or service is needed when: the steering wheel is harder to turn or has too much free play, or when there are strange sounds when turning or parking.

E: Wheel Alignment, Balance, and Tires : Check tires for abnormal wear or damage. Also, check for damaged wheels. A pull right or left on a straight and level road may show the need for a wheel alignment. A vibration of the steering wheel or seat at normal highway speeds may mean a wheel balancing is needed. Check tire pressure when the tires are "cold," at least monthly, and whenever the vehicle is serviced.

Check the pressure more often if daily checks show it's needed. (Refer to "Recommended Daily (Pre-operation) Inspections" under *Owner Checks and Services ⇨ 347*). Change tire pressure as needed when changing loads.

F: Brakes : Be alert to illumination of the brake system warning light or brake low vacuum warning light or the tone alarm, or changes in braking action, such as repeated pulling to one side, unusual sounds

when braking, increased brake pedal travel or harder pedal. The front and rear brakes are attached to an auto adjuster mechanism. If there are no defects, as the pedal travel is properly maintained, adjustments are not necessary. Check regularly that the brake fluid reservoir (left-hand side of the instrument panel) is properly filled and check for fluid leaks. Any of these conditions could indicate the need for brake system inspection and/or service.

G: Exhaust System : Be alert for any changes in the sound of the exhaust system or any smell of fumes. These are signs the system may be leaking. Have it checked and/or repaired at once. (Refer to "Engine Exhaust Emissions Caution (Carbon Monoxide)" under *Engine Exhaust ⇨ 171*).

H: Windshield Wipers and Washers : Check operation and condition of the wiper blades. Check the flow of the washer spray.

I: Defroster : Turn the outlet selector knob to "Defroster" and the fan speed control knob to the fully clockwise position. Then check the airflow from the ducts at the inside base of the windshield.

J: Rearview Mirrors and Sun Visors : Check that friction joints hold mirrors and sun visors in place.

K: Horn : Sound the horn, now and then, to be sure it works.

L: Lap-Shoulder Belts : Check the seat belt system (including webbing, buckles, latch plates and anchors) for proper operation, and for damage.

M: Seat Adjusters : When adjusting the driver's manual seat, be sure the seat adjusters latch by pushing the seat forward and backward. Do not attempt to adjust the seat when the vehicle is in motion.

N: Lamps : Check panel lighting, warning lamps, indicator lamps and interior lamps. On the outside, check: license plate lamps, side marker lamps, reflectors on outside mirrors, headlamps, parking lamps, identification and clearance lamps, taillights, brake lamps, turn signals, cornering lamps, backup lamps and hazard warning flashers. Have headlamp aim checked immediately if beams seem improperly aimed.

O: Glass, Mirrors, Lights and/or Reflectors Condition : Look for broken, scratched, dirty or damaged glass, mirrors, lamps or reflectors that could reduce the view or visibility, or cause injury. Replace, clean or repair promptly.

P: Door Latches : Check that doors close, latch and lock tightly. Check for broken, damaged or missing parts that might prevent tight latching.

Q :Tilt Cab (Driving Position) : Be sure the tilt lever is down and locked.

R: Fluid Leaks : Check for fuel, water, oil or other fluid leaks by looking at the surface beneath the vehicle after it has been parked for a while. If you notice diesel fumes or fluid at any time, have the cause found and corrected at once.

S: Underbody : Corrosive materials used for ice removal, snow removal and dust control can collect on the underbody. If these materials are not removed, accelerated corrosion (rust) can occur on underbody parts such as fuel lines, frame, floor pan and exhaust system. At least every spring, flush these materials from the underbody with plain water. Take care to clean well any areas where mud and other debris can collect. Sediment packed in closed areas of the frame should be loosened before being flushed.

Checking Components that Showed Abnormalities during Previous Operation

Check the components that showed abnormalities during the previous operation. Have any abnormalities repaired by your dealer before using the vehicle.

