2007 GMC T-Series Owner Manual

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This manual includes the latest information at the time it was printed. We reserve the right to make changes after that time without further notice. For vehicles first sold in Canada, substitute the name “General Motors of Canada Limited” for GM Medium Duty Truck Division when it appears in this manual.

This manual describes features that may be available in this model, but your vehicle may not have all of them. For example, more than one entertainment system may be offered or your vehicle may have been ordered without a front passenger or rear seats.

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Keep this manual in the vehicle, so it will be there if it is needed while you are on the road. If the vehicle is sold, leave this manual in the vehicle.

Canadian Owners

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

Helm, Incorporated
P.O. Box 07130
Detroit, MI 48207

Emission Control Systems Warranty

The emission warranty on your vehicle is issued in accordance with the U.S. Federal Clean Air Act. Defects in material or workmanship in Isuzu emission parts may also be covered under the Medium Duty Truck Limited Warranty coverage. There may be additional coverage on GM diesel engine chassis. In any case, the warranty with the broadest coverage applies.

What Is Covered

The parts covered under the emission warranty are listed under the “Emission Warranty Parts List” later in this section.

How to Determine the Applicable Emission Control System Warranty

State and Federal agencies may require a different emission control system warranty for chassis depending on:

- Whether the vehicle conforms to regulations applicable to light duty or heavy duty emission control systems
- Whether the vehicle or engine conforms to California regulations in addition to U.S. Environmental Protection Agency (EPA) Federal regulations

To determine eligibility: Light Duty vehicles with a Gross Vehicle Weight Rating (GVWR) of 8,500 lbs. or less; Heavy Duty vehicles with a GVWR of 8,500 lbs. or greater.

All vehicles are eligible for Federal Emissions Control System Warranty Coverage. If the emissions control label contains language stating the vehicle conforms to California regulations, the vehicle is also eligible for California Emissions Control System Warranty Coverage.

Federal Emission Control System Warranty

Federal Warranty Coverage is as follows:

- Vehicles with a 8,500 GVWR or less equipped with a Light Duty Emission Control System Gasoline Engine
  - 2 years or 24,000 miles, and 8 years or 80,000 miles for the catalytic converter or vehicle, powertrain control module, whichever comes first.
- Vehicles with a 8,500 GVWR or greater equipped with a Heavy Duty Gasoline Engine
  - 5 years or 50,000 miles, whichever comes first.
- Vehicles with a 14,000 GVWR or less equipped with a Heavy Duty Diesel Engine
  - 5 years or 50,000 miles, whichever comes first.
- Vehicles with a 14,000 GVWR or greater equipped with a Heavy Duty Diesel Engine
  - 5 years or 100,000 miles, whichever comes first.

Federal Emission Defect Warranty

GM warrants to the owner the following:

- The vehicle was designed, equipped, and built so as to conform at the time of sale with applicable regulations of the Federal Environmental Protection Agency (EPA)
- The vehicle is free from defects in materials and workmanship which cause the chassis to fail to conform with those regulations during the emission warranty period

Emission related defects in the genuine GM parts listed under the Emission Warranty Parts List covered, including related diagnostic costs, parts, and labor are covered by this warranty.

Federal Emission Performance Warranty

Some states and/or local jurisdictions have established periodic Chassis Inspection and Maintenance (I/M) programs to encourage proper maintenance of the chassis. If an EPA approved I/M program is enforced in your area, you may also be eligible for Emission Performance Warranty coverage when all of the following three conditions are met:

- The chassis has been maintained and operated in accordance with the instructions for proper maintenance and use set forth in the owner manual supplied with the chassis.
- The chassis fails an EPA approved I/M test during the emission warranty period.
- The failure results, or will result, in the owner of the chassis having to bear a penalty or other sanctions (including the denial of the right to use the chassis) under local, state, or federal law.

GM warrants that your dealer will replace, repair, or adjust to GM specifications, at no charge to you, any of the parts listed under the “Emission Warranty Parts List” later in this section which may be necessary to conform to the applicable emission standards. Non-GM parts labeled “Certified to EPA Standards” are covered by the Federal Emission Performance Warranty.

California Emission Control System Warranty

This section outlines the emission warranty that GM provides for the chassis in accordance with the California Air Resources Board. Defects in material or workmanship in GM emission parts may also be covered under the Medium Duty Limited Warranty coverage. There may be additional coverage on GM diesel engine chassis. In any case, the warranty with the broadest coverage applies.

This warranty applies if the chassis meets both of the following requirements:

- The chassis is registered in California **or other states adopting California emission and warranty regulations*.**
- The chassis conforms to California regulations as indicated on the chassis emission control label.

Important: *Massachusetts, Maine, and Vermont have California Emissions Control System Warranty coverage. (New York adopted California emission standards, but not the California emissions warranty. The Federal Emissions Control System warranty applies to all vehicles in New York.)

Your Rights and Obligations (For Chassis Subject to California Exhaust Emission Standards)

The Emission Control System Warranty on your vehicle is issued in accordance with the California Air Resources Board and GM. In California, new chassis must be designed, equipped, and built to meet the state's stringent anti-smog standards. GM must warrant the chassis emission control system for the periods of time and mileage listed below provided there has been no abuse, neglect, or improper maintenance of your chassis. The chassis emission control system may include parts such as the fuel injection system, ignition system, catalytic converter, and engine computer. Also included are hoses, belts, connectors, and other emission related assemblies.

Where a warrantable condition exists, GM will repair the chassis at no cost to you including diagnosis, parts, and labor.

California Emission Defect and Emission Performance Warranty Coverage

- For 3 years or 50,000 miles, whichever comes first, vehicles with a GVWR of 14,000 lbs. or less:

  For 5 years or 50,000 miles, whichever comes first, gasoline vehicles with a GVWR of 14,000 lbs. or more:

  For 5 years or 100,000 miles, whichever comes first, diesel vehicles with a GVWR of 14,000 lbs. or more:

  - If your vehicle fails a smog check inspection, GM will make all necessary repairs and adjustments to ensure that your vehicle passes the inspection. This is your Emission Control System Performance Warranty.
  - If any emission related part on your vehicle is defective, GM will repair or replace it. This is your Short-term Emission Defects Warranty.
- For 7 years or 70,000 miles, whichever comes first, vehicles with a GVWR of 14,000 lbs. or less:
  - If an emission related part listed in this booklet specially noted with coverage for 7 years or 70,000 miles is defective, GM will repair or replace it. This is your Long-term Emission Control System Defects Warranty.
- For 8 years or 80,000 miles, whichever comes first, vehicles with a GVWR of 8,500 lbs. or less:
  - If the catalytic converter or vehicle, powertrain, control module is found to be defective, GM will repair or replace it under the Federal Emission Control System Warranty.

Any authorized GM dealer will, as necessary under these warranties, replace, repair, or adjust to GM specifications any genuine GM parts that affect emissions.

The applicable warranty period shall begin on the date the chassis is delivered to the first retail purchaser.

Owner's Warranty Responsibilities

As the vehicle owner, you are responsible for the performance of the scheduled maintenance listed in your owner manual. GM recommends that you retain all maintenance receipts for the chassis, but GM cannot deny warranty coverage solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

You are responsible for presenting your chassis to a GM dealer as soon as a problem exists. The warranted repairs should be completed in a reasonable amount of time, not to exceed 30 days.

As the vehicle owner, you should also be aware that GM may deny warranty coverage if your chassis or a part has failed due to abuse, neglect, improper or insufficient maintenance, or modifications not approved by GM.

If you have any questions regarding your rights and responsibilities under these warranties, you should contact Customer Assistance Center at 1-800-222-1020 or, in California, write to:

State of California Air Resources Board
Mobile Source Operations Division
P.O. Box 8001
El Monte, CA 91731-2990

Emission Warranty Parts List

The emission parts listed here are covered under the Emission Control System Warranty. The terms are explained previously in this section under Federal Emission Control System Warranty and California Emission Control System Warranty.

Important: Certain parts may be covered beyond these warranties if shown with asterisk(s) as follows:

- (*) 7 years/70,000 miles, whichever comes first, California Emission Control System Warranty coverage.
- (**) 8 years/80,000 miles, whichever comes first, California Emission Control System Warranty coverage.

The Emission Control Systems Warranties obligations do not apply to conditions resulting from tampering, abuse, neglect, or improper maintenance; or any other item listed under "What Is Not Covered" in the New Vehicle Limited Warranty in the warranty booklet. The "Other Terms" presented in the New Vehicle Limited Warranty also apply to the emission related warranties.

Powertrain Control System

Anti-lock Brake System (ABS) Control Module **

Camshaft Position Actuator *

Camshaft Position Actuator Valve

Coolant Level Sensor

Data Link Connector

Electronic Throttle Control (ETC) Motor

Engine Control Module (ECM) *

Engine Coolant Temperature Sensor

Fast Idle Solenoid

Flexible Fuel Sensor *

Intake Air Temperature Sensor

Intake Manifold Temperature Sensor (7.8L Isuzu Diesel)

Malfunction Indicator Lamp

Manifold Absolute Pressure Sensor

Mass Air Flow Sensor

Oil Pressure Sensor (DOD™)

Oil Pressure Sensor (7.8L Isuzu Diesel)

Oxygen Sensors

Powertrain Control Module (PCM) **

Programmable Read Only Memory (PROM)

Throttle Position Sensor

Throttle Position Switch

Vehicle Control Module (VCM) **

Vehicle Speed Sensor

Wheel Speed Sensor

Transmission Controls and Torque Management

IsuzuLAN (CAN) Communications Circuit

PARK/NEUTRAL Switch

Torque Converter Clutch Solenoids

Transmission Control Module **

Transmission Fluid Temperature Sensor

Transmission Gear Selection Switch (Diesel)

Transmission Internal Mode Switch

Transmission Pressure Control Solenoids 1 & 2

Transmission Pressure Switches

Transmission Shift Solenoids 1, 2 & 3

Transmission Speed Sensors

Fuel Management System

Common Rail Assembly (6.6L DURAMAX® Diesel) *

Common Rail Assembly (7.8L Isuzu Diesel)

Diesel Fuel Injection Pump *

Diesel Fuel Injection Pump Timing Adjust

Diesel Fuel Injector Control Module – EDU (6.6L DURAMAX® Diesel) *

Diesel Fuel Temperature Sensor

Direct Fuel Injector Assembly (6.6L DURAMAX® Diesel) *

Function Block (6.6L DURAMAX® Diesel)

Fuel Injector

Fuel Pressure Regulator

Fuel Rail Assembly *

Fuel Rail Pressure Sensor (6.6L DURAMAX® Diesel)

Fuel Rail Pressure Sensor (7.8L Isuzu Diesel)

Air Management System

Air Cleaner

Air Cleaner Diaphragm Isuzu Motor

Air Cleaner Resonator

Air Cleaner Temperature Compensator Valve

Air Intake Ducts

Charge Air Control Actuator

Charge Air Control Solenoid Valve

Charge Air Control Valve

Charge Air Cooler (6.6L DURAMAX® Diesel) *

Charge Air Cooler (7.8L Isuzu Diesel) *

Charge Air Cooler Fan

Idle Air Control Valve

Idle Speed Control Motor

Intake Manifold *

Intake Manifold Gasket (7/70 only Terraza, Uplander, Montana SV6, RELAY, & DURAMAX® Diesel) *

Intake Manifold Gasket (7.8L Isuzu Diesel) *
Intake Manifold Heater
Intake Manifold Tuning Valve
Intake Manifold Tuning Valve Relay
Supercharger Assembly *
Throttle Body * (Replacement Only)
Throttle Body Heater
Throttle Closing Dashpot
Turbocharger Assembly *
Turbocharger Boost Sensor (6.6L DURAMAX® Diesel)
Turbocharger Boost Sensor (7.8L Isuzu Diesel)
Turbocharger Oil Separator
Turbocharger Thermo Purge Switch
Vacuum Pump (6.6L DURAMAX® Diesel)

Ignition System

Camshaft Position Sensor(s)
Crankshaft Position Sensor(s)
Distributor
Distributor Cap
Distributor Pick Up Coil
Distributor Rotor
Glow Plug(s) (Diesel)
Glow Plug Controller (Diesel)
Glow Plug Relay (Diesel)
Ignition Coil(s)
Ignition Control Module
Ignition Timing Adjustment
Knock Sensor
Spark Plug Wires
Spark Plugs

Catalytic Converter System

Catalytic Converter(s) and Muffler if attached as assembly **

Diesel Particulate Filter assembly (7.8L Isuzu Diesel)

Exhaust Manifold (C/K Trucks < 14,000 GVWR 8.1L)

Exhaust Manifold (7.8L Isuzu Diesel)

Exhaust Manifold with Catalytic Converter if attached as assembly *

Exhaust Manifold Gasket

Exhaust Pipes and/or Mufflers (when located between catalytic converters and exhaust manifold)

Exhaust Pipes and/or Mufflers (when located between catalytic converters and exhaust manifold - 7.8L Isuzu Diesel)

Exhaust Throttle (7.8L Isuzu Diesel)

Positive Crankcase Ventilation (PCV) System

Oil Filler Cap

PCV Filter

PCV Oil Separator

PCV Valve

Exhaust Gas Recirculation (EGR) System

EGR Feed and Delivery Pipes or Cast-in Passages

EGR Valve

EGR Valve Assembly (7.8L Isuzu Diesel)

EGR Valve Cooler (6.6L DURAMAX® Diesel)

EGR Cooler (7.8L Isuzu Diesel)

EGR Vacuum Pump Assembly (6.6L DURAMAX® Diesel)

Secondary Air Injection System

Air Pump

Check Valves

Evaporative Emission Control System (Gasoline Engines)

Canister

Canister Purge Solenoid Valve

Canister Vent Solenoid

Fuel Feed and Return Pipes and Hoses

Fuel Filler Cap

Fuel Level Sensor

Fuel Limiter Vent Valve *

Fuel Tank Filler Pipe (with restrictor)

Fuel Tank(s) *

Fuel Tank Vacuum or Pressure Sensor

Hybrid

Auxiliary Transmission Pump, Relay, and Circuit

Battery Pack Current Sensor and Circuit

Battery Pack 12V Modules (3)

Brake Pedal Switch (PCM ZAB Switch)

Energy Storage Control Module *

IsuzuLAN (CAN) Communications Circuit

Hood Ajar Switch and Circuit

Hybrid Control Module **

SGCM Coolant Circuit (fan and fan relay and pump)

Starter Generator Control Module *

Wheel Speed Sensor and Circuits (left and right front)

Miscellaneous Items Used with Above Components are Covered

Belts

Boots

Clamps

Connectors

Ducts

Fittings

Gaskets

Grommets

Hoses

Housings

Mounting Hardware

Pipes

Pulleys

Sealing Devices

Springs

Tubes

Wiring

Parts specified in your maintenance schedule that require scheduled replacement are covered up to their first replacement interval or the applicable emission warranty coverage period, whichever comes first. If failure of one of these parts results in failure of another part, both will be covered under the Emission Control System Warranty.

For detailed information concerning specific parts covered by these emission control systems warranties, ask your dealer.

Replacement Parts

The emission control systems of your chassis were designed, built, and tested using genuine GM parts* and the chassis is certified as being in conformity with applicable federal and California emission requirements. **Accordingly, it is recommended that any replacement parts used for maintenance or for the repair of emission control systems be new, genuine GM parts.**

The warranty obligations are not dependent upon the use of any particular brand of replacement parts. The owner may elect to use non-genuine GM parts for replacement purposes. Use of replacement parts which are not of equivalent quality may impair the effectiveness of emission control systems.

If other than new, genuine GM parts are used for maintenance replacements or for the repair of parts affecting emission control, the owner should assure himself/herself that such parts are warranted by their manufacturer to be equivalent to genuine GM parts in performance and durability.

* “Genuine GM parts,” when used in connection with GM chassis means parts manufactured by or for GM, designed for use on GM chassis, and distributed by any division or subsidiary of GM.

Maintenance and Repairs

Maintenance and repairs can be performed by any qualified service outlet; however, warranty repairs must be performed by an authorized dealer except in an emergency situation when a warranted part or a warranty station is not reasonably available to the chassis owner.

In an emergency, where an authorized dealer is not reasonably available, repairs can be performed at any available service establishment or by the owner, using any replacement part. GM will consider reimbursement for the expense incurred (including diagnosis), not to exceed the manufacturer's suggested retail price for all warranted parts replaced and labor charges based on GM's recommended time allowance for the warranty repair and the geographically appropriate labor rate. A part not being available within 10 days or a repair not being completed within 30 days constitutes an emergency. Retain receipts and failed parts in order to receive compensation for warranty repairs reimbursable due to an emergency.

If, in an emergency situation, it is necessary to have repairs performed by other than a GM dealer and you believe the repairs are covered by emission warranties, take the replaced parts and your receipt to a GM dealer for reimbursement consideration. This applies to both the Federal Emission Defect Warranty and Federal Emission Performance Warranty.

Receipts and records covering the performance of regular maintenance or emergency repairs should be retained in the event questions arise concerning maintenance. These receipts and records should be transferred to each subsequent owner. GM will not deny warranty coverage solely on the absence of maintenance records. However, GM may deny a warranty claim if a failure to perform scheduled maintenance resulted in the failure of a warranty part.

Claims Procedure

As with the other warranties covered in the separate warranty booklet, take your chassis to any authorized GM dealer facility to obtain service under the emission warranty. This should be done as soon as possible after failing an EPA-approved I/M test or a California smog check test, or at any time you suspect a defect in a part.

Those repairs qualifying under the warranty will be performed by any GM dealer at no charge. Repairs which do not qualify will be charged to you. You will be notified as to whether or not the repair qualifies under the warranty within a reasonable time (not to exceed 30 days after receipt of the chassis by the dealer, or within the time period required by local or state law).

The only exceptions would be if you request or agree to an extension, or if a delay results from events beyond the control of your dealer or GM. If you are not so notified, GM will provide any required repairs at no charge.

In the event a warranty matter is not handled to your satisfaction, refer to the “Customer Satisfaction Procedure” in the warranty booklet under “Owner Assistance”.

For further information or to report violations of the Emission Control System Warranty, contact the EPA at:

Manager, Certification and Compliance
Division (6405J)
Warranty Claims
Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

For a chassis subject to the California Exhaust Emission Standards, contact:

State of California Air Resources Board
Mobile Source Operations Division
P.O. Box 8001
El Monte, CA 91731-2990

How to Use This Manual

Many people read the owner manual from beginning to end when they first receive their new vehicle to learn about the vehicle's features and controls. Pictures and words work together to explain things.

Index

A good place to quickly locate information about the vehicle is 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.

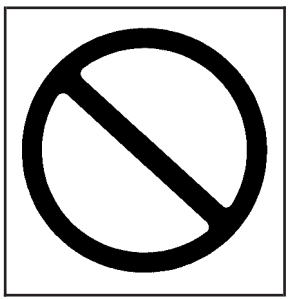
Safety Warnings and Symbols

There are a number of safety cautions in this book. A box with the word CAUTION is used to tell about things that could hurt you or others if you were to ignore the warning.

⚠ CAUTION:

These mean there is something that could hurt you or other people.

We tell you what the hazard is and what to do to help avoid or reduce the hazard. Please read these cautions. If you do not, you or others could be hurt.



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."

Vehicle Damage Warnings

You will also find notices in this manual.

Notice: **These mean there is something that could damage your vehicle.**

A notice tells about something that can damage the vehicle. Many times, this damage would not be covered by your vehicle's warranty, and it could be costly. The notice tells what to do to help avoid the damage.

When you read other manuals, you might see CAUTION and NOTICE warnings in different colors or in different words.

There are also warning labels on the vehicle which use the same words, CAUTION or NOTICE.

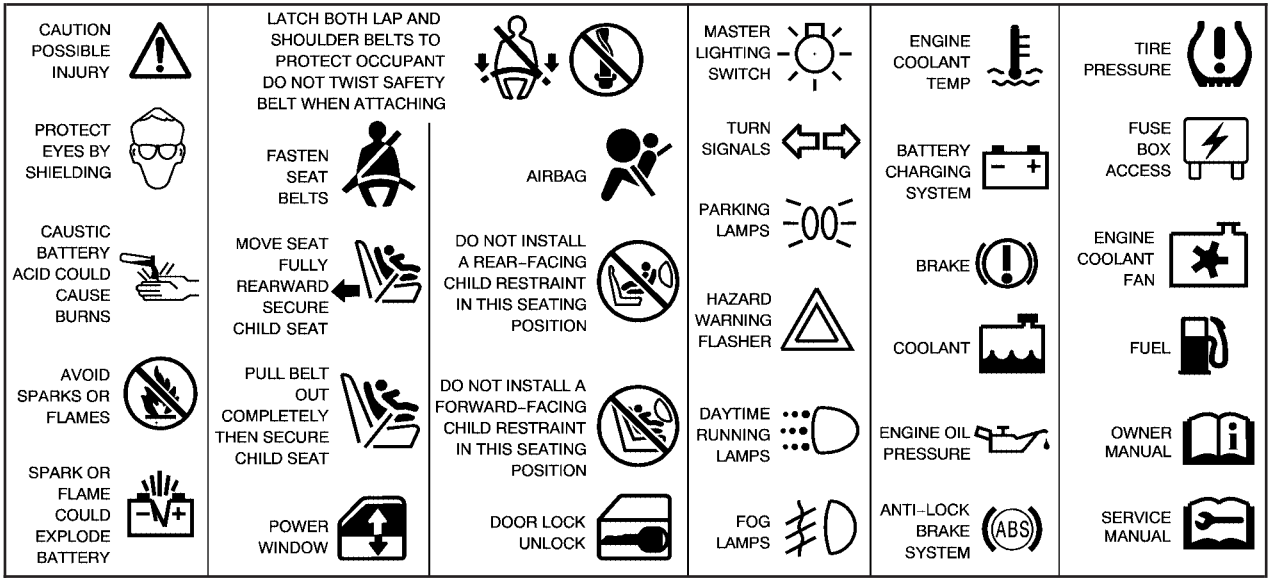
Vehicle Symbols

The vehicle has components and labels that use symbols instead of text. Symbols are shown along with the text describing the operation or information relating to a specific component, control, message, gage, or indicator.

If you need help figuring out a specific name of a component, gage, or indicator, reference the following topics:

- Seats and Restraint Systems in Section 1
- Features and Controls in Section 2
- Instrument Panel Overview in Section 3
- Climate Controls in Section 3
- Warning Lights, Gages, and Indicators in Section 3
- Audio System(s) in Section 3
- Engine Compartment Overview in Section 5

These are some examples of symbols that may be found on the vehicle:



✍ NOTES

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- Manual Lumbar 23
- Reclining Seatbacks 24
- Air Suspension Seats 26
- Center Seat 27

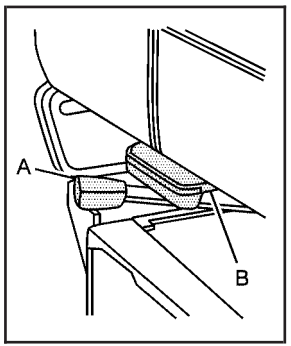
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Front Seats

Manual Seats



Your vehicle has bucket seats. You can adjust the driver's seat with these levers located at the front of the seat.

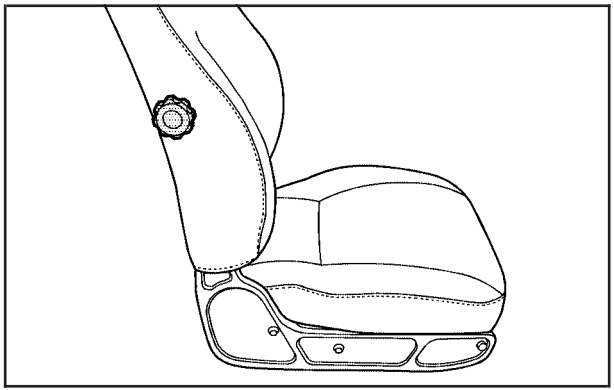
⚠ CAUTION:

You can lose control of the vehicle if you try to adjust a manual driver's seat while the vehicle is moving. The sudden movement could startle and confuse you, or make you push a pedal when you do not want to. Adjust the driver's seat only when the vehicle is not moving.

Slide lever (A) to the left to unlock the seat and slide the seat to where you want it. Release the lever and try to move the seat with your body to make sure the seat is locked into place.

To adjust the lower seat cushion forward or backward, pull up on lever (B) and slide the cushion to where you want it. Then release the lever.

Manual Lumbar

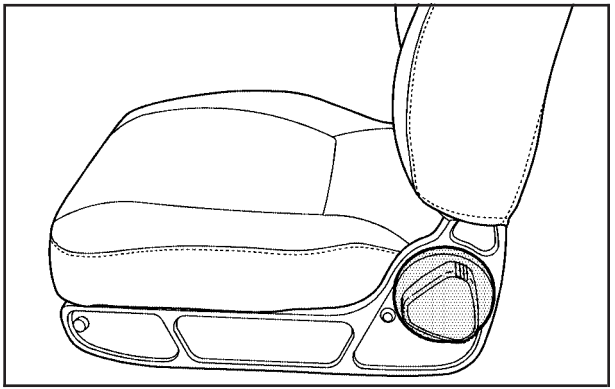


To get more support in the lumbar area of your back, turn the lumbar adjustment knob. The knob is located on the inboard side of the driver's seatback and the outboard side of the passenger's seatback.

Reclining Seatbacks

⚠ CAUTION:

You can lose control of the vehicle if you try to adjust a manual driver's seat while the vehicle is moving. The sudden movement could startle and confuse you, or make you push a pedal when you do not want to. Adjust the driver's seat only when the vehicle is not moving.



To tilt the seatback, turn the reclining knob. The knob is located on the outboard side of both seats.



⚠ CAUTION:

Sitting in a reclined position when your vehicle is in motion can be dangerous. Even if you buckle up, your safety belts cannot do their job when you are reclined like this.

The shoulder belt cannot do its job. In a crash, you could go into it, receiving neck or other injuries.

The lap belt cannot do its job either. In a crash the belt could go up over your abdomen. The belt forces would be there, not at your pelvic bones. This could cause serious internal injuries.

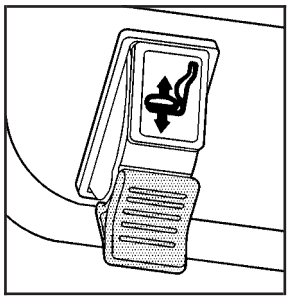
For proper protection when the vehicle is in motion, have the seatback upright. Then sit well back in the seat and wear your safety belt properly.

Do not have a seatback reclined if the vehicle is moving.

Air Suspension Seats

Your vehicle may have an air suspension seat. There are two ways you can adjust the seat.

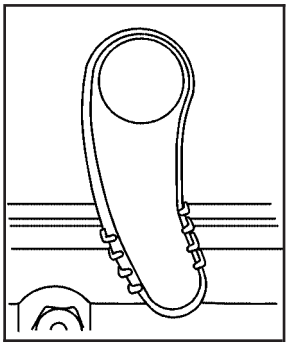
Height Adjustment



The height adjustment is controlled by the air suspension valve. The lever for the valve is located on the outboard side of the driver's seat.

Pull the lever up to raise the seat. Push the lever down to lower the seat.

Isolator Lock Lever



The lever is located on the inboard side of the driver's seat.

Lever shown in the Locked Position

Move the handle down to lock the seat in place. This is used to reduce backslap experienced while in tractor/trailer operation or while operating a dump truck.

Center Seat

Your vehicle may have a center seat.

To fold the seatback down, pull the lever, located on the right side of the seat.

Then lower the seatback forward and push down firmly to lock in position. A storage compartment is located on the rear of the seatback for use when the seatback is in the fully lowered position.

Push the lever on the right side of the seat and pull on the seatback when you are ready to raise it.

⚠ CAUTION:

If the seatback is not locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always push and pull on the seatback to be sure it is locked.

Safety Belts

Safety Belts: They Are for Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

⚠ CAUTION:

Do not let anyone ride where he or she cannot wear a safety belt properly. If you are in a crash and you are not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be, if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.

⚠ CAUTION:

It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed. Do not allow people to ride in any area of your vehicle that is not equipped with seats and safety belts. Be sure everyone in your vehicle is in a seat and using a safety belt properly.



Your vehicle has a light that comes on as a reminder to buckle up. See *Safety Belt Reminder Light on page 121*.

In most states and in all Canadian provinces, the law says to wear safety belts. Here is why: *They work*.

You never know if you will be in a crash. If you do have a crash, you do not know if it will be a bad one.

A few crashes are mild, and some crashes can be so serious that even buckled up, a person would not survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

After more than 40 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter... a lot!

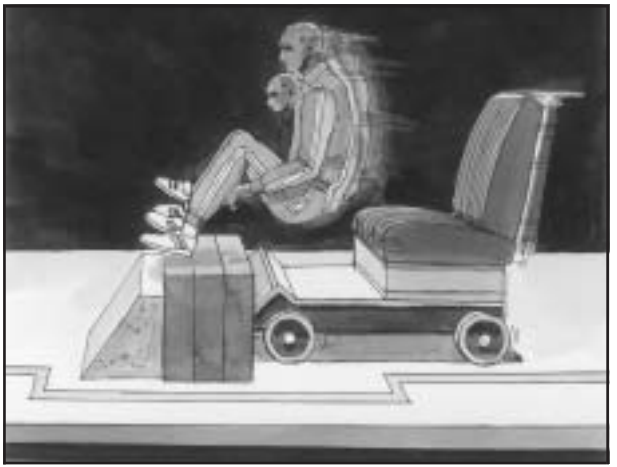
Why Safety Belts Work

Q: Aren't safety belts for kids?

A: Yes. And they are for adult truckers, and anyone else who rides in your vehicle.



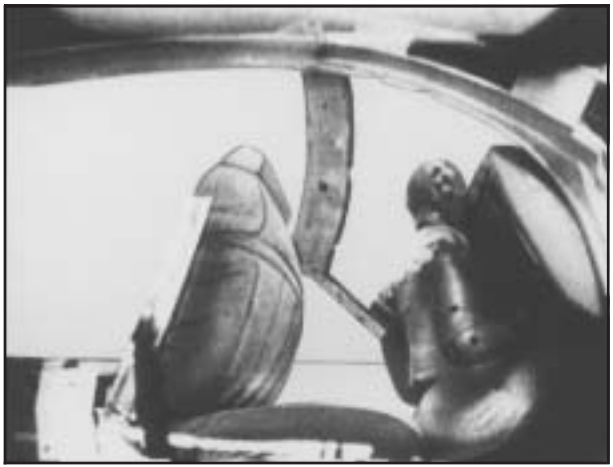
Here is why: when your vehicle goes, say, 30 mph (50 km/h), so do you and your passengers.



If the vehicle hits something, it stops – right then. But nothing stops the people. They keep moving.



Then something will stop them. It could be the windshield.



Or it could be the instrument panel.

Now, what if you and your passengers were to give that big vehicle a chance to deal with the force of the impact, instead of you?



With safety belts, you slow down as the vehicle does. You get more time to stop.

You stop over more distance, and your strongest bones take the forces. Safety belts are for everyone.

Questions and Answers About Safety Belts

Q: Will I be trapped in the vehicle after an accident if I am wearing a safety belt?

A: You *could* be — whether you are wearing a safety belt or not. But you can unbuckle a safety belt, even if you are upside down. And your chance of being conscious during and after an accident, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: If I am a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you are in an accident — even one that is not your fault — you and your passengers can be hurt. Being a good driver does not protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

How to Wear Safety Belts Properly

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your vehicle, see *Older Children on page 43* or *Infants and Young Children on page 46*. Follow those rules for everyone's protection.

First, you will want to know which restraint systems your vehicle has.

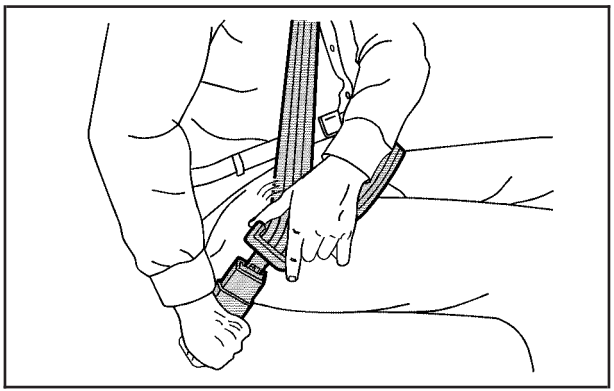
We will start with the driver position.

Driver Position

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here is how to wear it properly.

1. Close and lock the door.
2. Adjust the seat so you can sit up straight. To see how, see “Seats” in the Index.



3. Pick up the latch plate and pull the belt across you. Do not let it get twisted.

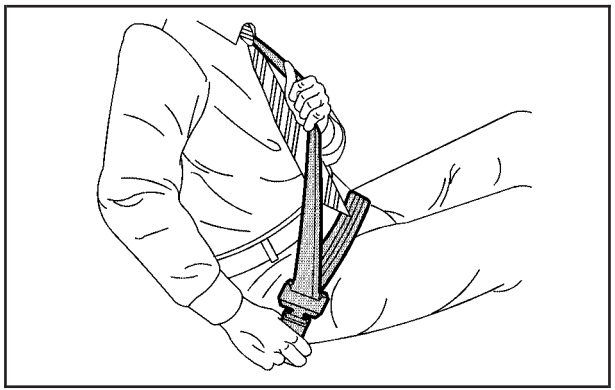
   The lap-shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly. There is a clip on the lap portion of the lap-shoulder belt. Make sure this clip is not too close to the latch plate when you wear your safety belt, so you can make the belt snug.

4. Push the latch plate into the buckle until it clicks.

   Pull up on the latch plate to make sure it is secure. If the belt is not long enough, see *Safety Belt Extender on page 43*.

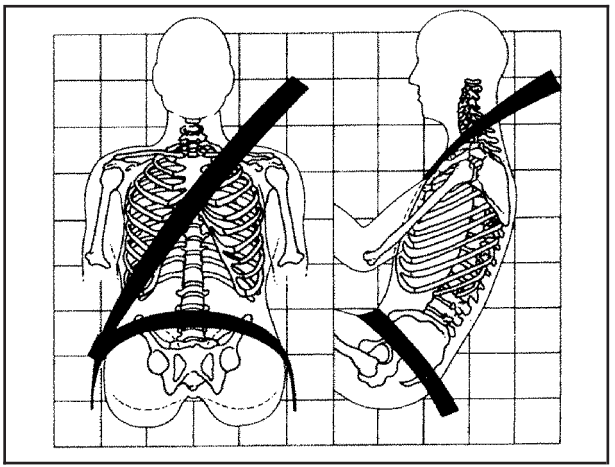
   Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

5. Move the shoulder belt height adjuster to the height that is right for you. Improper shoulder belt height adjustment could reduce the effectiveness of the safety belt in a crash. See *Shoulder Belt Height Adjustment on page 40*.



6. To make the lap part tight, pull up on the shoulder belt.

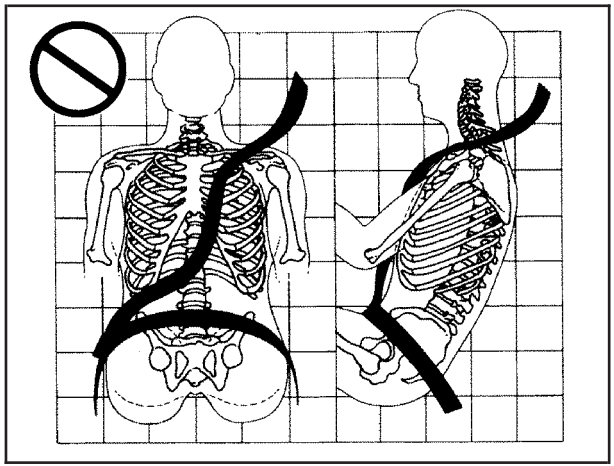
   It may be necessary to pull stitching on the safety belt through the latch plate to fully tighten the lap belt on smaller occupants.



The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you would be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there is a sudden stop or crash.

Q: What is wrong with this?

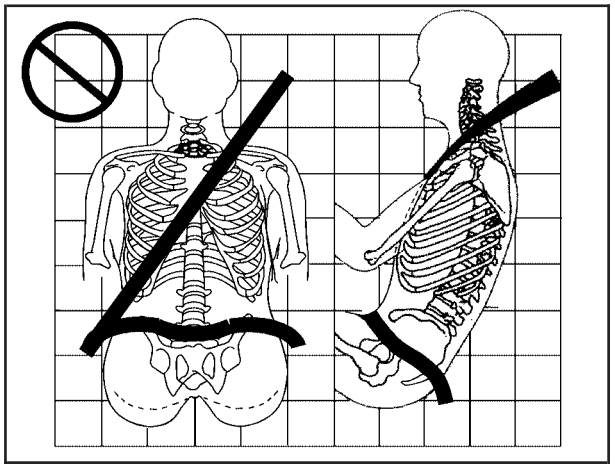


A: The shoulder belt is too loose. It will not give nearly as much protection this way.

⚠ CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

Q: What is wrong with this?

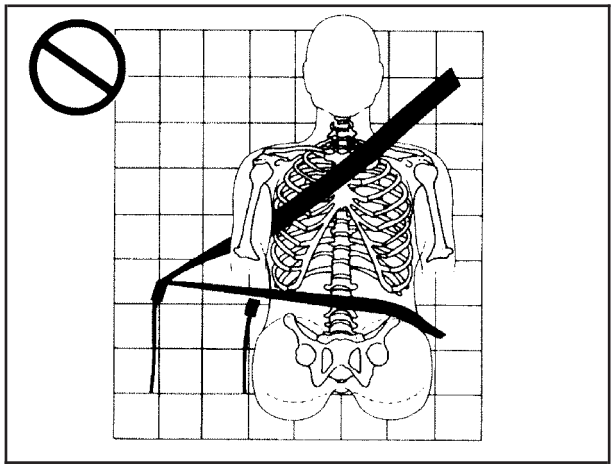


A: The lap belt is too loose. It will not give nearly as much protection this way.

⚠ CAUTION:

You can be seriously hurt if your lap belt is too loose. In a crash, you could slide under the lap belt and apply force at your abdomen. This could cause serious or even fatal injuries. The lap belt should be worn low and snug on the hips, just touching the thighs.

Q: What is wrong with this?

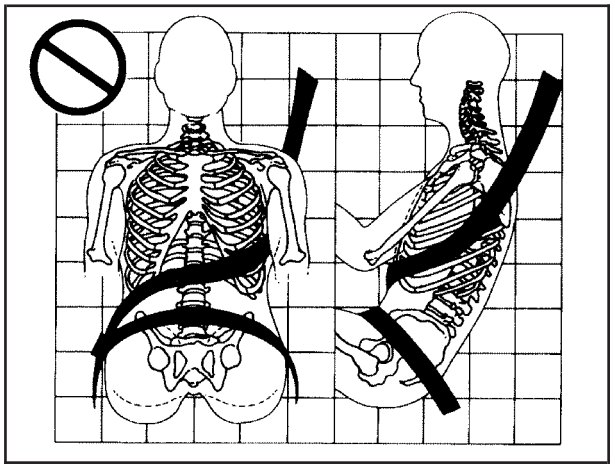


A: The belt is buckled in the wrong place.

⚠ CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

Q: What is wrong with this?

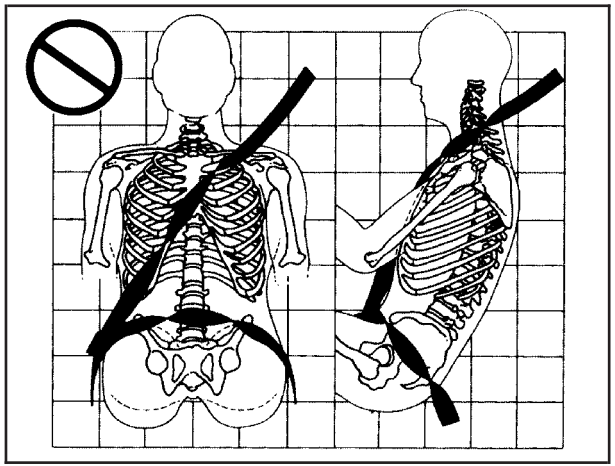


A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

⚠ CAUTION:

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which are not as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

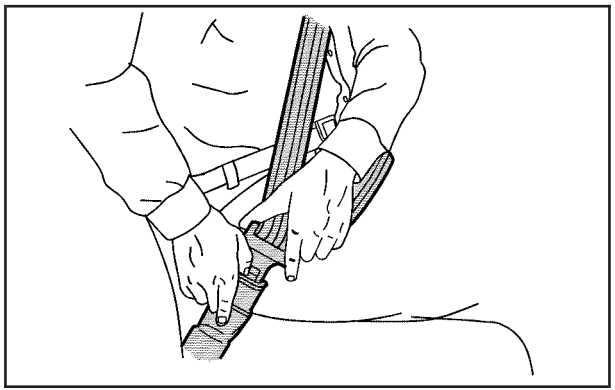
Q: What is wrong with this?



A: The belt is twisted across the body.

⚠ CAUTION:

You can be seriously injured by a twisted belt. In a crash, you would not have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer/retailer to fix it.



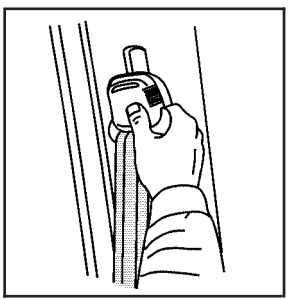
To unlatch the belt, push the button on the buckle. The belt should go back out of the way.

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Shoulder Belt Height Adjustment

Before you begin to drive, move the shoulder belt height adjuster to the height that is right for you.

Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder. Improper shoulder belt height adjustment could reduce the effectiveness of the safety belt in a crash.

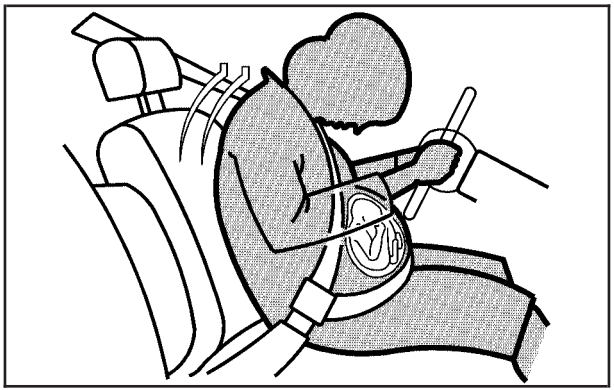


To move it down, press in at the top of the arrows and move the height adjuster to the desired position. You can move the height adjuster up just by pushing up on the shoulder belt guide.

After you move the height adjuster to where you want it, try to move it down without pressing in to make sure it has locked into position.

Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they do not wear safety belts.



A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it is more likely that the fetus will not be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

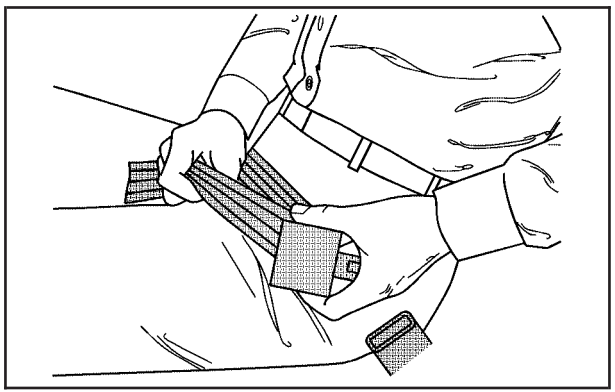
Right Passenger Position

The right passenger's safety belt works the same way as the driver's safety belt. See *Driver Position on page 33*.

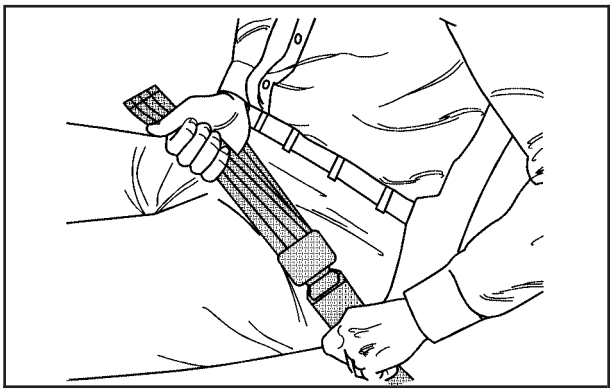
Center Passenger Position

Lap Belt

If your vehicle has a center seat, someone can sit in the center position.



When you sit in a center seating position, you have a lap safety belt, which has no retractor. To make the belt longer, tilt the latch plate and pull it along the belt.



To make the belt shorter, pull its free end as shown until the belt is snug.

Buckle, position and release it the same way as the lap part of a lap-shoulder belt. If the belt is not long enough, see *Safety Belt Extender on page 43*.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

Safety Belt Extender

If the vehicle's safety belt will fasten around you, you should use it.

But if a safety belt is not long enough, your dealer/retailer will 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. To help avoid personal injury, do not let someone else use it, and use it only for the seat it is made to fit. The extender has been designed for adults. Never use it for securing child seats. To wear it, attach it to the regular safety belt. For more information, see the instruction sheet that comes with the extender.

Child Restraints

Older Children



Older children who have outgrown booster seats should wear the vehicle's safety belts.

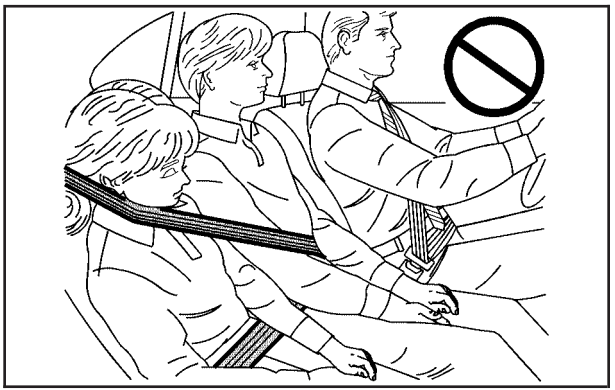
If you have the choice, a child should sit next to a window so the child can wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide.

Q: What is the proper way to wear safety belts?

A: If possible, an older child should wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide. The shoulder belt should not cross the face or neck. The lap belt should fit snugly below the hips, just touching the top of the thighs. It should never be worn over the abdomen, which could cause severe or even fatal internal injuries in a crash.

According to accident statistics, children are safer when properly restrained in the rear seating positions than in the front seating positions.

In a crash, children who are not buckled up can strike other people who are buckled up, or can be thrown out of the vehicle. Older children need to use safety belts properly.



⚠ CAUTION:

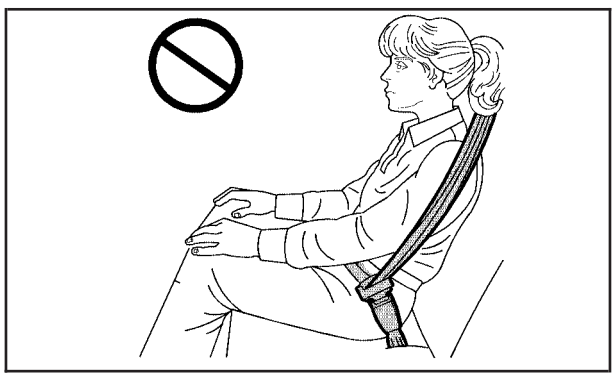
Never do this.