Recommended Fluids, Lubricants, and Parts

Recommended Fluids and Lubricants

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

Usage	Fluid/Lubricant
Automatic Transmission (Diesel Engine)	Automatic Transmission Fluid (GM Part No. 19354076).
Automatic Transmission (Gasoline Engine)	DEXRON®-VI Automatic Transmission Fluid.
Battery Terminals	Petroleum Jelly (outer surfaces)
Brake Fluid	DOT 3 Hydraulic Brake Fluid (GM Part No. 19299818).
Cab-Door Hinges and Latches Lubricant	Multi-Purpose Lubricant, Superlube (GM Part No. 12346241) or equivalent containing zinc oxide.
Chassis Lubricant	Chassis Lubricant (GM Part No. 12377985) or high temperature equivalent.
Diesel Exhaust Fluid (DEF)	Diesel Exhaust Fluid (GM Part No. 19286291) or diesel exhaust fluid that meets ISO 22241-1 or displays the API Diesel Exhaust Fluid Certification Mark.
Driveshaft Center Bearing, Wheel Hub Bearing Lubricant	NLGI #2 or #3
Driveshaft, Universal Joints and Sliding Sleeve Lubricant	NLGI #1 or #2 multi-purpose type grease

Usage	Fluid/Lubricant
Engine Coolant	50/50 mixture of clean, drinkable water and use only DEX-COOL® coolant. See *Engine Coolant* ⇨ *254*.
Engine Oil (Diesel Engine)	Engine oils with the letters CJ-4 are required for your vehicle. The CJ-4 designation can appear either alone or in combination with other American Petroleum Institute (API) designations, such as API CJ-4/SL. These letters show API levels of quality. To determine the preferred viscosity for your vehicle's diesel engine, see *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*.
Engine Oil (Gasoline Engine)	Engine oil meeting the dexos1™ specification of the proper SAE viscosity grade. ACDelco dexos1 Synthetic Blend is recommended. See *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*.
Power Steerig Fluid	DEXRON®-VI Automatic Transmission Fluid.
Rear Axle	Multi purpose gear oil SAE80W-90 GL-5, SAE90 GL-5
Rear Axle (Limited slip differential (LSD))	Multi purpose gear oil SAE80W-90 GL-5, SAE90 GL-5 for limited slip differential together with limited slip differential lubricant additive (GM Part No. 88900330) or equivalent.
Windshield Washer Solvent	Automotive windshield washer fluid that meets regional freeze protection requirements.

Be sure to use the LSD gear oil additive mentioned above in vehicles equipped with limited slip differentials, and ensure there is an appropriate amount of the LSD gear oil additive, otherwise a chattering noise and/or excessive vibration may occur when turning.

If abnormal noises occur despite having used the specified LSD gear oil additive, have it inspected and serviced at your dealer.

Maintenance Replacement Parts

Replacement Parts

Please contact your dealer for genuine GM parts.

⚠ Warning

If part replacement is necessary, the part must be replaced with one of the same part number or with an equivalent part. Use of a replacement part of lesser quality may result in personal injury or damage to the vehicle.

3.0L Diesel

Part	GM Part Number
Engine Air Cleaner	98177271
Engine Oil Filter	98018858
Fuel Filter	Main: 98203599
	Pre: 98037481

6.0L Gas

Part	GM Part Number
Engine Air Cleaner	97062294
Engine Oil Filter	89017524

Replacement Fasteners

During vehicle maintenance, any fasteners used to replace older ones must have the same measurements and strength as those removed, whether metric or customary. Fasteners taken from the vehicle should be saved for reuse in the same location when possible. Where a fastener cannot be used again, take care to choose a replacement that matches the old one. For information and help, see your dealer.

⚠ Warning

This vehicle is primarily dimensioned in the metric system. Most fasteners are metric and many are very close in dimension

(Continued)

Warning (Continued)

to well-known customary fasteners in the inch system. Mismatched or incorrect fasteners can result in damage to the vehicle or possibly personal injury.

Technical Data

Vehicle Identification
Vehicle Identification Number (VIN) 362

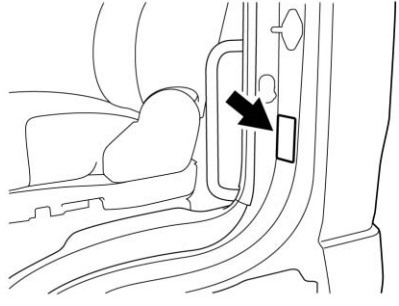
Vehicle Data
Capacities and Specifications 367
Engine Drive Belt Routing 373

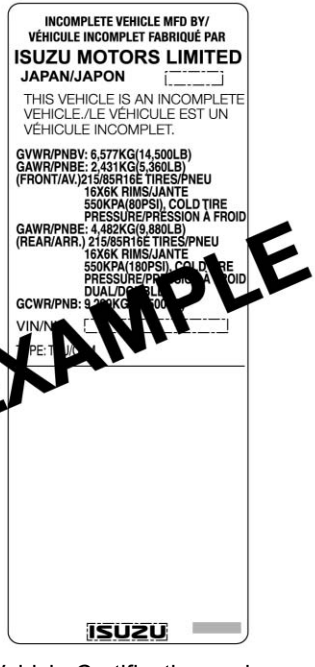
Vehicle Identification

Vehicle Identification Number (VIN)

The VIN and engine number are necessary for registering your vehicle. They are also necessary when your vehicle undergoes official inspections. Provide your dealer with these numbers when you are having the vehicle repaired or when ordering replacement parts. The Dealer will be able to do the requested jobs more competently and quickly.