Here two children are wearing the same belt. The belt cannot properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

Q: What if a child is wearing a lap-shoulder belt, but the child is so small that the shoulder belt is very close to the child's face or neck?

A: Move the child toward the center of the vehicle, but be sure that the shoulder belt still is on the child's shoulder, so that in a crash the child's upper body would have the restraint that belts provide.

If the child is so small that the shoulder belt is still very close to the child's face or neck, you might want to place the child in a seat that has a lap belt, if your vehicle has one.



⚠ CAUTION:

Never do this.

Here a child is sitting in a seat that has a lap-shoulder belt, but the shoulder part is behind the child. If the child wears the belt in this way, in a crash the child might slide under the belt. The belt's force would then be applied right on the child's abdomen. That could cause serious or fatal injuries.

Wherever the child sits, the lap portion of the belt should be worn low and snug on the hips, just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

Infants and Young Children

Everyone in a vehicle needs protection! This includes infants and all other children. Neither the distance traveled nor the age and size of the traveler changes the need, for everyone, to use safety restraints. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

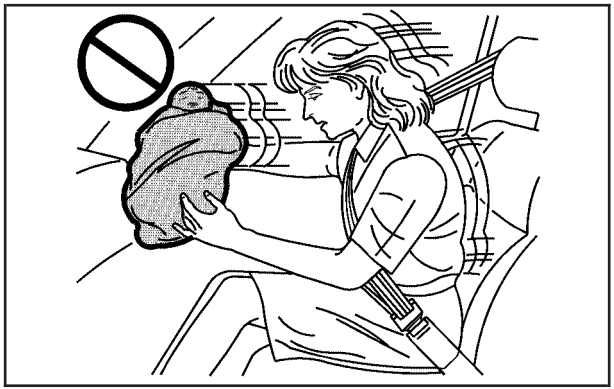
⚠ CAUTION:

Children can be seriously injured or strangled if a shoulder belt is wrapped around their neck and the safety belt continues to tighten. Never leave children unattended in a vehicle and never allow children to play with the safety belts.

Every time infants and young children ride in vehicles, they should have the protection provided by appropriate restraints. Young children should not use the vehicle's adult safety belts alone, unless there is no other choice. Instead, they need to use a child restraint.

⚠ CAUTION:

People should never hold a baby in their arms while riding in a vehicle. A baby does not weigh much — until a crash. During a crash a baby will become so heavy it is not possible to hold it. For example, in a crash at only 25 mph (40 km/h), a 12 lb (5.5 kg) baby will suddenly become a 240 lb (110 kg) force on a person's arms. A baby should be secured in an appropriate restraint.



Q: What are the different types of add-on child restraints?

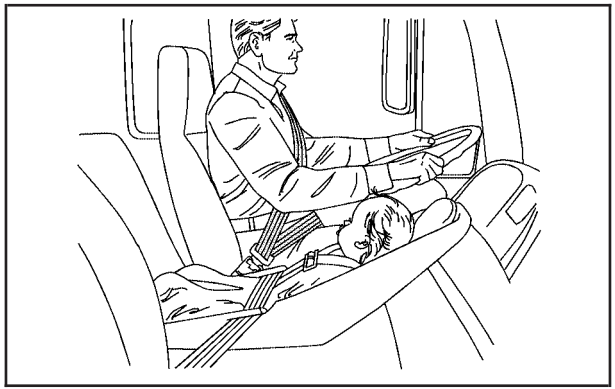
A: Add-on child restraints, which are purchased by the vehicle's owner, are available in four basic types. Selection of a particular restraint should take into consideration not only the child's weight, height, and age but also whether or not the restraint will be compatible with the motor vehicle in which it will be used.

For most basic types of child restraints, there are many different models available. When purchasing a child restraint, be sure it is designed to be used in a motor vehicle. If it is, the restraint will have a label saying that it meets federal motor vehicle safety standards.

The restraint manufacturer's instructions that come with the restraint state the weight and height limitations for a particular child restraint. In addition, there are many kinds of restraints available for children with special needs.

⚠ CAUTION:

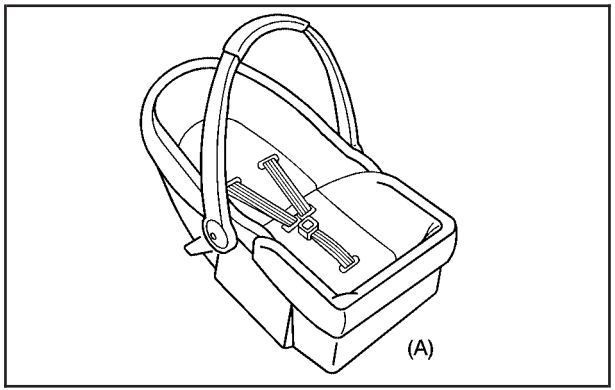
Newborn infants need complete support, including support for the head and neck. This is necessary because a newborn infant's neck is weak and its head weighs so much compared with the rest of its body. In a crash, an infant in a rear-facing seat settles into the restraint, so the crash forces can be distributed across the strongest part of an infant's body, the back and shoulders. Infants always should be secured in appropriate infant restraints.



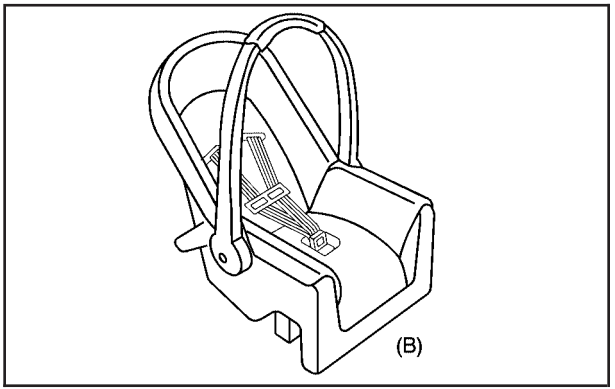
⚠ CAUTION:

The body structure of a young child is quite unlike that of an adult or older child, for whom the safety belts are designed. A young child's hip bones are still so small that the vehicle's regular safety belt may not remain low on the hip bones, as it should. Instead, it may settle up around the child's abdomen. In a crash, the belt would apply force on a body area that is unprotected by any bony structure. This alone could cause serious or fatal injuries. Young children always should be secured in appropriate child restraints.

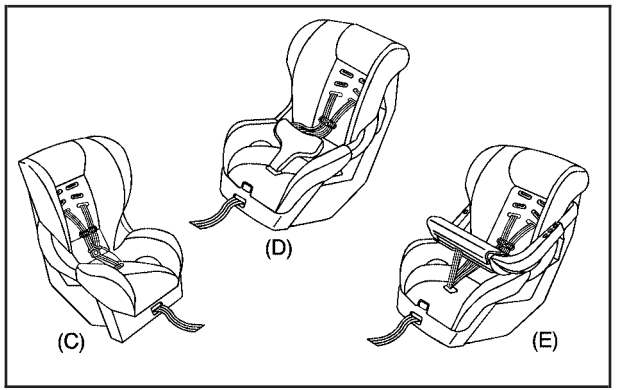
Child Restraint Systems



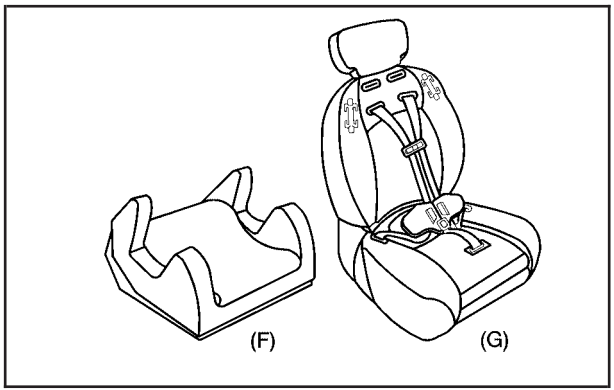
An infant car bed (A), a special bed made for use in a motor vehicle, is an infant restraint system designed to restrain or position a child on a continuous flat surface. Make sure that the infant's head rests toward the center of the vehicle.



A rear-facing infant seat (B) provides restraint with the seating surface against the back of the infant. The harness system holds the infant in place and, in a crash, acts to keep the infant positioned in the restraint.



A forward-facing child seat (C-E) provides restraint for the child's body with the harness and also sometimes with surfaces such as T-shaped or shelf-like shields.



A booster seat (F-G) is a child restraint designed to improve the fit of the vehicle's safety belt system. Some booster seats have a shoulder belt positioner, and some high-back booster seats have a five-point harness. A booster seat can also help a child to see out the window.

Q: How Should I Use a Child Restraint?

A: A child restraint system is any device designed for use in a motor vehicle to restrain, seat, or position children. A built-in child restraint system is a permanent part of the motor vehicle. An add-on child restraint system is a portable one, which is purchased by the vehicle's owner. To help reduce injuries, an add-on child restraint must be secured in the vehicle. With built-in or add-on child restraints, the child has to be secured within the child restraint.

When choosing an add-on child restraint, be sure the child restraint is designed to be used in a vehicle. If it is, it will have a label saying that it meets federal motor vehicle safety standards. Then follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both.

Securing an Add-on Child Restraint in the Vehicle

⚠ CAUTION:

A child can be seriously injured or killed in a crash if the child restraint is not properly secured in the vehicle. Make sure the child restraint is properly installed in the vehicle using the vehicle's safety belt, following the instructions that came with that restraint, and also the instructions in this manual.

To help reduce the chance of injury, the child restraint must be secured in the vehicle. Child restraint systems must be secured in vehicle seats by lap belts or the lap belt portion of a lap-shoulder belt. A child can be endangered in a crash if the child restraint is not properly secured in the vehicle.

When securing an add-on child restraint, refer to the instructions that come with the restraint which may be on the restraint itself or in a booklet, or both, and to this manual. The child restraint instructions are important, so if they are not available, obtain a replacement copy from the manufacturer.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle — even when no child is in it.

Securing the Child Within the Child Restraint

There are several systems for securing the child within the child restraint. One system, the three-point harness, has straps that come down over each of the infant's shoulders and buckle together at the crotch. The five-point harness system has two shoulder straps, two hip straps, and a crotch strap. A shield may take the place of hip straps. A T-shaped shield has shoulder straps that are attached to a flat pad which rests low against the child's body. A shelf- or armrest-type shield has straps that are attached to a wide, shelf-like shield that swings up or to the side.

⚠ CAUTION:

A child can be seriously injured or killed in a crash if the child is not properly secured in the child restraint. Make sure the child is properly secured, following the instructions that came with that restraint.

Because there are different systems, it is important to refer to the instructions that come with the restraint. A child can be endangered in a crash if the child is not properly secured in the child restraint.

Lower Anchors and Tethers for Children (LATCH)

Some child restraints have a LATCH system. As part of the LATCH system, your child restraint may have lower attachments and/or a top tether. The LATCH system can help hold the child restraint in place during driving or in a crash. Some vehicles have lower and/or top tether anchors designed to secure a child restraint with lower attachments and/or a top tether.

Some child restraints with a top tether are designed to be used whether the top tether is anchored or not. Other child restraints require that the top tether be anchored. A national or local law may require that the top tether be anchored.

In Canada, the law requires that forward-facing child restraints have a top tether, and that the tether be attached.

Your vehicle does not have lower anchors or top tether anchors to secure a child restraint with the LATCH system. If a national or local law requires that your top tether be anchored, do not use a child restraint in this vehicle because a top tether cannot be properly anchored. You must use the safety belts to secure your child restraint in this vehicle, unless a national or local law requires that the top tether be anchored. Refer to your child restraint instructions and instructions in this manual for securing a child restraint using the vehicle's safety belts.

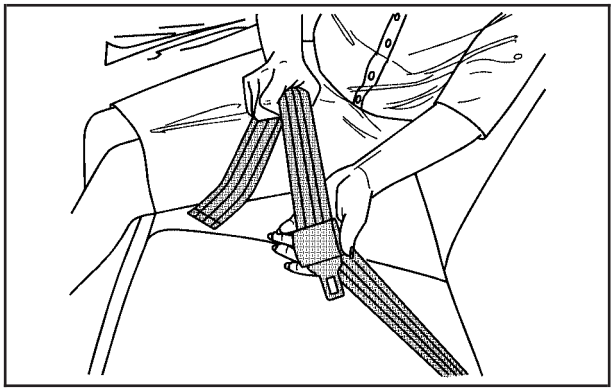
Securing a Child Restraint in Your Medium Duty Vehicle

We know securing a child can present real problems in a medium-duty vehicle like yours. The only place where you can properly secure a child restraint is the center seating position, the place that has the lap belt only. But your vehicle may not have a center seating position. Or, even if you have one, you may find that the child restraint keeps you from operating the shift lever or other controls. The only answer may be to have the smaller children make the trip in another vehicle, where they can get to protection they need.

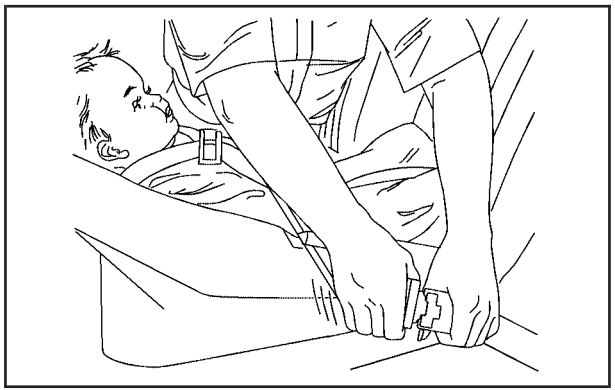
If your vehicle has a center seat, you can secure a child restraint here.

You will be using the lap belt. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say. But do not use this position if the child restraint interferes with shifting gears.

There are no top tether anchors in this vehicle. Do not secure a child seat in this vehicle if a national or local law requires that the top tether be anchored, or if the instructions that come with the restraint say that the top tether must be anchored. See *Lower Anchors and Tethers for Children (LATCH) on page 54* if the child restraint has one.



1. Make the belt as long as possible by tilting the latch plate and pulling it along the belt.
2. Put the child restraint on the seat.
3. Run the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.



4. Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.
5. To tighten the belt, pull its free end while you push down on the child restraint. If you are using a forward-facing child restraint, you may find it helpful to use your knee to push down on the child restraint as you tighten the belt.
6. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt. It will be ready to work for an adult or larger child passenger.

Restraint System Check

Checking the Restraint Systems

Now and then, make sure the safety belt reminder light and all your belts, buckles, latch plates, retractors, and anchorages are working properly. Look for any other loose or damaged safety belt system parts. If you see anything that might keep a safety belt system from doing its job, have it repaired. See *Care of Safety Belts on page 270* for more information.

Torn or frayed safety belts may not protect you in a crash. They can rip apart under impact forces. If a belt is torn or frayed, get a new one right away.

Replacing Restraint System Parts After a Crash

⚠ CAUTION:

A crash can damage the restraint systems in your vehicle. A damaged restraint system may not properly protect the person using it, resulting in serious injury or even death in a crash. To help make sure your restraint systems are working properly after a crash, have them inspected and any necessary replacements made as soon as possible.

If you have had a crash, do you need new belts?

After a very minor collision, nothing may be necessary. But if the belts were stretched, as they would be if worn during a more severe crash, then you need new parts.

If belts are cut or damaged, replace them. Collision damage also may mean you will need to have safety belt or seat parts repaired or replaced. New parts and repairs may be necessary even if the belt was not being used at the time of the collision.

✍ NOTES

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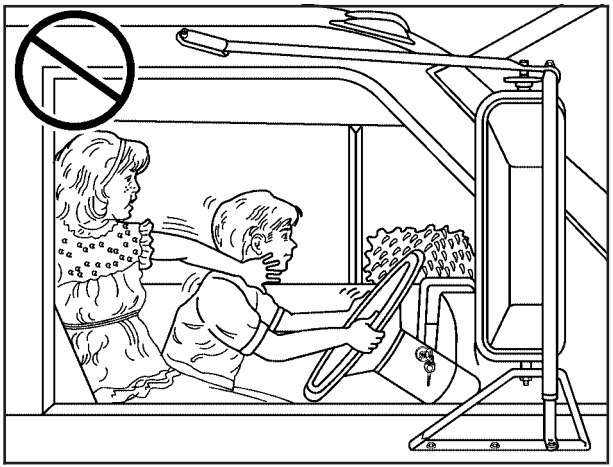
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Keys

⚠ CAUTION:

Leaving children in a vehicle with the ignition key is dangerous for many reasons, children or others could be badly injured or even killed. They could operate the power windows or other controls or even make the vehicle move. The windows will function with the keys in the ignition and they could be seriously injured or killed if caught in the path of a closing window. Do not leave the keys in a vehicle with children.



The key can be used for the ignition switch and all locks.

The key has a code on it that tells your dealer/retailer or a qualified locksmith how to make extra keys. Record and keep the key code in a safe place. If the key is lost, you can have a new one made using this code.

Notice: **If you ever lock your keys in your vehicle, you may have to damage the vehicle to get in. Be sure you have spare keys.**

Doors and Locks

Door Locks

⚠ CAUTION:

Unlocked doors can be dangerous.

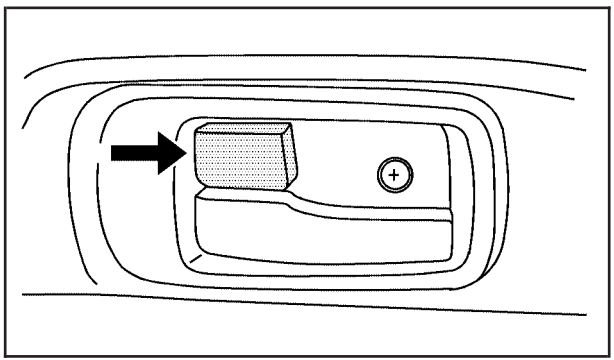
- **Passengers, especially children, can easily open the doors and fall out of a moving vehicle. When a door is locked, the handle will not open it. You increase the chance of being thrown out of the vehicle in a crash if the doors are not locked. So, wear safety belts properly and lock the doors whenever you drive.**
- **Young children who get into unlocked vehicles may be unable to get out. A child can be overcome by extreme heat and can suffer permanent injuries or even death from heat stroke. Always lock your vehicle whenever you leave it.**

CAUTION: (Continued)

CAUTION: (Continued)

- **Outsiders can easily enter through an unlocked door when you slow down or stop your vehicle. Locking your doors can help prevent this from happening.**

A manual door lock is located above each door handle.



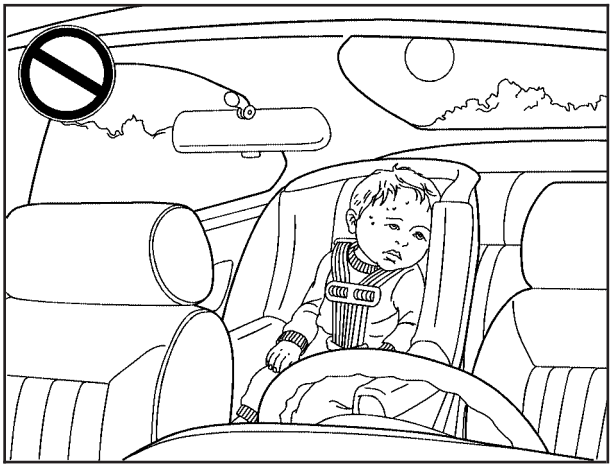
To lock your door from the inside, push the manual lock in. To unlock the door, pull the manual lock out.

When the doors are locked, they can't be opened using the inside handles until the manual lock is pulled out.

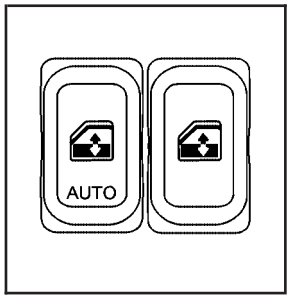
Windows

⚠ CAUTION:

Leaving children, helpless adults, or pets in a vehicle with the windows closed is dangerous. They can be overcome by the extreme heat and suffer permanent injuries or even death from heat stroke. Never leave a child, a helpless adult, or a pet alone in a vehicle, especially with the windows closed in warm or hot weather.



Power Windows



If your vehicle has power windows, the switches for both windows are located on the driver's door. In addition, the passenger door has a switch for its own window.

Press the rearward part of the switch to lower the window. Press the forward part of the switch to raise the window.

The power windows will operate when the ignition is in ACC or ON.

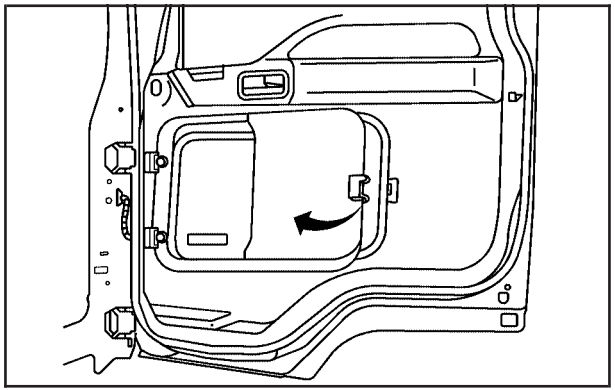
Power Window Lock Switch

Pressing the power window lock switch once locks the passenger side window and prevents it from opening or closing. Pressing the switch a second time unlocks the passenger side window.

Express-Down

The driver's window has an express-down feature. This allows the window to be lowered fully without continuously holding the switch. Press the switch down fully to initiate the express-down feature. Press the top of the switch to stop the window from lowering.

Passenger Side Door Glass



If your vehicle has this feature, the cover on the passenger's side lower window will open so that the glass can be cleaned.

⚠ CAUTION:

Never open the passenger side door glass with the ignition on. You can be injured if the window linkage moves. Open this glass only with the ignition off.

To open the window cover, pull on the latch at the rear of the window and swing the window cover open. When closing the window cover, push firmly at the latch to close completely.

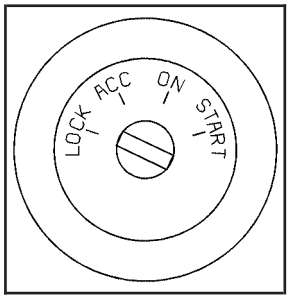
Starting and Operating Your Vehicle

New Vehicle Break-In

Notice: **Your vehicle does not need an elaborate break-in. But it will perform better in the long run if you follow these guidelines:**

- **Let the engine warm up before you operate your vehicle under load.**
- **Keep your speed at 55 mph (88 km/h) or less for the first 500 miles (805 km).**
- **Do not drive at any one speed, fast or slow, for the first 500 miles (805 km). Do not make full-throttle starts.**
- **Avoid making hard stops for the first 200 miles (322 km) or so. During this time the new brake linings are not yet broken in. Hard stops with new linings can mean premature wear and earlier replacement. Follow this breaking-in guideline every time you get new brake linings.**
- **Use the lowest gear you can when you start a loaded vehicle in motion and when going up hills to avoid overloading the engine.**
- **Check and adjust engine and transmission fluid levels often and be sure tires are properly inflated for the load you are carrying.**
- **When new, parking brake linings have not yet been broken in. When linings are new, it is possible that the vehicle could move while the parking brake is applied. Before using the parking brake on grades, follow the parking brake burnish procedure. See *Parking Brake Burnish Procedure on page 85*.**

Ignition Positions



Use your ignition key to start your vehicle. You can turn the ignition switch to four different positions.

LOCK: This position allows you to insert and remove the ignition key.

ACC (Accessory): This position lets you use accessories when the engine is off.

ON: This is the position for driving.

The battery could be drained if you leave the key in the ACC or On position with the engine off. You may not be able to start your vehicle if the battery is allowed to drain for an extended period of time.

START: This position starts your engine.

Key In the Ignition

Never leave your vehicle with the keys inside, as it is an easy target for joy riders or thieves. If you leave the key in the ignition and park your vehicle, a chime will sound, when you open the driver's door. Always remember to remove your key from the ignition and take it with you. This will lock your ignition and transaxle. Also, always remember to lock the doors.

The battery could be drained if you leave the key in the ignition while your vehicle is parked. You may not be able to start your vehicle after it has been parked for an extended period of time.

Starting the Diesel Engine

Automatic Transmission

Move the shift lever to PARK (P) or NEUTRAL (N). The engine will not start in any other position – that is a safety feature. To restart when the vehicle is already moving, use NEUTRAL (N) only.

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

Manual Transmission

Move the shift lever to NEUTRAL (N) and hold the clutch pedal to the floor while starting the engine. Your vehicle will not start if the clutch pedal is not all the way down – that is a safety feature.

Starting Procedure

1. Turn your ignition key to ON.
   Observe the wait to start light. See *Wait to Start Indicator on page 129*.
   This light may not come on if the engine is hot.
2. As soon as the wait to start light goes off, immediately turn the ignition key to START. When the engine starts, let go of the key.

Notice: **Holding your key in START for longer than 15 seconds at a time will cause your battery to be drained much sooner. And the excessive heat can damage your starter motor.**

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

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

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

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

Cold Weather Starting

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

Use the recommended engine oil when the outside temperature drops below freezing. See *Engine Oil on page 206*. When the outside temperature drops below 0°F (–18°C), use of the engine coolant heater is recommended.

See *Engine Coolant Heater on page 73* for more information.

See *What Fuel to Use on page 195* for information on what fuel to use in cold weather.

If Your Engine Will Not Start

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

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

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

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

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

If your batteries do not have enough charge to start your engine, see *Battery on page 235* for more information.

Be sure you have the right oil for your engine, and that you have changed the oil at the proper times. If you use the wrong oil, your engine may be harder to start. See *Engine Oil on page 206* for more information.

Be sure you are using the proper fuel for existing weather conditions. See *What Fuel to Use on page 195* What Fuel to Use.

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

⚠ CAUTION:

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

Engine Alarm and Automatic Shutdown

For vehicle with this feature, the check gages light will come on if the system senses high engine temperature, and a low or high engine oil pressure. See *Check Gages Warning Light on page 134* for more information. If a high engine temperature is detected, or if a low or high engine oil pressure is detected, a tone alarm sounds. The alarm and the light remains on until the condition is fixed. If the engine temperature or oil pressure condition worsens, the tone alarm increases in frequency.

If the system senses there is low engine coolant, the alarm and the low coolant warning light comes on.

See *Low Coolant Warning Light on page 129* for more information.

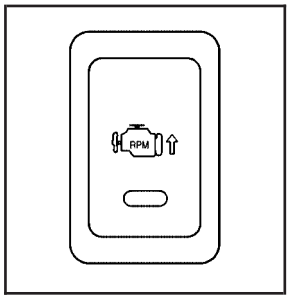
The alarm means that your engine will shut down. See *Engine Shutdown Warning Light on page 132* for more information.

Pull off the road and shut off the engine. Do not start it until the vehicle is repaired. If the engine shuts down while you are still in traffic, the engine can be restarted for another 25-30 seconds of operation. The engine will not shut down until the vehicle speed is less than 5 mph (8 km/h).

Notice: **If you try to operate the vehicle after the engine automatically shuts down, you may damage the vehicle. Have your vehicle repaired as soon as possible.**

High Idle System

Manual High Idle System



If your vehicle has this feature, the manual high idle button is located in the instrument panel. See *Instrument Panel Overview on page 100* Instrument Panel Overview for more information.

This system can be used to increase your engine idle speed whenever the following conditions are met:

- The brake pedal is not pressed.
- The vehicle is at a complete stop.
- The manual transmission clutch pedal is not pressed or, the automatic transmission is in NEUTRAL (N) or PARK (P).

The manual high idle feature is activated by pressing the button on the instrument panel. When the button is pressed again, or any of the previous conditions are not met, manual high idle will be deactivated.

Exhaust Restrictor

If your vehicle is equipped with this feature, there is an exhaust restrictor valve located in the exhaust stream. The valve closes to provide back pressure to the engine for the purpose of warming the engine quickly.

The exhaust restrictor operates:

- while the engine is running.
- while the vehicle is not moving.
- while the accelerator, brake and clutch pedals are not pressed on a manual transmission vehicle.
- while idling in cold temperatures.
- when the shift lever is in NEUTRAL (N) or PARK (P) on an automatic transmission vehicle.

On vehicles equipped with a diesel engine exhaust brake, the exhaust brake switch must be on. See *Diesel Engine Exhaust Brake on page 74* for more information. The indicator in the exhaust brake switch will be lit when the exhaust restrictor is active. The exhaust brake indicator light in the center of the instrument panel will also be lit whenever the exhaust restrictor is active. See *Exhaust Brake Indicator Light on page 133* for more information.

When the engine coolant temperature is below 149°F (65°C) and the outside temperature is below 50°F (10°C), the exhaust restrictor will come on within 60 seconds of starting the engine. After running the engine for an additional 10 seconds, the engine idle will increase.

The exhaust restrictor will shut off and engine idle will return to normal once the engine is warmed up, or the brake pedal is pressed.

Engine Checks Before Operating

When you have started your engine, let it run for 20 to 30 seconds before you put a load on the engine. But do not leave the vehicle while the engine is running.

Avoid unnecessary idling of diesel engine equipped vehicles.

If the engine idles too long, the temperature of the engine coolant will fall below the normal operating range. Low engine operating temperature causes several conditions which affect engine operation and reduce engine life.

The engine should be permitted to go through a warm-up period. Operate the vehicle at a minimum of 600 rpm during the warm-up period. During this period and during operation, the following observations should be made.

During this warm-up period, check your warning lights and gages:

- If oil pressure does not begin to rise within 15 seconds of starting, stop the engine and find the cause. See *Oil Pressure Gage on page 130* for more information.
- If the engine coolant temperature gage needle goes into the hot area on the gage, stop the engine and find the cause of the overheating. See *Engine Coolant Temperature Gage on page 128* for more information.
- If you have air brakes, the dual-needle air pressure gage should read at least 115 psi (790 kPa) for both service systems before you try to move the vehicle. When air pressure is below 60 psi (420 kPa), the LOW AIR light will come on and you will hear a tone alarm. See *Brake System Warning Light on page 124* for more information. If the pressure does not build up or drops during warm-up, stop the engine and find the cause before you try to move the vehicle. Recommended air pressure before driving is 120 psi (830 kPa). See *Air Pressure Gage on page 136* for more information.
- The charging system light should come on when the ignition key is turned to ON or START and should go out when the engine is running above idle. If the light does not go out or comes back on during normal engine operation, have the charging system checked right away. (This light tells you if the generator is not charging; it does not reflect the condition of the battery.) See *Charging System Light on page 122* for more information.
- The voltmeter charge indicator gage tells you the condition of your battery's charge. The gage should be in the center area during engine operation. The red area on the left indicates an undercharge condition; the red area on the right indicates an overcharge. If the gage is in either red area, have the battery and charging system checked right away. See *Voltmeter Gage on page 122* for more information.

Notice: **Do not allow the engine to operate at low idle for more than five minutes. This can cause low engine operating temperatures which can affect engine operation and reduce engine life. Engine idle speed should be increased to 1200 rpm whenever extended idle is required.**

Once started, the engine should be placed under load to allow the engine coolant temperature to reach 150°F (66°C) before shutting off the engine.

Engine Coolant Heater

Your vehicle may be equipped with this feature.

In very cold weather, 0°F (–18°C) or colder, the engine coolant heater can help. You will get easier starting and better fuel economy during engine warm-up. Usually, the coolant heater should be plugged in a minimum of four hours prior to starting your vehicle. At temperatures above 32°F (0°C), use of the coolant heater is not required. Your vehicle may also have an internal thermostat in the plug end of the cord. This will prevent operation of the engine coolant heater when the temperature is at or above 0°F (–18°) as noted on the cord.

To Use the Engine Coolant Heater

1. Turn off the engine.
2. Find the cord on the drivers side in the engine compartment.
3. Plug it into a normal, grounded 110-volt AC outlet.

⚠ CAUTION:

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

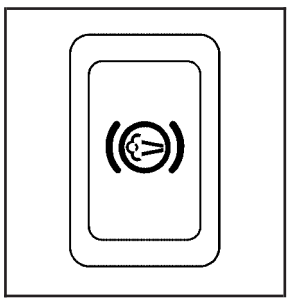
4. Before starting the engine, be sure to unplug and store the cord as it was before to keep it away from moving engine parts. If you do not, it could be damaged.

How long should you keep the coolant heater plugged in? The answer depends on the outside temperature, the kind of oil you have, and some other things. Instead of trying to list everything here, we ask that you contact your dealer/retailer in the area where you will be parking your vehicle. The dealer/retailer can give you the best advice for that particular area.

Diesel Engine Exhaust Brake

The exhaust brake is used to help slow the vehicle and may assist the vehicle's foundation brakes. The use of the exhaust brake will assist the braking of the vehicle and prolong the life of the foundation brake lining material.

The exhaust brake button is located in the instrument panel.



Push the bottom of the button to turn the exhaust brake on. When you push the top of the switch, the exhaust brake will turn off.

There is an indicator light on the instrument panel similar to the symbol on the switch, that will come on when the exhaust brake is active. See *Exhaust Brake Indicator Light on page 133* for more information.

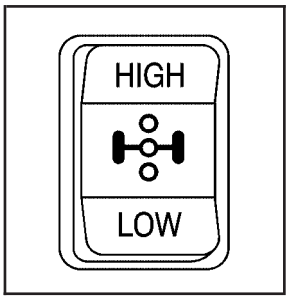
When using the exhaust brake, the proper gear range selection is important. The exhaust brake will be most effective if the gear range selected is the lowest possible range that does not allow the engine rpm to exceed 2500 rpm.

If you have an automatic transmission and press this button, the transmission will downshift to a factory default setting of fourth gear. To change the default setting, or for more information on factory default settings, contact your dealer for assistance.

The accelerator and clutch pedals, on a manual transmission, must be released in order for the exhaust brake to engage.

Two-Speed Rear Axle Electric Shift Control

The switch is located on the center console between the driver's and passenger's seats. See *Instrument Panel Overview on page 100* for more information.



While the switch is up, the rear axle is in the high range. Push it down to get the low range.

To operate off-road or under a heavy load, shift into low range while the vehicle is standing still and then operate the transmission normally.

On the highway, with the rear axle in low range and the transmission in top gear, you can shift the rear axle to high range by raising the switch and releasing the accelerator momentarily. Reapply the accelerator after you shift.

Under light load conditions, first shift the rear axle into the high range with the vehicle at a standstill and then operate the transmission normally.

Automatic Transmission Operation

GM builds vehicles with five and six-speed automatic transmissions. This part of the manual covers the basics of these. With these transmissions, you will find an Allison® Transmission Operator's Manual in your vehicle that goes into more detail. On the headliner, in front of and above the driver, or in some other place near the driver, you will see a label that describes important operating facts about the automatic transmission in your vehicle. Make sure you follow the instructions on this label.

⚠ CAUTION:

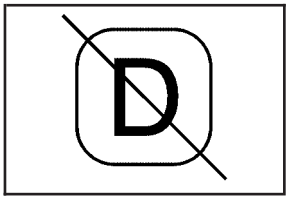
It can be dangerous to get out of your vehicle without the parking brake firmly set. Your vehicle can roll. If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure your vehicle will not move, even when you are on fairly level ground, always set the parking brake.

⚠ CAUTION:

Shifting into a drive gear while the engine is running at high speed is dangerous. Unless your foot is firmly on the brake pedal, your vehicle could move very rapidly. You could lose control and hit people or objects. Do not shift into a drive gear while your engine is running at high speed.

Overdrive Defeat

If your vehicle has this feature, you can select to limit the transmission to fourth gear. This may be useful when operating at a higher Gross Vehicle Weight (GVW) or where operating conditions do not require fifth gear.



The overdrive defeat button is located in the instrument panel to the right of the steering column.

See *Instrument Panel Overview on page 100* for more information.

Press the button to turn on the overdrive defeat. Press the button again to turn off the overdrive defeat. The indicator light in the button will come on whenever overdrive defeat is active.

Automatic Transmission Third-Gear Hold

If your vehicle has this feature, your range selector has a 2-3 position. You cannot shift up to the next higher gear when the transmission is in this position unless your engine-governed speed is exceeded, such as when going downhill.

This feature is used for certain load and traffic conditions or when plowing snow. See the Allison® Transmission Operator's Manual in your vehicle for more information about this.

Manual Transmission Operation

Using the Clutch

When you are starting to move the vehicle, it is important to begin with the engine speed at idle. Then start to engage the clutch and listen for an engine speed drop of about 100 rpm. At this point, the clutch is engaging, so you should increase the engine speed and fully engage the clutch.

Notice: **If you increase the engine speed before the clutch is fully engaged, you could damage your transmission. Always allow the clutch to fully engage before increasing engine speed.**

Six-Speed Transmission

The transmission has gears that automatically synchronize when you shift up or down. Choose the gear which will maintain the road speed you want while keeping the engine above two-thirds of the governed speed. When the engine speed drops below two-thirds of the governed speed, shift into the next lower gear before your engine begins to become sluggish. When you shift down, be sure to double-clutch if required.

See “Double Clutching” later in this section.

Eaton® Fuller® Nine and Ten-Speed Non-Synchronized Manual Transmissions

If your vehicle has one of these non-synchronized transmissions, it is naturally somewhat complicated.

The following are driving tips:

- Always choose an initial starting gear suitable for the load and terrain.
- Always use double-clutching procedures when shifting.
- Never move the range shift lever to the LO speed gear position after HI range preselection, or anytime the transmission is in the HI range.
- Never move the range knob or lever with the shift lever in NEUTRAL while the vehicle is moving.
- Never make a range shift while moving in REVERSE (R).

Double-Clutching

You must use the double-clutching method when you shift an unsynchronized gear set. Disengage the clutch, shift to neutral and engage the clutch. When upshifting, slow the engine until the engine rpm and road speed match. When downshifting, accelerate the engine until the engine rpm and road speed match. Then quickly disengage the clutch and move the shift lever to the next gear position and engage the clutch.

Clutch Brake (Vehicles with Non-Synchronized Transmission)

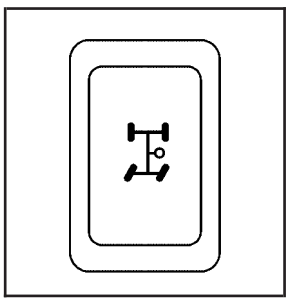
A clutch brake is used to stop transmission input shaft turning so that FIRST (1) or REVERSE (R) gear selection can be initiated when the vehicle is at a standstill and the engine is idling.

Press the clutch pedal all the way down to the floorboard to apply the clutch brake.

When using the clutch brake, disengage the clutch pedal and shift the transmission into either the initial starting gear or REVERSE (R). If the tooth-butting occurs between the clutching teeth, re-engage the clutch while applying light pressure to the shift lever. This will provide for a smooth shift into either FIRST (1) or REVERSE (R) gear.

Notice: **Using the clutch brake for shifting into any gear other than FIRST (1) or REVERSE (R) may cause premature wear of the clutch brake and make gear shift effort more difficult. Do not use the clutch brake for shifting after engaging FIRST (1) or REVERSE (R).**

Power Take-Off (PTO)



Your vehicle may be equipped with power take-off (PTO). The PTO switch is located on the instrument panel.

An indicator in the switch comes on to show PTO is active.

A PTO is a gearbox or mechanical device used to transmit mechanical power from the powertrain, through gears or a transmission, to another mechanical or hydraulic device. Before using a PTO, refer to the manufacturer's or installer's instructions.

Parking

⚠ CAUTION:

If you do not park your vehicle properly, it can roll. If you have left the engine running, it can move very quickly. You or others could be injured. To be sure your vehicle will not move, even when you are on level ground, follow the steps below.

Parking a Vehicle With the Two-Speed Rear Axle

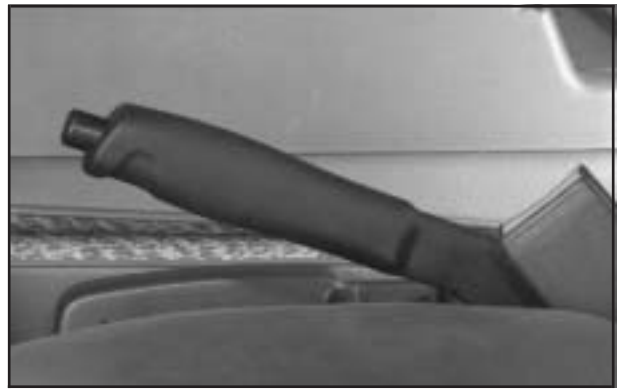
1. With the engine running, shift the two-speed rear axle into low. To be sure it is in low, you will need to move the vehicle in gear just a little.
2. Hold the regular brake pedal down with your right foot.
3. Apply the parking brake. See *Parking Brake (With Hydraulic Brakes) on page 81* or *Parking Brake (With Air Brakes) on page 82* for parking brake apply procedure.
4. Shift the transmission to NEUTRAL for manual transmission or PARK (P) for automatic transmission.

Parking Brake (With Hydraulic Brakes)

If your vehicle has hydraulic brakes, it has a parking brake lever. The lever is located in the center console.

Your vehicle may also be equipped with an automatic transmission which has a center console shift lever. This lever will have a PARK (P) position on the shift indicator. Even when PARK (P) is selected, be sure to apply the parking brake firmly so the vehicle will not move.

To apply the parking brake, pull the lever all the way up. The park brake light will come on when the parking brake is applied. See *Brake System Warning Light on page 124* for more information. Then shift the transmission to NEUTRAL for a manual transmission or PARK (P) for an automatic transmission. The vehicle must be stationary when applying the parking brake, except while burnishing the parking brake linings. See *Parking Brake Burnish Procedure on page 85* for more information.



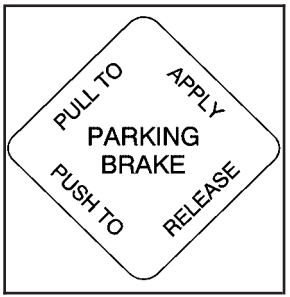
Once the parking brake is applied, slowly remove your foot from the regular brake pedal, while checking to see if the vehicle moves. If the vehicle does start to move, press the regular brake pedal and follow the parking brake burnish procedures. See *Parking Brake Burnish Procedure on page 85* for more information.

If your parking brake still does not set, take your vehicle dealer/retailer for service.

To release the parking brake, first push down the regular brake pedal. Then, while pressing in the release button, push the parking brake lever all the way down and shift the transmission to NEUTRAL. The parking brake light will stay on if the parking brake is not fully released.

Notice: **Driving with the parking brake on can overheat the brake system and cause premature wear or damage to brake system parts. Verify that the parking brake is fully released and the brake warning light is off before driving.**

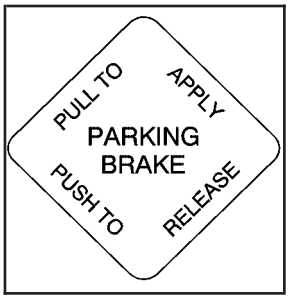
Parking Brake (With Air Brakes)

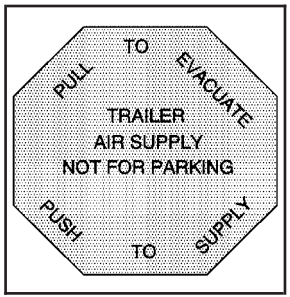


If your vehicle has air brakes, you will have this parking brake. It is located above the radio on the instrument panel.

Pulling it out applies the parking brake. The parking brake light will come on when the air parking brake is applied.

Vehicles built for use as tractors or towing vehicles have two air brake controls. They look like this:





⚠ CAUTION:

When the yellow PARKING BRAKE and the red TRAILER AIR SUPPLY knobs are both pushed in, your rig will be free to move. It could strike someone or something. When both of these knobs are pushed in, hold the regular brake pedal down to keep your rig from moving.

To charge a trailer's air brake system do the following:

1. Move your vehicle into the proper position.
2. Apply the parking brake by pulling the yellow parking brake knob out.
3. Hook up the trailer air system properly.
4. Get into the vehicle.
5. Push and hold down the regular brake pedal.
6. Push in both the yellow parking brake and the red trailer air supply knobs. This will charge your trailer's air system.

After a few minutes, the trailer system should be fully charged. When it is, the air pressure gage will show about 125 to 135 psi (862 to 931 kPa). See *Air Pressure Gage on page 136* for more information.

For driving with a trailer, the yellow and red, if equipped, knobs must be pushed in. When you are not pulling a trailer, the red trailer air supply knob must be pulled out.

⚠ CAUTION:

If you apply any one of the air brake parking controls while the vehicle is moving, your rig will stop suddenly. If you are not ready for this, you or others could be injured. Do not apply any one of these controls while you are driving, unless you have to make an emergency stop.

If the air pressure drops below 60 to 70 psi (413 to 482 kPa), the primary brake light and warning buzzer will come on. If the air pressure drops to 35 to 45 psi (241 to 310 kPa), the red trailer air supply knob will automatically pop out and apply the spring brakes on the trailer.

If the air pressure drops to 35 to 45 psi (241 to 310 kPa), the yellow park brake knob will automatically pop out and apply the spring brakes on the truck or tractor.

If you ever have a complete loss of air so that your air brakes automatically apply, there is a way that the tow operator can release the parking brakes to tow the vehicle. See *Towing Your Vehicle on page 182*.

Parking Brake Burnish Procedure

All vehicles which have hydraulic brakes will have a parking brake. It is recommended that the parking brake be burnished as part of the new vehicle break-in. The parking brake will work best after it has been burnished following these instructions:

1. Making sure that there is no other traffic around, get the vehicle speed up to 20 mph (32 km/h) and pull up to apply the parking brake. Let the vehicle come to a complete stop. Apply the base brakes and disengage the parking brake.
2. Repeat the burnishing procedure in Step 1 a total of 10 times
3. Between stops, drive the vehicle about 2 ½ miles (4 km)

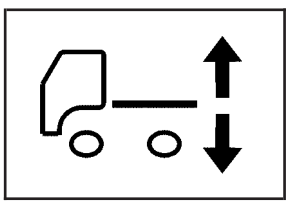
Notice: **Driving with the parking brake on can damage the transmission and brake system parts. Verify that the parking brake is fully released and the brake warning light is off before driving.**

Air Suspension

Your vehicle may have the Hendrickson HAS Series single-axle air suspension which is designed for a single-axle on-highway use. This feature is available in 19,000 lb (8 613.3 kg), 21,000 lb (9 525.4 kg) and 23,000 lb (10 432.6 kg) capacities.

Rear Air Suspension Dump Control

If your vehicle is equipped with the Hendrickson HAS Series single-axle air suspension, you may have this control. The air suspension dump control allows the operator to lower the deck height approximately 4.5 inches (11.5 cm) from the normal frame height.