VIN and Weight Rating Plate





The "Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate" shows the manufacturer's gross vehicle weight rating (GVWR), the front and rear gross axle weight ratings (GAWRs), as well as the VIN and emissions information for your vehicle.

This plate is located on the left side rear pillar panel below the striker (single cab) or on the left center pillar panel beside the shoulder seat belt anchor (crew cab).

The VIN is a legal identifier of your vehicle. It not only appears on the VIN plate; but also on the vehicle certificates of title and registration. The VIN specifically identifies a vehicle by code.

See “Overloading” under *Information on Loading the Vehicle* ⇨ *61*.

The VIN contains multiple pieces of information including the vehicle and engine model codes as shown below.

Typical VIN	5	4	D	B	D	J	1	B	X	G	S	1	2	3	4	5	6
VIN POS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

1–3: World Make/Manufacturer Identifier (WMI)

1: Region of Build
- **J:** Japan
- **5:** United States

Valid Combinations
JAL
54D

2: Manufacturer
- **A:** Isuzu Motors Ltd.
- **4:** Spartan Motors Chassis Inc.

3: Vehicle Brand/Type
- **L:** Incomplete Vehicle - Medium & Heavy Duty
- **D:** Incomplete Vehicle

4: GVWR/Brake System/Body Style

GVW (Lbs) / Brake System	Body Style	
	03	43
Class 3: 10,001-14,000 Hyd.	B	B
Class 4: 14,001-16,000 Hyd.	C	C

5: Make/Series
D: GM Chevrolet 3500 / 3500HD / 4500
6: Line/Cab Type
J: Non-Tilt Cab, BBC = 110 in. **W:** Tilt Cab, BBC = 71 in.
7: Chassis Type
1: 4x2, 2 Axles, 1 Driving
8: Engine Type
B: L96 – Engine Gas, 8 Cyl, 6.0L, SFI, E85 Max, Iron, GM **C:** LC8 – Engine LPG/CNG, 8 Cyl, V8, 6.0L, SFI, Gen 1, GMNA **7:** IZ3 – Engine Diesel, 4 Cyl, 3.0L, 4JJ1-TC 150HP
9: Check Digit
0–9, X - Calculated by POMS
10: Model Year
G: 2016
11: Plant Location
When VIN position 1 is “1” (USA): **S:** Charlotte, Michigan **7:** Fujisawa, Japan
12: Sequence Number
Positions 12 through 17 represent the number sequentially assigned by the manufacturer in the production process.

Interpretation of the VIN may differ depending on the vehicle. For further details, please ask your dealer.

Option Codes

ID Plate

The ID plate at the lower part of the righthand door striker indicates option codes. These codes are three-digit, alphanumeric codes, each assigned to a particular component of the vehicle.

You will be able to use these codes to identify the model or type of engine, transmission, rear axle or other components when your vehicle needs inspection and other services.

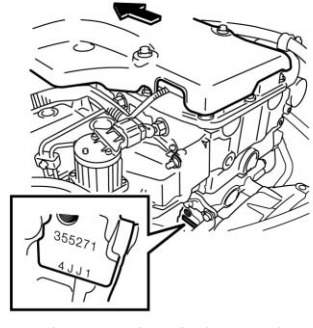
Option Codes	Engine
IZ3	L4 3.0L Diesel Engine
L96	V8 Gasoline Engine
LC8	V8 CNG/LPG Engine

Option Codes	Rear Axle
FL5	Heavy-duty φ320 mm
G86	Heavy-duty φ292 mm

Option Codes	Transmission
MYD	Automatic transmission 6L90 model
IX0	Automatic transmission A460 model

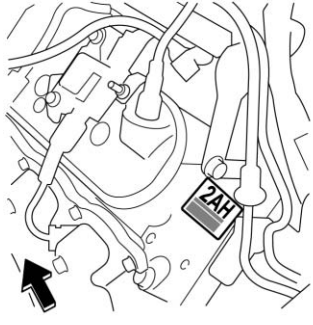
There are more option codes than those indicated above. Depending on the vehicle, an option code may not be shown. For detailed specifications of your vehicle, please ask your dealer.

Engine Number (3.0L L4 Diesel)

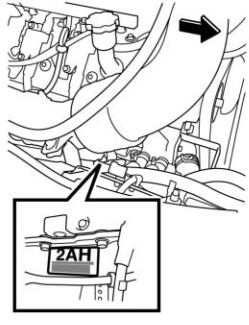


The engine number is located on the left-side rear part of the engine block.

Engine Number (6.0L V8 Engine)



Left-side rear



Right-side rear

The engine number is located on the left-side rear part of the engine block and the right-side front part of the oil pan.

Vehicle Data

Capacities and Specifications

These specifications are given here for information only. Before using them, see the Cautions and other instructions throughout this manual – the index may help you locate such items. For more information, see the Service Manual covering the chassis or body part in question. Your dealer may also be able to help.

ENGINE

Engine Specifications		
Description	Water-cooled, overhead camshaft, direct injection engine with a charge air cooled turbocharger.	Water-cooled, overhead valve, engine
Manufacturer	Isuzu	GMPT
Model	3.0L Diesel Engine	6.0L Gasoline Engine
Engine type	Inline 4, Four Cycle	V8, Four Cycle
Induction	Turbocharged W/Charge Air Cooler	Mass Air
Bore	95.4 mm	101.6 mm
Stroke	104.9 mm	92 mm
Displacement	2.999 L (183.0 CID)	6.000 L (364 CID)
Full load RPM	2,800 r/min	4,300 r/min
Compression ratio	17.5 to 1	9.67 to 1
Firing order	1-3-4-2	1-8-7-2-6-5-4-3
Fuel injection timing (static) degree	0°	Variable
Valve clearance (Between cam and roller)	Both inlet and exhaust valves: 0.15 mm (0.006 in) in cold engine	—
Idling speed	576 - 625 r/min	550 r/min

Fan belt tension		New belt: 4 - 6 mm (0.16 - 0.24 in)/212 - 236 Hz When used: 6 - 8 mm (0.24 - 0.31 in)/181 - 195 Hz	—
Oil filter		Replaceable element type	Replaceable element type
Engine oil capacity		When changing oil only: 7.5 L (7.9 qt)*1 When changing oil and filter: 8.2 L (8.7 qt)*1	When changing oil and filter: 5.7 L (6.0 qt)*1
Engine coolant capacity		12.6 L (13.3 qt)*2	15.0 L (15.9 qt)*2
Preheating system		Glow plugs	—
Transmission Specifications			
Model		RPO IXO-A460 Six-speed automatic transmission (overdrive gear for 5th and 6th), lock-up clutch for 2nd to 6th.	RPO MYD-6L90 Six-speed automatic transmission (overdrive gear for 5th and 6th), lock-up clutch for 2nd to 6th
Gear ratio	1st	3.742 to 1	4.027 to 1
	2nd	2.003 to 1	2.364 to 1
	3rd	1.343 to 1	1.532 to 1
	4th	1.000 to 1	1.152 to 1
	5th	0.773 to 1	0.852 to 1
	6th	0.634 to 1	0.667 to 1
Reverse		3.539 to 1	3.064 to 1

Transmission oil capacity	13.4 L (28.3 pt)	12.17 L (25.72 pt)
Weights		
Model	3.0L Diesel Engine	6.0L Gasoline Engine
Axle weight rating : Front	3500HD: 2431 kg (5,360 lb)	3500: 2204 kg (4,860 lb) 4500: 3007 kg (6,630 lb)
Engine Oil Service		
Model	3.0L Diesel Engine	6.0L Gasoline Engine
Engine oil capacity	When changing oil only: 7.5 L (7.9 qt)[*1] When changing oil and filter: 8.2 L (8.7 qt)[*1]	When changing oil and filter: 5.7 L (6.0 qt)[*1]
Engine Cooling System Service		
Model	3.0L Diesel Engine	6.0L Gasoline Engine
Capacity	12.6 L (13.3 qt)	15.0 L (15.9 qt)
Thermostat: Starts to open	85 °C (185 °F)	85.5-87.5 °C (185.9-189.5 °F)
Radiator pressure	108 kPa (16 psi)	103 kPa (15 psi)
Transmission Service		
Model	RPO IXO-A460	RPO MYD-6L90
Transmission oil capacity	13.4 L (28.3 qt)[*3]	12.7 L (25.7 qt)[*3]
Rear Axle Service		
Model	3.0L Diesel Engine	6.0L Gasoline Engine