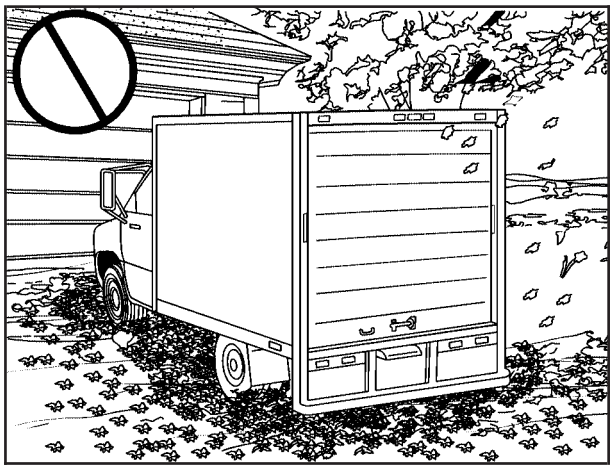


The switch to deflate and inflate the air suspension is located on the instrument panel.

Press the bottom of the switch to deflate the air suspension and lower the deck height. Press the top of the switch to return the suspension to normal deck height.

An indicator light will come on and stay on whenever the switch is in the dumped position.

Parking Over Things That Burn



⚠ CAUTION:

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

Engine Exhaust

⚠ CAUTION:

Engine exhaust can kill. It contains the gas carbon monoxide (CO), which you cannot see or smell. It can cause unconsciousness and death.

CAUTION: (Continued)

CAUTION: (Continued)

You might have exhaust coming in if:

- **The exhaust system sounds strange or different.**
- **Your vehicle gets rusty underneath.**
- **Your vehicle was damaged in a collision.**
- **Your vehicle was damaged when driving over high points on the road or over road debris.**
- **Repairs were not done correctly.**
- **Your vehicle or the exhaust system has been modified improperly.**

If you ever suspect exhaust is coming into your vehicle:

- **Drive it only with all the windows down to blow out any CO; and**
- **Have your vehicle fixed immediately.**

Diesel Particulate Filter

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

The DPF, the tailpipe, or other exhaust system components must not be altered. The area where the exhaust cooler connects to the tailpipe should be inspected, especially the area where the fresh air enters the cooler. Make sure the openings are not restricted or plugged with mud or dirt which could inhibit exhaust gas cooling. See “Exhaust System Inspection” under *At Least Twice a Year on page 316*.

The DPF will regenerate (self-clean) itself as part of normal operation. During regeneration, the green DPF indicator is lit and you will notice a difference in engine noise and engine speed, but this is normal. The Engine Control Module (ECM) controls this function based on several factors including the amount of fuel consumed, hours of engine operation and miles driven.

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

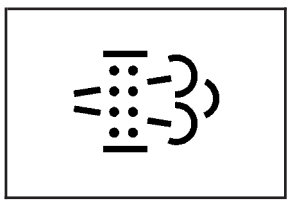
Your DPF equipped vehicle has specific fuel and engine oil requirements. See *What Fuel to Use on page 195* and *Engine Oil on page 206* to make sure you use the required fuel and engine oil.

⚠ CAUTION:

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

When the yellow DPF indicator comes on, the filter is dirty and DPF regeneration is necessary. When driving continues without regeneration, the DPF indicator will change from yellow to red. Continuing to drive the vehicle with the red indicator can cause filter damage.

To clean the filter, either drive the vehicle above 30 mph (50 km/h) to activate the automatic regeneration or stop the vehicle and perform the manual regeneration procedure. For the automatic regeneration, drive until the green DPF indicator light goes off. This will take approximately 20 minutes. Once automatic regeneration has started, drive until the green indicator light goes off to complete the regeneration in a single operation if possible.



During regeneration, the green DPF indicator light will come on. See *Diesel Particulate Filter Warning Light on page 136*.

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

Extended idling in PARK (P) can cause exhaust parts and gases to become very hot. Keep the exhaust area clear of material that could ignite or burn. See *Parking Over Things That Burn on page 86* for more information.

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

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

See *Accessories and Modifications on page 191* for important information.

Manual Regeneration Procedure

⚠ CAUTION:

During DPF regeneration, the exhaust system and exhaust gases are very hot. Stay clear of the tailpipe area and do not park over things that burn. You or others could be burned or your vehicle could catch fire. See *Parking Over Things That Burn on page 86*.

If the yellow or red DPF indicator is on, you can clean the DPF by performing a manual regeneration.

When it is safe to do so, stop the vehicle. Perform manual DPF regeneration in a well ventilated area. Manual DPF regeneration must be performed outdoors, as follows. Once manual regeneration is started, complete the regeneration in a single operation if possible. If manual regeneration is not completed, as indicated by the green DPF indicator going off, in a single operation, automatic regeneration might not be allowed until the vehicle is stopped and manual regeneration is performed until completed.

1. Check engine oil and engine coolant levels to be sure they are at proper operating levels.
2. To prevent running out of fuel during regeneration, make sure there is at least a quarter of a tank of fuel.
3. Check to make sure the area near the exhaust tailpipe and under the exhaust system is clear of any materials that could catch fire. Keep people away from the area of the exhaust system and exhaust gases.
4. Fully set the parking brake.
5. Shift the transmission to PARK (P) or NEUTRAL (N).
6. Idle the engine. If you used the idling control knob to increase the engine speed, restore it all the way to the left to reduce the engine speed.

7. If the vehicle has Power Take Off (PTO), turn the PTO off. See *Power Take-Off (PTO) on page 79*.
8. Press the DPF switch on the instrument panel. See *Instrument Panel Overview on page 100*. The green DPF indicator light comes on, the exhaust gas control valve operates, engine idle speed automatically increases, and DPF regeneration begins. Do not leave the vehicle unattended during manual regeneration.
9. When the green DPF indicator light goes off, regeneration is completed. Regeneration is normally completed in about 30 minutes.

Under certain operating conditions, manual regeneration might not be able to be performed, even if the soot level in the DPF requires regeneration. This can occur because of low coolant temperature, low battery voltage, or high exhaust temperature or immediately after starting the vehicle. When manual regeneration is requested, by pressing the DPF switch, when coolant temperature is low, the exhaust restrictor is engaged, the exhaust brake light comes on, and engine rpm increases to help raise engine coolant temperature. When operating conditions allow, the green DPF indicator will come on to indicate that regeneration has started.

Running the Engine While Parked

It is better not to park with the engine running. But if you ever have to, here are some things to know.

⚠ CAUTION:

Idling the engine with the climate control system off could allow dangerous exhaust into your vehicle. See the earlier caution under *Engine Exhaust on page 86*.

Also, idling in a closed-in place can let deadly carbon monoxide (CO) into your vehicle even if the climate control fan is at the highest setting. One place this can happen is a garage. Exhaust — with CO — can come in easily. NEVER park in a garage with the engine running.

Another closed-in place can be a blizzard. See *Winter Driving on page 174*.

⚠ CAUTION:

It can be dangerous to get out of your vehicle if the automatic transmission shift lever is not fully in PARK (P) with the parking brake firmly set. Your vehicle can roll. Do not leave your vehicle when the engine is running unless you have to. If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure your vehicle will not move, even when it is on fairly level ground, always set the parking brake and move the automatic transmission shift lever to PARK (P), or the manual transmission shift lever to NEUTRAL.

Follow the proper steps to be sure your vehicle will not move.

Mirrors

Outside Manual Mirrors

Adjust the outside rearview mirrors so you can see a little of the side of your vehicle, and the area beside your vehicle from a comfortable driving position. Some mirrors can be folded in to enter narrow passageways.

If the mirrors have the clearance lamps, they will be on when the headlamps or parking lamps are on.

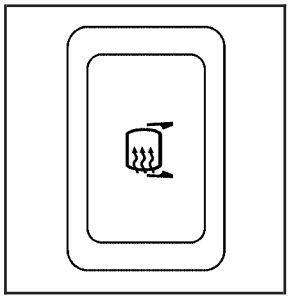
Outside Convex Mirrors

⚠ CAUTION:

A convex mirror can make things (like other vehicles) look farther away than they really are. If you cut too sharply into the right or left lane, you could hit a vehicle. Check your regular outside mirrors (or your inside mirror, if you have one) before changing lanes.

Your vehicle may have convex mirrors on both the driver's side and the passenger's side. They are curved to allow more to be seen from the driver's seat. A convex mirror can make things look farther away than they really are.

Outside Heated Mirrors

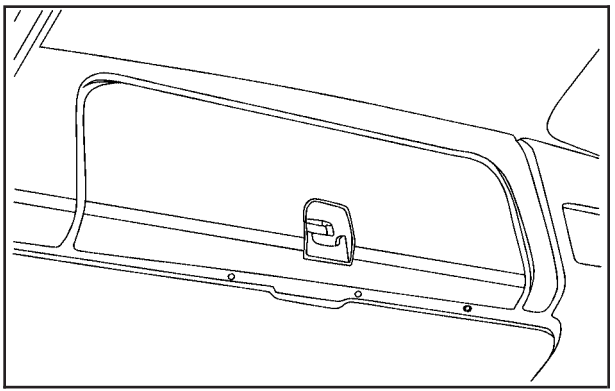


For vehicles with this feature, the switch is located on the instrument panel.

Press the switch to turn the outside heated rearview mirrors on. The switch indicator light will come on and stay on whenever the outside heated rearview mirrors are activated.

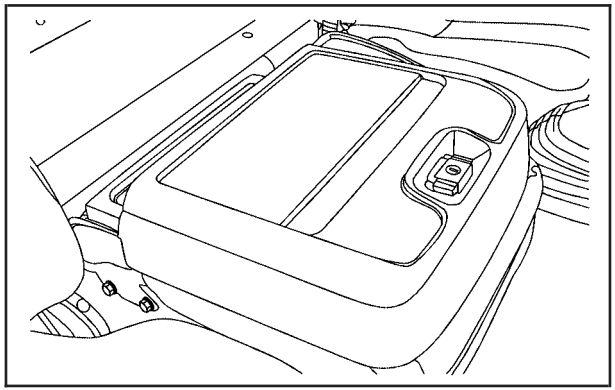
Storage Areas

Overhead Storage

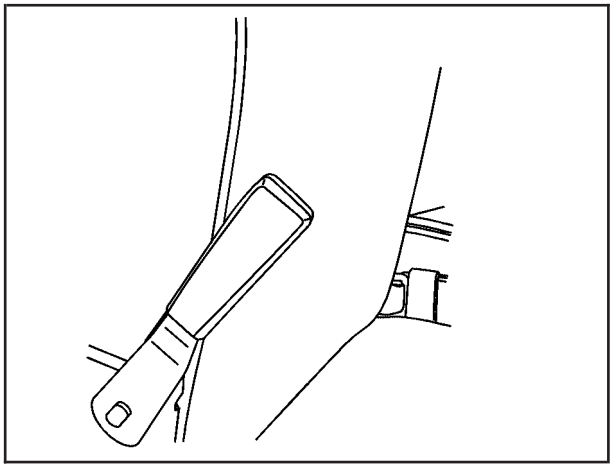


An overhead storage compartment is provided above each of the driver's and passenger's seats. To open push down on the inner button and lift the compartment doors all the way up to lock in position. Be sure the doors are securely closed before moving the vehicle.

Center Seat Storage



A storage compartment is located behind the seatback in the center seat.



To access the compartment, you must first pull down on the handle located on the passenger side to fold the seat all the way forward. To open, squeeze both sides of the latch.

Center Console Storage Area

There are additional storage areas for small items in the center console to the right of the driver's seat.

✍ NOTES

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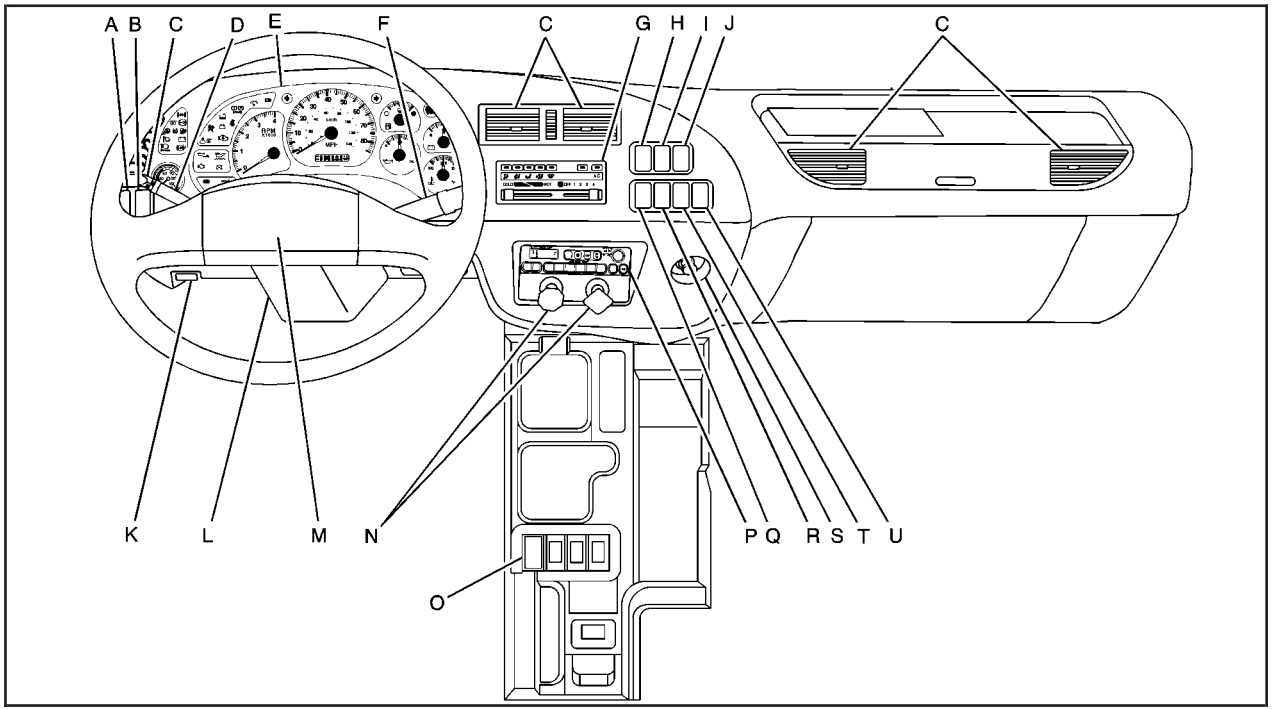
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✍ NOTES

Instrument Panel Overview



The main components of your instrument panel are the following:

A. Rear Reading Lamp Button. See *Rear Reading Lamps on page 113*.

B. Cruise Control Button. See *Cruise Control on page 107*.

C. Air Outlets. See *Outlet Adjustment on page 116*.

D. Turn Signal/Multifunction Lever. See *Turn Signal/Multifunction Lever on page 103*.

E. Instrument Panel Cluster. See *Instrument Panel Cluster on page 119*.

F. Windshield Wiper/Washer Controls. See *Windshield Wipers on page 105* and *Windshield Washer on page 106*.

G. Climate Control System. See *Climate Control System on page 114*.

H. Exhaust Brake Button. See *Diesel Engine Exhaust Brake on page 74*.

I. Heated Mirror Button (If Equipped). See *Outside Heated Mirrors on page 94*.

J. High Idle Button. See “Manual High Idle System” under *Starting the Diesel Engine on page 66*. Power Take Off (PTO) (If Equipped). See *Power Take-Off (PTO) on page 79*.

K. Front Panel Release. See *Lifting the Front Panel on page 247*.

L. Tilt Steering Column. See *Tilt Wheel on page 102*.

M. Horn. See *Horn on page 102*.

N. Air Brake Controls (If Equipped). See *Parking Brake (With Hydraulic Brakes) on page 81* or *Parking Brake (With Air Brakes) on page 82*.

O. Two-Speed Rear Axle Button. See *Two-Speed Rear Axle Electric Shift Control on page 75*. Air Suspension Indicator (If Equipped). See *Air Suspension on page 85*. Air Suspension Button (If Equipped). See *Air Suspension on page 85*. Differential Lock Button (If Equipped). See *Rear Axle Differential Lock Control on page 157*.

P. Audio System. See *Audio System(s) on page 137*.

Q. Marker and Clearance Lamp Button. See *Marker Lamps on page 112*.

R. Overdrive Defeat Button. See “Overdrive Defeat” under *Automatic Transmission Operation on page 76*.

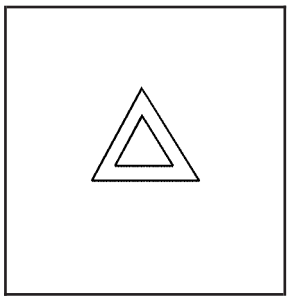
S. Cigarette Lighter. See *Ashtray(s) and Cigarette Lighter on page 114*.

T. Traction Control Button. See *Traction Control System (TCS) on page 157*.

U. Diesel Particulate Filter Button. See *Diesel Particulate Filter on page 87*.

Hazard Warning Flashers

The hazard warning flashers let you warn police and others that you have a problem. The front and rear turn signal lamps will flash on and off.



The hazard warning flashers are controlled by the lever located to the right of the steering column. Move the lever up to start the hazard flashers. Move the lever down again to turn the flashers off.

The hazard warning flashers will work with or without the key in the ignition.

When the hazard warning flashers are on, the turn signals will not work. The hazard warning flashers will not flash if the brakes are applied.

Other Warning Devices

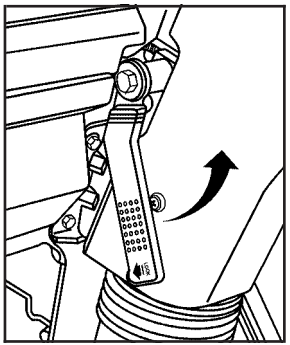
If you carry reflective triangles, you can set them up at the side of the road about 300 feet (100 m) behind your vehicle.

Horn

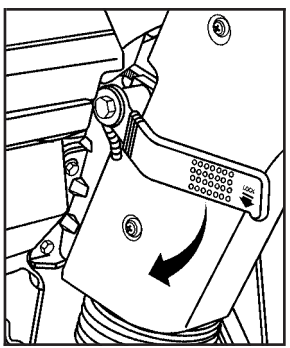
Sound the horn by firmly pressing the pad in the center of the steering wheel.

Tilt Wheel

A tilt steering column allows you to adjust the steering wheel before you drive. You can also raise it to the highest level to give your legs more room when you enter or exit the vehicle.

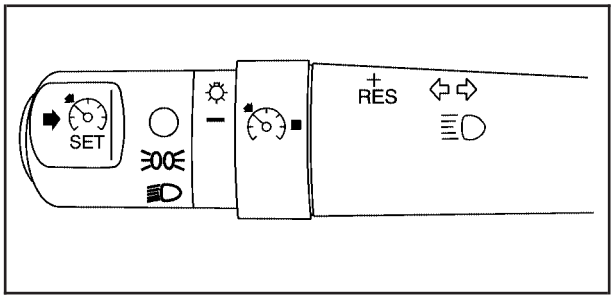


To tilt the column, hold the steering wheel and pull the lever on the left side of the column to unlock the steering column.



Move the steering wheel to a comfortable location, then lock the column in place by turning the lock lever all the way down.

Turn Signal/Multifunction Lever



The multifunction lever, located on the left side of the steering column, includes the following:

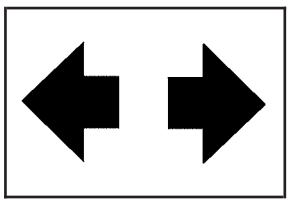
- Turn and Lane-Change Signals. See *Turn and Lane-Change Signals on page 104*.
- Headlamp High-Beam/Low-Beam Changer. See *Headlamp High/Low-Beam Changer on page 104*.
- Flash-to-pass. See *Flash-to-Pass on page 105*.
- Headlamps. See *Headlamps on page 110*.
- Cruise Control (if equipped). See *Cruise Control on page 107*.

Turn and Lane-Change Signals

The turn signals are controlled by the multifunction lever.

To signal a turn, move the lever all the way up for right or down for left and release it. When the turn is finished, the lever will return automatically.

To signal a lane change, raise or lower the lever until the arrow on the instrument panel starts to flash. Hold the lever in this position until the lane change has been completed.



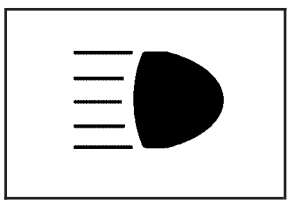
An arrow on the instrument panel cluster will flash in the direction of the turn or lane change.

If you signal a turn or a lane change and the arrows on the instrument panel turn on but do not flash, check the turn signal flasher and circuit breaker.

If a bulb is burned out, replace it to help avoid an accident. If the arrows don't go on at all when you signal a turn, check for burned-out bulbs and a blown fuse. See *Fuses and Circuit Breakers on page 277*.

Headlamp High/Low-Beam Changer

(Headlamp High/Low Beam Changer):
To change the headlamps from low to high beam, push the multifunction lever toward the instrument panel. To return to low-beam headlamps, pull the multifunction lever toward you. Then release it.



While the high beams are on, this indicator light on the instrument panel cluster will also be on.

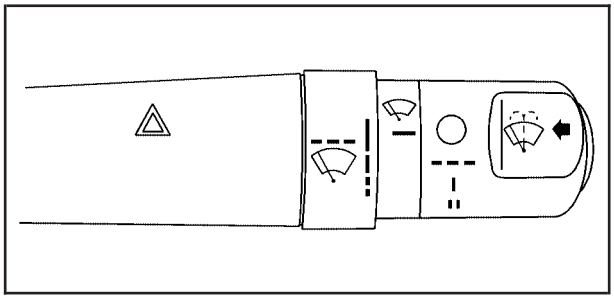
Flash-to-Pass

This feature lets you use the high-beam headlamps to signal a driver in front of you that you want to pass. It works even if the headlamps are in the automatic position.

To use this feature, pull the multifunction lever toward you, then release it.

If the headlamps are in the automatic position or on low beam, the high-beam headlamps will turn on. They'll stay on as long as you hold the lever toward you. The high-beam indicator on the instrument panel cluster will come on. Release the lever to return to normal operation.

Windshield Wipers



The windshield wipers are controlled by the lever located on the right side of the steering column.

The windshield wipers have these positions:

◯ **(OFF):** Turn the knob at the end of the windshield wiper lever to turn off the wipers.

- - - (Intermittent): Turn the knob to the intermittent setting to delay the wiper speed. This can be very useful in light rain or snow. When you turn the knob to this setting, you can also set the wiper speed. See the following text for more information.

: Turn this band on the windshield wiper lever to set the delay time between wipes. The closer to the top of the lever, the shorter the delay.

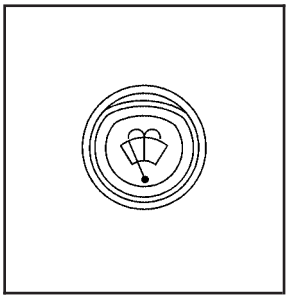
(LO): Turn the knob to this setting to operate the windshield wipers at a low speed.

(HI): Turn the knob to this setting to operate the windshield wipers at a high speed.

Be sure to clear ice and snow from the wiper blades before using them. If they are frozen to the windshield, carefully loosen or thaw them. If your blades do become worn or damaged, get new blades or blade inserts. For more information, see *Windshield Wiper Blade Replacement on page 250*.

Heavy snow or ice can overload your wipers. The windshield wiper motor is protected from overload by a circuit breaker and a fuse. If the motor overheats due to heavy snow or ice, the wiper will stop until the motor cools. Although the circuit is protected from electrical overload, overload due to heavy snow or ice may cause wiper linkage damage. Always clear ice and heavy snow from the windshield before using your windshield wipers.

Windshield Washer



To wash the window, you must have the windshield wipers on.

(Washer Fluid): Press this button at the end of the multifunction lever located on the right side of the steering column. Spray will continue as long as this button is pressed.

⚠ CAUTION:

In freezing weather, do not use your washer until the windshield is warmed. Otherwise the washer fluid can form ice on the windshield, blocking your vision.

Cruise Control

With cruise control, the vehicle can maintain a speed of about 25 mph (40 km/h) or more without keeping your foot on the accelerator. Cruise control does not work at speeds below about 25 mph (40 km/h).

If your vehicle has this feature, the controls are located on the multifunction lever on the left side of the steering column.

If the vehicle has a automatic transmission and the brakes are applied, the cruise control will shut off.

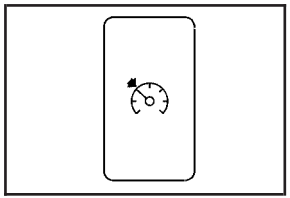
If the vehicle has a manual transmission and the brakes are applied, or the clutch pedal is pushed, the cruise control will shut off.

⚠ CAUTION:

Cruise control can be dangerous where you cannot drive safely at a steady speed. So, do not use your cruise control on winding roads or in heavy traffic.

Cruise control can be dangerous on slippery roads. On such roads, fast changes in tire traction can cause excessive wheel slip, and you could lose control. Do not use cruise control on slippery roads.

Setting Cruise Control



This button is located at the lower left side of the instrument panel. It turns the cruise control on and off.

SET: Press this button at the end of the multifunction lever to set the cruise control speed.

+ RES: Move the band to this position to resume the set speed.

⚠ CAUTION:

If you leave your cruise control on when you are not using cruise, you might hit a button and go into cruise when you do not want to. You could be startled and even lose control. Keep the cruise control switch off until you want to use cruise control.

1. Press the button to turn the cruise control on. The light inside the switch will turn on.
2. Get up to the speed you want.
3. Press in the SET button at the end of the lever and release it.
4. Take your foot off the accelerator pedal.

Resuming a Set Speed

Suppose you set the cruise control at a desired speed and then you apply the brake or the clutch. This, of course, shuts off the cruise control. But you do not need to reset it.

Using the accelerator pedal, increase your vehicle's speed to 25 mph (40 km/h) or more. The cruise control does not work below this speed.

Move the band on the lever to the +RES position and release it. The vehicle will accelerate to the previously set speed.

Increasing Speed While Using Cruise Control

There are two ways to go to a higher speed:

- Use the accelerator pedal to get to the higher speed. Press the SET button, then release the button and the accelerator pedal. You will now cruise at the higher speed.
- Move the band on the multifunction lever from on to the +RES position. Hold it there until the vehicle reaches the speed desired, and then release the band. To increase the vehicle speed in small amounts, move the band on the multifunction lever to the +RES position and release it. Each time this is done, the vehicle will go about 1 mph (1.6 km/h) faster.

Reducing Speed While Using Cruise Control

Press the SET button until you reach the lower speed desired, then release it.

To slow down in very small amounts, tap the button briefly. Each time this is done, your vehicle goes about 1 mph (1.6 km/h) slower.

Passing Another Vehicle While Using Cruise Control

Use the accelerator pedal to increase your speed. When you take your foot off the pedal, the vehicle slows down to the cruise control speed that was set earlier.

Using Cruise Control on Hills

How well the cruise control works on hills depends upon your speed, load, and the steepness of the hills. While going up steep hills, you might want to step on the accelerator pedal to maintain the vehicle speed. While going downhill, you might have to brake or shift to a lower gear to keep the vehicle speed down. Of course, applying the brake or clutch disengages the cruise control. Many drivers find this to be too much trouble and do not use cruise control on steep hills.

Ending Cruise Control

There are four different ways to turn off the cruise control:

- Step lightly on the brake pedal (manual and automatic transmissions).
- Press the clutch pedal to the floor (manual transmissions).
- Turn off cruise control by pressing the button again.
- Shift the transmission to NEUTRAL.

Erasing Speed Memory

When the ignition is turned off, the cruise control set speed memory is erased.

Headlamps

The multifunction lever operates the exterior lamps.

(Exterior Lamps): Turn the band on the multifunction lever with this symbol to operate the exterior lamps.

The exterior lamp band has three positions:

(OFF): Turn the band to this position to turn off all lamps, except the daytime running lamps (DRL).

(Parking Lamps): Turn the band to this position to turn on the parking lamps, together with the following:

- Marker Lamps (unless your vehicle has the marker and clearance lamps switch)
- Tail Lamps
- License Plate Lamps
- Instrument Panel Lights

(Headlamps): Turn the band to this position to turn on all the headlamps, together with the previously listed lamps and lights.

A circuit breaker protects the headlamps. If you have an electrical overload, the headlamps will flicker on and off. Have the headlamp wiring checked right away if this ever happens.

Headlamps on Reminder

If your vehicle has this feature, an alarm will sound when the headlamps and/or parking lamps are turned on and the ignition is in LOCK or ACC.

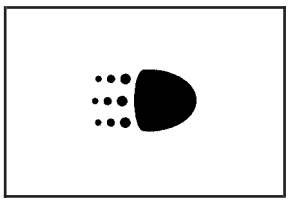
Daytime Running Lamps (DRL)

Daytime Running Lamps (DRL) can make it easier for others to see the front of your vehicle during the day. DRL can be helpful in many different driving conditions, but they can be especially helpful in the short periods after dawn and before sunset. Fully functional daytime running lamps are required on all vehicles first sold in Canada.

The DRL system will make the headlamps come on at reduced brightness when the following conditions are met:

- The ignition is on.
- The headlamp band is in the OFF position.
- The parking brake is released.

When the DRL are on, only your low-beam headlamps will be on. The exterior lamps and instrument panel will not be lit.



When it begins to get dark, the DRL indicator light is a reminder to turn your headlamp switch on.

The other lamps that come on with your headlamps, will also come on.

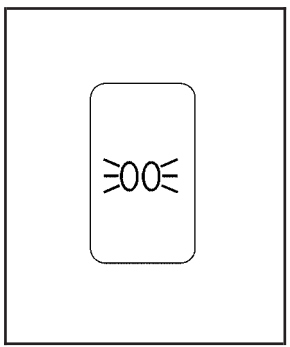
When the headlamp band is turned to OFF, the regular lamps will go off, and the low-beam headlamps will change to the reduced brightness of DRL.

To idle your vehicle with the DRL off, set the parking brake. The DRL will stay off until the parking brake is released.

As with any vehicle, you should turn on the regular headlamp system when needed.

Marker Lamps

If your vehicle is designed for trailer towing, this button will operate the marker and clearance lamps.

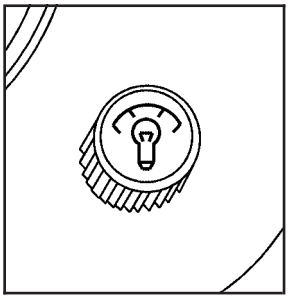


The marker and clearance lamp button is located in the instrument panel. See *Instrument Panel Overview on page 100*.

Press the button to turn the lamps on and press it again to turn them off.

The headlamp band will not operate these lamps.

Instrument Panel Brightness



If your vehicle has this feature, the knob is located on the lower right of the instrument panel.

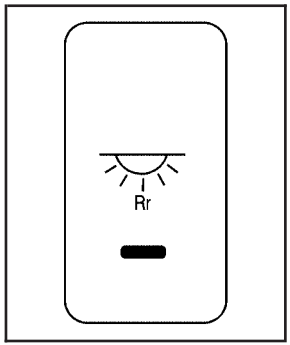
Turn the knob counterclockwise to brighten the instrument panel lights or clockwise to dim them.

Dome Lamps

The dome lamp switch can be set to three different positions: DOOR, OFF, and ON.

When the switch is set to DOOR, the dome lamp will come on only when the driver's door is open. If the switch is set in the OFF position, the dome lamp will not illuminate, even when the door is opened. The dome lamp will remain on whether or not the door is open if the switch is placed in the ON position.

Rear Reading Lamps

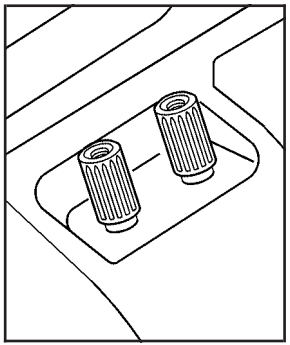


Your vehicle may have a rear lamp button which is located on the lower left side of the instrument panel. See *Instrument Panel Overview on page 100*.

When pressed in, an indicator light inside the button will illuminate.

Because your truck may be finished in a variety of different ways by a number of companies, the function of this switch depends on how your vehicle was finished after it left the factory. Refer to the other manuals that came with your vehicle to learn more about this switch, or see your dealer for more information.

Auxiliary Power Jacks



If your vehicle has these power jacks, they are on the console to the right of the driver's seat.

These jacks provide 12-volt power so you can operate things such as a citizen's band (CB) radio or a cellular phone. You will see positive (red) and negative (black) outlets. They are protected by a 15-amp circuit breaker.

Notice: **If you plug in FM communications equipment at the cigarette lighter, you could damage your vehicle. Over time, the high heat from the equipment could damage wires and/or start a fire. Do not plug in FM communications equipment at the ashtray area.**

Ashtray(s) and Cigarette Lighter

Your vehicle may have an ashtray and a cigarette lighter located in the center floor console. To open the removable ashtray, flip open the top.

Notice: **If you put papers, pins, or other flammable items in the ashtray, hot cigarettes or other smoking materials could ignite them and possibly damage your vehicle. Never put flammable items in the ashtray.**

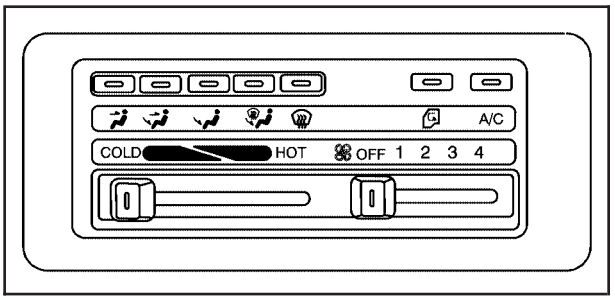
To use the cigarette lighter, push it in all the way and let it go. When it's ready, it will pop back out by itself.

Notice: **Holding a cigarette lighter in while it is heating does not let the lighter back away from the heating element when it is hot. Damage from overheating can occur to the lighter or heating element, or a fuse could be blown. Do not hold a cigarette lighter in while it is heating.**

Climate Controls

Climate Control System

With this climate control system, you can control the heating, cooling, and ventilation for your vehicle.



Slide the temperature lever to the left toward COLD for cooler air. Slide it to the right toward HOT for warmer air.

To change the current mode, press one of the following buttons:

(Vent): This mode directs air to the instrument panel outlets.

(Bi-Level): This mode directs about half of the air to the instrument panel outlets, and then directs most of the remaining air to the floor outlets. Some air may be directed toward the windshield.

(Floor): This mode directs most of the air to the floor outlets with some air directed to the outboard outlets for the side windows and some air directed to the windshield.

(Fan): The fan has five speed settings: OFF, 1, 2, 3, and 4. Slide the fan lever to OFF to turn the system off. Outside air will still come out of the floor outlets whenever the vehicle is moving.

(Recirculation): If you press this button, the air inside the cab will be recirculated. If your vehicle has air conditioning, using recirculation will give you maximum cooling. This mode can also be used to keep outside air, odors and dust from entering your vehicle.

Recirculation is not available in Defog or Defrost modes.

A/C (Air Conditioning): If your vehicle has this feature, you can use your air conditioner by selecting one of the mode buttons, selecting a fan speed and pressing the A/C button.

On hot days, open the windows to let hot inside air escape; then close them. This helps to reduce the time it takes for your vehicle to cool down. It also helps the system to operate more efficiently.

For quick cool down on hot days:

1. Select the vent mode.
2. Select the recirculation mode.
3. Select A/C.
4. Select the coolest temperature.
5. Select the highest fan speed.

Using these settings together for long periods of time may cause the air inside of your vehicle to become too dry. To prevent this from happening, after the air in your vehicle has cooled, turn the recirculation mode off. The air-conditioning system removes moisture from the air, so you may sometimes notice a small amount of water dripping underneath your vehicle while idling or after turning off the engine. This is normal.

Defogging and Defrosting

There are two modes to clear fog or frost from your windshield. Press the defog button to clear the windows of fog or moisture and warm the passengers. Press the defrost button to remove fog or frost from the windshield more quickly.

(Defog): Press this button to direct the air equally between the windshield and the floor outlets. When you select this mode, the system turns off recirculation and runs the air-conditioning compressor unless the outside temperature is at or below freezing. The recirculation mode cannot be selected while in the defog mode.

(Defrost): Press this button to direct most of the air to the windshield and the side window outlets, with some air directed to the floor outlets. In this mode, the system will automatically turn off recirculation and run the air-conditioning compressor, unless the outside temperature is at or below freezing. Recirculation cannot be selected while in the defrost mode.

Outlet Adjustment

The air outlets are located in the center and on the sides of your instrument panel. See *Instrument Panel Overview on page 100*. You can move the vents to direct the flow of air or close the outlets altogether. When you close a vent, it will increase the flow of air coming out of any vents that are open.

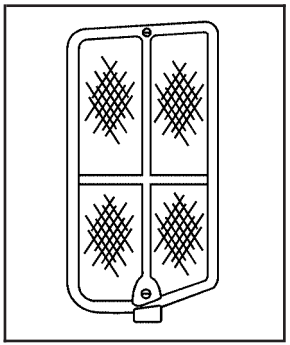
Keep the path under the front seats clear of objects to help circulate the air inside of your vehicle more effectively.

Passenger Compartment Air Filter

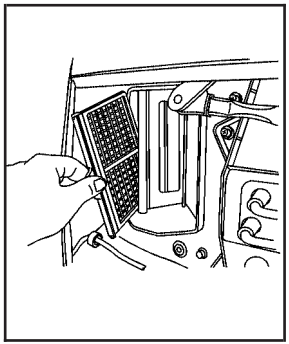
The passenger compartment outside air is routed through a passenger compartment filter. The filter removes certain debris, including dirt and leaves. Reductions in your climate control system performance may indicate that the filter needs to be inspected and cleaned.

The passenger compartment air filter can be accessed from the outside of the vehicle on the front passenger side. It is concealed by the front access panel. Pull the latch inside the cab on the driver's side of the vehicle to open the front panel.

To inspect and clean the passenger compartment air filter, use the following steps:



1. Pull the tab located at the bottom of the screen.



2. Pull the tab and remove the filter.
3. Rinse both sides of the filter with clean water.
4. Reinstall the filter and screen after cleaning.

Warning Lights, Gages, and Indicators

This part describes the warning lights and gages on your vehicle. The pictures help to locate them.

Warning lights and gages 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 gages could also save you or others from injury.

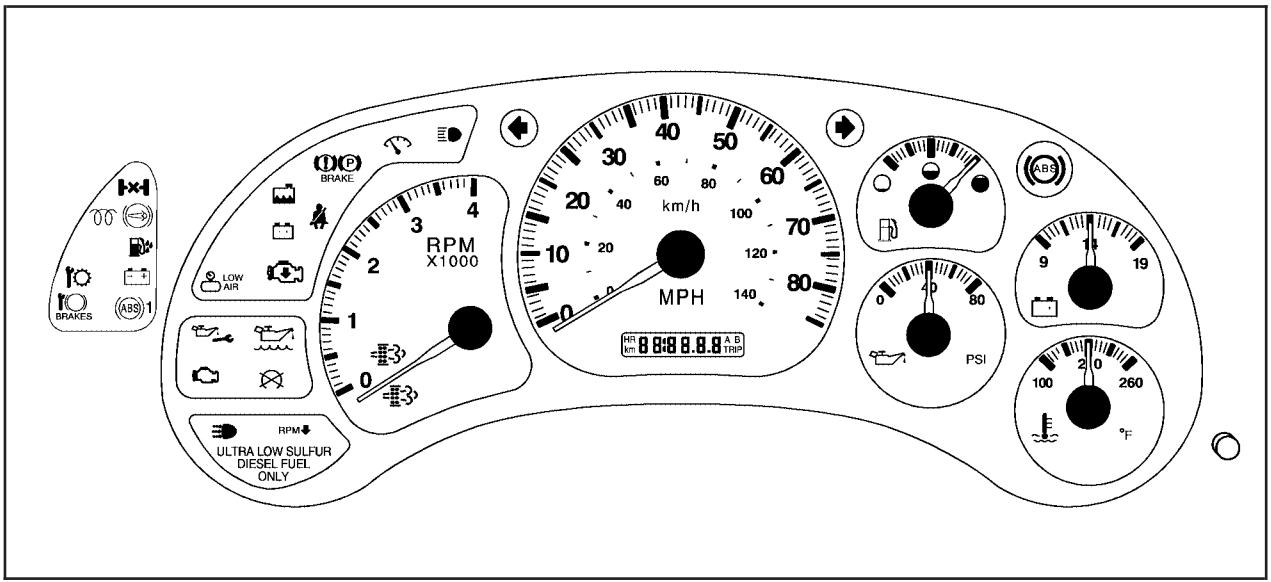
Warning lights come on when there may be or is a problem with one of your vehicle's functions. As the details show on the next few pages, some warning lights come on briefly when you start the engine just to let you know they are working. If you are familiar with this section, you should not be alarmed when this happens.

Gages can indicate when there may be or is a problem with one of your vehicle's functions. Often gages and warning lights work together to let you know when there is a problem with your vehicle.

When one of the warning lights comes on and stays on as you are driving, or when one of the gages shows there may be a problem, check the section that tells you what to do about it. Please follow this manual's advice. Waiting to do repairs can be costly and even dangerous. So please get to know your vehicle's warning lights and gages. They can be a big help.

Instrument Panel Cluster

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



Speedometer and Odometer

Your speedometer lets you see your speed in both miles per hour (mph) and kilometers per hour (km/h).

Your odometer shows how far your vehicle has been driven, in either miles (used in the United States) or kilometers (used in Canada).

Trip Odometer

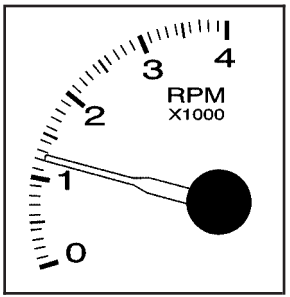
The trip odometer can tell you how far your vehicle has been driven since you last set the trip odometer to zero.

While the engine is running, press the reset button, located to the right of the trip odometer, to toggle between the trip odometer and the regular odometer. Holding the reset button for two seconds while the engine is running and the trip odometer is displayed, will reset it.

To display the odometer reading with the ignition off, press the reset button.

The hourmeter gage is accessed through the trip odometer, for more information see *Hourmeter Gage on page 137*.

Tachometer



This gage shows the safe operating range for the engine speed in revolutions per minute (rpm).

Engine Speed Limiter

All engines have electronic engine speed limiting to 2,550 rpm.

Engine Road Speed Governor

This system controls maximum vehicle speed automatically and reduces engine power until vehicle speed gets down to maximum governed speed.

A 75 mph (120 km/h) road speed governor is standard for most models, but can be programmed to any speed below that default setting. Other models have a default setting of 80 to 85 mph (128 to 136 km/h). You may have a label on the headliner of your vehicle with more information on your engine road speed governor. See your dealer for assistance with programming your engine limited speed.

Safety Belt Reminder Light

When the key is turned to ON or START, a light will come on for several seconds to remind people to fasten their safety belts.

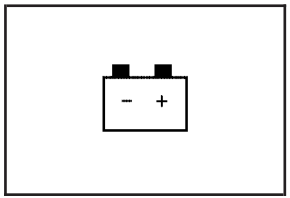


The safety belt light will also come on and stay on for several seconds.

Safety Belt Reminder Tone

If your vehicle has this feature, when you turn your key to ON or START, a tone will sound for several seconds to remind people to fasten their safety belts.

Charging System Light



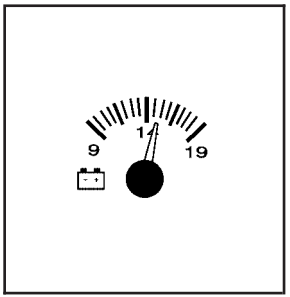
The charging system light may be located in the instrument panel cluster, or with the auxiliary warning lights in the center of the instrument panel.

It should come on briefly when you turn on the ignition, before the engine is running, as a check to show that it is working.

If it stays on, or comes on while you are driving, have your vehicle checked right away. You could have a loose generator drive belt or some other problem.

Driving while this light is on will drain your battery. If you must drive a short distance with the light on, turn off your radio and other accessories. Sustained driving with a generator failure could result in a lack of back-up braking if the engine quits or the power steering pump should fail.

Voltmeter Gage



When your engine is running, the voltmeter gage shows the charging system voltage.

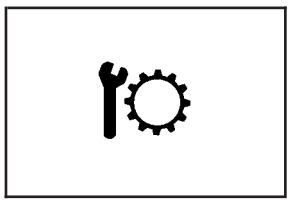
Readings in either warning zone indicate a possible problem in the electrical system.

Readings in the low warning zone may occur when a large number of electrical accessories are operating in the vehicle and the engine is left at an idle for an extended period. This condition is normal since the charging system may not be able to provide full power at engine idle. As engine speeds are increased, this condition should correct itself because higher engine speeds allow the charging system to create maximum power.

You can only drive a short time on the battery. Be sure to shut off the radio, the fan or any unnecessary accessories and have the system serviced.

Service Transmission Warning Light

If your vehicle has an Allison® automatic transmission, certain transmission malfunctions will turn this light on.

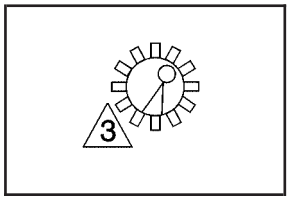


This light is located with the auxiliary warning lights in the center of the instrument panel.

If this light comes on while you are driving, do not use the transmission shift control or you may lose forward gears. The computer for the transmission senses a problem and chooses a gear to stay in so that you can drive the vehicle in that gear. You may not be able to drive as fast or back up when this light is on.

Notice: **If you continue driving your vehicle after the transmission warning light comes on, you could damage the transmission. While this light is on, the transmission cannot operate in all gears. If you attempt to shift gears, the vehicle may not continue to move. Do not attempt to shift gears while the transmission warning light is on. Instead, drive directly to an authorized dealer for service. If you cannot drive to a dealer immediately, have the vehicle towed.**

Range Inhibit Warning Indicator



Your vehicle may have this light.

If your vehicle has an Allison 1000/2000/2200/2400/2500 series automatic transmission, this light may come on and a lighted bar under the current gear selected will flash.

If your vehicle has an Allison 3000/3500 series automatic transmission, the current gear selected on the pushbutton display will flash.

The flashing bar, light, or gear selection indicates that transmission range shifts may not occur.

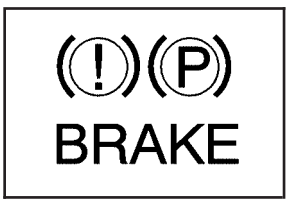
For detailed information on shift inhibit limitations, see the Allison Automatic Transmission Operator's Manual in your vehicle for further information.

Brake System Warning Light

Your vehicle has either hydraulic or air brakes. Each system has different warning lights.

Hydraulic Brake System Warning Lights

Vehicles with hydraulic brake systems have two brake system warning lights on the instrument panel.

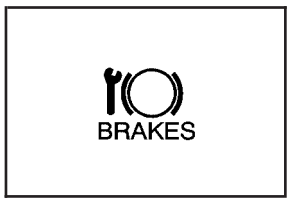


If this light comes on, the fluid level in the master cylinder reservoir is low or there is a problem with the hydraulic brakes.

When it comes on, you will also hear a warning tone.

This light should come on briefly when you turn the ignition key to ON. If it does not come on, then have it fixed so it will be ready to warn you if there is a problem.