Differential gear oil capacity	9.0 L (19.0 qt)[*4]	9.7 L (20.5 qt)[*4]
Limited slip differential lubricant additive	0.5 L (1.06 qt)[*5]	0.6 L (1.27 qt)[*5]
Fuel		
Fuel tank capacity	113 L (30.0 gal)[*6]	
Diesel Exhaust Fluid (DEF)		
DEF tank capacity (Diesel Only)	16.0 L (4.23 gal)	
Steering		
Steering wheel free play	10 - 50 mm (0.39 - 1.97 in)	
Power steering fluid capacity	1.5 L (1.6 qt/0.33 gal)	
Wheel		
Wheel alignment		
Toe-in	-2 to 2 mm (-0.08 to 0.08 in)	
Camber	0°15’	
Caster	LH 2°50’, RH 3°40’	
King pin	12°	
Wheel hub bearing grease capacity	0.11 kg (0.24 lb)	
Wheel stud nut torque : Front and rear	500 N•m (363 lb ft)	
Disc Brakes		
Model	3500/3500HD	4500HD

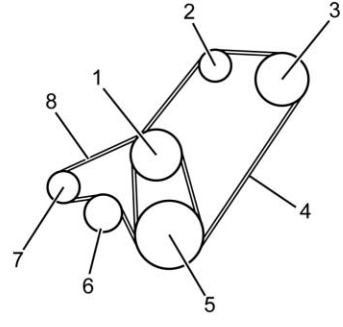
Brake size (Diameter x Thickness)	293 x 40 mm (11.54 x 1.57 in)	363 x 42 mm (14.29 x 1.65 in)
Rotor thickness		
[Standard Value]	40.0 mm (1.575 in)	42.0 mm (1.654 in)
[Usable Limit]	37.0 mm (1.457 in)	39.0 mm (1.535 in)
Pad thickness		
[Standard Value]	13.0 mm (0.512 in)	13.0 mm (0.512 in)
[Usable Limit]	1.0 mm (0.04 in)	1.0 mm (0.04 in)
Service Brakes		
Brake pedal free play	Refer to *Brakes* ⇨ *266*.	
Clearance between the brake pedal and the brake pedal bracket (applied to the brake pedal)		
Parking Brake		
Lever effective stroke (Under pull force of approx. 147 N (33 lb)	6 - 8 notches	
Electrical System		
Model	3.0L Diesel Engine	6.0L Gasoline Engine
Battery type [BCI size] (RC-CCA) x No. of units	31 (160 - 750) x 2	31 (180 - 750) x 1
Starter	12 V - 2.0 kw	12 V - 1.7 kw
Alternator	12 V - 140 amp	12 V - 145 amp

Tightening Torque		
Model	3.0L Diesel Engine	6.0L Gasoline Engine
Oil pan drain plug	83.3 N•m (61.0 lb ft)	25.0 N•m (18.0 lb ft)
Oil filter drain plug	25.0 N•m (18.0 lb ft)	—
Oil filter	—	30.0 N•m (22.0 lb ft)
Remarks:*1 see *Engine Oil (Diesel)* ⇨ *243* or *Engine Oil (Gasoline)* ⇨ *248*. Remarks:*2 see *Engine Coolant* ⇨ *254*. Remarks:*3 see *Automatic Transmission Fluid* ⇨ *251*. Remarks:*4 see *Rear Axle (Gear Oil Viscosity Chart)* ⇨ *271* or *Rear Axle (Oil Level Check)* ⇨ *272*. Remarks:*5 only for vehicles equipped with optional limited slip differential. Remarks:*6 the fuel tank capacity is stated on a metal plate attached to the fuel tank body. Only fill the tank to 95 percent of its capacity, this allows room for the expansion of the fuel.		

Engine Drive Belt Routing

Fan Belt and Air Conditioning Compressor Belt

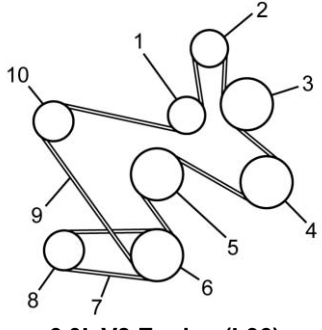
See the *Maintenance Schedule* ⇨ *328*.



3.0L L4 Engine (IZ3)

No.	Name
1	Fan Pulley
2	Tension pulley
3	A/C compressor
4	A/C belt
5	Crank pulley
6	Idler
7	Alternator
8	Fan belt

If your air conditioning system is functioning properly, it is not necessary to remove and replace the refrigerant or compressor oil.