The brake system warning light may come on, and the warning tone may sound, when you are turning and braking at the same time. This is normal. See “Hydraulic Brake Systems” under *Braking on page 152*.



If this light comes on, it means there may be a problem with the brake system.

When this light comes on, you will also hear a warning tone. Have the system repaired immediately.

Both of these lights should come on briefly every time you start your engine. If they do not come on then, have them fixed so they will be ready to warn you if there is a problem. If one or both of these warning lights stay on after you start the engine, there could be a brake problem. Have your brake system inspected right away.

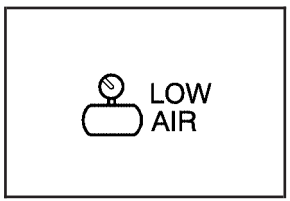
If one or both of these lights come on while you are driving, pull off the road and stop carefully. You may notice that the pedal is harder to push, or the pedal may go closer to the floor. It may take longer to stop. If the brake system warning light is still on, have the vehicle towed for service. See *Towing Your Vehicle on page 182*. See “Hydraulic Brake Systems” under *Braking on page 152* for further information.

Parking Brake Warning Light

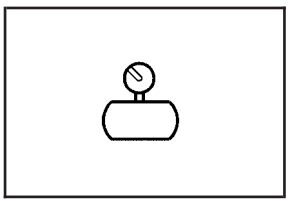
This light will also come on when you set the parking brake. The light will stay on if your parking brake does not release fully.

Air Brake System Warning Light

Vehicles with air brake systems have a brake system warning light on the instrument panel.



United States



Canada

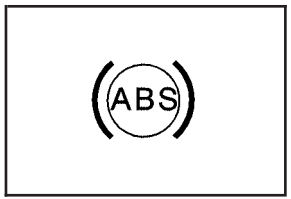
The low air warning light should come on, as a check, whenever you start the engine. However, it is designed to come on, and stay on, when brake reservoir pressure has dropped below 60 psi (410 kPa).

When the warning light comes on while you are driving, you should drive only as far as the nearest point of safety and then stop the vehicle.

⚠ CAUTION:

If the air brake system warning light comes on and the warning tone sounds, the vehicle can stop suddenly and without further warning. This is because the parking brake will come on if the pressure falls below 35 to 45 psi (240 to 310 kPa). You or others could be injured. If the air brake system warning light comes on and the warning tone sounds, stop as soon as you can. You will not know how quickly the system is losing pressure, so be aware that the parking brake may come on suddenly.

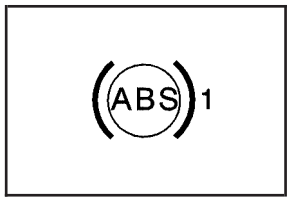
Antilock Brake System Warning Light



This light will come on briefly when you start the engine, then it will turn off. This is normal.

If the light stays on, or comes on when you are driving, your vehicle needs service. If the brake or low air warning light is not on, you still have brakes, but you do not have the antilock brake feature. If the brake and/or low air warning light is on, you do not have antilock brakes and there is a problem with your regular brakes. See *Brake System Warning Light on page 124* and *Antilock Brake System (ABS) on page 154* for more information.

Trailer Antilock Brake System Warning Light

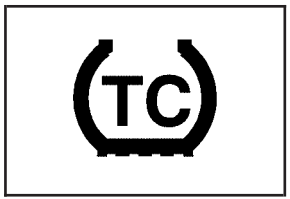


If your vehicle is connected to a trailer with antilock brakes, this light should come on briefly, as a check, when you turn on the ignition.

When this light comes on and stays on, it means there is something wrong in the trailer Antilock Brake System (ABS). Have the system repaired immediately.

If an ABS equipped trailer is not connected, this light is not functional.

Traction Control System Active Light

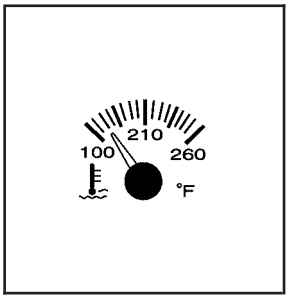


If your vehicle has the Traction Control System (TCS), this light will come on when the system is limiting wheel spin.

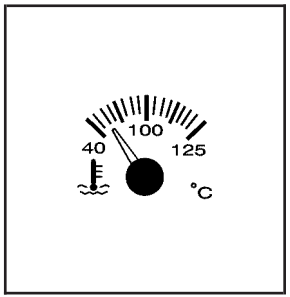
Slippery road conditions may exist if the TCS active light comes on, so adjust your driving accordingly.

The light will stay on for a few seconds after the system stops limiting wheel spin.

Engine Coolant Temperature Gage



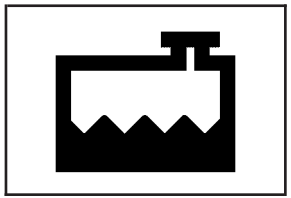
United States



Canada

This gage shows the engine coolant temperature. If the gage pointer moves into the red area, your engine coolant might have overheated and your engine may be too hot. You should pull off the road, stop your vehicle and turn off the engine as soon as possible. See *Engine Overheating on page 219* for more information.

Low Coolant Warning Light



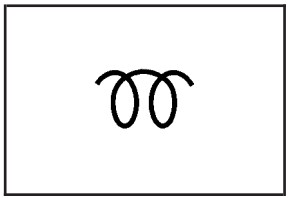
You have a low coolant warning light. If this light comes on, your system is low on coolant and the engine may overheat.

The warning light should come on briefly, as a check, when you turn on the ignition.

When it comes on, you will also hear a warning tone for 10 seconds. See *Engine Coolant on page 216* and have your vehicle serviced as soon as you can.

This light may also come on if your vehicle is equipped with the automatic engine shutdown system and engine shutdown has begun.

Wait to Start Indicator



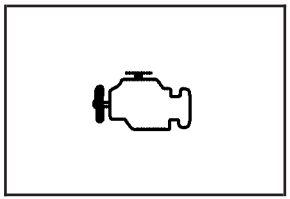
This indicator, in the center of the instrument panel, will come on when the glow plugs are on and the ignition key is in ON or START.

Wait until the indicator turns off before turning the ignition key to START.

When the temperature is below 32°F (0°C), you should wait no more than 10 seconds to start your vehicle. See *Ignition Positions on page 66* for more information.

Malfunction Indicator Lamp

Service Engine Soon Light



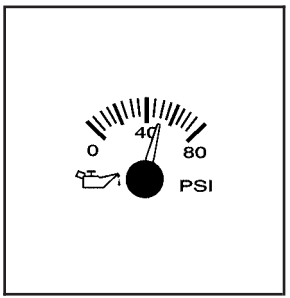
If this light comes on or flashes while you are driving, two things may happen.

First, you will not notice any difference in engine performance, but your tail pipe emissions may increase. Second, your engine may not run properly or may stall without warning. If either of these things happen, drive or tow your vehicle to your dealer for service.

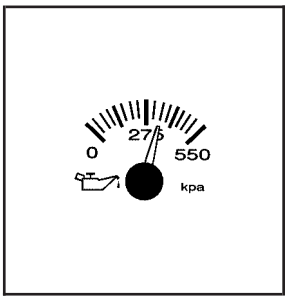
This light should come on when the ignition is on, but the engine is not running, as a check to show you it is working. If it does not come on at all, have it repaired.

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

Oil Pressure Gage



United States



Canada

The engine oil pressure gage, on the lower right portion of your instrument panel cluster, shows engine oil pressure in psi (pounds per square inch) or in kPa (kilopascals). Oil pressure may vary with outside temperature and oil viscosity, but readings of 30 to 40 psi (205 to 275 kPa) are normal. The normal operating range should be between 35 and 70 psi (240 to 480 kPa).

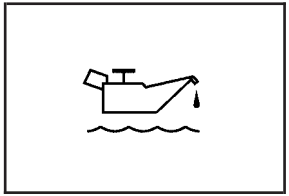
A reading in the low pressure zone may be caused by a dangerously low oil level or other problem. See *Engine Oil on page 206* and *Scheduled Maintenance on page 295* for more information.

⚠ CAUTION:

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

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

Low Oil Level Light



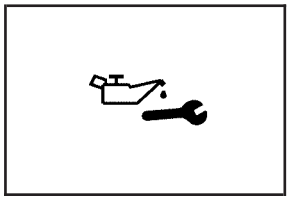
This light comes on briefly when the engine is started. This normal.

If the light fails to come on, have it repaired as soon as possible so you will be aware when the oil level is low.

If this light comes on and stays on, it means the engine is low on oil. You need to check the oil level right away. See *Engine Oil on page 206* for more information.

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

Change Engine Oil Light



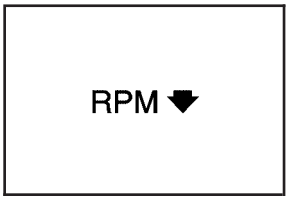
Your vehicle may have a change engine oil light.

It should come on briefly as a bulb check when you start the engine. If the light does not come on, have it serviced.

If the change engine oil light comes on and stays on after you start the engine, have the oil changed.

For additional information on when to change engine oil for Isuzu 6H diesel engines, see *Engine Oil on page 206*. To reset the change engine oil light, see *Engine Oil on page 206*.

Engine Overspeed Warning Light

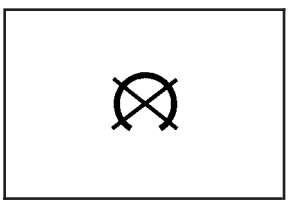


If your vehicle has this light, it will come on if your engine is operating at too many revolutions per minute (rpm).

It will also come on for a moment as a check when you start your engine.

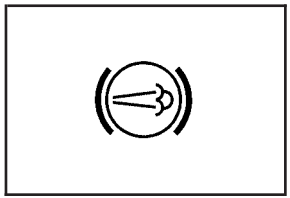
If it comes on when you're driving, reduce your engine speed immediately.

Engine Shutdown Warning Light



If your vehicle has the engine shutdown feature, this light will come on when engine shutdown is active.

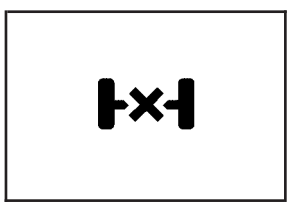
Exhaust Brake Indicator Light



For vehicles with an exhaust brake, this light is located above the climate controls.

The exhaust brake indicator light will come on and stay on whenever the diesel engine exhaust brake or exhaust restrictor is active. For more information, see *Diesel Engine Exhaust Brake on page 74*.

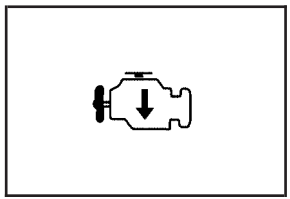
Differential Lock Indicator Light



If your vehicle has this feature, this light is located in the center of the instrument panel. The light is on when the inter-axle differential lock system is in use.

The light will come on momentarily during starting. If the light fails to come on, have it repaired as soon as possible so you will be aware when the lock system is in use.

Reduced Engine Power Light

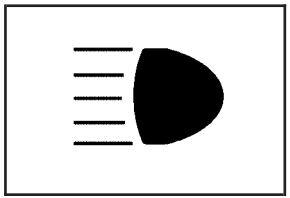


If the check engine and reduced engine power lights are on, the throttle may be disabled, and a noticeable change in the vehicle's performance may occur.

If the reduced engine power light is on, but there is no change in performance, proceed to your destination. The performance may be reduced the next time the vehicle is driven. The vehicle may be driven at a slower speed while the reduced engine power light is on, but acceleration and speed may be limited.

Anytime the check engine light stays on, the vehicle should be taken to an authorized dealer as soon as possible for service.

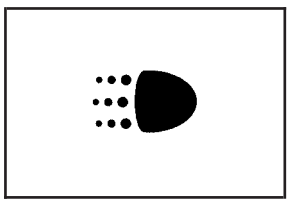
Highbeam On Light



This light comes on when the high-beam headlamps are in use.

See *Headlamp High/Low-Beam Changer on page 104* for more information.

Daytime Running Lamps (DRL) Indicator Light

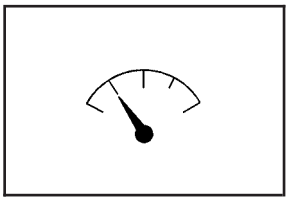


This light is located on the instrument panel cluster. It goes on whenever the Daytime Running Lamps are on.

See *Daytime Running Lamps (DRL) on page 111* for further information.

When it begins to get dark, the DRL indicator light is a reminder to turn on your headlamps.

Check Gages Warning Light

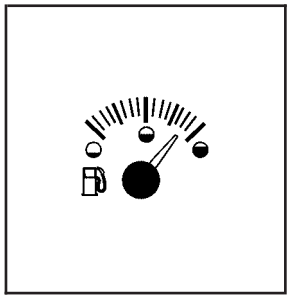


This light will come on as you're starting the engine, just as a check.

If it ever comes on and stays on while you are driving, however, it means that either your engine coolant temperature gage or your engine oil pressure gage may be showing a reading in the warning zone.

When the check gages light comes on, you will also hear a warning tone. The tone and the light will stay activated until the problem is corrected.

Fuel Gage



Your fuel gage is located on the right side of your instrument panel cluster.

When the ignition is on, your fuel gage lets you know about how much fuel you have left. When the gage first shows empty, you'll still have a little fuel left, but you should get more fuel soon.

If your vehicle has dual fuel tanks, the reading on the gage is the total fuel left in both tanks.

Here are four concerns of some operators. None of these shows a problem with your fuel gage:

- The gage moves a little when you turn a corner or speed up.
- The gage doesn't go back to empty when you turn off the ignition.
- At the gas station, the pump shuts off before the gage reads full.
- It takes a little more or less fuel to fill up than the gage indicated.

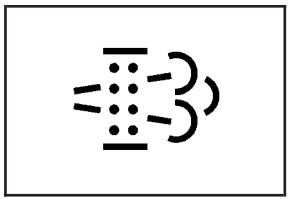
Water in Fuel Warning Light



If your vehicle is equipped with a diesel engine, this light will come on to warn you that there is water in the fuel system.

For more information on how this light works, see *Water in Fuel on page 198*.

Diesel Particulate Filter Warning Light

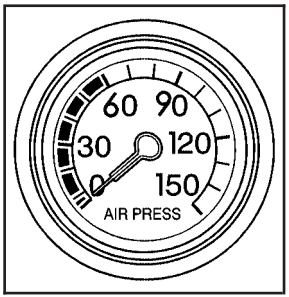


Your vehicle may have two Diesel Particulate Filter (DPF) Warning lights.

These lights will come on briefly when the ignition is turned to ON. One of these lights will come on green during DPF regeneration. If the other light comes on yellow, the vehicle can continue running, but at a reduced speed and duration. If the light changes from yellow to red, the DPF requires an immediate regeneration. If the DPF is not regenerated, the check engine light will come on and engine power will be reduced.

See *Diesel Particulate Filter on page 87* and *Reduced Engine Power Light on page 133* for more information.

Air Pressure Gage



If your vehicle has air brakes, this gage shows the air pressure for both your front and rear brake systems.

If the needle on the gage indicates that the air pressure is below 60 psi (415 kPa), the low air warning light will come on. An alarm will also sound if this happens.

The top pointer shows the pressure available for the front system, while the bottom pointer shows pressure for the rear. There should be no more than 4 psi (28 kPa) difference showing between the systems.

Don't drive until both pointers are showing at least 120 psi (830 kPa), so you'll have enough air if you need to apply your brakes.

Hourmeter Gage

To access the engine hourmeter gage press the trip odometer button three times.

The instrument panel cluster displays the accumulated engine run time hours using the reconfigurable odometer display. The engine run time hours displays only when the ignition is in the LOCK/OFF or ACC/ACCESSORY position and the trip reset switch is pressed for about four seconds.

When the ignition is in the LOCK/OFF or ACC/ACCESSORY position, the instrument panel cluster displays the engine accumulated hours for up to 30 seconds. The value of the accumulated hours does not change when the battery is disconnected.

The hourmeter resets to 0.0 when 10,000 hours are accumulated. The instrument panel cluster begins to reaccumulate the engine run time hours from 0.0 hours.

Audio System(s)

Determine which radio your vehicle has and then read the pages following to familiarize yourself with its features.

⚠ CAUTION:

This system provides you with far greater access to audio stations and song listings. Giving extended attention to entertainment tasks while driving can cause a crash and you or others can be injured or killed. Always keep your eyes on the road and your mind on the drive — avoid engaging in extended searching while driving.

Keeping your mind on the drive is important for safe driving. See *Defensive Driving on page 148*. Here are some ways in which you can help avoid distraction while driving.

While your vehicle is parked:

- Familiarize yourself with all of its controls.
- Familiarize yourself with its operation.
- Set up your audio system by presetting your favorite radio stations, setting the tone, and adjusting the speakers. Then, when driving conditions permit, you can tune to your favorite radio stations using the presets and steering wheel controls if the vehicle has them.

Notice: **Before adding any sound equipment to your vehicle, such as an audio system, CD player, CB radio, mobile telephone, or two-way radio, make sure that it can be added by checking with your dealer/retailer. Also, check federal rules covering mobile radio and telephone units. If sound equipment can be added, it is very important to do it properly. Added sound equipment may interfere with the operation of your vehicle's engine, radio, or other systems, and even damage them. Your vehicle's systems may interfere with the operation of sound equipment that has been added.**

Setting the Time

AM-FM Radio

Press and hold the DISP button. Press the up tuning button until the correct hour displays. Press the down tuning arrow until the correct minute displays. The time can be set with the ignition on or off.

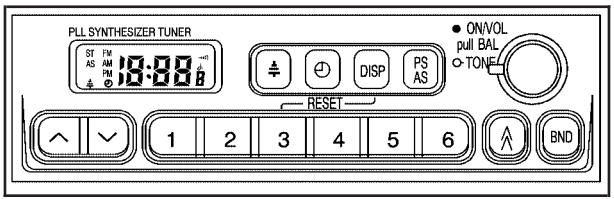
See "Using the Alarm" under *AM-FM Radio on page 139* to set the alarm.

Radio with Cassette

Press and hold the AM FM button. Then press the H button until the correct hour displays. Press and hold the M button until the correct minute displays. The time can be set with the ignition on or off.

See "Using the Alarm" under *Radio with Cassette on page 142* to set the alarm.

AM-FM Radio



Playing the Radio

ON (Power): Press this knob to turn the system on and off.

VOL (Volume): Turn this knob clockwise or counterclockwise to increase or to decrease the volume.

DISP (Display): Press this knob to switch the display between the radio station frequency, the time, and the alarm status.

Finding a Station

BND (Band): Press this button to switch between FM or AM. The display shows the selection.

(Tune): Press the down arrow to go to the previous radio frequency. Press the up arrow to go to the next radio frequency.

To seek stations, press and hold either the down or up arrow for a second or longer. The radio seeks to the next or previous station.

The radio only seeks stations with a strong signal that are in the selected band.

(Scan): Press the button to scan radio stations. The radio goes to a station, plays for a few seconds, then goes to the next station. Press the button again to stop scanning.

The radio only scans stations with a strong signal that are in the selected band.

PS AS (Preset Scan/Auto Scan): Press this button for less than two seconds to scan preset stations. The radio goes to the first preset station, plays for a few seconds, then goes to the next preset station. Press this button again to stop scanning presets.

The radio only scans preset stations with a strong signal that are in the selected band.

Setting Preset Stations

Up to 12 stations (six FM and six AM) can be programmed on the six numbered pushbuttons, by performing the following steps:

1. Turn the radio on.
2. Press BND to select FM or AM.
3. Tune in the desired station.
4. Press and hold one of the six numbered pushbuttons for two seconds or longer. When that numbered pushbutton is pressed, the station that was set, returns.
5. Repeat Steps 2 through 4 for each pushbutton.

To automatically store the preset pushbuttons, perform the following steps:

1. Turn the radio on.
2. Press BND to select FM or AM.
3. Press and hold the AS button for more than two seconds. The radio stores, the first six strongest stations found, onto the radio preset pushbuttons. When that numbered pushbutton is pressed, the station that was set, returns.

Setting the Tone (Bass/Treble)

TONE: To adjust the bass, turn the control ring behind the ON/VOL knob counterclockwise.

To adjust the treble, turn the control ring behind the ON/VOL knob clockwise. If a station is weak or has static, decrease the treble.

Adjusting the Speakers (Balance/Fade)

BAL (Balance): To adjust the balance between the right and the left speakers, pull the ON/VOL knob out. Turn the knob to move the sound to the right or the left speakers. The middle position balances the sound between the speakers. Push the knob back in when not in use.

Using the Timer

(Timer): The timer on the radio can be used to set a time from 15 minutes up to three hours.

To set the timer, press the button. The timer symbol and 0:00 displays. With each press of this button, the time increases. An alarm sounds for two minutes, when the time expires.

Using the Alarm

(Alarm): The alarm on the radio can be used to activate an alarm at a desired time.

To set the alarm, perform the following:

1. Press the DISP button until the alarm symbol displays.
2. Press the alarm button while the alarm symbol is flashing, until the letter A displays.
3. Press the up tuning arrow to change the hour.
4. Press the down tuning arrow to change the minutes. After setting the alarm, the display changes back to the current time.
5. Press the alarm button, again. The alarm symbol displays. The alarm sounds at the same time every day.
6. To turn the alarm off, press the alarm button.
7. To deactivate the alarm, press the alarm button.

To check the time of the alarm, press the DISP button.

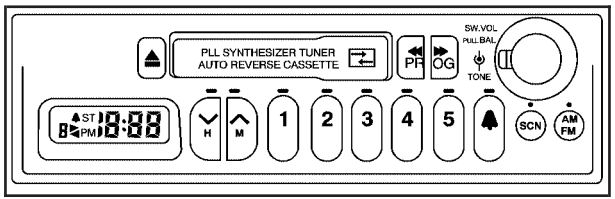
Using the Wake-Up Timer

The wake-up timer can be used to turn the radio on at a specific time, without the key in the ignition.

1. Press the DISP button until the alarm symbol displays.
2. Press the alarm button while the alarm symbol is flashing, until the letter U displays.
3. Press the up tuning arrow to change the hour.
4. Press the down tuning arrow to change the minutes. After setting the timer, the display changes back to the current time.

   When the set time comes, the radio is switched on and remains on for one hour.
5. To turn the radio off, press the alarm button.

Radio with Cassette



Playing the Radio

Power: Press the knob located on the upper right side of the radio faceplate to turn the system on and off.

SW.VOL (Volume): Turn the same knob located on the upper right side of the radio clockwise or counterclockwise to increase or to decrease the volume.

∨∧ **(Tune):** Press the down ∨ arrow to go to the previous radio frequency. Press the up ∧ arrow to go to the next radio frequency.

To seek stations, press and hold either the down ∨ or up ∧ arrow for a second or longer. The radio seeks to the next or previous station.

The radio only seeks stations with a strong signal that are in the selected band.

Finding a Station

AM FM: Press this button to switch between AM or FM. The display shows the selection.

SCN (Scan): Press and release this button to scan radio stations. The radio goes to a station, plays for a few seconds, then goes to the next station. Press this button again to stop scanning.

The radio only scans stations with a strong signal that are in the selected band.

Setting Preset Stations

Up to 10 stations (five FM and five AM) can be programmed on the five numbered pushbuttons, by performing the following steps:

1. Turn the radio on.
2. Press AM FM to select AM or FM.
3. Tune in the desired station.
4. Press and hold one of the six numbered pushbuttons for two seconds or longer. When that numbered pushbutton is pressed, the station that was set returns.
5. Repeat the steps for each pushbutton.

Setting the Tone (Bass/Treble)

TONE: To adjust the bass, turn the control ring behind the power/volume knob counterclockwise.

To adjust the treble, turn the control ring behind the power/volume knob clockwise. If a station is weak or has static, decrease the treble.

Adjusting the Speakers (Balance/Fade)

PULL BAL (Balance): To adjust the balance between the right and the left speakers, pull the power/volume knob out. Turn the knob to move the sound to the right or the left speakers. The middle position balances the sound between the speakers. Push the knob back in when not in use.

Using the Alarm

(Alarm): The alarm on the radio can be used to activate an alarm at a desired time.

To set the alarm, perform the following:

1. Press the button until the alarm symbol displays.
2. Press the button again until the display flashes.
3. Press the up tuning arrow to change the hour.
4. Press the down tuning arrow to change the minutes. After setting the alarm, the display changes back to the current time.
5. Press the alarm button, again and the alarm symbol displays. The alarm sounds at the same time every day.
6. To turn the alarm off, press the button.
7. To deactivate the alarm, press the alarm button.

To check the time of the alarm, press the button.

Playing a Cassette Tape

The tape player is built to work best with tapes that are up to 30 to 45 minutes long on each side. Tapes longer than that are so thin they may not work well in this player. The longer side with the tape visible should face to the right. If you hear nothing or hear a garbled sound, the tape might not be in squarely. Press the (eject) button to remove the tape and start over.

If the ignition is on and the radio is off, the tape can be inserted and begins playing.

While the tape is playing, use the VOL, TONE, and BAL controls just as you do for the radio. The radio displays an arrow to show the tape direction. The tape player plays the other side of the tape when it reaches the end.

The tape bias is set automatically when a metal or chrome tape is inserted.

PR / OG (Fast Forward/Reverse): Press either arrow to either fast forward or reverse the tape, depending on the direction of the tape as indicated on the display. To stop fast forwarding or reversing, press the other arrow.

PROG (Program): Press both arrows at the same time to play the other side of the tape. An arrow appears on the display to show the tape playing direction.

AM FM: Press this button to switch between playing the radio and the tape. The inactive tape remains safely inside the radio for future listening.

⏏ **(Eject):** Press the ⏏ button to eject a tape. Eject can be activated with the radio off. Cassette tapes can be loaded with the ignition and radio off if this button is pressed first.

Radio Reception

Frequency interference and static during normal radio reception can occur if items such as cell phone chargers, vehicle convenience accessories, and external electronic devices are plugged into the accessory power outlet. If there is interference or static, unplug the item from the accessory power outlet.

AM

The range for most AM stations is greater than for FM, especially at night. The longer range can cause station frequencies to interfere with each other. For better radio reception, most AM radio stations boost the power levels during the day, and then reduce these levels during the night. Static can also occur when things like storms and power lines interfere with radio reception. When this happens, try reducing the treble on your radio.

FM Stereo

FM stereo gives the best sound, but FM signals reach only about 10 to 40 miles (16 to 65 km). Tall buildings or hills can interfere with FM signals, causing the sound to fade in and out.

Care of the Cassette Tape Player

A tape player that is not cleaned regularly can cause reduced sound quality, ruined cassettes or a damaged mechanism. Cassette tapes should be stored in their cases away from contaminants, direct sunlight, and extreme heat. If they are not, they may not operate properly or may cause failure of the tape player.

The tape player should be cleaned regularly after every 50 hours of use. If there is a reduction in sound quality, try a known good cassette to see if the tape or the tape player is at fault. If this other cassette has no improvement in sound quality, clean the tape player.

For best results, use a scrubbing action, non-abrasive cleaning cassette with pads which scrub the tape head as the hubs of the cleaner cassette turn. The recommended cleaning cassette is available through your dealer.

A non-scrubbing action, wet-type cleaner which uses a cassette with a fabric belt to clean the tape head can be used. This type of cleaning cassette will not eject on its own. A non-scrubbing action cleaner may not clean as thoroughly as the scrubbing type cleaner. The use of a non-scrubbing action, dry-type cleaning cassette is not recommended.

Cassettes are subject to wear and the sound quality may degrade over time. Always make sure the cassette tape is in good condition before the tape player is serviced.

Fixed Mast Antenna

The antenna is located in front of the driver's side door at the top of the cab. Push the antenna back in to retract it. The antenna should be retracted when entering low clearance areas.

Section 4 Driving Your Vehicle

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Your Driving, the Road, and Your Vehicle

Defensive Driving

The best advice anyone can give about driving is: Drive defensively.

Please start with a very important safety device in your vehicle: Buckle up. See *Safety Belts: They Are for Everyone on page 28*.

⚠ CAUTION:

Defensive driving really means "Be ready for anything." On city streets, rural roads, or expressways, it means "Always expect the unexpected." Assume that pedestrians or other drivers are going to be careless and make mistakes. Anticipate what they might do and be ready. Rear-end collisions are about the most preventable of accidents. Yet they are common. Allow enough following distance. Defensive driving requires that a driver concentrate on the driving task. Anything that distracts from the driving task makes proper defensive driving more difficult and can even cause a collision, with resulting injury. Ask a passenger to help do these things, or pull off the road in a safe place to do them. These simple defensive driving techniques could save your life.

Drunken Driving

Death and injury associated with drinking and driving is a national tragedy. It is the number one contributor to the highway death toll, claiming thousands of victims every year.

Alcohol affects four things that anyone needs to drive a vehicle:

- Judgment
- Muscular Coordination
- Vision
- Attentiveness

Police records show that almost half of all motor vehicle-related deaths involve alcohol. In most cases, these deaths are the result of someone who was drinking and driving. In recent years, more than 16,000 annual motor vehicle-related deaths have been associated with the use of alcohol, with more than 300,000 people injured.

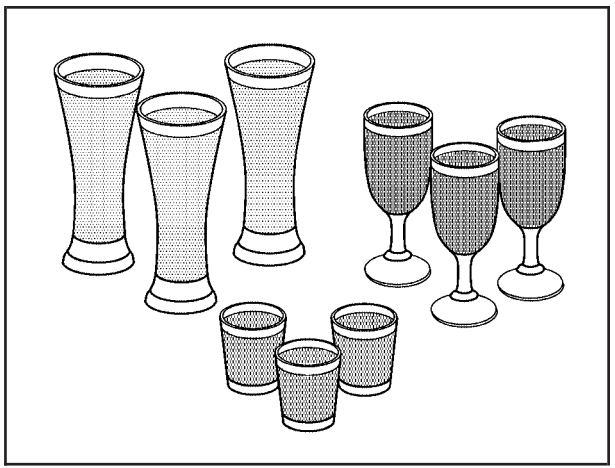
Many adults — by some estimates, nearly half the adult population — choose never to drink alcohol, so they never drive after drinking. For persons under 21, it is against the law in every U.S. state to drink alcohol. There are good medical, psychological, and developmental reasons for these laws.

The obvious way to eliminate the leading highway safety problem is for people never to drink alcohol and then drive. But what if people do? How much is “too much” if someone plans to drive? It is a lot less than many might think. Although it depends on each person and situation, here is some general information on the problem.

The Blood Alcohol Concentration (BAC) of someone who is drinking depends upon four things:

- The amount of alcohol consumed
- The drinker’s body weight
- The amount of food that is consumed before and during drinking
- The length of time it has taken the drinker to consume the alcohol

According to the American Medical Association, a 180 lb (82 kg) person who drinks three 12 ounce (355 ml) bottles of beer in an hour will end up with a BAC of about 0.06 percent. The person would reach the same BAC by drinking three 4 ounce (120 ml) glasses of wine or three mixed drinks if each had 1-1/2 ounces (45 ml) of liquors like whiskey, gin, or vodka.



It is the amount of alcohol that counts. For example, if the same person drank three double martinis (3 ounces or 90 ml of liquor each) within an hour, the person's BAC would be close to 0.12 percent. A person who consumes food just before or during drinking will have a somewhat lower BAC level.

There is a gender difference, too. Women generally have a lower relative percentage of body water than men. Since alcohol is carried in body water, this means that a woman generally will reach a higher BAC level than a man of her same body weight will when each has the same number of drinks.

The law in most U.S. states, and throughout Canada, sets the legal limit at 0.08 percent. In some other countries, the limit is even lower. For example, it is 0.05 percent in both France and Germany. The BAC limit for all commercial drivers in the United States is 0.04 percent.

The BAC will be over 0.10 percent after three to six drinks (in one hour). Of course, as we have seen, it depends on how much alcohol is in the drinks, and how quickly the person drinks them.

But the ability to drive is affected well below a BAC of 0.10 percent. Research shows that the driving skills of many people are impaired at a BAC approaching 0.05 percent, and that the effects are worse at night. All drivers are impaired at BAC levels above 0.05 percent. Statistics show that the chance of being in a collision increases sharply for drivers who have a BAC of 0.05 percent or above. A driver with a BAC level of 0.06 percent has doubled his or her chance of having a collision. At a BAC level of 0.10 percent, the chance of this driver having a collision is 12 times greater; at a level of 0.15 percent, the chance is 25 times greater!

The body takes about an hour to rid itself of the alcohol in one drink. No amount of coffee or number of cold showers will speed that up. "I will be careful" is not the right answer. What if there is an emergency, a need to take sudden action, as when a child darts into the street? A person with even a moderate BAC might not be able to react quickly enough to avoid the collision.

There is something else about drinking and driving that many people do not know. Medical research shows that alcohol in a person's system can make crash injuries worse, especially injuries to the brain, spinal cord, or heart. This means that when anyone who has been drinking — driver or passenger — is in a crash, that person's chance of being killed or permanently disabled is higher than if the person had not been drinking.

⚠ CAUTION:

Drinking and then driving is very dangerous. Your reflexes, perceptions, attentiveness, and judgment can be affected by even a small amount of alcohol. You can have a serious — or even fatal — collision if you drive after drinking. Please do not drink and drive or ride with a driver who has been drinking. Ride home in a cab; or if you are with a group, designate a driver who will not drink.

Control of a Vehicle

The following three systems help to control your vehicle while driving — brakes, steering, and accelerator. At times, as when driving on snow or ice, it is easy to ask more of those control systems than the tires and road can provide. Meaning, you can lose control of your vehicle.

Braking

See *Brake System Warning Light on page 124*.

Braking action involves perception time and reaction time. First, you have to decide to push on the brake pedal. That is perception time. Then you have to bring up your foot and do it. That is reaction time.

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. So do alcohol, drugs and frustration. But even in three-fourths of a second, a vehicle moving at 60 mph (100 km/h) travels 66 feet (20 m). That could be a lot of distance in an emergency, so keeping enough space between your vehicle and others is important.

And, of course, actual stopping distances vary greatly with 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.

Avoid needless heavy braking. Some people drive in spurts — heavy acceleration followed by heavy braking — rather than keeping pace with traffic. This is a mistake. The brakes might not have time to cool between hard stops. The brakes will wear out much faster if you do a lot of heavy braking. If you keep pace with the traffic and allow realistic following distances, you will eliminate a lot of unnecessary braking. That means better braking and longer brake life.

If your vehicle's engine ever stops while you are driving, brake normally but do not pump the brakes. If you do, the pedal could get harder to push down. If the engine stops, you will still have some power brake assist. But you will use it when you brake. Once the power assist is used up, it can take longer to stop and the brake pedal will be harder to push.

Hydraulic Brake Systems

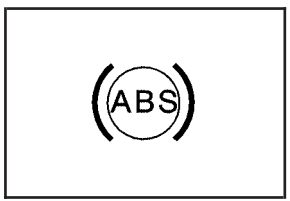
If the engine stops running, or if the primary brake system stops working, your vehicle has a reserve power assist system to help you slow down. Just slowly and steadily apply the brake pedal until you can safely get off the road. The pedal will seem harder to push down. Do not pump the pedal; the system will not work well that way.

You might find that the steering wheel seems hard to turn when you are turning and braking at the same time. Also, the primary brake warning light might come on and the warning tone might sound. This is normal because the main hydraulic brake system and power steering both use the power steering pump. If this ever happens, let up on the brake pedal a little. When you let up on the brake pedal in that situation, it lets the steering get a little more help from the pump.

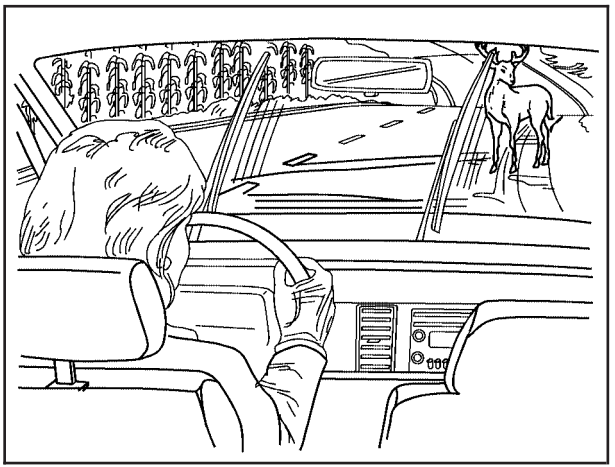
Antilock Brake System (ABS)

Your vehicle has the Antilock Brake System (ABS), an advanced electronic braking system that will help prevent a braking skid.

When you start the engine and begin to drive away, ABS will check itself. You might hear a momentary motor or clicking noise while this test is going on. This is normal.



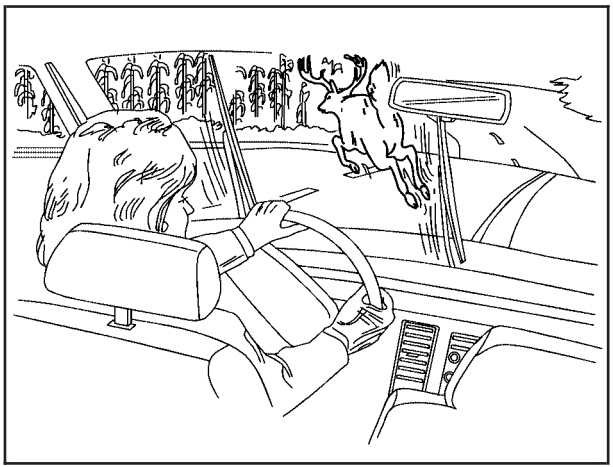
If there is a problem with ABS, this warning light will stay on. See *Antilock Brake System Warning Light on page 127*.



Let us say the road is wet and you are driving safely. Suddenly, an animal jumps out in front of you. You slam on the brakes and continue braking. Here is what happens with ABS:

A computer senses that wheels are slowing down. If one of the wheels is about to stop rolling, the computer will separately work the brakes at each wheel.

ABS can change the brake pressure faster than any driver could. The computer is programmed to make the most of available tire and road conditions. This can help you steer around the obstacle while braking hard.



As you brake, the computer keeps receiving updates on wheel speed and controls braking pressure accordingly.

Remember: ABS does not change the time you need to get your foot up to the brake pedal or always decrease stopping distance. If you get too close to the vehicle in front of you, you will not have time to apply the brakes if that vehicle suddenly slows or stops. Always leave enough room up ahead to stop, even though you have ABS.

Using ABS

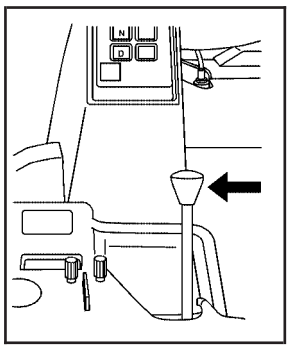
Do not pump the brakes. Just hold the brake pedal down firmly and let antilock work for you. You might feel the brakes pulsate, or you might hear air exhausting if your vehicle has air brakes, but this is normal.

Braking in Emergencies

With ABS, you can steer and brake at the same time. In many emergencies, steering can help you more than even the very best braking.

Trailer Brake Hand Control Valve

If your vehicle has this feature, the control is mounted on the floor console.



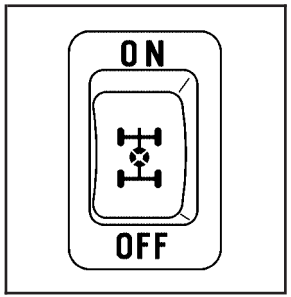
This feature lets you apply the trailer brakes without applying the tractor brakes.

You can apply the trailer brakes a little or apply them all the way if you have to. Use this control only when you are driving. Do not use it for parking or to hold the rig on a hill.

⚠ CAUTION:

Using the trailer brake hand control for parking or for holding the vehicle on a hill may not keep the vehicle from rolling. This can happen if someone hits the valve by accident, or if air pressure bleeds from the system. If the vehicle rolls, you or others could be injured. To park the vehicle or hold it on a hill, use the parking brake properly.

Rear Axle Differential Lock Control



If your vehicle has a controlled traction or locking differential axle, the switch is located in the center of the instrument panel.

You'll see this control on single rear axle vehicles.

If you're approaching a slippery surface where it looks like one or even both wheels may start to slip, you can press the switch to off. It locks your rear differential so that power is transmitted equally to both rear wheels.

Let up on the accelerator before you turn on your rear axle differential lock.

Notice: **Turning on the inter-axle differential lock while the rear wheels are spinning freely, as they might on snow or ice, can damage the axle(s). Turn on this control only while the wheels are not spinning freely.**

Traction Control System (TCS)

Your vehicle may have a traction control system that limits wheel spin. This is especially useful in slippery road conditions. The system operates only if it senses that one or both of the rear wheels are spinning or beginning to lose traction. When this happens, the system applies the brake(s) at the affected wheel(s).

The bottom light on the TCS on/off button will come on when the TCS is limiting wheel spin. You may feel or hear the system working, but this is normal. The TCS will function at speeds up to about 25 mph (42 km/h).

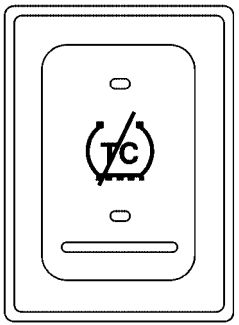
The TCS may operate on dry roads under some conditions. When this happens, you may notice a reduction in acceleration. This is normal and doesn't mean there's a problem with your vehicle. Examples of these conditions include a hard acceleration in a turn, an abrupt upshift or downshift of the transmission or driving on rough roads.

When the light in the top of the TCS button is on, the TCS is off and will not limit wheel spin. Adjust your driving accordingly.

The light in the top of the TCS button will come on if the TCS is turned off by pressing the TCS on/off button.

The light may also come on if a problem has been detected in either the traction control system or the anti-lock brake system.

The traction control system automatically comes on whenever you start your vehicle. To limit wheel spin, especially in slippery road conditions, you should always leave the system on. But you can turn the traction control system off if you ever need to. You should turn the system off if your vehicle ever gets stuck in sand, mud or snow and rocking the vehicle is required. See *Rocking Your Vehicle to Get It Out on page 179* for more information.



To turn the system on or off, press the traction control button located on the instrument panel.

If you used the TCS button to turn the system off, the light in the top of the button will come on and stay on. You can turn the TCS back on at any time by pressing the button again; the light should go off.

Adding non-dealer/non-retailer accessories can affect your vehicle's performance. See *Accessories and Modifications on page 191* for more information.

Steering

Power Steering

If you lose power steering assist because the engine stops or the system is not functioning, you can steer but it will take much more effort.

On vehicles with hydraulic brakes, the power steering and main hydraulic brake system both use the power steering pump. See *Braking on page 152*.

Steering Tips

Driving on Curves

It is important to take curves at a reasonable speed.

A lot of the “driver lost control” accidents mentioned on the news happen on curves. Here is why:

Experienced driver or beginner, each of us is subject to the same laws of physics when driving on curves. The traction of the tires against the road surface makes it possible for the vehicle to change its path when you turn the front wheels.

If there is no traction, inertia will keep the vehicle going in the same direction. If you have ever tried to steer a vehicle on wet ice, you will understand this.

The traction you can get in a curve depends on the condition of the tires and the road surface, the angle at which the curve is banked, and your speed. While you are in a curve, speed is the one factor you can control.

Suppose you are steering through a sharp curve. Then you suddenly accelerate. Both control systems — steering and acceleration — have to do their work where the tires meet the road. Adding the sudden acceleration can demand too much of those places. You can lose control. See *Traction Control System (TCS) on page 157*.

What should you do if this ever happens? Ease up on the accelerator pedal, steer the vehicle the way you want it to go, and slow down.

Speed limit signs near curves warn that you should adjust your speed. Of course, the posted speeds are based on good weather and road conditions. Under less favorable conditions you will want to go slower.

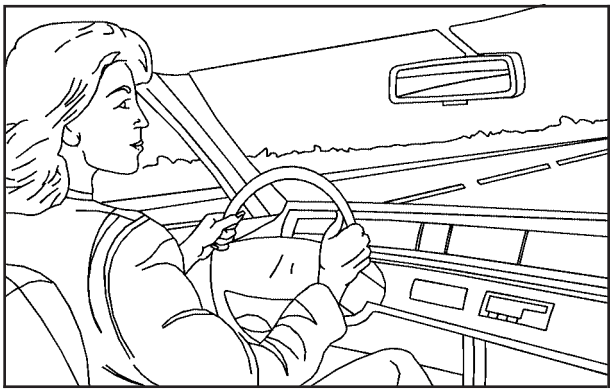
If you need to reduce your speed as you approach a curve, do it before you enter the curve, while the front wheels are straight ahead.

Try to adjust your speed so you can “drive” through the curve. Maintain a reasonable, steady speed. Wait to accelerate until you are out of the curve, and then accelerate gently into the straightaway.

Steering in Emergencies

There are times when steering can be more effective than braking. For example, you come over a hill and find a truck stopped in your lane, or a car suddenly pulls out from nowhere, or a child darts out from between parked cars and stops right in front of you. You can avoid these problems by braking — if you can stop in time. But sometimes you cannot; there is not room. That is the time for evasive action — steering around the problem.

Your vehicle can perform very well in emergencies like these. First apply the brakes. See *Braking on page 152*. It is better to remove as much speed as you can from a possible collision. Then steer around the problem, to the left or right depending on the space available.

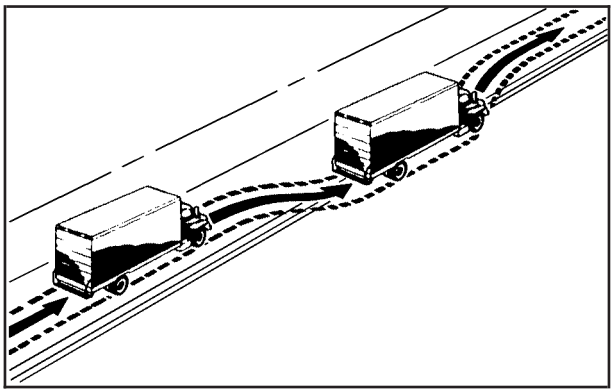


An emergency like this requires close attention and a quick decision. If you are holding the steering wheel at the recommended 9 and 3 o’clock positions, you can turn it a full 180 degrees very quickly without removing either hand. But you have to act fast, steer quickly, and just as quickly straighten the wheel once you have avoided the object.

The fact that such emergency situations are always possible is a good reason to practice defensive driving at all times and wear safety belts properly.

Off-Road Recovery

You may find that your right wheels have dropped off the edge of a road onto the shoulder while you are driving.



If the level of the shoulder is only slightly below the pavement, recovery should be fairly easy. Ease off the accelerator and then, if there is nothing in the way, steer so that your vehicle straddles the edge of the pavement. You can turn the steering wheel up to one-quarter turn until the right front tire contacts the pavement edge. Then turn your steering wheel to go straight down the roadway.

Passing

The driver of a vehicle about to pass another on a two-lane highway waits for just the right moment, accelerates, moves around the vehicle ahead, then goes back into the right lane again. A simple maneuver?

Not necessarily! Passing another vehicle on a two-lane highway is a potentially dangerous move, since the passing vehicle occupies the same lane as oncoming traffic for several seconds. A miscalculation, an error in judgment, or a brief surrender to frustration or anger can suddenly put the passing driver face to face with the worst of all traffic accidents — the head-on collision.

So here are some tips for passing:

- A vehicle like yours takes a longer time to reach passing speed, so you will need a longer stretch of clear road ahead than you would with a passenger car.
- Drive ahead. Look down the road, to the sides, and to crossroads for situations that might affect your passing patterns. If you have any doubt whatsoever about making a successful pass, wait for a better time.
- Watch for traffic signs, pavement markings, and lines. If you can see a sign up ahead that might indicate a turn or an intersection, delay your pass. A broken center line usually indicates it is all right to pass, providing the road ahead is clear. Never cross a solid line on your side of the lane or a double solid line, even if the road seems empty of approaching traffic.
- Do not get too close to the vehicle you want to pass while you are awaiting an opportunity. For one thing, following too closely reduces your area of vision, especially if you are following a larger vehicle. Also, you will not have adequate space if the vehicle ahead suddenly slows or stops. Keep back a reasonable distance.
- When it looks like a chance to pass is coming up, start to accelerate but stay in the right lane and do not get too close. Time your move so you will be increasing speed as the time comes to move into the other lane. If the way is clear to pass, you will have a running start that more than makes up for the distance you would lose by dropping back. And if something happens to cause you to cancel your pass, you need only slow down and drop back again and wait for another opportunity.
- If other cars are lined up to pass a slow vehicle, wait your turn. But take care that someone is not trying to pass you as you pull out to pass the slow vehicle.

- Check your vehicle's mirrors and start the left lane change signal before moving out of the right lane to pass. When you are far enough ahead of the passed vehicle to see its front in your vehicle's passenger side outside mirror, activate the right lane change signal and move back into the right lane. Remember that an outside convex mirror makes the vehicle you just passed seem farther away from you than it really is.
- Try not to pass more than one vehicle at a time on two-lane roads. Reconsider before passing the next vehicle.
- Do not overtake a slowly moving vehicle too rapidly. Even though the brake lamps are not flashing, it might be slowing down or starting to turn.
- If you are being passed, make it easy for the following driver to get ahead of you. Perhaps you can ease a little to the right.

Loss of Control

Let us review what driving experts say about what happens when the three control systems — brakes, steering, and acceleration — do not have enough friction where the tires meet the road to do what the driver has asked.

In any emergency, do not give up. Keep trying to steer and constantly seek an escape route or area of less danger.

Skidding

In a skid, a driver can lose control of the vehicle. Defensive drivers avoid most skids by taking reasonable care suited to existing conditions, and by not overdriving those conditions. But skids are always possible.

The three types of skids correspond to your vehicle's three control systems. In the braking skid, the wheels are not rolling. In the steering or cornering skid, too much speed or steering in a curve causes tires to slip and lose cornering force. And in the acceleration skid, too much throttle causes the driving wheels to spin.

A cornering skid is best handled by easing your foot off the accelerator pedal.

If you have the Traction Control System (TCS), remember: It helps avoid only the acceleration skid. See *Traction Control System (TCS) on page 157*. If you do not have this system, or if the system is off, then an acceleration skid is also best handled by easing your foot off the accelerator pedal.

Of course, traction is reduced when water, snow, ice, gravel, or other material is on the road. For safety, you will want to slow down and adjust your driving to these conditions. It is important to slow down on slippery surfaces because stopping distance will be longer and vehicle control more limited.

While driving on a surface with reduced traction, try your best to avoid sudden steering, acceleration, or braking, including reducing vehicle speed by shifting to a lower gear. Any sudden changes could cause the tires to slide. You may not realize the surface is slippery until your vehicle is skidding. Learn to recognize warning clues — such as enough water, ice, or packed snow on the road to make a mirrored surface — and slow down when you have any doubt.

If you have the Antilock Brake System (ABS), remember: It helps avoid only the braking skid. If you do not have ABS, then in a braking skid, where the wheels are no longer rolling, release enough pressure on the brakes to get the wheels rolling again. This restores steering control. Push the brake pedal down steadily when you have to stop suddenly. As long as the wheels are rolling, you will have steering control.

Driving at Night

Night driving is more dangerous than day driving. One reason is that some drivers are likely to be impaired — by alcohol or drugs, with night vision problems, or by fatigue.

Here are some tips on night driving.

- Drive defensively.
- Do not drink and drive.
- Adjust the inside rearview mirror to reduce the glare from headlamps behind you.
- Since you cannot see as well, slow down and keep more space between you and other vehicles.
- Slow down, especially on higher speed roads. Your vehicle's headlamps can light up only so much road ahead.
- In remote areas, watch for animals.
- If you are tired, pull off the road in a safe place and rest.

No one can see as well at night as in the daytime. But as we get older these differences increase. A 50-year-old driver might require at least twice as much light to see the same thing at night as a 20-year-old.

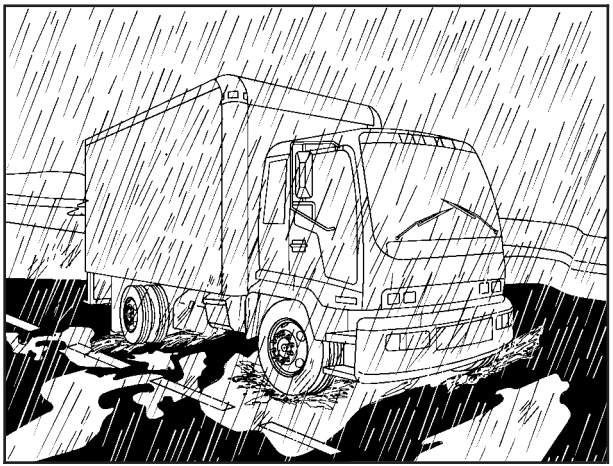
What you do in the daytime can also affect your night vision. For example, if you spend the day in bright sunshine you are wise to wear sunglasses. Your eyes will have less trouble adjusting to night. But if you are driving, do not wear sunglasses at night. They might cut down on glare from headlamps, but they also make a lot of things invisible.

You can be temporarily blinded by approaching headlamps. It can take a second or two, or even several seconds, for your eyes to re-adjust to the dark. When you are faced with severe glare, as from a driver who does not lower the high beams, or a vehicle with misaimed headlamps, slow down a little. Avoid staring directly into the approaching headlamps.

Keep the windshield and all the glass on your vehicle clean — inside and out. Glare at night is made much worse by dirt on the glass. Even the inside of the glass can build up a film caused by dust. Dirty glass makes lights dazzle and flash more than clean glass would, making the pupils of your eyes contract repeatedly.

Remember that the headlamps light up far less of a roadway when you are in a turn or curve. Keep your eyes moving; that way, it is easier to pick out dimly lighted objects. Just as the headlamps should be checked regularly for proper aim, so should your eyes be examined regularly. Some drivers suffer from night blindness — the inability to see in dim light — and are not even aware of it.

Driving in Rain and on Wet Roads



Rain and wet roads can mean driving trouble. On a wet road, you cannot stop, accelerate, or turn as well because your tire-to-road traction is not as good as on dry roads. And, if your tires do not have much tread left, you will get even less traction.

It is always wise to go slower and be cautious if rain starts to fall while you are driving. The surface may get wet suddenly when your reflexes are tuned for driving on dry pavement.

The heavier the rain, the harder it is to see. Even if your windshield wiper blades are in good shape, a heavy rain can make it harder to see road signs and traffic signals, pavement markings, the edge of the road, and even people walking.

It is wise to keep your wiping equipment in good shape and keep your windshield washer fluid reservoir filled with washer fluid. Replace your windshield wiper inserts when they show signs of streaking or missing areas on the windshield, or when strips of rubber start to separate from the inserts.

⚠ CAUTION:

Wet brakes can cause accidents. They may not work as well in a quick stop and may cause pulling to one side. You could lose control of the vehicle.

After driving through a large puddle of water or a vehicle wash, apply your brake pedal lightly until your brakes work normally.

Driving too fast through large water puddles or even going through some vehicle washes can cause problems, too. The water may affect your brakes. Try to avoid puddles. But if you cannot, try to slow down before you hit them.

Hydroplaning

Hydroplaning is dangerous. So much water can build up under your tires that they can actually ride on the water. This can happen if the road is wet enough and you are going fast enough. When your vehicle is hydroplaning, it has little or no contact with the road.

Hydroplaning does not happen often. But it can if your tires do not have much tread or if the pressure in one or more is low. It can happen if a lot of water is standing on the road. If you can see reflections from trees, telephone poles, or other vehicles, and raindrops dimple the water's surface, there could be hydroplaning.

Hydroplaning usually happens at higher speeds. There just is not a hard and fast rule about hydroplaning. The best advice is to slow down when it is raining.

Driving Through Deep Standing Water

Notice: **If you drive too quickly through deep puddles or standing water, water can come in through the engine's air intake and badly damage the engine. Never drive through water that is slightly lower than the underbody of your vehicle. If you cannot avoid deep puddles or standing water, drive through them very slowly.**

Driving Through Flowing Water

⚠ CAUTION:

Flowing or rushing water creates strong forces. If you try to drive through flowing water, as you might at a low water crossing, your vehicle can be carried away. As little as six inches of flowing water can carry away a smaller vehicle. If this happens, you and other vehicle occupants could drown. Do not ignore police warning signs, and otherwise be very cautious about trying to drive through flowing water.

Some Other Rainy Weather Tips

- Turn on your low-beam headlamps and your marker and clearance lamps, if your vehicle has them — not just your parking lamps — to help make you more visible to others.
- Besides slowing down, allow some extra following distance. And be especially careful when you pass another vehicle. Allow yourself more clear room ahead, and be prepared to have your view restricted by road spray.
- Have good tires with proper tread depth. See *Tires on page 254*.

City Driving



One of the biggest problems with city streets is the amount of traffic on them. You will want to watch out for what the other drivers are doing and pay attention to traffic signals.

Here are ways to increase your safety in city driving:

- Know the best way to get to where you are going. Get a city map and plan your trip into an unknown part of the city just as you would for a cross-country trip.
- Larger vehicles cannot be driven everywhere smaller ones can. There are low underpasses, truck routes and other special situations. Usually these are well marked, so be sure to watch for the signs.
- Try to use the freeways that rim and crisscross most large cities. You will save time and energy. See *Freeway Driving on page 170*.
- Treat a green light as a warning signal. A traffic light is there because the corner is busy enough to need it. When a light turns green, and just before you start to move, check both ways for vehicles that have not cleared the intersection or may be running the red light.

Freeway Driving



Mile for mile, freeways — also called thruways, parkways, expressways, turnpikes, or superhighways — are the safest of all roads. But they have their own special rules.

The most important advice on freeway driving is: Keep up with traffic and keep to the right. Drive at the same speed most of the other drivers are driving. Too-fast or too-slow driving breaks a smooth traffic flow. Treat the left lane on a freeway as a passing lane.

At the entrance, there is usually a ramp that leads to the freeway. If you have a clear view of the freeway as you drive along the entrance ramp, you should begin to check traffic. Try to determine where you expect to blend with the flow. Try to merge into the gap at close to the prevailing speed. Switch on your turn signal, check your mirrors, and try to blend smoothly with the traffic flow.

Once you are on the freeway, adjust your speed to the posted limit or to the prevailing rate if it is slower. Stay in the right lane unless you want to pass. On some freeways, larger vehicles are not allowed to use some lanes. These places usually are well-marked.

Before changing lanes, check your mirrors. Then use your turn signal.

Once you are moving on the freeway, make certain you allow a reasonable following distance. Expect to move slightly slower at night.

When you want to leave the freeway, move to the proper lane well in advance. If you miss your exit, do not, under any circumstances, stop and back up. Drive on to the next exit.

The exit ramp can be curved, sometimes quite sharply. The exit speed for cars — but not larger vehicles — is usually posted. You should go more slowly.

Reduce your speed according to your speedometer, not to your sense of motion. After driving for any distance at higher speeds, you may tend to think you are going slower than you actually are.

Highway Hypnosis

Is there actually such a condition as highway hypnosis? Or is it just plain falling asleep at the wheel? Call it highway hypnosis, lack of awareness, or whatever.

When you drive the vehicle for a long distance, there is something about an easy stretch of road with the same scenery, along with the hum of the tires on the road, the drone of the engine, and the rush of the wind against the vehicle that can make you sleepy. Do not let it happen to you! If it does, your vehicle can leave the road in less than a second, and you could crash and be injured.

What can you do about highway hypnosis? First, be aware that it can happen.

Then here are some tips:

- Make sure your vehicle is well ventilated, with a comfortably cool interior.
- Keep your eyes moving. Scan the road ahead and to the sides. Check your mirrors and your instruments frequently.
- If you get sleepy, pull off the road into a rest, service, or parking area and take a nap, get some exercise, or both. For safety, treat drowsiness on the highway as an emergency.

Hill and Mountain Roads



Driving on steep hills or mountains is different from driving in flat or rolling terrain.

Here are some tips that can make your drive through steep country safer:

- Keep the vehicle in good shape. Check all fluid levels and also the brakes, tires, cooling system, and transmission. These parts can work hard on mountain roads.

⚠ CAUTION:

If you do not shift down, the brakes could get so hot that they would not work well. You would then have poor braking or even none going down a hill. You could crash. Shift down to let the engine assist the brakes on a steep downhill slope.

⚠ CAUTION:

Coasting downhill in NEUTRAL (N) or with the ignition off is dangerous. The brakes will have to do all the work of slowing down. They could get so hot that they would not work well. You would then have poor braking or even none going down a hill. You could crash. Always have the engine running and your vehicle in gear when you go downhill.

- Know how to go down hills. The most important thing to know is this: let your engine do some of the slowing down. Shift to a lower gear when you go down a steep or long hill.
- Stay in your own lane when driving on two-lane roads in hills or mountains. Do not swing wide or cut across the center of the road. Drive at speeds that let you stay in your own lane.
- As you go over the top of a hill, be alert. There could be something in your lane, like a stalled car or an accident.

- You might see highway signs on mountains that warn of special problems. Examples are long grades, passing or no-passing zones, a falling rocks area, winding roads, and special truck lanes. Be alert to these and take appropriate action.

Winter Driving

Here are some tips for winter driving:

- Be sure the vehicle is in good shape for winter.
- You might want to put winter emergency supplies in your vehicle.

Include an ice scraper, a small brush or broom, a supply of windshield washer fluid, a rag, some winter outer clothing, a small shovel, a flashlight, a red cloth, and reflective warning triangles. And, if you will be driving under severe conditions, include a small bag of sand, a piece of old carpet, or a couple of burlap bags to help provide traction. Be sure you properly secure these items in your vehicle.

Also see *Tires on page 254*.

Driving on Snow or Ice

Most of the time, those places where the tires meet the road probably have good traction.

However, if there is snow or ice between the tires and the road, you can have a very slippery situation. You have a lot less traction, or grip, and need to be very careful.



What is the worst time for this? Wet ice. Very cold snow or ice can be slick and hard to drive on.

But wet ice can be even more trouble because it can offer the least traction of all. You can get wet ice when it is about freezing, 32°F (0°C), and freezing rain begins to fall. Try to avoid driving on wet ice until salt and sand crews can get there.

Whatever the condition — smooth ice, packed, blowing, or loose snow — drive with caution.

If your vehicle has the Traction Control System (TCS), it will improve your ability to accelerate when driving on a slippery road. But you can turn the TCS off if you ever need to. You should turn the TCS off if your vehicle ever gets stuck in sand, mud, ice, or snow. See *If Your Vehicle is Stuck in Sand, Mud, Ice, or Snow on page 178*. Even if you have TCS, slow down and adjust your driving to the road conditions. Under certain conditions, you might want to turn the TCS off, such as when driving through deep snow and loose gravel, to help maintain vehicle motion at lower speeds. See *Traction Control System (TCS) on page 157*.

If your vehicle does not have TCS, accelerate gently. Try not to break the fragile traction. If you accelerate too fast, the drive wheels will spin and polish the surface under the tires even more.

Unless your vehicle has the Antilock Brake System (ABS), you will want to brake very gently, too. If you do have ABS, see *Antilock Brake System (ABS) on page 154*. ABS improves your vehicle's stability when you make a hard stop on a slippery road. Whether your vehicle has ABS or not, begin stopping sooner than you would on dry pavement. Without ABS, if you feel your vehicle begin to slide, let up on the brakes a little. Push the brake pedal down steadily to get the most traction you can.

Remember, unless your vehicle has ABS, if you brake so hard that the wheels stop rolling, you will just slide. Brake so the wheels always keep rolling and you can still steer.

- Whatever your vehicle's braking system, allow greater following distance on any slippery road.
- Watch for slippery spots. The road might be fine until you hit a spot that is covered with ice. On an otherwise clear road, ice patches can appear in shaded areas where the sun cannot reach, such as around clumps of trees, behind buildings, or under bridges. Sometimes the surface of a curve or an overpass can remain icy when the surrounding roads are clear. If you see a patch of ice ahead of you, brake before you are on it. Try not to brake while you are actually on the ice, and avoid sudden steering maneuvers.

If You Are Caught in a Blizzard

If you are stopped by heavy snow, you could be in a serious situation. You should probably stay with your vehicle unless you know for sure that you are near help and you can hike through the snow. Here are some things to do to summon help and keep yourself and your passengers safe:

- Turn on the hazard warning flashers.
- Tie a red cloth to your mirror arm to alert police that you have been stopped by the snow.
- Put on extra clothing or wrap a blanket around you. If you do not have blankets or extra clothing, make body insulators from newspapers, burlap bags, rags, floor mats — anything you can wrap around yourself or tuck under your clothing to keep warm.



You can run the engine to keep warm, but be careful.

⚠ CAUTION:

Snow can trap exhaust gases under your vehicle. This can cause deadly CO (carbon monoxide) gas to get inside. CO could overcome you and kill you. You cannot see it or smell it, so you might not know it is in your vehicle. Clear away snow from around the base of your vehicle if any is blocking your exhaust pipe. And check around again from time to time to be sure snow does not collect there.

Open a window just a little on the side of the vehicle that is away from the wind. This will help keep CO out.

Run your engine only as long as you must. This saves fuel. When you run the engine, make it go a little faster than just idle. That is, push the accelerator slightly. This uses less fuel for the heat that you get and it keeps the batteries charged.

You will need well-charged batteries to restart the vehicle, and possibly for signaling later on with the headlamps. Let the heater run for a while.

Then, shut the engine off and close the window almost all the way to preserve the heat. Start the engine again and repeat this only when you feel really uncomfortable from the cold. But do it as little as possible. Preserve the fuel as long as you can. To help keep warm, you can get out of the vehicle and do some fairly vigorous exercises every half hour or so until help comes.

If Your Vehicle is Stuck in Sand, Mud, Ice, or Snow

In order to free your vehicle when it is stuck, you will need to spin the wheels, but you do not want to spin the wheels too fast. The method known as rocking can help you get out when you are stuck, but you must use caution.

⚠ CAUTION:

If you let your vehicle's tires spin at high speed, they can explode, and you or others could be injured. And, the transmission or other parts of the vehicle can overheat. That could cause an engine compartment fire or other damage. When you are stuck, spin the wheels as little as possible. Do not spin the wheels above 35 mph (55 km/h) as shown on the speedometer.

Notice: **Spinning the wheels can destroy parts of your vehicle as well as the tires. If you spin the wheels too fast while shifting the transmission back and forth, you can destroy the transmission.**

Rocking Your Vehicle to Get It Out

First, turn the steering wheel left and right to clear the area around the front wheels. Turn off any traction system. See *Traction Control System (TCS) on page 157*. Then shift back and forth between REVERSE (R) and a forward gear, spinning the wheels as little as possible.
To prevent transmission wear, wait until the wheels stop spinning before shifting gears. Release the accelerator pedal while you shift, and press lightly on the accelerator pedal when the transmission is in gear. By slowly spinning the wheels in the forward and reverse directions, you will cause a rocking motion that could free your vehicle. If that does not get your vehicle out after a few tries, it might need to be towed out. If your vehicle does need to be towed out, see *Towing Your Vehicle on page 182*.

Tow Hooks

⚠ CAUTION:

These hooks, when used, are under a lot of force. Always pull the vehicle straight out. Never pull on the hooks at a sideways angle. The hooks could break off and you or others could be injured from the chain or cable snapping back.

Notice: **Never use tow hooks to tow the vehicle. Your vehicle could be damaged and it would not be covered by warranty.**

If your vehicle has tow hooks, the hooks are at the front of the vehicle. You may need to use them if you are stuck off-road and need to be pulled to some place where you can continue driving.

Loading Your Vehicle

It is the responsibility of the Final Stage manufacturer to install a Certification label on your vehicle. This label shows how much weight your vehicle can properly carry. It may also show the size of the vehicle's original tires, and the inflation pressures needed to obtain the gross weight capacity of your vehicle. This is called the Gross Vehicle Weight Rating (GVWR). The tire information could also be shown on a separate Tire Information label.

The GVWR includes the weight of the vehicle, all occupants, fuel, and cargo.

The Certification label also tells you the maximum weight for the front and rear axles, called the Gross Axle Weight Rating (GAWR). To find out the actual loads on your front and rear axles, go to a weigh station and weigh your vehicle. Your dealer can help you with this. Be sure to spread out your load equally on both sides of the center line.

Never exceed the GVWR for your vehicle, or the GAWR for either the front or rear axle.

And, if you do have a heavy load, spread it out.

⚠ CAUTION:

Do not load your vehicle any heavier than the Gross Vehicle Weight Rating (GVWR), or either the maximum front or rear Gross Axle Weight Rating (GAWR). If you do, parts on your vehicle can break, and it can change the way your vehicle handles. These could cause you to lose control and crash. Also, overloading can shorten the life of your vehicle.

Using heavier suspension components to get added durability might not change the weight ratings. Ask your dealer to help you load your vehicle the right way.

Notice: **Overloading your vehicle may cause damage. Repairs would not be covered by your warranty. Do not overload your vehicle.**

If you put things inside your vehicle — like suitcases, tools, packages, or anything else — they go as fast as the vehicle goes. If you have to stop or turn quickly, or if there is a crash, they keep going.

⚠ CAUTION:

Things you put inside your vehicle can strike and injure people in a sudden stop or turn, or in a crash.

- **Put things in the cargo area of your vehicle. Try to spread the weight evenly.**
- **Never stack heavier things, like suitcases, inside the vehicle so that some of them are above the tops of the seats.**
- **Do not leave an unsecured child restraint in your vehicle.**
- **When you carry something inside the vehicle, secure it whenever you can.**
- **Do not leave a seat folded down unless you need to.**

Towing

Towing Your Vehicle

⚠ CAUTION:

To help avoid serious personal injury to you or others:

- **Never let passengers ride in a vehicle that is being towed.**
- **Never tow faster than safe or posted speeds.**
- **Never tow with damaged parts not fully secured.**
- **Never get under your vehicle after it has been lifted by the tow truck.**
- **Always secure the vehicle on each side with separate safety chains when towing it.**

CAUTION: (Continued)

CAUTION: (Continued)

- **Working on air brakes without first using the release studs to compress the springs can lead to injury. Never work on the air brakes chambers without first using the release studs to compress the brake springs.**
- **When the brake springs are manually compressed, you will have no brakes. Release your air-operated parking brakes manually only to tow the vehicle. Never drive the vehicle with the brakes released.**

Consult your dealer/retailer or a professional towing service if you need to have your vehicle towed. They can provide the right equipment and know-how to tow it without damage.
See *Roadside Assistance Program on page 332*.

Before you do anything, turn on the hazard warning flashers (if they have not been damaged).
See *Hazard Warning Flashers on page 102* for more information.

When you call, tell the towing service:

- That your vehicle has rear-wheel drive.
- The make, model and year of your vehicle.
- Whether you can still move the shift lever.
- If there was an accident, what was damaged.

When the towing service arrives, let the tow operator know that this manual contains towing instructions. The operator may want to see them.

Here are specific towing instructions:

Towing Your Vehicle From the Front (Front Wheels Off the Ground)

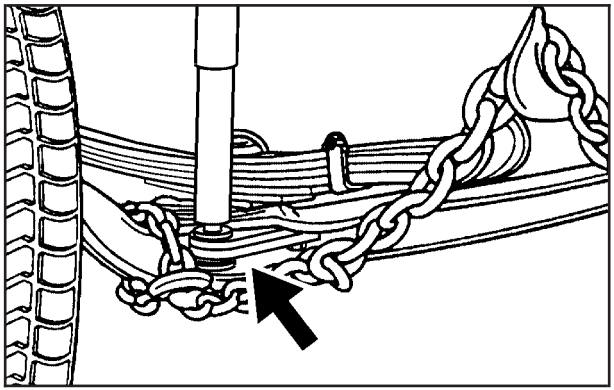
Before Towing

Block the rear wheels of the disabled vehicle. On vehicles with air brakes, release the emergency brake system by compressing the brake chamber springs as outlined in this section. (This is to prevent the possibility of the emergency brake being applied during towing.)

On vehicles with hydraulic brakes, release the parking brake fully by moving the lever to the fully-released position.

Towing the Vehicle with the Front Bumper Removed

1. Remove the front bumper.
2. Connect and lock the lift chains to the front axle, outside of the spring anchor plates as shown.



3. Connect the lift chains to the tow bar and raise the tow bar until lift chain slack has been taken up.
4. Raise the vehicle to the required height.

Rear Axle

1. Disconnect the propshaft at the rear axle.
2. Secure the propshaft to the frame or the crossmember.

After Towing

1. Block the rear wheels and install the propshafts.
2. Check for proper phasing of universal joints.
3. Apply the emergency brake system before disconnecting from the towing vehicle.
4. Check and fill the rear axle with oil as required.

Towing Your Vehicle From the Front (All Wheels On the Ground)

Your vehicle may be towed on all wheels provided the steering is working. Remember that the power brakes and power steering will not have power assist. Vehicles with air brakes will not have brakes. There must be a tow bar installed between the towing vehicle and the disabled vehicle.

Before Towing

Block the wheels of the disabled vehicle. On vehicles with air brakes, release the emergency brake system by compressing the brake chamber springs as outlined in this section. (This is to prevent the possibility of the emergency brake being applied during towing.)

On vehicles with hydraulic brakes, release the parking brake fully by moving the lever to the fully-released position.

If there is damage or suspected damage to the axle(s), remove the axle shafts. Cover the hub openings to prevent the loss of lubricant or entry of dirt or foreign objects.

After Towing

1. Block the rear wheels and install axle shafts and/or propshafts.
2. Check for proper phasing of universal joints.
3. Apply the parking brake system before disconnecting from the towing vehicle.
4. Check and fill rear axle with oil as required.

Towing Your Vehicle From the Rear (Rear Wheels Off the Ground)

Before Towing

Secure the steering wheel to maintain a straight-ahead position. Make certain that the front axle is not loaded above the front axle Gross Axle Weight Rating (GAWR) as indicated on the vehicle's Certification Label. See *Loading Your Vehicle on page 180* for more information.

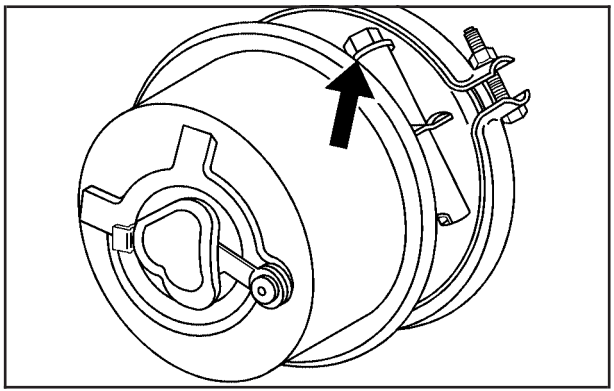
After Towing

1. Block the rear wheels and release the steering wheel.
2. Apply the parking brake system before disconnecting from the towing vehicle.
3. Check and fill the rear axle with oil as required.

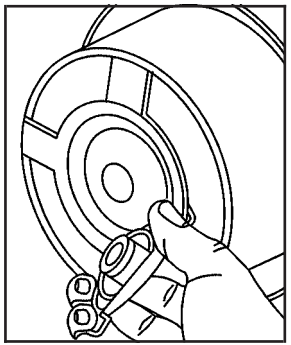
Releasing Air-Operated Parking Brakes

If your vehicle has air brakes, you could have a special towing problem. If your vehicle has to be towed because of a complete loss of air pressure from both systems, the parking brakes will have automatically engaged. The tow operator can release the brakes manually by using the following steps. Then your vehicle can be towed with all wheels or only the rear wheels on the ground.

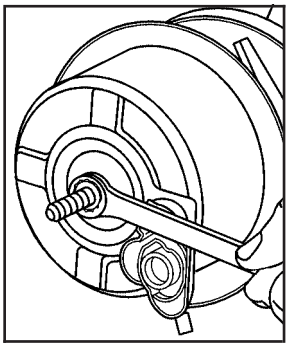
1. Block the wheels of the vehicle.



2. Remove the release stud and nut from the side of the brake chamber. Some chambers have studs which are visible at all times.



3. Remove the rubber cap from the rear of the chamber.



6. Turn the stud nut clockwise several turns to release the brakes. Follow the same procedure to release the other brake or brakes.

4. Put the release stud, nut and flat washer into the chamber.
5. Turn the stud clockwise one quarter of a turn.
7. At the repair facility, apply air pressure of at least 70 psi (480 kPa) to the brake chambers, either from an external air supply or the vehicle's air system.
8. Turn the stud nut counterclockwise several turns. Remove the stud from the chamber.
9. Replace the stud and washer and tighten the nut into the side of the chamber.
10. Replace the rubber cap.

Trailer Connections (T7/T8 Models Only)

If your vehicle has these trailer connections, they are located at the rear of the cab for a tractor and at the rear of the chassis when towing a trailer. There will be an air connection and an electrical connection.

Be sure that the couplings to the trailer are made correctly.

Air Connections

If you are not connecting the trailer air line connections to another piece of equipment, be sure to replace their protective caps.

Electrical Connections

This system is a seven-wire cable that will connect to the trailer, supplying power to the trailer's lighting system. When not in use, it is stored in the trailer air-hose storage bracket.

Heavy-Duty Trailer Wiring Package

Your vehicle may have an eight-wire trailer towing harness. This harness, with a seven-pin universal heavy-duty trailer connector, is attached to a bracket on the platform hitch.

The Center High-Mounted Stoplamp (CHMSL) wire is tied next to the trailer wiring harness for use with a trailer.

The eight-wire harness contains the following trailer circuits:

- Yellow: Left Stop/Turn Signal
- Dark Green: Right Stop/Turn Signal
- Brown: Taillamps
- White: Ground
- Light Green: Back-up Lamps
- Light Blue: CHMSL
- Red: Battery Feed
- Dark Blue: Trailer Brake

✍ NOTES

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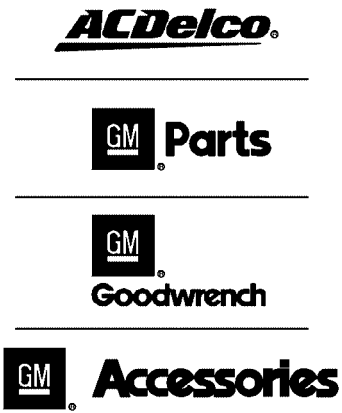
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Service

Your dealer knows your vehicle best and wants you to be happy with it. We hope you will go to your dealer for all your service needs. You will get genuine GM parts and GM-trained and supported service people.

We hope you will want to keep your GM vehicle all GM. Genuine GM parts have one of these marks:



Accessories and Modifications

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

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

Aftermarket Engine Performance Enhancement Products and Modifications

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

California Proposition 65 Warning

Most motor vehicles, including this one, 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.

Doing Your Own Service Work

⚠ CAUTION:

You can be injured and your vehicle could be damaged if you try to do service work on a vehicle without knowing enough about it.

- **Be sure you have sufficient knowledge, experience, the proper replacement parts, and tools before you attempt any vehicle maintenance task.**
- **Be sure you wait until the engine and any attaching parts have sufficiently cooled before you tilt the cab to service the vehicle.**
- **Be sure to use the proper nuts, bolts, and other fasteners. English and metric fasteners can be easily confused. If you use the wrong fasteners, parts can later break or fall off. You could be hurt.**

If you want to do some of your own service work, you will want to use the proper service manual. It tells you much more about how to service your vehicle than this manual can. To order the proper service manual, see *Service Publications Ordering Information on page 338*.

You should keep a record with all parts receipts and list the mileage and the date of any service work you perform. See *Part D: Maintenance Record on page 323*.

Engine Fan Breakage

⚠ CAUTION:

Changing the Fan Drive Ratio or Engine Governed Speed:

If you change the fan drive ratio or increase the governed speed of the engine, you may increase stress and the fan could eventually fail. If the fan breaks apart while it is rotating, pieces can cause severe injury to anyone — such as a service technician — who is nearby. And, of course, the pieces can severely damage the vehicle. Do not change the fan drive ratio or increase the governed speed of the vehicle without getting the necessary information from your dealer.

CAUTION: (Continued)

CAUTION: (Continued)

Winter Fronts, Grille Covers or Obstructions:

Winter Fronts, grille covers or other add-on equipment causing obstructions in front or behind the fan should not be used on this vehicle. If this causes the fan to eventually break apart while it is rotating, the pieces can cause severe injury to anyone nearby, such as a service technician working on the engine, and of course the pieces can severely damage the vehicle.

Fuel

Diesel Engine Fuel

Notice: **Diesel fuel or fuel additives not recommended in this manual could damage your fuel system and engine. Your warranty would not cover this damage. And:**

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

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

If you run out of fuel, *Running Out of Fuel on page 203* tells you how to restart your engine.

What Fuel to Use

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

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

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

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

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

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

Diesel fuel can foam when you fill the tank. This can cause the automatic pump nozzle to shut off, even though the tank is not full. If this happens, just wait for the foaming to stop and then try filling the tank more slowly. See *Filling the Tank on page 204*.

⚠ CAUTION:

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

What Fuel to Use in Canada

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

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

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

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

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

Very Cold Weather Operation

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

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

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

Water in Fuel

⚠ CAUTION:

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

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

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

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



If this happens, a water-in-fuel indicator light will come on in the instrument panel. If it does, the water must be drained.

Your dealer/retailer can show you how to do this.

If the light comes on, use this chart to determine what action to take.

Water In Fuel Light

Problem	Recommended Action
Light comes on intermittently.	Drain water from the fuel filter.
Light stays on at temperatures above freezing.	Drain the fuel filter immediately. If no water can be drained and the light stays on, see your dealer/retailer for assistance.
Light stays on at temperatures below freezing.	Drain the fuel filter immediately. If no water can be drained, water may be frozen in the water drain system or in the fuel lines. Move the vehicle to a warm location to thaw out, and then drain the filter system.

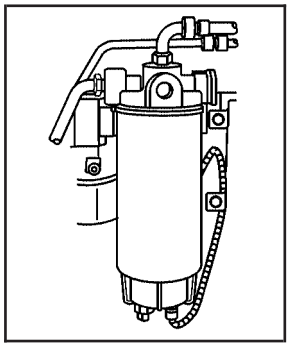
Water In Fuel Light (cont'd)

Problem	Recommended Action
Light stays on immediately after refueling, and a large amount of water was possibly pumped into the fuel tank.	Fuel tank purging is required. See your dealer/retailer for assistance.

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

The frequency of water draining or element replacement is determined by the contamination level in the fuel. Inspect or service the collection bowl for water daily and replace the element as shown in the Maintenance Schedule. See *Scheduled Maintenance on page 295* for change interval information.

To drain water, do the following:



1. Loosen the self-venting drain to empty the bowl of water.
2. Tighten the drain. Run the engine and check for leaks.

To replace the element, do the following:

1. Disconnect the element electrical connector from the bowl.
2. Loosen the self-venting drain to empty the bowl of water.
3. Remove the filter element from the mounting head with the bowl connected.
4. Remove the bowl from the filter element. Clean the bowl and the O-ring gland and save them for re-use.
5. Lubricate the O-ring with clean diesel fuel or motor oil and place it in the bowl gland.
6. Spin the bowl onto the new filter element snugly by hand. Do not use tools to tighten them together.
7. Lubricate the filter top seal with clean diesel fuel or motor oil.
8. Fill the filter element/bowl assembly with clean diesel fuel and attach it onto the mounting head. Hand tighten an additional one-third to one-half turn after full seal contact is made.
9. Complete the priming procedure. See “Fuel Priming” following.
10. Start your engine and check that there are no leaks.

If the water-in-fuel light comes on again after driving a short distance or if the engine runs rough or stalls, a large amount of water has probably been pumped into the fuel tank. The fuel tank should be purged.

Fuel Priming

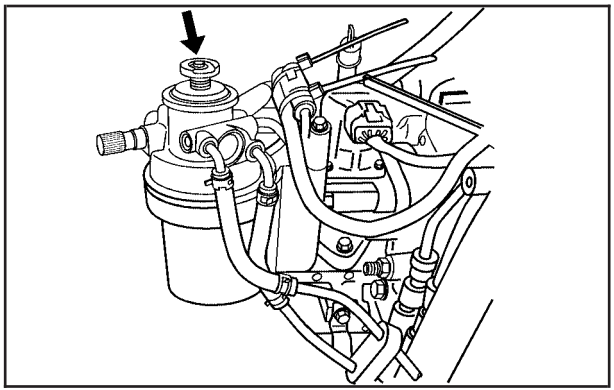
In order for the diesel engine fuel system to work properly, the fuel lines must be full of fuel and contain no air. If air gets into the fuel lines, it will be necessary to prime the fuel lines to eliminate air before operating the vehicle.

Air can get into the fuel lines if any of the following happen:

- The vehicle runs out of fuel.
- The fuel filter is removed for servicing or replacement.
- The fuel lines are removed or disconnected for servicing.
- The fuel filter water drain valve is opened while the engine is running.

Air in the fuel lines will not harm the engine or the vehicle. However, the engine may not be able to start until the fuel system is primed and the air is removed.

For vehicles with cruise control, you can prime the vehicle and remove the air from the fuel system. The following procedure will show you how:



1. Make sure there is fuel in the fuel tank.
2. Make sure the specified fuel filter is properly installed.
3. Make sure the fuel lines are securely connected.
4. Make sure the fuel filter is cool to the touch.
5. Use a clean cloth to remove dirt and oil from the fuel filter head and breather valve.

6. Use the palm of your hand to repeatedly press and release the plunger (1) at the top of the fuel filter priming pump. Continue until the plunger resistance becomes firm. This may take from 20 to 100 times, depending upon fuel tank location.
7. Turn the fuel filter breather valve screw (2) left (counterclockwise) several turns to open the breather valve.
8. Use the palm of your hand to repeatedly press and release the plunger (1) at the top of the fuel filter priming pump until fuel begins to seep from the breather valve.
9. Tighten the fuel filter breather screw (2) to the specified torque, 4.9 N•m (43 in. lbs).
10. Use the palm of your hand to press and release the plunger (1) at the top of the fuel filter priming pump about 20 more times. This sends fuel to the engine.
11. Use a clean cloth to remove any fuel from the fuel filter and surrounding area.
12. Start the engine and allow it to idle for a few minutes.
13. Check the fuel filter for leakage.

Running Out of Fuel

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

⚠ CAUTION:

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

1. If you are parked on a level surface, add at least 2 gallons (7.6 liters) of fuel. However, if you are parked on a slope, you may need to add up to 5 gallons (18.9 liters) of fuel.
2. Follow the fuel priming procedure earlier in this section to prime the fuel filter.
3. Close the air bleed valve.
4. Turn the ignition key to START for 10 to 15 seconds at a time until your engine starts. If the engine tries to run, but does not run smoothly, increase the rpm a little using the accelerator pedal. This will help force air through the system.

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

Filling the Tank

⚠ CAUTION:

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

The fuel cap may be on either or both sides of your vehicle, depending upon option content.

To remove the cap, turn it slowly counterclockwise.

⚠ CAUTION:

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

When replacing the fuel cap, turn it clockwise until it is tight.

⚠ CAUTION:

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

Notice: **If you need a new fuel cap, be sure to get the right type. Your dealer/retailer can get one for you. If you get the wrong type, it may not fit properly. This may cause your malfunction indicator lamp to light and may damage your fuel tank and emissions system. See *Malfunction Indicator Lamp on page 130*.**

Filling a Portable Fuel Container

⚠ CAUTION:

Never fill a portable fuel container while it is in your vehicle. Static electricity discharge from the container can ignite

CAUTION: (Continued)

CAUTION: (Continued)

the fuel vapor. You can be badly burned and your vehicle damaged if this occurs. To help avoid injury to you and others:

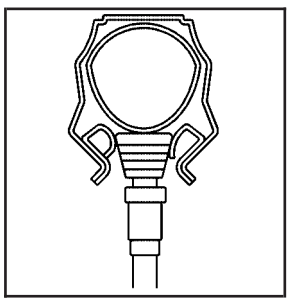
- **Dispense fuel only into approved containers.**
- **Do not fill a container while it is inside a vehicle, in a vehicle's trunk, pickup bed, or on any surface other than the ground.**
- **Bring the fill nozzle in contact with the inside of the fill opening before operating the nozzle. Contact should be maintained until the filling is complete.**
- **Do not smoke while pumping fuel.**
- **Do not use a cellular phone while pumping fuel.**

Checking Things Under the Hood

Engine Oil

Checking Engine Oil

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



The engine oil dipstick is located behind the cab on the driver side of the vehicle. It can be reached without tilting the cab.

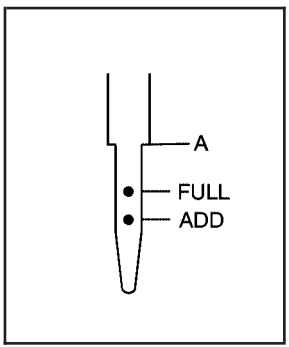
In order to get an accurate reading, the engine should be at normal operating temperature, so that the oil is warm, and the vehicle must be on level ground.

1. If the engine is at normal operating temperature and the oil is warm, turn off the engine and allow at least five minutes for the oil to drain back into the oil pan. If you do not do this, the oil dipstick might not show the actual level.

   If the engine has not been run long enough to bring it up to normal operating temperature and the oil is cool, turn off the engine and allow 30 minutes for the oil to drain back into the oil pan. If you do not do this, the oil dipstick might not show the actual level.
2. Pull out the dipstick and clean it with a paper towel or a cloth, then push it back in all the way.
3. Remove the dipstick again, keeping the tip down, and check the oil level.

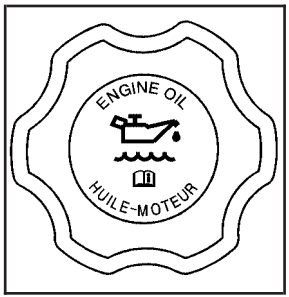
When to Add Engine Oil

Notice: **Do not add too much oil. Keep the oil level between the ADD and FULL marks on the dipstick. Under normal engine operation, the engine oil level can increase above the FULL mark as a result of DPF regeneration. A small increase in the oil level is normal. If the engine has so much oil that the oil level reaches the wider portion (A) on the dipstick, the engine oil must be changed as soon as possible or the engine could be damaged.**



If the oil is below the ADD mark on the dipstick, you need to add at least one quart/liter of oil. But you must use the right kind.

This section explains what kind of oil to use. For engine oil crankcase capacity, see *Capacities and Specifications on page 285*.



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

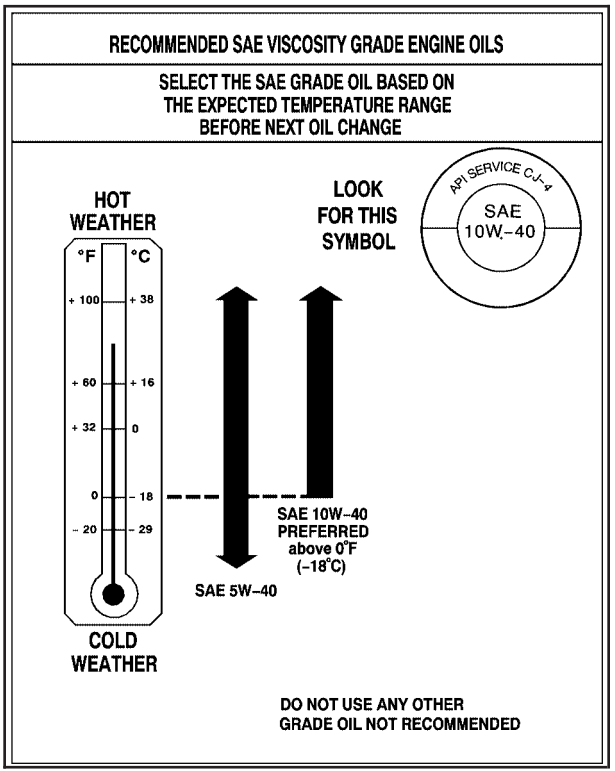
What Kind of Engine Oil to Use

Look for three things:

- CJ-4

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

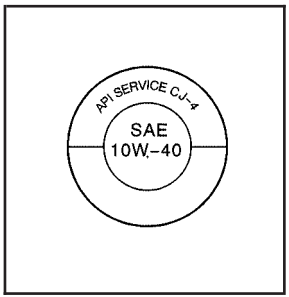
Notice: **Use only engine oils that have the designation CJ-4 for the diesel engine. Failure to use the recommended oil can result in engine damage not covered by your warranty.**



- SAE 10W-40

  As shown in the viscosity chart, SAE 10W-40 is best for your vehicle. When it is very cold, below 0°F (–18°C), you should use SAE 5W-40 to improve cold starting.

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



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

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

Engine Oil Additives

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

When to Change Engine Oil (Vehicles Without the Engine Oil Life System)

Change the engine oil and filter every 15,000 miles (24 000 km), or every 12 months, or every 750 hours of engine operation, whichever occurs first. See *Scheduled Maintenance on page 295*.

Engine Oil Life System

When to Change Engine Oil

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

When the system has calculated that oil life has been diminished, it will indicate that an oil change is necessary. A change engine oil light will come on. See *Change Engine Oil Light on page 132*. Change the oil as soon as possible within the next 600 miles (1 000 km) or 30 hours of engine operation, whichever occurs first. It is possible that, if you are driving under the best conditions, the oil life system might not indicate that an oil change is necessary for over a year. However, the engine oil and filter must be changed at least once a year and at this time the system must be reset. Your dealer/retailer has trained service people who will perform this work using genuine parts and reset the system. It is also important to check the oil regularly and keep it at the proper level.

If the system is ever reset accidentally, you must change the oil at 3,000 miles (5 000 km), or 150 hours of engine operation, whichever occurs first, since your last oil change. Remember to reset the oil life system whenever the oil is changed.

How to Reset the Engine Oil Life System

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

To reset the Engine Oil Life System:

1. Turn the ignition key to ON with the engine off.
2. Fully press and release the accelerator pedal slowly three times within 10 seconds.

   If the change engine oil light flashes for five seconds, the system is resetting.
3. Turn the key to LOCK.