6.0L V8 Engine (L96)

No.	Name
1	Fan belt idler pulley
2	Alternator
3	Vacuum pulley
4	Power steering pump pulley
5	Cooling fan pulley
6	Crank pulley
7	A/C belt
8	A/C compressor
9	Fan belt
10	Fan belt tensioner

A V-ribbed belt is used for the fan belt. This type of belt requires the tension to be adjusted more accurately than is required with the conventional V belt. Inappropriate tension could cause the belt to make noise or break. When the fan belt is damaged, electricity is not properly generated or becomes a cause of engine overheating. You must check the tension of the fan belt carefully.

Use dealer-certified genuine GM parts when changing the fan belt.

Have the vehicle inspected and serviced at your dealer.

The air conditioning drive belt, if equipped, must be adjusted after fan belt adjustment. If the belt is not adjusted properly, the A/C belt may experience excessive tension, and possible premature failure.

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Customer Information

Customer Satisfaction Procedure

Your satisfaction and goodwill are important to your dealer and to Chevrolet. Normally, any concerns with the sales transaction or the operation of the Chevrolet chassis, or upfitted rear body will be resolved by your dealer's sales or service departments. Sometimes, however, despite the best intentions of all concerned, misunderstandings can occur. If your concern has not been resolved to your satisfaction, the following steps should be taken:

STEP ONE : Discuss your concern with a member of dealership management. Normally, concerns can be quickly resolved at that level. If the matter has already been reviewed with the sales, service, or parts manager, contact the owner of your dealership or the general manager.

STEP TWO : If after contacting a member of dealership management, it appears your concern cannot be resolved by your dealership without further help call the Chevrolet Customer Assistance Center at 1-800-862-4389.

We encourage you to call the toll-free number in order to give your inquiry prompt attention. Have the following information available to give the Customer Assistance representative:

- Your name, address, and daytime phone number.
- Vehicle Identification Number (VIN). This is available from the vehicle registration or title, and on the VIN plate or the Vehicle Certification and Greenhouse Gas (GHG) Emissions Plate in the cab of the vehicle.
- Dealership name and location.
- Vehicle delivery date and present mileage.
- Nature of the problem.

When contacting Chevrolet, remember that your concern will likely be resolved at a dealer's facility. That is why we suggest following Step One first.

Customer Assistance Offices

Chevrolet encourages customers to call the toll-free number for assistance. However, if a customer wishes to write or e-mail Chevrolet, the letter should be addressed to:

United States

Chevrolet Motor Division
Chevrolet Customer Assistance Center
P.O. Box 33170
Detroit, MI 48232-5170
www.Chevrolet.com

1-800-862-4389
1-800-833-2438 (For Text Telephone Devices (TTYs))
Roadside Assistance:
1-888-899-1327

Customer Assistance for Text Telephone (TTY) Users

To assist customers who are deaf, hard of hearing, or speech-impaired and who use Text Telephones (TTYs), Chevrolet has TTY equipment available at its Customer Assistance Center. Any TTY user in the U.S. can communicate with Chevrolet by dialing: 1-800-833-2438.

Online Owner Center

Online Owner Experience my.chevrolet.com

The Chevrolet online owner experience allows interaction with Chevrolet and keeps important vehicle-specific information in one place.

Membership Benefits

: Download owner manuals and view vehicle-specific how-to videos.

: View maintenance schedules, alerts, and OnStar Vehicle Diagnostic Information. Schedule service appointments.

: View and print dealer-recorded service records and self-recorded service records.

: Select a preferred dealer and view locations, maps, phone numbers, and hours.

: Track your vehicle's warranty information.

: View active recalls by Vehicle Identification Number (VIN). See *Vehicle Identification Number (VIN)* ⇨ *362*.

: View GM Card, SiriusXM Satellite radio (if equipped), and OnStar account information (if equipped).

: Chat with online help representatives.

See my.chevrolet.com to register your vehicle.

GM Mobility Reimbursement Program

GM MOBILITY

This program is available to qualified applicants for cost reimbursement of eligible aftermarket adaptive equipment required for the vehicle, such as hand controls or a wheelchair/scooter lift for the vehicle.

For more information on the limited offer, visit www.gmmobility.com or call the GM Mobility Assistance Center at 1-800-323-9935. Text Telephone (TTY) users, call 1-800-833-9935.

Roadside Assistance Program

Call 1-888-899-1327. (Text Telephone (TTY): 1-888-889-2438.)

Service is available 24 hours a day, 365 days a year.

Calling for Assistance

When calling Roadside Assistance, have the following information ready:

- Your name, home address, and home telephone number.
- Telephone number of your location.
- Location of the vehicle.
- Model, year, color, and license plate number of the vehicle.
- Odometer reading, Vehicle Identification Number (VIN), and delivery date of the vehicle.
- Description of the problem.

Coverage

Services are provided for the duration of the vehicle's powertrain warranty.

Anyone driving the vehicle is covered.

Roadside Assistance is not a part of the New Vehicle Limited Warranty. General Motors North America and Chevrolet reserve the right to make any changes or discontinue the Roadside Assistance program at any time without notification.

General Motors North America and Chevrolet reserve the right to limit services or payment to an owner or driver if they decide the claims are made too often, or the same type of claim is made many times.

Services Provided

- **Emergency Tow from a Public Road or Highway:** Tow to the nearest Chevrolet dealer for warranty service, or if the vehicle was in a crash and cannot be driven. Assistance is not given when the vehicle is stuck in the sand, mud, or snow.

Services Not Included in Roadside Assistance

- Impound towing caused by violation of any laws.
- Legal fines.
- Mounting, dismounting, or changing of snow tires, chains, or other traction devices.

Service is not provided if a vehicle is in an area that is not accessible to the service vehicle or is not a regularly traveled or maintained public road, which includes ice and winter roads. Off-road use is not covered.

Scheduling Service Appointments

When the vehicle requires warranty service, contact your dealer and request an appointment. By scheduling a service appointment and advising the service consultant of your transportation needs, your dealer can help minimize your inconvenience.

If the vehicle cannot be scheduled into the service department immediately, keep driving it until it can be scheduled for service, unless, of course, the problem is safety related. If it is, please call your dealership, let them know this, and ask for instructions.

If your dealer requests you to bring the vehicle for service, you are urged to do so as early in the work day as possible to allow for same-day repair.

Collision Damage Repair

If the vehicle is involved in a collision and it is damaged, have the damage repaired by a qualified technician using the proper equipment and quality replacement parts. Poorly performed collision repairs diminish the vehicle resale value, and safety performance can be compromised in subsequent collisions.

Collision Parts

Genuine GM Collision parts are new parts made with the same materials and construction methods as the parts with which the vehicle was originally built. Genuine GM Collision parts are the best choice to ensure that the vehicle's designed appearance, durability, and safety are preserved. The use of Genuine GM parts can help maintain the GM New Vehicle Limited Warranty.

Recycled original equipment parts may also be used for repair. These parts are typically removed from vehicles that were total losses in prior crashes. In most cases, the parts being recycled are from undamaged sections of the vehicle. A recycled original equipment GM part may be an acceptable choice to maintain the vehicle's originally designed appearance and safety performance; however, the history of these parts is not known. Such parts are not covered by the GM New Vehicle Limited Warranty, and any related failures are not covered by that warranty.

Aftermarket collision parts are also available. These are made by companies other than GM and may not have been tested for the vehicle. As a result, these parts may fit poorly, exhibit premature durability/ corrosion problems, and may not perform properly in subsequent collisions. Aftermarket parts are not covered by the GM New Vehicle Limited Warranty, and any vehicle failure related to such parts is not covered by that warranty.

Repair Facility

GM also recommends that you choose a collision repair facility that meets your needs before you ever need collision repairs. Your dealer may have a collision repair center with GM-trained technicians and state-of-the-art equipment, or be able to recommend a collision repair center that has GM-trained technicians and comparable equipment.

Insuring the Vehicle

Protect your investment in the GM vehicle with comprehensive and collision insurance coverage. There are significant differences in the quality of coverage afforded by various insurance policy terms. Many insurance policies provide reduced protection to the GM vehicle by limiting compensation for damage repairs through the use of aftermarket collision parts. Some insurance companies will not specify aftermarket collision parts. When purchasing insurance, we recommend that you ensure that the vehicle will be repaired with GM original equipment collision parts. If such insurance coverage is not available from your current insurance carrier, consider switching to another insurance carrier.

If the vehicle is leased, the leasing company may require you to have insurance that ensures repairs with Genuine GM Original Equipment Manufacturer (OEM) parts or Genuine Manufacturer replacement

parts. Read the lease carefully, as you may be charged at the end of the lease for poor quality repairs.

If a Crash Occurs

If there has been an injury, call emergency services for help. Do not leave the scene of a crash until all matters have been taken care of. Move the vehicle only if its position puts you in danger, or you are instructed to move it by a police officer.