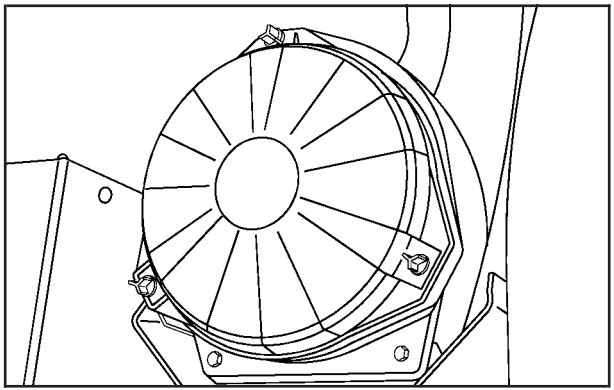
If the change engine oil light comes back on when you start your vehicle, the Engine Oil Life System has not reset. Repeat the procedure.

What to Do with Used Oil

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

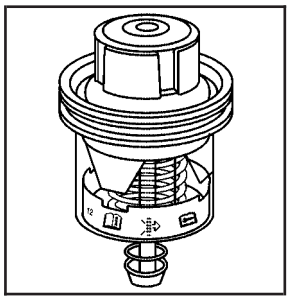
Used oil can be a threat to the environment. If you change your own oil, be sure to drain all the oil from the filter before disposal. Never dispose of oil by putting it in the trash, pouring it on the ground, into sewers, or into streams or bodies of water. Instead, recycle it by taking it to a place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

Engine Air Cleaner/Filter



The engine air cleaner/filter is located behind the cab on the passenger's side of the vehicle.

When to Inspect the Engine Air Cleaner/Filter



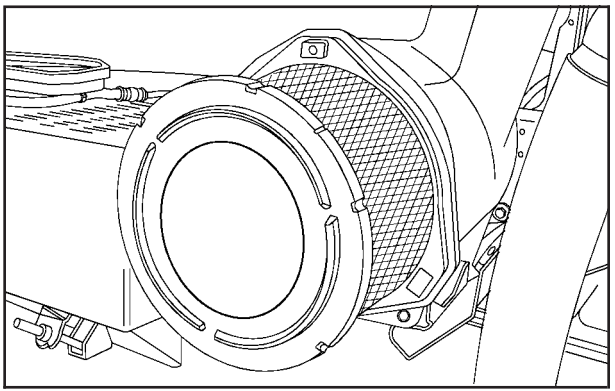
The filter change indicator will let you know when the filter should be replaced. If you are driving in dusty/dirty conditions inspect the filter each oil change.

How to Inspect the Engine Air Cleaner/Filter

Locate the filter change indicator, if equipped. When the change indicator turns black or is in the red/orange change zone, replace the filter and reset the indicator.

To inspect the air cleaner/filter, remove the filter from the vehicle and lightly shake the filter to release loose dust and dirt. If the filter remains caked with dirt, a new filter is required.

To inspect or replace the filter and reset the indicator, if equipped, do the following:



1. Remove all three screws and carefully remove the filter cover.
2. Inspect or replace the engine air cleaner/filter.
3. Be sure that all three screws are tightened securely when reinstalling the filter cover.

⚠ CAUTION:

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

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

Automatic Transmission Fluid

When to Check

A good time to check your automatic transmission fluid level is when the engine oil is checked. See your Allison Automatic Transmission Operator's Manual to find out when to change your transmission fluid and filters.

How to Check and What to Use

The Allison Automatic Transmission Operator's Manual that came with the vehicle shows how to check the automatic transmission fluid and what fluid to use.

Automatic Transmission External Filter

Your automatic transmission filter requires periodic replacement.

Consult the Allison Automatic Transmission Operator's Manual that came with the vehicle for proper change intervals.

Manual Transmission Fluid

When to Check

A good time to have it checked is when the engine oil is checked. Refer to the Maintenance Schedule to find out when to check and change your manual transmission fluid. See *Scheduled Maintenance on page 295*.

How to Check and What to Use

Check the fluid level only when your engine is off, the vehicle is parked on a level place, and the transmission is cool enough for you to rest your fingers on the transmission case.

To check the transmission fluid level, do the following:

1. Remove the filler plug.
2. Check to be sure that the lubricant level is up to the bottom of the fill opening. On heavy duty transmissions, an inch of oil level equals about one gallon of fluid.
3. If the fluid level is good, reinstall the plug and be sure it is fully seated. If the fluid level is low, add more fluid as described in the next steps. Refer to the Maintenance Schedule to determine what kind of fluid to use. See *Part C: Recommended Fluids and Lubricants on page 321*.

How to Add Fluid

To add transmission fluid, do the following:

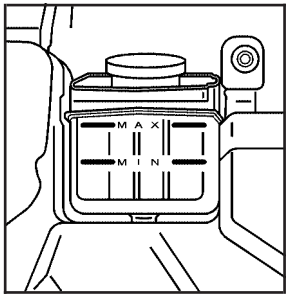
1. Remove the filler plug.
2. Add fluid at the filler plug hole. Add only enough fluid to bring the fluid level up to the bottom of the fill opening. Refer to the Maintenance Schedule to determine the proper fluid to use. See *Part C: Recommended Fluids and Lubricants on page 321*.
3. Reinstall the filler plug. Be sure the plug is fully seated.

Hydraulic Clutch

It is not necessary to regularly check clutch fluid unless you suspect there is a leak in the system. Adding fluid will not correct a leak.

A fluid loss in this system could indicate a problem. Have the system inspected and repaired.

When to Check and What to Use



The hydraulic clutch fluid reservoir is located behind the front panel on the driver's side of the vehicle.

Refer to the Maintenance Schedule to determine how often you should check the fluid level in your clutch master cylinder reservoir and for the proper fluid. See *Part B: Owner Checks and Services on page 315* and *Part C: Recommended Fluids and Lubricants on page 321* for more information.

How to Check and Add Fluid

The proper fluid should be added if the fluid level is not between the MAX (Maximum) and MIN (Minimum) marks.

Engine Coolant

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

The following explains your cooling system and how to add coolant when it is low. If you have a problem with engine overheating, see *Engine Overheating on page 219*.

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

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

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

What to Use

Use a mixture of one-half clean, drinkable water and one-half DEX-COOL® coolant which will not damage aluminum parts. If you use this coolant mixture, you do not need to add anything else.

⚠ CAUTION:

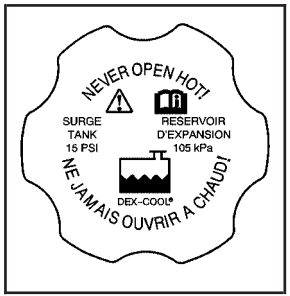
Adding only plain water to your cooling system can be dangerous. Plain water, or some other liquid such as alcohol, can boil before the proper coolant mixture will. Your vehicle's coolant warning system is set for the proper coolant mixture. With plain water or the wrong mixture, your engine could get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

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

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

Notice: **If you use extra inhibitors and/or additives in your vehicle's cooling system, you could damage your vehicle. Use only the proper mixture of the engine coolant listed in this manual for the cooling system. See *Part C: Recommended Fluids and Lubricants on page 321* for more information.**

Checking Coolant

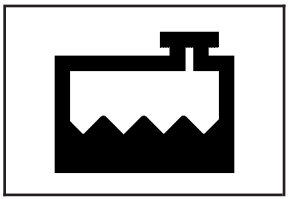


The coolant surge tank pressure cap can be accessed without tilting the cab. It is located behind the cab on the driver's side of the vehicle.

⚠ CAUTION:

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

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



If the low coolant light comes on in the instrument panel cluster and stays on, it means you are low on engine coolant.

See *Low Coolant Warning Light on page 129* for further information.

Adding Coolant

If you need more coolant, add the proper DEX-COOL® coolant mixture at the surge tank, but only when the engine is cool.

⚠ CAUTION:

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

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

Coolant Surge Tank Pressure Cap

The surge tank pressure cap is located behind the cab on the driver's side of the vehicle.

Notice: **Your vehicle's surge tank pressure cap is designed for use with medium-duty cooling systems only. If the surge tank pressure cap is not tightly installed, coolant loss and possible engine damage may occur. Be sure the cap is properly and tightly secured.**

Engine Overheating

You will find an engine coolant temperature warning gage, as well as a low coolant warning light, on your vehicle's instrument panel. See *Engine Coolant Temperature Gage on page 128* and *Low Coolant Warning Light on page 129* for more information.

Your vehicle also has a check gages warning light on the instrument panel. See *Check Gages Warning Light on page 134* for more information.

If Steam Is Coming From Your Engine

⚠ CAUTION:

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

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

Notice: **If your engine catches fire because you keep driving with no coolant, your vehicle can be badly damaged. The costly repairs would not be covered by your warranty.**

If No Steam Is Coming From Your Engine

An overheat warning, along with a low coolant light, can indicate a serious problem. See *Low Coolant Warning Light on page 129* for more information.

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

- Climb a long hill on a hot day.
- Stop after high-speed driving.
- Idle for long periods in traffic.

If you get the overheat warning with no sign of steam, try this for a minute or so:

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

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

If the warning continues and you have not stopped, pull over, stop, and park your vehicle right away.

If there is still no sign of steam, you can push down the accelerator until the engine speed is about twice as fast as normal idle speed for at least three minutes while you are parked. If you still have the warning, turn off the engine and get everyone out of the vehicle until it cools down.

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

Cooling System

⚠ CAUTION:

If your vehicle has air conditioning, the auxiliary electric fan under the hood can start up even when the engine is not running and can injure you. Keep hands, clothing and tools away from any underhood electric fan.

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

When the engine is cold, the coolant level should be at the COLD FULL mark. If it is not, you may have a leak at the pressure cap or in the radiator hoses, heater hoses, radiator, water pump, or somewhere else in the cooling system.

⚠ CAUTION:

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

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

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

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

How to Add Coolant to the Coolant Surge Tank

If you have not found a problem yet, but the coolant level is not at the COLD FULL mark, add a 50/50 mixture of clean, drinkable water and DEX-COOL® coolant at the coolant surge tank, but be sure the cooling system, including the coolant surge tank pressure cap, is cool before you do it. See *Engine Coolant on page 216* for more information.

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

⚠ CAUTION:

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

⚠ CAUTION:

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

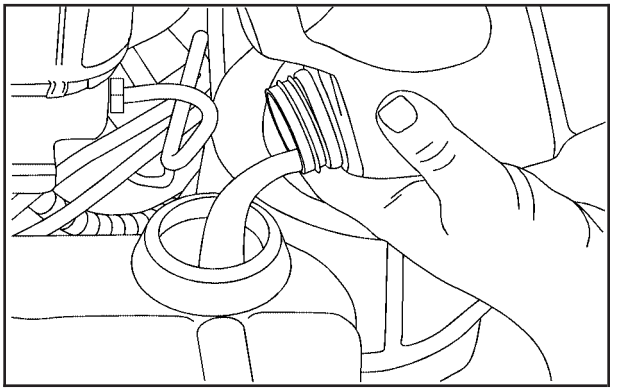
Notice: **In cold weather, water can freeze and crack the engine, radiator, heater core and other parts. Use the recommended coolant and the proper coolant mixture.**

⚠ CAUTION:

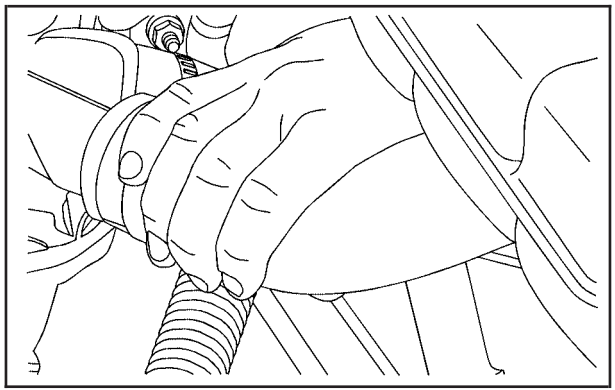
You can be burned if you spill coolant on hot engine parts. Coolant contains ethylene glycol and it will burn if the engine parts are hot enough. Do not spill coolant on a hot engine.

1. You can remove the coolant surge tank pressure cap when the cooling system, including the coolant surge tank pressure cap and upper radiator hose, is no longer hot. Turn the pressure cap slowly counterclockwise about one full turn.

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



3. Fill the coolant surge tank with the proper mixture, to the COLD FULL mark.



4. With the coolant surge tank pressure cap off, start the engine and let it run until you can feel the upper radiator hose getting hot. Watch out for the engine cooling fan.

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

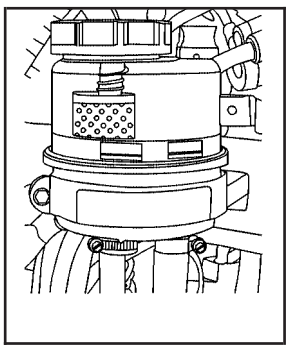
5. Then replace the pressure cap. Be sure the pressure cap is hand-tight and fully seated.

Power Steering Fluid

See *Scheduled Maintenance on page 295* to determine when to check your power steering fluid.

How To Check Power Steering Fluid

Check your power steering fluid only when the engine is warm. If the engine is not warm, you probably will not get an accurate reading.



If the fluid level is between the MIN (Minimum) and MAX (Maximum) marks, you have enough. If you need fluid, add only enough of the proper fluid to bring it into view in the sight glass.

If your power steering fluid level is low, this can cause the brake or service brake soon warning lights to come on.

If either light remains on after you have added power steering fluid to the proper level, then shut off the engine for 10 seconds. This should reset the brake warning lights. If one or both lights stay on though, see “Hydraulic Brake System Warning Lights” under *Brake System Warning Light on page 124* for more information.

What to Use

To determine what kind of fluid to use, see *Part C: Recommended Fluids and Lubricants on page 321*.

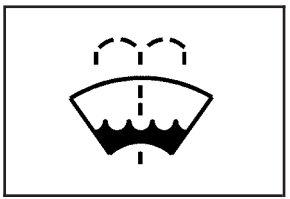
Notice: **When adding power steering fluid or making a complete fluid change, always use the proper fluid. Failure to use the proper fluid can cause leaks and damage hoses and seals.**

Windshield Washer Fluid

What to Use

When you need windshield washer fluid, be sure to read the manufacturer’s instructions before use. If you will be operating your vehicle in an area where the temperature may fall below freezing, use a fluid that has sufficient protection against freezing.

Adding Washer Fluid



Open the cap with the washer symbol on it. Add washer fluid until the tank is full.

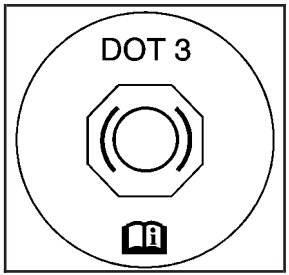
The reservoir is located behind the front panel on the driver’s side of the vehicle.

Notice:

- **When using concentrated washer fluid, follow the manufacturer's instructions for adding water.**
- **Do not mix water with ready-to-use washer fluid. Water can cause the solution to freeze and damage your washer fluid tank and other parts of the washer system. Also, water does not clean as well as washer fluid.**
- **Fill the washer fluid tank only three-quarters full when it is very cold. This allows for fluid expansion if freezing occurs, which could damage the tank if it is completely full.**
- **Do not use engine coolant (antifreeze) in your windshield washer. It can damage the vehicle's windshield washer system and paint.**

Brakes

Brake Fluid



If your vehicle has hydraulic brakes, there is a brake master cylinder.

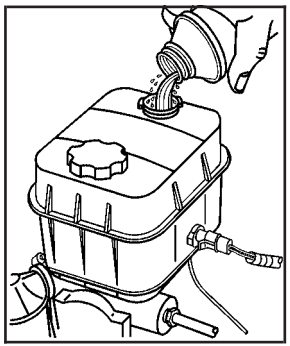
Refer to the Maintenance Schedule to determine when to check the brake fluid.

⚠ CAUTION:

Do not add brake fluid before you check the level. If you do, you could get too much brake fluid. Brake fluid could spill on the hot engine and it can catch fire. You could be burned and your vehicle could be damaged. See "Checking Brake Fluid" in this section.

Checking Brake Fluid

Apply the brake pedal several times with the ignition off. Then clean one of the reservoir caps and the area around the cap, and remove it.



The fluid level should be even with the bottom ring of the filler opening. If it is low, add enough fluid to fill the reservoir to the proper level.

What to Add

Use the proper fluid listed in the Maintenance Schedule. Use new brake fluid from a sealed container only.

Always clean the brake fluid reservoir cap and the area around the cap before removing it. This helps keep dirt from entering the reservoir.

⚠ CAUTION:

With the wrong kind of fluid in the brake system, the brakes may not work well. This could cause a crash. Always use the proper brake fluid.

Notice:

- **Using the wrong fluid can badly damage brake system parts. For example, just a few drops of mineral-based oil, such as engine oil, in the brake system can damage brake system parts so badly that they will have to be replaced. Do not let someone put in the wrong kind of fluid, and do not use DOT-5 silicone brake fluid.**
- **If you spill brake fluid on your vehicle's painted surfaces, the paint finish can be damaged. Be careful not to spill brake fluid on your vehicle. If you do, wash it off immediately. See *Washing Your Vehicle on page 270*.**

Four-Wheel and Six-Wheel Drum Brakes (Air Only)

The brake drums should be removed and inspected each time the tires are removed for rotation or changing. When you have the front brakes replaced, have the rear brakes inspected, too.

Brake linings should always be replaced as complete axle sets.

Brake Pedal Travel

See your dealer/retailer if the brake pedal does not return to normal height, or if there is a rapid increase in pedal travel. This could be a sign that brake service might be required.

Brake Adjustment

Every time you make a brake stop, the brakes adjust for wear.

Brake Adjustment on Air Braked Vehicles

Your vehicle has automatic slack adjusters. Every time you make a brake stop, the brakes automatically adjust for wear. Slack adjusters should never be manually adjusted to correct excessive brake chamber pushrod stroke. Excessive brake chamber pushrod stroke means that the brake system needs to be serviced by a qualified service technician.

Notice: **Do not manually adjust automatic slack adjusters. Manual adjustment of the automatic slack adjusters can result in a degradation of the slack adjuster performance over time. If the brake chamber pushrod stroke is out of adjustment, the brake system needs to be serviced by a qualified service technician.**

Four-Wheel Disc Brakes (Hydraulic Only)

Your vehicle has four-wheel disc brakes.

Some driving conditions or climates can cause a brake squeal when the brakes are first applied or lightly applied. This does not mean something is wrong with the brakes.

Brake linings should always be replaced as complete axle sets.

Replacing Brake System Parts

The braking system on a vehicle is complex. Its many parts have to be of top quality and work well together if the vehicle is to have really good braking. Your vehicle was designed and tested with top-quality brake parts. When you replace parts of the braking system — for example, when the brake linings wear down and you need new ones put in — be sure you get new approved replacement parts. If you do not, the brakes might not work properly. For example, if someone puts in brake linings that are wrong for your vehicle, the balance between the front and rear brakes can change — for the worse. The braking performance you have come to expect can change in many other ways if someone puts in the wrong replacement brake parts.

Air Brake Systems

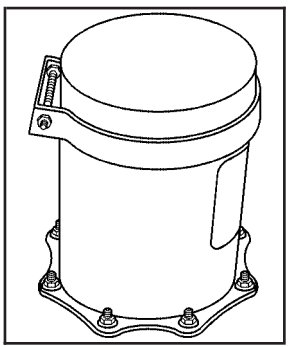
If your vehicle has air brakes, it is important to get rid of moisture in the system. Moisture will damage the system if it is not removed daily.

There are two ways to do this. One is automatic through the air brake vehicle's air dryer with intregal automatic moisture ejector that purges air from the system through a self-contained reservoir. The other way to drain moisture from the air brake system is to manually activate drain valves at each reservoir. Drain the air reservoirs occasionally to be sure the air dryer is working properly.

Drain them at full system pressure. To be sure you are at full pressure, check the air pressure gage. It should read at least 100 psi (692 kPa).

Air Dryer

If your vehicle has air brakes, it will have an air dryer. This collects and removes dirt, moisture, or other foreign matter from the air prior to entering the brake system. The air dryer also serves as a moisture ejector. It automatically ejects the moisture when the compressor cycles. The integral purge tank has a manual drain valve that must be drained every day. See “Air Brake Systems” for the manual drain procedure. The dryer is mounted on the driver side frame rail.

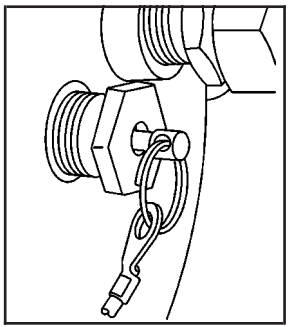


The dryer has a filter that you need to change at intervals. See *Scheduled Maintenance on page 295* for more about servicing this filter.

Electric Air Compressor

Your vehicle may have an electric air compressor. This compressor is used to run options that require pressurized air, such as air horn, air seat, exhaust restrictor, or an exhaust brake.

The air compressor is used when vehicles do not have an air brake system.



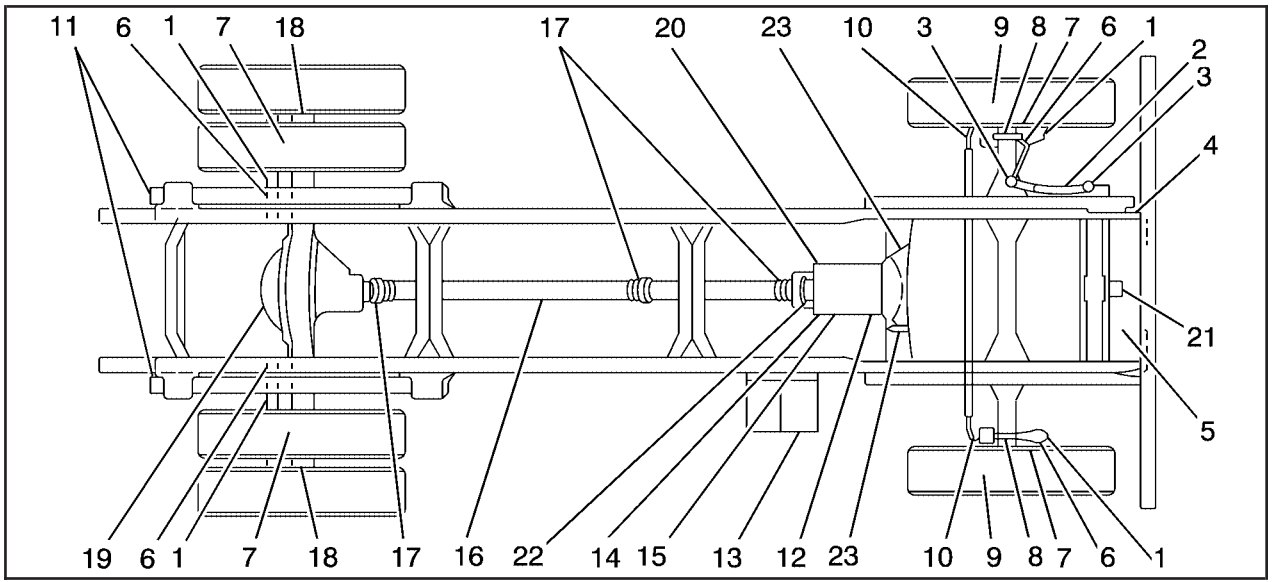
The air supply for this system must be maintained by releasing the drain valve to eject any moisture that could have built up in the system.

It is recommended that this system be drained on a weekly basis.

Clutch Pedal Free Travel

Normal clutch pedal free play is 1.5 to 2 inches (38 to 51 mm) measured from the floorboard. If the free play is less than 1.25 inches (32 mm), adjustment is required.

Chassis Lubrication



Item Number	Item	Remarks
1	Brake Camshaft*** Brake Caliper Rails$	One fitting each (apply sparingly). For caliper rails, apply Aero Shell #5 Lubricant.
2	Steering Column Slip Joint**	One fitting.
3	Steering Drag Link Ends	One fitting each end.
4	Steering Column U-Joints	One fitting each joint.
5	Pivot Points and Hinges	Apply chassis lubricant.
6	Slack Adjuster***	One fitting.
7	Brake Cam Roller Pins***	Apply engine oil.
8	Front Steering Knuckles	One fitting each side, lower bushing. (Hand-operated grease gun only.) Hand-pack upper bearing.
9	Front Wheel Bearings*	Hand-pack or lubricate.
10	Steering Tie Rod Ends	One fitting each end.
11	Spring Slip Pads** (Multi-leaf Only)	Apply chassis lubricant.
12	Clutch Release Bearing**	Cup or fitting.
13	Battery Terminal (except “ST” type)	Keep coated with petroleum jelly.
14	Parking Brake Bell Crank**, $	One fitting.

Item Number	Item	Remarks
15	Transmission*	Fill to level of filler plug.
15	Transmission-Automatic*,**,†	Check fluid level.
16	Propshaft Slip Joints	One fitting each joint; lubricate with GM Part No. 1051344 Wheel Bearing Lubricant.
17	Propshaft U-joints	One fitting each joint (1480 and 1550 Series); lubricate with GM Part No. 1051344 Wheel Bearing Lubricant. Two fittings each joint (1610 Series and larger); lubricate with GM Part No. 1051344 Wheel Bearing Lubricant.
18	Rear Wheel Bearings*	Hand-pack or lubricate.
19	Rear Axle*	Fill to level of filler plug.
20	Parking Brake Clevis Pin$	Apply chassis lubricant.
21	Master Cylinder$	Fill 1/4 inch (6 mm) below opening.
22	Parking Brake Lever Pivot**, $	Apply chassis lubricant.
23	Clutch Release Cross Shaft**	One fitting each.

* Refer to Maintenance Schedule.
** Applies to some vehicles.
*** Applies to air brakes only.
† Refer to Allison Transmission® Operator's Manual.
$ Applies to hydraulic brakes only.

Battery

Your vehicle has two maintenance free batteries. When it is time for a new battery, see your dealer/retailer for one that has the replacement number shown on the original battery's label.

Warning: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

Vehicle Storage

If you are not going to drive your vehicle for 25 days or more, remove the black, negative (–) cable from each battery. This will help keep the batteries from running down.

⚠ CAUTION:

Batteries have acid that can burn you and gas that can explode. You can be badly hurt if you are not careful. See *Jump Starting on page 236* for tips on working around a battery without getting hurt.

When you are ready to use the vehicle again, refer to the engine starting procedure in the Index.

Jump Starting

If your vehicle's batteries have run down, you may want to use another vehicle and some jumper cables to start your vehicle. Be sure to use the following steps to do it safely.

⚠ CAUTION:

Batteries can hurt you. They can be dangerous because:

- **They contain acid that can burn you.**
- **They contain gas that can explode or ignite.**
- **They contain enough electricity to burn you.**

If you do not follow these steps exactly, some or all of these things can hurt you.

Notice: **Ignoring these steps could result in costly damage to your vehicle that would not be covered by your warranty.**

Trying to start your vehicle by pushing or pulling it will not work, and it could damage your vehicle.

1. Check the other vehicle. It must have a 12-volt battery (or batteries) with a negative ground system.

Notice: **If the other vehicle's system is not a 12-volt system with a negative ground, both vehicles can be damaged. Only use vehicles with 12-volt systems with negative grounds to jump start your vehicle.**

   In diesel engine vehicles with two batteries, you may not be able to get enough power from a single battery in another vehicle to start your diesel engine, especially in cold weather.

   Use the battery closest to the starter — this will reduce electrical resistance.

2. Get the vehicles close enough so the jumper cables can reach, but be sure the vehicles are not touching each other. If they are, it could cause a ground connection you do not want. You would not be able to start your vehicle, and the bad grounding could damage the electrical systems.

To avoid the possibility of the vehicles rolling, set the parking brake firmly on both vehicles involved in the jump start procedure. Put an automatic transmission in PARK (P) or a manual transmission in NEUTRAL before setting the parking brake.

Notice: **If you leave your radio or other accessories on during the jump starting procedure, they could be damaged. The repairs would not be covered by your warranty. Always turn off your radio and other accessories when jump starting your vehicle.**

3. Turn off the ignition on both vehicles. Unplug unnecessary accessories plugged into the cigarette lighter or accessory power outlets. Turn off the radio and all lamps that are not needed. This will avoid sparks and help save both batteries. And it could save the radio!
4. Locate the batteries on each vehicle. Find the positive (+) and negative (–) terminals on each battery.

   You will not see the batteries of your vehicle under the hood. They are located in a frame mounted battery box on the passenger's side of the vehicle.

⚠ CAUTION:

Using a match near a battery can cause battery gas to explode. People have been hurt doing this, and some have been blinded. Use a flashlight if you need more light.

Be sure the batteries have enough water. You do not need to add water to the ACDelco® battery (or batteries) installed in your new vehicle. But if a battery has filler caps, be sure the right amount of fluid is there. If it is low, add water to take care of that first. If you do not, explosive gas could be present.

Battery fluid contains acid that can burn you. Do not get it on you. If you accidentally get it in your eyes or on your skin, flush the place with water and get medical help immediately.

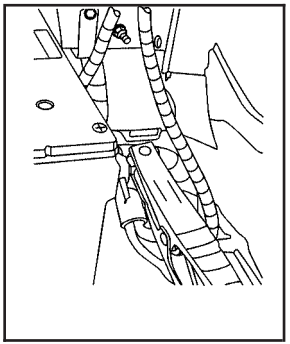
⚠ CAUTION:

Fans or other moving engine parts can injure you badly. Keep your hands away from moving parts once the engine is running.

5. Check that the jumper cables do not have loose or missing insulation. If they do, you could get a shock. The vehicles could be damaged too.

   Before you connect the cables, here are some basic things you should know. Positive (+) will go to positive (+) or to a remote positive (+) terminal if the vehicle has one. Negative (–) will go to a heavy, unpainted metal engine part or to a remote negative (–) terminal if the vehicle has one.

   Do not connect positive (+) to negative (–) or you will get a short that would damage the battery and maybe other parts too. And do not connect the negative (–) cable to the negative (–) terminal on the dead battery because this can cause sparks.

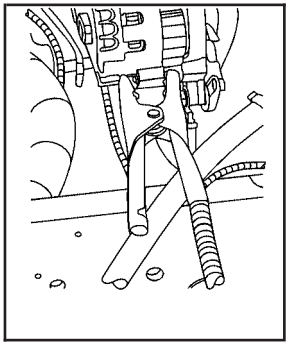


6. Connect the red positive (+) cable to the positive (+) terminal of the dead battery. Use a remote positive (+) terminal if the vehicle has one.

7. Do not let the other end touch metal. Connect it to the positive (+) terminal of the good battery. Use a remote positive (+) terminal if the vehicle has one.

8. Now connect the black negative (–) cable to the negative (–) terminal of the good battery. Use a remote negative (–) terminal if the vehicle has one.

   Do not let the other end touch anything until the next step. The other end of the negative (–) cable does not go to the dead battery. It goes to a heavy, unpainted metal engine part or to a remote negative (–) terminal on the vehicle with the dead battery.



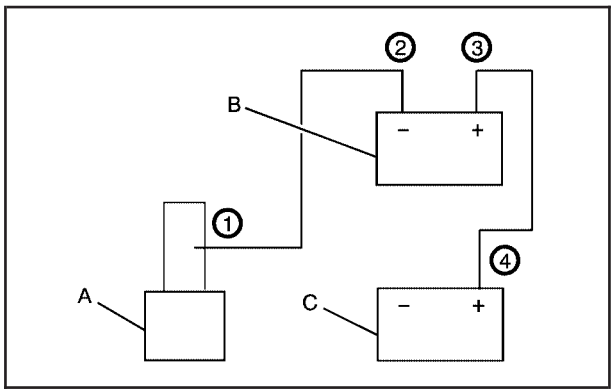
9. Connect the other end of the negative (–) cable at least 18 inches (45 cm) away from the dead battery, but not near engine parts that move.

   The electrical connection is just as good there, and the chance of sparks getting back to the battery is much less.

10. Now start the vehicle with the good batteries and run the engine for a while. If your vehicle has the high idle option, use it.

11. Try to start the vehicle that had the dead batteries. If it will not start after a few tries, it probably needs service.

Notice: **If the jumper cables are connected or removed in the wrong order, electrical shorting may occur and damage the vehicle. The repairs would not be covered by your warranty. Always connect and remove the jumper cables in the correct order, making sure that the cables do not touch each other or other metal.**



Jumper Cable Removal

A. Heavy, Unpainted Metal Engine Part or Remote Negative (–) Terminal
B. Good Battery or Remote Positive (+) and Remote Negative (–) Terminals
C. Dead Battery or Remote Positive (+) Terminal

To disconnect the jumper cables from both vehicles, do the following:

1. Disconnect the black negative (–) cable from the vehicle that had the dead batteries.
2. Disconnect the black negative (–) cable from the vehicle with the good batteries.
3. Disconnect the red positive (+) cable from the vehicle with the good batteries.
4. Disconnect the red positive (+) cable from the other vehicle.

Rear Axle

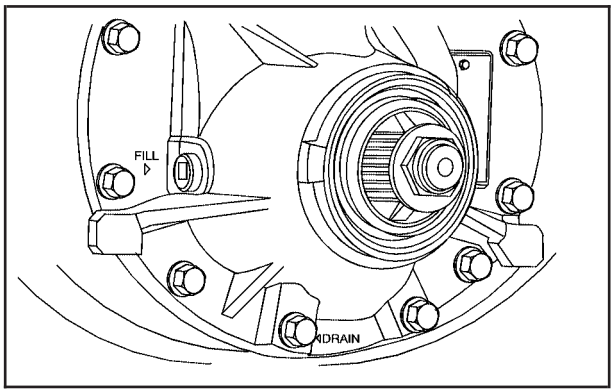
When to Check and Change Lubricant

Refer to the Maintenance Schedule to determine how often to check the lubricant and when to change it. See *Scheduled Maintenance on page 295*.

Notice: **If you drive your vehicle through deep water that is higher than the front or rear axle, water may enter the axle housing and cause the axle lubricant to break down. This could damage the gears inside. Avoid driving your vehicle through deep water.**

You should avoid driving your vehicle through deep puddles or standing water. If you must drive through water that is higher than the front or rear axle, see your dealer immediately afterward to have the condition of the axle lubricant checked.

How to Check Lubricant



HD2 Axle

To get an accurate reading, the vehicle should be on a level surface.

If the level is below the bottom of the filler plug hole, located on the rear axle, you'll need to add some lubricant. Add enough lubricant to raise the level to the bottom of the filler plug hole.

What to Use

Refer to the Maintenance Schedule to determine what kind of lubricant to use. See *Part C: Recommended Fluids and Lubricants on page 321*.

Rear Axle Shift Motor

When to Check and Change Fluid

If you have an optional air-shift two-speed, controlled traction, or locking differential type rear axle, a good time to check the fluid level in the axle shift motor is when the rear axle lubricant is checked.

How to Check Fluid

Remove the plug on the front plate of the axle shift motor, add enough fluid to raise the level to the bottom of the filler plug hole, then replace the plug.

What to Use

Refer to your Maintenance Schedule to determine what kind of lubricant to use. See *Part C: Recommended Fluids and Lubricants on page 321*.

Cab Tilting

Before You Tilt the Cab

Most fluids and lubricants requiring regular checking can be accessed at the back of the cab. If you need to gain access to components under the cab, follow this entire procedure carefully.

- Find a level place to tilt the cab.
- Secure all loose articles in the cab and close the cab door.
- Check for adequate clearance in front and above the cab.

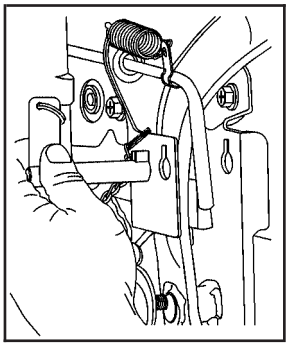
To help prevent the vehicle from moving:

1. Apply the parking brake.
2. Place the automatic transmission in PARK (P) or shift the manual transmission to NEUTRAL.
3. Turn the engine off.
4. Block the front and rear wheels.

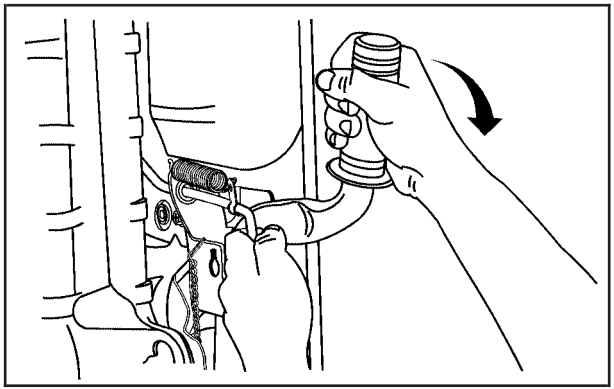
Tilting the Cab

To tilt the cab, do the following:

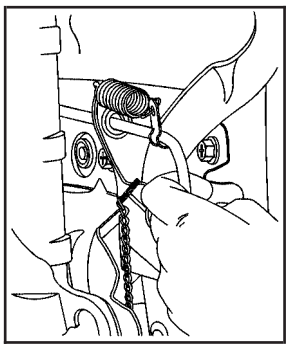
1. Locate the lever pin at the rear of the cab, on the passenger's side.



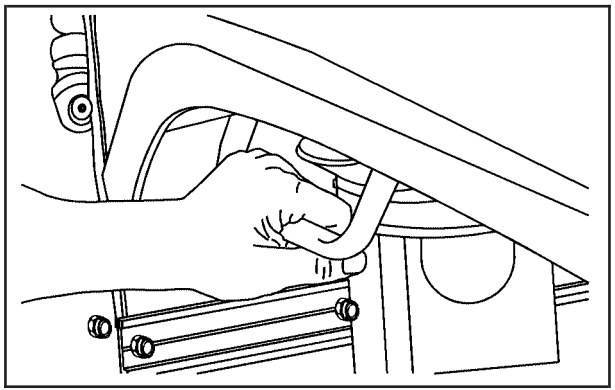
2. Turn the lever pin so that the tab is aligned with the slot. Remove the lever pin.



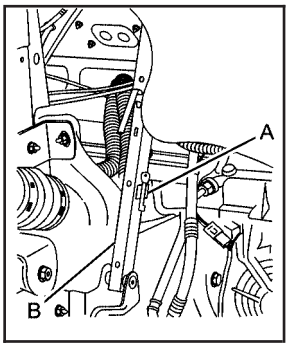
3. Move the primary tilt lever all the way down.



4. Pull the secondary latch lever to release the hook from the catch at the back of the cab.



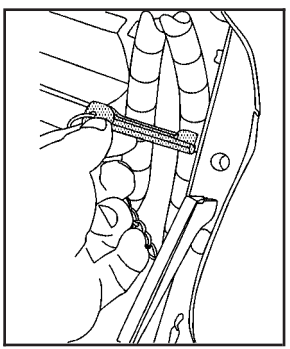
5. Using the handle located at the bottom of the cab at the back, tilt the cab forward.



6. Tilt the cab all the way forward until the cab support under the cab locks fully.

A. Safety Lock Pin

B. Cab Support



7. Remove the safety lock pin from its retainer on the cab support. Insert the pin into the hole in the cab support by aligning the tab with the slot.

⚠ CAUTION:

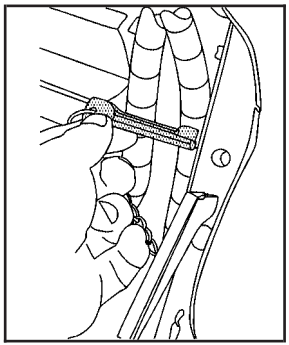
A cab not properly locked in the tilted position could fall, causing serious injury. To ensure that the cab is securely locked in position and will not move, the safety lock pin (A) must always be inserted into the cab support (B) when the cab is in the tilted position.

⚠ CAUTION:

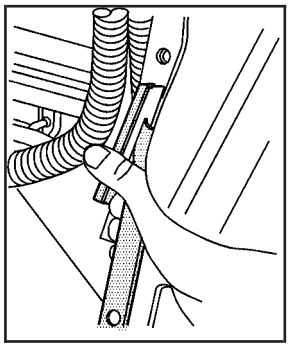
Things that burn can get on hot engine parts and start a fire. These include liquids like fuel, oil, coolant, brake fluid, windshield washer and other fluids, and plastic or rubber. You or others could be burned. Be careful not to drop or spill things that will burn onto a hot engine.

Lowering the Cab

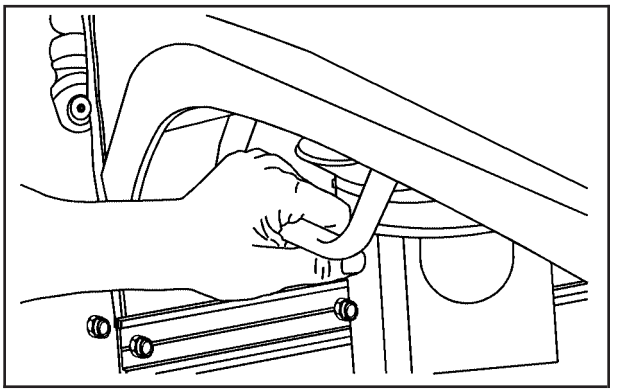
When the cab is ready to be lowered, follow the instructions below carefully. Before lowering the cab, be sure all filler caps are on properly.



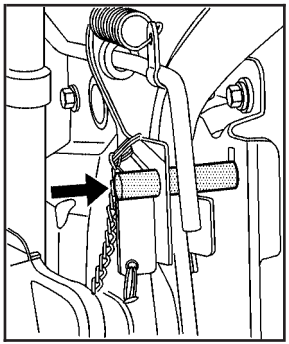
1. Remove the safety lock pin from the cab support by turning it and pulling it out.



2. Squeeze the lever on the cap support to release the detent.



3. Using the handle located at the bottom of the cab toward the back, lower the cab until the hook catches and the cab is held down.
4. Push the primary tilt lever upward fully to lock the cab to the chassis.



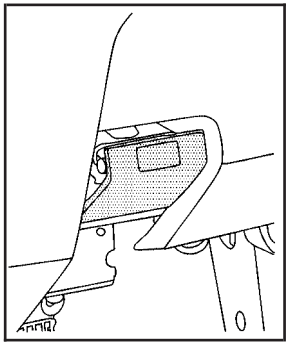
5. Reinstall the pin and turn it to keep the primary tilt lever from moving downward.

⚠ CAUTION:

An unsecured cab could move suddenly causing an accident or an injury. Be sure the tilt cab is properly secured to the chassis before moving the vehicle.

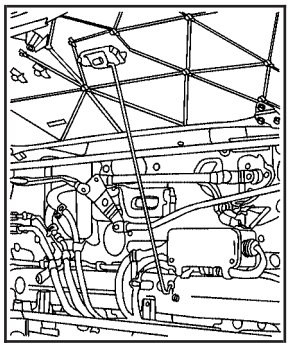
Lifting the Front Panel

To access the windshield washer fluid reservoir and the clutch fluid reservoir, the front panel must be lifted.



1. To lift the panel, grasp the rear of the release catch, located at the bottom of the instrument panel, and pull it toward you.

See *Instrument Panel Overview on page 100* for more information on location of the release catch.



2. Then go to the front of the vehicle and lift the panel at the center. Use the prop rod to hold the panel open.

3. To close the front panel, remove the prop rod, close the panel and push firmly on both sides to ensure that the panel is fully closed.

Noise Control System

Tampering with Noise Control System Prohibited

The following information relates to compliance with federal noise emission standards for vehicles with a Gross Vehicle Weight Rating (GVWR) of more than 10,000 lbs (4 536 kg). 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 given in your warranty booklet.

These standards apply only to vehicles sold in the United States.

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 underhood insulation.

Engine:

- Removal or rendering engine speed governor, if the vehicle has one, inoperative so as to allow engine speed to exceed manufacturer specifications.

Fan and Drive:

- Removal of fan clutch, if the vehicle has one, or rendering clutch inoperative.
- Removal of the fan shroud, if the vehicle has one.

Air Intake:

- Removal of the air cleaner silencer.
- Modification of the air cleaner.

Exhaust:

- Removal of the muffler or resonator.
- Removal of the exhaust pipes and exhaust pipe clamps.
- Removal of the DOC converter, the Diesel Particulate Filter, or the diesel exhaust gas cooler device.

Bulb Replacement

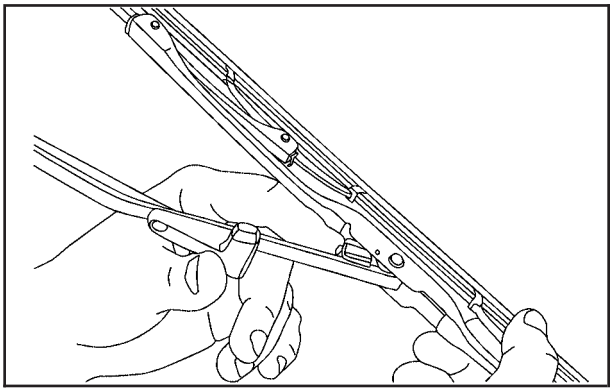
It is recommended that all bulbs be replaced by your dealer.

Windshield Wiper Blade Replacement

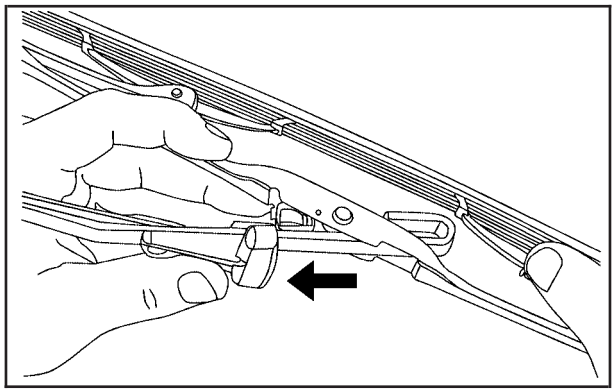
Windshield wiper blades should be inspected at least twice a year for wear or cracking. See “Wiper Blade Check” under *At Least Twice a Year on page 316* for more information.

Replacement blades come in different types and are removed in different ways.

Here’s how to remove the wiper blade:



1. Pull the windshield wiper arm away from the windshield.



2. Push the release lever and slide the wiper assembly toward the driver's side of the vehicle.
3. Install a new blade by reversing Steps 1 and 2.

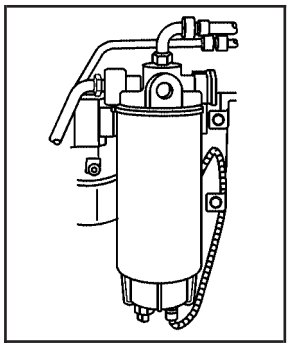
Other Service Items

Fuel Filter

Your fuel filter is located in the engine compartment on the driver's side of the vehicle, or along the driver's side frame rail. See *Fuel Filter Replacement* earlier in this section for further information.

Also see *Scheduled Maintenance on page 295* for recommended service intervals.

Primary Fuel Filter and Water Separator



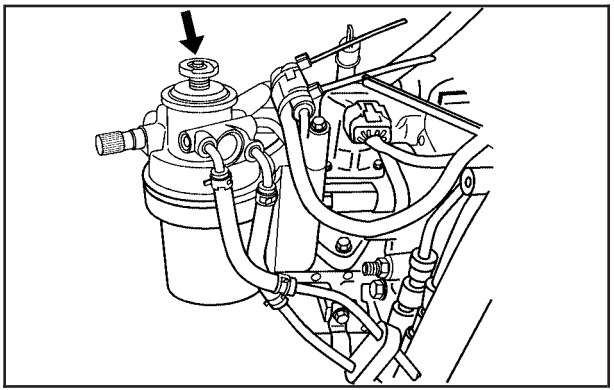
Your vehicle may have this spin-on filter. It is located on the driver's side frame rail.

It has a clear plastic drain bowl at the bottom. Check the drain bowl occasionally for any water or particles.

To drain the water or to replace the element, follow the water draining and element replacement procedure under *Water in Fuel on page 198*.

Secondary Fuel Filter and Heater

Your vehicle may have this fuel filter and fuel heater. It is mounted on the left side of the engine.

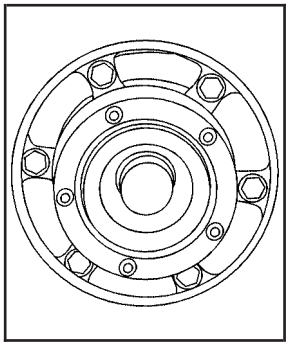


It has a metal drain bowl at the bottom. Occasionally, check the bowl for any water or particles. To check or drain the bowl, shut off the engine.

Front Wheel Bearings with Oil-Filled Hubs

Notice: **If you drive your vehicle through deep water that is higher than the front or rear axle, water may enter the axle housing and cause the axle lubricant to break down. This could damage the gears inside. Avoid driving your vehicle through deep water.**

You should avoid driving your vehicle through deep puddles or standing water. If you must drive through water that is higher than the front or rear axle, see your dealer immediately afterward to have the condition of the axle lubricant checked.



If your vehicle has oil-filled hubs, occasionally check to see if they have enough oil. You can tell if there is oil there by using the circular gage on the sight glass.

If there isn't, clean the rubber fill plug in the center of the glass, and then remove it. Be careful not to allow any dirt or water to get into the oil. Add enough of the recommended oil to bring it up to the level mark that you'll see on the glass.

Refer to your Maintenance Schedule for the proper oil to use.

When you fill the hub, check the glass again after driving a short distance. It takes a while for the oil to flow through the system, and you may find that you have to add a little more to fill it to the proper level. Be sure not to overfill the hub.

Tires

Your new vehicle comes with high-quality tires made by a leading tire manufacturer. If you ever have questions about your tire warranty and where to obtain service, see your vehicle Warranty booklet for details.

⚠ CAUTION:

Poorly maintained and improperly used tires are dangerous.

- **Overloading your vehicle's tires can cause overheating as a result of too much friction. You could have an air-out and a serious accident. See *Loading Your Vehicle on page 180*.**

CAUTION: (Continued)

CAUTION: (Continued)

- **Underinflated tires pose the same danger as overloaded tires. The resulting accident could cause serious injury. Check all tires frequently to maintain the recommended pressure. Tire pressure should be checked when your vehicle's tires are cold. See *Inflation - Tire Pressure on page 255*.**
- **Overinflated tires are more likely to be cut, punctured, or broken by a sudden impact — such as when you hit a pothole. Keep tires at the recommended pressure.**
- **Worn, old tires can cause accidents. If the tire's tread is badly worn, or if your vehicle's tires have been damaged, replace them.**

Inflation - Tire Pressure

Tires need the correct amount of air pressure to operate effectively. The Certification or Tire Information label shows the correct inflation pressures for your tires when they are cold. Cold means your vehicle has been sitting for at least three hours or driven no more than 1 mile (1.6 km).

Notice: **Do not let anyone tell you that under-inflation or over-inflation is all right. It is not. If your tires do not have enough air (under-inflation), you can get the following:**

- **Too much flexing**
- **Too much heat**
- **Tire overloading**
- **Premature or irregular wear**
- **Poor handling**
- **Reduced fuel economy**

If your tires have too much air (over-inflation), you can get the following:

- **Unusual wear**
- **Poor handling**
- **Rough ride**
- **Needless damage from road hazards**

When to Check

Check your tires once a month or more.

Also, check the tire pressure of the spare tire if your vehicle has one.

How to Check

Use a good quality pocket-type gage to check tire pressure. You cannot tell if your vehicle's tires are properly inflated simply by looking at them. Radial tires may look properly inflated even when they are underinflated. Check the tire's inflation pressure when the tires are cold. Cold means your vehicle has been sitting for at least three hours or driven no more than 1 mile (1.6 km).

Remove the valve cap from the tire valve stem. Press the tire gage firmly onto the valve to get a pressure measurement. If the cold tire inflation pressure matches the recommended pressure on the Certification or Tire Information label, no further adjustment is necessary. If the inflation pressure is low, add air until you reach the recommended amount. If you overfill the tire, release air by pushing on the metal stem in the center of the tire valve. Re-check the tire pressure with the tire gage.

Be sure to put the valve caps back on the valve stems. They help prevent leaks by keeping out dirt and moisture.

Wheel Loading

Wheels are stamped with a maximum load and cold inflation rating. Be sure you do not exceed these limits.

Dual Tire Operation

When the vehicle is new, check the wheel nut tightness on all wheels with a torque wrench after your first 100 miles (160 km) and then 1,000 miles (1 600 km) after that. Whenever a wheel, wheel bolt or wheel nut is removed or serviced, repeat the 100 miles (160 km), and then 1,000 mile (1 600 km) wheel nut tightness check.

See *Tightening the Wheel Nuts on page 259* for wheel nut tightening information and proper torque values.

⚠ CAUTION:

If you operate your vehicle with a tire that is badly underinflated, the tire can overheat. An overheated tire can lose air suddenly or catch fire. You or others could be injured. Be sure all tires (including the spare, if any) are properly inflated.

See *Tires on page 254* and *Inflation - Tire Pressure on page 255* for more information on proper tire inflation.

When It Is Time for New Tires

Replace your tires when the tread depth is down to 1/8 of an inch (3.2 mm) for the front tires, or 1/16 of an inch (1.6 mm) for a rear tire. Also, you need a new tire if:

- You can see cord or fabric showing through the tire's rubber.
- The tread or sidewall is cracked, cut, or snagged deep enough to show cord or fabric.
- The tire has a bump, bulge, or split.
- The tire has a puncture, cut, or other damage that cannot be repaired well because of the size or location of the damage.

⚠ CAUTION:

Mixing tires could cause you to lose control while driving. If you mix tires of different sizes, brands, or types (radial and bias-belted tires) the vehicle may not handle properly, and you could have a crash. Using tires of different sizes, brands, or types may also cause damage to your vehicle. Be sure to use the correct size, brand, and type of tires on your vehicle's wheels.

When you replace tires, make sure they are the same size, load range, speed rating, and construction type (bias, bias-belted or radial) as your original tires.

Different Size Tires and Wheels

If wheels or tires are added that are a different size than the original equipment wheels and tires, this could affect the way your vehicle performs, including its braking, ride and handling characteristics, stability, and resistance to rollover. Additionally, if your vehicle has electronic systems such as, anti-lock brakes, traction control, and electronic stability control, the performance of these systems can be affected.

⚠ CAUTION:

If you add different sized wheels, your vehicle may not provide an acceptable level of performance and safety if tires not recommended for those wheels are selected. You may increase the chance that you will crash and suffer serious injury. Only use the specific wheel and tire systems developed for your vehicle, and have them properly installed.

See *Accessories and Modifications on page 191* for additional information.

Wheel Alignment and Tire Balance

The wheels on your vehicle were aligned at the factory to give you the longest tire life and best overall performance.

Proper front wheel alignment must be maintained in order to ensure efficient steering, good directional stability, and prevent abnormal tire wear. If you notice unusual tire wear or your vehicle is pulling one way or the other, the alignment may need to be reset. If you notice your vehicle vibrating when driving on a smooth road, your wheels may need to be balanced.

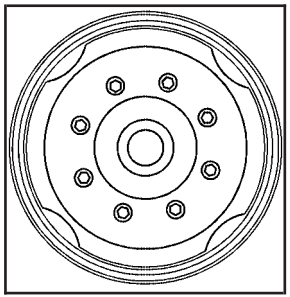
Tightening the Wheel Nuts

⚠ CAUTION:

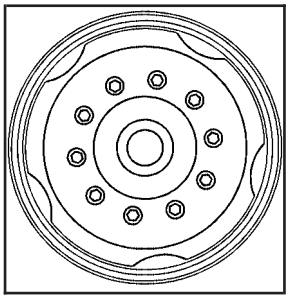
Wheel nuts that are not tight can work loose. If all the nuts on a wheel come off, the wheel can come off the vehicle, causing a crash. All wheel nuts must be properly tightened. Follow the rules in this section to be sure they are.

This section lets you know how often to check the tightness of the wheel nuts on your vehicle and how tight they must be.

First, use these pictures to decide what kind of wheels you have.



Hub-Piloted Type, 8-Hole



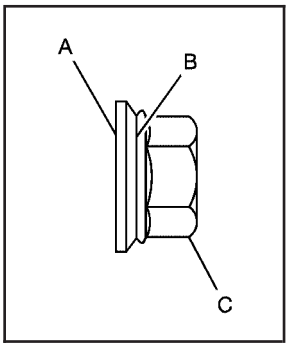
Hub-Piloted Type, 10-Hole

Then, refer to the following steps for the wheels you have.

Hub-Piloted Wheels, 8-Hole or 10-Hole

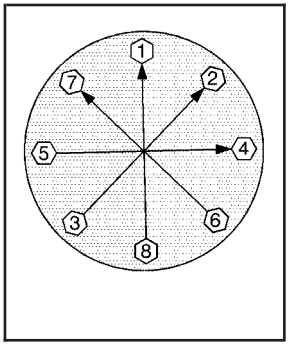
The studs and nuts used with these wheels have right-hand threads.

1. With intermittent pilot pads, position a pad at 12 o'clock to center the wheel and reduce run-out.
2. Put the tire and rim assembly on the axle hub. Install the outer rear tire and rim assembly so that its valve stem is exactly opposite the valve stem on the inner tire and rim assembly.
3. Put on the wheel nuts.
4. Finger-tighten the nuts.

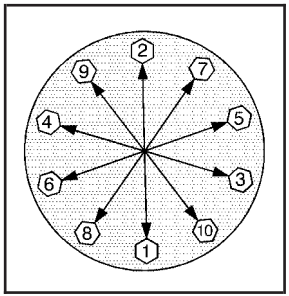


5. Oil the surfaces (B) between the nuts (C) and washers (A). Do not oil the studs or the threads of the nut.

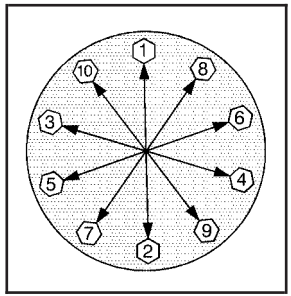
6. Tighten the nuts to 400 lb ft (542 N•m) if an 8-hole stud or 480 lb ft (650 N•m) if a 10-hole stud, using the following diagrams.



8-Hole



10-Hole (Front)



10-Hole (Rear)

⚠ CAUTION:

Never use oil or grease on studs or the threads of the wheel nuts. If you do, the wheel nuts might come loose and the wheel could fall off, causing a crash.

⚠ CAUTION:

If wheel studs are damaged, they can break. If all the studs on a wheel broke, the wheel could come off and cause a crash. If any stud is damaged because of a loose-running wheel, it could be that all of the studs are damaged. To be sure, replace all studs on the wheel. If the stud holes in a wheel have become larger, the wheel could collapse in operation. Replace any wheel if its stud holes have become larger or distorted in any way. Inspect hubs and hub-piloted wheels for damage. Because of loose running wheels, piloting pad damage may occur and require replacement of the entire hub, for proper centering of the wheels. When replacing studs, hubs, wheel nuts or wheels, be sure to use GM original equipment parts.

⚠ CAUTION:

Rust or dirt on a wheel, or on the parts to which it is fastened, can make wheel nuts become loose after a time. The wheel could come off and cause a crash. When you change a wheel, remove any rust or dirt from places where the wheel attaches to the vehicle. In an emergency, you can use a cloth or a paper towel to do this; but be sure to use a scraper or wire brush later, if you need to, to get all the rust or dirt off.

How Often to Check

Wheel tightness is so important you should have a technician check nut tightness on all wheels with a torque wrench after your first 100 miles (160 km), and then 1,000 miles (1 600 km) after that. Be sure to repeat this service whenever you have a tire removed or serviced. See *Scheduled Maintenance on page 295* for further information.

Wheel Replacement

Replace any wheel that is bent, cracked, or badly rusted or corroded. If wheel nuts keep coming loose, replace the wheel, wheel bolts, and wheel nuts. If the wheel leaks air, replace it.

Your dealer will know the kind of wheel you need.

Each new wheel should have the same load-carrying capacity, diameter, width, offset and be mounted the same way as the one it replaces.

⚠ CAUTION:

Using the wrong replacement wheels, wheel bolts, or wheel nuts on your vehicle can be dangerous. It could affect the braking and handling of your vehicle, make your tires lose air and make you lose control. You could have a collision in which you or others could be injured. Always use the correct wheel, wheel bolts, and wheel nuts for replacement.

If you need to replace any of your wheels, wheel bolts or wheel nuts, replace them only with new original equipment parts. This way, you will be sure to have the right wheel, wheel bolts and wheel nuts for your vehicle.

⚠ CAUTION:

A leaking wheel could fail without warning. A wheel designed for tubeless tires could be leaking because it is damaged. Do not use an inner tube or some other thing to try to stop the leaking. Get a new wheel of the proper type.

⚠ CAUTION:

Without the correct wheel, wheel bolts or wheel nuts, you may not be able to stop properly, and you could have other problems like a tire air-out. You could have a collision. If you do not go to your

CAUTION: (Continued)

CAUTION: (Continued)

dealer to get a new wheel, wheel bolts or wheel nuts, be sure you get the correct ones. Each new wheel should match the original wheel in load-carrying capacity, inflation pressure capacity, diameter, width, offset and mounting configuration.

Using wheels and tires with higher load-carrying limits than the original wheels and tires does not change the Gross Axle Weight Rating (GAWR) or the Gross Vehicle Weight Rating (GVWR) of your vehicle. See *Loading Your Vehicle on page 180* for more information.

Notice: **The wrong wheel can cause trouble in bearing life, brake cooling, speedometer/ odometer calibration, headlamp aim, bumper height, vehicle ground clearance, stopping distance and tire clearance to the body and chassis. You could also have other problems like a tire air-out.**

Used Replacement Wheels

⚠ CAUTION:

Putting a used wheel on your vehicle is dangerous. You cannot know how it has been used or how far it has been driven. It could fail suddenly and cause a crash. If you have to replace a wheel, use a new original equipment wheel.

If a Tire Goes Flat

It is unusual for a tire to blowout while you are driving, especially if you maintain your tires properly. If air goes out of a tire, it is much more likely to leak out slowly. But if you should ever have a blowout, here are a few tips about what to expect and what to do:

If a front tire fails, the flat tire will create a drag that pulls the vehicle toward that side. Take your foot off the accelerator pedal and grip the steering wheel firmly. Steer to maintain lane position, and then gently brake to a stop well out of the traffic lane.

A rear blowout, particularly on a curve, acts much like a skid and may require the same correction you would use in a skid. In any rear blowout, remove your foot from the accelerator pedal. Get the vehicle under control by steering the way you want the vehicle to go. It may be very bumpy and noisy, but you can still steer. Gently brake to a stop — well off the road if possible.

If a tire goes flat, avoid further tire and wheel damage by driving slowly to a level place and turn on your hazard warning flashers. See *Hazard Warning Flashers on page 102*.

⚠ CAUTION:

Your vehicle, when new, did not include tire changing equipment or a place to store a tire in the vehicle. Special tools and procedures are required if a tire needs to be serviced. If these tools and procedures are not used, you or others could be injured or killed while trying to change or service a truck tire.

Your truck, when new, did not include tire changing equipment or a place to store a tire in the vehicle. Few drivers of these vehicles have the necessary equipment aboard to be able to change a flat tire safely. For example, you would need a truck jack that can lift several thousand pounds and a torque wrench that can generate several hundred foot-pounds (N•m) of twisting force.

⚠ CAUTION:

If you try to put air back into a tire that has run flat, even a tire that was extremely low on air, the tire can have a sudden air-out. This could cause you to lose control of the vehicle and have a serious crash. Do not refill a flat or very low tire with air without first having the tire taken off the wheel and checked for damage.

So if you are stopped somewhere by a flat or damaged tire or wheel, you should get expert help. See *Roadside Assistance Program on page 332*.

Appearance Care

Cleaning the Inside of Your Vehicle

Your vehicle's interior will continue to look its best if it is cleaned often. Although not always visible, dust and dirt can accumulate on your upholstery. Dirt can damage carpet, fabric, leather, and plastic surfaces. Regular vacuuming is recommended to remove particles from your upholstery. It is important to keep your upholstery from becoming and remaining heavily soiled. Soils should be removed as quickly as possible. Your vehicle's interior may experience extremes of heat that could cause stains to set rapidly.

Lighter colored interiors may require more frequent cleaning. Use care because newspapers and garments that transfer color to your home furnishings may also transfer color to your vehicle's interior.

When cleaning your vehicle's interior, only use cleaners specifically designed for the surfaces being cleaned. Permanent damage may result from using cleaners on surfaces for which they were not intended. Use glass cleaner only on glass. Remove any accidental over-spray from other surfaces immediately. To prevent over-spray, apply cleaner directly to the cleaning cloth.

Notice: **If you use abrasive cleaners when cleaning glass surfaces on your vehicle, you could scratch the glass. When cleaning the glass on your vehicle, use only a soft cloth and glass cleaner.**

Many cleaners contain solvents that may become concentrated in your vehicle's breathing space. Before using cleaners, read and adhere to all safety instructions on the label. While cleaning your vehicle's interior, maintain adequate ventilation by opening your vehicle's doors and windows.

Dust may be removed from small buttons and knobs using a small brush with soft bristles.

Your GM dealer has a product for cleaning your vehicle's glass. Should it become necessary, you can also obtain a product from your GM dealer to remove odors from your vehicle's upholstery.

Do not clean your vehicle using the following cleaners or techniques:

- Never use a knife or any other sharp object to remove a soil from any interior surface.
- Never use a stiff brush. It can cause damage to your vehicle's interior surfaces.
- Never apply heavy pressure or rub aggressively with a cleaning cloth. Use of heavy pressure can damage your interior and does not improve the effectiveness of soil removal.
- Use only mild, neutral-pH soaps. Avoid laundry detergents or dishwashing soaps with degreasers. Using too much soap will leave a residue that leaves streaks and attracts dirt. For liquid cleaners, about 20 drops per gallon (3.78 L) of water is a good guide.
- Do not heavily saturate your upholstery while cleaning.
- Damage to your vehicle's interior may result from the use of many organic solvents such as naptha, alcohol, etc.

Fabric/Carpet

Use a vacuum cleaner with a soft brush attachment frequently to remove dust and loose dirt. A canister vacuum with a beater bar in the nozzle may only be used on floor carpet and carpeted floor mats. For soils, always try to remove them first with plain water or club soda. Before cleaning, gently remove as much of the soil as possible using one of the following techniques:

- For liquids: gently blot the remaining soil with a paper towel. Allow the soil to absorb into the paper towel until no more can be removed.
- For solid dry soils: remove as much as possible and then vacuum.

To clean, use the following instructions:

1. Saturate a lint-free, clean white cloth with water or club soda.
2. Wring the cloth to remove excess moisture.
3. Start on the outside edge of the soil and gently rub toward the center. Continue cleaning, using a clean area of the cloth each time it becomes soiled.

4. Continue to gently rub the soiled area until the cleaning cloth remains clean.
5. If the soil is not completely removed, use a mild soap solution and repeat the cleaning process that was used with plain water.

If any of the soil remains, a commercial fabric cleaner or spot lifter may be necessary. When a commercial upholstery cleaner or spot lifter is to be used, test a small hidden area for colorfastness first. If the locally cleaned area gives any impression that a ring formation may result, clean the entire surface.

After the cleaning process has been completed, a paper towel can be used to blot excess moisture from the fabric or carpet.

Instrument Panel, Vinyl, and Other Plastic Surfaces

A soft cloth dampened with water may be used to remove dust. If a more thorough cleaning is necessary, a clean soft cloth dampened with a mild soap solution can be used to gently remove dust and dirt. Never use spot lifters or removers on plastic surfaces. Many commercial cleaners and coatings that are sold to preserve and protect soft plastic surfaces may permanently change the appearance and feel of your interior and are not recommended. Do not use silicone or wax-based products, or those containing organic solvents to clean your vehicle's interior because they can alter the appearance by increasing the gloss in a non-uniform manner.

Some commercial products may increase gloss on your instrument panel. The increase in gloss may cause annoying reflections in the windshield and even make it difficult to see through the windshield under certain conditions.

Care of Safety Belts

Keep belts clean and dry.

⚠ CAUTION:

Do not bleach or dye safety belts. If you do, it may severely weaken them. In a crash, they might not be able to provide adequate protection. Clean safety belts only with mild soap and lukewarm water.

Weatherstrips

Silicone grease on weatherstrips will make them last longer, seal better, and not stick or squeak. Apply silicone grease with a clean cloth. During very cold, damp weather frequent application may be required. See *Part C: Recommended Fluids and Lubricants on page 321*.

Washing Your Vehicle

The paint finish on the vehicle provides beauty, depth of color, gloss retention, and durability.

The best way to preserve the vehicle's finish is to keep it clean by washing it often with lukewarm or cold water.

Do not wash the vehicle in the direct rays of the sun. Use a car washing soap. Do not use strong soaps or chemical detergents. Be sure to rinse the vehicle well, removing all soap residue completely. Approved cleaning products can be obtained from your dealer. See *Vehicle Care/Appearance Materials on page 274*. Do not use cleaning agents that are petroleum based, or that contain acid or abrasives. All cleaning agents should be flushed promptly and not allowed to dry on the surface, or they could stain. Dry the finish with a soft, clean chamois or an all-cotton towel to avoid surface scratches and water spotting.

High pressure car washes may cause water to enter the vehicle.

Cleaning Exterior Lamps/Lenses

Use only lukewarm or cold water, a soft cloth and a car washing soap to clean exterior lamps and lenses. Follow instructions under *Washing Your Vehicle on page 270*.

Finish Care

Occasional waxing or mild polishing of the vehicle by hand may be necessary to remove residue from the paint finish. You can get GM-approved cleaning products from your dealer. See *Vehicle Care/Appearance Materials on page 274*.

Notice: **Machine compounding or aggressive polishing on a basecoat/clearcoat paint finish may damage it. Use only non-abrasive waxes and polishes that are made for a basecoat/clearcoat paint finish on your vehicle.**

Foreign materials such as calcium chloride and other salts, ice melting agents, road oil and tar, tree sap, bird droppings, chemicals from industrial chimneys, etc., can damage the vehicle's finish if they remain on painted surfaces. Wash the vehicle as soon as possible. If necessary, use non-abrasive cleaners that are marked safe for painted surfaces to remove foreign matter.

Exterior painted surfaces are subject to aging, weather and chemical fallout that can take their toll over a period of years. The paint finish can be kept looking new by keeping the vehicle garaged or covered whenever possible.

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. However, chrome polish on chrome or stainless steel trim can be used if necessary.

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 high polish, is recommended for all bright metal parts.

Windshield and Wiper Blades

Clean the outside of the windshield with glass cleaner.

Clean the rubber blades using a lint free cloth or paper towel soaked with windshield washer fluid or a mild detergent. Wash the windshield thoroughly when cleaning the blades. Bugs, road grime, sap, and a buildup of vehicle wash/wax treatments may cause wiper streaking. Replace the wiper blades if they are worn or damaged.

Wipers can be damaged by:

- Extreme dusty conditions
- Sand and salt
- Heat and sun
- Snow and ice, without proper removal

Aluminum Wheels

The vehicle may have aluminum wheels.

Notice: **If you use strong soaps, chemicals, abrasive polishes, cleaners, brushes, or cleaners that contain acid on aluminum or chrome-plated wheels, you could damage the surface of the wheel(s). The repairs would not be covered by your warranty. Use only GM-approved cleaners on aluminum or chrome-plated wheels.**

Keep the wheels clean using a soft clean cloth with mild soap and water. Rinse with clean water. After rinsing thoroughly, dry with a soft clean towel. A wax may then be applied.

Notice: **Using chrome polish on aluminum wheels could damage the wheels. The repairs would not be covered by your warranty. Use chrome polish on chrome wheels only.**

The surface of these wheels is similar to the painted surface of the vehicle. Do not use strong soaps, chemicals, abrasive polishes, abrasive cleaners, cleaners with acid, or abrasive cleaning brushes on them because the surface could be damaged. Do not use chrome polish on aluminum wheels.

Tires

To clean the tires, use a stiff brush with tire cleaner.

Notice: **Using petroleum-based tire dressing products on your vehicle may damage the paint finish and/or tires. When applying a tire dressing, always wipe off any overspray from all painted surfaces on your vehicle.**

Sheet Metal Damage

If the vehicle is damaged and requires sheet metal repair or replacement, make sure the body repair shop applies anti-corrosion material to parts repaired or replaced to restore corrosion protection.

Original manufacturer replacement parts will provide the corrosion protection while maintaining the warranty.

Finish Damage

Any stone chips, fractures or deep scratches in the finish should be repaired right away. 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 dealer. Larger areas of finish damage can be corrected in your dealer's body and paint shop.

Underbody Maintenance

Chemicals used for ice and snow removal and dust control can collect on the underbody. If these are not removed, corrosion and rust can develop on the underbody parts such as fuel lines, frame, floor pan, and exhaust system even though they have corrosion protection.

At least every spring, flush these materials from the underbody with plain water. Clean any areas where mud and debris can collect. Dirt packed in close areas of the frame should be loosened before being flushed. Your dealer or an underbody car washing system can do this for you.

Chemical Paint Spotting

Some weather and atmospheric conditions can create a chemical fallout. Airborne pollutants can fall upon and attack painted surfaces on the vehicle. This damage can take two forms: blotchy, ring-shaped discolorations, and small, irregular dark spots etched into the paint surface.

Although no defect in the paint job causes this, we will repair, at no charge to the owner, the surfaces of new vehicles damaged by this fallout condition within 12 months or 12,000 miles (20 000 km) of purchase, whichever occurs first.

Vehicle Care/Appearance Materials

Description	Usage
Polishing Cloth Wax- Treated	Interior and exterior polishing cloth.
Tar and Road Oil Remover	Removes tar, road oil and asphalt.
Chrome Cleaner and Polish	Use on chrome or stainless steel.
White Sidewall Tire Cleaner	Removes soil and black marks from whitewalls.
Vinyl Cleaner	Cleans vinyl.
Glass Cleaner	Removes dirt, grime, smoke and fingerprints.
Chrome and Wire Wheel Cleaner	Removes dirt and grime from chrome wheels and wire wheel covers.

Description	Usage
Finish Enhancer	Removes dust, fingerprints, and surface contaminants. Spray on wipe off.
Swirl Remover Polish	Removes swirl marks, fine scratches and other light surface contamination.
Cleaner Wax	Removes light scratches and protects finish.
Foaming Tire Shine Low Gloss	Cleans, shines and protects in one easy step, no wiping necessary.
Wash Wax Concentrate	Medium foaming shampoo. Cleans and lightly waxes. Biodegradable and phosphate free.
Spot Lifter	Quickly and easily removes spots and stains from carpets, vinyl and cloth upholstery.
Odor Eliminator	Odorless spray odor eliminator used on fabrics, vinyl, leather and carpet.

Vehicle Identification

Vehicle Identification Number (VIN)



This is the legal identifier for your vehicle. It appears on a plate in the front corner of the instrument panel, on the driver side. You can see it if you look through the windshield from outside your vehicle. The VIN also appears on the Certification/Tire label and the certificates of title and registration.

Engine Identification

The eighth character in the VIN is the engine code. This code helps you identify your vehicle's engine, specifications, and replacement parts.

Electrical System

Add-On Electrical Equipment

Notice: **Do not add anything electrical to your vehicle unless you check with your dealer first. Some electrical equipment can damage your vehicle and the damage would not be covered by your warranty. Some add-on electrical equipment can keep other components from working as they should.**

Headlamp Wiring

The headlamp wiring is protected by a circuit breaker in the light switch. An electrical overload will cause the lights to go on and off, or in some cases to remain off. If this happens, have your headlamp wiring checked right away.

Windshield Wiper Fuses

The windshield wiper motor is protected by a circuit breaker inside the motor and a circuit breaker or fuse in the fuse block. If the motor overheats, the wipers will stop until the motor cools. If the overload is caused by an electrical problem, be sure to get it fixed.

Fusible Links

A fusible link is a short piece of wire that is covered by an insulated cover. It is several gage sizes smaller than the circuit it protects. It will melt in an overload situation, opening the circuit.

Your starter and other circuits have these fusible links. The size is printed on the insulation. If the insulation is burned beyond recognition, consult your GM dealer for the proper size. Replace a fusible link with one of the same size and insulation type. Fusible link insulation is a special purpose high-temperature material.

Power Windows and Other Power Options

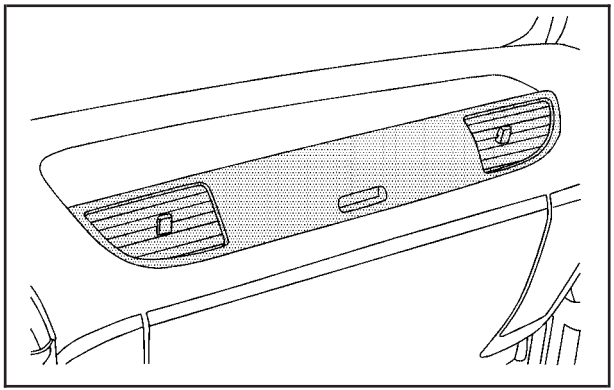
Circuit breakers in the fuse panel protect the power windows and other power accessories. When the current load is too heavy, the circuit breaker opens. This protects the circuit until the current load returns to normal or the problem is fixed.

Fuses and Circuit Breakers

The wiring circuits in your vehicle are protected from short circuits by a combination of fuses, circuit breakers, maxi-fuses and fusible links. This greatly reduces the chance of a fire caused by an electrical problem. There may be a fuse taped to the wiring harness near the hydraulic brake booster.

Before changing a fuse, turn the ignition off and set the parking brake.

Instrument Panel Fuse Block



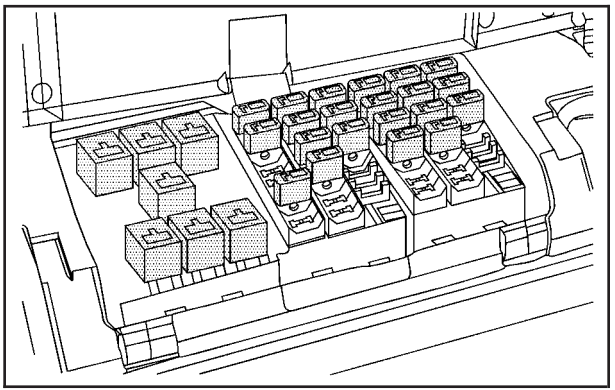
The instrument panel fuse block is located on the top of the instrument panel on the passenger's side of the vehicle.

To access the fuse block, remove the cover by lifting up on the front and turning it backward.

To reinstall the cover, put the tabs at the rear of the cover into the slots on the instrument panel and lower the cover down to snap into place.

If you ever have a problem on the road and don't have a spare fuse, you can borrow one of the correct value. Just pick some feature of your vehicle that you can get along without, like the radio or cigarette lighter, and use its fuse if it is the value you need. Remember to replace the fuse as soon as you can.

These fuses are non-cycling; do not replace them with cycling fuses. Also, do not use fuses of a higher amperage than those listed on the circuit breaker block.



NOTICE USE SPECIFIED FUSE ONLY,
UNSPECIFIED FUSES CAN CAUSE FIRE AND MALFUNCTION OF EQUIPMENT.

F U S E B O X

1	IGNITION SWITCH	6	WARNING LAMP SEE NOTE 1	11	TRL TURN LH LAMP	14	HEAD LAMP LH	19	ID LAMP MARKER LAMP TAIL LAMP,LIGHT MIR, ILLUMINATION LAMP	24	BLOWER MOTOR, AIRCON RELAY
2	CIGAR LIGHTER RADIO METER	7	ROOM LAMP,HORN ELEC PARK BRK SEE NOTE 2	12	AUXILIARY (IGNITION ON)	15	HEAD LAMP RH	20	COOL COND FAN MOTOR, COOLER COMPRESSOR	25	TRL TURN RH LAMP, FLASHER UNIT
3	ECM IGN 1	8	POWER WINDOW	13	AUXILIARY (BATTERY DIRECT)	16	HEAD LAMP	21	WIPER MOTOR, WASHER MOTOR	26	POWER POST, (CONSENT)
4	TCM IGN,METER SDG CHAIME	9	EXH BRK BACK LAMP SEE NOTE 3			17	HEATED FUEL	22	HEATED MIRROR, 2 SP AXLE MOTOR, 2 SP AXLE RELAY		
5	ALDL CONN.	10	ECM IGN POWER			18	METER TCM	23			

NOTE 1 ALSO INCLUDES IGN RLY, BLOWER MOTOR RLY, AUXI RLY, P/W RLY, INT RLY
2 ALSO INCLUDES RADIO (BACK UP), REAR BODY DOME LAMP
3 ALSO INCLUDES ELEC PARK BRK, AIR SUSP DUMP, DIFF LOCK, AIR DRY & MOIST EJECT HEATER ELEC AIR COMP, PTO

Fuses	Usage
1	Ignition Switch
2	Cigarette Lighter
3	Engine Control Module, Ignition 1

Fuses	Usage
4	Transmission Control Module, Ignition, Chime
5	Assembly Line Data Link Connector

Fuses	Usage
6	Warning Lamp, Ignition Relay, Blower Motor, Motor Relay, Auxiliary Relay, Power Window Relay, Interior Relay
7	Room Lamp, Horn, Electric Parking Brake, Radio Back Up, Rear Body Dome Lamp
8	Power Window
9	Exhaust Brake Back Up, Air Suspension Dump, Differential Lock, Air Dryer, Moisture Ejection Heater, Electric Air Compressor, Power Take Off
10	Ignition Power
11	Left Trailer Turn Lamp
12	Auxiliary (Ignition ON)
13	Auxiliary (Battery Direct)
14	Driver's Side Headlamp
15	Passenger's Side Headlamp

Fuses	Usage
16	Headlamp
17	Heated Fuel
18	Meter Transmission Control Module
19	Identification Lamp, Marker Lamp, Tail Lamp, Lighted Mirror, Illumination Lamp
20	Cool Condenser Fan Motor, Cooler Compressor
21	Wiper Motor, Washer Motor
22	Heated Mirror, Two-Speed Axle Relay
23	Empty
24	Fan Motor, Air Conditioner Relay
25	Right Trailer Turn Lamp, Flasher Unit
26	Power Post (Consent)

Maxi-Fuse Block

When a fuse goes out, first check the instrument panel fuse block. If there are no fuses out, the problem could be in the maxi-fuse block.

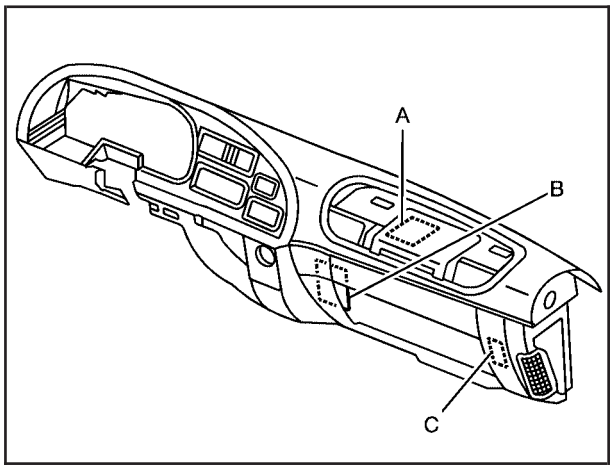
The maxi-fuse block outside of the cab on the driver's side of the vehicle. To access the maxi-fuse block, remove the four screws from the front of the box and remove the cover.

Power is fed through these fuses to devices such as the headlamp switch, ignition switch feed circuits and the auxiliary brake pump (hydraulic brake vehicles).

Do not use maxi-fuses of higher amperage than those indicated on the maxi-fuse block.

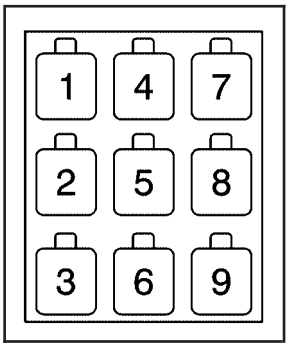
Fuses	Usage
ST/TURN/HAZ	Stoplamp, Turn Signals/Hazard Warning Flashers
IGN SW 3	Air Conditioner, Axle, Chassis
INT/EXT LIGHTS	Parking Lamps, Dome Lamp, Instrument Panel Lights
HEAD LAMP	Headlamps, Daytime Running Lamps
AUX WRG	Auxiliary Wiring, Parking Brake
IGN SW 1	Ignition Switch, Washer/Wiper, Crank, Radio
HYD PUMP	Hydraulic Brake, Brake Pump Motor
ABS	Anti-lock Brake System Module
ELECT TRANS	Ignition Relay
PARK BRAKE	Parking Brake Motor
BLOWER HORN	Blower, Horn, Cigarette Lighter, Auxiliary Outlets
TRAILER ABS	Trailer Anti-lock Brake System, Trailer Stoplamps
PWR WDO/ LOCKS	Power Window, Power Door Locks

Relay Center



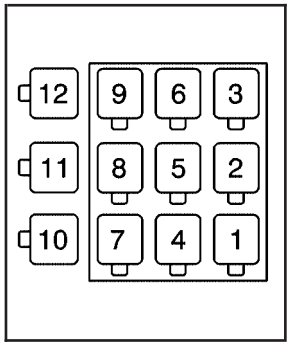
There are four relay blocks in your vehicle:

A. Relay Block A
B. Relay Block B
C. Relay Block C
D. Relay Block D (Not Shown)



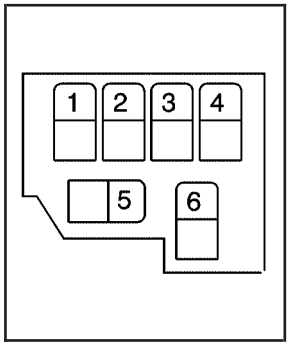
Relay Block A

Relay Block A	Usage
1	Power Window (If Equipped)
2	Power Main (ECU)
3	High Beam
4	Lighting
5	Lighting (Low, High)
6	Trailer Turn Signal (Left Headlamp)
7	Taillamp
8	Marker Lamp (Tractor Only)
9	Trailer Turn Signal (Right Headlamp)



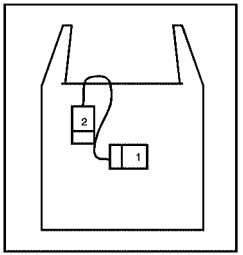
Relay Block B

Relay Block B	Usage
1	Air Conditioning Condenser (If Equipped)
2	Air Conditioning Compressor (If Equipped)
3	Heater Fan
4	Ignition (Accessory)
5	Ignition (1)
6	Ignition (2)
7	Auxiliary
8	Horn
9	Ignition (3)
10	Dome Lamp (If Equipped)
11	Exhaust Brake (If Equipped)
12	Power Take-Off Control (If Equipped)



Relay Block C

Relay Block C	Usage
1	Parking Brake
2	Daytime Running Lamps (DRL) On (Engine Run)
3	Daytime Running Lamps (DRL) Off (Parking)
4	Parking Lamps/Daytime Running Lamps (DRL)
5	Fuel Filter (Heated Fuel)
6	Stop Lamp



Relay Block D

Relay Block D	Usage
1	Neutral (Medium Duty Transmission)
2	Back-up Lamp (Reverse) (Medium Duty Transmission)

Capacities and Specifications

The following approximate capacities are given in English and metric conversions. See *Part C: Recommended Fluids and Lubricants on page 321* for more information.

Capacities and Specifications

Application	Capacities	
	English	Metric
Air Conditioning Refrigerant R134a	For the air conditioning system refrigerant charge amount, see the refrigerant caution label located under the hood. See your dealer for more information.	
Cooling System		
Engine Torque below 660 lb ft (LYA, LYB, LYC)	33.6 qt	31.8 L
Engine Torque above 835 lb ft (LYD, LQF)	35.0 qt	33.1 L
Engine Oil with Filter*	23.8 qt	22.5 L
*Additional oil is required with auxiliary oil filter systems. Make sure to add enough extra oil to fill the auxiliary oil filter system. For vehicles equipped with LUBERFINER 750-C, add 14 quarts (13.2 L).		

Capacities and Specifications (cont'd)

Application	Capacities	
	English	Metric
Fuel Tank		
Standard (Single)	50.0 gal	189.3 L
Optional (Single)[1]	50.0 gal	189.3 L
Optional (Dual)[2]	75.0 gal	283.9 L
Optional (Dual)[3]	100.0 gal	378.5 L
[1]Single 50-gallon (189 L) tanks. Not applicable to 4X2 vehicles with 128 inch or 140 inch wheelbases and not applicable to 6x4 vehicles with a 152 inch wheelbase. [2]One 25-gallon (94.6 L) tank and one 50-gallon (189.2 L) tank. Available only on 4x2 vehicles with 128 inch or 140 inch wheelbases or 6x4 vehicles with a 152 inch wheelbase. [3]Two 50-gallon (189 L) tanks. Not applicable to 4X2 vehicles with 128 inch or 140 inch wheelbases and not applicable to 6x4 vehicles with a 152 inch wheelbase.		
Rear Axle – Single Speed		
15040S	21.0 pt	10.0 L
19060S (HPK); 21060S (HPP)	31.0 pt	14.7 L
23090S (HPT)	42.5 pt	20.1 L
26105S (HPA)	51.0 pt	24.1 L
S110 (HD2)	15.0 pt	7.1 L

Capacities and Specifications (cont'd)

Application	Capacities	
	English	Metric
Rear Axle – Tandem		
DS404 (front) (HPE); RS404 (rear)	32.0 pt	15.1 L
Rear Axle – Two-Speed		
19060T (HPL); 21060T (H15)	38.0 pt	18.0 L
23080T (H25)	44.0 pt	20.8 L
Transmission Fluid, Automatic		
2200 Series; 2350 Series, 2500 Series, 2550 Series	40.0 pt*	19.0 L*
MD 3000; MD 3500 with PTO Provision	59.8 pt	28.1 L
MD 3000; MD 3500 without PTO Provision	52.0 pt	24.6 L
*Add 2 pints (1 L) when changing spin-on or remote filter. See the Allison Automatic Transmission Operator's Manual for fluid check and maintenance information.		
Transmission Fluid, Manual		
FS5406; FS6406	19.5 pt	9.2 L
RT8709B	26.0 pt	12.3 L
RT8908LL	28.0 pt	13.2 L
All capacities are approximate. When adding, be sure to fill to the approximate level, as recommended in this manual. Recheck the fluid level after filling.		

Engine Specifications

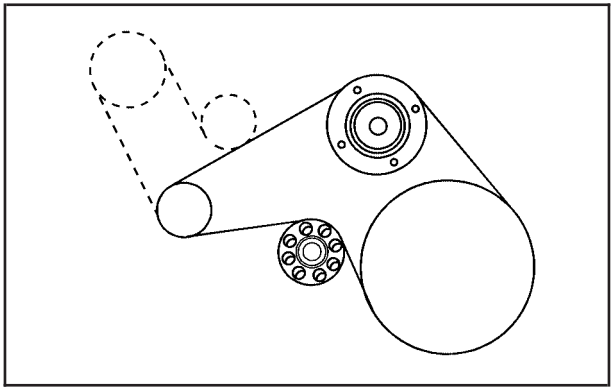
Engine	RPO	Type	Firing Order
Isuzu 6H	LF8	L6	1–5–3–6–2–4

Normal Maintenance Replacement Parts

Part	Part Number
Air Compressor Filter (Haldex Air Compressor)	100696-E[1]
Oil Filter	94392475[2]
Engine Air Cleaner/Filter	P533930[3]
Chassis Mounted Fuel Filter	15725783†
Engine Mounted Fuel Filter	98026037[2]

[1]Haldex
[2]GM part number
[3]Donaldson
†Racor

Engine Drive Belt Routing



Isuzu 6H Diesel Engine

Belt routing for non air conditioning option shown. Dotted line shows routing for vehicles with air conditioning.

✍ NOTES

Section 6 Maintenance Schedule

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Part C: Recommended Fluids and Lubricants 321
Part D: Maintenance Record 323

Maintenance Schedule

Introduction

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



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

Maintenance Requirements

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

Your Vehicle and the Environment

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

How This Section is Organized

This maintenance schedule is divided into four parts:

“Part A: Scheduled Maintenance Services” explains what to have done and how often. Some of these services can be complex, so unless you are technically qualified and have the necessary equipment, you should let your dealer/retailer do these jobs.

Your dealer/retailer has trained and supported service people that will perform the work using genuine parts.

⚠ CAUTION:

Performing maintenance work on a vehicle can be dangerous. In trying to do some jobs, you can be seriously injured. Do your own maintenance work only if you have the required know-how and the

CAUTION: (Continued)

CAUTION: (Continued)

proper tools and equipment for the job. If you have any doubt, have a qualified technician do the work. See *Doing Your Own Service Work on page 193*.

If you want to purchase service information, see *Service Publications Ordering Information on page 338*.

“Part B: Owner Checks and Services” tells you what should be checked and when. It also explains what you can easily do to keep your vehicle in good condition.

“Part C: Recommended Fluids and Lubricants” lists some recommended products necessary to help keep your vehicle properly maintained. These products, or their equivalents, should be used whether you do the work yourself or have it done.

“Part D: Maintenance Record” is a place for you to record and keep track of the maintenance performed on your vehicle. Keep your maintenance receipts. They may be needed to qualify your vehicle for warranty repairs.

Part A: Scheduled Maintenance Services

In this part are scheduled maintenance services which are to be performed at the mileage intervals specified.

Using the Maintenance Schedule

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

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

This part tells you the maintenance services you should have done and when to schedule them.

When you go to your dealer for your service needs, you will know that GM-trained and supported service people will perform the work using genuine GM parts.

The proper fluids and lubricants to use are listed in Part C. Make sure whoever services your vehicle uses these. All parts should be replaced and all necessary repairs done before you or anyone else drives the vehicle.

This schedule is for vehicles that:

- carry passengers and cargo within recommended limits. You will find limits on your vehicle's Certification or Tire Information label. See *Loading Your Vehicle on page 180*.
- are driven on reasonable road surfaces within legal driving limits.
- use the recommended fuel. See *What Fuel to Use on page 195*.