Give only the necessary information to police and other parties involved in the crash.

For emergency towing see *Roadside Assistance Program* ⇨ *377*.

Gather the following information:

- Driver name, address, and telephone number.
- Driver license number.
- Owner name, address, and telephone number.
- Vehicle license plate number.
- Vehicle make, model, and model year.
- Vehicle Identification Number (VIN).
- Insurance company and policy number.
- General description of the damage to the other vehicle.

Choose a reputable repair facility that uses quality replacement parts. See “Collision Parts” earlier in this section.

Managing the Vehicle Damage Repair Process

In the event that the vehicle requires damage repairs, GM recommends that you take an active role in its repair. If you have a pre-determined repair facility of choice, take the vehicle there, or have it towed there. Specify to the facility that any required replacement collision parts be original equipment parts, either new Genuine GM parts or recycled original GM parts. Remember, recycled parts will not be covered by the GM vehicle warranty.

Insurance pays the bill for the repair, but you must live with the repair. Depending on your policy limits, your insurance company may initially value the repair using aftermarket parts. Discuss this with the repair professional, and insist on Genuine GM parts. Remember, if the vehicle is leased, you may be obligated to have the vehicle repaired with Genuine GM parts, even if your insurance coverage does not pay the full cost.

If another party's insurance company is paying for the repairs, you are not obligated to accept a repair valuation based on that insurance company's collision policy repair limits, as you have no contractual limits with that company. In such cases, you can have control of the repair and parts choices as long as the cost stays within reasonable limits.

Service Publications Ordering Information

Service Manuals

Service Manuals have the diagnosis and repair information on the engines, transmission, axle, suspension, brakes, electrical, steering, body, etc.

Owner Information

Owner publications are written specifically for owners and intended to provide basic operational information about the vehicle. The Owner Manual includes the Maintenance Schedule for all models.

In-Portfolio: Includes a Portfolio, Owner Manual, and Warranty Manual.

RETAIL SELL PRICE: $35.00 – $40.00 (U.S.) plus handling and shipping fees.

Without Pouch: Owner Manual only.

RETAIL SELL PRICE: $25.00 (U.S.) plus handling and shipping fees.

Current and Past Models

Service and Owner publications are available for many current and past model year GM vehicles.

ORDER TOLL FREE:
1-800-551-4123 Monday – Friday
8:00 AM – 6:00 PM Eastern Time

For Credit Card Orders Only (VISA-MasterCard-Discover), see Helm, Inc. at: www.helminc.com.

Or write to:

Helm, Incorporated
Attention: Customer Service
47911 Halyard Drive
Plymouth, MI 48170

Prices are subject to change without notice and without incurring obligation. Allow ample time for delivery.

All listed prices are quoted in U.S. funds. Make checks payable in U.S. funds.

Radio Frequency Statement

This vehicle has systems that operate on a radio frequency that complies with Part 15 of the Federal Communications Commission (FCC) rules.

Operation is subject to the following two conditions:

1. The device may not cause harmful interference.
2. The device must accept any interference received, including interference that may cause undesired operation of the device.

Changes or modifications to any of these systems by other than an authorized service facility could void authorization to use this equipment.

Reporting Safety Defects

Reporting Safety Defects to the United States Government

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying General Motors.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or General Motors.

To contact NHTSA, you may call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to *http://www.safercar.gov;* or write to:

Administrator, NHTSA
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

You can also obtain other information about motor vehicle safety from *http://www.safercar.gov*.

Reporting Safety Defects to General Motors

In addition to notifying NHTSA in a situation like this, notify General Motors.

Call 1-800-862-4389, or write:

Chevrolet Motor Division
Chevrolet Customer Assistance Center
P.O. Box 33170
Detroit, MI 48232-5170

Vehicle Data Recording and Privacy

Your vehicle, like other modern motor vehicles, has a number of sophisticated computer systems that monitor and control several aspects of the vehicle performance. Your vehicle uses onboard vehicle computers to monitor emission control components to optimize fuel economy and to provide anti-lock braking and to help the driver control the vehicle in difficult driving situations. These computers and your vehicle's Data Recording Module (DRM) also store information about the performance and status of certain systems in your vehicle including the engine, throttle, and braking systems. General Motors and its affiliates, as well as service and repair facilities may access or download and share this information via a direct connection to your vehicle in order to diagnose and repair problems and properly service the vehicle. GM and its affiliates may also download and retrieve stored information from your vehicle for motor vehicle research and development, safety and vehicle improvement purposes.

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