Scheduled Maintenance Supplements

If your vehicle has an Allison Transmission®, your owner manual is supplemented by an Allison Transmission® Operator's Manual. Always refer to these manuals for related maintenance services.

Scheduled Maintenance

The services shown in this schedule up to 100,000 miles (166 000 km) should be repeated after 100,000 miles (166 000 km) at the same intervals for the life of this vehicle. The services shown after 100,000 miles (166 000 km) should be repeated at the same miles (km) after those intervals for the life of this vehicle.

The "Footnotes" at the end of this Maintenance Schedule further explain maintenance services.

See *Service Publications Ordering Information on page 338*.

100 Miles (160 km)

- ❑ Wheel stud nut service. *(30)*

1,000 Miles (1 600 km)

- ❑ Wheel stud nut service. *(30)*
- ❑ Rear axle air shift motor service. *(9)*

7,500 Miles (12 000 km)

- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Spring-to-axle U-bolts and shackle bolts service. *(15)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).

- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*

15,000 Miles (24 000 km)

- ❑ Vehicles Without Engine Oil Life System Only: Change engine oil and filter (or every 12 months, or every 750 hours of engine operation, whichever occurs first). *(2)*
- ❑ Vehicles With Engine Oil Life System Only: Check oil life system (or every 12 months, or every 750 hours of engine operation, whichever occurs first). If engine oil and filter are changed, reset system. See *Engine Oil Life System on page 209*. *(2) (8)*
- ❑ Inspect engine air cleaner filter change indicator. If necessary, replace the filter. If vehicle is driven in dusty/dirty conditions, inspect filter change indicator at every engine oil change. See *Engine Air Cleaner/Filter on page 211* for more information.
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Replace fuel filter (or every 750 hours of engine operation, whichever occurs first).
- ❑ Steering system service. *(11)*
- ❑ Front and rear suspension service. *(12)*
- ❑ Spring-to-axle U-bolts and shackle bolts service. *(14)*
- ❑ Exhaust system service (or every 6 months, whichever occurs first). *(2) (3) (15)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).

- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*
- ❑ Air compressor dry element pleated paper air strainer service (or every 2 months, or every 800 hours, whichever occurs first).
- ❑ Thermostatically controlled engine cooling fan service. *(3) (17)*
- ❑ Shields and underhood insulation service. *(3) (4) (18)*

22,500 Miles (36 000 km)

- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Inspect door hinge pins and bushings and replace as necessary.
- ❑ Cooling system service. Clean the cooling system filter cap with clean water, clean the core, pressure test the cap and the system for proper pressure capability, and inspect the condition of cooling and heater hoses and clamps. Replace hoses if cracked, swollen, or damaged.
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*

- ❑ Air brake system valve service (or every 3 months, or every 900 hours, whichever occurs first). *(31)*
- ❑ Air intake system service (or every 24 months, whichever occurs first). *(3) (4) (20)*
- ❑ Rear axle air shift motor service. *(9)*

24,000 Miles (40 000 km)

- ❑ Lubricate U-joints (or every 6 months, whichever occurs first).

30,000 Miles (48 000 km)

- ❑ Vehicles Without Engine Oil Life System Only: Change engine oil and filter (or every 12 months, or every 750 hours of engine operation, whichever occurs first). *(2)*
- ❑ Vehicles With Engine Oil Life System Only: Check oil life system (or every 12 months, or every 750 hours of engine operation, whichever occurs first). If engine oil and filter are changed, reset system. See *Engine Oil Life System on page 209*. *(2) (8)*
- ❑ Inspect engine air cleaner filter change indicator. If necessary, replace the filter. If vehicle is driven in dusty/dirty conditions, inspect filter change indicator at every engine oil change. See *Engine Air Cleaner/Filter on page 211* for more information.
- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Replace fuel filter (or every 750 hours of engine operation, whichever occurs first).
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Steering system service. *(11)*
- ❑ Front and rear suspension service. *(12)*
- ❑ Spring-to-axle U-bolts and shackle bolts service. *(14)*
- ❑ Exhaust system service (or every 6 months, whichever occurs first). *(2) (3) (15)*
- ❑ Wheel bearing (grease type) service (and whenever hubs are removed). *(19) (30)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*

- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*
- ❑ Air compressor dry element pleated paper air strainer service (or every 2 months, or every 800 hours, whichever occurs first).
- ❑ Thermostatically controlled engine cooling fan service. *(3) (17)*
- ❑ Shields and underhood insulation service. *(3) (4) (18)*

37,500 Miles (60 000 km)

- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*

45,000 Miles (72 000 km)

- ❑ Vehicles Without Engine Oil Life System Only: Change engine oil and filter (or every 12 months, or every 750 hours of engine operation, whichever occurs first). *(2)*
- ❑ Vehicles With Engine Oil Life System Only: Check oil life system (or every 12 months, or every 750 hours of engine operation, whichever occurs first). If engine oil and filter are changed, reset system. See *Engine Oil Life System on page 209*. *(2) (8)*
- ❑ Inspect engine air cleaner filter change indicator. If necessary, replace the filter. If vehicle is driven in dusty/dirty conditions, inspect filter change indicator at every engine oil change. See *Engine Air Cleaner/Filter on page 211* for more information.
- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Replace fuel filter (or every 750 hours of engine operation, whichever occurs first).
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Cooling system service. Clean the cooling system filler cap with clean water, clean the core, pressure test the cap and the system for proper pressure capability, and inspect the condition of cooling and heater hoses and clamps. Replace hoses if cracked, swollen, or damaged.
- ❑ Inspect door hinge pins and bushings and replace as necessary.
- ❑ Steering system service. *(11)*
- ❑ Front and rear suspension service. *(12)*
- ❑ Spring-to-axle U-bolts and shackle bolts service. *(14)*
- ❑ Exhaust system service (or every 6 months, whichever occurs first). *(2) (3) (15)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*

- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*
- ❑ Air brake system valve service (or every 3 months, or every 900 hours, whichever occurs first). *(31)*
- ❑ Air compressor dry element pleated paper air strainer service (or every 2 months, or every 800 hours, whichever occurs first).
- ❑ Thermostatically controlled engine cooling fan service. *(3) (17)*
- ❑ Shields and underhood insulation service. *(3) (4) (18)*
- ❑ Rear axle air shift motor service. *(9)*
- ❑ Air intake system service (or every 24 months, whichever occurs first). *(3) (4) (20)*

48,000 Miles (75 000 km)

- ❑ Lubricate U-joints (or every 6 months, whichever occurs first).

50,000 Miles (80 000 km)

- ❑ Inspect air compressor discharge port (or every 6 months or every 1,800 hours, whichever occurs first.)

52,500 Miles (84 000 km)

- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).

- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*

60,000 Miles (96 000 km)

- ❑ Vehicles Without Engine Oil Life System Only: Change engine oil and filter (or every 12 months, or every 750 hours of engine operation, whichever occurs first). *(2)*
- ❑ Vehicles With Engine Oil Life System Only: Check oil life system (or every 12 months, or every 750 hours of engine operation, whichever occurs first). If engine oil and filter are changed, reset system. See *Engine Oil Life System on page 209*. *(2) (8)*
- ❑ Inspect engine air cleaner filter change indicator. If necessary, replace the filter. If vehicle is driven in dusty/dirty conditions, inspect filter change indicator at every engine oil change. See *Engine Air Cleaner/Filter on page 211* for more information.
- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Replace fuel filter (or every 750 hours of engine operation, whichever occurs first).
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Inspect door hinge pins and bushings and replace as necessary.
- ❑ Steering system service. *(11)*
- ❑ Front and rear suspension service. *(12)*
- ❑ Spring-to-axle U-bolts and shackle bolts service. *(14)*
- ❑ Exhaust system service (or every 6 months, whichever occurs first). *(2) (3) (15)*
- ❑ Wheel bearing (grease type) service (and whenever hubs are removed). *(19) (30)*
- ❑ Wheels and tires service. *(13)*
- ❑ Adjust valve lash (or every 2,625 hours of engine operation, whichever occurs first). *(16)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*

- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*
- ❑ Air compressor dry element pleated paper air strainer service (or every 2 months, or every 800 hours, whichever occurs first).
- ❑ Thermostatically controlled engine cooling fan service. *(3) (17)*
- ❑ Shields and underhood insulation service. *(3) (4) (18)*

67,500 Miles (108 000 km)

- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Cooling system service. Clean the cooling system filler cap with clean water, clean the core, pressure test the cap and the system for proper pressure capability, and inspect the condition of cooling and heater hoses and clamps. Replace hoses if cracked, swollen, or damaged.
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*

- ❑ Air brake system valve service (or every 3 months, or every 900 hours, whichever occurs first). *(31)*
- ❑ Rear axle air shift motor service. *(9)*
- ❑ Air intake system service (or every 24 months, whichever occurs first). *(3) (4) (20)*

72,000 Miles (115 000 km)

- ❑ Lubricate U-joints (or every 6 months, whichever occurs first).

75,000 Miles (120 000 km)

- ❑ Vehicles Without Engine Oil Life System Only: Change engine oil and filter (or every 12 months, or every 750 hours of engine operation, whichever occurs first). *(2)*
- ❑ Vehicles With Engine Oil Life System Only: Check oil life system (or every 12 months, or every 750 hours of engine operation, whichever occurs first). If engine oil and filter are changed, reset system. See *Engine Oil Life System on page 209*. *(2) (8)*
- ❑ Inspect engine air cleaner filter change indicator. If necessary, replace the filter. If vehicle is driven in dusty/dirty conditions, inspect filter change indicator at every engine oil change. See *Engine Air Cleaner/Filter on page 211* for more information.
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Replace fuel filter (or every 750 hours of engine operation, whichever occurs first).
- ❑ Steering system service. *(11)*
- ❑ Front and rear suspension service. *(12)*
- ❑ Spring-to-axle U-bolts and shackle bolts service. *(14)*
- ❑ Exhaust system service (or every 6 months, whichever occurs first). *(2) (3) (15)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*

- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*
- ❑ Air compressor dry element pleated paper air strainer service (or every 2 months, or every 800 hours, whichever occurs first).
- ❑ Fuel tank, fuel cap, and fuel lines service (or every 72 months, whichever occurs first). *(2) (21) †*
- ❑ Thermostatically controlled engine cooling fan service. *(3) (17)*
- ❑ Shields and underhood insulation service. *(3) (4) (18)*

82,500 Miles (132 000 km)

- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*
- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*

90,000 Miles (144 000 km)

- ❑ Vehicles Without Engine Oil Life System Only: Change engine oil and filter (or every 12 months, or every 750 hours of engine operation, whichever occurs first). *(2)*
- ❑ Vehicles With Engine Oil Life System Only: Check oil life system (or every 12 months, or every 750 hours of engine operation, whichever occurs first). If engine oil and filter are changed, reset system. See *Engine Oil Life System on page 209*. *(2) (8)*
- ❑ Inspect engine air cleaner filter change indicator. If necessary, replace the filter. If vehicle is driven in dusty/dirty conditions, inspect filter change indicator at every engine oil change. See *Engine Air Cleaner/Filter on page 211* for more information.
- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Replace fuel filter (or every 750 hours of engine operation, whichever occurs first).
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Cooling system service. Clean the cooling system filler cap with clean water, clean the core, pressure test the cap and the system for proper pressure capability, and inspect the condition of cooling and heater hoses and clamps. Replace hoses if cracked, swollen, or damaged.
- ❑ Steering system service. *(11)*
- ❑ Front and rear suspension service. *(12)*
- ❑ Spring-to-axle U-bolts and shackle bolts service. *(14)*
- ❑ Exhaust system service (or every 6 months, whichever occurs first). *(2) (3) (15)*
- ❑ Inspect door hinge pins and bushings and replace as necessary.
- ❑ Wheel bearing (grease type) service (and whenever hubs are removed). *(19) (30)*
- ❑ Wheels and tires service. *(13)*
- ❑ Hydraulic brake service (or every 6 months, whichever occurs first). *(6) (30)*
- ❑ Parking brake service (or every 6 months, whichever occurs first). *(7)*
- ❑ Air brake service (or every 6 months, whichever occurs first). *(26)*

- ❑ Air brake automatic slack adjuster service (or every 500 hours, whichever occurs first). *(27)*
- ❑ Check air brake relay valve operation and check for leaks (or every month, or every 300 hours, whichever occurs first).
- ❑ Clean air brake application valve (or every 3 months, or every 300 hours, whichever occurs first). Lubricate linkage.
- ❑ Air brake chamber service (or every 2 months, whichever occurs first). *(28)*
- ❑ Air brake system valve service (or every 3 months, or every 900 hours, whichever occurs first). *(31)*
- ❑ Air compressor dry element pleated paper air strainer service (or every 2 months, or every 800 hours, whichever occurs first).
- ❑ Thermostatically controlled engine cooling fan service. *(3) (17)*
- ❑ Shields and underhood insulation service. *(3) (4) (18)*
- ❑ Rear axle air shift motor service. *(9)*
- ❑ Air intake system service (or every 24 months, whichever occurs first). *(3) (4) (20)*

96,000 Miles (152 000 km)

- ❑ Lubricate U-joints (or every 6 months, whichever occurs first).

97,500 Miles (156 000 km)

- ❑ Check fluid levels (or every 3 months, whichever occurs first). *(1) (5)*
- ❑ Chassis lubrication service (or every 6 months, whichever occurs first). *(10)*
- ❑ Wheels and tires service. *(13)*

100,000 Miles (160 000 km)

- ❑ Inspect engine drive belt; replace as necessary.
- ❑ Change power steering fluid (or every 36 months, whichever occurs first). *(11)*
- ❑ Replace power steering reservoir filter element (or every 24 months, whichever occurs first).
- ❑ Wheel bearing (oil type) service (and whenever hubs are removed). *(19) (30)*
- ❑ Front axle service. *(25)*
- ❑ Rear axle service – Eaton®, Rockwell®, Spicer® axles (or every 12 months, whichever occurs first). *(24)*

- ❑ Exhaust brake service, if equipped. Check for excessive spindle free play and smooth operation. Lubricate ball joint cap.
- ❑ Inspect air compressor discharge port (or every 6 months or every 1,800 hours, whichever occurs first).
- ❑ Trailer brake hand control valve service (or every 12 months, or every 3,600 hours, whichever occurs first). *(29)*

150,000 Miles (240 000 km)

- ❑ Cooling system service (or every 60 months since last service, whichever occurs first). *(2) (23)*
- ❑ Inspect engine drive belt; replace as necessary.
- ❑ Diesel Particulate Filter (DPF) service (or every 4,500 hours, whichever occurs first). Then, every 10,000 miles (16 000 km), or every 12 months, or every 3,000 hours, whichever occurs first. *(32)*

200,000 Miles (320 000 km)

- ❑ Rear axle service – Eaton®, Rockwell®, Spicer® axles (or every 12 months, whichever occurs first). *(24)*
- ❑ Remove, disassemble, clean, and inspect the air brake trailer supply valve (or every 2 years, or every 7,200 hours, whichever occurs first).
- ❑ Inspect engine drive belt; replace as necessary.
- ❑ Diesel Particulate Filter (DPF) service (or every 4,500 hours, whichever occurs first). Then, every 10,000 miles (16 000 km), or every 12 months, or every 3,000 hours, whichever occurs first. *(32)*

250,000 Miles (400 000 km)

- ❑ Diesel Particulate Filter (DPF) service (or every 4,500 hours, whichever occurs first). Then, every 10,000 miles (16 000 km), or every 12 months, or every 3,000 hours, whichever occurs first. *(32)*

300,000 Miles (480 000 km)

- ❑ Rear axle service – Eaton®, Rockwell®, Spicer® axles (or every 12 months, whichever occurs first). *(24)*
- ❑ Remove, disassemble, clean, and inspect the air brake air dryer (or every 3 years, or 10,800 hours, whichever occurs first). Replace desiccant.
- ❑ Diesel Particulate Filter (DPF) service (or every 4,500 hours, whichever occurs first). Then, every 10,000 miles (16 000 km), or every 12 months, or every 3,000 hours, whichever occurs first. *(32)*

Footnotes

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

(1) = If your vehicle has an Allison Transmission®, your owner manual is supplemented by an Allison Transmission® Operator's Manual. Always refer to these manuals for related maintenance services.

(2) = An Emission Control Service.

(3) = A Noise Emission Control Device.

(4) = Applies to vehicles sold in the United States and is recommended for vehicles sold in Canada.

(5) = Check fluid level in brake master cylinder, power steering pump, front and rear axles, transmission, and hydraulic spring parking brake pump, if equipped. A low fluid level in the brake master cylinder can indicate worn brake linings and should be checked accordingly.

(6) = Inspect brake lines and hoses for proper hook-up, binding, leaks, cracks, chafing, etc. Inspect disc brake pads for wear and rotors for surface condition. Inspect caliper assemblies. Check brake pedal for excessive free play or travel (or every 6 months, whichever occurs first) and have serviced if needed. Check brakes more often if driving habits and conditions result in frequent braking.

(7) = Inspect parking brake drum and linings for wear or cracks and check linkage and adjustment.

(8) = This vehicle has the Engine Oil Life System. This system will show you when to change the engine oil and filter – usually between 3,000 miles (5 000 km) and 15,000 miles (24 000 km) since your last oil change. Under severe conditions, the indicator may come on before 3,000 miles (5 000 km). Never drive your vehicle more than 15,000 miles (24 000 km) or 12 months without an oil and filter change.

Remember to reset the Engine Oil Life System whenever the oil is changed. For more information, see *Engine Oil Life System on page 209*.

(9) = Inspect rear axle air shift motor for fluid leaks. Remove plug to check fluid level. Inspect air lines and hoses for proper hook-up, binding, leaks, etc. Inspect at 1,000 miles (1 600 km) and 22,500 miles (36 000 km) and then every 22,500 miles (36 000 km) thereafter.

(10) = Chassis Lubrication Service: Lubricate all grease fittings in front suspension, front axle, and steering linkage. Do not lubricate kingpin bushings with air pressure equipment; instead, use a hand grease gun to ensure complete purge and eliminate sealer cap distortion. Front axle tie rod ends, both upper and lower kingpin fittings, and both steering linkage relay rod ends should be greased with the vehicle loaded on the ground and wheels turned straight ahead, not with the vehicle on a hoist. Apply kingpin bushing lubricant to both upper and lower kingpin grease fittings until new lubricant purges from between the upper shim pack and thrust bearing. Lubricate transmission and shift linkage, tilt cab hinges and latches, parking brake lever pivot, clevis pins and linkage, disc brake caliper rails, bearing pads, propshaft universal joints, brake camshaft bracket, slack adjusters, and pedal shaft. Lubricate suspension, axle, and steering linkage more often when operating under dusty or muddy conditions and in excessive off-road use. Frequently power-washed vehicles will require more frequent lubrication.

(11) = Check steering system:

- Look for damaged, loose, or missing parts. Inspect the steering linkage relay rod and tie rod ends for looseness or lack of lubricant. Also look for parts showing signs of wear or lack of lubrication. Replace parts as needed. Also check steering gear mounting bolts, pitman arm nut, gear housing upper cover and side cover attaching bolts, steering column mounting bolts, and cardan joint clamp bolts; tighten if necessary. See the service manual.
- Inspect power steering hoses, tubes, and fittings for leaks. Hoses and lines must not be twisted, kinked, or tightly bent. Make sure clips, clamps, supporting tubes, and hoses are in place and properly secured.
- Check steering gear for leakage around pitman shaft and housing. If leakage is evident (lubricant oozing out, not just oily film), leak should be corrected immediately.

(12) = Check front and rear suspension. Look for damaged, loose or missing parts or parts showing signs of wear or lack of lubrication. Replace parts as needed.

(13) = Adjust tire pressures as indicated on the Certification or Tire Information label for optimum tire life. See *Tires on page 254* for further details. Check tires for excessive or abnormal wear or damage. Also check for damaged wheels. Replace wheels and/or tires as needed.

(14) = Check spring-to-axle U-bolts and shackle bolts for proper torque. See the service manual for torque sequence and specifications. When parts are replaced, the torque must be checked and adjusted more often during the first 6,000 miles (10 000 km). Check torque at 500 miles (800 km) and 2,000 miles (3 000 km) after first use of parts.

(15) = Check complete exhaust system, including DPF pressure lines, and cab areas near the exhaust system for broken, damaged, missing, or out-of-position parts. Also inspect for open seams, holes, loose connections, or other conditions which could let exhaust fumes seep into the driver compartment. Needed repairs should be made at once. To help maintain system integrity, replace exhaust pipes whenever a new muffler is put on.

(16) = Adjust valve lash. Incorrect valve clearance will result in increased engine noise and reduced engine output.

(17) = With the engine off and below normal operating temperature, check to see that the thermostatically controlled engine cooling fan can be rotated by hand on viscous-operated drives. Replace as needed.

(18) = Check shields and underhood insulation for damage or looseness. Adjust or replace as needed.

(19) = Wheel bearing service:

- Grease type – Clean, inspect, and lubricate with the proper wheel bearing grease at designated intervals or when hubs are removed. See *Part C: Recommended Fluids and Lubricants on page 321*.
- Oil-filled type – Some wheel bearings are lubricated by axle lubricant. When you have oil-filled hubs, use lubricant identical to that used in the axle. Lubricant change intervals are the same for front and rear axles. However, you must maintain the proper oil level between change intervals. See *Front Wheel Bearings with Oil-Filled Hubs on page 253* and *Part C: Recommended Fluids and Lubricants on page 321*.

(20) = Check the air intake system installation to see that gaskets are seated properly and all hose connections, fasteners, and other components are tight. Tighten connections and fasteners or replace parts as required.

(21) = Check the fuel tank, fuel cap, and fuel lines for damage which could cause leakage. Inspect fuel cap for correct sealing ability and any indications of damage. Check fuel cap gasket for even filler neck imprint. Replace parts as needed.

(22) = Inspect Electronic Vacuum Regulator Valve (EVRV) filter for excessive contamination or plugging. If needed, clean filter with solution of soap and water, let dry and install.

(23) = Drain, flush, and refill cooling system. This service can be complex; you should have your dealer/retailer perform this service. See *Part C: Recommended Fluids and Lubricants on page 321* for what to use. Inspect hoses. Clean radiator, condenser, pressure cap, and neck. Pressure test cooling system and pressure cap.

(24) = Rear axle service: Change the lubricant. See *Part C: Recommended Fluids and Lubricants on page 321*.

(25) = Front axle service: Re-pack upper kingpin roller bearing.

(26) = Air brake service:

- Inspect brake lines and hoses for proper hook-up, binding, leaks, cracks, chafing, etc. Inspect drum brake linings for wear or cracks. Inspect other brake parts at each wheel, including drums, wheel cylinders and piston heat shields, boots and wheel speed sensor wiring. Check brake pedal for excessive free play or travel (or every 6 months, whichever occurs first) and have serviced if needed. Check brakes more often if driving habits and conditions result in frequent braking. Replace air dryer cartridge only if excessive oil or moisture is present. A small amount of oil in the system is normal and should not be considered as a reason to replace the cartridge.
- Test air lines for leaks; tighten as needed. Replace compressor filter.
- Inspect air parking brake chamber for leaks and damage. Inspect lines and hoses for leaks, cracks, chafing, etc. Also check all attachments for tightness, wear, or damage. Note: The spring brake section of the rear brake diaphragms are non-serviceable.
- Replace the air compressor filter element, mounted on the air compressor. For remote air compressor intake service, refer to engine air cleaner filter replacement.
- Remove, disassemble, clean, and inspect the safety valve, service brake chambers, quick release valve, quick release/double check valve combination, parking brake control valve, double check valve, pressure protection valve, and ether injector.
- Remove, disassemble, and clean the application valve; replace parts showing wear.
- Remove, disassemble, clean, and inspect the spring brake control valve; replace rubber parts.

(27) = Clean and lubricate air brake automatic slack adjuster. Check pushrod travel and auto adjustment operation. Have serviced if needed.

(28) = Air brake chamber service: Check operation, mounting clamps, and air lines and check for leaks.

(29) = Trailer brake hand control valve service: Check operation; lubricate cam and follower.

(30) = Tighten the wheel stud nuts to the specified torque values at 100 miles (160 km). Thereafter, tighten them 1,000 miles (1 600 km) after each time the wheel is removed. See *Tightening the Wheel Nuts on page 259*.

(31) = Inspect and clean any accumulated dirt, gravel, or other foreign objects from the valves and valve boots as needed. Using light oil, lubricate brake pedal to brake application valve linkage components. Check any rubber boots for cracks, holes, or deterioration and replace if necessary.

(32) = Check for filter ash, sensor adjustment, and sensor hose restriction. Clean as needed. This service can be complex; you should have your dealer/retailer perform this service.

Part B: Owner Checks and Services

Listed in this part are owner checks and services which should be performed at the intervals specified to help ensure the safety, dependability and emission control performance of your vehicle.

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 any needed repairs made before operating the vehicle.

At the minimum, these routine checks should be made every 6 months or 6,000 miles (10 000 km), whichever occurs first. Whenever repairs are needed, have them completed before operating the vehicle.

At Each Fuel Fill

It is important for you or a service station attendant to perform these underhood checks at each fuel fill.

Engine Oil Level Check

Check the engine oil level and add the proper oil if necessary. See *Engine Oil on page 206*.

Engine Coolant Level Check

Check the engine coolant level and add DEX-COOL® coolant mixture if necessary. See *Engine Coolant on page 216*.

Windshield Washer Fluid Level Check

Check the windshield washer fluid level in the windshield washer fluid reservoir and add the proper fluid if necessary. See *Windshield Washer Fluid on page 226*.

Tire Inflation Check

Check tire inflation cold. Make sure the tires are inflated to the correct pressures. See *Loading Your Vehicle on page 180* and *Inflation - Tire Pressure on page 255*.

At Least Twice a Year

Restraint System Check

Make sure any safety belt reminder light and safety belt assemblies are working properly. Look for any other loose or damaged safety belt system parts. If you see anything that might keep a safety belt system from doing its job, have it repaired. Have any torn or frayed safety belts replaced.

Wiper Blade Check

Inspect wiper blades for wear, cracking, or contamination. Clean the windshield and wiper blades, if contaminated. Replace wiper blades that are worn or damaged. See *Windshield Wiper Blade Replacement on page 250* and *Windshield and Wiper Blades on page 272* for more information.

Weatherstrip Lubrication

Silicone grease on weatherstrips will make them last longer, seal better, and not stick or squeak. Apply silicone grease with a clean cloth. During very cold, damp weather more frequent application may be required. Part C tells you what to use.

Body Lubrication Service

Lubricate all exposed surfaces such as door checks, door lock bolts, lock strike plates, door hinge bushings, latches, and dovetail bumper wedges. Where oil holes are provided, a dripless oil can be used. The seat adjusters, seat track, door weatherstrips, and rubber cap bumpers should also be lubricated. Part C tells you what to use. More frequent lubrication may be required when exposed to a corrosive environment.

Parking Brake Check

Park on a fairly steep hill and hold the vehicle with the parking brake only. This checks holding ability.

Starter Switch Check

⚠ CAUTION:

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

1. Before you start, be sure you have enough room around the vehicle.
2. Firmly apply both the parking brake and the regular brakes.

   Do not use the accelerator pedal, and be ready to turn off the engine immediately if it starts.
3. On automatic transmission vehicles, try to start the engine in each gear. The starter should work only in PARK (P) or NEUTRAL (N). If the starter works in any other position, your vehicle needs service. On manual transmission vehicles, the starter should work only when the clutch pedal is all the way down.

Transmission Shift Indicator Check

Check that the indicator points to the gear chosen.

Steering Check

Be alert for any changes in steering action, abnormal front tire wear, or steering wheel position. An inspection or service is needed when the steering wheel is harder to turn or has too much free play, or if there are strange sounds when turning or parking.

Brake System Check

Be alert to the low air warning light or tone alarm, or changes in braking action, such as repeated pulling to one side, unusual sounds when braking, or increased brake pedal travel. Make sure air brake system reservoirs are drained daily with full system air pressure, and check system for leaks. Any of these conditions could indicate the need for brake system inspection and/or service.

Engine Cooling System Service

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

Exhaust System Inspection

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. See *Engine Exhaust on page 86* and *Running the Engine While Parked on page 92*.

Check to be sure that mud or dirt is not caked on the exhaust system, especially in the area of the diesel particulate filter and tailpipe. Clean the area as needed. See *Diesel Particulate Filter on page 87*.

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

Windshield Wipers and Washers Check

Check operation and condition of the wiper blades. Check the flow of the washer spray.

Defroster Check

Move the control to the defrost symbol and the fan to HI or the high symbol. Then check the airflow from the ducts at the inside base of the windshield.

Mirrors and Sun Visors Check

Check that friction joints hold mirrors and sun visors in place.

Seat Adjuster Check

When adjusting a manual seat, be sure seat adjusters latch by attempting to move the seat after latching.

Lamps Check

Check panel lighting, warning lights, indicator lights, and interior lamps. On the outside, check: license plate lamps, sidemarker lamps, reflectors or lights on outside mirrors, headlamps, parking lamps, identification and clearance lamps, taillamps, brake lamps, turn signals, backup lamps, and hazard warning flashers. Have headlamp aim checked at once if beams seem improperly aimed.

Glass, Mirrors, Lamps, and/or Reflectors Condition Check

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.

Door Latches Check

Check that doors close, latch, and lock tightly. Check for broken, damaged, or missing parts that might prevent tight latching.

Cab Latches Check

Check that the cab closes firmly. Check for broken, damaged, loose, or missing parts that might prevent tight latching.

Fluid Leaks Check

Check for fuel, coolant, oil, or other fluid leaks by looking at the surface beneath the vehicle after it has been parked for awhile.

Underbody Inspection

Corrosive materials used for ice, 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.

Engine Cover Check

Check that the cab's engine cover and seal, if the vehicle has one, are not torn or damaged. Be sure that the cover is clamped down firmly to the floor.

At Least Once a Year

Key Lock Cylinders Service

Lubricate the key lock cylinders with the lubricant specified in Part C.

Underbody Flushing Service

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

Tractor Protection (Breakaway) Valve Check

On air brake models, remove, disassemble, clean, and inspect the tractor protection (breakaway) valve.

Part C: Recommended Fluids and Lubricants

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

Usage	Fluid/Lubricant
Engine Oil	Engine oils with the letters CJ-4 are required for your vehicle. The CJ-4 designation can appear either alone or in combination with other American Petroleum Institute (API) designations, such as API CJ-4/SL. These letters show API levels of quality. To determine the preferred viscosity for your vehicle's diesel engine, see *Engine Oil on page 206*.
Engine Coolant	50/50 mixture of clean, drinkable water and use only DEX-COOL® Coolant. See *Engine Coolant on page 216*.
Hydraulic Brake System	Delco® Supreme 11 Brake Fluid or equivalent DOT-3 brake fluid.
Windshield Washer Solvent	GM Optikleen® Washer Solvent.

Usage	Fluid/Lubricant
Exhaust Brake Ball Joint Cap Lubricant	High-Temperature Grease (GM Part No. U.S. 1051344, in Canada 903037) or NLGI #3 consistency.
Power Steering System	DEXRON®-VI Automatic Transmission Fluid.
Automatic Transmission	See the Allison Transmission® Operator's Manual for correct transmission fluid.
Manual Transmission	Synthetic Manual Transmission Fluid (GM Part No. U.S. 88861952, in Canada 88861953).
Hydraulic Clutch System	Hydraulic Clutch Fluid (GM Part No. U.S. 12345347, in Canada 10953571) or equivalent DOT-3 brake fluid.
Key Lock Cylinders	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Chassis Lubrication	Chassis Lubricant (GM Part No. U.S. 12377985, in Canada 88901242) or lubricant meeting requirements of NLGI #2, Category LB or GC-LB.

Usage	Fluid/Lubricant
Front Wheel Bearings (Except Oil Filled Hubs)	Wheel bearing lubricant meeting requirements of NLGI #2, Category GC or GC-LB (GM Part No. U.S. 1051344, in Canada 993037).
Front Wheel Bearings with Oil Filled Hubs	SAE 75W-90 Synthetic Axle Lubricant for Medium Duty Trucks (GM Part No. U.S. 89021675, in Canada 10953512).
Rear Axle and Rear Hubs	SAE 75W-90 Synthetic Axle Lubricant for Medium Duty Trucks (GM Part No. U.S. 89021675, in Canada 10953512).
Rear Axle Shift Motor Lubricant	Refrigerant Oil (GM Part No. U.S. 5416939, in Canada 10953496).

Usage	Fluid/Lubricant
Propshafts and Splines	Wheel bearing lubricant meeting requirements of NLGI #2, Category GC or GC-LB (GM Part No. U.S. 1051344, in Canada 993037).
Cab — Door Hinges and Latches	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Weatherstrip Conditioning	Weatherstrip Lubricant (GM Part No. U.S. 3634770, in Canada 10953518) or Dielectric Silicone Grease (GM Part No. U.S. 12345579, in Canada 992887).
Weatherstrip Squeaks	Synthetic Grease with Teflon, Superlube (GM Part No. U.S. 12371287, in Canada 10953437).

Part D: Maintenance Record

After the scheduled services are performed, record the date, odometer reading and who performed the service, and any additional information from “Owner Checks and Services” on the following record pages. Also, you should retain all maintenance receipts.

Date	Miles/km Or Hours	Serviced By	Maintenance Record

Date	Miles/km Or Hours	Serviced By	Maintenance Record

Date	Miles/km Or Hours	Serviced By	Maintenance Record

Date	Miles/km Or Hours	Serviced By	Maintenance Record

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Customer Assistance and Information

Customer Satisfaction Procedure

Your satisfaction and goodwill are important to your dealer and to GMC. Normally, any concerns with the sales transaction or the operation of your vehicle 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 the dealership or the general manager.

STEP TWO: If after contacting a member of dealership management, it appears your concern cannot be resolved by the dealership without further help, contact the GM Medium Duty Truck Customer Assistance Center at 1-800-862-4389. In Canada, contact GM of Canada Customer Communication Centre in Oshawa by calling 1-800-263-3777 (English) or 1-800-263-7854 (French).

We encourage you to call the toll-free number in order to give your inquiry prompt attention. Please have the following information available to give the Customer Assistance Representative:

- Vehicle Identification Number (VIN). This is available from the vehicle registration or title, or the plate at the top left of the instrument panel and visible through the windshield.
- Dealership name and location.
- Vehicle delivery date and present mileage (kilometers).

When contacting GMC please remember that your concern will likely be resolved at a dealer's facility. That is why we suggest you follow Step One first if you have a concern.

STEP THREE: Both General Motors and your dealer are committed to making sure you are completely satisfied with your new vehicle. However, if you continue to remain unsatisfied after following the procedure outlined in Steps One and Two, you should file with the BBB Auto Line Program to enforce any additional rights you may have. Canadian owners refer to your Warranty and Owner Assistance Information booklet for information on the Canadian Motor Vehicle Arbitration Plan (CAMVAP).

The BBB Auto Line Program is an out of court program administered by the Council of Better Business Bureaus to settle automotive disputes regarding vehicle repairs or the interpretation of the New Vehicle Limited Warranty. Although you may be required to resort to this informal dispute resolution program prior to filing a court action, use of the program is free of charge and your case will generally be heard within 40 days. If you do not agree with the decision given in your case, you may reject it and proceed with any other venue for relief available to you.

You may contact the BBB Auto Line Program using the toll-free telephone number or write them at the following address:

BBB Auto Line Program
Council of Better Business Bureaus, Inc.
4200 Wilson Boulevard
Suite 800
Arlington, VA 22203-1838

Telephone: 1-800-955-5100

This program is available in all 50 states and the District of Columbia. Eligibility is limited by vehicle age, mileage, and other factors. General Motors reserves the right to change eligibility limitations and/or discontinue its participation in this program.

Customer Assistance for Text Telephone (TTY) Users

To assist customers who are deaf, hard of hearing, or speech-impaired and who use the Text Telephones (TTYs), GMC has TTY equipment available at its Customer Assistance Center. Any TTY user can communicate with GMC by dialing: 1-800-GMC-8583 (462-8583). (TTY users in Canada can dial 1-800-263-3830.)

Customer Assistance Offices

GMC encourages customers to call the toll-free number for assistance. However, if a customer wishes to write or e-mail, refer to the addresses below.

United States – Customer Assistance

GM Medium Duty Truck Customer
Assistance Center
Customer Assistance Center
P.O. Box 44947
Detroit, MI 48244

www.GMC.com

1-800-862-4389
1-800-462-8583 (For Text Telephone devices (TTYs))
Fax Number: 313-381-0022

From Puerto Rico
1-800-496-9992 (English)
1-800-496-9993 (Spanish)
Fax Number: 313-381-0022

U.S. Virgin Islands:
1-800-496-9994
Fax Number: 313-381-0022

Canada – Customer Assistance

General Motors of Canada Limited
Customer Communication Centre, CA1-163-005
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7

1-800-263-3777 (English)
1-800-263-7854 (French)
1-800-263-3830 (For Text Telephone devices (TTYs)
Roadside Assistance: 1-800-268-6800

Overseas – Customer Assistance

Please contact the local General Motors Business Unit.

Mexico, Central America and Caribbean Islands/Countries (Except Puerto Rico and U.S. Virgin Islands) – Customer Assistance

General Motors de Mexico, S. de R.L. de C.V.
Customer Assistance Center
Paseo de la Reforma # 2740
Col. Lomas de Bezares
C.P. 11910, Mexico, D.F.
01-800-508-0000
Long Distance: 011-52-53 29 0 800

GM Mobility Reimbursement Program



This program, available to qualified applicants, can reimburse you up to $1,000 of the cost of eligible aftermarket adaptive equipment required for your vehicle, such as hand controls or a wheelchair/scooter lift.

The offer is available for a very limited period of time from the date of vehicle purchase/lease. For more details, or to determine your vehicle's eligibility, visit gmmobility.com or call the GM Mobility Assistance Center at 1-800-323-9935. Text telephone (TTY) users, call 1-800-833-9935.

GM of Canada also has a Mobility Program. Call 1-800-GM-DRIVE (463-7483) for details. TTY users call 1-800-263-3830.

Roadside Assistance Program

The Roadside Assistance program for GM Medium Duty trucks provide stranded owners/operators with towing service for disabled vehicles.

Roadside Assistance is available 24 hours a day, 7 days a week, 365 days a year.

This service combines the efforts of trained telephone representatives with a network of GM Medium Duty truck dealer services.

Call GM Medium Duty Truck Roadside Assistance at **1-800-862-4389**, in the U.S., and **1-800-268-6800**, in Canada, to reach a qualified representative who can assist you in a repair or arrange a tow.

Other services can be arranged for situations such as retrieving locked in keys, changing a tire, or delivering gasoline, at a charge to the owner/operator. We also provide dealer information at no charge, such as location of the nearest authorized medium duty GM Medium Duty Truck dealer and their hours of operation.

Collision Damage Repair

If your 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 your vehicle's 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 your vehicle was originally built. Genuine GM Collision parts are your best choice to assure that your vehicle's designed appearance, durability, and safety are preserved. The use of Genuine GM parts can help maintain your GM New Vehicle Warranty.

Recycled original equipment parts may also be used for repair. These parts are typically removed from vehicles that were total losses in prior accidents. 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 your vehicle's originally designed appearance and safety performance, however, the history of these parts is not known. Such parts are not covered by your 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 your 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 your GM New Vehicle Limited Warranty, and any vehicle failure related to such parts are 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/retailer 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 Your Vehicle

Protect your investment in your 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 your GM vehicle by limiting compensation for damage repairs by using aftermarket collision parts. Some insurance companies will not specify aftermarket collision parts. When purchasing insurance, we recommend that you assure your 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 your vehicle is leased, the leasing company may require you to have insurance that assures repairs with Genuine GM Original Equipment Manufacturer (OEM) parts or Genuine Manufacturer replacement parts. Read your lease carefully, as you may be charged at the end of your lease for poor quality repairs.

If an Accident Occurs

Here is what to do if you are involved in an accident.

- Try to relax and then check to make sure you are all right. If you are uninjured, make sure that no one else in your vehicle, or the other vehicle, is injured.
- If there has been an injury, call 911 for help. Do not leave the scene of an accident until all matters have been taken care of. Move your vehicle only if its position puts you in danger or you are instructed to move it by a police officer.
- Give only the necessary and requested information to police and other parties involved in the accident. Do not discuss your personal condition, mental frame of mind, or anything unrelated to the accident. This will help guard against post-accident legal action.
- If you need roadside assistance, call GM Roadside Assistance. See *Roadside Assistance Program on page 332* for more information.
- If your vehicle cannot be driven, know where the towing service will be taking it. Get a card from the tow truck operator or write down the driver's name, the service's name, and the phone number.
- Remove any valuables from your vehicle before it is towed away. Make sure this includes your insurance information and registration if you keep these items in your vehicle.
- Gather the important information you will need from the other driver. Things like name, address, phone number, driver's license number, vehicle license plate, vehicle make, model and model year, Vehicle Identification Number (VIN), insurance company and policy number, and a general description of the damage to the other vehicle.

- If possible, call your insurance company from the scene of the accident. They will walk you through the information they will need. If they ask for a police report, phone or go to the police department headquarters the next day and you can get a copy of the report for a nominal fee. In some states/provinces with “no fault” insurance laws, a report may not be necessary. This is especially true if there are no injuries and both vehicles are driveable.
- Choose a reputable collision repair facility for your vehicle. Whether you select a dealer/retailer or a private collision repair facility to fix the damage, make sure you are comfortable with them. Remember, you will have to feel comfortable with their work for a long time.
- Once you have an estimate, read it carefully and make sure you understand what work will be performed on your vehicle. If you have a question, ask for an explanation. Reputable shops welcome this opportunity.

Managing the Vehicle Damage Repair Process

In the event that your 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 your 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 your 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 your repair professional, and insist on Genuine GM parts. Remember if your 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 cost stays within reasonable limits.

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, inform the National Highway Traffic Safety Administration (NHTSA) immediately, in addition to notifying General Motors.

If NHTSA receives similar complaints, it may open an investigation. 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/retailer, or General Motors.

To contact NHTSA, 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
400 Seventh Street, SW.
Washington, D.C. 20590

You can obtain information about motor vehicle safety from http://www.safercar.gov.

Reporting Safety Defects to the Canadian Government

If you live in Canada, and you believe that your vehicle has a safety defect, notify Transport Canada immediately, in addition to notifying General Motors of Canada Limited. Call them at 1-800-333-0510 or write to:

Transport Canada
Road Safety Branch
2780 Sheffield Road
Ottawa, Ontario K1B 3V9

Reporting Safety Defects to General Motors

In addition to notifying NHTSA (or Transport Canada) in a situation like this, we certainly hope you'll notify us. Please call us at 1-800-862-4389, or write:

GM Medium Duty Truck
Customer Assistance Center
P.O. Box 44947
Detroit, MI 48244

In Canada, please call us at 1-800-263-3777 (English) or 1-800-263-7854 (French). Or, write:

General Motors of Canada Limited
Customer Communication Centre, CA1-163-005
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7

Service Publications Ordering Information

Service Manuals

Service Manuals have the diagnosis and repair information on engines, transmission, axle suspension, brakes, electrical, steering, body, etc.

Service Bulletins

Service Bulletins' give additional technical service information needed to knowledgeably service GM cars and trucks. Each bulletin contains instructions to assist in the diagnosis and service of your vehicle.

Owner Information

Owner publications are written specifically for owners and intended to provide basic operational information about the vehicle. The owner's manual will include the Maintenance Schedule for all models.

In-Portfolio: Includes a Portfolio, Owner Manual, and Warranty Booklet.

RETAIL SELL PRICE: $35.00

Without Portfolio: Owner Manual only.

RETAIL SELL PRICE: $25.00

Current and Past Model Order Forms

Technical Service Bulletins and Manuals are available for current and past model GM vehicles. To request an order form, please specify year and model name of the vehicle.

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), visit Helm, Inc. at:
www.helminc.com

Or you can write to:

Helm, Incorporated
P.O. Box 07130
Detroit, MI 48207

Prices are subject to change without notice and without incurring obligation. Allow ample time for delivery.

Note to Canadian Customers: All listed prices are quoted in U.S. funds. Canadian residents are to make checks payable in U.S. funds.

Vehicle Data Recording and Privacy

Your GM vehicle has a number of sophisticated computers that record information about the vehicle's performance and how it is driven. For example, your vehicle uses computer modules to monitor and control engine and transmission performance, to monitor the conditions for airbag deployment and deploy airbags in a crash and, if so equipped, to provide anti-lock braking to help the driver control the vehicle. These modules may store data to help your dealer/retailer technician service your vehicle. Some modules may also store data about how you operate the vehicle, such as rate of fuel consumption or average speed. These modules may also retain the owner's personal preferences, such as radio pre-sets, seat positions, and temperature settings.

Event Data Recorders

This vehicle has an Event Data Recorder (EDR). The main purpose of an EDR is to record, in certain crash or near crash-like situations, such as an air bag deployment or hitting a road obstacle, data that will assist in understanding how a vehicle's systems performed. The EDR is designed to record data related to vehicle dynamics and safety systems for a short period of time, typically 30 seconds or less. The EDR in this vehicle is designed to record such data as:

- How various systems in your vehicle were operating
- Whether or not the driver and passenger safety belts were buckled/fastened
- How far, if at all, the driver was pressing the accelerator and/or brake pedal
- How fast the vehicle was traveling

This data can help provide a better understanding of the circumstances in which crashes and injuries occur.

Important: EDR data is recorded by your vehicle only if a non-trivial crash situation occurs; no data is recorded by the EDR under normal driving conditions and no personal data (e.g., name, gender, age, and crash location) is recorded. However, other parties, such as law enforcement, could combine the EDR data with the type of personally identifying data routinely acquired during a crash investigation.

To read data recorded by an EDR, special equipment is required, and access to the vehicle or the EDR is needed. In addition to the vehicle manufacturer, other parties, such as law enforcement, that have the special equipment, can read the information if they have access to the vehicle or the EDR.

GM will not access this data or share it with others except: with the consent of the vehicle owner or, if the vehicle is leased, with the consent of the lessee; in response to an official request of police or similar government office; as part of GM's defense of litigation through the discovery process; or, as required by law. Data that GM collects or receives may also be used for GM research needs or may be made available to others for research purposes, where a need is shown and the data is not tied to a specific vehicle or vehicle owner.

OnStar

If your vehicle has OnStar® and you subscribe to the OnStar® services, please refer to the OnStar® Terms and Conditions for information on data collection and use.

Navigation System

If your vehicle has a **navigation system,** use of the system may result in the storage of **destinations, addresses, telephone numbers, and other trip information.** Please refer to the navigation system operating manual for information on stored data and for deletion instructions.

Radio Frequency Identification (RFID)

RFID technology is used in some vehicles for functions such as tire pressure monitoring and ignition system security, as well as in connection with conveniences such as key fobs for remote door locking/unlocking and starting, and in-vehicle transmitters for garage door openers. RFID technology in GM vehicles does not use or record personal information or link with any other GM system containing personal information.

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